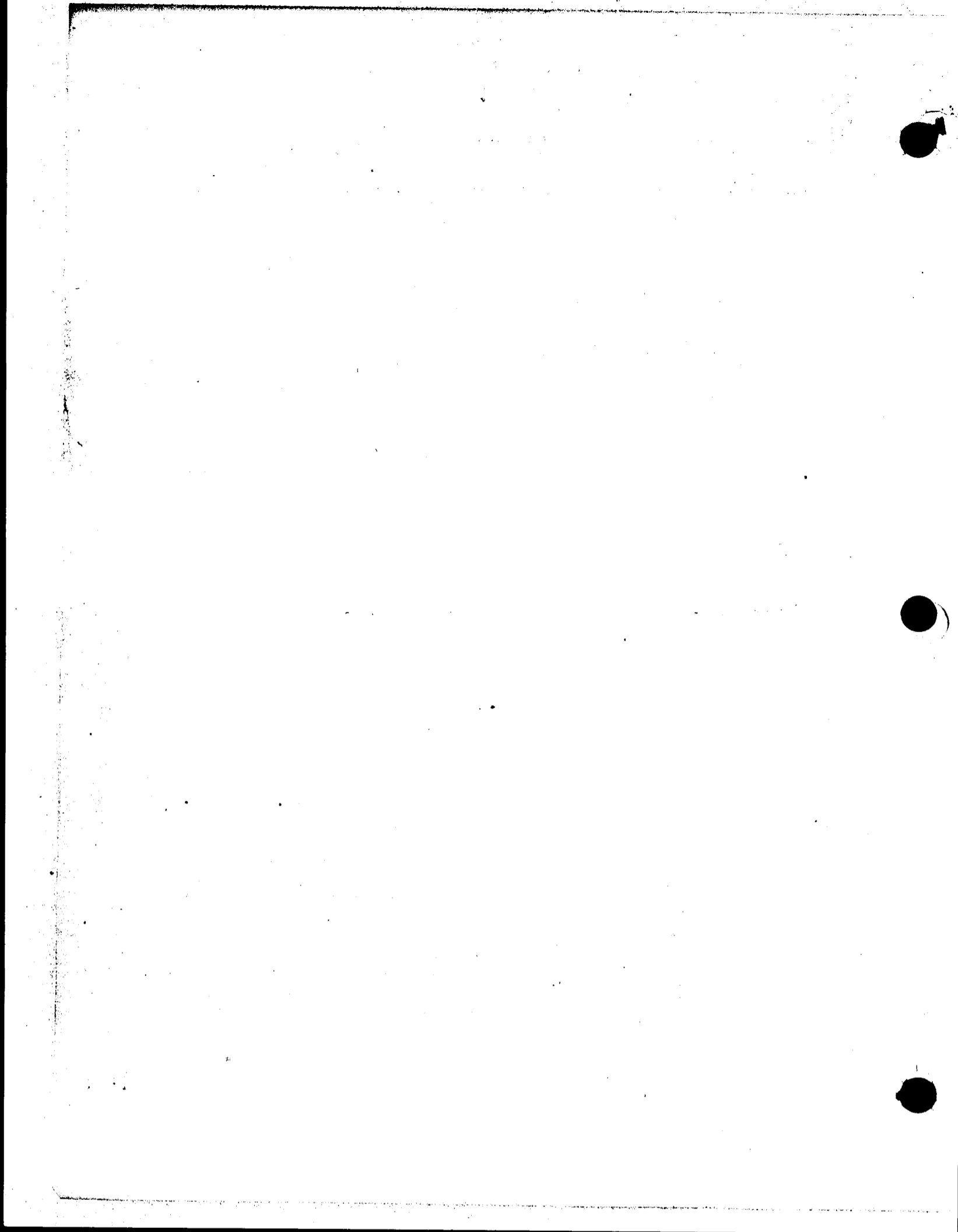


NORM BRODEUR







L ASSEMBLY AND OPERATION INFORMATION

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R000001
R000002 *****
R000004 *
R000006 *           THIS AGC PROGRAM SHALL ALSO BE REFERRED TO AS'
R000008 *
R00001 *           COLOSSUS 1A
R000012 *
R000014 *           PREPARED BY'
R000016 *           MASSACHUSETTS INSTITUTE OF TECHNOLOGY
R000018 *           75 CAMBRIDGE PARKWAY
R00002 *           CAMBRIDGE, MASSACHUSETTS
R000022 *           UNDER NASA CONTRACT NAS 9-4065.
R000024 *
R000026 *****
R0001 ASSEMBLY AND OPERATIONS INFORMATION
R0002 TAGS FOR RELATIVE SETLOC AND BLANK BANK CARDS
R0003 SUBROUTINE CALLS
R0004 KILERASE
R0005 ERASABLE ASSIGNMENTS
R0006 KOCLADE
R0007 INTERRUPT LEAD INS
R0008 TARUPT PROGRAM
R0009 DOWNLINK LISTS
R0010 FRESH START AND RESTART
R0011 RESTART TABLES
R0012 SKYMARK
R0013 EXTENDED VERBS
R0014 PINBALL NOUN TABLES
R0015 CSM GEOMETRY
R0016 IMJ COMPENSATION PACKAGE
R0017 PINBALL GAME BUTTONS AND LIGHTS
R0018 R60,R62
R0019 ANGLFIND
R0020 GIMBAL LOCK AVOIDANCE
R0021 KALOMANU STEERING
R0022 SYSTEM TEST STANDARD LEAD INS
R0023 IMJ CALIBRATION AND ALIGNMENT
R0024 SMOOCH
R0025 GROUND TRACKING DETERMINATION PROGRAM - P21
R0026 P34-P35, P74-P75
R0027 R31
R0028 P76
R00285 R30
R0029 STABLE ORBIT - P36-P39

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R0030 PANDORA
 R0031 P11
 R0032 TPI SEARCH
 R0033 P20-P25
 R0034 P30,P37
 R0035 P40-P47
 R0036 P51-P53
 R0037 LUNAR AND SOLAR EPHEMERIDES SUBROUTINES
 R0038 P61-P67
 R0039 SERVICER207
 R0040 ENTRY LEXICON
 R0041 REENTRY CONTROL
 R0042 CM BODY ATTITUDE
 R0043 P37,P70
 R0044 S-BAND ANTENNA FOR CM
 R0045 LUNAR LANDMARK SELECTION FOR CM
 R0046 DAPCSM
 R0047 TVCINITIALIZE
 R0048 TVCEXECUTIVE
 R0049 TVCMASSPROP
 R0050 TVCRESTARTS
 R0051 TVCDAPS
 R0052 TVCSTROKTEST
 R0053 TVCROLLDAP
 R0054 TVCEN3FILTERS
 R0055 MYSUBS
 R0056 RCS-CM DIGITAL AUTOPILOT
 R0057 AUTOMATIC MANEUVERS
 R0058 RCS-CM DAP EXECUTIVE PROGRAMS
 R0059 JET SELECTION LOGIC
 R0060 CM ENTRY DIGITAL AUTOPILOT
 R0061 SATRAP
 R0062 DOWN-TELEMETRY PROGRAM
 R0063 INTER-BANK COMMUNICATION
 R0064 INTERPRETER
 R0065 FIXED-FIXED CONSTANT POOL
 R0066 INTERPRETIVE CONSTANTS
 R0067 SINGLE PRECISION SUBROUTINES
 R0068 EXECUTIVE
 R0069 WAITLIST
 R0070 LATITUDE LONGITUDE SUBROUTINES
 R0071 PLANETARY INERTIAL ORIENTATION
 R0072 MEASUREMENT INCORPORATION
 R0073 CONIC SUBROUTINES
 R0074 INTEGRATION INITIALIZATION
 R0075 ORBITAL INTEGRATION
 R0076 INFLIGHT ALIGNMENT ROUTINES
 R0077 POWERED FLIGHT SUBROUTINES
 R0078 TIME OF FREE FALL
 R0079 STAR TABLES

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| | |
|-------|---|
| R0080 | AGC BLOCK TWO SELF-CHECK |
| R0081 | PHASE TABLE MAINTENANCE |
| R0082 | RESTARTS ROUTINE |
| R0083 | IMJ MODE SWITCHING ROUTINES |
| R0084 | KEYRUPT, UPRUPT |
| R0085 | DISPLAY INTERFACE ROUTINES |
| R0086 | SERVICE ROUTINES |
| R0087 | ALARM AND ABORT |
| R0088 | UPDATE PROGRAM |
| R0089 | RIS OF CODES |
| R0090 | SYMBOL TABLE LISTING |
| R0091 | UNREFERENCED SYMBOL LISTING |
| R0092 | ERASABLE & EQUALS CROSS-REFERENCE TABLE |
| R0093 | SUMMARY OF SYMBOL TABLE LISTINGS |
| R0094 | MEMORY TYPE & AVAILABILITY DISPLAY |
| R0095 | COUNT TABLE |
| R0096 | PARAGRAPHS GENERATED FOR THIS ASSEMBLY |
| R0097 | OCTAL LISTING |
| R0098 | OCCUPIED LOCATIONS TABLE |
| R0099 | SUBROS CALLED & PROGRAM STATUS |



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P0100 VERB LIST FOR CSM

R0101 REGULAR VERBS

- R0102 00 NOT IN USE
- R0103 01 DISPLAY OCTAL COMP 1 IN R1
- R0104 02 DISPLAY OCTAL COMP 2 IN R1
- R0105 03 DISPLAY OCTAL COMP 3 IN R1
- R0106 04 DISPLAY OCTAL COMP 1,2 IN R1,R2
- R0107 05 DISPLAY OCTAL COMP 1,2,3 IN R1,R2,R3
- R0108 06 DISPLAY DECIMAL IN R1 OR R1,R2 OR R1,R2,R3
- R0109 07 DISPLAY DP DECIMAL IN R1,R2 (TEST ONLY)
- R0110 08
- R0111 09
- R0112 10
- R0113 11 MONITOR OCTAL COMP 1 IN R1
- R0114 12 MONITOR OCTAL COMP 2 IN R1
- R0115 13 MONITOR OCTAL COMP 3 IN R1
- R0116 14 MONITOR OCTAL COMP 1,2 IN R1,R2
- R0117 15 MONITOR OCTAL COMP 1,2,3 IN R1,R2,R3
- R0118 16 MONITOR DECIMAL IN R1 OR R1,R2 OR R1,R2,R3
- R0119 17 MONITOR DP DECIMAL IN R1,R2 (TEST ONLY)
- R0120 18
- R0121 19
- R0122 20
- R0123 21 LOAD COMPONENT 1 INTO R1
- R0124 22 LOAD COMPONENT 2 INTO R2
- R0125 23 LOAD COMPONENT 3 INTO R3
- R0126 24 LOAD COMPONENT 1,2 INTO R1,R2
- R0127 25 LOAD COMPONENT 1,2,3 INTO R1,R2,R3
- R0128 26
- R0129 27 DISPLAY FIXED MEMORY
- R0130 28
- R0131 29
- R0132 30 REQUEST EXECUTIVE
- R0133 31 REQUEST WAITLIST
- R0134 32 RECYCLE PROGRAM
- R0135 33 PROCEED WITHOUT DSKY INPUTS
- R0136 34 TERMINATE FUNCTION
- R0137 35 TEST LIGHTS
- R0138 36 REQUEST FRESH START
- R0139 37 CHANGE PROGRAM (MAJOR MODE)
- R0140 38
- R0141 39



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P0142 EXTENDED VERBS

R0143 40 ZERO CDU-S
R0144 41 COARSE ALIGN CDU-S
R0145 42 FINE ALIGN IMU-S
R0146 43 LOAD IMU ATT ERROR METERS
R0147 44 SET SURFACE FLAG
R0148 45 RESET SURFACE FLAG
R0149 46 ESTABLISH G.C CONTROL
R0150 47 MOVE LM STATE VECTOR INTO CM STATE VECTOR.
R0151 48 REQUEST DAP DATA LOAD ROUTINE (R03)
R0152 49 REQUEST CREW DESIGNED MANEUVER ROUTINE (R02)
R0153 50 PLEASE PERFORM
R0154 51 PLEASE MARK
R0155 52 MARK ON OFFSET LANDING SITE
R0156 53 PLEASE PERFORM ALTERNATE LOS MARK
R0157 54 REQUEST RENDEZVOUS BACKUP SIGHTING MARK ROUTINE (R23)
R0158 55 INCREMENT AGC TIME (DECIMAL)
R0159 56 TERMINATE TRACKING (P20 + P25)
R0160 57 REQUEST RENDEZVOUS SIGHTING MARK ROUTINE (R21)
R0161 58 RESET STICK FLAG
R0162 59 PLEASE CALIBRATE
R0163 60 SET ASTRONAUT TOTAL ATTITUDE (N17) TO PRESENT ATTITUDE
R0164 61 DISPLAY DAP ATTITUDE ERROR
R0165 62 DISPLAY TOTAL ATTITUDE ERROR (WRT N22 (THETA))
R0166 63 DISPLAY TOTAL ASTRONAUT ATTITUDE ERROR (WRT N17 (CPHIX))
R0167 64 REQUEST S-BAND ANTENNA ROUTINE
R0168 65 OPTICAL VERIFICATION OF PRELAUNCH ALIGNMENT
R0169 66 VEHICLES ARE ATTACHED. MOVE THIS VEHICLE STATE TO OTHER VEHICLE.
R0170 67
R0171 68 CSM STROKE TEST ON
R0172 69 CAUSE RESTART
R0173 70 UPDATE LIPTOFF TIME
R0174 71 UNIVERSAL UPDATE-BLOCK ADR
R0175 72 UNIVERSAL UPDATE-SINGLE ADR
R0176 73 UPDATE AGC TIME (OCTAL)
R0177 74 INITIALIZE ERASABLE DUMP VIA DOWNLINK
R0178 75 BACKUP LIPTOFF
R0179 76 SET PREFERRED ATTITUDE FLAG
R0180 77 RESET PREFERRED ATTITUDE FLAG
R0181 78 UPDATE PRELAUNCH AZIMUTH
R0182 79 REQUEST LUNAR LANDMARK SELECTION ROUTINE (R35)
R0183 80 UPDATE LM STATE VECTOR
R0184 81 UPDATE CSM STATE VECTOR
R0185 82 REQUEST ORBIT PARAM DISPLAY (R30)
R0186 83 REQUEST REND PARAM DISPLAY (R31)
R0187 84 START TARGET DELTA V (R32)
R0188 85 REQUEST RENDEZVOUS PARAMETER DISPLAY NO. 2 (R34)
R0189 86 REJECT RENDEZVOUS BACKUP SIGHTING MARK
R0190 87 SET VHP RANGE FLAG



L ASSEMBLY AND OPERATION INFORMATION

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- R0191 88 RESET VHF RANGE FLAG
- R0192 89 REQUEST RENDEZVOUS FINAL ATTITUDE ROUTINE (R63)
- R0193 90 REQUEST RENDEZVOUS OUT OF PLANE DISPLAY ROUTINE (R36)
- R0194 91 DISPLAY BANK SUM
- R0195 92 OPERATE IMJ PERFORMANCE TEST (P07)
- R0196 93 ENABLE W MATRIX INITIALIZATION
- R0197 94 PERFORM CYSLINAR ATTITUDE MANEUVER (P23)
- R0198 95 NO UPDATE OF EITHER STATE VECTOR (P20 OR P22)
- R0199 96 TERMINATE INTEGRATION AND GO TO P00
- R0200 97 PERFORM ENGINE FAIL PROCEDURE
- R0201 98 ENABLE TRANSLINAR INJECT
- R0202 99 PLEASE ENABLE ENGINE



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R0203 IN THE FOLLOWING NOUN LIST THE 'NO LOAD' RESTRICTION MEANS THE NOUN
R0204 CONTAINS AT LEAST ONE COMPONENT WHICH CANNOT BE LOADED, I.E. OF
R0205 SCALES TYPE L (MIN/SEC) OR PP (2 INTEGERS).
R0206 IN THIS CASE VERBS 24 AND 25 ARE NOT ALLOCATED, BUT VERBS 21, 22 OR 23
R0207 MAY BE USED TO LOAD ANY OF THE NOUN'S COMPONENTS WHICH ARE NOT OF THE
R0208 ABOVE SCALE TYPES.
R0209 THE 'DEC ONLY' RESTRICTION MEANS ONLY DECIMAL OPERATION IS ALLOWED ON
R0210 EVERY COMPONENT IN THE NOUN. (NOTE THAT 'NO LOAD' IMPLIES 'DEC ONLY'.)

| R0211 | NORMAL NOUNS | COMPONENTS | SCALE AND DECIMAL POINT | RESTRICTIONS |
|-------|--|------------|-------------------------|-------------------|
| R0213 | 00 NOT IN USE | | | |
| R0214 | 01 SPECIFY MACHINE ADDRESS (FRACTIONAL) | 3COMP | .XXXXX FOR EACH | |
| R0215 | 02 SPECIFY MACHINE ADDRESS (WHOLE) | 3COMP | XXXXX. FOR EACH | |
| R0216 | 03 SPECIFY MACHINE ADDRESS (DEGREES) | 3COMP | XXX.XX DEG FOR EACH | |
| R0217 | 04 SPARE | | | |
| R0218 | 05 ANGULAR ERROR/DIFFERENCE | 1COMP | XXX.XX DEG | |
| R0219 | 06 OPTION CODE | 2COMP | OCTAL ONLY FOR EACH | |
| R0220 | LOADING NOUN 07 WILL SET OR RESET SELECTED BITS IN ANY ERASABLE REGISTER | | | |
| R0221 | 07 SCADR OF WORD TO BE MODIFIED | 3COMP | OCTAL ONLY FOR EACH | |
| R0222 | ONES FOR BITS TO BE MODIFIED | | | |
| R0223 | 1 TO SET OR 0 TO RESET SELECTED BITS | | | |
| R0224 | 08 ALARM DATA | 3COMP | OCTAL ONLY FOR EACH | |
| R0225 | 09 ALARM CODES | 3COMP | OCTAL ONLY FOR EACH | |
| R0226 | 10 CHANNEL TO BE SPECIFIED | 1COMP | OCTAL ONLY | |
| R0227 | 11 SPARE | | | |
| R0228 | 12 OPTION CODE | 2COMP | OCTAL ONLY FOR EACH | |
| R0229 | (USED BY EXTENDED VERBS ONLY) | | | |
| R0230 | 13 SPARE | | | |
| R0231 | 14 SPARE | | | |
| R0232 | 15 INCREMENT MACHINE ADDRESS | 1COMP | OCTAL ONLY | |
| R0233 | 16 TIME OF EVENT | 3COMP | 0000X. HRS | DEC ONLY |
| R0235 | (USED BY EXTENDED VERBS ONLY) | | 0000X. MIN | MUST LOAD 3 COMPS |
| R0237 | | | 00X.XX SEC | |
| R0238 | 17 ASTRONAUT TOTAL ATTITUDE | 3COMP | XXX.XX DEG FOR EACH | |
| R0239 | 18 AUTO MANEUVER ROLL ANGLES | 3COMP | XXX.XX DEG FOR EACH | |
| R0240 | 19 BYPASS ATTITUDE TRIM MANEUVER | 3COMP | XXX.XX DEG FOR EACH | |
| R0241 | 20 ICDU ANGLES | 3COMP | XXX.XX DEG FOR EACH | |
| R0242 | 21 PIPAS | 3COMP | XXXXX. PULSES FOR EACH | |
| R0244 | 22 NEW ICDU ANGLES | 3COMP | XXX.XX DEG FOR EACH | |
| R0245 | 23 SPARE | | | |
| R0246 | 24 DELTA TIME FOR AGC CLOCK | 3COMP | 0000X. HRS | DEC ONLY |
| R0248 | | | 0000X. MIN | MUST LOAD 3 COMPS |
| R0250 | | | 00X.XX SEC | |
| R0251 | 25 CHECKLIST | 3COMP | XXXXX. FOR EACH | |
| R0252 | (USED WITH PLEASE PERFORM ONLY) | | | |
| R0253 | 26 PRIORITY/DELAY, ADRES, BRCON | 3COMP | OCTAL ONLY FOR EACH | |
| R0254 | 27 SLP TEST ON/OFF SWITCH | 1COMP | XXXXX. | |
| R0255 | 28 SPARE | | | |
| R0256 | 29 XSM LAUNCH AZIMUTH | 1COMP | XXX.XX DEG | DEC ONLY |



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| | | | | | |
|-------|----|-------------------------|-------|-----------------|-------------------|
| R0258 | 30 | TARGET CODES | 3COMP | X000X. FOR EACH | |
| R0259 | 31 | TIME OF LANDING SITE | 3COMP | 0000X. HRS | DEC ONLY |
| R0261 | | | | 0000X. MIN | MUST LOAD 3 COMPS |
| R0263 | | | | 0XX.XX SEC | |
| R0264 | 32 | TIME FROM PERIGEE | 3COMP | 0000X. HRS | DEC ONLY |
| R0266 | | | | 0000X. MIN | MUST LOAD 3 COMPS |
| R0268 | | | | 0XX.XX SEC | |
| R0269 | 33 | TIME OF IGNITION | 3COMP | 0000X. HRS | DEC ONLY |
| R0271 | | | | 0000X. MIN | MUST LOAD 3 COMPS |
| R0273 | | | | 0XX.XX SEC | |
| R0274 | 34 | TIME OF EVENT | 3COMP | 0000X. HRS | DEC ONLY |
| R0276 | | | | 0000X. MIN | MUST LOAD 3 COMPS |
| R0278 | | | | 0XX.XX SEC | |
| R0279 | 35 | TIME FROM EVENT | 3COMP | 0000X. HRS | DEC ONLY |
| R0281 | | | | 0000X. MIN | MUST LOAD 3 COMPS |
| R0283 | | | | 0XX.XX SEC | |
| R0284 | 36 | TIME OF AOC CLOCK | 3COMP | 0000X. HRS | DEC ONLY |
| R0286 | | | | 0000X. MIN | MUST LOAD 3 COMPS |
| R0288 | | | | 0XX.XX SEC | |
| R0289 | 37 | TIG OF TPI | 3COMP | 0000X. HRS | DEC ONLY |
| R0291 | | | | 0000X. MIN | MUST LOAD 3 COMPS |
| R0293 | | | | 0XX.XX SEC | |
| R0294 | 38 | TIME OF STATE VECTOR | 3COMP | 0000X. HRS | DEC ONLY |
| R0296 | | | | 0000X. MIN | MUST LOAD 3 COMPS |
| R0298 | | | | 0XX.XX SEC | |
| R0299 | 39 | DELTA TIME FOR TRANSFER | 3COMP | 0000X. HRS | DEC ONLY |
| R0301 | | | | 0000X. MIN | MUST LOAD 3 COMPS |
| R0303 | | | | 0XX.XX SEC | |



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| P0304 | MIXED NOUNS | COMPONENTS | SCALE AND DECIMAL POINT | RESTRICTIONS |
|-------|------------------------------------|------------|-------------------------|-------------------|
| R0306 | 40 TIME FROM IGNITION/CUTOFF | 3COMP | XXXXX MIN/SEC | NO LOAD, DEC ONLY |
| R0308 | VG, | | XXXX.X FT/SEC | |
| R0309 | DELTA V (ACCUMULATED) | | XXXX.X FT/SEC | |
| R0310 | 41 TARGET AZIMUTH, | 2COMP | XXX.XX DEG | |
| R0311 | ELEVATION | | XX.XXX DEG | |
| R0312 | 42 APOGEE, | 3COMP | XXXX.X NAUT MI | DEC ONLY |
| R0314 | PERIGEE, | | XXXX.X NAUT MI | |
| R0315 | DELTA V (REQUIRED) | | XXXX.X FT/SEC | |
| R0316 | 43 LATITUDE, | 3COMP | XXX.XX DEG | DEC ONLY |
| R0318 | LONGITUDE, | | XXX.XX DEG | |
| R0319 | ALTITUDE | | XXXX.X NAUT MI | |
| R0320 | 44 APOGEE, | 3COMP | XXXX.X NAUT MI | NO LOAD, DEC ONLY |
| R0322 | PERIGEE, | | XXXX.X NAUT MI | |
| R0323 | TFP | | XXXXX MIN/SEC | |
| R0324 | 45 MARKS (VHP - OPTICS) | 3 COMP | XXXXX | NO LOAD, DEC ONLY |
| R0326 | TPI OF NEXT BURN | | XXXXX MIN/SEC | |
| R0327 | MGA | | XXX.XX DEG | |
| R0328 | 46 AUTOPILOT CONFIGURATION | 2COMP | OCTAL ONLY FOR EACH | |
| R0329 | 47 THIS VEHICLE WEIGHT | 2COMP | XXXXX. LBS | DEC ONLY |
| R0331 | OTHER VEHICLE WEIGHT | | XXXXX. LBS | |
| R0332 | 48 PITCH TRIM | 2COMP | XXX.XX DEG | DEC ONLY |
| R0334 | YAW TRIM, | | XXX.XX DEG | |
| R0335 | 49 DELTA R | 3COMP | XXXX.X NAUT MI | DEC ONLY |
| R0337 | DELTA V | | XXXX.X FT/SEC | |
| R0338 | VHP OR OPTICS CODE | | XXXXX. | |
| R0339 | 50 SPLASH ERROR, | 3COMP | XXXX.X NAUT MI | NO LOAD, DEC ONLY |
| R0341 | PERIGEE, | | XXXX.X NAUT MI | |
| R0342 | TFP | | XXXXX MIN/SEC | |
| R0343 | 51 S-BAND ANTENNA ANGLES PITCH | 2COMP | XXX.XX DEG | DEC ONLY |
| R0345 | YAW | | XXX.XX DEG | |
| R0346 | 52 CENTRAL ANGLE OF ACTIVE VEHICLE | 1COMP | XXX.XX DEG | |
| R0347 | 53 RANGE, | 3COMP | XXX.XX NAUT MI | DEC ONLY |
| R0349 | RANGE RATE, | | XXXX.X FT/SEC | |
| R0350 | PHI | | XXX.XX DEG | |
| R0351 | 54 RANGE, | 3COMP | XXX.XX NAUT MI | DEC ONLY |
| R0353 | RANGE RATE, | | XXXX.X FT/SEC | |
| R0354 | THETA | | XXX.XX DEG | |
| R0355 | 55 PERIGEE CODE | 3COMP | XXXXX. | DEC ONLY |
| R0357 | ELEVATION ANGLE | | XXX.XX DEG | |
| R0358 | CENTRAL ANGLE OF PASSIVE VEHICLE | | XXX.XX DEG | |
| R0359 | 56 REENTRY ANGLE, | 2COMP | XXX.XX DEG | DEC ONLY |
| R0361 | DELTA V | | XXXXX. FT/SEC | |
| R0362 | 57 DELTA R | 1COMP | XXXX.X NAUT MI | DEC ONLY |
| R0364 | 58 PERIGEE ALT (POST TPI) | 3COMP | XXXX.X NAUT MI | DEC ONLY |
| R0366 | DELTA V TPI | | XXXX.X FT/SEC | |
| R0367 | DELTA V TFP | | XXXX.X FT/SEC | |
| R0368 | 59 DELTA VELOCITY LOS | 3COMP | XXXX.X FT/SEC FOR EA. | DEC ONLY |
| R0370 | 60 GMAX, | 3COMP | XXX.XX G | DEC ONLY |



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| | | | | |
|-------|------------------------------------|-------|------------------------|-------------------|
| R0372 | VPRED, | | X0000. FT/SEC | |
| R0373 | GAMMA EI | | X00.XX DEG | |
| R0374 | 61 IMPACT LATITUDE, | 3COMP | X00.XX DEG | DEC ONLY |
| R0376 | IMPACT LONGITUDE, | | X00.XX DEG | |
| R0377 | HEADS UP/DO:Z | | +/- 00001 | |
| R0378 | 62 INERTIAL VEL MAG (VI), | 3COMP | X0000. FT/SEC | DEC ONLY |
| R0380 | ALT RATE CHANGE (HDOT), | | X0000. FT/SEC | |
| R0381 | ALT ABOVE PAD RADIUS (H) | | X000.X NAUT MI | |
| R0382 | 63 RANGE 297,431 TO SPLASH (RTGO), | 3COMP | X000.X NAUT MI | NO LOAD, DEC ONLY |
| R0384 | PREDICTED INERT VEL (VIO), | | X0000. FT/SEC | |
| R0385 | TIME FROM 297,431 (TFB) | | X0000 MIN/SEC | |
| R0386 | 64 DRAG ACCELERATION, | 3COMP | X00.XX G | DEC ONLY |
| R0388 | INERTIAL VELOCITY (VI), | | X0000. FT/SEC | |
| R0389 | RANGE TO SPLASH | | X000.X NAUT MI | |
| R0390 | 65 SAMPLED AGC TIME | 3COMP | X0000. HRS | DEC ONLY |
| R0392 | (FETCHED IN INTERRUPT) | | 00000. MIN | MUST LOAD 3 COMPS |
| R0394 | | | 000.XX SEC | |
| R0395 | 66 COMMAND BANK ANGLE (BETA), | 3COMP | X00.XX DEG | DEC ONLY |
| R0397 | CROSS RANGE ERROR, | | X000.X NAUT MI | |
| R0398 | DOWN RANGE ERROR | | X000.X NAUT MI | |
| R0399 | 67 RANGE TO TARGET, | 3COMP | X000.X NAUT MI | DEC ONLY |
| R0401 | PRESENT LATITUDE, | | X00.XX DEG | |
| R0402 | PRESENT LONGITUDE | | X00.XX DEG | |
| R0403 | 68 COMMAND BANK ANGLE (BETA), | 3COMP | X00.XX DEG | DEC ONLY |
| R0405 | INERTIAL VELOCITY (VI), | | X0000. FT/SEC | |
| R0406 | ALT RATE CHANGE (ROOT) | | X0000. FT/SEC | |
| R0407 | 69 BETA | 3COMP | X00.XX DEG | DEC ONLY |
| R0409 | DL | | X00.XX G | |
| R0410 | VL | | X0000. FT/SEC | |
| R0411 | 70 STAR CODE, | 3COMP | OCTAL ONLY | |
| R0412 | LANDMARK DATA, | | OCTAL ONLY | |
| R0413 | HORIZON DATA | | OCTAL ONLY | |
| R0414 | 71 STAR CODE | 3COMP | OCTAL ONLY | |
| R0415 | LANDMARK DATA | | OCTAL ONLY | |
| R0416 | HORIZON DATA | | OCTAL ONLY | |
| R0417 | 72 DELT ANO | 3COMP | X00.XX DEG | DEC ONLY |
| R0419 | DELT ALT | | X000.X NAUT MI | |
| R0420 | SEARCH OPTION | | X0000. | |
| R0421 | 73 SPARE | | | |
| R0422 | 74 SPARE | | | |
| R0423 | 75 SPARE | | | |
| R0424 | 76 SPARE | | | |
| R0425 | 77 SPARE | | | |
| R0426 | 78 SPARE | | | |
| R0427 | 79 SPARE | | | |
| R0428 | 80 TIME FROM IGNITION/CUTOFF | 3COMP | X0000 MIN/SEC | NO LOAD, DEC ONLY |
| R0430 | VO | | X0000. FT/SEC | |
| R0431 | DELTA V (ACCUMULATED) | | X0000. FT/SEC | |
| R0432 | 81 DELTA V (LV) | 3COMP | X000.X FT/SEC FOR EACH | DEC ONLY |



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|--------------------------------------|-----------------------------------|--------------------|------------------------|----------|
| R0434 | 82 SPACS | | | |
| R0435 | 83 DELTA V (BODY) | 3COMP | XXXX.X FT/SEC FOR EACH | DEC ONLY |
| R0437 | 84 DELTA V (OTHER VEHICLE) | 3COMP | XXXX.X FT/SEC FOR EACH | DEC ONLY |
| R0439 | 85 VG (BODY) | 3COMP | XXXX.X FT/SEC FOR EACH | DEC ONLY |
| R0441 | 86 DELTA V(LV) | 3COMP | XXXXX. FT/SEC FOR EACH | DEC ONLY |
| R0443 | 87 MARK DATA SHAPT, | 2COMP | XX.XX DEG | |
| R0444 | TRUNION | | XX.XXX DEG | |
| R0445 | 88 HALF UNIT SUN OR PLANET VECTOR | 3COMP | .XXXXX FOR EACH | DEC ONLY |
| R0447 | 89 LANDMARK LATITUDE, | 3COMP | XX.XXX DEG | DEC ONLY |
| R0449 | LONGITUDE/2, | | XX.XXX DEG | |
| R0450 | ALTITUDE | | XX.XX NAUT MI | |
| R0451 | 90 Y | 3COMP | XX.XX NM | DEC ONLY |
| R0453 | Y DOT | | XXXX.X FPS | |
| R0454 | PSI | | XX.XX DEG | |
| R0455 | 91 OCDU ANGLES SHAPT, | 2COMP | XX.XX DEG | |
| R0456 | TRUNION | | XX.XXX DEG | |
| R0457 | 92 NEW OPTICS ANGLES SHAPT, | 2COMP | XX.XX DEG | |
| R0458 | TRUNION | | XX.XXX DEG | |
| R0459 | 93 DELTA GYRO ANGLES | 3COMP | XX.XXX DEG FOR EACH | |
| R0460 | 94 NEW OPTICS ANGLES SHAPT | 2COMP | XX.XX DEG | |
| R0461 | TRUNION | | XX.XXX DEG | |
| R0462 | 95 PREFERRED ATTITUDE OCDU ANGLES | 3COMP | XX.XX DEG FOR EACH | |
| R0463 | 96 X-AXIS ATTITUDE OCDU ANGLES | 3COMP | XX.XX DEG FOR EACH | |
| R0464 | 97 SYSTEM TEST INPUTS | 3COMP | XXXXX. FOR EACH | |
| R0465 | 98 SYSTEM TEST RESULTS AND INPUTS | 3COMP | XXXXX. | |
| R0466 | | | .XXXXX | |
| R0467 | | | XXXXX. | |
| R0468 | 99 RMS IN POSITION | 3COMP | XX.XX NAUT MI | DEC ONLY |
| R0470 | RMS IN VELOCITY | | XXXX.X FT/SEC | |
| R0471 | RMS OPTION | | XXXXX. | |



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R0472 REGISTERS AND SCALING FOR NORMAL NOLNS

| R0473 | NOLN | REGISTER | SCALE TYPE |
|-------|------|-------------------|------------|
| R0474 | 00 | NOT IN USE | |
| R0475 | 01 | SPECIFY ADDRESS | B |
| R0476 | 02 | SPECIFY ADDRESS | C |
| R0477 | 03 | SPECIFY ADDRESS | D |
| R0478 | 04 | SPARE | |
| R0479 | 05 | DSPTM1 | H |
| R0480 | 06 | OPTION1 | A |
| R0481 | 07 | XREG | A |
| R0482 | 08 | ALMCADR | A |
| R0483 | 09 | FAILREG | A |
| R0484 | 10 | SPECIFY CHANNEL | A |
| R0485 | 11 | SPARE | |
| R0486 | 12 | OPTIONX | A |
| R0487 | 13 | SPARE | |
| R0488 | 14 | SPARE | |
| R0489 | 15 | INCREMENT ADDRESS | A |
| R0490 | 16 | DSPTMX | C |
| R0491 | 17 | CPHX | D |
| R0492 | 18 | THETAD | D |
| R0493 | 19 | THETAD | D |
| R0494 | 20 | CDUX | D |
| R0495 | 21 | PIPAK | C |
| R0496 | 22 | THETAD | D |
| R0497 | 23 | SPARE | |
| R0498 | 24 | DSPTM2 +1 | K |
| R0499 | 25 | DSPTM1 | C |
| R0500 | 26 | DSPTM1 | A |
| R0501 | 27 | SMODE | C |
| R0502 | 28 | SPARE | |
| R0503 | 29 | DSPTM1 | D |
| R0504 | 30 | DSPTM1 | C |
| R0505 | 31 | DSPTM1 | K |
| R0506 | 32 | -TPER | K |
| R0507 | 33 | TIG | K |
| R0508 | 34 | DSPTM1 | K |
| R0509 | 35 | TTOGO | K |
| R0510 | 36 | TIME2 | K |
| R0511 | 37 | TPI | K |
| R0512 | 38 | TET | K |
| R0513 | 39 | T3TOT4 | K |

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P0514 REGISTERS AND SCALING FOR MIXED NOUNS

| R0516 | NOUN | COMP | REGISTER | SCALE TYPE |
|-------|------|------|------------|------------|
| R0516 | 40 | 1 | TTOO | L |
| R0517 | | 2 | VODISP | S |
| R0518 | | 3 | DVTOTAL | S |
| R0519 | 41 | 1 | DSPTM1 | D |
| R0520 | | 2 | DSPTM1 +1 | E |
| R0521 | 42 | 1 | HAP0 | O |
| R0522 | | 2 | HPER | O |
| R0523 | | 3 | VODISP | S |
| R0524 | 43 | 1 | LAT | H |
| R0525 | | 2 | LONG | H |
| R0526 | | 3 | ALT | O |
| R0527 | 44 | 1 | HAPK | O |
| R0528 | | 2 | HPERK | O |
| R0529 | | 3 | TFP | L |
| R0530 | 45 | 1 | VHPCNT | PP |
| R0531 | | 2 | TTOO | L |
| R0532 | | 3 | MGA | H |
| R0533 | 46 | 1 | DAPDATR1 | A |
| R0534 | | 2 | DAPDATR2 | A |
| R0535 | 47 | 1 | CSMASS | KK |
| R0536 | | 2 | LENMASS | KK |
| R0537 | 48 | 1 | PACTOFF | PP |
| R0538 | | 2 | YACTOFF | PP |
| R0539 | 49 | 1 | N49DISP | O |
| R0540 | | 2 | N49DISP +2 | S |
| R0541 | | 3 | N49DISP +4 | C |
| R0542 | 50 | 1 | RSP-RREC | LL |
| R0543 | | 2 | HPERK | O |
| R0544 | | 3 | TFP | L |
| R0545 | 51 | 1 | RHOSS | H |
| R0546 | | 2 | GAMMASS | H |
| R0547 | 52 | 1 | ACTCENT | H |
| R0548 | 53 | 1 | RANGE | JJ |
| R0549 | | 2 | RRATE | S |
| R0550 | | 3 | RTHETA | H |
| R0551 | 54 | 1 | RANGE | JJ |
| R0552 | | 2 | RRATE | S |
| R0553 | | 3 | RTHETA | H |
| R0554 | 55 | 1 | NN1 | C |
| R0555 | | 2 | ELEV | H |
| R0556 | | 3 | CENTANG | H |
| R0557 | 56 | 1 | RTEGAM2D | H |
| R0558 | | 2 | RTEGAM2D | P |
| R0559 | 57 | 1 | DELTA | O |
| R0560 | 58 | 1 | POSTTPI | O |
| R0561 | | 2 | DELVTPI | S |



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| | | | | |
|-------|----|---|-----------|----|
| R0562 | | 3 | DELVTFF | S |
| R0563 | 59 | 1 | DVLOS | S |
| R0564 | | 2 | DVLOS +2 | S |
| R0565 | | 3 | DVLOS +4 | S |
| R0566 | 60 | 1 | GMAX | T |
| R0567 | | 2 | VPRD | P |
| R0568 | | 3 | GAMMAB1 | H |
| R0569 | 61 | 1 | LAT(SPL.) | H |
| R0570 | | 2 | LNG(SPL.) | H |
| R0571 | | 3 | HEADSUP | C |
| R0572 | 62 | 1 | VMAGI | P |
| R0573 | | 2 | NDOT | P |
| R0574 | | 3 | ALTI | O |
| R0575 | 63 | 1 | RTOO | LL |
| R0576 | | 2 | VIO | P |
| R0577 | | 3 | TIR | L |
| R0578 | 64 | 1 | D | MM |
| R0579 | | 2 | VMAGI | P |
| R0580 | | 3 | RTON64 | LL |
| R0581 | 65 | 1 | SAMPTIME | K |
| R0582 | | 2 | SAMPTIME | K |
| R0583 | | 3 | SAMPTIME | K |
| R0584 | 66 | 1 | ROLLC | H |
| R0585 | | 2 | XRNERR | VV |
| R0586 | | 3 | DNRNERR | LL |
| R0587 | 67 | 1 | RTON67 | LL |
| R0588 | | 2 | LAT | H |
| R0589 | | 3 | LONG | H |
| R0590 | 68 | 1 | ROLLC | H |
| R0591 | | 2 | VMAGI | P |
| R0592 | | 3 | NDOT | UU |
| R0593 | 69 | 1 | ROLLC | H |
| R0594 | | 2 | OT | MM |
| R0595 | | 3 | VL | UU |
| R0596 | 70 | 1 | STARCODE | A |
| R0597 | | 2 | LANDMARK | A |
| R0598 | | 3 | HORIZON | A |
| R0599 | 71 | 1 | STARCODE | A |
| R0600 | | 2 | LANDMARK | A |
| R0601 | | 3 | HORIZON | A |
| R0602 | 72 | 1 | THETZERO | H |
| R0603 | | 2 | DELHTE | O |
| R0604 | | 3 | OPTION2 | C |
| R0605 | 73 | | SPARE | |
| R0606 | 74 | | SPARE | |
| R0607 | 75 | | SPARE | |
| R0608 | 76 | | SPARE | |
| R0609 | 77 | | SPARE | |
| R0610 | 78 | | SPARE | |
| R0611 | 79 | | SPARE | |

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| | | | | |
|-------|----|---|------------|----|
| R0612 | 80 | 1 | TTOOO | L |
| R0613 | | 2 | VODISP | P |
| R0614 | | 3 | DVTOTAL | P |
| R0615 | 81 | 1 | DELVAVC | S |
| R0616 | | 2 | DELVAVC +2 | S |
| R0617 | | 3 | DELVAVC +4 | S |
| R0618 | 82 | | SPARE | |
| R0619 | 83 | 1 | DELVINU | S |
| R0620 | | 2 | DELVINU +2 | S |
| R0621 | | 3 | DELVINU +4 | S |
| R0622 | 84 | 1 | DELVOV | S |
| R0623 | | 2 | DELVOV +2 | S |
| R0624 | | 3 | DELVOV +4 | S |
| R0625 | 85 | 1 | VOCODY | S |
| R0626 | | 2 | VOCODY +2 | S |
| R0627 | | 3 | VOCODY +4 | S |
| R0628 | 86 | 1 | DELVAVC | P |
| R0629 | | 2 | DELVAVC +2 | P |
| R0630 | | 3 | DELVAVC +4 | P |
| R0631 | 87 | 1 | MRKBUF1 +3 | D |
| R0632 | | 2 | MRKBUF1 +5 | J |
| R0633 | 88 | 1 | STAR | B |
| R0634 | | 2 | STAR +2 | B |
| R0635 | | 3 | STAR +4 | B |
| R0636 | 89 | 1 | LANDLAT | G |
| R0637 | | 2 | LANDLONG | G |
| R0638 | | 3 | LANDALT | JJ |
| R0639 | 90 | 1 | RANKR | JJ |
| R0640 | | 2 | RRATE | S |
| R0641 | | 3 | RHETA | H |
| R0642 | 91 | 1 | CDUS | D |
| R0643 | | 2 | CDUT | J |
| R0644 | 92 | 1 | SAC | D |
| R0645 | | 2 | PAC | J |
| R0646 | 93 | 1 | OCC | G |
| R0647 | | 2 | OCC +2 | G |
| R0648 | | 3 | OCC +4 | G |
| R0649 | 94 | 1 | MRKBUF1 +3 | D |
| R0650 | | 2 | MRKBUF1 +5 | J |
| R0651 | 95 | 1 | PRAXIS | D |
| R0652 | | 2 | PRAXIS +1 | D |
| R0653 | | 3 | PRAXIS +2 | D |
| R0654 | 96 | 1 | CPHIX | D |
| R0655 | | 2 | CPHIX +1 | D |
| R0656 | | 3 | CPHIX +2 | D |
| R0657 | 97 | 1 | DSPTM1 | C |
| R0658 | | 2 | DSPTM1 +1 | C |
| R0659 | | 3 | DSPTM1 +2 | C |
| R0660 | 98 | 1 | DSPTM2 | C |
| R0661 | | 2 | DSPTM2 +1 | R |



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| | | | | |
|-------|----|---|-----------|----|
| R0662 | | 3 | DSPTM2 +2 | C |
| R0663 | 99 | 1 | WWPOS | XX |
| R0664 | | 2 | WVVEL | YY |
| R0665 | | 3 | WVOPT | C |



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R0666 NOUN SCALES AND FORMATS

| R0667 | -SCALE TYPE- | PRECISION | |
|-------|-------------------|---------------------|--|
| R0668 | UNITS | DECIMAL FORMAT | -- AGC FORMAT |
| R0669 | ----- | ----- | ----- |
| R0670 | -A- | | |
| R0671 | OCTAL | XXXXX | SP OCTAL |
| R0672 | -B- | | |
| R0673 | FRACTIONAL | .XXXXX | SP BIT 1 = 2 ⁻¹⁴ UNITS |
| R0674 | | (MAX .99999) | |
| R0675 | -C- | | |
| R0676 | WHOLE | XXXXX. | SP BIT 1 = 1 UNIT |
| R0677 | | (MAX 16383.) | |
| R0678 | -D- | | |
| R0679 | DU DEGREES | XX.XX DEGREES | SP BIT 1 = 360/2 ¹⁵ DEGREES |
| R0680 | | (MAX 359.99) | (USES 15 BITS FOR MAGNITUDE AND 2-S COMP.) |
| R0681 | | | |
| R0682 | -E- | | |
| R0683 | ELEVATION DEGREES | XX.XXX DEGREES | SP BIT 1 = 90/2 ¹⁴ DEGREES |
| R0684 | | (MAX 89.999) | |
| R0685 | -F- | | |
| R0686 | DEGREES (180) | XX.XX DEGREES | SP BIT 1 = 180/2 ¹⁴ DEGREES |
| R0687 | | (MAX 179.99) | |
| R0688 | -G- | | |
| R0689 | DP DEGREES(90) | XX.XXX DEGREES | DP BIT 1 OF LOW REGISTER = 2 ²⁸ |
| R0690 | | | 360/2 DEGREES |
| R0691 | | | |
| R0692 | -H- | | |
| R0693 | DP DEGREES (360) | XX.XX DEGREES | DP BIT 1 OF LOW REGISTER = 2 ²⁸ |
| R0694 | | | 360/2 DEGREES |
| R0695 | | (MAX 359.99) | |
| R0696 | -J- | | |
| R0697 | Y OPTICS DEGREES | XX.XXX DEGREES | SP BIT 1 = 90/2 ¹⁵ DEGREES |
| R0698 | | (BIAS OF 19.775 | (USES 15 BITS FOR MAGNITUDE AND 2-S COMP.) |
| R0699 | | DEGREES ADDED FOR | |
| R0700 | | DISPLAY, SUBTRACTED | |
| R0701 | | FOR LOAD.) | |
| R0702 | | NOTE: NEGATIVE NUM- | |
| R0703 | | BERS CANNOT BE | |
| R0704 | | LOADED. | |
| R0705 | -K- | | |



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| | | | |
|-------|---------------------|-----------------------|---------------------------------|
| R0706 | TIME (HR, MIN, SEC) | 0000X. HR | DP BIT 1 OF LOW REGISTER = |
| R0707 | | 0000X. MIN | -2 |
| R0708 | | 00X.XX SEC | 10 SEC |
| R0709 | | (DECIMAL ONLY, | |
| R0710 | | MAX MIN COMP=59 | |
| R0711 | | MAX SEC COMP=59.99 | |
| R0712 | | MAX CAPACITY=745 HRS | |
| R0713 | | 39 MINS | |
| R0714 | | 14.55 SECS. | |
| R0715 | | WHEN LOADING, ALL 3 | |
| R0716 | | COMPONENTS MUST BE | |
| R0717 | | SUPPLIED.) | |
| R0718 | -L- | | |
| R0719 | TIME (MIN/SEC) | X000X MIN/SEC | DP BIT 1 OF LOW REGISTER = |
| R0720 | | (B IS A BLANK | -2 |
| R0721 | | POSITION, DECIMAL | 10 SEC |
| R0722 | | ONLY, DISPLAY OR | |
| R0723 | | MONITOR ONLY, CANNOT | |
| R0724 | | BE LOADED, | |
| R0725 | | MAX MIN COMP=59 | |
| R0726 | | MAX SEC COMP=59 | |
| R0727 | | VALUES GREATER THAN | |
| R0728 | | 59 MIN 59 SEC | |
| R0729 | | ARE DISPLAYED AS | |
| R0730 | | 59 MIN 59 SEC.) | |
| R0731 | -M- | | |
| R0732 | TIME (SEC) | X00.XX SEC | SP BIT 1 = 10 ⁻² SEC |
| R0733 | | (MAX 163.83) | |
| R0734 | -N- | | |
| R0735 | TIME(SEC) DP | X00.XX SEC | DP BIT 1 OF LOW REGISTER = |
| R0736 | | | -2 |
| R0737 | | | 10 SEC |
| R0738 | -P- | | |
| R0739 | VELOCITY 2 | X0000. FEET/SEC | DP BIT 1 OF HIGH REGISTER = |
| R0740 | | (MAX 41994.) | -7 |
| R0741 | | | 2 METERS/CENTI-SEC |
| R0742 | -Q- | | |
| R0743 | POSITION 4 | X000.X NAUTICAL MILES | DP BIT 1 OF LOW REGISTER = |
| R0744 | | | 2 METERS |
| R0745 | -S- | | |
| R0746 | VELOCITY 3 | X000.X FT/SEC | DP BIT 1 OF HIGH REGISTER = |
| R0747 | | | -7 |
| R0748 | | | 2 METERS/CENTI-SEC |

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| | | | |
|-------|-------------------|----------------------|--|
| R0749 | -T- | | |
| R0750 | G | XXX.XX G | SP BIT 1 = 10 ⁻² G |
| R0751 | | (MAX 163.63) | |
| R0752 | -PP- | | |
| R0753 | TRIM DEGREES | XXX.XX DEG. | SP LOW ORDER BIT = 65.41 SEC |
| R0754 | | (MAX 386.69) | OF ARC |
| R0755 | -GG- | | |
| R0756 | INERTIA | XXXXXX. SLUG FT SQ | SP FRACTIONAL PART OF |
| R0757 | | (MAX 67733RR.) | 20 2 |
| R0758 | | | 2 KG M |
| R0759 | -II- | | |
| R0760 | THRUST MOMENT | XXXXXX. FT LBS | SP FRACTIONAL PART OF 2 ²⁰ |
| R0761 | | (MAX 67733RR.) | NEWTON METER |
| R0762 | -JJ- | | |
| R0763 | POSITIONS | XXX.XX NAUT MI | DP BIT 1 OF LOW REGISTER = |
| R0764 | | | 2 METERS |
| R0765 | -KK- | | |
| R0766 | WEIGHT2 | XXXXX. LBS | SP FRACTIONAL PART OF 2 ¹⁶ KG |
| R0767 | -LL- | | |
| R0768 | POSITIONS | XXXX.X NAUT MI | DP BIT 1 OF LOW REG = |
| R0769 | | | (6,373,338)(2(PI))X2 ⁻²⁸ |
| R0770 | | | ----- |
| R0771 | | | 1852 |
| R0772 | | | NAUT. MI. |
| R0773 | | | |
| R0774 | -MM- | | |
| R0775 | DRAG ACCELERATION | XXX.XX G | DP BIT 1 OF LOW REGISTER = |
| R0776 | | MAX (024.99) | -28 |
| R0777 | | | 25X2 G |
| R0778 | -PP- | | |
| R0779 | 2 INTEGERS | XXRY | DP BIT 1 OF HIGH REGISTER = |
| R0780 | | (B IS A BLANK | 1 UNIT OF XX |
| R0781 | | POSITION. DECIMAL | BIT 1 OF LOW REGISTER = |
| R0782 | | ONLY, DISPLAY OR | 1 UNIT OF YY |
| R0783 | | MONITOR ONLY. CANNOT | (EACH REGISTER MUST |
| R0784 | | BE LOADED.) | CONTAIN A POSITIVE INTEGER |
| R0785 | | (MAX 99999) | LESS THAN 100) |
| R0786 | -UU- | | |
| R0787 | VELOCITY/2VS | XXXXX. FEET/SEC | DP FRACTIONAL PART OF |
| R0788 | | (MAX 51532.) | 2VS FEET/SEC |
| R0789 | | | (VS = 25766.1973) |



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| | | | |
|-------|--------------------------|-----------------|----------------------------|
| R0790 | -VV- | | |
| R0791 | POSITION 8 | X000.X NAUT MI | DP BIT 1 OF LOW REGISTER = |
| R0792 | | | -28 |
| R0793 | | | 4 X 6,373,338 X 2 |
| R0794 | | | ----- |
| R0795 | | | 1852 |
| R0796 | | | NAUT MI |
| | | | |
| R0797 | -XX- | | |
| R0798 | POSITION 9 | X00X.XX NAUT MI | DP BIT 1 OF LOW REGISTER = |
| R0799 | | (MAX 283.09) | -9 |
| R0800 | | | 2 METERS |
| | | | |
| R0801 | -YY- | | |
| R0802 | VELOCITY 4 | X000.X FEET/SEC | DP FRACTIONAL PART OF |
| R0803 | | (MAX 328.0) | METERS/CENTI-SEC |
| R0804 | THAT-S ALL ON THE NOLNS. | | |

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| R0805 | ALARM CODES FOR 504 | | | | |
|-------|---|--|----------------------------------|--|----------------|
| R0806 | REPORT DEFICIENCIES TO JOHN SUTHERLAND * MIT 617-864-8900 X1458 | | | | |
| R0807 | *9 | *18 | *80 | | *25 COLUMN |
| R0809 | CODE | * TYPE | SET BY | | ALARM ROUTINE |
| R0811 | 00110 | NO MARK SINCE LAST MARK REJECT | SKTMARK | | ALARM |
| R0813 | 00112 | MARK NOT BEING ACCEPTED | SKTMARK | | ALARM |
| R0815 | 00113 | NO INBITS | SKTMARK | | ALARM |
| R0817 | 00114 | MARK MADE BUT NOT DESIRED | SKTMARK | | ALARM |
| R0819 | 00115 | OPTICS TORQUE REQUEST WITH SWITCH NOT AT CCC | EXT VERB OPTICS CDU | | ALARM |
| R0821 | | | | | |
| R0822 | 00116 | OPTICS SWITCH ALTERED BEFORE 15 SEC ZERO TIME ELAPSED. | T4RUPT | | ALARM |
| R0824 | | | | | |
| R0825 | 00117 | OPTICS TORQUE REQUEST WITH OPTICS NOT AVAILABLE (OPTIND=-0) | EXT VERB OPTICS CDU | | ALARM |
| R0827 | | | | | |
| R0828 | 00120 | OPTICS TORQUE REQUEST WITH OPTICS NOT ZEROED | T4RUPT | | ALARM |
| R0830 | | | | | |
| R0831 | 00121 | CDUS NO GOOD AT TIME OF MARK | SKTMARK | | ALARM |
| R0833 | 00122 | MARKING NOT CALLED FOR | SKTMARK | | ALARM |
| R0835 | 00124 | P17 TPI SEARCH - NO SAFE PERICTR HERE. | TPI SEARCH | | ALARM |
| R0837 | 00205 | BAD PIPA READING | SERVICR | | ALARM |
| R0839 | 00206 | ZERO ENCODE NOT ALLOWED WITH COARSE ALIGN + GIMBAL LOCK | IMJ MODE SWITCHING | | ALARM |
| R0841 | | | | | |
| R0842 | 00207 | ISS TURNON REQUEST NOT PRESENT FOR 90 SEC | T4RUPT | | ALARM |
| R0844 | 00210 | IMJ NOT OPERATING | IMJ MODE SWITCH, IMJ-2, R02, P51 | | ALARM,VARALARM |
| R0846 | 00211 | COARSE ALIGN ERROR - DRIVE 8 2 DEGREES | IMJ MODE SWITCH | | ALARM |
| R0848 | 00212 | PIPA FAIL BUT PIPA IS NOT BEING USED | IMJ MODE SWITCH,T4RPT | | ALARM |
| R0850 | 00213 | IMJ NOT OPERATING WITH TURN-ON REQUEST | T4RUPT | | ALARM |
| R0852 | 00214 | PROGRAM USING IMJ WHEN TURNED OFF | T4RUPT | | ALARM |
| R0854 | 00215 | PREFERRED ORIENTATION NOT SPECIFIED | P52,P54 | | ALARM |
| R0856 | 00217 | BAD RETURN FROM STALL ROUTINES. | CURTAINS | | ALARM2 |
| R0858 | 00220 | IMJ NOT ALIGNED - NO REFSMAT | R02,P51 | | VARALARM |
| R0860 | 00401 | DESIRED GIMBAL ANGLES YIELD GIMBAL LOCK | IMP ALIGN, IMJ-2 | | ALARM |
| R0862 | 00404 | TARGET OUT OF VIEW - TRUN ANGLE 8 90 DEG | R52 | | PRICLARM |
| R0864 | 00405 | TWO STARS NOT AVAILABLE | P52,P54 | | ALARM |
| R0866 | 00406 | REND NAVIGATION NOT OPERATING | R21,R23 | | ALARM |
| R0868 | 00407 | AUTO OPTICS REQUEST TRUN ANGLE 8 50 DEG. | R52 | | ALARM |
| R0870 | 00420 | THIRD CALL TO ORBITAL INTEGRATION | ALL CALLS TO INTEG | | * |
| R0872 | 00421 | W-MATRIX OVERFLOW | INTEGRV | | ALARM |
| R0874 | 00605 | NUMBER OF ITERATIONS EXCEEDS LOOP MAXIMUM | P32,P72, | | VARALARM |
| R0876 | 00611 | NO TIG FOR GIVEN ELEV ANGLE | P34,P74 | | VARALARM |
| R0878 | 00612 | STATE VECTOR IN WRONG SPHERE OF INFLUENCE | P37 | | VARALARM |
| R0880 | 00613 | REENTRY ANGLE OUT OF LIMITS | P37 | | VARALARM |
| R0883 | 01103 | * UNUSED CCS BRANCH EXECUTED | ABORT | | ALARM2 |
| R0885 | 01104 | * DELAY ROUTINE BUSY | EXEC | | RAILOUT |
| R0887 | 01105 | DOWNLINK TOO FAST | T4RUPT | | ALARM |
| R0889 | 01106 | UPLINK TOO FAST | T4RUPT | | ALARM |



L ASSEMBLY AND OPERATION INFORMATION

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| | | | | |
|--------|-------|---|---------------------|----------|
| R0891 | 01107 | PHASE TABLE FAILURE, ASSURE | RESATRT | ALARM |
| DO693 | | ERASABLE MEMORY IS DESTROYED | | |
| R0894 | 01201 | * EXECUTIVE OVERFLOW-NO VAC AREAS | EXOC | BAILOUT |
| R0896 | 01202 | * EXECUTIVE OVERFLOW-NO CORE SETS | EXOC | BAILOUT |
| R0898 | 01203 | * WAITLIST OVERFLOW-TOO MANY TASKS | WAITLIST | BAILOUT |
| R0900 | 01206 | * SECOND JOB ATTEMPTS TO GO TO SLEEP | PINBALL | POODOO |
| R0902 | | VIA KEYBOARD AND DISPLAY PROGRAM | | |
| DO903 | 01207 | * NO VAC AREA FOR MARKS | SKTMRK | BAILOUT |
| R0905 | 01210 | * TWO PROGRAMS USING DEVICE AT SAME TIME | IMJ MODE SWITCH | POODOO |
| 110907 | 01211 | * ILLEGAL INTERRUPT OF EXTENDED VERB | SKTMRK | BAILOUT |
| 110909 | 01301 | ARCSIN-ARCCOS ARGUMENT TOO LARGE | INTERPRETER | ALARM |
| 110911 | 01302 | * SORT CALLED WITH NEGATIVE ARGUMENT, ABORT | INTERPRETER | POODOO |
| R0913 | 01407 | VG INCREASING | S40.8 | ALARM |
| R0915 | 01426 | IMJ UNSATISFACTORY | P61, P62 | ALARM |
| R0917 | 01427 | IMJ REVERSED | P61, P62 | ALARM |
| R0919 | 01501 | * KEYBOARD AND DISPLAY ALARM DURING | PINBALL | POODOO |
| R0921 | | INTERNAL USE (INVSUB), ABORT. | | |
| R0922 | 01502 | * ILLEGAL FLASHING DISPLAY | GOPLAY | POODOO |
| R0924 | 01520 | V37 REQUEST NOT PERMITTED AT THIS TIME | V37 | ALARM |
| R0926 | 01600 | OVERFLOW IN DRIFT TEST | OPT PRE ALIGN CALIB | ALARM |
| R0928 | 01601 | * BAD IMJ TORQUE - ABORT | OPT PRE ALIGN CALIB | ALARM |
| R0930 | 01602 | RAD OPTICS DURING VERIFICATION | OPTALGN CALIB (CSM) | ALARM |
| R0932 | 01703 | INSUF. TIME FOR INTEG., TIG WAS SLIPPED | R41 | ALARM |
| R0934 | 01708 | STAGE VERIFY DISCRETE DOES NOT AGREE | R03 | F |
| R0936 | 01101 | CHECKLIST 203 NOT PERFORMED. | R61 | F |
| R0938 | 03117 | ICDU FAIL CAUSED THE ISS WARNING | T4RUPT | VARALARM |
| R0940 | 04717 | ICDU, PIPA FAILS CAUSED THE ISS WARNING | T4RUPT | VARALARM |
| R0942 | 07777 | IMJ FAIL CAUSED THE ISS WARNING | T4RUPT | VARALARM |
| R0944 | 10777 | IMJ, PIPA FAILS CAUSED THE ISS WARNING | T4RUPT | VARALARM |
| R0946 | 13711 | IMJ, ICDU FAILS CAUSED THE ISS WARNING | T4RUPT | VARALARM |
| R0948 | 14711 | IMJ, ICDU, PIPA FAILS CAUSED THE ISS WARNING | T4RUPT | VARALARM |
| R0950 | | * INDICATES ABORT TYPE, ALL OTHERS ARE NON-ABORTIVE | | |



L ASSEMBLY AND OPERATION INFORMATION

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R0951 CHECKLIST CODES FOR 504

R0952 PLEASE REPORT ANY DEFICIENCIES IN THIS LIST TO JOHN SUTHERLAND

R0953 *9 *17 *28 COLUMN

R0954 R1 CODE ACTION TO BE EFFECTED

- R0955 00014 KEY IN FINE ALIGNMENT OPTION
- R0956 00015 PERFORM CELESTIAL BODY ACQUISITION
- R0957 00016 KEY IN TERMINATE MARK SEQUENCE
- R0958 00041 SWITCH CM/SM SEPARATION TO UP
- R0959 00062 SWITCH AGC POWER DOWN
- R0960 00202 PERFORM GNC'S AUTOMATIC MANEUVER
- R0961 00203 SWITCH TO CMC-AUTO
- R0962 00204 PERFORM SPS GIMBAL TRIM
- R0963 00403 SWITCH OPTICS TO MANUAL OR ZERO
- R0964 SWITCH DENOTES CHANGE POSITION OF A CONSOLE SWITCH
- R0965 PERFORM DENOTES START OR END OF A TASK
- R0966 KEY IN DENOTES KEY IN OF DATA THRU THE DSKY



L ASSEMBLY AND OPERATION INFORMATION

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R0967 OPTION CODES FOR 504

R0968 PLEASE REPORT ANY DEFICIENCIES IN THIS LIST TO JOHN SUTHERLAND

R0969 THE SPECIFIED OPTION CODES WILL BE FLASHED IN COMPONENT R1 IN
 R0970 CONJUNCTION WITH VERB04NOUN06 TO REQUEST THE ASTRONAUT TO LOAD INTO
 R0971 COMPONENT R2 THE OPTION HE DESIRES.

R0972 *9 *17 *52 *11 *25 COLUMN

| R0974 | OPTION | PURPOSE | INPUT FOR COMPONENT 2 | PROGRAM(S) | APPLICABILITY |
|-------|--------|----------------------------------|---------------------------------|------------|---------------------|
| R0975 | CODE | | | | |
| R0977 | 00001 | SPECIFY IMU ORIENTATION | 1=PREP 2=NOM 3=REPSMAT | P50-S | ALL |
| R0979 | 00002 | SPECIFY VEHICLE | 1=THIS 2=OTHER | P21,R30 | ALL |
| R0981 | 00003 | SPECIFY TRACKING ATTITUDE | 1=PREFERRED 2=OTHER | R63 | ALL |
| R0983 | 00004 | SPECIFY RADAR | 1=RR 2=LR | R04 | SUNDANCE + LUMINARY |
| R0985 | 00005 | SPECIFY SOR PHASE | 1=FIRST 2=SECOND | P38 | COLOSSUS + LUMINARY |
| R0987 | 00006 | SPECIFY RR COARSE ALIGN OPTION | 1=LOCKON 2=CONTINUOUS DESIG. | V41N72 | SUNDANCE + LUMINARY |
| R0989 | 00007 | SPECIFY PROPULSION SYSTEM | 1=SPS 2=RCS | P37 | COLOSSUS |
| R0991 | 00010 | SPECIFY ALIGNMENT MODE | 0=ANY TIME 1=REPSMAT +G | P57 | LUMINARY |
| R0993 | | | 2=TWO BODIES 3=ONE BODY + G | | |
| R0994 | 00011 | SPECIFY SEPARATION MONITOR PHASE | 1=DELTA V 2=STATE VECTOR UPDATE | P46 | LUMINARY |
| R0996 | 00012 | SPECIFY CSM ORBIT OPTION | 1=NO ORBIT CHANGE 2=CHANGE | P22 | LUMINARY |
| R0998 | | | ORBIT TO PASS OVER LM | | |



L TAGS FOR RELATIVE SETLOC AND BLANK BANK CARDS USER=8 PAGE NO. 1 E0

0001 44,2000 44,2000 FIXED MEMORY 120000 - 167777
 0002 REP 1 COUNT BANKSUM

R00025 MODULE 1 CONTAINS BANKS 0 THROUGH 5

| | | | | |
|-------|---------------|---------|----------|----------|
| 0003 | | 4000 | | BLOCK 02 |
| 0004 | | 4000 | FPTAG1 | EQUALS |
| 0005 | | 4000 | FPTAG2 | EQUALS |
| 0006 | | 4000 | FPTAG3 | EQUALS |
| 0007 | | 4000 | FPTAG4 | EQUALS |
| 0008 | | 4000 | FPTAG7 | EQUALS |
| 0009 | | 4000 | FPTAG8 | EQUALS |
| 0010 | | 4000 | FPTAG9 | EQUALS |
| 0011 | | 4000 | FPTAG10 | EQUALS |
| 0012 | | 4000 | FPTAG12 | EQUALS |
| 0013 | 79 WORDS LEFT | 5660 | 05660 1 | BKSUM 02 |
| 0013 | | 5661 | 05661 0 | |
| 0014 | | 6000 | | BLOCK 03 |
| 0015 | | 6000 | FPTAG5 | EQUALS |
| 0016 | | 6000 | FPTAG6 | EQUALS |
| 0017 | 21 WORDS LEFT | 7752 | 07752 0 | BKSUM 03 |
| 0017 | | 7753 | 07753 1 | |
| 0018 | | 00,2000 | | BANK 00 |
| 0019 | | 00,2000 | DLAYJOB | EQUALS |
| 0020 | 7 WORDS LEFT | 00,3770 | 03770 1 | BKSUM 00 |
| 0020 | | 00,3771 | 03771 0 | |
| 0021 | | 01,2000 | | BANK 01 |
| 0022 | | 01,2000 | RESTART | EQUALS |
| 0023 | 7 WORDS LEFT | 01,3770 | 03770 1 | BKSUM 01 |
| 0023 | | 01,3771 | 03771 0 | |
| 0024 | | 04,2000 | | BANK 4 |
| 0025 | | 04,2000 | VERP37 | EQUALS |
| 0026 | | 04,2000 | CONICS1 | EQUALS |
| 0027 | | 04,2000 | PINBALL4 | EQUALS |
| 0028 | | 04,2000 | R38LM | EQUALS |
| 0029 | | 04,2000 | INTPRST2 | EQUALS |
| 00291 | | 04,2000 | IMCAL1 | EQUALS |
| 00292 | | 04,2000 | STRICORR | EQUALS |
| 00293 | | 04,2000 | E/PROG | EQUALS |
| 00294 | | 04,2000 | MIDDGIM | EQUALS |
| 0030 | 87 WORDS LEFT | 04,3650 | 03650 1 | BKSUM 04 |
| 0030 | | 04,3651 | 03651 0 | |



L TAGS FOR RELATIVE SETLOC AND BLANK BANK CARDS

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| | | | | |
|--------|----------------|--------------------------------------|---------|-----------------|
| 0031 | | 05,2000 | | BANK 5 |
| 0032 | | 05,2000 | | FRANDRES EQUALS |
| 0033 | | 05,2000 | | DOWTELM EQUALS |
| 00335 | | 05,2000 | | DAPMASS EQUALS |
| 0034 | 112 WORDS LEFT | 05,3617 | 03617 1 | BNKSUM 05 |
| 0034 | | 05,3620 | 03620 0 | |
| R00345 | | MODULE 2 CONTAINS BANKS 6 THROUGH 13 | | |
| 0036 | | 06,2000 | | BANK 6 |
| 0036 | | 06,2000 | | INUCOMP EQUALS |
| 0037 | | 06,2000 | | TMRUP EQUALS |
| 00375 | | 06,2000 | | INUCAL2 EQUALS |
| 0038 | 86 WORDS LEFT | 06,3651 | 03651 0 | BNKSUM 06 |
| 0038 | | 06,3652 | 03652 0 | |
| 0039 | | 07,2000 | | BANK 7 |
| 0040 | | 07,2000 | | SKTMARK EQUALS |
| 0041 | | 07,2000 | | R02 EQUALS |
| 0042 | | 07,2000 | | MODESW EQUALS |
| 0043 | | 07,2000 | | XANG EQUALS |
| 0044 | | 07,2000 | | KEYRUPT EQUALS |
| 0045 | 48 WORDS LEFT | 07,3717 | 03717 0 | BNKSUM 07 |
| 0045 | | 07,3720 | 03720 1 | |
| 0046 | | 10,2000 | | BANK 10 |
| 0047 | | 10,2000 | | DISPLAYS EQUALS |
| 0048 | | 10,2000 | | PHASER EQUALS |
| 0049 | | 10,2000 | | COMCON2 EQUALS |
| 0050 | | 10,2000 | | SKTMARK1 EQUALS |
| 0051 | | 10,2000 | | P80S4 EQUALS |
| 0052 | | 10,2000 | | OPTDRV EQUALS |
| 0053 | 81 WORDS LEFT | 10,3702 | 03702 1 | BNKSUM 10 |
| 0053 | | 10,3703 | 03703 0 | |
| 0054 | | 11,2000 | | BANK 11 |
| 0055 | | 11,2000 | | ORBITAL EQUALS |
| 0056 | | 11,2000 | | ORBITAL1 EQUALS |
| 0057 | | 11,2000 | | INTVEL EQUALS |
| 0058 | | 11,2000 | | SS 2/2 EQUALS |
| 0059 | 46 WORDS LEFT | 11,3721 | 03721 0 | BNKSUM 11 |
| 0059 | | 11,3722 | 03722 0 | |
| 0060 | | 12,2000 | | BANK 12 |
| 0061 | | 12,2000 | | CONICS EQUALS |

CONSTANTS



L TAGS FOR RELATIVE SETLOC AND BLANK BANK CARDS

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| | | | | |
|-------|---------------|---------|---------|-----------------|
| 0062 | 34 WORDS LEFT | 12,3735 | 03735 0 | BKSUM 12 |
| 0062 | | 12,3736 | 03736 0 | |
| 0063 | | 13,2000 | | BANK 13 |
| 0064 | | 13,2000 | | P76LOC EQUALS |
| 0065 | | 13,2000 | | LATLONG EQUALS |
| 0066 | | 13,2000 | | INTINIT EQUALS |
| 0067 | | 13,2000 | | SRS 2/1 EQUALS |
| 00675 | | 13,2000 | | ORBITAL2 EQUALS |
| 0069 | 6 WORDS LEFT | 13,3771 | 03771 0 | BKSUM 13 |
| 0069 | | 13,3772 | 03772 0 | |

R0070 SPACER

R00705 MODULE 3 CONTAINS BANKS 14 THROUGH 21

| | | | | |
|------|---------------|---------|---------|----------------|
| 0071 | | 14,2000 | | BANK 14 |
| 0072 | | 14,2000 | | STARTAB EQUALS |
| 0073 | | 14,2000 | | RTS 3 EQUALS |
| 0074 | | 14,2000 | | P50S1 EQUALS |
| 0075 | 27 WORDS LEFT | 14,3744 | 03744 0 | BKSUM 14 |
| 0075 | | 14,3745 | 03745 1 | |
| 0076 | | 15,2000 | | BANK 15 |
| 0077 | | 15,2000 | | P50S EQUALS |
| 0078 | | 15,2000 | | STRYDAP EQUALS |
| 0079 | | 15,2000 | | S52/3 EQUALS |
| 0080 | 3 WORDS LEFT | 15,3774 | 03774 0 | BKSUM 15 |
| 0080 | | 15,3775 | 03775 1 | |
| 0081 | | 16,2000 | | BANK 16 |
| 0082 | | 16,2000 | | P40S1 EQUALS |
| 0083 | | 16,2000 | | DAPROLL EQUALS |
| 0084 | | 16,2000 | | P50S2 EQUALS |
| 0085 | 30 WORDS LEFT | 16,3741 | 03741 0 | BKSUM 16 |
| 0085 | | 16,3742 | 03742 0 | |
| 0086 | | 17,2000 | | BANK 17 |
| 0087 | | 17,2000 | | DAPS4 EQUALS |
| 0088 | | 17,2000 | | DAPS5 EQUALS |
| 0089 | | 17,2000 | | DAPS7 EQUALS |
| 0090 | 11 WORDS LEFT | 17,3764 | 03764 1 | BKSUM 17 |
| 0090 | | 17,3765 | 03765 0 | |
| 0091 | | 20,2000 | | BANK 20 |



L TAGS FOR RELATIVE SETLOC AND BLANK BANK CARDS

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| | | | | | | |
|-------|---------------------------------------|---------|---------|----------|-----------|--|
| 0092 | | 20,2000 | | DAPS6 | EQUALS | |
| 0093 | | 20,2000 | | DAPS1 | EQUALS | |
| 0094 | | 20,2000 | | DAPS2 | EQUALS | |
| 0095 | 52 WORDS LEFT | 20,3713 | 03713 1 | | BNKSUM 20 | |
| 0095 | | 20,3714 | 03714 0 | | | |
| 0096 | | 21,2000 | | | BANK 21 | |
| 0097 | | 21,2000 | | DAPS3 | EQUALS | |
| 0098 | | 21,2000 | | MYSUBS | EQUALS | |
| 0099 | 22 WORDS LEFT | 21,3751 | 03751 1 | | BNKSUM 21 | |
| 0099 | | 21,3752 | 03752 1 | | | |
| 00995 | MODULE 4 CONTAINS BANKS 22 THROUGH 27 | | | | | |
| 0100 | | 22,2000 | | | BANK 22 | |
| 0101 | | 22,2000 | | RTBCODES | EQUALS | |
| 0102 | | 22,2000 | | RTBCODE1 | EQUALS | |
| 0103 | | 22,2000 | | DAPS8 | EQUALS | |
| 0104 | | 22,2000 | | APOPER1 | EQUALS | |
| 0105 | | 22,2000 | | P40S5 | EQUALS | |
| 0106 | | 22,2000 | | KALCMQ2 | EQUALS | |
| 0107 | | 22,2000 | | KALCMQ1 | EQUALS | |
| 0108 | 5 WORDS LEFT | 22,3772 | 03772 0 | | BNKSUM 22 | |
| 0108 | | 22,3773 | 03773 1 | | | |
| 0109 | | 23,2000 | | | BANK 23 | |
| 0110 | | 23,2000 | | P20S2 | EQUALS | |
| 0111 | | 23,2000 | | INFLIGHT | EQUALS | |
| 0112 | | 23,2000 | | COMGROM1 | EQUALS | |
| 0113 | | 23,2000 | | POWPLIT1 | EQUALS | |
| 0114 | | 23,2000 | | POWPLIT1 | EQUALS | |
| 0115 | | 23,2000 | | RENDOUID | EQUALS | |
| 0116 | | 23,2000 | | POWPLIT2 | EQUALS | |
| 0117 | | 23,2000 | | R30LOC | EQUALS | |
| 0118 | | 23,2000 | | P11POUR | EQUALS | |
| 0119 | 42 WORDS LEFT | 23,3725 | 03725 1 | | BNKSUM 23 | |
| 0119 | | 23,3726 | 03726 1 | | | |
| 0120 | | 24,2000 | | | BANK 24 | |
| 0121 | | 24,2000 | | LOADDAP | EQUALS | |
| 0122 | | 24,2000 | | P40S | EQUALS | |
| 0125 | 60 WORDS LEFT | 24,3703 | 03703 0 | | BNKSUM 24 | |
| 0125 | | 24,3704 | 03704 1 | | | |
| 0126 | | 25,2000 | | | BANK 25 | |

L TAGS FOR RELATIVE SETLOC AND BLANK BANK CARDS

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| | | | | | |
|-------|--------------|---------|---------|----------|-----------|
| 0127 | | 25,2000 | | REENTRY | EQUALS |
| 0128 | 9 WORDS LEFT | 25,3766 | 03766 0 | | BNKSUM 25 |
| 0128 | | 25,3767 | 03767 1 | | |
| 0129 | | 26,2000 | | | BANK 26 |
| 0130 | | 26,2000 | | INTPRET1 | EQUALS |
| 0131 | | 26,2000 | | REENTRY1 | EQUALS |
| 0132 | | 26,2000 | | P605 | EQUALS |
| 0133 | | 26,2000 | | P6051 | EQUALS |
| 0134 | | 26,2000 | | P6052 | EQUALS |
| 0135 | | 26,2000 | | P6053 | EQUALS |
| 0136 | | 26,2000 | | PLANTIN | EQUALS |
| 0137 | | 26,2000 | | EPHEM | EQUALS |
| 0138 | | 26,2000 | | F05P06 | EQUALS |
| 01381 | | 26,2000 | | 26P505 | EQUALS |
| 0139 | 3 WORDS LEFT | 26,3774 | 03774 0 | | BNKSUM 26 |
| 0139 | | 26,3775 | 03775 1 | | |

LUNAR ROT

R0140

| | | | | | |
|-------|---------------|---------|---------|----------|-----------|
| 0141 | | 27,2000 | | | BANK 27 |
| 0142 | | 27,2000 | | TOP-PP | EQUALS |
| 0143 | | 27,2000 | | TOP-PP1 | EQUALS |
| 0144 | | 27,2000 | | MANUVER | EQUALS |
| 0145 | | 27,2000 | | MANUVER1 | EQUALS |
| 0146 | | 27,2000 | | VECPY | EQUALS |
| 0147 | | 27,2000 | | UPDATE1 | EQUALS |
| 0148 | | 27,2000 | | UPDATE2 | EQUALS |
| 0149 | | 27,2000 | | R22S1 | EQUALS |
| 01495 | | 27,2000 | | P6055 | EQUALS |
| 01490 | | 27,2000 | | RTS2 | EQUALS |
| 0150 | 19 WORDS LEFT | 27,3754 | 03754 1 | | BNKSUM 27 |
| 0150 | | 27,3755 | 03755 0 | | |

R01505 MODULE 5 CONTAINS BANKS 30 THROUGH 35

| | | | | | |
|-------|--------------|---------|---------|----------|-----------|
| 0151 | | 30,2000 | | | BANK 30 |
| 0152 | | 30,2000 | | IMUSUPER | EQUALS |
| 0153 | | 30,2000 | | LOWSUPER | EQUALS |
| 0154 | | 30,2000 | | FCSTART | EQUALS |
| 0155 | | 30,2000 | | LOPC | EQUALS |
| 0156 | | 30,2000 | | P20S1 | EQUALS |
| 0157 | | 30,2000 | | P20S6 | EQUALS |
| 01575 | | 30,2000 | | P40S3 | EQUALS |
| 01577 | | 30,2000 | | R35A | EQUALS |
| 0158 | 1 WORDS LEFT | 30,3776 | 03776 1 | | BNKSUM 30 |

STANDARD LOCATION FOR THIS. (FOR FIXTR)



L TAGS FOR RELATIVE SETLOC AND BLANK BANK CARDS

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| | | | | | |
|---------------------------------------|---------------|---------|-----------|--------|----|
| 0159 | | 31,2000 | | BANK | 31 |
| 0160 | | 31,2000 | | EQUALS | |
| 0161 | | 31,2000 | R35 | EQUALS | |
| 0162 | | 31,2000 | RT23 | EQUALS | |
| 01621 | | 31,2000 | P30S1A | EQUALS | |
| 0163 | 9 WORDS LEFT | 31,3766 | R34 | EQUALS | |
| 0163 | | 31,3767 | | RNKSUM | 31 |
| 0164 | | 32,2000 | | | |
| 0165 | | 32,2000 | | BANK | 32 |
| 0166 | | 32,2000 | MSGSCAN1 | EQUALS | |
| 0167 | | 32,2000 | RTE | EQUALS | |
| 01675 | | 32,2000 | DELRSP1.1 | EQUALS | |
| 0168 | 18 WORDS LEFT | 32,3755 | IMCAL3 | EQUALS | |
| 0168 | | 32,3756 | | RNKSUM | 32 |
| 0169 | | 33,2000 | | | |
| 0170 | | 33,2000 | | BANK | 33 |
| 0171 | | 33,2000 | TESTLEAD | EQUALS | |
| 0172 | 5 WORDS LEFT | 33,3772 | IMCAL | EQUALS | |
| 0172 | | 33,3773 | | RNKSUM | 33 |
| 0173 | | 34,2000 | | | |
| 0175 | | 34,2000 | | BANK | 34 |
| 0176 | | 34,2000 | P11ONE | EQUALS | |
| 0177 | | 34,2000 | P20S3 | EQUALS | |
| 01775 | | 34,2000 | P20S4 | EQUALS | |
| 0178 | 2 WORDS LEFT | 34,3775 | RTECON | EQUALS | |
| 0178 | | 34,3776 | | RNKSUM | 34 |
| 0179 | | 35,2000 | | | |
| 01795 | | 35,2000 | | BANK | 35 |
| 0180 | | 35,2000 | RTECON1 | EQUALS | |
| 0181 | | 35,2000 | CSI/CDH | EQUALS | |
| 0182 | | 35,2000 | P30S1 | EQUALS | |
| 0183 | | 35,2000 | P30S | EQUALS | |
| 0184 | | 35,2000 | R31 | EQUALS | |
| 0185 | 4 WORDS LEFT | 35,3773 | P17S1 | EQUALS | |
| 0185 | | 35,3774 | | RNKSUM | 35 |
| R01855 | | | | | |
| MODULE 8 CONTAINS BANKS 36 THROUGH 43 | | | | | |
| 0186 | | 36,2000 | | BANK | 36 |
| 0188 | | 36,2000 | MEASINC | EQUALS | |
| 0189 | | 36,2000 | MEASINC1 | EQUALS | |



L TAGS FOR RELATIVE SSTLOC AND BLANK BANK CARDS

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| | | | | | |
|-------|---------------|---------|---------|----------|-----------------|
| 0190 | | 36,2000 | | P178 | EQUALS |
| 0191 | | 36,2000 | | RTS1 | EQUALS |
| 0192 | 9 WORDS LEFT | 36,3700 | 03766 0 | | BNKSUM 36 |
| 0193 | | 36,3707 | 03767 1 | | |
| 0194 | | 37,2000 | | | BANK 37 |
| 0195 | | 37,2000 | | P208 | EQUALS |
| 0196 | | 37,2000 | | BODYATT | EQUALS |
| 0197 | | 37,2000 | | RENDEZ | EQUALS |
| 01975 | | 37,2000 | | SERVICES | EQUALS |
| 0198 | 15 WORDS LEFT | 37,3700 | 03760 0 | P11TWO | EQUALS |
| 0199 | | 37,3761 | 03761 1 | | BNKSUM 37 |
| 0200 | | 40,2000 | | | BANK 40 |
| 0201 | | 40,2000 | | PINSUPR | EQUALS |
| 0202 | | 40,2000 | | SR.FSUPR | EQUALS |
| 0203 | 32 WORDS LEFT | 40,3737 | 03737 1 | PINBALL1 | EQUALS |
| 0204 | | 40,3740 | 03740 1 | | BNKSUM 40 |
| 0205 | | 41,2000 | | | BANK 41 |
| 0206 | 50 WORDS LEFT | 41,3715 | 03715 1 | PINBALL2 | EQUALS |
| 0207 | | 41,3718 | 03718 1 | | BNKSUM 41 |
| 0208 | | 42,2000 | | | BANK 42 |
| 0209 | | 42,2000 | | SRAND | EQUALS |
| 02095 | | 42,2000 | | PINBALL3 | EQUALS |
| 0210 | 58 WORDS LEFT | 42,3765 | 03705 0 | EXTVRS | EQUALS |
| 0211 | | 42,3768 | 03706 0 | | BNKSUM 42 |
| 0212 | | 43,2000 | | | BANK 43 |
| 0213 | | 43,2000 | | SELPHPC | EQUALS |
| 0214 | 13 WORDS LEFT | 43,3762 | 03762 1 | EXTVRRS | EQUALS |
| 0215 | REP 1 | 43,3763 | 03763 0 | | BNKSUM 43 |
| 0216 | REP 1 | 26,3331 | | H16ZEROS | EQUALS ZEROVECS |
| 0217 | REP 1 | 04,3455 | | L06ZEROS | EQUALS ZEROVEC |
| 0218 | REP 1 | 26,3327 | | H10PHALP | EQUALS UNITX |
| 0219 | REP 1 | 04,3453 | | L00PHALP | EQUALS XUNIT |
| 0219 | REP 1 | 26,3321 | | H10P1/4 | EQUALS DP1/4TH |

ZERO VECTOR ALWAYS IN HIGH MEMORY
ZERO VECTOR ALWAYS IN LOW MEMORY



L TAGS FOR RELATIVE SETLOC AND BLANK BANK CARDS

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| | | | | | | | | | | |
|-------|-------|---|------|---------|---------|---|----------|----------|---------------------------|--|
| 0220 | REP | 1 | | 04,3501 | LODP1/4 | EQUALS | D1/4 | 2DEC | .25 | |
| 0221 | REP | 2 | LAST | 31 | 26,3327 | HIUNITX | EQUALS | UNITX | | |
| 0222 | REP | 1 | | | 26,3325 | HIUNITY | EQUALS | UNITY | | |
| 0223 | REP | 1 | | | 26,3323 | HIUNITZ | EQUALS | UNITZ | | |
| 0224 | REP | 2 | LAST | 31 | 04,3453 | LQUNITX | EQUALS | XUNIT | 2DEC .5 | |
| 0225 | REP | 1 | | | 04,3451 | LQUNITY | EQUALS | YUNIT | 2DEC 0 | |
| 0226 | REP | 1 | | | 04,3447 | LQUNITZ | EQUALS | ZUNIT | 2DEC 0 | |
| 0227 | REP | 1 | | | 11,3706 | 3/4LODP | EQUALS | 3/4 | 2DEC 3.0 R-2 | |
| 0228 | REP | 1 | | | 30,2000 | BRANK= | LOWSUPER | | | |
| R0229 | ROPE | | | | | SPECIFIC ASSIGNS OVIATING NEED TO CHECK COMPUTER FLAG IN DETVRUZZING INTEGRATION AREA ENTRIES | | | | |
| 0231 | REP | 1 | | | 13,3036 | OTHPREC | EQUALS | LECPREC | | |
| 0232 | REP | 1 | | | 13,2711 | ATOPORH | EQUALS | ATOPLEM | | |
| 0233 | REP | 1 | | | 13,2636 | ATOPHIS | EQUALS | ATOPCSM | | |
| 0234 | REP | 1 | | | 0173 | MOONHIS | EQUALS | MOONPLG | | |
| 02345 | REP | 1 | | | 0174 | MOONTH | EQUALS | MOONPLG | | |
| 0235 | REP | 1 | | | 13,2651 | MOVATHIS | EQUALS | MOVEACSM | | |
| 0236 | REP | 1 | | | 35,3204 | STATST | EQUALS | V83CALL | * TEMPORARY | |
| 0237 | REP | 1 | | | 13,3022 | THISPREC | EQUALS | CSMPREC | | |
| 0238 | REP | 3 | LAST | 32 | 26,3327 | THISXIS | = | UNITX | | |
| 02385 | REP | 1 | | | 4747 | BRASID | EQUALS | LOV10 | DOWNLINK ERASABLE DUMP ID | |
| 02388 | REP | 1 | | | 6214 | DELAYNM | EQUALS | THREE | | |
| R0239 | ***** | | | | | | | | | |

R0241 THE FOLLOWING ECADRS ARE DEFINED TO FACILITATE BRANK SWITCHING. THEY ALSO MAKE IT EASIER FOR
R0243 ERASABLE CONTROL TO REARRANGE ERASABLE MEMORY WITHOUT DISRUPTING THE PROGRAMS WHICH SET BRANKS.
R0245 PRIOR TO ROPE RELEASE FIXED MEMORY CAN BE SAVED BY SETTING EACH ERXXX =EBRANK (X=4,5,6,7).EBRANK OF COURSE
R0247 WILL BE THE BANK WHERE THE ERASABLES REFERENCED IN ERXXX WILL BE STORED.

| | | | | | | | | | | |
|------|-----|---|------|----|---------|-------|---|-----------|----------|----------|
| 0249 | | | | | 07,2000 | | | BANK | 7 | |
| 0250 | REP | 1 | | | 07,1674 | | | EBRANK= | MARKDOWN | |
| 0251 | REP | 2 | LAST | 32 | 07,2000 | 03674 | 1 | ERMARKDO | ECADR | MARKDOWN |
| 0252 | REP | 1 | | | 07,1725 | | | EBRANK= | MRK(RUP1 | |
| 0253 | REP | 2 | LAST | 32 | 07,2001 | 03725 | 1 | ERMRK(RUP | ECADR | MRK(RUP1 |
| 0254 | | | | | 24,2000 | | | BANK | 24 | |
| 0255 | REP | 1 | | | 07,1431 | | | EBRANK= | DVCNTR | |
| 0256 | REP | 2 | LAST | 32 | 24,2000 | 03431 | 1 | ERDVCNTR | ECADR | DVCNTR |
| 0257 | REP | 1 | | | 07,1672 | | | EBRANK= | F40TMP | |
| 0258 | REP | 2 | LAST | 32 | 24,2001 | 03672 | 1 | ERF40TMP | ECADR | F40TMP |
| 0259 | | | | | 34,2000 | | | BANK | 34 | |
| 0260 | REP | 3 | LAST | 32 | 07,1431 | | | EBRANK= | DVCNTR | |
| 0261 | REP | 4 | LAST | 32 | 34,2000 | 03431 | 1 | ERDVCNTR | ECADR | DVCNTR |
| 0262 | REP | 1 | | | 05,1426 | | | EBRANK= | OPLACES | |
| 0263 | REP | 2 | LAST | 32 | 34,2001 | 02426 | 0 | EROPLACES | ECADR | OPLACES |
| 0264 | | | | | 37,2000 | | | BANK | 37 | |
| 0265 | REP | 1 | | | 1231 | | | EBRANK= | RV1 | |



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L TAGS FOR RELATIVE SETLOC AND BLANK BANK CARDS USER'S PAGE NO. 9 BY 53

0206 RSP 2 LAST 32 37,2000 01231 0 EBRN1 BCADR RN1

R0207 *****



L SUBROUTINE CALLS

USER'S PAGE NO. 1 E0 S3

| | | | |
|------|---------|-------|----------|
| 0001 | 37,2000 | SUBRO | KILBRASE |
| 0002 | 37,2000 | SUBRO | KOOLADE |
| 0003 | 37,2000 | SUBRO | SNOOCH |
| 0004 | 37,2000 | SUBRO | PANDORA |
| 0005 | 37,2000 | SUBRO | DAPCSM |
| 0006 | 37,2000 | SUBRO | BATRAP |

*** END OF MAIN PROGRAM ***

L ERASABLE ASSIGNMENTS

USER'S PAGE NO. 1 E0 93

- R0001 CONVENTIONS AND NOTATIONS UTILIZED FOR ERASABLE ASSIGNMENTS.
- R0002 EQUALS IS USED IN TWO WAYS. IT IS OFTEN USED TO CHAIN A GROUP
R0003 OF ASSIGNMENTS SO THAT THE GROUP MAY BE MOVED WITH THE
R0004 CHANGING OF ONLY ONE CARD. EXAMPLE.
- | | | | |
|-------|---|--------------|---------|
| A0005 | X | EQUALS START | |
| A0006 | Y | EQUALS X | +SIZE.X |
| A0007 | Z | EQUALS Y | +SIZE.Y |
- R0008 (X, Y, AND Z ARE CONSECUTIVE AND BEGIN AT START.)
R0009 USUALLY NUMERIC, IE. 1, 2, 6, 10D ETC.)
R0010 EQUALS OFTEN IMPLIES THE SHARING OF REGISTERS (DIFFERENT NAMES
R0011 AND DIFFERENT INSTRUCTIONS). EXAMPLE.
R0012
- | | | | |
|-------|---|----------|--|
| A0013 | X | EQUALS Y | |
|-------|---|----------|--|
- R0014 = MEANS THAT MULTIPLE NAMES HAVE BEEN GIVEN TO THE SAME DATA.
R0015 (THIS IS LOGICAL EQUIVALENCE, NOT SHARING) EXAMPLE.
- | | | | |
|-------|---|---|---|
| A0016 | X | = | Y |
|-------|---|---|---|
- R0017 THE SIZE AND UTILIZATION OF AN ERASABLE ARE OFTEN INCLUDED IN
R0018 THE COMMENTS IN THE FOLLOWING FORM. M(SIZE)N.
- R0019 M REFERS TO THE MOBILITY OF THE ASSIGNMENT.
R0020 B MEANS THAT THE SYMBOL IS REFERENCED BY BASIC
R0021 INSTRUCTIONS AND THUS IS E-RANK SENSITIVE.
R0022 I MEANS THAT THE SYMBOL IS REFERENCED ONLY BY
R0023 INSTRUCTIVE INSTRUCTIONS, AND IS THUS E-RANK
R0024 INSENSITIVE AND MAY APPEAR IN ANY E-RANK.
- R0025 SIZE IS THE NUMBER OF REGISTERS INCLUDED BY THE SYMBOL.
- R0026 N INDICATES THE NATURE OR PERMANENCE OF THE CONTENTS.
R0027 PL MEANS THAT THE CONTENTS ARE PAD LOADED.
R0028 DSP MEANS THAT THE REGISTER IS USED FOR A DISPLAY.
R0029 PRM MEANS THAT THE REGISTER IS PERMANENT, IE. IT
R0030 IS USED DURING THE ENTIRE MISSION FOR ONE
R0031 PURPOSE AND CANNOT BE SHARED.
R0032 TMP MEANS THAT THE REGISTER IS USED TEMPORARILY OR
R0033 IS A SCRATCH REGISTER FOR THE ROUTINE TO WHICH
R0034 IT IS ASSIGNED. THAT IS, IT NEED NOT BE SET
R0035 PRIOR TO INVOCATION OF THE ROUTINE NOR DOES IT
R0036 CONTAIN USEFUL OUTPUT TO ANOTHER ROUTINE. THUS



L ERASABLE ASSIGNMENTS

USER-S PAGE NO. 2 E0 53

R0037
R0038
R0039
R0040
R0041
R0042

IT MAY BE SHARED WITH ANY OTHER ROUTINE WHICH
IS NOT ACTIVE IN PARALLEL.
IN MEANS INPUT TO THE ROUTINE AND IT IS PROBABLY
TEMPORARY FOR A HIGHER-LEVEL ROUTINE/PROGRAM.
OUT MEANS OUTPUT FROM THE ROUTINE, PROBABLY
TEMPORARY FOR A HIGHER-LEVEL ROUTINE/PROGRAM.



L ERASABLE ASSIGNMENTS

USER=8 PAGE NO. 3 EQ 83

P0050 SPECIAL REGISTERS.

| | | | |
|-------|------------|----------|-----------|
| 0051 | 0000 | A | EQUALS 0 |
| 0052 | 0001 | I | EQUALS 1 |
| 0053 | 0002 | Q | EQUALS 2 |
| 0054 | 0003 | FRANK | EQUALS 3 |
| 0055 | 0004 | FRANK | EQUALS 4 |
| 0056 | 0005 | Z | EQUALS 5 |
| 0057 | 0006 | BRANK | EQUALS 6 |
| A0058 | | | |
| 0059 | 0010 | ARUPT | EQUALS 10 |
| 0060 | 0011 | LARUPT | EQUALS 11 |
| 0061 | 0012 | CRUPT | EQUALS 12 |
| 0062 | 0013 | SAMPTIME | EQUALS 13 |
| 0063 | 0015 | ZRUPT | EQUALS 15 |
| 0064 | 0016 | BANKRUPT | EQUALS 16 |
| 0065 | 0017 | BRUPT | EQUALS 17 |
| 0066 | 0020 | CYR | EQUALS 20 |
| 0067 | 0021 | SR | EQUALS 21 |
| 0068 | 0022 | CYL | EQUALS 22 |
| 0069 | 0023 | EDOP | EQUALS 23 |
| 0070 | 0024 | TIME2 | EQUALS 24 |
| 0071 | 0025 | TIME1 | EQUALS 25 |
| 0072 | 0026 | TIME3 | EQUALS 26 |
| 0073 | 0027 | TIME4 | EQUALS 27 |
| 0074 | 0030 | TIME5 | EQUALS 30 |
| 0075 | 0031 | TIME6 | EQUALS 31 |
| 0076 | 0032 | CDUX | EQUALS 32 |
| 0077 | 0033 | CDUY | EQUALS 33 |
| 0078 | 0034 | CDUZ | EQUALS 34 |
| 0079 | 0035 | CDUT | EQUALS 35 |
| 0080 | REF 1 0035 | OPTX | = CDUT |
| 0081 | 0036 | CDUS | EQUALS 36 |
| 0082 | REF 1 0036 | OPTX | = CDUS |
| 0083 | 0037 | PIPAK | EQUALS 37 |
| 0084 | 0040 | PIPAY | EQUALS 40 |
| 0085 | 0041 | PIPAZ | EQUALS 41 |
| 0086 | 0042 | RMAGX | EQUALS 42 |
| 0087 | 0043 | RMAGY | EQUALS 43 |
| 0088 | 0044 | RMAGZ | EQUALS 44 |
| 0089 | 0045 | INLINK | EQUALS 45 |
| 0090 | 0046 | RNRAD | EQUALS 46 |
| 0091 | 0047 | GYROCTR | EQUALS 47 |
| 0092 | 0047 | GYROCMD | EQUALS 47 |
| 0093 | 0050 | CDUXCMD | EQUALS 50 |
| 0094 | 0051 | CDUYCMD | EQUALS 51 |

L AND Q ARE BOTH CHANNELS AND REGISTERS.

ADJACENT TO FRANK AND BRANK FOR DXCH Z (DTCH) AND DXCH FRANK (DTCP). REGISTER 7 IS A ZERO-SOURCE, USED BY ZL.

INTERRUPT STORAGE.

SAMPLED TIME 1 d 2. (13 AND 14 ARE SPARES.) USUALLY HOLDS FRANK OR BRANK. RESUME ADDRESS AS WELL.

EDITS INTERPRETIVE OPERATION CODE PAIRS.

OPTICS TRUNNION CDU (WAS OPTY).

OPTICS SHAFT CDU (WAS OPTX).



L ERASABLE ASSIGNMENTS

USER'S PAGE NO. 4 E0 53

| | | | | | |
|---|---------------|------|----------|--------|---------|
| 0095 | | 0052 | CDUZCMD | EQUALS | 52 |
| 0096 | | 0053 | CDUTCMD | EQUALS | 53 |
| 0097 | REP 1 | 0053 | OPTXCMD | = | CDUTCMD |
| 0098 | REP 2 LAST 38 | 0053 | TVCYAW | EQUALS | CDUTCMD |
| 0099 | | 0054 | CDUSCMD | EQUALS | 54 |
| 0100 | REP 1 | 0054 | TVCPTCH | EQUALS | CDUSCMD |
| 0101 | REP 2 LAST 38 | 0054 | OPTXCMD | = | CDUSCMD |
| 0102 | | 0055 | EMSD | EQUALS | 55 |
| 0103 | | 0055 | THRUST | EQUALS | 55 |
| 0104 | | 0056 | LENOM | EQUALS | 56 |
| 0105 | | 0057 | OUTLINK | EQUALS | 57 |
| 0106 | | 0060 | ALTM | EQUALS | 60 |
| 0107 | | | | | |
| INTERPRETIVE REGISTERS ADDRESSD RELATIVE TO VAC AREA. | | | | | |
| 0108 | | 0042 | LVSQUARE | EQUALS | 34D |
| 0109 | | 0044 | LW | EQUALS | 38D |
| 0110 | | 0046 | X1 | EQUALS | 38D |
| 0111 | | 0047 | X2 | EQUALS | 39D |
| 0112 | | 0050 | S1 | EQUALS | 40D |
| 0113 | | 0051 | S2 | EQUALS | 41D |
| 0114 | | 0052 | OPRRT | EQUALS | 42D |

OPTICS TRUNNION COMMAND (WAS OPTXCMD).

SPS YAW COMMAND IN TVC MODE.
OPTICS SHAPT COMMAND (WAS OPTXCMD).
SPS PITCH COMMAND IN TVC MODE.

SQUARE OF VECTOR INPUT TO ABVAL AND UNIT
LENGTH OF VECTOR INPUT TO UNIT.
INTERPRETIVE SPECIAL REGISTERS RELATIVE
TO THE WORK AREA.



L ERASABLE ASSIGNMENTS

USER'S PAGE NO. 5 E0 53

P0115 INPUT/OUTPUT CHANNELS

| | | | |
|--------|----------------------------|------|--|
| A01151 | | | *** CHANNEL ZERO IS TO BE USED IN AN INDEXED OPERATION ONLY. *** |
| 01152 | REP 1 | 0001 | LOHAN EQUALS L |
| 01153 | REP 1 | 0002 | OCHAN EQUALS O |
| 0116 | | 0003 | HISCALAR EQUALS 3 |
| 0117 | | 0004 | LOSCALAR EQUALS 4 |
| 0118 | | 0005 | PYJETS EQUALS 5 |
| 0119 | | 0006 | ROLLJETS EQUALS 6 |
| 0120 | | 0007 | SUPERBANK EQUALS 7 |
| 0121 | | 0010 | CUTO EQUALS 10 |
| 0122 | | 0011 | DSALMOUT EQUALS 11 |
| 0123 | | 0012 | CHAN12 EQUALS 12 |
| 0124 | | 0013 | CHAN13 EQUALS 13 |
| 0125 | | 0014 | CHAN14 EQUALS 14 |
| 0126 | | 0015 | MNKEYIN EQUALS 15 |
| 0127 | | 0016 | NAVKEYIN EQUALS 16 |
| 01271 | | 0030 | CHAN30 EQUALS 30 |
| 01272 | | 0031 | CHAN31 EQUALS 31 |
| 01273 | | 0032 | CHAN32 EQUALS 32 |
| 0128 | | 0033 | CHAN33 EQUALS 33 |
| 0129 | | 0034 | DNTM1 EQUALS 34 |
| 0130 | | 0035 | DNTM2 EQUALS 35 |
| R0131 | END OF CHANNEL ASSIGNMENTS | | |



L ERASABLE ASSIGNMENTS

USER=5 PAGE NO. 6 E0 53

| RO135 | FLAGWORDS | STATE | |
|-------|-----------|-----------|-----------|
| RO136 | FLAGRD0 | STATE +0 | (000-014) |
| RO137 | FLAGRD1 | STATE +1 | (015-029) |
| RO138 | FLAGRD2 | STATE +2 | (030-044) |
| RO139 | FLAGRD3 | STATE +3 | (045-059) |
| RO140 | FLAGRD4 | STATE +4 | (060-074) |
| RO141 | FLAGRD5 | STATE +5 | (075-089) |
| RO142 | FLAGRD6 | STATE +6 | (090-104) |
| RO143 | FLAGRD7 | STATE +7 | (105-119) |
| RO144 | FLAGRD8 | STATE +8D | (120-134) |
| RO145 | FLAGRD9 | STATE +9D | (135-149) |

RO146
RO147 SORTED LIST OF

RO148 INTERPRETIVE SWITCH BIT ASSIGNMENTS

| RO149 | INTERPRETIVE SWITCH BIT ASSIGNMENTS | | EQUIVALENT FLAGWORDS |
|----------|-------------------------------------|------|----------------------|
| FLAGWORD | DECIMAL | BIT | FLAG |
| RO151 | 22DSPLG | 032D | BIT 13 FLAG 2 |
| RO152 | 360SW | 134D | BIT 1 FLAG 8 |
| RO153 | 3AKISPLG | 084D | BIT 6 FLAG 5 |
| RO156 | ADVTYK | 125D | BIT 10 FLAG 8 |
| RO157 | APSESW | 130D | BIT 5 FLAG 8 |
| RO159 | ASTNPLG | 108D | BIT 12 FLAG 7 |
| RO161 | ATTCHPLG | 118D | BIT 2 FLAG 7 |
| RO164 | AVGCPFLAG | 029D | BIT 1 FLAG 1 |
| RO165 | AVEMIDSW | 149D | BIT 1 FLAG 9 |
| RO166 | AVPLAG | 040D | BIT 5 FLAG 2 |
| RO169 | CALCMAN2 | 043D | BIT 2 FLAG 2 |
| RO170 | CALCMAN3 | 042D | BIT 3 FLAG 2 |
| RO171 | CHOPPLG | 030D | BIT 12 FLAG 0 |
| RO172 | CHOCNPLG | 123D | BIT 12 FLAG 8 |
| RO173 | CM/DSTBY | 103D | BIT 2 FLAG 6 |
| RO174 | CUAPLAG | 131D | BIT 4 FLAG 8 |
| RO175 | COMPUTER | 082D | BIT 8 FLAG 5 |
| RO176 | CPHIFLAG | 000D | BIT 15 FLAG 0 |
| RO177 | CULTPLG | 053D | BIT 7 FLAG 3 |
| RO178 | CYCLESW | 035D | BIT 10 FLAG 2 |
| RO179 | D6OR9PLG | 058D | BIT 2 FLAG 3 |
| RO180 | DAPRIT1 | 090D | BIT 15 FLAG 6 |
| RO181 | DAPRIT2 | 091D | BIT 14 FLAG 6 |
| RO182 | DIMQFLAG | 059D | BIT 1 FLAG 3 |
| RO184 | DMENPLG | 081D | BIT 9 FLAG 5 |
| RO185 | DRIFTPLG | 030D | BIT 15 FLAG 2 |
| RO186 | DSKYFLAG | 075D | BIT 15 FLAG 5 |



L ERASABLE ASSIGNMENTS

USER=5 PAGE NO. 7 E0 53

| | | | | | |
|--------|----------|------|----------------|----------|---------|
| R0187 | BOSW | 97D | BIT 8 FLAG 6 | KNOWFLG | R57FLAG |
| R0189 | ENG1FLAG | 018D | BIT 12 FLAG 1 | | |
| R0190 | ENG2FLAG | 019D | BIT 11 FLAG 1 | | |
| R0191 | ENGONFLG | 083D | BIT 7 FLAG 5 | | |
| R0193 | ERADFLAG | 017D | BIT 13 FLAG 1 | | |
| R0194 | BTPIFLAG | 038D | BIT 7 FLAG 2 | FIRSTFLG | OPTNSW |
| R0196 | F2RTE | 10D | BIT 5 FLAG 0 | | |
| R0197 | FINALFLG | 039D | BIT 8 FLAG 2 | | |
| R0198 | FIRSTFLG | 38D | BIT 7 FLAG 2 | BTPIFLAG | OPTNSW |
| R0201 | FREEFLAG | 012D | BIT 3 FLAG 0 | | |
| R0202 | GANDIFSW | 094D | BIT 11 FLAG 6 | | |
| R0204 | GLCKPAIL | 048D | BIT 14 FLAG 3 | | |
| R0205 | GMEDRVSW | 095D | BIT 10 FLAG 6 | GONEPAST | |
| R0207 | GONERY | 112D | BIT 8 FLAG 7 | | |
| R0208 | GONEPAST | 095D | BIT 10 FLAG 6 | GMEDRVSW | |
| R0209 | GRBKFLG | 085D | BIT 5 FLAG 5 | | |
| R0211 | GUESSW | 028D | BIT 2 FLAG 1 | | |
| R0212 | GNDIFSW | 104D | BIT 1 FLAG 6 | | |
| R0213 | .05GSW | 102D | BIT 3 FLAG 6 | | |
| R0214 | HIND | 099D | BIT 8 FLAG 6 | | |
| R02152 | IDLEPAIL | 024D | BIT 6 FLAG 1 | | |
| R0216 | IDLEFLAG | 113D | BIT 7 FLAG 7 | | |
| R0217 | IGNFLAG | 107D | BIT 13 FLAG 7 | | |
| R0218 | IMPULSW | 036D | BIT 9 FLAG 2 | | |
| R0219 | IMUSE | 007D | BIT 8 FLAG 0 | | |
| R0220 | INCORFLG | 079D | BIT 11 FLAG 5 | | |
| R0221 | INFINFLG | 128D | BIT 7 FLAG 8 | | |
| R0222 | INRLSW | 100D | BIT 5 FLAG 6 | | |
| R02221 | INTFLAG | 151D | BIT 14 FLAG 10 | | |
| R0225 | INTYFLG | 056D | BIT 4 FLAG 3 | | |
| R0227 | ITSWICH | 106D | BIT 14 FLAG 7 | | |
| R0229 | KFLAG | 014D | BIT 1 FLAG 0 | | |
| R0232 | KNOWFLG | 097D | BIT 8 FLAG 6 | BOSW | R57FLAG |
| R0234 | LATSW | 101D | BIT 4 FLAG 6 | | |
| R0235 | LMOONFLG | 124D | BIT 11 FLAG 6 | | |
| R0236 | LUNAFLAG | 048D | BIT 12 FLAG 3 | | |
| R02395 | MAXDBFLG | 138D | BIT 12 FLAG 9 | | |
| R0240 | MCLVFLAG | 088D | BIT 2 FLAG 5 | | |
| R0241 | MID1FLAG | 147D | BIT 3 FLAG 9 | | |
| R0242 | MIDAVFLG | 148D | BIT 2 FLAG 9 | | |
| R0243 | MIDFLAG | 002D | BIT 13 FLAG 0 | | |
| R0244 | MKVFLAG | 072D | BIT 3 FLAG 4 | | |
| R0245 | MOONFLAG | 003D | BIT 12 FLAG 0 | | |
| R0246 | MRKIDFLG | 060D | BIT 15 FLAG 4 | | |
| R0247 | MRONVFLG | 066D | BIT 9 FLAG 4 | | |
| R0248 | MRUPTFLG | 070D | BIT 5 FLAG 4 | | |
| R0251 | MWAITFLG | 064D | BIT 11 FLAG 4 | | |
| R0252 | N22ORN17 | 144D | BIT 6 FLAG 9 | | |
| R0254 | NEEDLFLG | 006D | BIT 9 FLAG 0 | | |
| R0255 | NEWIFLG | 122D | BIT 13 FLAG 8 | | |



L ERASABLE ASSIGNMENTS

USER-6 PAGE NO. 6 E0 53

| | | | |
|--------|----------|------|---------------|
| R0256 | NJETSFLG | 015D | BIT 15 FLAG 1 |
| R0258 | NODOFLAG | 044D | BIT 1 FLAG 2 |
| R0259 | NORFOR | 004D | BIT 11 FLAG 0 |
| R0260 | NORMSW | 110D | BIT 10 FLAG 7 |
| R0261 | NOSWITCH | 098D | BIT 7 FLAG 6 |
| R0265 | NRMIDFLG | 062D | BIT 13 FLAG 4 |
| R0266 | NRMNFLO | 067D | BIT 8 FLAG 4 |
| R0267 | NRUPTFLG | 071D | BIT 4 FLAG 4 |
| R0268 | NTARGFLG | 102D | BIT 3 FLAG 6 |
| R0269 | NWAITFLG | 065D | BIT 10 FLAG 4 |
| R0272 | OPINSW | 038D | BIT 7 FLAG 2 |
| R0274 | ORBNFLAG | 054D | BIT 6 FLAG 3 |
| R0275 | ORDERSW | 129D | BIT 6 FLAG 8 |
| R02765 | P22RKFLO | 49D | BIT 11 FLAG 3 |
| R0278 | P39/T9SW | 128D | BIT 9 FLAG 8 |
| R0279 | PDSFFLAG | 063D | BIT 12 FLAG 4 |
| R0280 | PFRATFLG | 041D | BIT 4 FLAG 2 |
| R0281 | PINRRFLG | 069D | BIT 6 FLAG 4 |
| R0282 | PRECIFLO | 052D | BIT 8 FLAG 3 |
| R0283 | PRFTRKAT | 080D | BIT 10 FLAG 5 |
| R0284 | PRICDFLO | 061D | BIT 14 FLAG 4 |
| R0285 | PRONVFLG | 068D | BIT 7 FLAG 4 |
| R0286 | QUITFLAG | 145D | BIT 5 FLAG 9 |
| R0287 | R21MARK | 031D | BIT 14 FLAG 2 |
| R0288 | R22CARLO | 143D | BIT 7 FLAG 9 |
| R0290 | R23FLG | 021D | BIT 9 FLAG 1 |
| R0291 | R31FLAG | 148D | BIT 4 FLAG 9 |
| R0293 | R53FLAG | 009D | BIT 6 FLAG 0 |
| R0294 | R57FLAG | 097D | BIT 8 FLAG 6 |
| R0296 | R60FLAG | 086D | BIT 4 FLAG 5 |
| R0297 | REPSMFLG | 047D | BIT 13 FLAG 3 |
| R02971 | REINTFLG | 158D | BIT 7 FLAG 10 |
| R0298 | RELVELSW | 096D | BIT 9 FLAG 6 |
| R0299 | RENDWFLG | 089D | BIT 1 FLAG 5 |
| R0300 | RNDV2FLG | 008D | BIT 7 FLAG 0 |
| R0304 | RPOFLAG | 120D | BIT 15 FLAG 8 |
| R0308 | RVS | 111D | BIT 9 FLAG 7 |
| R0313 | SAVECFLO | 140D | BIT 10 FLAG 9 |
| R0314 | SLOPESW | 027D | BIT 3 FLAG 1 |
| R0315 | SOLNSW | 087D | BIT 3 FLAG 5 |
| R0318 | SOURCFLO | 142D | BIT 8 FLAG 9 |
| R0318 | STATFLG | 055D | BIT 5 FLAG 3 |
| R0319 | STEERSW | 034D | BIT 11 FLAG 2 |
| R0320 | STIKFLAG | 016D | BIT 14 FLAG 1 |
| R03201 | STRULLSW | 92D | BIT 13 FLAG 6 |
| R0321 | SURFFLAG | 127D | BIT 8 FLAG 8 |
| R0323 | SWTOVER | 135D | BIT 15 FLAG 9 |
| R0324 | TARG1FLG | 020D | BIT 10 FLAG 1 |
| R0325 | TARG2FLG | 021D | BIT 9 FLAG 1 |
| R0326 | TERMIFLO | 105D | BIT 15 FLAG 7 |

ETPIFLAG FIRSTFLG

KNOWNFLG EOSW



L ERASABLE ASSIGNMENTS

USER=8 PAGE NO. 9 E0 83

| | | | |
|--------|-----------|------|---------------|
| R0327 | TFPSW | 119D | BIT 1 FLAG 7 |
| R0328 | TIMERFLAG | 109D | BIT 11 FLAG 7 |
| R0329 | TRACFLAG | 025D | BIT 5 FLAG 1 |
| R03295 | TRM03FLAG | 26D | BIT 4 FLAG 1 |
| R0330 | TRUNFLAG | 011D | BIT 4 FLAG 0 |
| R0332 | UPDATFLAG | 023D | BIT 7 FLAG 1 |
| R0334 | UPLOCKFL | 116D | BIT 4 FLAG 7 |
| R0335 | V37FLAG | 114D | BIT 6 FLAG 7 |
| R0336 | V59FLAG | 078D | BIT 12 FLAG 5 |
| R03361 | V67FLAG | 136D | BIT 14 FLAG 9 |
| R03362 | V62EMFLAG | 137D | BIT 13 FLAG 9 |
| R0337 | V94FLAG | 139D | BIT 11 FLAG 9 |
| R0338 | VERUPFLAG | 022D | BIT 8 FLAG 1 |
| R0339 | VERIFLAG | 117D | BIT 3 FLAG 7 |
| R0340 | VFLAG | 050D | BIT 10 FLAG 3 |
| R0341 | VHPFLAG | 141D | BIT 9 FLAG 9 |
| R0343 | VINTFLAG | 057D | BIT 3 FLAG 3 |
| R0344 | XDSLFLAG | 037D | BIT 8 FLAG 2 |
| R0345 | XDSPFLAG | 074D | BIT 1 FLAG 4 |



L ERASABLE ASSIGNMENTS

USER=5 PAGE NO. 10 E0 53

| Address | Mode | Value | Label | Bit | Description |
|---------|-------|-------|------------|---------------|---|
| P0352 | | | FLAGWDO = | STATE +0 | (000-014) |
| 0353 | REP 1 | 0074 | | | (SET) (RESET) |
| A0354 | | | | | |
| A0355 | | | CPHIFLAG = | BIT 15 FLAG 0 | |
| 0356 | | 0000 | | 000D | OUTPUT OF CALOGA IS CPHIX |
| A0357 | | | | | OUTPUT OF CALOGA IS THETAD |
| 03575 | REP 1 | 4874 | CPHIBIT = | BIT15 | |
| A0358 | | | JSWITCH = | BIT 14 FLAG 0 | |
| 0359 | | 0001 | | 001D | INTEGRATION OF W MATRIX |
| A0360 | | | | | INTEGRATION OF STATE VECTOR |
| 03605 | REP 1 | 4875 | JSWCHBIT = | BIT14 | |
| A0361 | | | MIDFLAG = | BIT 13 FLAG 0 | |
| 0362 | | 0002 | | 002D | INTEGRATION WITH SOLAR PERTURBATIONS |
| A0363 | | | | | INTEGRATION WITHOUT SOLAR PERTURBATIONS |
| 03635 | REP 1 | 4876 | MIDFLBIT = | BIT13 | |
| A0364 | | | MOONFLAG = | BIT 12 FLAG 0 | |
| 0365 | | 0003 | | 003D | MOON IS SPHERE OF INFLUENCE |
| A0366 | | | | | EARTH IS SPHERE OF INFLUENCE |
| 03665 | REP 1 | 4877 | MOONBIT = | BIT12 | |
| A0369 | | | NORPHOR = | BIT 11 FLAG 0 | |
| 0370 | | 0004 | | 004D | FAR HORIZON |
| 03705 | REP 1 | 4700 | NORPBIT = | BIT11 | NEAR HORIZON |
| A0373 | | | ZMEASURE = | BIT 10 FLAG 0 | |
| 0374 | | 0005 | | 005D | MEASUREMENT PLANET AND PRIMARY PLANET DIFFERENT |
| A0375 | | | | | MEASUREMENT PLANET AND PRIMARY PLANET SAME |
| A0376 | | | | | |
| 03775 | REP 1 | 4701 | ZMEASBIT = | BIT10 | |
| A0379 | | | NEEDLPLG = | BIT 9 FLAG 0 | |
| 0380 | | 0006 | | 006D | TOTAL ATTITUDE ERROR DISPLAYED |
| A0381 | | | | | A/P FOLLOWING ERROR DISPLAYED |
| 03815 | REP 1 | 4702 | NEEDLRIT = | BIT9 | |
| A0382 | | | IMUSE = | BIT 8 FLAG 0 | |
| 0383 | | 0007 | | 007D | IMJ IN USE |
| | | | | | IMJ NOT IN USE |



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| | | | | | | | |
|-------|-----|--------|------|-------------|---------------|--|----------------------|
| 03835 | REP | 1 | 4703 | IMUSEBIT = | BIT6 | | |
| A0384 | | | | | | | |
| 0385 | | | 0010 | RNDVZPLG = | BIT 7 FLAG 0 | P20 RUNNING | P20 NOT RUNNING |
| 03865 | REP | 1 | 4704 | RNDVZBIT = | BIT7 | | |
| A0390 | | | | | | | |
| 0391 | | | 0011 | RS3FLAG = | BIT 6 FLAG 0 | VS1 INITIATED | VS1 NOT INITIATED |
| 03915 | REP | 1 | 4705 | RS3PLBIT = | BIT6 | | |
| A0395 | | | | | | | |
| 0396 | | | 0012 | F2RTS = | BIT 5 FLAG 0 | IN TIME CRITICAL | NOT IN TIME CRITICAL |
| A0397 | | | | | | MODE | MODE |
| 03975 | REP | 1 | 4706 | F2RTSBIT = | BIT5 | | |
| A0398 | | | | | | | |
| 0399 | | | 0013 | TRUNFLAG = | BIT 4 FLAG 0 | DRIVING OF TRUNNION | DRIVING OF TRUNNION |
| A0400 | | | | | | ALLOWED | NOT ALLOWED |
| 04005 | REP | 1 | 4707 | TRUNBIT = | BIT4 | | |
| A0403 | | | | | | | |
| 0404 | | | 0014 | FREEFLAG = | BIT 3 FLAG 0 | (TEMPORARY FLAG USED IN MANY ROUTINES) | |
| 04045 | REP | 1 | 4710 | FREEPRBIT = | BIT3 | | |
| A0405 | | | | | | | |
| A0406 | | | | | | | |
| A0408 | | | | | | | |
| 0409 | | | 0016 | KFLAG = | BIT 1 FLAG 0 | SEARCH SECTOR MORE | SEARCH SECTOR LESS |
| A0410 | | | | | | THAN 180 DEGREES | THAN 180 DEGREES |
| 04105 | REP | 1 | 4712 | KBIT = | BIT1 | | |
| 0411 | REP | 2 LAST | 44 | FLAGWRD1 = | STATE +1 | (015-029) | |
| A0412 | | | | | | (SET) | (RESET) |
| A0413 | | | | | | | |
| 0414 | | | 0017 | NJETSPLG = | BIT 15 FLAG 1 | TWO JET RCS BURN | FOUR JET RCS BURN |
| 04145 | REP | 2 LAST | 44 | NJETSBIT = | BIT15 | | |
| A0415 | | | | | | | |
| 0416 | | | 0020 | STIKFLAG = | BIT 14 FLAG 1 | RHC CONTROL | GMC CONTROL |



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| | | | | | | | | | |
|--------|-----|---|------|----|------|------------|---------------|---|--------------------------------|
| 04185 | REP | 2 | LAST | 44 | 4675 | STKBIT = | BIT14 | | |
| A0417 | | | | | | | BIT 13 FLAG 1 | | |
| 0418 | | | | | 0021 | BRADFLAG = | 017D | EARTH, COMPUTE FISCHER ELLIPSOID RADIUS | EARTH, USE FIXED RADIUS |
| A0419 | | | | | | | | | |
| A04191 | | | | | | | | | |
| A04192 | | | | | | | | MOON, USE FIXED RADIUS | MOON, USE RLS FOR LUNAR RADIUS |
| A04193 | | | | | | | | | |
| 04195 | REP | 2 | LAST | 44 | 4676 | BRADPBIT = | BIT13 | | |
| A0420 | | | | | | | BIT 12 FLAG 1 | | |
| A0421 | | | | | | | 018D | | |
| A0422 | | | | | | | BIT 11 FLAG 1 | | |
| 0423 | | | | | 0023 | ENG2FLAG = | 019D | RCS BURN | SPS BURN |
| 04235 | REP | 2 | LAST | 44 | 4700 | ENG2BIT = | BIT11 | | |
| A0427 | | | | | | | BIT 10 FLAG 1 | | |
| 0428 | | | | | 0024 | TARG1FLG = | 020D | SIGHTING LEM | NOT SIGHTING LEM |
| 04285 | REP | 2 | LAST | 44 | 4701 | TARG1BIT = | BIT10 | | |
| A0429 | | | | | | | BIT 9 FLAG 1 | | |
| 0430 | | | | | 0025 | TARG2FLG = | 021D | SIGHTING LANDMARK | SIGHTING STAR |
| 04305 | REP | 2 | LAST | 44 | 4702 | TARG2BIT = | BIT9 | | |
| A0431 | | | | | | | BIT 9 FLAG 1 | | |
| 0432 | | | | | 0025 | R23FLG = | 021D | R23 MARKING | R21 MARKING |
| A0433 | | | | | | | | | |
| 04335 | REP | 3 | LAST | 46 | 4702 | R23BIT = | BIT9 | | |
| A0434 | | | | | | | BIT 8 FLAG 1 | | |
| 0435 | | | | | 0026 | VRHUPFLG = | 022D | CSM STATE VECTOR BEING UPDATED | LEM STATE VECTOR BEING UPDATED |
| A0436 | | | | | | | | | |
| 04365 | REP | 2 | LAST | 45 | 4703 | VRHUPBIT = | BIT8 | | |
| A0437 | | | | | | | BIT 7 FLAG 1 | | |
| 0438 | | | | | 0027 | UPDATFLG = | 023D | UPDATING BY MARKS ALLOWED | UPDATING BY MARKS NOT ALLOWED |
| A0439 | | | | | | | | | |
| 04395 | REP | 2 | LAST | 45 | 4704 | UPDATBIT = | BIT7 | | |
| A0440 | | | | | | | BIT 6 FLAG 1 | | |

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| | | | | | | | | |
|--------|-----|---|------|------|------------|------------|------------------|-----------------------|
| 04411 | | | | 0030 | IDLEPAIL = | 024D | INHIBIT R41 | ENABLE R41 (ENOPAIL) |
| 04415 | REP | 2 | LAST | 45 | 4705 | IDLEBIT = | BIT6 | |
| A0442 | | | | | | TRACKFLG = | BIT 5 FLAG 1 | |
| 0443 | | | | 0031 | | 025D | TRACKING ALLOWED | TRACKING NOT ALLOWED |
| 04435 | REP | 2 | LAST | 45 | 4706 | TRACKBIT = | BIT5 | |
| A0444 | | | | | | TRM03FLG = | BIT 4 FLAG 1 | |
| 0445 | | | | 0032 | | 26D | REQUEST TO | NO REQUEST TO |
| 0446 | REP | 2 | LAST | 45 | 4707 | TRM03BIT = | BIT4 | TERMINATE P03 HAS |
| A0447 | | | | | | | BEEN ENTERED | TERMINATE P03 HAS |
| A0450 | | | | | | | | BEEN ENTERED |
| 0451 | | | | 0033 | | SLOPESW = | BIT 3 FLAG 1 | |
| A0452 | | | | | | | 27D | ITERATE WITH BIAS |
| A04521 | | | | | | | | METHOD IN ITERATOR |
| 04525 | REP | 2 | LAST | 45 | 4710 | SLOPBIT = | BIT3 | ITERATE WITH REGULA |
| | | | | | | | | FALSI METHOD IN |
| | | | | | | | | ITERATOR |
| A0456 | | | | | | | BIT 2 FLAG 1 | |
| 0457 | | | | 0034 | | GUESSW = | 028D | NO STARTING VALUE |
| A0458 | | | | | | | | FOR ITERATION |
| | | | | | | | | STARTING VALUE FOR |
| | | | | | | | | ITERATION EXISTS |
| 04585 | REP | 1 | | | 4711 | GUESSBIT = | BIT2 | |
| A0459 | | | | | | | BIT 1 FLAG 1 | |
| 0460 | | | | 0035 | | AVERGFLG = | 029D | AVERAGED (SERVICER) |
| A0461 | | | | | | | | TO CONTINUE |
| | | | | | | | | AVERAGED (SERVICER) |
| | | | | | | | | TO CEASE |
| 04615 | REP | 2 | LAST | 45 | 4712 | AVERBIT = | BIT1 | |
| 0462 | REP | 3 | LAST | 45 | 0076 | FLAGRD2 = | STATE +2 | (030-044) |
| A0463 | | | | | | | | (SET) |
| | | | | | | | | (RESET) |
| A0464 | | | | | | | BIT 15 FLAG 2 | |
| 0465 | | | | 0036 | | DRIFTFLG = | 030D | TRSCRIPT CALLS GYRO |
| A0466 | | | | | | | | COMPENSATION |
| | | | | | | | | TRSCRIPT DOES NO GYRO |
| | | | | | | | | COMPENSATION |
| 04665 | REP | 3 | LAST | 45 | 4674 | DRFTBIT = | BIT15 | |
| A0470 | | | | | | | BIT 14 FLAG 2 | |
| 0471 | | | | 0037 | | R21MARK = | 031D | OPTION ONE FOR |
| A0472 | | | | | | | | MARKRUPT |
| | | | | | | | | OPTION TWO FOR |
| | | | | | | | | MARKRUPT |
| 04725 | REP | 3 | LAST | 46 | 4675 | R21BIT = | BIT14 | |



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| | | | | | | |
|---------------------------------|---------------|--------------|--------------------------|--------------------------------|--|--|
| A0476 0477 04775 | REP 3 LAST 46 | 0040 4676 | 22DSFPLG = 22DSFBIT = | BIT 13 FLAG 2 032D BIT13 | DISPLAY DR,DV | DO NOT DISPLAY DR,DV |
| A0478 A0479 A0480 | | | = | BIT 12 FLAG 2 033D | | |
| A0481 0482 | | 0042 | STERSW = | BIT 11 FLAG 2 034D | STEERING TO BE DONE | STEERING OMITTED |
| 04825 | REP 3 LAST 46 | 4700 | STERSBIT = | BIT11 | | |
| A0483 0484 A0485 | | 0043 | CYCLESW = | BIT 10 FLAG 2 035D | VG CALCULATION TO BE DONE | VG CALCULATION OMITTED |
| 04855 | REP 3 LAST 46 | 4701 | CYCLESBIT = | BIT10 | | |
| A0486 0487 A0488 A0489 | | 0044 | IMPULSW = | BIT 9 FLAG 2 036D | MINIMUM IMPULSE BURN (CUTOFF TIME SPECIFIED) | STEERING BURN (NO CUTOFF TIME YET AVAILABLE) |
| 04895 | REP 4 LAST 46 | 4702 | IMPULBIT = | BIT9 | | |
| A0490 0491 A0492 | | 0045 | XDELVFLG = | BIT 8 FLAG 2 037D | EXTERNAL DELTAV VG COMPUTATION | LAMBERT (AIMPOINT) VG COMPUTATION |
| 04925 | REP 3 LAST 46 | 4704 | XDELVBIT = | BIT7 | | |
| A0493 0494 A0495 | | 0046 | ETPIFLAG = | BIT 7 FLAG 2 038D | ELEVATION ANGLE SUPPLIED FOR P34,74 | TPI TIME SUPPLIED FOR P34,74 |
| A0496 0497 A0498 | REP 1 | 0046 | FIRSTFLG = | BIT 7 FLAG 2 ETPIFLAG | SUCCESSING PASS THRU S40.9 | FIRST PASS THRU S40.9 |
| 04985 | REP 4 LAST 46 | 4704 | FIRSTBIT = | BIT7 | | |
| A0501 0502 | REP 2 LAST 46 | 0046 | OPINSW = | BIT 7 FLAG 2 ETPIFLAG | SOI PHASE P38/P78 | SOR PHASE OF P38/P78 |
| 05025 | REP 3 LAST 47 | 4705 | FINALBIT = | BIT6 | | |
| A0503 | | | | BIT 6 FLAG 2 | | |



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|-------|-----|---|------|----|------|------------|---------------|---------------------|----------------------|
| 05305 | REP | 4 | LAST | 48 | 4676 | REPSBIT = | BIT13 | | |
| A0531 | | | | | | | BIT 12 FLAG 3 | | |
| 0532 | | | | | 0060 | LUNAFLO = | 048D | LUNAR LAT-LONG | EARTH LAT-LONG |
| 05325 | REP | 2 | LAST | 44 | 4677 | LUNABIT = | BIT12 | | |
| A0533 | | | | | | | BIT 11 FLAG 3 | | |
| 0534 | | | | | 0061 | P22*FLO = | 49D | P22 DOWNLINKED MARK | P22 DOWNLINK MARK |
| A0535 | | | | | | | | DATA WAS JUST TAKEN | DATA NOT JUST TAKEN |
| 05355 | REP | 4 | LAST | 48 | 4700 | P22*FBIT = | BIT11 | | |
| A0537 | | | | | | | BIT 10 FLAG 3 | | |
| 0538 | | | | | 0062 | VFLAG = | 050D | LESS THAN TWO STARS | TWO STARS IN FIELD |
| A0539 | | | | | | | | IN FIELD OF VIEW | OF VIEW |
| 05395 | REP | 4 | LAST | 48 | 4701 | VFLACBIT = | BIT10 | | |
| A0540 | | | | | | | BIT 9 FLAG 3 | | |
| A0541 | | | | | | | 051D | | |
| A0542 | | | | | | | BIT 8 FLAG 3 | | |
| 0543 | | | | | 0064 | PRECIFLO = | 052D | CMPREC OR LEMPREC | INTEGRV OR INTEGRVS |
| A0544 | | | | | | | | CALLED | CALLED |
| 05445 | REP | 3 | LAST | 48 | 4703 | PRECIBIT = | BIT8 | | |
| A0545 | | | | | | | BIT 7 FLAG 3 | | |
| 0546 | | | | | 0065 | CULTFLAG = | 053D | STAR OCCULTED | STAR NOT OCCULTED |
| 05465 | REP | 5 | LAST | 48 | 4704 | CULTBIT = | BIT7 | | |
| A0547 | | | | | | | BIT 6 FLAG 3 | | |
| 0548 | | | | | 0066 | ORWFLAG = | 054D | W MATRIX VALID FOR | W MATRIX INVALID FOR |
| A0549 | | | | | | | | ORBITAL NAVIGATION | ORBITAL NAVIGATION |
| 05495 | REP | 4 | LAST | 48 | 4705 | ORWFBIT = | BIT6 | | |
| A0550 | | | | | | | BIT 5 FLAG 3 | | |
| 0551 | | | | | 0067 | STATEFLO = | 055D | PERMANENT STATE | PERMANENT STATE |
| A0552 | | | | | | | | VECTOR UPDATED | VECTOR NOT UPDATED |
| 05525 | REP | 4 | LAST | 49 | 4706 | STATEBIT = | BIT5 | | |
| A0553 | | | | | | | BIT 4 FLAG 3 | | |
| 0554 | | | | | 0070 | INTYPFLO = | 056D | CONIC INTEGRATION | ENCKE INTEGRATION |
| 05545 | REP | 4 | LAST | 49 | 4707 | INTYBIT = | BIT4 | | |



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| | | | | | | |
|---------------------------------|---------------|------|-------------|-----------------------|---|--|
| A0555 0556 A0557 | | 0071 | VINTFLAG = | BIT 3 FLAG 3 057D | CEM STATE VECTOR BEING INTEGRATED | LEM STATE VECTOR BEING INTEGRATED |
| 05575 | REP 4 LAST 49 | 4710 | VINTPBIT = | BIT3 | | |
| A0558 0559 A0560 | | 0072 | D0CR0FLAG = | BIT 2 FLAG 3 056D | DIMENSION OF W IS 9 FOR INTEGRATION | DIMENSION OF W IS 6 FOR INTEGRATION |
| 05605 | REP 3 LAST 49 | 4711 | D0CR0BIT = | BIT2 | | |
| A0561 0562 A0563 | | 0073 | DIM0FLAG = | BIT 1 FLAG 3 059D | W MATRIX IS TO BE USED | W MATRIX IS NOT TO BE USED |
| 0564 | REP 5 LAST 49 | 0100 | FLAGRD4 = | STATE +4 | (060-074) | |
| A0565 | | | | | (SET) | (RESET) |
| 05655 | REP 4 LAST 49 | 4712 | DIM0BIT = | BIT1 | | |
| A0566 0567 A0568 | | 0074 | MRKIDFLAG = | BIT 15 FLAG 4 060D | MARK DISPLAY IN ENDIDLE | NO MARK DISPLAY IN ENDIDLE |
| 05685 | REP 4 LAST 47 | 4874 | MRKIDBIT = | BIT15 | | |
| A0569 0570 A0571 | | 0075 | PRIODFLAG = | BIT 14 FLAG 4 061D | PRIORITY DISPLAY IN ENDIDLE | NO PRIORITY DISPLAY IN ENDIDLE |
| 05715 | REP 5 LAST 49 | 4875 | PRIODBIT = | BIT14 | | |
| A0572 0573 A0574 | | 0076 | NRWIDFLAG = | BIT 13 FLAG 4 062D | NORMAL DISPLAY IN ENDIDLE | NO NORMAL DISPLAY IN ENDIDLE |
| 05745 | REP 5 LAST 50 | 4876 | NRWIDBIT = | BIT13 | | |
| A0575 0576 A0577 | | 0077 | P0SPFLAG = | BIT 12 FLAG 4 063D | CAN'T INTERRUPT PRIORITY DISPLAY | SEE M. HAMILTON |
| 05775 | REP 3 LAST 50 | 4877 | P0SPBIT = | BIT12 | | |
| A0578 0579 A0580 A0581 | | 0100 | MWAITFLAG = | BIT 11 FLAG 4 064D | HIGHER PRIORITY DISPLAY OPERATING WHEN MARK DISPLAY | NO HIGHER PRIORITY DISPLAY OPERATING WHEN MARK DISPLAY |

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| | | | | | | |
|-----------------------------------|---------------------|------|------------|-----------------------|--|--|
| A0611 A0612 A0613 A0614 | | 0107 | NRUPTFLG = | 071D | NORMAL DISPLAY INTERRUPTED BY PRIORITY OR MARK DISPLAY | NORMAL DISPLAY NOT INTERRUPTED BY PRIORITY OR MARK DISPLAY |
| A0615 A0616 A0617 | 06145 REP 5 LAST 50 | 4707 | NRUPTBIT = | BIT4 | | |
| A06179 A0618 A0619 | | 0110 | MCOVFLAG = | BIT 3 FLAG 4 072D | MARK DISPLAY OVER NORMAL | NO MARK DISPLAY OVER NORMAL |
| A0620 A0621 | 06175 REP 5 LAST 51 | 4110 | MCOVBIT = | BIT3 | | |
| A0622 | | | | BIT 2 FLAG 4 073D | DISPLAY BIT CLEARED AT INTERVALS | |
| A0623 | | | | | | |
| A0624 A0625 A0626 A06265 | | 0112 | XDSPFLAG = | BIT 1 FLAG 4 074D | MARK DISPLAY NOT TO BE INTERRUPTED | NO SPECIAL MARK INFORMATION. |
| A0627 A0628 | 06215 REP 5 LAST 51 | 4712 | XDSPBIT = | BIT1 | | |
| A0630 A0631 | 0622 REP 6 LAST 51 | 0101 | FLAGWRD5 = | STATE +5 | (075-099) | |
| A0633 A0638 A0639 | | | | | (SET) | (RESET) |
| A0640 A0641 | | 0113 | DSKYFLAG = | BIT 15 FLAG 5 075D | DISPLAYS SENT TO DSKY | NO DISPLAYS TO DSKY |
| 06395 REP 4 LAST 51 | 4677 | | DSKYBIT = | BIT15 | | |
| 06415 REP 6 LAST 52 | 4700 | | | BIT 14 FLAG 5 76D | | |
| | | | | BIT 13 FLAG 5 77D | | |
| | | 0116 | V59FLAG = | BIT 12 FLAG 5 078D | CALIBRATING FOR P 23 | NORMAL MARKING FOR P 23 |
| | | 0117 | V59FLBIT = | BIT12 | | |
| | | | INCORFLG = | BIT 11 FLAG 5 079D | FIRST INCORPORATION | SECOND INCORPORATION |
| | | | INCORBIT = | BIT11 | | |

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| | | | | | | | | | |
|-------|-----|---|------|----|------|-------------|---------------|---------------------|----------------------|
| 06745 | REP | 6 | LAST | 53 | 4710 | SOLNSBIT = | BIT3 | | |
| A0675 | | | | | | | BIT 2 FLAG 5 | | |
| 0676 | | | | | 0130 | MCLVFLAG = | 088D | LOCAL VERTICAL | MIDDLE GIMBAL ANGLE |
| A0677 | | | | | | | | COORDINATES | COMPUTED |
| A0678 | | | | | | | | COMPUTED | |
| 06785 | REP | 4 | LAST | 51 | 4711 | MCLVFBIT = | BIT2 | | |
| A0679 | | | | | | | BIT 1 FLAG 5 | | |
| 0680 | | | | | 0131 | RENDFWLG = | 089D | W MATRIX VALID | W MATRIX INVALID |
| A0681 | | | | | | | | FOR RENDEZVOUS | FOR RENDEZVOUS |
| A0682 | | | | | | | | NAVIGATION | NAVIGATION |
| 06825 | REP | 6 | LAST | 53 | 4712 | RENDFWBIT = | BIT1 | | |
| 0683 | REP | 7 | LAST | 53 | 0102 | FLAGWRD6 = | STATE +6 | (090-104) | |
| A0684 | | | | | | | | (SET) | (RESET) |
| A0687 | | | | | | | BIT 15 FLAG 6 | | |
| 0688 | | | | | 0132 | DAPBIT1 = | 090D | 1 SATURN 1 TVC | 0 RCS 0 NO |
| 06885 | REP | 6 | LAST | 53 | 4674 | DAP1BIT = | BIT15 | | |
| A0689 | | | | | | | BIT 14 FLAG 6 | | |
| 0690 | | | | | 0133 | DAPBIT2 = | 091D | 1 A/P 0 A/P | 1 A/P 0 A/P |
| 06905 | REP | 6 | LAST | 51 | 4675 | DAP2BIT = | BIT14 | | |
| A0694 | | | | | | | BIT 13 FLAG 6 | | |
| 0695 | | | | | 0134 | STRLLSW = | 92D | DO STERRILL | DO LIAGEOFF ONLY |
| A0696 | | | | | | | | | |
| 06965 | REP | 6 | LAST | 51 | 4676 | STRLLBIT = | BIT13 | | |
| A0697 | | | | | | | BIT 13 FLAG 6 | | |
| 0698 | REP | 1 | | | 0134 | ENTRYDSP = | STRLLSW | DO ENTRY DISPLAY | OMIT ENTRY DISPLAY |
| A0699 | | | | | | | | VIA ENTRYVN. | |
| 06995 | REP | 7 | LAST | 55 | 4676 | ENDSPBIT = | BIT13 | | |
| A0706 | | | | | | | BIT 12 FLAG 6 | | |
| 0707 | | | | | 0135 | CMAPARM = | 093D | ALLOW ENTRY FIRINGS | INHIBIT ENTRY FIRING |
| A0708 | | | | | | | | AND CALCULATIONS | AND CONTROL FUNCTION |
| 07085 | REP | 5 | LAST | 53 | 4677 | CMARBIT = | BIT12 | | |
| A0709 | | | | | | | BIT 11 FLAG 6 | | |
| 0710 | | | | | 0136 | GAMDIFSW = | 094D | CALCULATE GAMDOT | GAMDOT NOT TO BE |



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| Address | REP | LAST | Value | Assignment | Flag | Condition | Action |
|---------|-------|---------|-------|------------|---------------|---|---|
| A0711 | | | | QNDIFBIT = | BIT11 | | CALCULATED |
| 07115 | REP 7 | LAST 53 | 4700 | | | | |
| A0712 | | | | QMDRVSW = | BIT 10 FLAG 6 | | |
| 07113 | | | 0137 | | 095D | TRIMMING OVER | TRIMMING NOT OVER |
| 07135 | REP 7 | LAST 54 | 4701 | QMDRBIT = | BIT10 | | |
| A0714 | | | | QONEPAST = | BIT 10 FLAG 6 | | |
| 07115 | REP 1 | | 0137 | | QMDRVSW | LATERAL CONTROL CALCULATIONS TO BE OMITTED | LATERAL CONTROL CALCULATIONS TO BE DONE |
| A0716 | | | | QONEBIT = | BIT10 | | |
| 07175 | REP 8 | LAST 56 | 4701 | | | | |
| A0718 | | | | RELVELSW = | BIT 9 FLAG 6 | | |
| 07119 | | | 0140 | | 098D | TARGETING USES EARTH-RELATIVE VELOCITY | TARGETING USES INERTIAL VELOCITY |
| A0720 | | | | RELBIT = | BIT9 | | |
| 07215 | REP 7 | LAST 54 | 4702 | | | | |
| A0724 | | | | EGSW = | BIT 8 FLAG 6 | | |
| 0725 | | | 0141 | | 097D | IN FINAL PHASE | NOT IN FINAL PHASE |
| 07255 | REP 6 | LAST 54 | 4703 | EOPLBIT = | BIT8 | | |
| A0726 | | | | KNOWNPLG = | BIT 8 FLAG 6 | | |
| 0727 | REP 1 | | 0141 | | EGSW | LANDMARK KNOWN | LANDMARK UNKNOWN |
| 07275 | REP 7 | LAST 56 | 4703 | KNOWNBIT = | BIT8 | | |
| A0728 | | | | RSTFLAG = | BIT 8 FLAG 6 | | |
| 0729 | REP 1 | | 0141 | | KNOWNPLG | DO NOT DO R57 TRINION BIAS HAS BEEN OBTAINED. | DO R57, TRINION BIAS NEEDED |
| A0730 | | | | RSTBIT = | BIT8 | | |
| 07315 | REP 8 | LAST 56 | 4703 | | | | |
| A0735 | | | | NOSWITCH = | BIT 7 FLAG 6 | | |
| 0736 | | | 0142 | | 098D | LATERAL ROLL MANUEVER INHIBITED IN ENTRY | LATERAL ROLL MANUEVER PERMITTED IN ENTRY |
| 0737 | REP 8 | LAST 54 | 4704 | NOSWBIT = | BIT7 | | |
| A07375 | | | | HIND = | BIT 6 FLAG 6 | | |
| 0740 | | | 0143 | | 099D | ITERATING HINTEST CALCULATIONS TO BE DONE AFTER RANGE | ITERATING OF HINTEST CALCULATIONS TO BE OMITTED AFTER RANGE |
| 0741 | | | | | | | |
| 0742 | | | | | | | |
| 0743 | | | | | | | |



L ERASABLE ASSIGNMENTS

USER=8 PAGE NO. 23 E0 S3

| | | | | | | PREDICTION | PREDICTION |
|-------|-----|---|---------|------|------------|-----------------------|---|
| A0744 | | | | | | | |
| 07445 | REP | 7 | LAST 54 | 4705 | HINDBIT = | BIT6 | |
| A0748 | | | | | | | |
| 0749 | | | | 0144 | INLSW = | BIT 5 FLAG 6 100D | INITIAL ROLL V(LV) |
| A0750 | | | | | | | INITIAL ROLL V(LV) |
| 07505 | REP | 7 | LAST 54 | 4708 | INLBIT = | BIT5 | |
| A0751 | | | | | | | ATTITUDE NOT HELD |
| A0754 | | | | | | | ATTITUDE HELD |
| 0755 | | | | 0145 | LATSW = | BIT 4 FLAG 6 101D | DOWNLIFT NOT INHIBITED |
| A0756 | | | | | | | DOWNLIFT INHIBITED |
| 07585 | REP | 7 | LAST 54 | 4707 | LATSBIT = | BIT4 | |
| A0759 | | | | | | | |
| 0760 | | | | 0146 | .05OSW = | BIT 3 FLAG 6 102D | DRAG OVER .05G |
| 07605 | REP | 7 | LAST 55 | 4710 | .05GRIT = | BIT3 | DRAG LESS THAN .05G |
| A0761 | | | | | | | |
| 0762 | | | | 0146 | NTARCFLO = | BIT 3 FLAG 6 102D | ASTRONAUT DID OVERWRITE DELTA |
| A0763 | | | | | | | ASTRONAUT DID NOT OVERWRITE DELTA |
| 07635 | REP | 8 | LAST 57 | 4710 | NTARCBIT = | BIT3 | |
| A0764 | | | | | | | |
| 0765 | | | | 0147 | CM/DSBY = | BIT 2 FLAG 6 103D | ENTRY DAP ACTIVATED |
| A0766 | | | | | | | ENTRY DAP NOT ACTIVATED |
| 07665 | REP | 5 | LAST 55 | 4711 | CM/DSBIT = | BIT2 | |
| A0769 | | | | | | | |
| 0770 | | | | 0150 | GYNDIPSW = | BIT 1 FLAG 6 104D | CDU DIFFERENCES AND BODY RATES COMPUTED |
| A0775 | | | | | | | CDU DIFFERENCES AND BODY RATES NOT COMPUTED |
| A0776 | | | | | | | |
| 07765 | REP | 7 | LAST 55 | 4712 | GYNDIBIT = | BIT1 | |
| 0777 | REP | 8 | LAST 55 | 0103 | FLAGRD7 = | STATE +7 | (105-119) |
| A0778 | | | | | | | (SET) |
| A0779 | | | | | | | (RESET) |
| 0780 | | | | 0151 | TERMIFLO = | BIT 15 FLAG 7 105D | TERMINATE R21,R22 |
| A0781 | | | | | | | DO NOT TERMINATE R21,R22 |
| 07815 | REP | 7 | LAST 55 | 4674 | TERMBIT = | BIT15 | |



L ERASABLE ASSIGNMENTS

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| | | | | | |
|-----------------------------------|---------------|------|------------|-----------------------|---|
| A0786 0787 A0788 | | 0152 | ITSWICH = | BIT 14 FLAG 7 108D | ACCEPT NEXT LAMBERT TEST LAMBERT ANSWER TPI SEARCH SOLUTION AGAINST LIMITS |
| 07885 | REP 7 LAST 55 | 4875 | ITSWBIT = | BIT14 | |
| A0789 0790 | | 0153 | IGNFLAG = | BIT 13 FLAG 7 107D | TIG HAS ARRIVED TIG HAS NOT ARRIVED |
| 07905 | REP 8 LAST 55 | 4876 | IGNFLBIT = | BIT13 | |
| A0791 0792 A0793 | | 0154 | ASTNFLAG = | BIT 12 FLAG 7 108D | ASTRONAUT HAS QKAYED IGNITION ASTRONAUT HAS NOT QKAYED IGNITION |
| 07935 | REP 6 LAST 55 | 4877 | ASTNBIT = | BIT12 | |
| A0794 0795 | | 0155 | TIMRFLAG = | BIT 11 FLAG 7 109D | CLOCKTASK OPERATING CLOCKTASK INOPERATIVE |
| 07955 | REP 8 LAST 56 | 4700 | TIMRBIT = | BIT11 | |
| A0799 0800 A0801 08015 | REP 9 LAST 56 | 4701 | NORMSW = | BIT 10 FLAG 7 110D | UNIT NORMAL INPUT LAMBERT COMPUTE ITS OWN UNIT NORMAL. |
| 08015 | | | NORMSBIT = | BIT10 | |
| A0806 0807 A08071 A08075 | REP 8 LAST 56 | 4702 | RVSW = | BIT 9 FLAG 7 111D | DO NOT COMPUTE FINAL COMPUTE FINAL STATE VECTOR IN TIME-THETA STATE VECTOR IN TIME-THETA. |
| 08075 | | | RVSMBIT = | BIT9 | |
| A0808 0809 | | 0160 | QONRY = | BIT 8 FLAG 7 112D | PASSED TARGET APPROACHING TARGET |
| 08095 | REP 9 LAST 56 | 4703 | QONRYBIT = | BIT8 | |
| A0810 0811 | | 0161 | IDLEFLAG = | BIT 7 FLAG 7 113D | NO DV MONITOR CONNECT DV MONITOR |
| 08115 | REP 9 LAST 56 | 4704 | IDLEBIT = | BIT7 | |
| A0812 0813 A0814 | | 0162 | V37FLAG = | BIT 6 FLAG 7 114D | AVERAGED (SERVICER) RUNNING AVERAGED (SERVICER) OFF |

L ERASABLE ASSIGNMENTS

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| | | | | | | | | | |
|-------|-----|---|------|----|------|-------------|---------------|--|-------------------------------------|
| 08145 | REP | 8 | LAST | 57 | 4705 | V37FLBIT = | BIT6 | | |
| A0815 | | | | | | | BIT 5 FLAG 7 | | |
| A0816 | | | | | | = | 115D | | |
| A0817 | | | | | | = | BITS | | |
| A0818 | | | | | | | | | |
| A0819 | | | | | | | BIT 4 FLAG 7 | | |
| 0820 | | | | | 0164 | UNLOCKFL = | 116D | K-KBAR-K FAIL | NO K-KBAR-K FAIL |
| 08205 | REP | 8 | LAST | 57 | 4707 | UNLOCKBIT = | BIT4 | | |
| A0821 | | | | | | | BIT 3 FLAG 7 | | |
| 0822 | | | | | 0165 | VERIFLAG = | 117D | CHANGED WHEN V33B OCCURS AT END OF P27 | |
| 08225 | REP | 9 | LAST | 57 | 4710 | VERIFBIT = | BIT3 | | |
| A0823 | | | | | | | BIT 2 FLAG 7 | | |
| 0824 | | | | | 0166 | ATTCHFLD = | 118D | LM,CM ATTACHED | LM,CM NOT ATTACHED |
| 08245 | REP | 6 | LAST | 57 | 4711 | ATTCHBIT = | BIT2 | | |
| A0825 | | | | | | | BIT 1 FLAG 7 | | |
| 0826 | | | | | 0167 | TPFSW = | 119D | CALCULATE TPERICES | CALCULATE TPF |
| 08265 | REP | 8 | LAST | 57 | 4712 | TPFSWBIT = | BIT1 | | |
| 0827 | REP | 9 | LAST | 57 | 0104 | FLAGWRD8 = | STATE +8D | (120-134) | |
| A0828 | | | | | | | | (SET) | (RESET) |
| A0829 | | | | | | | BIT 15 FLAG 8 | | |
| 0830 | | | | | 0170 | RPOFLAG = | 120D | RPO NOT COMPUTED | RPO COMPUTED |
| 08305 | REP | 6 | LAST | 57 | 4674 | RPOFLBIT = | BIT15 | | |
| A0831 | | | | | | | BIT 14 FLAG 8 | | |
| A0832 | | | | | | = | 121D | | |
| A0833 | | | | | | | | | |
| A0834 | | | | | | | BIT 13 FLAG 8 | | |
| 0835 | | | | | 0172 | NEWIFLD = | 122D | FIRST PASS THROUGH INTEGRATION | SUCCESSING ITERATION OF INTEGRATION |
| A0836 | | | | | | | | | |
| 08365 | REP | 9 | LAST | 58 | 4676 | NEWIBIT = | BIT13 | | |
| A0837 | | | | | | | BIT 12 FLAG 8 | | |
| 0838 | | | | | 0173 | CNOONFLD = | 123D | PERMANENT CSM STATE IN LUNAR SPHERE | PERMANENT CSM STATE IN EARTH SPHERE |
| 0839 | REP | 7 | LAST | 58 | 4677 | CNOONBIT = | BIT12 | | |



L ERASABLE ASSIGNMENTS

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| | | | | | | | | |
|--------|-----|----|------|------|-------------|---------------|----------------------|----------------------|
| A0840 | | | | 0174 | LMOONFLG = | BIT 11 FLAG 8 | | |
| 0841 | | | | 4700 | LMOONBIT = | 124D | PERMANENT LM STATE | PERMANENT LM STATE |
| 0842 | REP | 9 | LAST | 58 | | BIT11 | IN LUNAR SPHERE | IN EARTH SPHERE |
| A0843 | | | | 0175 | ADVTRK = | BIT 10 FLAG 8 | | |
| 0844 | | | | | | 125D | ADVANCE GROUND TRACK | NOT ADVANCED |
| A0845 | | | | | | | SIGHTING WANTED | GROUND TRACK |
| 08455 | REP | 10 | LAST | 58 | ADVTRKBIT = | BIT10 | | |
| A0846 | | | | 0176 | P39/79SW = | BIT 9 FLAG 8 | | |
| 0847 | | | | | | 126D | P39/79 OPERATING | P38/78 OPERATING |
| A0848 | | | | | | | | |
| 08485 | REP | 9 | LAST | 58 | P39SWBIT = | BIT9 | | |
| A0849 | | | | 0177 | SURPFLG = | BIT 8 FLAG 8 | | |
| 0850 | | | | | | 127D | LM ON LUNAR SURFACE | LM NOT ON LUNAR |
| A0851 | | | | | | | SURFACE | |
| 08515 | REP | 10 | LAST | 58 | SURPBIT = | BIT8 | | |
| A0854 | | | | 0200 | INFINFLG = | BIT 7 FLAG 8 | | |
| 0855 | | | | | | 128D | NO CONIC SOLUTION | CONIC SOLUTION |
| A0856 | | | | | | | (CLOSURE THROUGH | EXISTS. |
| A08561 | | | | | | | INFINITY REQUIRED). | |
| 08565 | REP | 10 | LAST | 58 | INFINBIT = | BIT7 | | |
| A0857 | | | | 0201 | ORDERSV = | BIT 6 FLAG 8 | | |
| 0858 | | | | | | 129D | ITERATOR USES 2ND | ITERATOR USES 1ST |
| A08581 | | | | | | | ORDER MINIMUM MODE. | ORDER STANDARD MODE. |
| 08585 | REP | 9 | LAST | 59 | ORDERBIT = | BIT6 | | |
| A0859 | | | | 0202 | APSESW = | BIT 5 FLAG 8 | | |
| 0860 | | | | | | 130D | DESIRED OUTSIDE | DESIRED INSIDE |
| A08605 | | | | | | | PERICENTER-APOCENTER | PERICENTER-APOCENTE |
| A0861 | | | | | | | RANGE IN TIME-RAD | RANGE IN TIME-RADIUS |
| 08615 | REP | 8 | LAST | 57 | APSESBIT = | BIT5 | | |
| A0862 | | | | 0203 | COGAFLAG = | BIT 4 FLAG 8 | | |
| 08625 | | | | | | 131D | NO CONIC SOLUTION | CONIC SOLUTION |
| A0863 | | | | | | | TOO CLOSE TO | EXISTS (COGA DOES |
| A08631 | | | | | | | RECTILINEAR (COGA | NOT OVERFLOW). |
| A0864 | | | | | | | OVERFLOWS). | |

L ERASABLE ASSIGNMENTS

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| | | | | | | | | | |
|--------|-----|----|------|----|------|------------|---------------|----------------------|--------------------|
| 08645 | REP | 9 | LAST | 59 | 4707 | COGAPBIT = | BIT4 | | |
| A0865 | | | | | | | BIT 3 FLAG 8 | | |
| A0866 | | | | | | = | 132D | | |
| A0867 | | | | | | | | | |
| A0868 | | | | | | | BIT 2 FLAG 8 | | |
| A0869 | | | | | | = | 133D | | |
| A0870 | | | | | | | BIT 1 FLAG 8 | | |
| 0871 | | | | | 0206 | 360SW = | 134D | TRANSFER ANGLE NEAR | TRANSFER ANGLE NOT |
| A0872 | | | | | | | | 360 DEGREES | NEAR 360 DEGREES |
| 08725 | REP | 9 | LAST | 59 | 4712 | 360SWBIT = | BIT1 | | |
| 0873 | REP | 10 | LAST | 59 | 0105 | FLAGWD9 = | STATE +9D | (135 - 149) | |
| A0874 | | | | | | | | (SET) | (RESET) |
| A0875 | | | | | | | BIT 15 FLAG 9 | | |
| 0876 | | | | | 0207 | SWTOVER = | 135D | SWITCHOVER HAS | NO SWITCHOVER YET |
| A0877 | | | | | | | | OCCURRED | |
| 08775 | REP | 9 | LAST | 59 | 4674 | SWTOVBIT = | BIT15 | | |
| A0878 | | | | | | | BIT 14 FLAG 9 | | |
| 0879 | | | | | 0210 | V87FLAG = | 136D | ASTRONAUT OVERWRITES | ASTRONAUT DOES NOT |
| A08795 | | | | | | | | W MATRIX INITIAL | OVERWRITE INITIAL |
| A08796 | | | | | | | | VALUES | VALUES |
| 087965 | REP | 8 | LAST | 58 | 4675 | V87FLBIT = | BIT14 | | |
| A0880 | | | | | | | BIT 13 FLAG 9 | | |
| 0881 | | | | | 0211 | V82EMPLG = | 137D | MOON VICINITY | EARTH VICINITY |
| A08815 | | | | | | | | | |
| 088155 | REP | 10 | LAST | 59 | 4676 | V82MBIT = | BIT13 | | |
| A0882 | | | | | | | BIT 12 FLAG 9 | | |
| 0883 | | | | | 0212 | MAXDRFLG = | 138D | MAX DR SELECTED | MIN DR SELECTED |
| A0884 | | | | | | | | | |
| 08845 | REP | 8 | LAST | 59 | 4677 | MAXDRBIT = | BIT12 | | |
| A0885 | | | | | | | BIT 11 FLAG 9 | | |
| 0886 | | | | | 0213 | V94FLAG = | 139D | V94 ALLOWED DURING | V94 NOT ALLOWED |
| A0887 | | | | | | | | P23 | |
| 08875 | REP | 10 | LAST | 60 | 4700 | V94FLBIT = | BIT11 | | |



L ERASABLE ASSIGNMENTS

USER'S PAGE NO. 28 Pg 53

| | | | | | | |
|---------------------------------|----------------|------|-------------|-----------------------|---|--|
| A0888 0889 A0890 A0891 | | 0214 | SAVECPLG = | BIT 10 FLAG 9 140D | P23 DISPLAY AND DATA STORAGE AFTER MARK IS DONE | P23 DISPLAY AND DATA STORAGE BEFORE MARK IS DONE |
| 08915 | REP 11 LAST 60 | 4701 | SAVECBIT = | BIT10 | | |
| A0892 0893 A0894 A0895 | | 0215 | VHPRFLAG = | BIT 9 FLAG 9 141D | ALLOW R22 TO ACCEPT RANGE DATA | STOP ACCEPTANCE OF RANGE DATA |
| 08955 | REP 10 LAST 60 | 4702 | VHPRBIT = | BIT9 | | |
| A0896 0897 A0898 A0899 | | 0216 | SOURCEPLG = | BIT 8 FLAG 9 142D | SOURCE OF INPUT DATA IS FROM VHF RADAR | SOURCE OF INPUT DATA IS FROM OPTICS MARK |
| 08995 | REP 11 LAST 60 | 4703 | SOURCEBIT = | BIT8 | | |
| A0900 0901 A0902 | | 0217 | R22CAPLG = | BIT 7 FLAG 9 143D | R-22 CALCULATIONS ARE GOING ON | R-22 CALCULATIONS ARE NOT GOING ON |
| 09025 | REP 11 LAST 60 | 4704 | R22CARBIT = | BIT7 | | |
| A0903 0904 A0905 A0906 | | 0220 | N22ORN17 = | BIT 6 FLAG 9 144D | COMPUTE TOTAL ATTITUDE ERRORS WRT N22 (V62) | COMPUTE TOTAL ATTITUDE ERRORS WRT N17 (V63) |
| 09065 | REP 10 LAST 60 | 4705 | N2217BIT = | BIT6 | | |
| A0907 0908 | | 0221 | QUITFLAG = | BIT 5 FLAG 9 145D | | |
| 09085 | REP 9 LAST 60 | 4706 | QUITBIT = | BIT5 | | |
| A0909 0910 | | 0222 | R31FLAG = | BIT 4 FLAG 9 146D | R31 SELECTED (V63) | R34 SELECTED (V65) |
| 09105 | REP 10 LAST 61 | 4707 | R31FLBIT = | BIT4 | | |
| A0911 0912 A0913 | | 0223 | MID1FLAG = | BIT 3 FLAG 9 147D | INTEGRATE TO TDEC | INTEGRATE TO THE THEN-PRESENT TIME |
| 09135 | REP 10 LAST 59 | 4710 | MID1FBIT = | BIT3 | | |



L ERASABLE ASSIGNMENTS

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| | | | | | | | | | | |
|-------|--------|---------|------|--|------------|--|--|--|--|--|
| A0947 | | | | | | | | | | |
| A0948 | | | | | | | | | | |
| A0949 | | | | | | | | | | |
| | | | | | | | | | | |
| A0950 | | | | | | | | | | |
| 0951 | | | 0236 | | REINTPLG = | | | | | |
| A0952 | | | | | | | | | | |
| 09525 | REP 12 | LAST 62 | 4704 | | REINTBIT = | | | | | |
| | | | | | | | | | | |
| A0953 | | | | | | | | | | |
| A0954 | | | | | | | | | | |
| A0955 | | | | | | | | | | |
| | | | | | | | | | | |
| A0956 | | | | | | | | | | |
| A0957 | | | | | | | | | | |
| A0958 | | | | | | | | | | |
| | | | | | | | | | | |
| A0959 | | | | | | | | | | |
| A0960 | | | | | | | | | | |
| A0961 | | | | | | | | | | |
| | | | | | | | | | | |
| A0962 | | | | | | | | | | |
| A0963 | | | | | | | | | | |
| A0964 | | | | | | | | | | |
| | | | | | | | | | | |
| A0965 | | | | | | | | | | |
| A0966 | | | | | | | | | | |
| A0967 | | | | | | | | | | |
| | | | | | | | | | | |
| A0968 | | | | | | | | | | |
| A0969 | | | | | | | | | | |
| A0970 | | | | | | | | | | |
| | | | | | | | | | | |
| A0971 | | | | | | | | | | |
| 0972 | REP 13 | LAST 63 | 0107 | | FLOWRD11 = | | | | | |
| | | | | | | | | | | |
| A0973 | | | | | | | | | | |
| | | | | | | | | | | |
| A0974 | | | | | | | | | | |
| A0975 | | | | | | | | | | |
| A0976 | | | | | | | | | | |
| | | | | | | | | | | |
| A0977 | | | | | | | | | | |
| A0978 | | | | | | | | | | |
| A0979 | | | | | | | | | | |
| | | | | | | | | | | |
| A0980 | | | | | | | | | | |
| A0981 | | | | | | | | | | |

INTEGRATION ROUTINE TO BE RESTARTED INTEGRATION ROUTINE NOT TO BE RESTARTED

STATE +11D (165 - 179)
(SET) (RESRT)



L ERASABLE ASSIGNMENTS

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| | | |
|-------|---|----------------|
| A0982 | | |
| A0983 | = | BIT 12 FLAG 11 |
| A0984 | | 169D |
| A0986 | | BIT 11 FLAG 11 |
| A0987 | = | 169D |
| A0988 | | |
| A0989 | | BIT 10 FLAG 11 |
| A0990 | = | 170D |
| A0991 | | |
| A0993 | = | 171D |
| A0994 | | |
| A0995 | | BIT 8 FLAG 11 |
| A0996 | = | 172D |
| A0997 | | |
| A0998 | | BIT 7 FLAG 11 |
| A0999 | = | 173D |
| A1000 | | |
| A1001 | | BIT 6 FLAG 11 |
| A1003 | | 174D |
| A1004 | | BIT 5 FLAG 11 |
| A1005 | = | 175D |
| A1006 | | |
| A1007 | | BIT 4 FLAG 11 |
| A1008 | = | 176D |
| A1009 | | |
| A1010 | | BIT 3 FLAG 11 |
| A1011 | = | 177D |
| A1012 | | |
| A1013 | | BIT 2 FLAG 11 |
| A1014 | = | 178D |
| A1016 | | BIT 1 RAO 11 |
| A1017 | = | 179D |
| A1018 | | |



L ERASABLE ASSIGNMENTS

P1019 GENERAL ERASABLE ASSIGNMENTS.

1020 0061 SETLOC 61
 R1021 INTERRUPT TEMPORARY STORAGE POOL. (11D)
 R1022 (ITEMP1 THROUGH RUPTREG4)

R1023 ANY OF THESE MAY BE USED AS TEMPORARIES DURING INTERRUPT OR WITH INTERRUPT INHIBITED. THE ITEMP SERIES
 R1025 IS USED DURING CALLS TO THE EXECUTIVE AND WAITLIST - THE RUPTREGS ARE NOT.

| | | | | | | | | |
|-------|-----|---|------|------|------|----------|--------|-----------|
| 1027 | | | | 0061 | 0061 | ITEMP1 | ERASE | |
| 1028 | REF | 1 | | 0061 | | WAITEXIT | EQUALS | ITEMP1 |
| 1029 | REF | 2 | LAST | 66 | 0061 | EXECTEM1 | EQUALS | ITEMP1 |
| 1030 | | | | 0062 | 0062 | ITEMP2 | ERASE | |
| 1031 | REF | 1 | | 0062 | | WAITBANK | EQUALS | ITEMP2 |
| 1032 | REF | 2 | LAST | 66 | 0062 | EXECTEM2 | EQUALS | ITEMP2 |
| 1033 | | | | 0063 | 0063 | ITEMP3 | ERASE | |
| 1034 | REF | 1 | | 0063 | | RUPTSTOR | EQUALS | ITEMP3 |
| 1035 | REF | 2 | LAST | 66 | 0063 | WAITADR | EQUALS | ITEMP3 |
| 1036 | REF | 3 | LAST | 66 | 0063 | NEWPRIO | EQUALS | ITEMP3 |
| 1037 | | | | 0064 | 0064 | ITEMP4 | ERASE | |
| 1038 | REF | 1 | | 0064 | | LOCCTR | EQUALS | ITEMP4 |
| 1039 | REF | 2 | LAST | 66 | 0064 | WAITTEMP | EQUALS | ITEMP4 |
| 1040 | | | | 0065 | 0065 | ITEMP5 | ERASE | |
| 1041 | REF | 1 | | 0065 | | NEWLOC | EQUALS | ITEMP5 |
| 1042 | | | | 0066 | 0066 | ITEMP6 | ERASE | |
| A1043 | | | | | | NEWLOC+1 | EQUALS | ITEMP6 |
| 1044 | | | | 0067 | | | | SETLOC 67 |
| 1045 | | | | 0067 | 0067 | NEWJOB | ERASE | |
| 1046 | | | | 0070 | 0070 | RUPTREG1 | ERASE | |
| 1047 | | | | 0071 | 0071 | RUPTREG2 | ERASE | |
| 1048 | | | | 0072 | 0072 | RUPTREG3 | ERASE | |
| 1049 | | | | 0073 | 0073 | RUPTREG4 | ERASE | |
| 1050 | REF | 1 | | 0073 | | KEYTEMP1 | EQUALS | RUPTREG4 |
| 1051 | REF | 2 | LAST | 66 | 0073 | DSRUPTEM | EQUALS | RUPTREG4 |

DP ADDRESS.

MUST BE AT LOC 67 DUE TO WIRING.

R1052 FLAGWORD RESERVATIONS.

(12D)

| | | | | | | | | |
|------|--|--|--|------|------|----------|-------|------|
| 1054 | | | | 0074 | 0107 | STATE | ERASE | +11D |
| 1055 | | | | 0110 | 0113 | FLAGFILL | ERASE | +3 |

SPACE FOR FUTURE FLAGS



L ERASABLE ASSIGNMENTS

USER-S PAGE NO. 33 E0 83

| | | | | | | | | | | | |
|--------|-----|----|---------|------|------|----------|--------|-------------|----|--|--|
| R10554 | | | | | | | | | | | (1) |
| | | | | | | | | | | | |
| 10556 | REP | 1 | | 0110 | | ENDOT | EQUALS | FLAGFILL | | | I(1)PL (SPS FLOW RATE, SC.AT B+3KO/CS) |
| R10557 | | | | | | | | | | | (1D) |
| 10559 | REP | 2 | LAST 67 | 0112 | | STATXIT | EQUALS | FLAGFILL +2 | | | I(1) STQ ADDRESS FOR STATEXTP |
| R1056 | | | | | | | | | | | |
| R1057 | | | | | | | | | | | (32D) |
| | | | | | | | | | | | |
| 1059 | | | | 0114 | 0114 | INTB15+ | ERASE | | | | REFLECTS 15TH BIT OF INDEXABLE ADDRESSES |
| 1060 | REP | 1 | | 0114 | | DSEXIT | EQUALS | INTB15+ | | | RETURN FOR DSPIN |
| 1061 | REP | 2 | LAST 67 | 0114 | | EXITEM | EQUALS | INTB15+ | | | RETURN FOR SCALE FACTOR ROUTINE SELECT |
| 1062 | REP | 3 | LAST 67 | 0114 | | BLANKRET | EQUALS | INTB15+ | | | RETURN FOR 2BLANK |
| | | | | | | | | | | | |
| 1063 | | | | 0115 | 0115 | INTBIT15 | ERASE | | | | SIMILAR TO ABOVE. |
| 1064 | REP | 1 | | 0115 | | WRDRET | EQUALS | INTBIT15 | | | RETURN FOR 5BLANK |
| 1065 | REP | 2 | LAST 67 | 0115 | | WRDRET | EQUALS | INTBIT15 | | | RETURN FOR DSPWD |
| 1066 | REP | 3 | LAST 67 | 0115 | | DECRET | EQUALS | INTBIT15 | | | RETURN FOR PUTCOM(DEC LOAD) |
| 1067 | REP | 4 | LAST 67 | 0115 | | 21/22REG | EQUALS | INTBIT15 | | | TEMP FOR CHARIN |
| | | | | | | | | | | | |
| R1068 | | | | | | | | | | | THE REGISTERS BETWEEN ADDRWD AND PRIORITY MUST STAY IN THE FOLLOWING ORDER FOR INTERPRETIVE TRACE. |
| | | | | | | | | | | | |
| 1070 | | | | 0116 | 0116 | ADDRWD | ERASE | | | | 12 BIT INTERPRETIVE OPERAND SUB-ADDRESS. |
| 1071 | | | | 0117 | 0117 | POLISH | ERASE | | | | HOLDS CADR MADE FROM POLISH ADDRESS. |
| 1072 | REP | 1 | | 0117 | | UPDATRET | EQUALS | POLISH | | | RETURN FOR UPDATNN, UPDATVB |
| 1073 | REP | 2 | LAST 67 | 0117 | | CHAR | EQUALS | POLISH | | | TEMP FOR CHARIN |
| 1074 | REP | 3 | LAST 67 | 0117 | | ERONT | EQUALS | POLISH | | | COUNTER FOR ERROR LIGHT RESET |
| 1075 | REP | 4 | LAST 67 | 0117 | | DECOUNT | EQUALS | POLISH | | | COUNTER FOR SCALING AND DISPLAY (DEC) |
| | | | | | | | | | | | |
| 1076 | | | | 0120 | 0120 | FIXLOC | ERASE | | | | WORK AREA ADDRESS. |
| 1077 | | | | 0121 | 0121 | OVIND | ERASE | | | | SET NON-ZERO ON OVERFLOW. |
| | | | | | | | | | | | |
| 1078 | | | | 0122 | 0127 | VRUP | ERASE | +5 | | | TEMPORARY STORAGE USED FOR VECTORS. |
| 1079 | REP | 1 | | 0122 | | SGNON | EQUALS | VRUP | | | TEMP FOR +, - ON |
| 1080 | REP | 2 | LAST 67 | 0122 | | NCUNTEM | EQUALS | VRUP | | | COUNTER FOR MIXNOUN FETCH |
| 1081 | REP | 3 | LAST 67 | 0122 | | DISTEM | EQUALS | VRUP | | | COUNTER FOR OCTAL DISPLAY VERRS |
| 1082 | REP | 4 | LAST 67 | 0122 | | DECTEM | EQUALS | VRUP | | | COUNTER FOR FETCH (DEC DISPLAY VERRS) |
| | | | | | | | | | | | |
| 1083 | REP | 5 | LAST 67 | 0123 | | SGNOFF | EQUALS | VRUP | +1 | | TEMP FOR +, - ON |
| 1084 | REP | 6 | LAST 67 | 0123 | | NVTEMP | EQUALS | VRUP | +1 | | TEMP FOR NVSUB |
| 1085 | REP | 7 | LAST 67 | 0123 | | SPTMP1 | EQUALS | VRUP | +1 | | STORAGE FOR SP CONST HI PART(=SPTMP2-1) |
| 1086 | REP | 8 | LAST 67 | 0123 | | HITEMIN | EQUALS | VRUP | +1 | | TEMP FOR LOAD OF HRS, MIN, SEC |
| A1087 | | | | | | | | | | | MUST = LOTRMIN-1. |
| 1088 | REP | 9 | LAST 67 | 0124 | | CODE | EQUALS | VRUP | +2 | | FOR DSPIN |
| 1089 | REP | 10 | LAST 67 | 0124 | | SPTMP2 | EQUALS | VRUP | +2 | | STORAGE FOR SP CONST LO PART(=SPTMP1+1) |
| 1090 | REP | 11 | LAST 67 | 0124 | | LOTRMIN | EQUALS | VRUP | +2 | | TEMP FOR LOAD OF HRS, MIN, SEC |
| A1091 | | | | | | | | | | | MUST = HITEMIN+1. |

L ERASABLE ASSIGNMENTS

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| | | | | | | | | | | |
|-------|--|----|------|----|------|---------|----------|--------|--------|--|
| 1092 | REP | 12 | LAST | 67 | 0125 | MIXTEMP | EQUALS | VBUP | +3 | FOR MIXNOUN DATA |
| 1093 | REP | 13 | LAST | 68 | 0125 | SIGNRET | EQUALS | VBUP | +3 | RETURN FOR +,- ON |
| R1094 | ALSO MIXTEMP+1 = VBUP+4, MIXTEMP+2 = VBUP+5. | | | | | | | | | |
| 1095 | | | | | 0130 | 0132 | BUF | ERASE | +2 | TEMPORARY SCALAR STORAGE. |
| 1096 | | | | | 0133 | 0134 | BUF2 | ERASE | +1 | |
| 1097 | REP | 1 | | | 0130 | | INDEXLOC | EQUALS | BUF | CONTAINS ADDRESS OF SPECIFIED INDEX. |
| 1098 | REP | 2 | LAST | 68 | 0130 | | SWWORD | EQUALS | BUF | ADDRESS OF SWITCH WORD. |
| 1099 | REP | 3 | LAST | 68 | 0131 | | SWBIT | EQUALS | BUF +1 | SWITCH BIT WITHIN SWITCH WORD. |
| 1100 | | | | | 0135 | 0135 | MPTEMP | ERASE | | TEMPORARY USED IN MULTIPLY AND SHIFT. |
| 1101 | REP | 1 | | | 0135 | | DMPNTEMP | EQUALS | MPTEMP | DMPNTEMP TEMPORARY |
| 1102 | | | | | 0136 | 0136 | DOTINC | ERASE | | COMPONENT INCREMENT FOR DOT SUBROUTINE. |
| 1103 | REP | 1 | | | 0136 | | DVSIGN | EQUALS | DOTINC | DETERMINES SIGN OF DDV RESULT. |
| 1104 | REP | 2 | LAST | 68 | 0136 | | ESCAPE | EQUALS | DOTINC | USED IN ARCSIN/ARCCOS. |
| 1105 | REP | 3 | LAST | 68 | 0136 | | ENTRET | EQUALS | DOTINC | EXIT FROM ENTER |
| 1106 | | | | | 0137 | 0137 | DOTRET | ERASE | | RETURN FROM DOT SUBROUTINE. |
| 1107 | REP | 1 | | | 0137 | | DVNORMCT | EQUALS | DOTRET | DIVIDEND NORMALIZATION COUNT IN DDV. |
| 1108 | REP | 2 | LAST | 68 | 0137 | | ESCAPE2 | EQUALS | DOTRET | ALTERNATE ARCSIN/ARCCOS SWITCH. |
| 1109 | REP | 3 | LAST | 68 | 0137 | | WDNCT | EQUALS | DOTRET | CHAR COUNTER FOR DSPWD |
| 1110 | REP | 4 | LAST | 68 | 0137 | | INREL | EQUALS | DOTRET | INPUT BUFFER SELECTOR (X,Y,Z, REG) |
| 1111 | | | | | 0140 | 0140 | MATINC | ERASE | | VECTOR INCREMENT IN MKV AND VKM. |
| 1112 | REP | 1 | | | 0140 | | MAXDVS | EQUALS | MATINC | +0 IF DP QUOTIENT IS NEAR ONE - ELSE -1. |
| 1113 | REP | 2 | LAST | 68 | 0140 | | POLYCNT | EQUALS | MATINC | POLYNOMIAL LOOP COUNTER |
| 1114 | REP | 3 | LAST | 68 | 0140 | | DSPMTEM | EQUALS | MATINC | DSPCOUNT SAVE FOR DSPMM |
| 1115 | REP | 4 | LAST | 68 | 0140 | | MIXRR | EQUALS | MATINC | INDICATOR FOR MIXED OR NORMAL NOUN |
| 1116 | | | | | 0141 | 0141 | TEM1 | ERASE | | EXEC TEMP |
| 1117 | REP | 1 | | | 0141 | | POLYRET | EQUALS | TEM1 | |
| 1118 | REP | 2 | LAST | 68 | 0141 | | DSREL | EQUALS | TEM1 | REL ADDRESS FOR DSPIN |
| 1119 | | | | | 0142 | 0142 | TEM2 | ERASE | | EXEC TEMP |
| 1120 | REP | 1 | | | 0142 | | DSMAG | EQUALS | TEM2 | MAGNITUDE STORE FOR DSPIN |
| 1121 | REP | 2 | LAST | 68 | 0142 | | IDADDTEM | EQUALS | TEM2 | MIXNOUN INDIRECT ADDRESS STORAGE |
| 1122 | | | | | 0143 | 0143 | TEM3 | ERASE | | EXEC TEMP |
| 1123 | REP | 1 | | | 0143 | | COUNT | EQUALS | TEM3 | FOR DSPIN |
| 1124 | | | | | 0144 | 0144 | TEM4 | ERASE | | EXEC TEMP |
| 1125 | REP | 1 | | | 0144 | | LSTPTR | EQUALS | TEM4 | LIST POINTER FOR GRARUSY |
| 1126 | REP | 2 | LAST | 68 | 0144 | | RELRET | EQUALS | TEM4 | RETURN FOR RELDSP |
| 1127 | REP | 3 | LAST | 68 | 0144 | | FRERET | EQUALS | TEM4 | RETURN FOR FRERDSP |
| 1128 | REP | 4 | LAST | 68 | 0144 | | DSPDRET | EQUALS | TEM4 | RETURN FOR DSPSIGN |
| 1129 | REP | 5 | LAST | 68 | 0144 | | SEPSRET | EQUALS | TEM4 | RETURN FOR SEPSSEC |
| 1130 | REP | 6 | LAST | 68 | 0144 | | SEPMRET | EQUALS | TEM4 | RETURN FOR SEPMIN |
| 1131 | | | | | 0145 | 0145 | TEM5 | ERASE | | EXEC TEMP |
| 1132 | REP | 1 | | | 0145 | | NOUNADD | EQUALS | TEM5 | TEMP STORAGE FOR NOUN ADDRESS |

L ERASABLE ASSIGNMENTS

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P1150 DYNAMICALLY ALLOCATED CORE SETS FOR JOBS.

(84D)

| | | | | | | | |
|------|--|------|------|----------|-------|------|---|
| 1152 | | 0154 | 0162 | MPAC | ERASE | +6 | MULTI-PURPOSE ACCUMULATOR. |
| 1153 | | 0163 | 0163 | MODE | ERASE | | +1 FOR TP, +0 FOR DP, OR -1 FOR VECTOR. |
| 1154 | | 0164 | 0164 | LOC | ERASE | | LOCATION ASSOCIATED WITH JOB. |
| 1155 | | 0165 | 0165 | BANKSET | ERASE | | USUALLY CONTAINS BANK SETTING. |
| 1156 | | 0166 | 0166 | PUSHLOC | ERASE | | WORD OF PACKED INTERPRETIVE PARAMETERS. |
| 1157 | | 0167 | 0167 | PRIORITY | ERASE | | PRIORITY OF PRESENT JOB AND WORK AREA. |
| 1158 | | 0170 | 0277 | | ERASE | +71D | SEVEN SETS OF 12 REGISTERS EACH. |

R1159 SPECIAL DOWNLINK BUFFER, -OVERLAYS BY P27 STORAGE-

R1160 P27(UPDATE PROGRAM) STORAGE, -OVERLAYS SPEC DNLNK BUFF-

(24D)

| | | | | | | | |
|------|-----|------|------|----------|-----------------|------|--|
| 1162 | | 0300 | 0327 | COMPNUMB | ERASE | +23D | B(1)TMP NUMBER OF ITEMS TO BE UPLINKED. |
| 1163 | REF | 1 | 0301 | UPCLDMOD | EQUALS COMPNUMB | +1 | B(1)TMP HOLDS INTERRUPTED PROGRAM NUMBER |
| 1164 | REF | 1 | 0302 | UPVERB | EQUALS UPCLDMOD | +1 | B(1) TMP VERB NUMBER |
| 1165 | REF | 1 | 0303 | UPCOUNT | EQUALS UPVERB | +1 | B(1)TMP UPRUFF INDEX |
| 1166 | REF | 1 | 0304 | UPRUFF | EQUALS UPCOUNT | +1 | B(20D) |

R1166 MORE P27 STORAGE.

(2D)

| | | | | | | | |
|------|-----|------|------|----------|---------------|--|-----------------|
| 1170 | | 0330 | 0330 | UPTEMP | ERASE | | B(1)TMP SCRATCH |
| 1171 | | 0331 | 0331 | UPVERBSV | ERASE | | B(1)TMP |
| 1172 | REF | 1 | 0330 | INTWAK1Q | EQUALS UPTEMP | | (66D) |

(20 REGISTERS OF ENTRY DOWNLINK WILL GO HERE.)

A1181

THE FOLLOWING ARE INDEXED FOR TM. IN ENTRY DAP.

| | | | | | | | |
|-------|-----|---|------|---------|---|--------------|--------------------------------------|
| 1182 | REF | 1 | 0304 | CMYTIME | = | UPRUFF | B(1) (VEHICLE BODY RATE INFO IS |
| 1183 | REF | 1 | 0305 | SW/NDX | = | CMYTIME +1 | B(1) TELEMETRED EACH 0.2 SEC. DURING |
| 1184 | REF | 2 | 0324 | ENDRUP | = | CMYTIME +16D | B(1) ENTRY.) |
| 11842 | REF | 1 | 0325 | V1 | = | ENDRUP +1 | I(2) REENTRY, P84-P85 |
| 11843 | REF | 1 | 0327 | A0 | = | V1 +2 | I(2) REENTRY, P84-P85 |

A11844
R1185

HI-ORDER WORD ONLY ON DNLNK.

R1186 ALIGNMENT STORAGE.

(5D)

R1188 (CANNOT SHARE WITH PRECISION INTEGRATION OR KEPLER STORAGE.)

| | | | | | | | | |
|------|-----|---|------|----|------|----------|-----------------|---------|
| 1189 | REF | 2 | LAST | IO | 0300 | QMAJ | EQUALS COMPNUMB | B(1)TMP |
| 1190 | REF | 1 | | | 0301 | MARKINDX | EQUALS QMAJ | +1 |
| 1191 | REF | 1 | | | 0302 | BESTI | EQUALS MARKINDX | +1 |
| 1192 | REF | 1 | | | 0303 | BESTJ | EQUALS BESTI | +1 |
| 1193 | REF | 1 | | | 0304 | STARIND | EQUALS BESTJ | +1 |



L ERASABLE ASSIGNMENTS

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| | | | | | | |
|-------|---------------|------|------|--|-------------|--|
| R1234 | | | | UNSWITCHED FOR DISPLAY INTERPACE ROUTINES. | | (10D) |
| 1236 | | 0366 | 0366 | RESTRG ERASE | | |
| 1237 | | 0367 | 0367 | NVORD ERASE | | B(1)PRM FOR DISPLAY RESTARTS |
| 1238 | | 0370 | 0370 | MAROV ERASE | | |
| 1239 | | 0371 | 0371 | NVSAVE ERASE | | |
| R1240 | | | | (RETAIN THE ORDER OF CADRFLSH TO FAILREG +2 FOR DOWNLINK PURPOSES) | | |
| 1242 | | 0372 | 0372 | CADRFLSH ERASE | | B(1)TMP |
| 1243 | | 0373 | 0373 | CADRMARK ERASE | | B(1)TMP |
| 1244 | | 0374 | 0374 | TEMPFLSH ERASE | | B(1)TMP |
| 1245 | | 0375 | 0377 | FAILREG ERASE | +2 | B(3)PRM 3 ALARM-ABORT USER=8 2CADR |
| 1246 | | 0400 | | | | |
| R1247 | | | | VAC AREAS. -BE CAREFUL OF PLACEMENT- | SETLOC 400 | (220D) |
| 1249 | | 0400 | 0400 | VAC1USE ERASE | | B(1)PRM |
| 1250 | | 0401 | 0453 | VAC1 ERASE | +42D | B(43)PRM |
| 1251 | | 0454 | 0454 | VAC2USE ERASE | | B(1)PRM |
| 1252 | | 0455 | 0527 | VAC2 ERASE | +42D | B(43)PRM |
| 1253 | | 0530 | 0530 | VAC3USE ERASE | | B(1)PRM |
| 1254 | | 0531 | 0603 | VAC3 ERASE | +42D | B(43)PRM |
| 1255 | | 0604 | 0604 | VAC4USE ERASE | | B(1)PRM |
| 1256 | | 0605 | 0657 | VAC4 ERASE | +42D | B(43)PRM |
| 1257 | | 0660 | 0660 | VAC5USE ERASE | | B(1)PRM |
| 1258 | | 0661 | 0733 | VAC5 ERASE | +42D | B(43)PRM |
| R1259 | | | | WAITLIST REPEAT FLAG. | | (1D) |
| 1261 | | 0734 | 0734 | RUPTAGN ERASE | | B(1)PRM |
| 1262 | REP 1 | 0734 | | KEYTEMP2 = | RUPTAGN | |
| R1263 | | | | STARALGN ERASABLES. | | (13D) |
| 1265 | | 0735 | 0735 | STARCODE ERASE | | B(1)DSP NQIN 70 FOR P22,51 AND R52,53. |
| 1266 | | 0736 | 0751 | STARALGN ERASE | +11D | |
| 1267 | REP 1 | 0736 | | SINCDU = | STARALGN | |
| 1268 | REP 2 LAST 72 | 0744 | | COSCDU = | STARALGN +6 | |
| 1269 | REP 1 | 0742 | | SINCDUX = | SINCDU +4 | |
| 1270 | REP 2 LAST 72 | 0736 | | SINCDUY = | SINCDU | |
| 1271 | REP 3 LAST 72 | 0740 | | SINCDUZ = | SINCDU +2 | |
| 1272 | REP 1 | 0750 | | COSCDUX = | COSCDU +4 | |
| 1273 | REP 2 LAST 72 | 0744 | | COSCDUY = | COSCDU | |
| 1274 | REP 3 LAST 72 | 0746 | | COSCDUZ = | COSCDU +2 | |
| R1275 | | | | PHASE TABLE AND RESTART COUNTERS. | | (12D) |



L ERASABLE ASSIGNMENTS

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| | | | | | | | | |
|-------|-----|---|----------------------------|------|------------|------------|--|--------------------------------------|
| 1277 | | | 0752 | 0752 | -PHASE1 | ERASE | | B(1)PRM |
| 1278 | | | 0753 | 0753 | PHASE1 | ERASE | | B(1)PRM |
| 1279 | | | 0754 | 0754 | -PHASE2 | ERASE | | B(1)PRM |
| 1280 | | | 0755 | 0755 | PHASE2 | ERASE | | B(1)PRM |
| 1281 | | | 0756 | 0756 | -PHASE3 | ERASE | | B(1)PRM |
| 1282 | | | 0757 | 0757 | PHASE3 | ERASE | | B(1)PRM |
| 1283 | | | 0760 | 0760 | -PHASE4 | ERASE | | B(1)PRM |
| 1284 | | | 0761 | 0761 | PHASE4 | ERASE | | B(1)PRM |
| 1285 | | | 0762 | 0762 | -PHASE5 | ERASE | | B(1)PRM |
| 1286 | | | 0763 | 0763 | PHASE5 | ERASE | | B(1)PRM |
| 1287 | | | 0764 | 0764 | -PHASE6 | ERASE | | B(1)PRM |
| 1288 | | | 0765 | 0765 | PHASE6 | ERASE | | B(1)PRM |
| R1289 | | | AX*SR*ST STORAGE. | | | | | B(1)PRM (8D) |
| 1291 | | | 0766 | 0773 | CDUSPOT | ERASE +5 | | B(6) |
| 1292 | REP | 1 | | 0766 | CDUSPOTY = | CDUSPOT | | |
| 1293 | REP | 2 | LAST 73 | 0770 | CDUSPOTZ = | CDUSPOT +2 | | |
| 1294 | REP | 3 | LAST 73 | 0772 | CDUSPOTX = | CDUSPOT +4 | | |
| R1299 | | | VERB 37 STORAGE. | | | | | (2D) |
| 1301 | | | 0774 | 0774 | MINDEX | ERASE | | B(1)TMP INDEX FOR MAJOR MODE |
| 1302 | | | 0775 | 0775 | MNUMBER | ERASE | | B(1)TMP MAJOR MODE REQUESTED VIA V37 |
| R1303 | | | PINBALL INTERRUPT STORAGE. | | | | | (1D) |
| 1305 | | | 0776 | 0776 | DSPCNT | ERASE | | B(1)PRM DSPCNT COUNTER |
| R1306 | | | PINBALL EXECUTIVE ACTION. | | | | | (44D) |
| 1308 | | | 0777 | 0777 | DSPCNT | ERASE | | DISPLAY POSITION INDICATOR |
| 1309 | | | 1000 | 1000 | DECPNCH | ERASE | | .DEC, - DEC, OCT INDICATOR |
| 1310 | | | 1001 | 1001 | VERBREG | ERASE | | VERB CODE |
| 1311 | | | 1002 | 1002 | NOUNREG | ERASE | | NOUN CODE |
| 1312 | | | 1003 | 1003 | XREG | ERASE | | R1 INPUT BUFFER |
| 1313 | | | 1004 | 1004 | YREG | ERASE | | R2 INPUT BUFFER |
| 1314 | | | 1005 | 1005 | ZREG | ERASE | | R3 INPUT BUFFER |
| 1315 | | | 1006 | 1006 | XREGLP | ERASE | | LO PART OF XREG (FOR DEC CONV ONLY) |
| 1316 | | | 1007 | 1007 | YREGLP | ERASE | | LO PART OF YREG (FOR DEC CONV ONLY) |
| 1317 | REP | 1 | | 1007 | HITEMOUT = | YREGLP | | TEMP FOR DISPLAY OF HRS, MIN, SEC |
| A1318 | | | | | | | | MUST = LITEMOUT-1. |
| 1319 | | | 1010 | 1010 | ZREGLP | ERASE | | LO PART OF ZREG (FOR DEC CONV ONLY) |
| 1320 | REP | 1 | | 1010 | LITEMOUT = | ZREGLP | | TEMP FOR DISPLAY OF HRS, MIN, SEC |
| A1321 | | | | | | | | MUST = HITEMOUT+1. |



L ERASABLE ASSIGNMENTS

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| | | | | |
|------|--|------|------|----------------|
| 1362 | | 1067 | 1067 | ERANKSAV ERASE |
| 1363 | | 1070 | 1070 | MARKERAN ERASE |
| 1364 | | 1071 | 1071 | ERANKTEM ERASE |
| 1365 | | 1072 | 1072 | MARK2PAC ERASE |
| 1366 | | 1073 | 1073 | R1SAVE ERASE |

R1367 IMU COMPENSATION UNSWITCHED ERASABLE. (1D)

| | | | | | |
|------|-------|------|------|-------------------|---------|
| 1369 | | 1074 | 1074 | 1/PIPADT ERASE | B(1)PRM |
| 1370 | REF 1 | 1074 | | OLDBT1 = 1/PIPADT | |

R1371 SINGLE PRECISION SUBROUTINE TEMPORARIES. (3D)

A1373
A1374
A1375
A1376

SPSIN, SPCOS, SPROOT VARIABLES.
DO NOT SHARE. THESE ARE USED BY DAPS IN INTERRUPT
AND CURRENTLY ARE NOT PROTECTED. IF OTHER USERS
MATERIALIZER, THEN THIS CAN BE CHANGED.

| | | | | |
|------|-------|------|------|-------------------|
| 1377 | | 1075 | 1075 | HALPY ERASE |
| 1378 | | 1076 | 1076 | ROOTRET ERASE |
| 1379 | | 1077 | 1077 | SCRARD ERASE |
| 1380 | REF 1 | 1075 | | TEMK EQUALS HALPY |
| 1381 | REF 1 | 1076 | | SO EQUALS ROOTRET |



L ERASABLE ASSIGNMENTS

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P1382

UNSWITCHED FOR ORBIT INTEGRATION.

(21D)

| | | | | | | | | | |
|------|-----|---|------|------|---------|--------|--------|----|--|
| 1384 | | | 1100 | 1124 | TDEC | ERASE | +20D | | I(2) |
| 1385 | REP | 1 | | | COLREG | EQUALS | TDEC | +2 | I(1) |
| 1386 | REP | 1 | | | LAT | EQUALS | COLREG | +1 | I(2)DSP NOUN 43,67 FOR P20,22,51 R52,53. |
| 1387 | REP | 1 | | | LANDLAT | = | LAT | | NOUN 89 FOR P22. |
| 1388 | REP | 2 | LAST | 76 | LONG | EQUALS | LAT | +2 | I(2)DSP NOUN 43,67 FOR P20,22,51 R52,53. |
| 1389 | REP | 1 | | | ALT | EQUALS | LONG | +2 | I(2)DSP NOUN 43 FOR P20,22,51 R52,53. |
| 1390 | REP | 1 | | | YV | EQUALS | ALT | +2 | I(6) |
| 1391 | REP | 1 | | | ZV | EQUALS | YV | +6 | I(6) |

R1392
R1393

MARK STORAGE.

(2)

| | | | | | | | | | |
|------|--|--|------|------|---------|-------|--|--|---------------------------------------|
| 1395 | | | 1125 | 1125 | VHPCNT | ERASE | | | B(1) PRM NO. OF VHF MARKS (P20(R22)). |
| 1396 | | | 1126 | 1126 | TROMCNT | ERASE | | | B(1) PRM NO. OF VHF MARKS (P20(R22)). |

1397 REP 1
R1398

MISCELLANEOUS UNSWITCHED.

MARKCTR = TROMCNT

B(1) MARK COUNTER USED BY R32
(16D)

1400
A1401

1127 1127 IRETURN1 ERASE

B(1) RET ADDR USED BY MIDTOAV1 AND 2
CALLED BY P40,P41,P42, P61,P62
(1) USED BY KALOMANU

1402
1403

1130 1130 RATEINDX ERASE

B(1) NOUN 08 USES THIS

1404
1405

1131 1131 OPTION1 ERASE

B(1) NOUN 08 USES THIS

1406
1407

1132 1132 OPTION2 ERASE

B(2) LONGCALL REGISTER

1408
1409

1133 1134 LONGCADR ERASE +1

B(2) LONGCALL REGISTER

1410
1411

1135 1136 LONGBASE ERASE +1

B(1) LONGCALL REGISTER

1412 REP 1

1137 1140 LONGTIME ERASE +1

B(2) LONGCALL REGISTER

A14125
R14129

1141 1144 DELAYLOC ERASE +3

B(1)

R1413

MISC. INCLUDING RESTART COUNTER, GIMBAL ANGLE SAVE AND
STANDRY VERR ERASABLES. REDOCTR BEFORE THETAD (DWNLNK)

B(1)

1415
1416

1145 1145 NVWORD1 ERASE

B(1)

1417
1418

1146 1146 TEMPR60 ERASE

B(1)

1419 REP 1

1147 1147 PRIOTIME ERASE

B(1)

1420 REP 2 LAST 76

1150 1151 TIME2SAV ERASE +1

B(2)TMP

1421 REP 3 LAST 76

1152 1153 SCALSAVE ERASE +1

B(2)TMP

1154 1154 REDOCTR ERASE

B(1)PRM CONTAINS NUMBER OF RESTARTS.

1155 1157 THETAD ERASE +2

B(3)PRM DESIRED GIM ANGLES FOR MANEUVER.

1155 CPHI = THETAD

(OUTER)

1156 CTHETA = THETAD +1

(INNER)

1157 CPSI = THETAD +2

(MIDDLE)

L ERASABLE ASSIGNMENTS

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| | | | | | | | |
|--------|---|---|---|----|------|---------------------------|-------------------------------------|
| R14211 | ENTRY VARIABLES SHARED FOR TM. | | | | | | |
| 14212 | REP | 4 | LAST | 76 | 1155 | NDOTREP = THETAD | I(2) P65 |
| 14213 | REP | 1 | | | 1157 | VREF = RDOTREF +2 | I(2) P65 HI-ORDER WORD ONLY DNLNK=D |
| 1422 | | | | | 1160 | DESOPPT ERASE | B(1)DSP NOLN 92 FOR P20,22,52, R52. |
| 1423 | | | | | 1161 | DESOPTS ERASE | B(1)DSP NOLN 92 FOR P20,22,52, R52. |
| 1424 | | | | | 1162 | 1167 DELV ERASE +5 | I(6) |
| 1425 | REP | 1 | | | 1162 | DELAV = DELV | |
| 1426 | REP | 2 | LAST | 77 | 1164 | DELAVY = DELV +2 | |
| 1427 | REP | 3 | LAST | 77 | 1166 | DELAVZ = DELV +4 | |
| R14271 | | | P20, CONICS (SHARING WITH TIME 2 SAV AND SCAL SAV ONLY) | | | | (3D) |
| 14273 | REP | 1 | | | 1150 | POINTEX EQUALS TIME2SAV | I(1) POINT AXS EXIT |
| 14274 | REP | 1 | | | 1151 | VHPTIME EQUALS POINTEX +1 | I(2) DOWNLINK OF VHP RANGE TIME +1M |
| A14275 | | | | | | | |
| R1428 | PERM STATE VECTORS FOR BOOST AND DOWNLINK -WHOLE MISSION- | | | | | | (14D) |
| 1430 | | | | | 1170 | 1175 RN ERASE +5 | B(6)PRM |
| 1431 | | | | | 1176 | 1203 VN ERASE +5 | B(6)PRM |
| 1432 | | | | | 1204 | 1205 PIPTIME ERASE +1 | B(2)PRM (MUST BE FOLLOWED BY GDT/2) |
| R1433 | SERVICER STORAGE. | | | | | | (45D) |
| R1435 | (SERVICER STORAGE AND P11 STORAGE IN UNSWITCHED SHOULD NOT | | | | | | |
| R1436 | OVERLAY EACH OTHER AND THE TOTAL ERASABLE REQUIRED SHOULD NOT | | | | | | |
| R1437 | EXCEED THE ERASABLE STORAGE REQUIRED BY RENDEZVOUS GUIDANCE) | | | | | | |
| 1438 | REP | 1 | | | 1206 | GDT/2 EQUALS PIPTIME +2 | B(6)TMP (MUST FOLLOW PIPTIME) |
| 1439 | REP | 1 | | | 1214 | GDL/2 EQUALS GDT/2 +6 | B(6)TMP |
| 1440 | REP | 1 | | | 1222 | AVEGEXIT EQUALS GDL/2 +6 | B(2)TMP |
| 1441 | REP | 1 | | | 1222 | AVEGEXIT = AVEGEXIT | |
| 1442 | REP | 2 | LAST | 77 | 1224 | TEMX EQUALS AVEGEXIT +2 | B(1)TMP |
| 1443 | REP | 1 | | | 1225 | TEMY EQUALS TEMX +1 | B(1)TMP |
| 1444 | REP | 1 | | | 1226 | TEMZ EQUALS TEMY +1 | B(1)TMP |
| 1445 | REP | 1 | | | 1227 | PIPCTR EQUALS TEMZ +1 | B(1)TMP |
| 1446 | REP | 1 | | | 1230 | PIPAGE EQUALS PIPCTR +1 | B(1)TMP |
| 1447 | REP | 1 | | | 1231 | RN1 EQUALS PIPAGE +1 | B(6)TMP |
| 1448 | REP | 3 | LAST | 33 | 1237 | VN1 EQUALS RN1 +6 | B(6)TMP |
| 1449 | REP | 1 | | | 1245 | PIPTIME1 EQUALS VN1 +6 | B(2)TMP |
| 1450 | REP | 1 | | | 1247 | GDT1/2 EQUALS PIPTIME1 +2 | B(6)TMP |
| 1451 | REP | 1 | | | 1255 | GDL1/2 EQUALS GDT1/2 +6 | B(6)TMP |
| A1452 | | | | | | | |



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| Address | REP | Value | Operation | Code | Description | |
|---------|-------|-----------------------------|-----------|--------------------|--|--------------------------------------|
| R1453 | | | | | ENTRY STORAGE. (1D) | |
| 1455 | REP 1 | 1283 | ENTRYVN | EQUALS OORL1/2 +6 | B(1)TMP VN CODE FOR ENTRY DISPLAYS P605. | |
| A1456 | | | | | | |
| R1457 | | | | | P11 STORAGE. (9D) | |
| 1459 | REP 1 | 1283 | PADLONG | EQUALS ENTRYVN | (2)PL. LONGITUDE OF LAUNCH PAD | |
| 1460 | REP 1 | 1285 | LIFTTEMP | EQUALS PADLONG +2 | (2)TMP | |
| 1461 | REP 1 | 1287 | TEPHEN1 | EQUALS LIFTTEMP +2 | (3)TMP | |
| 1462 | REP 1 | 1272 | PONCSALT | EQUALS TEPHEN1 +3 | (2)PL. ALTITUDE | |
| R1463 | | | | | RENDEZVOUS NAVIGATION STORAGE. (SEE COMMENT IN SERVICES STORAGE) (68D) | |
| 1465 | | 1206 | 1277 | CSMPOS | ERASE +57D | I(6)TMP |
| 1466 | REP 1 | 1214 | LEMPOS | EQUALS CSMPOS +6 | I(6)TMP | |
| 1467 | REP 1 | 1222 | RCL | EQUALS LEMPOS +6 | I(2)TMP | |
| 1468 | REP 1 | 1224 | MARCTIME | EQUALS RCL +2 | B(2)TMP | |
| 1469 | REP 1 | 1226 | VTEMP | EQUALS MARCTIME +2 | B(6)TMP | |
| 1470 | REP 1 | 1234 | UM | EQUALS VTEMP +6 | I(6)TMP | |
| 1471 | REP 1 | 1242 | MARCDATA | EQUALS UM +6 | B(2)TMP | |
| 1472 | REP 1 | 1244 | USTAR | EQUALS MARCDATA +2 | I(6)TMP | |
| 1473 | REP 1 | 1252 | WIXA | EQUALS USTAR +6 | B(1)TMP | |
| 1474 | REP 1 | 1253 | WIXB | EQUALS WIXA +1 | B(1)TMP | |
| 1475 | REP 1 | 1254 | ZIXA | EQUALS WIXB +1 | B(1)TMP | |
| 1476 | REP 1 | 1256 | DELTA | EQUALS ZIXA +1 | I(18)TMP | |
| 1478 | REP 1 | 1256 | VHFRANCE | EQUALS DELTA | (2) | |
| 1479 | REP 2 | LAST 78 | 1272 | LCL | EQUALS DELTA +12D | (6) LM-CSM LINE OF SIGHT 1/2 (INIT V |
| R1480 | | *** CONICSEX (NEAS INC) *** | | | | |
| 1481 | REP 3 | LAST 78 | 1256 | TRIPA | EQUALS DELTA | |
| 1482 | REP 4 | LAST 78 | 1281 | TEMPVAR | EQUALS DELTA +3 | |
| A1483 | | | | | | |
| 1484 | | 1300 | 1301 | TEMPOR1 | ERASE +1 | B(2)TMP |
| R1485 | | | | | | |
| 1487 | | 1302 | 1302 | DSRUPTSW | ERASE | (6D) |
| 1488 | | 1303 | 1303 | OPTIND | ERASE | |
| 1489 | | 1304 | 1304 | LOYRO | ERASE | |
| 1490 | | 1305 | 1306 | COMMANDO | ERASE +1 | |

L ERASABLE ASSIGNMENTS

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| | | | | | | | | |
|-------|-------|------------------|-------------------------|------|------------|----------|------|---|
| 1491 | | | 1307 | 1307 | ZONE | ERASE | | |
| 1492 | REP 1 | | 0035 | | LASTXND = | | OPTY | B(1)PRM USED IN SHAPT STOP MONITOR |
| 1493 | REP 2 | LAST 79 | 0035 | | LASTXND = | | OPTY | DUMMY TO MAKE RR BRNCH TEST ASSEMBLE |
| R1494 | | UNSWITCHED DAP | ERASABLE. | | | | | DUMMY TO MAKE RR BRNCH TEST ASSEMBLE (4D) |
| 1496 | | | 1310 | 1310 | T6LOC | ERASE | | |
| 1497 | | | 1311 | 1311 | T6ADR | ERASE | | |
| 1498 | | | 1312 | 1313 | T6LOC | ERASE | +1 | |
| R1499 | | MODE SWITCHING | ERASABLE. | | | | | (14D) |
| 1501 | | | 1314 | 1314 | SWSAMPLE | ERASE | | B(1)PRM |
| 1502 | | | 1315 | 1315 | DEBOPND | ERASE | | B(1)PRM |
| 1503 | | | 1316 | 1316 | WTOPTION | ERASE | | B(1)PRM |
| 1504 | | | 1317 | 1317 | ZOPTCNT | ERASE | | B(1)PRM |
| 1505 | | | 1320 | 1320 | IMODES30 | ERASE | | B(1)PRM |
| 1506 | | | 1321 | 1321 | IMODES33 | ERASE | | B(1)PRM |
| 1507 | | | 1322 | 1324 | MODECADR | ERASE | +2 | B(3)TMP |
| 1508 | REP 1 | | 1322 | | IMUCADR = | MODECADR | | |
| 1509 | REP 2 | LAST 79 | 1323 | | OPTCADR = | MODECADR | +1 | |
| 1510 | REP 3 | LAST 79 | 1324 | | RADCADR = | MODECADR | +2 | |
| 1511 | | | 1325 | 1327 | ATTCADR | ERASE | +2 | B(3)PRM |
| 1512 | REP 1 | | 1327 | | ATTPRIO = | ATTCADR | +2 | |
| 1513 | | | 1330 | 1330 | MARKSTAT | ERASE | | B(1)PRM |
| 1514 | | | 1331 | 1331 | OPTMCDES | ERASE | | B(1)PRM |
| A1515 | | | | | | | | |
| R1516 | | NCSDAP | ERASABLE. | | | | | (1D) |
| 1518 | | | 1332 | 1332 | HOLDFLAG | ERASE | | B(1)PRM |
| A1519 | | | | | | | | |
| A1520 | | | | | | | | |
| R1524 | | CRS61.1 STORAGE. | -USED IN R63 (VERB 89)- | | | | | (5D) |
| 1526 | | | 1333 | 1335 | CPHIX | ERASE | +2 | B(3)DSP NOLN 98 CALCULATED BY CRS61.1 |
| A1527 | | | | | | | | |
| 1528 | | | 1336 | 1337 | TEVENT | ERASE | +1 | B(2) TIME OF EVENT FOR DOWNLIST |
| 1529 | REP 1 | | 1336 | | TLIPTOFF = | TEVENT | | |

L ERASABLE ASSIGNMENTS

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R1530 P34-P35 STORAGE (1D)

1532 1340 1340 NORMEX ERASE

A1533

R1535 SELF-CHECK ASSIGNMENTS. (17D)

R1537 (DO NOT MOVE, S-C IS ADDRESS SENSITIVE)

| | | | | | | |
|------|-------|------|------|---------------------------|-------------|-------------------------------|
| 1538 | | 1357 | 1377 | SELPERAS ERASE | 1357 - 1377 | ***MUST NOT BE MOVED*** |
| 1539 | REP 1 | 1357 | | SPAIL EQUALS SELPERAS | | B(1) |
| 1540 | REP 1 | 1360 | | ERSTORE EQUALS SPAIL +1 | | B(1) |
| 1541 | REP 1 | 1361 | | SELPRET EQUALS ERSTORE +1 | | B(1) RETURN |
| 1542 | REP 1 | 1362 | | SXODE EQUALS SELPRET +1 | | B(1) |
| 1543 | REP 1 | 1363 | | ALMCADR EQUALS SXODE +1 | | B(2) ALARM-ABORT USER'S 2CADR |
| 1544 | REP 1 | 1365 | | ERCOUNT EQUALS ALMCADR +2 | | B(1) |
| 1545 | REP 1 | 1366 | | SCOUNT EQUALS ERCOUNT +1 | | B(3) |
| 1546 | REP 1 | 1371 | | SKEEP1 EQUALS SCOUNT +3 | | B(1) |
| 1547 | REP 1 | 1372 | | SKEEP2 EQUALS SKEEP1 +1 | | B(1) |
| 1548 | REP 1 | 1373 | | SKEEP3 EQUALS SKEEP2 +1 | | B(1) |
| 1549 | REP 1 | 1374 | | SKEEP4 EQUALS SKEEP3 +1 | | B(1) |
| 1550 | REP 1 | 1375 | | SKEEP5 EQUALS SKEEP4 +1 | | B(1) |
| 1551 | REP 1 | 1376 | | SKEEP6 EQUALS SKEEP5 +1 | | B(1) |
| 1552 | REP 1 | 1377 | | SKEEP7 EQUALS SKEEP6 +1 | | B(1) |

A1553
R1554 USED BY P30 ROUTINES TO WRITE ONLY NEVER READ IN COLOSSUS

1555 REP 1 0000 DISPDEX EQUALS A
R1556 ERASABLE FOR SKYMARK CDU CHECK DELAY. -PAD LOADED. (1D)

1558 1341 1341 CDURWD ERASE B(1) PL
R15582 R57 STORAGE. -MUST BE UNSHARED EXCEPT IN BOOST OR ENTRY. (1D)

15583 1342 1342 TRUNRIAS ERASE B(1)PRM RESULT OF R57 CALIBR OF TRUNION
A15584
R15585 KEPLER STORAGE (6D)

15587 1343 1344 XMODULO ERASE +1 I(2) GREATER 2PI KEPLER
15588 1345 1346 TMODULO ERASE +1 I(2) GREATER 2 KEPLER
15589 1347 1350 EPSILON ERASE +1 I(2) TMP
A1559



L ERASABLE ASSIGNMENTS

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| | | | | | | | |
|--------|---------------|--------------------------------------|--------|----------------------|----|---|--------|
| R1560 | P37 | **RETURN TO EARTH (PAD LOAD) *** | | | | (2D) | |
| 1561 | | 1351 1352 RTED1 ERASE | | | +1 | I(2)PL VGAMMA POLY COEF | B-3 |
| R1562 | P40 | ***STEERING ROUTINE*** PAD LOAD | | | | (1D) | |
| 1564 | | 1353 1353 DVTHRESH ERASE | | | | I(1)PL DELTA V THRESHOLD FOR LOW THRUST ROUTINE | B-2 |
| A1565 | | | | | | | |
| R15651 | P23 | ***PAD LOAD*** | | | | (2D) | |
| 15653 | | 1354 1355 HORIZALT ERASE | | | +1 | I(2)PL HORIZIGN ALTITUDE | M B-29 |
| R1566 | P-20 | ALTERNATE LOS VARIANCE PAD LOAD***** | | | | (1D) | |
| A1568 | | | | | | | -16 |
| 1569 | | 1356 1356 ALTVAR ERASE | | | | I(2)PL MILLARD, SQAURED SCALED 2 | |
| 1570 | REP 2 LAST 80 | 1377 | END-UE | EQUALS SELPERAS +16D | | LAST USED UNSWITCHED ERASABLE | |



L ERASABLE ASSIGNMENTS

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| Address | Bank | Assignment | Operation | Notes |
|---------|---------|---|--------------------|--|
| P3000 | | EBANK-3 ASSIGNMENTS | | |
| 3001 | E3,1400 | SETLOC 1400 | | |
| R3002 | | WAITLIST TASK LISTS. | | (20D) |
| 3004 | E3,1400 | E3,1407 | LST1 ERASE +7 | B(0D)PRM DELTA T S. |
| 3005 | E3,1410 | E3,1431 | LST2 ERASE +17D | B(18D)PRM TASK 2CADR ADDRESSES. |
| R3008 | | RESTART STORAGE. | | (2D) |
| 3008 | E3,1432 | E3,1433 | RSSBO ERASE +1 | B(2)PRM SAVE BB AND Q FOR RESTARTS. |
| R3009 | | MORE LONCALL STORAGE. (MUST BE IN LST1 S BANK). | | (2D) |
| 3011 | E3,1434 | E3,1435 | LONGEXIT ERASE +1 | B(2)TMP MAY BE SELDOM OVERLAYED. |
| R3012 | | PHASE-CHANGE LISTS PART II. | | (12D) |
| 3014 | E3,1436 | E3,1436 | PHSNAME1 ERASE | B(1)PRM |
| 3015 | E3,1437 | E3,1437 | PHSRR1 ERASE | B(1)PRM |
| 3016 | E3,1440 | E3,1440 | PHSNAME2 ERASE | B(1)PRM |
| 3017 | E3,1441 | E3,1441 | PHSRR2 ERASE | B(1)PRM |
| 3018 | E3,1442 | E3,1442 | PHSNAME3 ERASE | B(1)PRM |
| 3019 | E3,1443 | E3,1443 | PHSRR3 ERASE | B(1)PRM |
| 3020 | E3,1444 | E3,1444 | PHSNAME4 ERASE | B(1)PRM |
| 3021 | E3,1445 | E3,1445 | PHSRR4 ERASE | B(1)PRM |
| 3022 | E3,1446 | E3,1446 | PHSNAME5 ERASE | B(1)PRM |
| 3023 | E3,1447 | E3,1447 | PHSRR5 ERASE | B(1)PRM |
| 3024 | E3,1450 | E3,1450 | PHSNAME6 ERASE | B(1)PRM |
| 3025 | E3,1451 | E3,1451 | PHSRR6 ERASE | B(1)PRM |
| R3026 | | IMU COMPENSATION PARAMETERS. | | (22D) |
| 3028 | E3,1452 | E3,1452 | PIRIASX ERASE | |
| 3029 | RESP 1 | E3,1452 | PIPARIAS = PIRIASX | B(1) PIPA RIAS, PIPA SCALE FACTR TERMS |
| 3030 | | E3,1453 | PIPASCFX ERASE | INTERMIXED. |
| 3031 | RESP 1 | E3,1453 | PIPASCF = PIPASCFX | |
| 3032 | | E3,1454 | PIRIASY ERASE | |
| 3033 | | E3,1455 | PIPASCFY ERASE | |
| 3034 | | E3,1456 | PIRIASZ ERASE | |
| 3035 | | E3,1457 | PIPASCFZ ERASE | |
| 3036 | | E3,1460 | NROX ERASE | |
| 3037 | RESP 1 | E3,1460 | GRIASX = NROX | GYRO RIAS DRIFTS |
| 3038 | | E3,1461 | NRODY ERASE | |

L ERASABLE ASSIGNMENTS

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| | | | | | | | |
|-------|-------|--|---------|----------|--------------------|---|--------|
| 3039 | | E3,1462 | E3,1462 | NEDZ | ERASE | | |
| 3040 | | E3,1463 | E3,1463 | ADIAK | ERASE | ACCELERATION SENSITIVE DRIFT ALONG THE | |
| 3041 | | E3,1464 | E3,1464 | ADIAV | ERASE | INPUT AXIS | |
| 3042 | | E3,1465 | E3,1465 | ADIAZ | ERASE | | |
| 3043 | | E3,1466 | E3,1466 | ADSRAX | ERASE | ACCELERATION SENSITIVE DRIFT ALONG THE | |
| 3044 | | E3,1467 | E3,1467 | ADSRAY | ERASE | SPIN REFERENCE AXIS | |
| 3045 | | E3,1470 | E3,1470 | ADSRZ | ERASE | | |
| 3046 | | E3,1471 | E3,1476 | GCOMP | ERASE +5 | CONTAINS COMPENSATING TORQUES | |
| 3047 | | E3,1477 | E3,1477 | GCOMP SW | ERASE | | |
| 3048 | REP 1 | E3,1471 | | COMMAND | EQUALS GCOMP | | |
| 3049 | REP 2 | E3,1474 | | CDUIND | EQUALS GCOMP +3 | | |
| R3050 | | LAST 83 STATE VECTORS FOR ORBIT INTEGRATION. | | | | | (44D) |
| R3052 | | (DIFEQNT THRU XKEP MUST BE IN SAME | | | | | |
| R3053 | | EBANK AS RRECTCSM, RRECTLEM ETC | | | | | |
| R3054 | | BECAUSE THE COPY-CYCLES (ATOPCSM, | | | | | |
| R3055 | | PTOACSM ETC) ARE EXECUTED IN BASIC. | | | | | |
| R3056 | | ALL OTHER REFERENCES TO THIS GROUP | | | | | |
| R3057 | | ARE BY INTERPRETIVE INSTRUCTIONS.) | | | | | |
| 3058 | | E3,1500 | E3,1553 | DIFEQNT | ERASE +43D | B(1)TMP | |
| R3059 | | (UPSVFLAG...XKEP MUST BE KEPT IN ORDER) | | | | | |
| 3060 | REP 1 | E3,1501 | | UPSVFLAG | EQUALS DIFEQNT +1 | B(1)PRM UPDATE FLAG | |
| 3061 | REP 1 | E3,1502 | | RRECT | EQUALS UPSVFLAG +1 | B(6)TMP POS AT RECT $K^{*2}(-14)$ | |
| 3062 | REP 1 | E3,1510 | | VRECT | EQUALS RRECT +6 | B(6)TMP VEL AT RECT $K^{*}(-1/2)*2(6)$ | |
| 3063 | REP 1 | E3,1516 | | TET | EQUALS VRECT +6 | B(2)TMP TIME OF STATE VECT $CSRCS*2(-28)$ | |
| 3064 | REP 1 | E3,1520 | | TDELTA V | EQUALS TET +2 | B(6)TMP POSITION DEVIATION $K^{*2}(14)$ | |
| 3065 | REP 1 | E3,1526 | | TNUV | EQUALS TDELTA V +6 | B(6)TMP VEL DEVIATION $K^{*}(-1/2)*2(14)$ | |
| 3066 | REP 1 | E3,1534 | | RCV | EQUALS TNUV +6 | B(6)TMP CONIC POSITION $K^{*2}(-14)$ | |
| 3068 | REP 1 | E3,1542 | | VCV | EQUALS RCV +6 | B(6)TMP CONIC VELOCITY $K^{*}(-1/2)*2(6)$ | |
| 3070 | REP 1 | E3,1550 | | TC | EQUALS VCV +6 | B(2)TMP TIME SINCE RECTIFICATION | |
| 3071 | REP 1 | E3,1552 | | XKEP | EQUALS TC +2 | B(2)TMP ROOT OF KEPLER EQ $K^{*}(1/2)*2(-10)$ | |
| R3072 | | *** TEMP - IN VAC AREA *** | | | | | |
| 3073 | | 0022 | | RRECT1 | EQUALS 18D | | |
| 3074 | | 0030 | | VRECT1 | EQUALS 24D | | |
| 3075 | | 0036 | | TET1 | EQUALS 30D | | |
| A3076 | | | | | | | |
| R3077 | | PERMANENT STATE VECTORS AND TIMES. | | | | | (101D) |
| R3079 | | (DO NOT OVERLAY WITH ANYTHING AFTER BOOST) | | | | | |

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R3080 (RRCTCSM ...XCEPCSM MUST BE KEPT IN THIS ORDER)

| | | | | | | | | |
|------|-------|---------|---------|-----------|---------|----|--|------------------------|
| 3081 | | E3,1554 | E3,1561 | RRCTCSM | ERASE | +5 | | B(8)PRM CSM VARIABLES. |
| 3082 | REP 1 | E3,1554 | | RRCTHIS = | RRCTCSM | | | |
| 3083 | | E3,1562 | E3,1567 | VRECTCSM | ERASE | +5 | | B(8)PRM |
| 3084 | | E3,1570 | E3,1571 | TETCSM | ERASE | +1 | | B(2)PRM |
| 3085 | | E3,1570 | | TETD10 = | TETD11 | | | |
| 3086 | | E3,1572 | E3,1577 | DELTA CSN | ERASE | +5 | | B(8)PRM |
| 3087 | | E3,1600 | E3,1605 | NUMCSM | ERASE | +5 | | B(8)PRM |
| 3088 | | E3,1600 | E3,1613 | NUMVET | ERASE | +5 | | B(8)PRM |
| 3089 | | E3,1614 | E3,1621 | VCVCSM | ERASE | +5 | | B(8)PRM |
| 3090 | | E3,1622 | E3,1623 | YCCSN | ERASE | +1 | | B(2)PRM |
| 3091 | | E3,1624 | E3,1625 | XCEPCSM | ERASE | +1 | | B(2)PRM |

R3092 (RRECTLEM ...XCEPLEM MUST BE KEPT IN THIS ORDER)

| | | | | | | | | |
|------|-------|---------|---------|------------|----------|----|--|-----------------------|
| 3093 | | E3,1628 | E3,1633 | RRECTLEM | ERASE | +5 | | B(8)PRM LEM VARIABLES |
| 3094 | REP 1 | E3,1628 | | RRECTOIH = | RRECTLEM | | | |
| 3095 | | E3,1634 | E3,1641 | VRECTLEM | ERASE | +5 | | B(8)PRM |
| 3096 | | E3,1642 | E3,1643 | TETLEM | ERASE | +1 | | B(2)PRM |
| 3097 | REP 1 | E3,1642 | | TETOTHER = | TETLEM | | | |
| 3098 | | E3,1644 | E3,1651 | DELTA LEM | ERASE | +5 | | B(8)PRM |
| 3099 | | E3,1652 | E3,1657 | NUMLEM | ERASE | +5 | | B(8)PRM |
| 3100 | | E3,1660 | E3,1665 | RCVLEM | ERASE | +5 | | B(8)PRM |
| 3101 | | E3,1666 | E3,1673 | VCVLEM | ERASE | +5 | | B(8)PRM |
| 3102 | | E3,1674 | E3,1675 | TCLEM | ERASE | +1 | | B(2)PRM |
| 3103 | | E3,1676 | E3,1677 | XCEPLEM | ERASE | +1 | | B(2)PRM |

| | | | | | | | | |
|------|-------|---------|---------|--------|--------------|----|--|-----|
| 3104 | | E3,1700 | E3,1705 | XT89 | ERASE | +5 | | |
| 3105 | | E3,1706 | E3,1710 | TEPHEN | ERASE | +2 | | |
| 3106 | | E3,1711 | E3,1712 | AZO | ERASE | +1 | | |
| 3107 | | E3,1713 | E3,1720 | UNITW | ERASE | +5 | | |
| 3108 | REP 1 | E3,1713 | | -AYO | EQUALS UNITW | | | (2) |
| 3109 | REP 2 | LAST 84 | E3,1715 | AYO | EQUALS UNITW | +2 | | (2) |

A31095 R3110 STATE VECTORS FOR DOWNLINK. (12D)

| | | | | | | | | |
|------|--|---------|---------|---------|-------|----|--|---|
| 3112 | | E3,1721 | E3,1726 | R-OTHER | ERASE | +5 | | B(8)PRM POS VECT (OTHER VECH) FOR DNLINK |
| 3113 | | E3,1727 | E3,1734 | V-OTHER | ERASE | +5 | | B(8)PRM VEL. VECT (OTHER VECH) FOR DNLINK |

| | | | | | | | | |
|-------|-------|----------|---------|-----------|--------|--|--|------------------------------|
| 3114 | REP 2 | LAST 84 | E3,1642 | T-OTHER = | TETLEM | | | TIME (OTHER VECH) FOR DNLINK |
| R3115 | | REFSMAT. | | | | | | (16D) |

| | | | | | | | | |
|------|--|---------|---------|---------|-------|------|--|-----------|
| 3117 | | E3,1735 | E3,1756 | REFSMAT | ERASE | +17D | | I(16D)PRM |
|------|--|---------|---------|---------|-------|------|--|-----------|



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R3118 AVERAGED INTEGRATOR STORAGE.

(8D)

| | | | | | | | | | |
|-------|--|--|---|---------|------|-------|----|--|--|
| 3120 | | | E3,1757 | E3,1764 | UNTR | ERASE | +5 | | |
| 3121 | | | E3,1765 | E3,1766 | RWAG | ERASE | +1 | | |
| R3126 | | | *** CONICSSX (PLANETARY INERT. ORIENT.) *** | | | | | | |

| | | | | | | | | |
|------|-----|---|---------|---------|--------|--------|----|-------------------------|
| 3127 | REF | 1 | E3,1766 | TIMBURO | EQUALS | TEPHEN | | CSEC B-42 (TRIPLE PREC) |
| 3128 | REF | 1 | E3,1767 | END-E3 | EQUALS | RWAG | +2 | NEXT UNUSED E3 ADDRESS |

L ERASABLE ASSIGNMENTS

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| P4000 | | BRANK-4 ASSIGNMENTS | | | | | |
|--------|---|---------------------|---------|-------------|---------------|------------|----------------------------|
| 4001 | | E4,1400 | | BSTLOC 2000 | | | |
| R4002 | P20 STORAGE. | -PAD LOADED- | | | | (4D) | |
| 4004 | | E4,1400 | E4,1400 | WRENDOPOS | ERASE | B(1)PL | M B-14 |
| 4005 | | E4,1401 | E4,1401 | WRENDEL | ERASE | B(1)PL | M/CSECB0 |
| 4006 | | E4,1402 | E4,1402 | RMAX | ERASE | B(1)PL | MSTERS*2(-19) |
| 4007 | | E4,1403 | E4,1403 | VMAX | ERASE | B(1)PL | M/CSEC*2(-7) |
| R4008 | P22 STORAGE. | -PAD LOADED- | | | | (6D) | |
| 4010 | | E4,1404 | E4,1404 | WORBPOS | ERASE | B(1)PL | M B-14 |
| 4011 | | E4,1405 | E4,1405 | WORBVEL | ERASE | B(1)PL | M/CSECB0 |
| 4012 | | E4,1406 | E4,1406 | S22WSL | ERASE | B(1)PL | M B-14 |
| 40125 | | E4,1407 | E4,1410 | RPVAR | ERASE | +1 B(2)PL | |
| R4013 | CONISEX STORAGE. | -PAD LOADED- | | | | (6D) | |
| 4015 | | E4,1411 | E4,1416 | 504LM | ERASE | +5 I(6)PL | MOON LIBRATION VECTOR |
| A4016 | | | | | | | |
| R4017 | ENTRY STORAGE. | -PAD LOADED- | | | | (2D) | |
| 4019 | | E4,1417 | E4,1420 | EMSALT | ERASE | +1 I(2)PL | |
| R4020 | P35 CONSTANTS. | -PAD LOADED- | | | | (4D) | |
| 4022 | | E4,1421 | E4,1422 | ATIGINC | ERASE | +1 B(2)PL | |
| 4023 | | E4,1423 | E4,1424 | PTIGINC | ERASE | +1 B(2)PL | |
| R40341 | LUNAR LANDING SIGHT DATA. | -PAD LOADED- | | | | (6D) | |
| R40342 | (USED BY INTEGRATION INITIALIZATION, LAT-LONG SUBROUTINES, P30=8) | | | | | | |
| 40343 | | E4,1425 | E4,1432 | RLS | ERASE | +5 I(6) PL | LUNAR LANDING SIGHT VECTOR |
| A40345 | | | | | | | |
| R4035 | CONISEX (LUNAR AND SOLAR EPHEM) STORAGE. | -PAD LOADED- | | | | (77D) | |
| 4037 | | E4,1433 | E4,1547 | TIMEMO | ERASE | +76D | |
| 4038 | REP 1 | E4,1436 | | VECOEM | EQUALS TIMEMO | +3 | |
| 4039 | REP 1 | E4,1532 | | RESO | EQUALS VECOEM | +60D | |



L ERASABLE ASSIGNMENTS

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| | | | | | | | | | | |
|-------|-----|---|------|--|---------|----------|---------|---------|-------|---|
| 4040 | REP | 1 | | E4,1540 | VESO | EQUALS | R8SO | +8 | | |
| 4041 | REP | 1 | | E4,1546 | OMEGARS | EQUALS | V8SO | +8 | | |
| R4043 | | | | FULL INTEGRATION STORAGE. | | | | | (98D) | |
| 4045 | | | | E4,1550 | E4,1550 | PBODY | ERASE | | | I(1) |
| 4046 | REP | 1 | | E4,1551 | ALPHAV | EQUALS | PBODY | +1 | | I(6)TMP |
| 4047 | REP | 1 | | E4,1557 | BETAV | EQUALS | ALPHAV | +8 | | I(6)TMP |
| 4048 | REP | 1 | | E4,1565 | PHIV | EQUALS | BETAV | +8 | | I(6)TMP |
| 4049 | REP | 1 | | E4,1573 | PSIV | EQUALS | PHIV | +8 | | I(6)TMP |
| 4050 | REP | 1 | | E4,1601 | PV | EQUALS | PSIV | +8 | | I(6)TMP |
| 4051 | REP | 1 | | E4,1607 | BETAM | EQUALS | PV | +8 | | I(6)TMP |
| 4052 | REP | 1 | | E4,1611 | H | EQUALS | BETAM | +2 | | I(2)TMP |
| 4053 | REP | 1 | | E4,1613 | GMODE | EQUALS | H | +2 | | I(1)TMP |
| 4054 | REP | 1 | | E4,1614 | IRSTURN | EQUALS | GMODE | +1 | | I(1)TMP |
| 4055 | REP | 1 | | E4,1615 | NORMGAM | EQUALS | IRSTURN | +1 | | I(1)TMP |
| 4056 | REP | 1 | | E4,1616 | VECTAB | EQUALS | NORMGAM | +1 | | I(36)TMP |
| 4057 | REP | 1 | | E4,1662 | RPOV | EQUALS | VECTAB | +38D | | (6)TMP VECTOR PRIMARY TO SECONDARY BODY |
| 4058 | REP | 1 | | E4,1670 | ORIGEX | EQUALS | RPOV | +6 | | (1)TMP QSAVE FOR COORD. SWITCH. ROUTINE |
| 4059 | REP | 1 | | E4,1670 | KEPRIN | EQUALS | ORIGEX | | | QSAVE FOR KEPLER |
| 4060 | REP | 2 | LAST | 87 | E4,1671 | ROVV | EQUALS | ORIGEX | +1 | (6) SEC. BODY TO VEH. VECTOR (USED P23) |
| 4061 | REP | 1 | | | E4,1677 | RPSV | EQUALS | ROVV | +6 | (6)TMP SUN TO PRIMARY BODY VECTOR |
| 4062 | REP | 1 | | | E4,1705 | XKSPNEW | EQUALS | RPSV | +6 | (2)TMP ROOT OF KEPLERS EQU FOR TIME TAU |
| R4064 | | | | THESE PROBABLY CAN SHARE INTEGRATION VARIABLES. | | | | | (9D) | |
| 4066 | REP | 2 | LAST | 87 | E4,1624 | VACX | EQUALS | VECTAB | +6 | I(2)TMP |
| 4067 | REP | 1 | | | E4,1626 | VACY | EQUALS | VACX | +2 | I(2)TMP |
| 4068 | REP | 1 | | | E4,1630 | VACZ | EQUALS | VACY | +2 | I(2)TMP |
| 4069 | REP | 3 | LAST | 87 | E4,1640 | BRADM | EQUALS | VECTAB | +18D | I(2)TMP |
| 4070 | REP | 1 | | | E4,1642 | INCORPEX | EQUALS | BRADM | +2 | I(1)TMP |
| R4071 | | | | R31(V83) STORAGE. -SHARES WITH INTEGRATION STORAGE- | | | | | (28D) | |
| A4074 | | | | | | | | | | |
| 4075 | REP | 4 | LAST | 87 | E4,1624 | BASEOTF | EQUALS | VECTAB | +6 | I(6) BASE POS VECTOR OTHER VEH |
| 4076 | REP | 5 | LAST | 87 | E4,1640 | BASEOTV | EQUALS | VECTAB | +18D | I(6) BASE VEL VECTOR OTHER VEH |
| 4077 | REP | 6 | LAST | 87 | E4,1654 | BASETHP | EQUALS | VECTAB | +30D | I(6) BASE POS VECTOR THIS VEH |
| 4078 | REP | 2 | LAST | 87 | E4,1662 | BASETHV | EQUALS | RPOV | | I(6) BASE VEL VECTOR THIS VEH |
| 4079 | REP | 2 | LAST | 87 | E4,1671 | BASETIME | EQUALS | ROVV | | I(2) TIME ASSOC WITH BASE VEC |
| 4080 | REP | 3 | LAST | 87 | E4,1673 | ORIG | EQUALS | ROVV | +2 | I(1) =0 FOR EARTH =+2 FOR MOON |
| R4081 | | | | | | | | | | |
| R4082 | | | | CONIC INTEGRATION STORAGE. -MAY NOT SHARE WITH SERVICER- | | | | | (6D) | |
| 4085 | REP | 1 | | | E4,1707 | ALPHAM | EQUALS | XKSPNEW | +2 | I(2)TMP |



| L | | ERASABLE ASSIGNMENTS | | | | USER#8 PAGE NO. 54 | E0 53 |
|-------|-------|--|---------|------------------------------------|------------------|--|-------------------------------------|
| 4088 | REP 1 | E4,1711 | TAU. | EQUALS ALPHAM | +2 | I(2)TMP | |
| 4088 | REP 1 | E4,1713 | DT/2 | EQUALS TAU. | +2 | I(2)TMP | |
| R4089 | | P21 STORAGE. | | | | (2D) | |
| 4091 | REP 1 | E4,1715 | P21TIME | EQUALS DT/2 | +2 | B(2) TMP | |
| A4092 | | INCORPORATION/VERB 83 COMMON STORAGE. | | | | (1D) | |
| R4093 | | | | | | | |
| 4095 | REP 1 | E4,1717 | BORSSS | EQUALS P21TIME | +2 | I(1)TMP SAVES RETURNS. | |
| R4096 | | VERB 83 STORAGE. | | MAY SHARE ONLY WITH INCORPORATION. | | (16D) | |
| 4098 | REP 1 | E4,1720 | RANGE | EQUALS BORSSS | +1 | I(2)DSP NOUN 54 DISTANCE TO OPTICAL SURJ | |
| 4099 | REP 1 | E4,1722 | RRATE | EQUALS RANGE | +2 | I(2)DSP NOUN 54 RATE OF APPROACH | |
| 4100 | REP 1 | E4,1724 | RHISTA | EQUALS RRATE | +2 | I(2)DSP NOUN 54 | |
| 4101 | REP 1 | E4,1726 | RONE | EQUALS RHISTA | +2 | I(6)TMP VECTOR STORAGE. (SCRATCH) | |
| 4102 | REP 1 | E4,1734 | VONE | EQUALS RONE | +6 | I(6)TMP VECTOR STORAGE. (SCRATCH) | |
| R4103 | | LUNAR LANDMARK SELECTION PROGRAM - R35 | | | | (26D) | |
| 4105 | REP 2 | LAST 88 | E4,1720 | XR1HOLD | EQUALS RANGE | I(2) | |
| 4106 | REP 1 | | E4,1722 | VECTIME | EQUALS XR1HOLD | +2 | I(2) |
| 4107 | REP 1 | | E4,1724 | JLOOPCNT | EQUALS VECTIME | +2 | I(1) |
| 4108 | REP 1 | | E4,1725 | KLOOPCNT | EQUALS JLOOPCNT | +1 | I(1) |
| 4109 | REP 1 | | E4,1726 | NKVAL | EQUALS KLOOPCNT | +1 | I(1) |
| 4110 | REP 1 | | E4,1727 | DELTA | EQUALS NKVAL | +1 | I(2) |
| 4111 | REP 1 | | E4,1731 | TK | EQUALS DELTA | +2 | I(2) |
| 4112 | REP 1 | | E4,1733 | INDESONUM | EQUALS TK | +2 | I(1) |
| 4113 | REP 1 | | E4,1734 | LONGSAVE | EQUALS INDESONUM | +1 | I(2) |
| 4114 | REP 1 | | E4,1736 | POSVECT | EQUALS LONGSAVE | +2 | I(6) |
| 4115 | REP 1 | | E4,1744 | VELVECT | EQUALS POSVECT | +6 | I(6) |
| 4116 | REP 1 | | E4,1752 | LSLONG | EQUALS VELVECT | +6 | I(2) TMP LONGITUDE OF LANDING SIGHT |
| R4117 | | S-BAND ANTENNA GIMBAL ANGLES. DISPLAYED BY R05 (EXT.VR.64) | | | | (4D) | |
| R4119 | | OPERATION DURING P00 ONLY. | | | | | |
| 4120 | REP 3 | LAST 88 | E4,1720 | RHOSB | EQUALS RANGE | B(2)DSP NOUN 51. PITCH ANGLE | |
| 4121 | REP 1 | | E4,1722 | GAMMASB | EQUALS RHOSB | +2 | B(2)DSP NOUN 51. YAW ANGLE |
| R4122 | | R 36 SCRATCHPAD STORAGE | | | | (12) | |

L ERASABLE ASSIGNMENTS

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| | | | | | | | | | | |
|-------|-----|---|------|----|---------|----------|--------|----------|----|--|
| 4124 | REP | 2 | LAST | 88 | E4,1726 | RPASS36 | EQUALS | RONE | | I (8)S-S |
| 4125 | REP | 1 | | | E4,1734 | UNP36 | EQUALS | RPASS36 | +6 | I (8)S-S |
| A4126 | | | | | | | | | | |
| R4127 | | | | | | | | | | EXTENDED VERB 82 STORAGE. |
| R4128 | | | | | | | | | | (** THE SHARING IN THIS SECTION IS TEMPORARY ONLY**) |
| 4130 | REP | 4 | LAST | 88 | E4,1720 | HPERMN | EQUALS | RANGE | | I(2) SET TO 300KFT OR 35KFT FOR SR30.1 |
| 4131 | REP | 1 | | | E4,1722 | RPADTEM | EQUALS | HPERMN | +2 | I(2) PAD OR LANDING RADIUS FOR SR30.1 |
| 4132 | REP | 1 | | | E4,1724 | TSTART92 | EQUALS | RPADTEM | +2 | I(2) TEMP TIME STORAGE FOR V82. |
| A4133 | | | | | | | | | | |
| R4134 | | | | | | | | | | MORE VERB 82 NOT SHARING WITH VERB 83 |
| 4136 | REP | 1 | | | E4,1742 | V82FLAGS | EQUALS | VONE | +6 | (1) FOR V 82 BITS |
| 4137 | REP | 1 | | | E4,1743 | TFP | EQUALS | V82FLAGS | +1 | I(2) DSP NOUN 42, FOR P30,40,41. |
| 4138 | REP | 1 | | | E4,1745 | -TPER | EQUALS | TFP | +2 | I(2) DSP NOUN 32 |
| 4139 | REP | 1 | | | E4,1747 | THETA(1) | EQUALS | -TPER | +2 | I(2) TMP SET AT END OF V82 |
| 4140 | REP | 1 | | | E4,1755 | RSP-RREC | EQUALS | AOPTIME | | DSP NOUN R32 |
| R4141 | | | | | | | | | | REENTRY CONICS |
| 4143 | REP | 2 | LAST | 89 | E4,1742 | URONE | EQUALS | V82FLAGS | | I(6) SAVE ACTUAL FOR CALCULATIONS |
| A4144 | | | | | | | | | | |
| R4145 | | | | | | | | | | V 82 DISPLAY |
| 4147 | REP | 1 | | | E4,1751 | HAPK | EQUALS | THETA(1) | +2 | I(2) DSP NOUN 44 |
| 4148 | REP | 1 | | | E4,1753 | HPRK | EQUALS | HAPK | +2 | I(2) DSP NOUN 44 |
| A4149 | | | | | | | | | | |
| R4154 | | | | | | | | | | VARIOUS DISPLAY REGISTERS. |
| 4156 | REP | 1 | | | E4,1755 | AOPTIME | EQUALS | HPRK | +2 | |
| 4157 | REP | 2 | LAST | 89 | E4,1757 | LANDLONG | EQUALS | AOPTIME | +2 | I(2) DSP NOUN 89 FOR P22 |
| 4158 | REP | 1 | | | E4,1761 | LANDALT | EQUALS | LANDLONG | +2 | I(2) DSP NOUN 89 FOR P22. |
| R4159 | | | | | | | | | | |
| R4160 | | | | | | | | | | S34/35.5, P34-P35 STORAGE. |
| 4162 | REP | 1 | | | E4,1763 | KT | EQUALS | LANDALT | +2 | B(2) |
| 4163 | REP | 1 | | | E4,1765 | VERRNOUN | EQUALS | KT | +2 | B(1)TMP |
| 4164 | REP | 1 | | | E4,1766 | QSAVED | EQUALS | VERRNOUN | +1 | B(1)TMP HOLDS RETURN |

L ERASABLE ASSIGNMENTS

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| | | | | | | | | | | |
|-------|-----|---|------|---------|---------|---------|---------|---------|--|--|
| 4165 | REP | 1 | | E4,1767 | RTRN | EQUALS | QSAVED | +1 | B(1) RETURN | |
| 4166 | REP | 1 | | E4,1770 | SUREXIT | EQUALS | RTRN | +1 | B(1) TMP | |
| A4167 | | | | | | | | | ROEXIT CANT SHARE WITH HPER,HAPO | |
| 4168 | REP | 1 | | E4,1770 | ROEXIT | EQUALS | SUREXIT | | I(1)TMP Q SAVE MODE 1 AND 2 TO RTRN MATN | |
| R4169 | | | | | | | | | (4D) | |
| | | | | | | | | | P 30 DISPLAY | |
| 4171 | REP | 2 | LAST | 89 | E4,1763 | HAPO | EQUALS | KT | I(2) DSP NQIN 42, FOR P30. | |
| 4172 | REP | 1 | | | E4,1765 | HPER | EQUALS | HAPO | +2 | I(2) DSP NQIN 42, FOR P30. |
| A4173 | | | | | | | | | | |
| R4174 | | | | | | | | | | SOME P34 STORAGE. (OVERLAYS P35.1 STORAGE) (2D) |
| 4176 | REP | 3 | LAST | 90 | E4,1763 | NOMTPI | EQUALS | KT | I(2)TMP NOMINAL TPI TIME FOR RECYCLE | |
| R4177 | | | | | | | | | | THE FOLLOWING ARE ERASABLES USED BY THE SYSTEM TESTS. 205 USES TRANSM1 |
| R4179 | | | | | | | | | | WHILE 504 USES TRANSM1 AND ALPK . GS ARE NOT USED IN 205 NOR ARE THEY |
| 4180 | | | | | E4,1400 | TRANSM1 | EQUALS | 2000 | (18) INITIALIZATION FOR IMU TESTS | |
| 4181 | REP | 1 | | | E4,1422 | ALPK | = | TRANSM1 | +18D | (144) ERASABLE LOAD IN 504 |
| R4182 | | | | | | | | | | END OF PERP. TEST ERASABLE IN BANK 4 |
| R4183 | | | | | | | | | | *** V82 *** (6D) |
| 4185 | REP | 1 | | | E4,1771 | VONE | EQUALS | ROEXIT | +1 | I(6)TMP NORMAL VELOCITY VONE/ SQ RT MU |
| A4186 | | | | | | | | | | |
| R4187 | | | | | | | | | | PAD LOAD INTEGRATION ERROR INCLUDED IN VARIANCE BY P20 (1D) |
| 4188 | REP | 1 | | | E4,1777 | INTVAR | EQUALS | VONE | +6 | I(1)PL SQUARE OF EXPECTED INTEGRATION |
| A4189 | | | | | | | | | | POSITION EXTRAPOLATION ERROR. |
| A4190 | | | | | | | | | | SCALED METERS(2) 2(15) |
| 4191 | REP | 1 | | | E4,1777 | END-E4 | EQUALS | INTVAR | | LAST USED ERASABLE IN E4 |

L ERASABLE ASSIGNMENTS

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P5000 BRANK-5 ASSIGNMENTS
5001          ES,1400          SFTLOC 2400
R5002          *-+*-+ OVERLAY 1 IN BRANK 5 *-+*-+

R5003          W-MATRIX STORAGE.          (162D)

5005          ES,1400          W          EQUALS 2400          B(162)

5006 REP 1          ES,1570          BMATRIX = W          +120D B(42B) USED TO CONVERT W TO 6X6
5007 REP 2 LAST 91 ES,1642          END-W EQUALS W          +162D **NEXT AVAILABLE LOC AFTER W MATRIX**
R5008          AUTO-OPTICS STORAGE -RS2-

R5009 DO NOT MOVE FROM ES,1554. A DELICATE BALANCE EXISTS BETWEEN THIS AND P03
5010 REP 3 LAST 91 ES,1554          XNB1 EQUALS W          +108D B(6D) TMP
5011 REP 1          ES,1562          YNB1 EQUALS XNB1          +6 B(6)TMP
5012 REP 1          ES,1570          ZNB1 EQUALS YNB1          +6 B(6)TMP
5013 REP 1          ES,1578          SAVORS2 EQUALS ZNB1          +6 I(2)TMP
5014 REP 1          ES,1600          PLANVEC EQUALS SAVORS2          +2 B(6) S-S SIGHTING VECTOR IN REP. COOR.
5015 REP 1          ES,1600          TSIGHT EQUALS PLANVEC          +6 B(2) S-S TIME OF SIGHTING
A5016
R50165          RENDEZVOUS -P34-35          (28D)

5018 REP 1          ES,1610          DVLOS EQUALS TSIGHT          +2 I(6) S-S DELTA VELOCITY, LOS COORD-DISPL1
5019 REP 1          ES,1610          DELTAR EQUALS DVLOS          I(2)
5020 REP 1          ES,1610          TINTSOI EQUALS DELTAR          I(2) INTERCEPT TIME FOR SOI MANEUVER
50205 REP 2 LAST 91 ES,1612          DELTTIME EQUALS DVLOS          +2 I(2)
5021 REP 3 LAST 91 ES,1614          TARGTIME EQUALS DVLOS          +4 I(2)
5022 REP 4 LAST 91 ES,1616          UNRM EQUALS DVLOS          +6 I(6) S-S
5023 REP 1          ES,1624          ULOS EQUALS UNRM          +6 I(6) S-S UNIT LINE OF SIGHT VECTOR
5024 REP 1          ES,1632          ACTCENT EQUALS ULOS          +6 I(2) S-S CENTRAL ANGLE BETWEEN ACTIVE
A5025          VEH AT TPI IGNITION TIME AND
A5026          TARGET VECTOR.
5027 REP 1          ES,1634          DELVTP1 EQUALS ACTCENT          +2 I(2) NOUN 58 FOR P34.
5028 REP 1          ES,1636          DELVTPF EQUALS DELVTP1          +2 I(2) NOUN 58,59 FOR P34,35.
5029 REP 1          ES,1640          POSTTPI EQUALS DELVTPF          +2 I(2) NOUN 58 FOR P34.
5030 REP 2 LAST 91 ES,1634          TDEC2 EQUALS DELVTP1          (2)
R5031          ALIGNMENT          (12D)

5033 REP 5 LAST 91 ES,1610          STARSAV1 EQUALS DVLOS          I(6)TMP RESTART STAR SAVR.
5034 REP 1          ES,1616          STARSAV2 EQUALS STARSAV1          +6 I(6)TMP RESTART STAR SAVR.
    
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L ERASABLE ASSIGNMENTS

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P5088 ***-**- OVERLAY 2 IN ERANK 5 -*-***

R5089 CONIC ROUTINES STORAGE.

(87D)

| | | | | | | | | | | |
|------|-----|---|------|----|---------|----------|--------|----------|----|---------|
| 5091 | REP | 2 | LAST | 93 | E5,1642 | DELX | EQUALS | END-W | | I(2)TMP |
| 5092 | REP | 1 | | | E5,1644 | DELT | EQUALS | DELT | +2 | I(2)TMP |
| 5093 | REP | 1 | | | E5,1646 | URRECT | EQUALS | DELT | +2 | I(6)TMP |
| 5094 | REP | 1 | | | E5,1654 | RCNORM | EQUALS | URRECT | +6 | I(2)TMP |
| 5095 | REP | 1 | | | E5,1652 | XPREV | EQUALS | XCEP | | I(2)TMP |
| 5096 | REP | 1 | | | E5,1656 | R1VEC | EQUALS | RCNORM | +2 | I(6)TMP |
| 5097 | REP | 1 | | | E5,1664 | R2VEC | EQUALS | R1VEC | +6 | I(6)TMP |
| 5098 | REP | 1 | | | E5,1672 | TDESIRE | EQUALS | R2VEC | +6 | I(2)TMP |
| 5099 | REP | 1 | | | E5,1674 | GEOMSON | EQUALS | TDESIRE | +2 | I(1)TMP |
| 5100 | REP | 1 | | | E5,1675 | UN | EQUALS | GEOMSON | +1 | I(6)TMP |
| 5101 | REP | 1 | | | E5,1703 | VTARGET | EQUALS | UN | +6 | I(1)TMP |
| 5102 | REP | 1 | | | E5,1704 | VTARGET | EQUALS | VTARGET | +1 | I(6)TMP |
| 5103 | REP | 1 | | | E5,1712 | RTNLAMB | EQUALS | VTARGET | +6 | I(1)TMP |
| 5104 | REP | 1 | | | E5,1713 | U2 | EQUALS | RTNLAMB | +1 | I(6)TMP |
| 5105 | REP | 1 | | | E5,1721 | MAGVEC2 | EQUALS | U2 | +6 | I(2)TMP |
| 5106 | REP | 1 | | | E5,1723 | UR1 | EQUALS | MAGVEC2 | +2 | I(6)TMP |
| 5107 | REP | 1 | | | E5,1731 | SNTH | EQUALS | UR1 | +6 | I(2)TMP |
| 5108 | REP | 1 | | | E5,1733 | CSTH | EQUALS | SNTH | +2 | I(2)TMP |
| 5109 | REP | 1 | | | E5,1735 | 1-CSTH | EQUALS | CSTH | +2 | I(2)TMP |
| 5110 | REP | 1 | | | E5,1737 | CSTH-RHO | EQUALS | 1-CSTH | +2 | I(2)TMP |
| 5111 | REP | 1 | | | E5,1741 | P | EQUALS | CSTH-RHO | +2 | I(2)TMP |
| 5112 | REP | 1 | | | E5,1743 | R1A | EQUALS | P | +2 | I(2)TMP |
| 5113 | REP | 2 | LAST | 94 | E5,1656 | RVEC | EQUALS | R1VEC | | I(6)TMP |
| 5114 | REP | 1 | | | E5,1745 | VVEC | EQUALS | R1A | +2 | I(6)TMP |
| 5115 | REP | 2 | LAST | 94 | E5,1712 | RTINTT | EQUALS | RTNLAMB | | I(1)TMP |
| 5116 | REP | 1 | | | E5,1753 | ECC | EQUALS | VVEC | +6 | I(2)TMP |
| 5117 | REP | 3 | LAST | 94 | E5,1712 | RTNTR | EQUALS | RTNLAMB | | I(1)TMP |
| 5118 | REP | 4 | LAST | 94 | E5,1712 | RTNAPSE | EQUALS | RTNLAMB | | I(1)TMP |
| 5119 | REP | 2 | LAST | 94 | E5,1721 | R2 | EQUALS | MAGVEC2 | | I(2)TMP |
| 5120 | REP | 1 | | | E5,1755 | RTNPRM | EQUALS | ECC | +2 | I(1)TMP |
| 5121 | REP | 1 | | | E5,1756 | SONRDOT | EQUALS | RTNPRM | +1 | I(1)TMP |
| 5122 | REP | 1 | | | E5,1757 | RDESIRE | EQUALS | SONRDOT | +1 | I(2)TMP |
| 5123 | REP | 1 | | | E5,1761 | DELDEP | EQUALS | RDESIRE | +2 | I(2)TMP |
| 5124 | REP | 1 | | | E5,1763 | DEPREV | EQUALS | DELDEP | +2 | I(2)TMP |
| 5125 | REP | 2 | LAST | 94 | E5,1761 | TERRLAMB | EQUALS | DRLEP | | I(2)TMP |
| 5126 | REP | 1 | | | E5,1763 | TPREV | EQUALS | DEPREV | | I(2)TMP |

A5127

L ERASABLE ASSIGNMENTS

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P5128 *-*-*- OVERLAY 3 IN BRANK 5 -*-*-*

R5129 MEASUREMENT INCORPORATION STORAGE. (66D)
 R5131 (CALLED BY P20, P22, P23)

| | | | | | | | | | | |
|------|-----|---|------|----|---------|---------|--------|---------|------|----------|
| 5132 | REP | 3 | LAST | 94 | ES,1642 | OMEGAM1 | EQUALS | END-W | | I(6)TMP |
| 5133 | REP | 1 | | | ES,1650 | OMEGAM2 | EQUALS | OMEGAM1 | +6 | I(6)TMP |
| 5134 | REP | 1 | | | ES,1656 | OMEGAM3 | EQUALS | OMEGAM2 | +6 | I(6)TMP |
| 5135 | REP | 1 | | | ES,1664 | HOLDW | EQUALS | OMEGAM3 | +6 | I(18)TMP |
| 5136 | REP | 1 | | | ES,1706 | TDPOS | EQUALS | HOLDW | +18D | I(6)TMP |
| 5137 | REP | 1 | | | ES,1714 | TDVEL | EQUALS | TDPOS | +6 | I(6)TMP |
| 5138 | REP | 1 | | | ES,1722 | ZI | EQUALS | TDVEL | +6 | I(18) |

R5140 P22-P23 STORAGE. (6D)

| | | | | | | | | | | |
|------|-----|---|--|--|---------|----------|--------|----------|------|-------------------------------------|
| 5143 | REP | 1 | | | ES,1744 | 22SUBSCL | EQUALS | ZI | +18D | DE OF ABCDE LANDMARK ID NO. |
| 5144 | REP | 1 | | | ES,1745 | CXOFF | EQUALS | 22SUBSCL | +1 | R OF ARCADE OFFSET INDICATOR |
| 5145 | REP | 1 | | | ES,1746 | 8KK | EQUALS | CXOFF | +1 | B(1)TMP INDEX OF PRESENT MARK. |
| 5146 | REP | 1 | | | ES,1747 | 8NN | EQUALS | 8KK | +1 | B(1)TMP |
| 5147 | REP | 1 | | | ES,1750 | S22LOC | EQUALS | 8NN | +1 | I(1)TMP MARK DATA LOC |
| 5148 | REP | 1 | | | ES,1751 | LANDMARK | EQUALS | S22LOC | +1 | B(1)DSP NOUN 70 FOR P22,51, R52,53. |
| 5149 | REP | 1 | | | ES,1752 | HORIZON | EQUALS | LANDMARK | +1 | B(1)DSP NOUN 70 FOR P22,51, R52,53. |
| 5150 | REP | 1 | | | ES,1753 | IDOFLMK | EQUALS | HORIZON | +1 | B(1) |

R5152 *****P23*** (1D)
 5155 REP 1 ES,1754 TRUNION EQUALS IDOFLMK +1 B(1)
 A5156

L ERASABLE ASSIGNMENTS

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PS157 *-*-*-* OVERLAY 0 IN BRANK R *-*-*-*

RS158 SYSTEM TEST STORAGE

(174)

| | | | | | | | | |
|------|-----|----|------|---------|---------|-----------|----------------|------------|
| 5160 | | | | ES,1400 | ES,1401 | AZIMUTH | ERASE | +1 |
| 5161 | | | | ES,1402 | ES,1403 | LATITUDE | ERASE | +1 |
| 5162 | REP | 1 | | 1160 | | TRUNA | EQUALS DESOPTT | |
| 5163 | REP | 1 | | 1161 | | SHAPTA | EQUALS DESOPTS | |
| 5164 | | | | ES,1404 | ES,1411 | BRVECTOR | ERASE | +5 |
| 5165 | | | | ES,1412 | ES,1412 | LENGTH | ERASE | |
| 5166 | | | | ES,1413 | ES,1420 | LOSVEC | ERASE | +5 |
| 5167 | REP | 1 | | ES,1413 | | SKTOPTN | = | LOSVEC |
| 5168 | | | | ES,1421 | ES,1421 | NOXCTR | ERASE | |
| 5169 | | | | ES,1422 | ES,1422 | PIPINDEX | ERASE | |
| 5170 | | | | ES,1423 | ES,1423 | POSITION | ERASE | |
| 5171 | | | | ES,1424 | ES,1424 | QPLAC | ERASE | |
| 5172 | | | | ES,1425 | ES,1425 | QPLACE | ERASE | |
| 5173 | | | | ES,1426 | ES,1426 | QPLACES | ERASE | |
| 5174 | | | | ES,1427 | ES,1427 | RUN | ERASE | |
| 5175 | | | | ES,1430 | ES,1430 | STOREPL | ERASE | |
| 5176 | | | | ES,1431 | ES,1431 | SOUTHDR | ERASE | |
| 5177 | REP | 1 | | ES,1431 | | TARG1/2 | = | SOUTHDR |
| 5178 | | | | ES,1432 | ES,1437 | TAZEL1 | ERASE | +5 |
| 5179 | | | | ES,1440 | ES,1441 | TEMPTIME | ERASE | +1 |
| 5180 | | | | ES,1442 | ES,1443 | TMARK | ERASE | +1 |
| 5181 | | | | ES,1444 | ES,1652 | GENPL | ERASE | +134D |
| 5182 | REP | 1 | | ES,1444 | | CDUTIMEI | = | GENPL |
| 5183 | REP | 2 | LAST | 96 | | CDUTIMEP | = | GENPL +2 |
| 5184 | REP | 3 | LAST | 96 | | IMU/OPT | = | GENPL +4 |
| 5185 | REP | 4 | LAST | 96 | | CDUREADP | = | GENPL +5 |
| 5186 | REP | 5 | LAST | 96 | | CDUREADI | = | GENPL +6 |
| 5187 | REP | 6 | LAST | 96 | | CHY.TIMIT | = | GENPL +7 |
| 5188 | REP | 7 | LAST | 96 | | TEMPADD | = | GENPL +4 |
| 5189 | REP | 8 | LAST | 96 | | TRIT | = | GENPL +5 |
| 5190 | REP | 9 | LAST | 96 | | NOBITS | = | GENPL +6 |
| 5191 | REP | 10 | LAST | 96 | | CHAN | = | GENPL +7 |
| 5192 | REP | 11 | LAST | 96 | | LOS1 | = | GENPL +8D |
| 5193 | REP | 12 | LAST | 96 | | LOS2 | = | GENPL +14D |
| 5194 | REP | 13 | LAST | 96 | | CALCDTR | EQUALS | GENPL +20D |
| 5195 | REP | 14 | LAST | 96 | | CDUPLAG | EQUALS | GENPL +21D |
| 5196 | REP | 15 | LAST | 96 | | GYTORETO | EQUALS | GENPL +22D |
| 5197 | REP | 16 | LAST | 96 | | OPTNREG | EQUALS | GENPL +23D |
| 5198 | REP | 17 | LAST | 96 | | SAVE | EQUALS | GENPL +24D |
| 5199 | REP | 18 | LAST | 96 | | SFCONST1 | EQUALS | GENPL +27D |

THREE CONSEC LOC

L ERASABLE ASSIGNMENTS

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| | | | | | | | | | |
|------|-----|----|------|----|---------|----------|--------|-------------|------|
| 5200 | REP | 19 | LAST | 96 | ES,1500 | TIMER | EQUALS | GENPL | +20D |
| 5201 | REP | 20 | LAST | 97 | ES,1502 | DATAFL | EQUALS | GENPL | +30D |
| 5202 | REP | 21 | LAST | 97 | ES,1444 | RDSP | EQUALS | GENPL | |
| 5203 | REP | 22 | LAST | 97 | ES,1544 | MASKREG | EQUALS | GENPL | +64D |
| 5204 | REP | 23 | LAST | 97 | ES,1546 | CDUNDX | EQUALS | GENPL | +66D |
| 5205 | REP | 24 | LAST | 97 | ES,1547 | RESULTCT | EQUALS | GENPL | +67D |
| 5206 | REP | 25 | LAST | 97 | ES,1552 | COUNTPL | EQUALS | GENPL | +70D |
| 5207 | REP | 26 | LAST | 97 | ES,1553 | CDUANG | EQUALS | GENPL | +71D |
| 5208 | REP | 27 | LAST | 97 | ES,1444 | AINLA | = | GENPL | |
| 5209 | REP | 1 | | | ES,1444 | WANGO | EQUALS | AINLA | |
| 5210 | REP | 2 | LAST | 97 | ES,1446 | WANGI | EQUALS | AINLA | +2D |
| 5211 | REP | 3 | LAST | 97 | ES,1450 | WANOT | EQUALS | AINLA | +4D |
| 5212 | REP | 1 | | | ES,1450 | TORGNDX | = | WANOT | |
| 5213 | REP | 4 | LAST | 97 | ES,1452 | DRIPPT | EQUALS | AINLA | +6D |
| 5214 | REP | 5 | LAST | 97 | ES,1454 | ALK15 | EQUALS | AINLA | +8D |
| 5215 | REP | 6 | LAST | 97 | ES,1455 | CMPX1 | EQUALS | AINLA | +9D |
| 5216 | REP | 7 | LAST | 97 | ES,1456 | ALK | EQUALS | AINLA | +10D |
| 5217 | REP | 8 | LAST | 97 | ES,1472 | VLAUNS | EQUALS | AINLA | +22D |
| 5218 | REP | 1 | | | ES,1460 | THETAX | = | ALK +2 | |
| 5219 | REP | 9 | LAST | 97 | ES,1474 | WPLATO | EQUALS | AINLA | +24D |
| 5220 | REP | 10 | LAST | 97 | ES,1500 | INTY | EQUALS | AINLA | +28D |
| 5221 | REP | 1 | | | ES,1466 | THETAN | = | THETAX +6 | |
| 5222 | REP | 11 | LAST | 97 | ES,1502 | ANOZ | EQUALS | AINLA | +30D |
| 5223 | REP | 12 | LAST | 97 | ES,1504 | INTZ | EQUALS | AINLA | +32D |
| 5224 | REP | 13 | LAST | 97 | ES,1506 | ANOY | EQUALS | AINLA | +34D |
| 5225 | REP | 14 | LAST | 97 | ES,1510 | ANOX | EQUALS | AINLA | +36D |
| 5226 | REP | 15 | LAST | 97 | ES,1512 | DRIPTO | EQUALS | AINLA | +38D |
| 5227 | REP | 16 | LAST | 97 | ES,1514 | DRIPTI | EQUALS | AINLA | +40D |
| 5228 | REP | 17 | LAST | 97 | ES,1520 | VLAUN | EQUALS | AINLA | +44D |
| 5229 | REP | 1 | | | ES,1474 | FILDELV | = | THETAN +6 | |
| 5230 | REP | 18 | LAST | 97 | ES,1522 | ACCD | EQUALS | AINLA | +46D |
| 5231 | REP | 1 | | | ES,1476 | INTVBC | = | FILDELV +2 | |
| 5232 | REP | 19 | LAST | 97 | ES,1530 | POSIV | EQUALS | AINLA | +52D |
| 5233 | REP | 20 | LAST | 97 | ES,1532 | DPIPAY | EQUALS | AINLA | +54D |
| 5234 | REP | 21 | LAST | 97 | ES,1536 | DPIPZ | EQUALS | AINLA | +58D |
| 5235 | REP | 22 | LAST | 97 | ES,1540 | ALTIM | EQUALS | AINLA | +60D |
| 5236 | REP | 23 | LAST | 97 | ES,1541 | ALTIMS | EQUALS | AINLA | +61D |
| 5237 | REP | 24 | LAST | 97 | ES,1542 | ALDK | EQUALS | AINLA | +62D |
| 5238 | REP | 25 | LAST | 97 | ES,1560 | DELM | EQUALS | AINLA | +76D |
| 5239 | REP | 26 | LAST | 97 | ES,1570 | WPLATI | EQUALS | AINLA | +84D |
| 5240 | REP | 27 | LAST | 97 | ES,1577 | RESTARPT | = | AINLA + 91D | |
| 5241 | REP | 28 | LAST | 97 | ES,1631 | GEOSAVED | = | AINLA +117D | |
| 5242 | REP | 29 | LAST | 97 | ES,1632 | PRMTRXC | = | AINLA +118D | |
| 5243 | REP | 30 | LAST | 97 | ES,1633 | LALNCHAZ | = | AINLA +119D | |
| 5244 | REP | 31 | LAST | 97 | ES,1635 | NEWAZMTH | = | AINLA +121D | |
| 5245 | REP | 32 | LAST | 97 | ES,1637 | OLDAZMTH | = | AINLA +123D | |

FIX LATER POSSIBLY KEEP1

OPTIMUM CALIB. AND ALIGNMENT

L BRASABLE ASSIGNMENTS

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| | | | | | | | | |
|------|-----|----|------|----|---------|------------|---------|-------|
| 8246 | REP | 33 | LAST | 97 | ES,1641 | TOLDAZPT = | AINLA | +125D |
| 8247 | REP | 34 | LAST | 98 | ES,1643 | GEOCOMPS = | AINLA | +127D |
| 8248 | REP | 35 | LAST | 98 | ES,1644 | 1SECT1 = | AINLA | +128D |
| 8249 | REP | 36 | LAST | 98 | ES,1645 | QTSWLT1 = | AINLA | +129D |
| 8250 | REP | 37 | LAST | 98 | ES,1646 | ERECTIME = | AINLA | +130D |
| 8251 | REP | 38 | LAST | 98 | ES,1647 | ERCOMP = | AINLA | +131D |
| 8252 | REP | 39 | LAST | 98 | ES,1655 | ZERONDZ = | AINLA | +137D |
| 8253 | REP | 1 | | | ES,1655 | QTSOPNDZ = | ZERONDZ | |

8254 THE FOLLOWING TAGS ARE USED BY THE 504 IMJ CALIBRATION AND ALIGNMENT PROGRAM ONLY.

| | | | | | | | | | |
|-------|-----|----|------|----|---------|----------|--------|----------|-------|
| 8256 | REP | 2 | LAST | 97 | ES,1460 | THETA1 | EQUALS | ALK | +2 |
| 8257 | REP | 1 | | | ES,1466 | THETA1 | EQUALS | THETA1 | +6 |
| 8258 | REP | 1 | | | ES,1474 | PILDELV1 | EQUALS | THETA1 | +6 |
| 8259 | REP | 1 | | | ES,1476 | INTVEC1 | EQUALS | PILDELV1 | +2 |
| 8260 | REP | 40 | LAST | 98 | ES,1631 | GEOSAVE1 | EQUALS | AINLA | +117D |
| 8261 | REP | 41 | LAST | 98 | ES,1632 | PREMTRX1 | EQUALS | AINLA | +118D |
| 8262 | REP | 42 | LAST | 98 | ES,1633 | LINCHAZ1 | EQUALS | AINLA | +119D |
| 8263 | REP | 1 | | | ES,1635 | NEWAZ1 | EQUALS | LINCHAZ1 | +2 |
| 8264 | REP | 2 | LAST | 98 | ES,1637 | OLDAZ1 | EQUALS | LINCHAZ1 | +4 |
| 8265 | REP | 3 | LAST | 98 | ES,1641 | TOLDAZ1 | EQUALS | LINCHAZ1 | +6 |
| 8266 | REP | 43 | LAST | 98 | ES,1643 | GEOCOMP1 | EQUALS | AINLA | +127D |
| 8267 | REP | 44 | LAST | 98 | ES,1644 | 1SECT1 | EQUALS | AINLA | +128D |
| 8268 | REP | 45 | LAST | 98 | ES,1645 | QTSWLT1 | EQUALS | AINLA | +129D |
| 8269 | REP | 46 | LAST | 98 | ES,1646 | ERECTIM1 | EQUALS | AINLA | +130D |
| 8270 | REP | 47 | LAST | 98 | ES,1647 | ERCOMP1 | EQUALS | AINLA | +131D |
| 8271 | REP | 48 | LAST | 98 | ES,1655 | ZERONDZ1 | EQUALS | AINLA | +137D |
| 82715 | REP | 49 | LAST | 98 | ES,1656 | PERFDLAY | EQUALS | AINLA | +138D |

8272 END OF 504 CAL + ALIGN BRASS.

8273 REP 1 ES,1777 END-E5 EQUALS QMIN LAST USED E5 ADDRESS

L ERASABLE ASSIGNMENTS

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| Address | Bank | Assignment | Operation | Count | Notes |
|---------|---|------------|-----------|-------|--|
| P6000 | BANK-8 ASSIGNMENTS | | | | |
| 6001 | E6,1400 | | | | SETLOC 3000 |
| R60011 | P23 PAD LOADS*** | | | | (2D) |
| 60013 | E6,1400 | E6,1400 | WMIDPOS | ERASE | I(1) PL INITIAL VALUES FOR W-MATRIX IN |
| 60014 | E6,1401 | E6,1401 | WMIDVEL | ERASE | I(1) PL CIBLINAR (P23) NAVIGATION |
| A60015 | R22 PAD LOADS | | | | (5D) |
| R60016 | R22 PAD LOADS | | | | (5D) |
| 60018 | E6,1402 | E6,1403 | RVAR | ERASE | +1 I(2) PL VHP RADAR |
| 60019 | E6,1404 | E6,1406 | RVARMIN | ERASE | +2 I(3) PL VHP RADAR |
| A600195 | ***** PAD LOADED ENTRY DAP STEERING VARIABLES ***** | | | | (3D) |
| R6002 | ***** PAD LOADED ENTRY DAP STEERING VARIABLES ***** | | | | (3D) |
| 6004 | E6,1407 | E6,1407 | LADPAD | ERASE | I(1) PL FOR ENTRY_HOLDS CM NOMINAL L/D |
| 6005 | E6,1410 | E6,1410 | LDDPAD | ERASE | I(1) PL FOR ENTRY_HOLDS CM NOMINAL LOD |
| 6006 | E6,1411 | E6,1411 | ALFAPAD | ERASE | R(1) PL ALFA TRIM / 180 |
| A60062 | ***** PAD LOADED TVC DAP VARIABLES ***** | | | | (26D) |
| R6007 | ***** PAD LOADED TVC DAP VARIABLES ***** | | | | (26D) |
| 6009 | E6,1412 | E6,1412 | ESTROKER | ERASE | B(1)PL |
| 6010 | E6,1413 | E6,1414 | EKPRIME | ERASE | +1 B(2)PL |
| 6011 | E6,1415 | E6,1415 | ETDECAY | ERASE | I(1)PL |
| 6012 | E6,1416 | E6,1417 | EKTLX/1 | ERASE | +1 B(2)PL |
| 6013 | E6,1420 | E6,1420 | ETVCDT/2 | ERASE | B(1)PL |
| 6014 | E6,1421 | E6,1421 | ETSWITCH | ERASE | B(1)PL |
| 6015 | E6,1422 | E6,1422 | ECORFRAC | ERASE | B(1)PL |
| 6016 | E6,1423 | E6,1424 | EREPFRAC | ERASE | +1 B(2)PL |
| 6017 | E6,1425 | E6,1425 | PACTOFF | ERASE | B(1)PL, DSP N46 R01 = PTRIM, R02 = YTRIM |
| 6018 | E6,1426 | E6,1426 | YACTOFF | ERASE | B(1)PL, CONSECUTIVE WITH PACTOFF |
| 6019 | E6,1427 | E6,1427 | AP0 | ERASE | B(1) |
| 6020 | E6,1430 | E6,1431 | AP1 | ERASE | +1 B(2) |
| 6021 | E6,1432 | E6,1433 | AP2 | ERASE | +1 B(2) |
| 6022 | E6,1434 | E6,1435 | AP3 | ERASE | +1 B(2) |
| 6023 | E6,1436 | E6,1437 | BP1 | ERASE | +1 B(2) |
| 6024 | E6,1440 | E6,1441 | BP2 | ERASE | +1 B(2) |
| 6025 | E6,1442 | E6,1443 | BP3 | ERASE | +1 B(2) |
| 6027 | REP 1 | E6,1427 | AY0 | = | AP0 |
| 6028 | REP 1 | E6,1430 | AY1 | = | AP1 |
| 6029 | REP 1 | E6,1432 | AY2 | = | AP2 |
| 6030 | REP 1 | E6,1434 | AY3 | = | AP3 |
| 6031 | REP 1 | E6,1436 | BY1 | = | BP1 |

L ERASABLE ASSIGNMENTS

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6032 REP 1      E6,1440      BY2 =      BP2
6033 REP 1      E6,1442      BY3 =      BP3
R6034 ***** EXCLUSIVE TVC DAP VARIABLES. ***** (5D)

6036          E6,1444 E6,1444 V9TVCNTR ERASE      B(1)
6037          E6,1445 E6,1446 TEMPDAP ERASE +1      B(2)
6038 REP 1      E6,1445      MRKRTMP =      TEMPDAP      ((B(1)))
6039          E6,1447 E6,1447 CNTR ERASE      B(1)
6040          E6,1450 E6,1450 OOAD ERASE      B(1)
A6041
R6042 ***** EXCLUSIVE RCS DAP VARIABLES. ***** (13D)

6044          E6,1451 E6,1465 RWORD1 ERASE +12D B(1)
6045 REP 1      E6,1452      RWORD2 EQUALS RWORD1 +1 B(1)
6046 REP 1      E6,1453      PWORD1 EQUALS RWORD2 +1 B(1)
6047 REP 1      E6,1454      PWORD2 EQUALS PWORD1 +1 B(1)
6048 REP 1      E6,1455      YWORD1 EQUALS PWORD2 +1 B(1)
6049 REP 1      E6,1456      YWORD2 EQUALS YWORD1 +1 B(1)
6050 REP 1      E6,1457      BLAST EQUALS YWORD2 +1 B(2)
6051 REP 1      E6,1461      BLAST1 EQUALS BLAST +2 B(2)
6052 REP 1      E6,1463      BLAST2 EQUALS BLAST1 +2 B(2)
60525 REP 1     E6,1465      TSPHASE EQUALS BLAST2 +2 B(1)
A60526
R6053 ***** RCS/TVC DAP COMMON STORAGE. ***** (16D)

6055          E6,1466 E6,1466 DAPDTR1 ERASE      B(1)DSP NOLN 46(R1)
6056          E6,1467 E6,1467 DAPDTR2 ERASE      B(1)DSP NOLN 46(R2)

6057          E6,1470 E6,1470 IXX ERASE      B(1) CONSECUTIVE WITH IAVG, IAVG/TLX FOR
6058          E6,1471 E6,1471 IAVG ERASE      B(1) MASSPROP
6059          E6,1472 E6,1472 IAVG/TLX ERASE      B(1)

6060          E6,1473 E6,1474 LEMASS ERASE +1      B(1) DSP NOLN 47 (R2) LEM/CSMASS
6061 REP 1      E6,1474      CSMASS EQUALS LEMASS +1 B(1) DSP NOLN 47 (R1) FOR DOWNLINK
6062          E6,1475 E6,1475 WEIGHT/G ERASE      B(1)
6063 REP 1      E6,1475      MASS =      WEIGHT/G

6064          E6,1476 E6,1476 AK ERASE
6065          E6,1477 E6,1477 AK1 ERASE
6066          E6,1500 E6,1500 AK2 ERASE

6067          E6,1501 E6,1501 RCSPLACS ERASE      B(1) CONSECUTIVE WITHAK2 DOWNLINK
6068          E6,1502 E6,1502 T5TEMP ERASE      B(1)
6069          E6,1503 E6,1503 EDRIEX ERASE
    
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L ERASABLE ASSIGNMENTS

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| | | | | | | | |
|------|-----|---|----------------------------|----------|--------------------|-------|--|
| 0102 | REP | 1 | E0,1547 | B3 | EQUALS B2 +1 | B(1) | |
| 0103 | REP | 1 | E0,1550 | B4 | EQUALS B3 +1 | B(1) | |
| 0104 | REP | 1 | E0,1551 | B5 | EQUALS B4 +1 | B(1) | |
| 0105 | REP | 1 | E0,1552 | B6 | EQUALS B5 +1 | B(1) | |
| 0106 | REP | 1 | E0,1553 | J1 | EQUALS B6 +1 | B(2) | |
| 0107 | REP | 1 | E0,1555 | J2 | EQUALS J1 +2 | B(2) | |
| 0108 | REP | 1 | E0,1557 | J3 | EQUALS J2 +2 | B(2) | |
| 0109 | REP | 1 | E0,1561 | J4 | EQUALS J3 +2 | B(2) | |
| 0110 | REP | 1 | E0,1563 | J5 | EQUALS J4 +2 | B(2) | |
| 0111 | REP | 1 | E0,1565 | YNSUM | EQUALS J5 +2 | B(2) | |
| 0112 | REP | 1 | E0,1567 | YDSUM | EQUALS YNSUM +2 | B(2) | |
| 0113 | REP | 1 | E0,1571 | C1 | EQUALS YDSUM +2 | B(1) | |
| 0114 | REP | 1 | E0,1572 | C2 | EQUALS C1 +1 | B(1) | |
| 0115 | REP | 1 | E0,1573 | C3 | EQUALS C2 +1 | B(1) | |
| 0116 | REP | 1 | E0,1574 | C4 | EQUALS C3 +1 | B(1) | |
| 0117 | REP | 1 | E0,1575 | C5 | EQUALS C4 +1 | B(1) | |
| 0118 | REP | 1 | E0,1576 | C6 | EQUALS C5 +1 | B(1) | |
| 0119 | REP | 1 | E0,1577 | Y1 | EQUALS C6 +1 | B(2) | |
| 0120 | REP | 1 | E0,1601 | Y2 | EQUALS Y1 +2 | B(2) | |
| 0121 | REP | 1 | E0,1603 | Y3 | EQUALS Y2 +2 | B(2) | |
| 0122 | REP | 1 | E0,1605 | Y4 | EQUALS Y3 +2 | B(2) | |
| 0123 | REP | 1 | E0,1607 | Y5 | EQUALS Y4 +2 | B(2) | |
| 0124 | REP | 1 | E0,1611 | ROLLFIRE | EQUALS Y5 +2 | B(1) | |
| 0125 | REP | 1 | E0,1612 | ROLLWORD | EQUALS ROLLFIRE +1 | B(1) | |
| 0126 | REP | 1 | E0,1613 | TEMREG | EQUALS ROLLWORD +1 | B(1) | |
| 0127 | REP | 1 | E0,1614 | STROKER | EQUALS TEMREG +1 | B(1) | |
| 0129 | REP | 1 | E0,1615 | PERRR | EQUALS STROKER +1 | B(2) | |
| 0130 | REP | 1 | E0,1617 | YERRR | EQUALS PERRR +2 | B(2) | |
| 0131 | REP | 1 | E0,1621 | DELPRAR | EQUALS YERRR +2 | B(2) | |
| 0132 | REP | 1 | E0,1623 | DELYRAR | EQUALS DELPRAR +2 | B(2) | |
| 0133 | REP | 1 | E0,1625 | PDELORP | EQUALS DELYRAR +2 | B(2) | |
| 0134 | REP | 1 | E0,1627 | YDELORP | EQUALS PDELORP +2 | B(2) | |
| 0135 | | | TVC ZEROING LOOP ENDS HERE | | | | |
| 0136 | REP | 1 | E0,1631 | PCMD | EQUALS YDELORP +2 | B(1) | |
| 0137 | REP | 1 | E0,1632 | YCMD | EQUALS PCMD +1 | B(1), | |
| 0138 | REP | 1 | E0,1633 | TACTOFF | EQUALS YCMD +1 | B(2) | |
| 0139 | REP | 1 | E0,1635 | TSTVCDT | EQUALS TACTOFF +2 | B(1) | |
| 0140 | REP | 1 | E0,1636 | MDT | EQUALS TSTVCDT +1 | I(6) | |

CONSECUTIVE WITH PCMD

L ERASABLE ASSIGNMENTS

USRS PAGE NO. 69 E0 53

| | | | | | | | | |
|-------|-----|---|---------|----------|--------|----------|----|------|
| 0141 | REP | 1 | E0,1644 | KPRIMEDT | EQUALS | MDT | +8 | I(2) |
| 0142 | REP | 1 | E0,1646 | KTLX/I | EQUALS | KPRIMEDT | +2 | B(1) |
| 0143 | REP | 1 | E0,1647 | TENNDOT | EQUALS | KTLX/I | +1 | B(1) |
| 0144 | REP | 1 | E0,1650 | 1/CQNACC | EQUALS | TENNDOT | +1 | B(1) |
| 0145 | REP | 1 | E0,1651 | VARC | EQUALS | 1/CQNACC | +1 | B(1) |
| 0146 | REP | 1 | E0,1652 | REPPRAC | EQUALS | VARC | +1 | B(1) |
| 0147 | REP | 1 | E0,1653 | VCNTR | EQUALS | REPPRAC | +1 | B(1) |
| 01472 | REP | 1 | E0,1654 | TVCPHASE | EQUALS | VCNTR | +1 | B(1) |
| 0148 | REP | 1 | E0,1655 | PCDUYPT | EQUALS | TVCPHASE | +1 | B(1) |
| 0149 | REP | 1 | E0,1656 | PCDUZPST | EQUALS | PCDUYPT | +1 | B(1) |
| 0150 | REP | 1 | E0,1657 | MCDUYDOT | EQUALS | PCDUZPST | +1 | B(1) |
| 0151 | REP | 1 | E0,1660 | MCDUDDOT | EQUALS | MCDUYDOT | +1 | B(1) |
| 0152 | REP | 1 | E0,1661 | TVCKPHS | EQUALS | MCDUDDOT | +1 | B(1) |
| 0153 | REP | 1 | E0,1662 | MASSIMP | EQUALS | TVCKPHS | +1 | R(1) |
| 0154 | REP | 1 | E0,1663 | VCNTRIMP | EQUALS | MASSIMP | +1 | B(1) |

PROTECT
*PROTECT***

R0155 STROKE TEST VARIABLES

| | | | | | | | | |
|-------|------|---|---------|----------|--------|----------|----|------|
| R0155 | (8D) | | | | | | | |
| 0157 | REP | 1 | E0,1664 | STRKTIME | EQUALS | VCNTRIMP | +1 | B(1) |
| 0158 | REP | 1 | E0,1665 | CADDY | EQUALS | STRKTIME | +1 | B(1) |
| 0159 | REP | 1 | E0,1666 | N | EQUALS | CADDY | +1 | B(1) |
| 0160 | REP | 1 | E0,1667 | BUNKER | EQUALS | N | +1 | B(1) |
| 0161 | REP | 1 | E0,1670 | REVS | EQUALS | BUNKER | +1 | B(1) |
| 0162 | REP | 1 | E0,1671 | CARD | EQUALS | REVS | +1 | B(1) |

R0163 TVC ROLL DAP VARIABLES

| | | | | | | | | |
|-------|------|---|----------|----------|--------|----------|----|-------------------------------------|
| R0163 | (8D) | | | | | | | |
| 0165 | REP | 1 | E0,1672 | OGANOW | EQUALS | CARD | +1 | B(1) |
| 0166 | REP | 1 | E0,1673 | OGAPAST | EQUALS | OGANOW | +1 | B(1) |
| 0167 | REP | 1 | E0,1674 | OGA | EQUALS | OGAPAST | +1 | B(1)TMP |
| 0168 | REP | 1 | E0,1674 | OGAERR | = | OGA | | (ROLL DAP USES OGA, MEANS OGAERROR) |
| 0169 | REP | 2 | LAST 103 | DELOGART | EQUALS | OGA | +1 | B(1)TMP |
| 0170 | REP | 1 | E0,1676 | SNRT | EQUALS | DELOGART | +1 | SIGN OF OGA RATE |
| 0171 | REP | 1 | E0,1677 | DELOGA | EQUALS | SNRT | +1 | USED IN ROLL LOGIC |
| 0172 | REP | 1 | E0,1700 | I | EQUALS | DELOGA | +1 | USED IN ROLL LOGIC |
| 0173 | REP | 1 | E0,1701 | IOGARATE | EQUALS | I | +1 | USED IN ROLL LOGIC |

R0174 TVC DAP RESTART TEMPORARIES.

(33D)

| | | | | | | | | |
|-------|-----|---|---------|----------|--------|----------|----|------|
| R0174 | | | | | | | | |
| 0176 | REP | 1 | E0,1702 | TKTLX/I | EQUALS | IOGARATE | +1 | B(1) |
| 0177 | REP | 1 | E0,1703 | PACTIMP | EQUALS | TKTLX/I | +1 | B(2) |
| 0178 | REP | 1 | E0,1705 | YACTIMP | EQUALS | PACTIMP | +2 | B(2) |
| 0179 | REP | 1 | E0,1707 | CNTRIMP | EQUALS | YACTIMP | +2 | B(1) |
| 0180 | REP | 1 | E0,1710 | STRCTIMP | EQUALS | CNTRIMP | +1 | B(1) |
| 0181 | REP | 1 | E0,1711 | NSUMIMP | EQUALS | STRCTIMP | +1 | B(2) |
| 0182 | REP | 1 | E0,1713 | DSUMIMP | EQUALS | NSUMIMP | +2 | B(2) |
| 0183 | REP | 1 | E0,1715 | DELRTIMP | EQUALS | DSUMIMP | +2 | B(2) |

| REF | REV | DATE | DESCRIPTION | BY | CHKD | APPD |
|------|-----|------|-------------|---------|------|------|
| 6184 | REF | 1 | B1711 | B17MP | | |
| 6185 | REF | 1 | B1720 | B17MP | | |
| 6186 | REF | 1 | B1721 | B17MP | | |
| 6187 | REF | 1 | B1722 | B17MP | | |
| 6188 | REF | 1 | B1723 | B17MP | | |
| 6189 | REF | 1 | B1724 | B17MP | | |
| 6190 | REF | 1 | B1725 | B17MP | | |
| 6191 | REF | 1 | B1726 | B17MP | | |
| 6192 | REF | 1 | B1730 | B17MP | | |
| 6193 | REF | 1 | B1732 | B17MP | | |
| 6194 | REF | 1 | B1734 | B17MP | | |
| 6195 | REF | 1 | B1736 | B17MP | | |
| 6196 | REF | 1 | B1740 | B17MP | | |
| 6197 | REF | 1 | B1742 | B17MP | | |
| 6198 | REF | 1 | B1744 | B17MP | | |
| 6200 | REF | 4 | LAST 101 | EQ,1533 | | |
| 6201 | REF | 2 | LAST 104 | EQ,1742 | | |
| 6202 | REF | 3 | LAST 104 | EQ,1742 | | |
| 6203 | REF | 1 | LAST 104 | EQ,1744 | | |
| 6204 | REF | 2 | LAST 104 | EQ,1744 | | |
| 6205 | REF | 2 | LAST 103 | EQ,1651 | | |
| 6206 | REF | 1 | LAST 103 | EQ,1651 | | |
| 6207 | REF | 4 | LAST 104 | EQ,1742 | | |
| 6208 | REF | 3 | LAST 104 | EQ,1744 | | |
| 6209 | REF | 2 | LAST 102 | EQ,1561 | | |
| 6210 | REF | 2 | LAST 102 | EQ,1563 | | |
| 6211 | REF | 2 | LAST 101 | EQ,1541 | | |
| 6212 | REF | 2 | LAST 101 | EQ,1543 | | |
| 6213 | REF | 2 | LAST 104 | EQ,1736 | | |
| 6214 | REF | 2 | LAST 103 | EQ,1711 | | |
| 6215 | REF | 2 | LAST 103 | EQ,1713 | | |
| 6216 | REF | 5 | LAST 104 | EQ,1742 | | |
| 6217 | REF | 4 | LAST 104 | EQ,1744 | | |
| 6218 | REF | 2 | LAST 102 | EQ,1605 | | |
| 6219 | REF | 2 | LAST 102 | EQ,1607 | | |
| 6220 | REF | 2 | LAST 102 | EQ,1585 | | |
| 6221 | REF | 2 | LAST 102 | EQ,1587 | | |
| 6222 | REF | 1 | LAST 104 | EQ,1736 | | |
| 6223 | REF | 3 | LAST 104 | EQ,1711 | | |
| 6224 | REF | 3 | LAST 104 | EQ,1713 | | |
| 6225 | REF | 1 | LAST 104 | EQ,1736 | | |
| 6226 | REF | 2 | LAST 102 | EQ,1585 | | |
| 6227 | REF | 2 | LAST 102 | EQ,1587 | | |
| 6228 | REF | 2 | LAST 102 | EQ,1585 | | |
| 6229 | REF | 2 | LAST 102 | EQ,1587 | | |
| 6230 | REF | 2 | LAST 102 | EQ,1585 | | |
| 6231 | REF | 2 | LAST 102 | EQ,1587 | | |
| 6232 | REF | 2 | LAST 102 | EQ,1585 | | |
| 6233 | REF | 2 | LAST 102 | EQ,1587 | | |
| 6234 | REF | 2 | LAST 102 | EQ,1585 | | |
| 6235 | REF | 2 | LAST 102 | EQ,1587 | | |
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| 6261 | REF | 2 | LAST 102 | EQ,1587 | | |
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| 6264 | REF | 2 | LAST 102 | EQ,1585 | | |
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| 6299 | REF | 2 | LAST 102 | EQ,1587 | | |
| 6300 | REF | 2 | LAST 102 | EQ,1585 | | |
| 6301 | REF | 2 | LAST 102 | EQ,1587 | | |
| 6302 | REF | 2 | LAST 102 | EQ,1585 | | |
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| 6350 | REF | 2 | LAST 102 | EQ,1585 | | |
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| 6360 | REF | 2 | LAST 102 | EQ,1585 | | |
| 6361 | REF | 2 | LAST 102 | EQ,1587 | | |
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| 6364 | REF | 2 | LAST 102 | EQ,1585 | | |
| 6365 | REF | 2 | LAST 102 | EQ,1587 | | |
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| 6373 | REF | 2 | LAST 102 | EQ,1587 | | |
| 6374 | REF | 2 | LAST 102 | EQ,1585 | | |
| 6375 | REF | 2 | LAST 102 | EQ,1587 | | |



L ERASABLE ASSIGNMENTS

USER-S PAGE NO. 71 E0 53

0225 REP 2 LAST 104 E6,1717
 0226 REP 2 LAST 104 E6,1720
 0227 REP 2 LAST 104 E6,1721
 0228 REP 2 LAST 104 E6,1722
 0229 REP 2 LAST 104 E6,1723
 0230 REP 2 LAST 104 E6,1724
 0231 REP 2 LAST 104 E6,1725

 0232 REP 2 LAST 104 E6,1726
 0233 REP 2 LAST 104 E6,1730
 0234 REP 2 LAST 104 E6,1732
 0235 REP 2 LAST 104 E6,1734
 0236 REP 3 LAST 104 E6,1736
 0237 REP 2 LAST 104 E6,1740
 R62371

C1TMP = B1TMP (B(1))
 C2TMP = B2TMP (B(1))
 C3TMP = B3TMP (B(1))
 C4TMP = B4TMP (B(1))
 C5TMP = B5TMP (B(1))
 C6TMP = B6TMP (B(1))
 C7TMP = B7TMP (B(1))

 Y1TMP = J1TMP (B(2))
 Y2TMP = J2TMP (B(2))
 Y3TMP = J3TMP (B(2))
 Y4TMP = J4TMP (B(2))
 Y5TMP = J5TMP (B(2))
 Y6TMP = J6TMP (B(2))

R62372 840.9 STORAGE.....

02373 REP 5 LAST 104 E6,1746
 02374 REP 1 E6,1747
 02375 REP 1 E6,1750
 02376 REP 1 E6,1756

NBRCYCLS EQUALS CMDTMP +2
 NBRCYCLP EQUALS NBRCYCLS +1
 DELVSUM EQUALS NBRCYCLP +1
 DELVSUMP EQUALS DELVSUM +6

B(1) COUNTER FOR P40,41 STEERING
 B(1) MAINTAIN ORDER
 I(6) P40,P41
 I(6) P40,P41

L ERASABLE ASSIGNMENTS

USER'S PAGE NO. 72 E0 53

R6238 ***** RCS DAP TEMPORARY VARIABLES ***** (95D)

R6240 ***** RCS INTERRUPT TRIS TEMPS *****

15D

| | | | | | | | | | | | |
|------|-----|---|------|-----|---------|----------|--------|----------|----|---------|---------------------------------|
| 0242 | REP | 2 | LAST | 101 | E0,1506 | SPNDX | EQUALS | INTTEMP | | B(1) | |
| 0243 | REP | 1 | | | E0,1507 | DPNDX | EQUALS | SPNDX | +1 | B(1)TMP | |
| 0244 | REP | 1 | | | E0,1510 | KMPAC | EQUALS | DPNDX | +1 | B(2)TMP | |
| 0245 | REP | 1 | | | E0,1512 | KMPTEMP | EQUALS | KMPAC | +2 | B(1)TMP | |
| 0246 | REP | 1 | | | E0,1513 | XNDX1 | EQUALS | KMPTEMP | +1 | B(1)TMP | XNDX1 THRU NYJETS ARE OVERLAYED |
| 0247 | REP | 1 | | | E0,1514 | XNDX2 | EQUALS | XNDX1 | +1 | B(1)TMP | BY OTHER DAP ERASABLES SO |
| 0248 | REP | 1 | | | E0,1515 | YNDX | EQUALS | XNDX2 | +1 | B(1)TMP | SHOULD ALWAYS BE DEFINED IN |
| 0249 | REP | 1 | | | E0,1516 | ZNDX | EQUALS | YNDX | +1 | B(1)TMP | A BLOCK |
| 0250 | REP | 1 | | | E0,1517 | RINDEX | EQUALS | ZNDX | +1 | B(1)TMP | |
| 0251 | REP | 1 | | | E0,1520 | PINDEX | EQUALS | RINDEX | +1 | B(1)TMP | |
| 0252 | REP | 1 | | | E0,1521 | YINDEX | EQUALS | PINDEX | +1 | B(1)TMP | |
| 0253 | REP | 1 | | | E0,1522 | NRJETS | EQUALS | YINDEX | +1 | B(1)TMP | |
| 0254 | REP | 1 | | | E0,1523 | NPJETS | EQUALS | NRJETS | +1 | B(1)TMP | |
| 0255 | REP | 1 | | | E0,1524 | NYJETS | EQUALS | NPJETS | +1 | B(1)TMP | |
| 0256 | REP | 2 | LAST | 106 | E0,1513 | WTEMP | EQUALS | XNDX1 | | B(2)TMP | WTEMP THRU DELTEMPZ OVERLAY |
| 0257 | REP | 1 | | | E0,1515 | DELTEMPX | EQUALS | WTEMP | +2 | B(2)TMP | XNDX1 THRU NRJETS AND EDOT THRU |
| 0258 | REP | 1 | | | E0,1517 | DELTEMPY | EQUALS | DELTEMPX | +2 | B(2)TMP | ADRVEL |
| 0259 | REP | 1 | | | E0,1521 | DELTEMPZ | EQUALS | DELTEMPY | +2 | B(2)TMP | |
| 0260 | REP | 2 | LAST | 106 | E0,1515 | EDOT | EQUALS | YNDX | | B(2)TMP | EDOT THRU ADRVEL OVERLAY |
| 0261 | REP | 1 | | | E0,1517 | AERR | EQUALS | EDOT | +2 | B(1)TMP | YNDX THRU NPJETS AND DELTEMPZ |
| 0262 | REP | 1 | | | E0,1520 | EDOTVEL | EQUALS | AERR | +1 | B(2)TMP | THRU DELTEMPZ |
| 0263 | REP | 1 | | | E0,1522 | AERVVEL | EQUALS | EDOTVEL | +2 | B(1)TMP | |
| 0264 | REP | 1 | | | E0,1523 | ADRVEL | EQUALS | AERVVEL | +1 | B(1)TMP | |

R6265 *** REGULAR RCS TEMPS *****

()

R6267 RCS ZEROING LOOP STARTS HERE*** ** ** ** **

(37)

| | | | | | | | | | | | |
|------|-----|---|------|-----|---------|---------|--------|---------|----|---------|--|
| 0269 | REP | 3 | LAST | 101 | E0,1525 | WBODY | EQUALS | TVCRCS | | B(2)TMP | |
| 0270 | REP | 1 | | | E0,1527 | WBODY1 | EQUALS | WBODY | +2 | B(2)TMP | |
| 0271 | REP | 2 | LAST | 106 | E0,1531 | WBODY2 | EQUALS | WBODY | +4 | B(2)TMP | |
| 0272 | REP | 1 | | | E0,1533 | ADOT | EQUALS | WBODY2 | +2 | B(2)TMP | |
| 0273 | REP | 1 | | | E0,1535 | ADOT1 | EQUALS | ADOT | +2 | B(2)TMP | |
| 0274 | REP | 1 | | | E0,1537 | ADOT2 | EQUALS | ADOT1 | +2 | B(2)TMP | |
| 0278 | REP | 1 | | | E0,1541 | MERRORX | EQUALS | ADOT2 | +2 | (2) | |
| 0279 | REP | 1 | | | E0,1543 | MERRORY | EQUALS | MERRORX | +2 | (2) | |
| 0280 | REP | 1 | | | E0,1545 | MERRORZ | EQUALS | MERRORY | +2 | (2) | |
| 0281 | REP | 1 | | | E0,1547 | DFT | EQUALS | MERRORZ | +2 | B(1)TMP | |
| 0282 | REP | 1 | | | E0,1550 | DFT1 | EQUALS | DFT | +1 | B(1)TMP | |
| 0283 | REP | 1 | | | E0,1551 | DFT2 | EQUALS | DFT1 | +1 | B(1)TMP | |
| 0284 | REP | 1 | | | E0,1552 | DRHO | EQUALS | DFT2 | +1 | B(2)TMP | |
| 0285 | REP | 1 | | | E0,1554 | DRHO1 | EQUALS | DRHO | +2 | B(2)TMP | |



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| | | | | | | | | |
|------|-----|---|---------|--------|--------|--------|----|---------|
| 6326 | REP | 1 | E6,1642 | AMCB5 | EQUALS | AMCB4 | +1 | B(1)TMP |
| 6327 | REP | 1 | E6,1643 | AMCB7 | EQUALS | AMCB5 | +1 | B(1)TMP |
| 6328 | REP | 1 | E6,1644 | AMCB8 | EQUALS | AMCB7 | +1 | B(1)TMP |
| 6329 | REP | 1 | E6,1645 | CAPSI | EQUALS | AMCB8 | +1 | B(1)TMP |
| 6330 | REP | 1 | E6,1646 | CDUO | EQUALS | CAPSI | +1 | B(2)TMP |
| 6331 | REP | 1 | E6,1650 | CDUO | EQUALS | CDUO | +2 | B(2)TMP |
| 6332 | REP | 1 | E6,1652 | CDUO | EQUALS | CDUO | +2 | B(2)TMP |
| 6333 | REP | 1 | E6,1654 | SLOPE | EQUALS | CDUO | +2 | B(1)TMP |
| 6334 | REP | 1 | E6,1655 | ADB | EQUALS | SLOPE | +1 | B(1)TMP |
| 6335 | REP | 1 | E6,1656 | RMANDX | EQUALS | ADB | +1 | B(1)TMP |
| 6336 | REP | 1 | E6,1657 | RMANDX | EQUALS | RMANDX | +1 | B(1)TMP |
| 6337 | REP | 1 | E6,1660 | YMANDX | EQUALS | RMANDX | +1 | B(1)TMP |

MUST BE LAST VARIABLE IN RCS

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0338 ***** ENTRY DAP TEMPORARY VARIABLES,***** (69D)

0340 ANGLE REGISTERS FOR ENTRY DAPS

| | | | | | | | |
|------|-----|---|---------|----------|--------|-------------|----|
| 0341 | REP | 1 | E0,1661 | AGC | EQUALS | BCDU | 1P |
| 0342 | REP | 1 | E0,1662 | AIG | EQUALS | AGC +1 | 1P |
| 0343 | REP | 1 | E0,1663 | AMG | EQUALS | AIG +1 | 1P |
| 0344 | REP | 1 | E0,1664 | ROLL/180 | EQUALS | AMG +1 | 1P |
| 0345 | REP | 1 | E0,1665 | ALPA/180 | EQUALS | ROLL/180 +1 | 1P |
| 0346 | REP | 1 | E0,1666 | BETA/180 | EQUALS | ALPA/180 +1 | 1P |
| 0347 | REP | 1 | E0,1667 | AGC/PIP | EQUALS | BETA/180 +1 | 1P |
| 0348 | REP | 1 | E0,1670 | AIG/PIP | EQUALS | AGC/PIP +1 | 1P |
| 0349 | REP | 1 | E0,1671 | AMG/PIP | EQUALS | AIG/PIP +1 | 1P |
| 0350 | REP | 1 | E0,1672 | ROLL/PIP | EQUALS | AMG/PIP +1 | 1P |
| 0351 | REP | 1 | E0,1673 | ALPA/PIP | EQUALS | ROLL/PIP +1 | 1P |
| 0352 | REP | 1 | E0,1674 | BETA/PIP | EQUALS | ALPA/PIP +1 | 1P |

0353 GYRAL DIFFERENCES OVER INTERVAL TCDU = .1 SEC.

| | | | | | | | |
|------|-----|---|---------|--------|--------|-------------|----|
| 0354 | REP | 1 | E0,1675 | -DELAG | EQUALS | BETA/PIP +1 | 1P |
| 0355 | REP | 1 | E0,1676 | -DELAG | EQUALS | -DELAG +1 | 1P |
| 0356 | REP | 1 | E0,1677 | -DELAG | EQUALS | -DELAG +1 | 1P |

0359 ESTIMATED BODY RATES

| | | | | | | | |
|-------|-----|---|---------|---------|--------|------------|---------------------------------------|
| 03591 | REP | 1 | E0,1700 | ONDARMD | EQUALS | -DELAG +1 | 1P GOES BEFORE PREL FOR TM. |
| 0360 | REP | 1 | E0,1701 | PREL | EQUALS | ONDARMD +1 | 1P P TCDU/180 (ROLLDOT) |
| 0361 | REP | 1 | E0,1702 | QREL | EQUALS | PREL +1 | 1P Q TCDU/180 (PITCHDOT) |
| 0362 | REP | 1 | E0,1703 | RREL | EQUALS | QREL +1 | 1P R TCDU/180 (YAWDOT) |
| 0363 | REP | 1 | E0,1704 | BETADOT | EQUALS | RREL +1 | 1P MUST FOLLOW RREL. BETADOT TCDU/180 |
| 0364 | REP | 1 | E0,1705 | PHIDOT | EQUALS | BETADOT +1 | 1P |

0365 OLD (UNAVERAGED) BODY RATE MEASURE

| | | | | | | | |
|------|-----|---|---------|--------|--------|-----------|---------------------------------------|
| 0366 | REP | 1 | E0,1706 | OLDELP | EQUALS | PHIDOT +1 | 1P |
| 0367 | REP | 1 | E0,1707 | OLDELO | EQUALS | OLDELP +1 | 1P |
| 0368 | REP | 1 | E0,1710 | OLDELR | EQUALS | OLDELO +1 | 1P |
| 0372 | REP | 1 | E0,1711 | JTAG | EQUALS | OLDELR +1 | 1P |
| 0373 | REP | 1 | E0,1712 | TUSED | EQUALS | JTAG +1 | 1P ELAPSED TIME SINCE NOMINAL UPDATE. |

A03731

0374 FOLLOWING 3 SP WORDS IN DOWNLINK. ROLLTM SENT EACH 1 SEC.

| | | | | | | | |
|------|-----|---|---------|---------|--------|------------|-------------------------------------|
| 0375 | REP | 1 | E0,1713 | PAXERR1 | EQUALS | TUSED +1 | 1P INTEGRATED ROLL ERROR/360. |
| 0376 | REP | 1 | E0,1714 | ROLLTM | EQUALS | PAXERR1 +1 | 1P ROLL/180 FOR TM. |
| 0377 | REP | 1 | E0,1715 | ROLLC | EQUALS | ROLLTM +1 | 2P ROLL.COM/360 FROM ENTRY (FOR TM) |

A03771 55 KEEP ROLLC & ROLLHOLD ADJACENT FOR TP

L ERASABLE ASSIGNMENTS

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6378 REP 1 E6,1717 ROLLHOLD EQUALS ROLLC +2 1P FOR ATTITUDE HOLD IN CMDAPMOD = +1
A63781

R63782 ENTRY DAP QUANTITIES THAT SHARE WITH RCS DAP.

6379 REP 2 LAST 107 E6,1603 ALFACOM EQUALS DCDU 1P KEEP ADJACENT TO BETACOM. +-
6380 REP 1 E6,1604 BETACOM EQUALS ALFACOM +1 1P

R6381 JET LIST DT, JETBITS IN THIS ORDER.

6382 REP 1 E6,1605 TOFF EQUALS BETACOM +1 1P DP PAIR
6383 REP 1 E6,1606 TBIT5 EQUALS TOFF +1 1P
6384 REP 1 E6,1607 TON2 EQUALS TBIT5 +1 1P DP PAIR
6385 REP 1 E6,1610 T2BIT5 EQUALS TON2 +1 1P

R6386 MISCELLANEOUS PERMANENT ERASABLE.

6388 REP 1 E6,1611 OUTTAG EQUALS T2BIT5 +1 1P
6389 REP 1 E6,1612 NUJET EQUALS OUTTAG +1 1P

R63891 MORE ENTRY DAP QUANTITIES THAT DO NOT SHARE WITH RCS DAP.

03892 REP 1 E6,1720 JETEM EQUALS ROLLHOLD +1 2P THIS DP USED IN RATEAVO.
6390 REP 1 E6,1722 GAMA EQUALS JETEM +2 1P
0391 REP 1 E6,1723 GAMDOT EQUALS GAMA +1 1P
6392 REP 1 E6,1724 POSEXIT EQUALS GAMDOT +1 1P
8393 REP 1 E6,1725 CM/GYMDT EQUALS POSEXIT +1 1P
0394 REP 1 E6,1726 HEADSUP EQUALS CM/GYMDT +1 1P DSP NQIN 61 FOR P62,63,64,67.
63941 REP 1 E6,1727 P63FLAG EQUALS HEADSUP +1 1P INTERLOCK FOR WAKEP62
A63945

A63946 66 SHARE BELOW WITH RCS RUPT TEMPS (+ 15D) ???

6395 REP 2 LAST 106 E6,1506 CALFA EQUALS SPNDX 1P
6396 REP 1 E6,1507 SALFA EQUALS CALFA +1 1P

6397 REP 1 E6,1510 SINM EQUALS SALFA +1 1P
6398 REP 1 E6,1511 COSM EQUALS SINM +1 1P
6399 REP 1 E6,1512 SINO EQUALS COSM +1 1P
6400 REP 1 E6,1513 COSO EQUALS SINO +1 1P
6401 REP 1 E6,1514 SINOCOSM EQUALS COSO +1 1P
6402 REP 1 E6,1515 COSOCOSM EQUALS SINOCOSM +1 1P

A64021 66 SHARE ABOVE WITH RCS RUPT TEMPS ???
A6403
R6404

THE FOLLOWING FCM REGISTERED USED ONCE EACH 2 360.

6405 REP 1 E6,1613 -VT/180 EQUALS NUJET +1 1P
6406 REP 1 E6,1614 LCK/380 EQUALS -VT/180 +1 1P
6407 REP 1 E6,1615 XD/380 EQUALS LCK/380 +1 1P
6408 REP 1 E6,1616 VSO/4API EQUALS XD/380 +1 1P
6409 REP 1 E6,1617 JNDX EQUALS VSO/4API +1 1P
6410 REP 1 E6,1620 JNDX1 EQUALS JNDX +1 1P

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| | | | | | | | | |
|--------|-----|---|----------|---------|----------|-------------------|----|--|
| 6411 | REP | 1 | | E6,1621 | TON1 | EQUALS JNDX1 +1 | 1P | DP PAIR |
| 6412 | REP | 1 | | E6,1622 | T1BITS | EQUALS TON1 +1 | 1P | |
| R64121 | | | | | | | | MISCELLANEOUS REGISTERS USED EACH UPDATE. |
| 6413 | REP | 1 | | E6,1623 | CM/SAVE | EQUALS T1BITS +1 | 1P | |
| 64131 | REP | 1 | | E6,1624 | JSTEM2 | EQUALS CM/SAVE +1 | 1P | TEMPORARY STORAGE |
| A6414 | | | | | | | | |
| R6418 | | | | | | | | DAP QUANTITIES SHARED WITH RCS DAP FOR TM d FLIGHT RECORDER. |
| 6419 | REP | 2 | LAST 107 | E6,1567 | VDT/180 | = ERRORX | 1P | (EDIT) |
| 6420 | REP | 2 | LAST 107 | E6,1570 | -VT/180E | = ERRORX | 1P | (EDIT) |
| 6421 | REP | 1 | | E6,1476 | PAXERR | EQUALS AK | 1P | ROLL ERROR FOR NEEDLES |
| 6422 | REP | 2 | LAST 107 | E6,1572 | QAXERR | = THETADX | 1P | SINCE AK1 IS ZEROED IN ATM DAP. |
| 6423 | REP | 1 | | E6,1573 | RAXERR | = QAXERR +1 | 1P | SINCE AK2 IS ZEROED IN TM DAP. |
| A6424 | | | | | | | | |
| R6425 | | | | | | | | **** COLMANU (R60,R62) **** |
| 6426 | REP | 1 | | E6,1710 | VECOTEMP | EQUALS COPSKEW | | |



L ERASABLE ASSIGNMENTS

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***** KALOMANU VARIABLES. (17D) *****

| | | | | | | | | | |
|------|-----|---|------|---------|----------|--------|----------|-----------|---------------------------------------|
| 0427 | REP | 1 | | E0,1661 | BCDU | EQUALS | YMANDX | +1 | B(3) TMP |
| 0428 | REP | 2 | LAST | 109 | E0,1664 | KSPNDX | EQUALS | BCDU +3 | B(1)TMP |
| 0430 | REP | 1 | | E0,1665 | KOPNDX | EQUALS | KSPNDX | +1 | B(1)TMP |
| 0431 | REP | 1 | | E0,1666 | TMIS | EQUALS | KOPNDX | +1 | I(18) MUST BE IN SAME BANK AS RCS DAP |
| 0432 | REP | 1 | | E0,1710 | COPSKW | EQUALS | TMIS | +18D | I(6) MUST BE IN SAME BANK AS RCS DAP |
| 0433 | REP | 2 | LAST | 111 | E0,1716 | CAM | EQUALS | COPSKW +6 | I(2) MUST BE IN SAME BANK AS RCS DAP |
| 0434 | REP | 1 | | E0,1720 | MIS | EQUALS | CAM | +2 | I(18) (THE REST MAY GO ANYWHERE) |
| 0435 | REP | 1 | | E0,1742 | COP | EQUALS | MIS | +18D | I(6)TMP |
| 0436 | REP | 1 | | E0,1750 | SCAXIS | EQUALS | COP | +6 | I(6)TMP |
| 0437 | REP | 1 | | E0,1756 | POINTVSM | EQUALS | SCAXIS | +6 | I(6)TMP |
| 0438 | REP | 1 | | E0,1764 | AM | EQUALS | POINTVSM | +6 | I(2)TMP |
| 0439 | REP | 1 | | E0,1766 | NAD | EQUALS | AM | +2 | I(2)TMP |

***** FIRST-ORDER OVERLAYS IN KALOMANU *****

| | | | | | | | | | |
|------|-----|----|------|-----|---------|----------|--------|--------|--------------|
| 0441 | REP | 2 | LAST | 112 | E0,1666 | KV1 | EQUALS | TMIS | I(6)TMP |
| 0442 | REP | 3 | LAST | 112 | E0,1666 | MPISYM | EQUALS | TMIS | I TMP |
| 0443 | REP | 4 | LAST | 112 | E0,1666 | TMPI | EQUALS | TMIS | I TMP |
| 0444 | REP | 5 | LAST | 112 | E0,1666 | NCDU | EQUALS | TMIS | B TMP |
| 0445 | REP | 6 | LAST | 112 | E0,1671 | NEXTIME | EQUALS | TMIS | +3 B TMP |
| 0446 | REP | 7 | LAST | 112 | E0,1672 | TTEMP | EQUALS | TMIS | +4 B TMP |
| 0447 | REP | 8 | LAST | 112 | E0,1674 | KV2 | EQUALS | TMIS | +6 I(6)TMP |
| 0448 | REP | 9 | LAST | 112 | E0,1674 | BIASTEMP | EQUALS | TMIS | +6 B TMP |
| 0449 | REP | 10 | LAST | 112 | E0,1702 | KV3 | EQUALS | TMIS | +12D I(6)TMP |
| 0450 | REP | 11 | LAST | 112 | E0,1702 | OGP | EQUALS | TMIS | +12D I TMP |
| 0451 | REP | 3 | LAST | 112 | E0,1710 | BRATE | EQUALS | COPSKW | B TMP |
| 0453 | REP | 2 | LAST | 112 | E0,1716 | TM | EQUALS | CAM | B TMP |

***** SECOND-ORDER OVERLAYS IN KALOMANU *****

| | | | | | | | | | |
|------|-----|---|------|---------|---------|--------|--------|-----|------------|
| 0455 | REP | 1 | | E0,1666 | P21 | EQUALS | KV1 | | I(2)TMP |
| 0456 | REP | 2 | LAST | 112 | E0,1670 | D21 | EQUALS | KV1 | +2 I(2)TMP |
| 0457 | REP | 3 | LAST | 112 | E0,1672 | G21 | EQUALS | KV1 | +4 I(2)TMP |

***** SATURN BOOST STORAGE. SAVE TILL RCS DAP OPERATION. (17D) *****

| | | | | | | | | | |
|------|-----|---|------|---------|---------|---------|--------|--------|----------------------|
| 0466 | REP | 3 | LAST | 112 | E0,1661 | POLYNM | EQUALS | BCDU | B(15) PAD LOADED |
| 0467 | REP | 1 | | E0,1673 | POLYLOC | = | POLYNM | +10D | |
| 0468 | REP | 2 | LAST | 112 | E0,1700 | SATRLRT | EQUALS | POLYNM | +15D B(2) PAD LOADED |

***** MORE P11 STORAGE -PAD LOADED- (2D) *****



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| | | | | | | | | | |
|-------|-----|---|------|-----|---------|---|--------|-------------|--|
| 8506 | REP | 2 | LAST | 113 | E6,1770 | TEMPROLL | EQUALS | GENRST | B(1)TMP COPY CYCLE REGISTER |
| 8507 | REP | 1 | | | E6,1771 | TEMPALFA | EQUALS | TEMPROLL +1 | B(1)TMP COPY CYCLE REGISTER |
| 8508 | REP | 1 | | | E6,1772 | TEMPBETA | EQUALS | TEMPALFA +1 | B(1)TMP COPY CYCLE REGISTER |
| 8509 | REP | 1 | | | E6,1773 | 60GENRST | EQUALS | TEMPBETA +1 | B(1)TMP QSAVE FOR S61.1 AND ENTRY. |
| 8510 | REP | 1 | | | E6,1774 | S61DT | EQUALS | 60GENRST +1 | B(1)TMP VARIABLE DT FOR S61.1 RESTART. |
| A6511 | | | | | | | | | |
| R6512 | | | | | | ENTRY TM SHARING FOR ACCELERATION PROFILE. | | | |
| 8513 | REP | 2 | LAST | 106 | E6,1533 | XPIBUP | EQUALS | ADOT | B(1) PIPA BUFFER FOR TM DURING ENTRY. |
| 8514 | REP | 1 | | | E6,1534 | YPIBUP | EQUALS | XPIBUP +1 | B(1) PIPS FILED HERE EACH .5 SEC APPEAR |
| 8515 | REP | 1 | | | E6,1535 | ZPIBUP | EQUALS | YPIBUP +1 | B(1) ON DOWNLIST ONCE PER SECOND DURING |
| 8516 | REP | 1 | | | E6,1536 | XOLDBUP | EQUALS | ZPIBUP +1 | B(1) ENTRY AFTER RCS DAP HAS BEEN DIS- |
| 8517 | REP | 1 | | | E6,1537 | YOLDBUP | EQUALS | XOLDBUP +1 | B(1) ABLED, NEWEST PIP VALUE REPLACES |
| 8518 | REP | 1 | | | E6,1540 | ZOLDBUP | EQUALS | YOLDBUP +1 | B(1) PIPBUP, WHICH IS MOVED INTO OLDBUP. |
| R6519 | | | | | | | | | |
| R6520 | | | | | | REENTRY VARIABLES SHARED WITH RCS DAP FOR TM d FLIGHT RECORDER. | | | |
| 8521 | REP | 2 | LAST | 107 | E6,1574 | OT | = | THETAZ | I(2) HI-WORD ONLY ON DNLIST. |
| 8522 | REP | 3 | LAST | 106 | E6,1525 | ASPS(TM) | = | WRDY | I(6) DWN |
| A6523 | | | | | | | | | ASKEP,ASP1,ASPLP,ASPDN,ASP3,ASP3+1 |
| A6524 | | | | | | | | | |
| 8525 | REP | 1 | | | E6,1776 | END-E6 | EQUALS | R61CNTR +1 | NEXT FREE E6 ADDRESS |



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P7000 EBANK-7 ASSIGNMENTS

T001 E7,1400 SETLOC 3400
 R7002 *-+*-+* OVERLAY 0 IN EBANK 7 *-+*-+*

R7003 EXTERNAL DELTA-V UPDATE. (21D)

R7005 (MUST BE IN ORDER FOR UPDATE PROGRAM. ALSO ENTRY PROGRAMS PICK UP LAT(SPL) WITH A VLOAD.)

T007 E7,1400 E7,1424 LAT(SPL) ERASE +20D I(2) DSP NOUN 61 FOR P62,63,64,67
 T008 REP 1 E7,1402 E7,1402 LNG(SPL) EQUALS LAT(SPL) +2 I(2)DSP NOUN 61 FOR P62,63,64,67.

T009 REP 1 E7,1404 DELVSLV EQUALS LNG(SPL) +2 I(6)TMP DELTA VEL VECT, LOC VER COORDS
 T010 REP 1 E7,1412 TIG EQUALS DELVSLV +6 B(2)DSP NOUN 33 FOR X-V84(R32),P30,40.
 T011 REP 1 E7,1414 RTARG EQUALS TIG +2 I(6)IN DESIRED VEHICLE RADIUS VECTOR
 T012 REP 1 E7,1422 DELLT4 EQUALS RTARG +6 I(2)IN TIME DIFFERENCE FOR INITVEL
 T013 REP 1 E7,1424 ECSTEER EQUALS DELLT4 +2 I(1)PL FOR P40 S
 T0135 REP 2 LAST 115 E7,1404 DELVLVC = DELVSLV
 T0136 REP 2 E7,1425 E7,1425 END-DELV ERASE *NEXT AVAIL LOC AFTER UNSHARED E7*

R7015 SERVICER STORAGE. (13D)
 T020 REP 1 E7,1425 DVTOTAL EQUALS END-DELV B(2) DSP NOUN 40,99 FOR P30,34,35,40
 T021 REP 1 E7,1427 TGO EQUALS DVTOTAL +2 B(2)
 T023 REP 1 E7,1431 DVCNTR EQUALS TGO +2 B(1)TMP
 T024 REP 6 LAST 32 E7,1432 DELVREP EQUALS DVCNTR +1 I(6)TMP

T0241 REP 1 E7,1447 NONTIG EQUALS END-KALC I(2) (CAN NOT SHARE WITH KALCMANU
 A702411 OR DELVREP)
 T025 REP 1 E7,1451 END-SVCR EQUALS NONTIG +2 ***NEXT AVAILABLE APTER SERVICER

A70255
 R7026 ALIGNMENT STORAGE. (25D)

T028 REP 1 E7,1451 XSCD EQUALS END-SVCR I(6)TMP
 T029 REP 1 E7,1457 YSCD EQUALS XSCD +6 I(6)TMP
 T030 REP 1 E7,1465 ZSCD EQUALS YSCD +6 I(6)TMP
 T033 REP 1 E7,1473 VEL/C EQUALS ZSCD +6 I(6)TMP
 T034 REP 1 E7,1501 R53EXIT EQUALS VEL/C +6 I(1)TMP

R70342 ALIGNMENT MARKDATA (DOWNLNK)***** (7D)
 T0344 REP 1 E7,1502 MARK2OWN EQUALS R53EXIT +1 (7) USED BY ALIGNMENT P508

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P7035 *-*-*-* OVERLAY 1 IN EBANK 7 *-*-*-*

R7036 REENTRY ERASABLES

(208D)

| | | | | | | | | | | |
|-------|-----|---|------|-----|---------|----------|--------|-------------|-----|----------------------------------|
| 7039 | REP | 2 | LAST | 115 | E7,1451 | RTINIT | EQUALS | END-SVCR | 6P | |
| 7040 | REP | 1 | | | E7,1457 | RTEAST | EQUALS | RTINIT +6 | 6P | |
| 7041 | REP | 1 | | | E7,1465 | RINORM | EQUALS | RTEAST +6 | 6P | |
| 7042 | REP | 1 | | | E7,1473 | RT | EQUALS | RINORM +6 | 6P | |
| 7043 | REP | 1 | | | E7,1501 | UNI | EQUALS | RT +6 | 6P | |
| 7044 | REP | 1 | | | E7,1507 | UNITV | EQUALS | UNI +6 | 6P | |
| 7045 | REP | 1 | | | E7,1515 | VEL | EQUALS | UNITV +6 | 6P | |
| 7046 | REP | 1 | | | E7,1523 | TIME/RTO | EQUALS | VEL +6 | 2P | TIME OF INITIAL TARGET, RTO. |
| 7047 | REP | 1 | | | E7,1525 | -VREL | EQUALS | TIME/RTO +2 | 6P | |
| 7048 | REP | 1 | | | E7,1533 | OLDUYA | EQUALS | -VREL +6 | 6P | USED BY CM/POSE (ENTRY DAP) |
| 7049 | REP | 1 | | | E7,1541 | UXA/2 | EQUALS | OLDUYA +6 | 6P | USED BY CM/POSE (ENTRY DAP) -UNV |
| 70495 | REP | 1 | | | E7,1541 | URH | = | UXA/2 | 6P | P61 DISPLAY NOLN |
| 7050 | REP | 2 | LAST | 116 | E7,1547 | UYA/2 | EQUALS | UXA/2 +6 | 6P | USED BY CM/POSE (ENTRY DAP) UVA |
| 7051 | REP | 1 | | | E7,1555 | UZA/2 | EQUALS | UYA/2 +6 | 6P | USED BY CM/POSE (ENTRY DAP) UNA |
| 7052 | REP | 1 | | | E7,1563 | URX/2 | EQUALS | UZA/2 +6 | 6P | USED BY CM/POSE (ENTRY DAP) |
| 7053 | REP | 1 | | | E7,1571 | URZ/2 | EQUALS | URX/2 +6 | 6P | USED BY CM/POSE (ENTRY DAP) |
| 7054 | REP | 1 | | | E7,1577 | URZ/2 | EQUALS | URZ/2 +6 | 6P | USED BY CM/POSE (ENTRY DAP) |
| 7055 | REP | 1 | | | E7,1605 | DTEAROT | EQUALS | URZ/2 +6 | 2P | |
| 7056 | REP | 1 | | | E7,1607 | DIFF | EQUALS | DTEAROT +2 | 2P | |
| 7057 | REP | 1 | | | E7,1611 | DIFFOLD | EQUALS | DIFF +2 | 2P | |
| 7058 | REP | 1 | | | E7,1613 | FACTOR | EQUALS | DIFFOLD +2 | 2P | |
| 7059 | REP | 1 | | | E7,1615 | FACT1 | EQUALS | FACTOR +2 | 2P | |
| 7060 | REP | 1 | | | E7,1617 | FACT2 | EQUALS | FACT1 +2 | 2P | |
| A7061 | | | | | | QT | = | THETADZ | 2P | SHARED FOR TM. P64-P66 |
| 7062 | REP | 1 | | | E7,1621 | VSQUARE | EQUALS | FACT2 +2 | 2P | |
| 7065 | REP | 1 | | | E7,1623 | LAD | EQUALS | VSQUARE +2 | 2P | |
| 7066 | REP | 1 | | | E7,1625 | LOD | EQUALS | LAD +2 | 2P | |
| 7067 | REP | 1 | | | E7,1627 | L/DOMINR | EQUALS | LOD +2 | 2P | |
| 7068 | REP | 1 | | | E7,1631 | KLAT | EQUALS | L/DOMINR +2 | 2P | |
| 7069 | REP | 1 | | | E7,1633 | L/D | EQUALS | KLAT +2 | 2P | |
| 7070 | REP | 1 | | | E7,1635 | L/D1 | EQUALS | L/D +2 | 2P | |
| 7071 | REP | 1 | | | E7,1724 | LEWD | = | VIO | 2P | SHARED FOR TM. P64-P65 |
| 7072 | REP | 1 | | | E7,1637 | D | EQUALS | L/D1 +2 | 2P | DSP NOLN 64,66,68 FOR P63,64,67 |
| A7073 | | | | | | V1 | = | ENDRUP +1 | 2P | SHARED FOR TM. P64-P65 |
| 7074 | REP | 1 | | | E7,1641 | DLEWD | EQUALS | D +2 | 2P | |
| 7076 | REP | 1 | | | E7,1643 | K2ROLL | EQUALS | DLEWD +2 | 2 P | |
| 7077 | REP | 1 | | | E7,1645 | GOTOADDR | EQUALS | K2ROLL +2 | 1P | |
| 7078 | REP | 1 | | | E7,1646 | TRM1B | EQUALS | GOTOADDR +1 | 2 P | |
| 7079 | REP | 1 | | | E7,1650 | MM | EQUALS | TRM1B +2 | 2 P | |
| 7080 | REP | 1 | | | E7,1651 | GRAD | EQUALS | MM +1 | 1P | |
| 7081 | REP | 1 | | | E7,1652 | PX | EQUALS | GRAD +1 | 1P | OVERWRITES NEXT 5 LOCs IN P67. |
| 7082 | REP | 1 | | | E7,1653 | LEQ | EQUALS | PX +1 | 2P | |
| 7083 | REP | 1 | | | E7,1655 | DHOOK | EQUALS | LEQ +2 | 2P | |
| 7084 | REP | 1 | | | E7,1657 | AHOOKV | EQUALS | DHOOK +2 | 2P | |

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| | | | | | | | | | |
|--------|-----|---|------|----------------|--|-----------------|----|------|--------------------------------------|
| 7085 | REP | 1 | | E7,1661 | DVL | EQUALS AHQKQV | +2 | 2P | |
| A7088 | | | | | A0 | = ENDBUF | +3 | 2P | SHARED FOR TM.(HI-WD) P64-P65 |
| 7089 | REP | 1 | | E7,1663 | A1 | EQUALS DVL | +2 | 2P | |
| 7090 | REP | 1 | | E7,1665 | VBAR5 | EQUALS A1 | +2 | 2P | |
| 7091 | REP | 1 | | E7,1667 | COSG/2 | EQUALS VBAR5 | +2 | 2P | |
| A7092 | | | | | GAMMAL | = GAMMAE1 | | 2P | SHARED FOR TM P64 |
| 70921 | | | | 0028 | GAMMAL1 | = 22D | | 2P | |
| 7093 | REP | 1 | | E7,1671 | VS1 | EQUALS COSG/2 | +2 | 2P | |
| 7094 | REP | 1 | | E7,1676 | VL | = VPRED | | 2P | SHARED FOR TM P64-P65 |
| 7095 | REP | 1 | | E7,1673 | V | EQUALS VS: | +2 | 2P | |
| A7098 | | | | | VREP | = THETAD | +2 | 2P | SHARED FOR TM P65 |
| 70981 | REP | 1 | | E7,1675 | LATANG | EQUALS V | +2 | 2P | ADJACENT FOR TM. |
| 7097 | REP | 1 | | E7,1677 | NDOT | EQUALS LATANG | +2 | 2P | ADJACENT FOR TM. |
| 70971 | REP | 1 | | E7,1701 | THETAH | EQUALS RDOT | +2 | 2P | DSP NOUN 64,67 FOR P63,64,67 |
| A7098 | | | | | NDOTREP | = THETAD | | 2P | SHARED FOR TM P65 |
| 7099 | REP | 1 | | E7,1703 | ALP | EQUALS THETAH | +2 | 2P | |
| 7100 | REP | 1 | | E7,1730 | ASKEP | = ASP5 | | 2P) | THESE ARE STORED IN |
| 7101 | REP | 2 | LAST | 117 | ASP1 | = ASP5 | +1 | 2P) | SEQUENCE, OVERLAPPING |
| 7102 | REP | 3 | LAST | 117 | ASPUP | = ASP5 | +2 | 2P) | HI-WD OF EACH: HI-WORD ONLY APPEAR |
| 7103 | REP | 4 | LAST | 117 | ASPDWN | = ASP5 | +3 | 2P) | ON DOWNLIST, EXCEPT |
| 7104 | REP | 5 | LAST | 117 | ASP3 | = ASP5 | +4 | 2P) | ASP3 IS COMPLETE. |
| 7105 | REP | 1 | | E7,1705 | C/D0 | EQUALS ALP | +2 | 2P | -1/D0 |
| 7106 | REP | 1 | | E7,1707 | D0 | EQUALS C/D0 | +2 | 1(2) | CONSTANT DRAG |
| 7107 | REP | 1 | | E7,1711 | Q2 | EQUALS D0 | +2 | 2P | |
| A7108 | | | | | | | | | |
| R7109 | | | | | ROLLC IS LOCATED IN BRANK= AGC TO AID ENTRY DAP. | | | | |
| 7110 | REP | 1 | | E7,1713 | RIG0 | EQUALS Q2 | +2 | 2P | DSP NOUN 66 FOR P64,P67. |
| 7111 | REP | 1 | | E7,1715 | DNRNGERR | EQUALS RIG0 | +2 | 2P | DSP NOUN 66 FOR P64,67. |
| 71111 | REP | 2 | LAST | 117 | XNRNGERR | = LATANG | | | FOR DISKY DISPLAY |
| 7112 | REP | 1 | | E7,1717 | KAT | EQUALS DNRNGERR | +2 | 2P | |
| 7113 | REP | 1 | | E7,1721 | GMAX | EQUALS KAT | +2 | 1P | DSP NOUN 60 FOR P61,62,63. |
| A7114 | | | | | | | | | GMAX IS LOADED IN DOUBLE PRECISION |
| 71141 | REP | 1 | | E7,1726 | L/DALC | = TTE | | 2P | CALCULATED L/D FOR TM' P64 - P67. |
| 71151 | REP | 1 | | E7,1770 | GAMMAL | = GAMMAE1 | | 2P | SHARED FOR TM P64 |
| 7116 | REP | 2 | LAST | 117 | PREDANG | = GAMMAE1 | | | FOR TM IN P67. |
| 7117 | REP | 1 | | E7,1771 | JJ | = PREDANG | +1 | | FOR TM IN P67. |
| 7118 | REP | 1 | | E7,1722 | VMAGI | EQUALS GMAX | +1 | 2P | DSP NOUN 62,64,66 FOR P11,63,64. |
| 7119 | REP | 1 | | E7,1724 | VIO | EQUALS VMAGI | +2 | 2P | DSP NOUN 63 FOR P61. |
| 7120 | REP | 2 | LAST | 116 | TTE | EQUALS VIO | +2 | 2P | DSP NOUN 63 FOR P61. |
| 712005 | REP | 2 | LAST | 117 | ASPS | EQUALS TTE | +2 | 1(2) | HI-WORD ONLY ON DNLIST FOR TM |
| 712006 | REP | 6 | LAST | 117 | TTE1 | EQUALS ASP5 | +2 | 1(2) | STMP HOLDS UNDECREMENTED TTE VALUE |
| R71201 | | | | **** P605 **** | | | | | |
| 71202 | REP | 2 | LAST | 117 | RIGON64 | EQUALS RIG0 | | | RANGE ERRORS NEGATIVE IF FALLS SHORT |



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| Label | REP | Count | LAST | Address | Operation | Value | Notes |
|-------|-----|-------|----------|---------|-----------|---------------------|---|
| P7130 | | | | | | | *-*-*- OVERLAY 2 IN BRANK 7 *-*-*- |
| R7131 | | | | | | | KALOMANU STORAGE. (18D) |
| 7133 | REP | 2 | LAST 115 | E7,1425 | MFS | EQUALS END-DELV | I(18) |
| 7134 | REP | 1 | | E7,1425 | MFI | EQUALS MFS | I TMP |
| 7136 | REP | 2 | LAST 119 | E7,1425 | DEL | EQUALS MFS | I TMP |
| 7138 | REP | 3 | LAST 119 | E7,1447 | END-KALC | EQUALS MFS | +18D **NEXT AVAIL LOC AFTER KALOMANU ** |
| R7139 | | | | | | | MEASUREMENT INCORPORATION STORAGE(R22) STORAGE. (56D) |
| 7141 | REP | 2 | LAST 115 | E7,1447 | TX789 | EQUALS END-KALC | I(6)TMP |
| 7142 | REP | 1 | | E7,1455 | GAMMA | EQUALS TX789 +6 | I(2)TMP |
| 7143 | REP | 1 | | E7,1457 | OMEGA | EQUALS GAMMA +2 | I(18)TMP |
| 7144 | REP | 1 | | E7,1501 | BVECTOR | EQUALS OMEGA +18D | I(18)TMP |
| 7145 | REP | 1 | | E7,1523 | DELTAQ | EQUALS BVECTOR +18D | I(2)TMP |
| 7146 | REP | 1 | | E7,1525 | VARIANCE | EQUALS DELTAQ +2 | I(3)TMP |
| 7147 | REP | 1 | | E7,1530 | RCLP | EQUALS VARIANCE +3 | I(6)TMP |
| 7148 | REP | 1 | | E7,1538 | GRP2SVQ | EQUALS RCLP +6 | I(1)TMP QSAVE FOR RESTARTS |
| R7149 | | | | | | | P20, P22, P23 DSP NOUN (5D) |
| 7151 | REP | 2 | LAST 119 | E7,1501 | N49DISP | EQUALS BVECTOR | B(5)TMP |
| R7154 | | | | | | | S22.1 STORAGE. (36D) |
| 7156 | REP | 1 | | E7,1537 | SVMRDAT | EQUALS GRP2SVQ +1 | I(38)TMP 5 SETS OF MARK DATA +PAD OP ON |
| R7162 | | | | | | | **** CISLINAR NAV. ERAS. (P20S) **** (57D). |
| 7164 | REP | 1 | | E7,1603 | TRUNK | EQUALS SVMRDAT +36D | |
| 71641 | REP | 1 | | E7,1603 | DATATEST | EQUALS TRUNK | (1) |
| 7165 | REP | 2 | LAST 119 | E7,1604 | URAR0 | EQUALS TRUNK +1 | |
| 7166 | REP | 1 | | E7,1612 | URAR1 | EQUALS URAR0 +6 | |
| 7167 | REP | 1 | | E7,1620 | URAR2 | EQUALS URAR1 +6 | |
| 7168 | REP | 1 | | E7,1628 | RZC | EQUALS URAR2 +6 | |
| 7169 | REP | 1 | | E7,1634 | VZC | EQUALS RZC +6 | |
| 7170 | REP | 1 | | E7,1642 | UCLSTAR | EQUALS VZC +6 | |
| 7171 | REP | 1 | | E7,1650 | USSTAR | EQUALS UCLSTAR +6 | |
| 7172 | REP | 1 | | E7,1656 | RCLL | EQUALS USSTAR +6 | |
| 7174 | REP | 1 | | E7,1664 | RL | EQUALS RCLL +6 | |
| 7176 | REP | 1 | | E7,1672 | SRRTURN | EQUALS RL +6 | |
| A7177 | | | | | | | |

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PT192 *-*-*- OVERLAY 3 IN BRANK 7 -*-*-*

RT193 RENDEZVOUS GUIDANCE STORAGE. - P32...P35 - (6D)

| | | | | | | | | | | |
|------|-----|---|----------|---------|---------|--------|----------|----|------|-------------------------------|
| T195 | REP | 3 | LAST 119 | B7,1447 | DELTEBO | EQUALS | END-KALC | | I(2) | S-S RACK VALUES OF DELTA TIME |
| T196 | REP | 1 | | B7,1451 | DELEL | EQUALS | DELTEBO | +2 | I(2) | S-S |
| T197 | REP | 1 | | B7,1453 | SECMAK | EQUALS | DELEL | +2 | I(2) | S-S MAX STOP SIZE FOR ROUTINE |
| T198 | REP | 1 | | B7,1455 | XXOALT | EQUALS | SECMAK | +2 | I(2) | |

AT199
RT200 S40.9 STORAGE. (16D)

| | | | | | | | | | | |
|------|-----|---|--|---------|----------|--------|--------|----|------|-----|
| T202 | REP | 1 | | B7,1457 | VG | EQUALS | XXOALT | +2 | I(6) | TMP |
| T203 | REP | 1 | | B7,1465 | VRPREV | EQUALS | VG | +6 | I(6) | |
| T204 | REP | 1 | | B7,1473 | TNIT | EQUALS | VRPREV | +6 | I(2) | |
| T205 | REP | 1 | | B7,1475 | TNITPREV | EQUALS | TNIT | +2 | I(2) | |

RT206 S40.2,3 STORAGE. (1D)

| | | | | | | | | | | |
|------|-----|---|--|---------|----------|--------|----------|----|------|----|
| T208 | REP | 1 | | B7,1477 | AXISCODE | EQUALS | TNITPREV | +2 | I(1) | IN |
|------|-----|---|--|---------|----------|--------|----------|----|------|----|

RT2085 P30-S-P17 COMMON STORAGE. (24D)

| | | | | | | | | | | |
|------|-----|---|----------|---------|--------|--------|---------|----|------|--------------------------------------|
| T210 | REP | 2 | LAST 119 | B7,1537 | RACT3 | EQUALS | GRP2SVO | +1 | I(6) | TMP POSITION OF ACTIVE AT TPI TIME. |
| T211 | REP | 1 | | B7,1545 | VACT3 | EQUALS | RACT3 | +6 | I(6) | TMP VELOCITY OF ACTIVE AT TPI TIME. |
| T212 | REP | 1 | | B7,1553 | RPASS3 | EQUALS | VACT3 | +6 | I(6) | TMP POSITION OF PASSIVE AT TPI TIME. |
| T213 | REP | 1 | | B7,1561 | VPASS3 | EQUALS | RPASS3 | +6 | I(6) | TMP VELOCITY OF PASSIVE AT TPI TIME. |

RT2131 P76, N84 DISPLAY (6D)

| | | | | | | | | | | |
|-------|-----|---|----------|---------|--------|--------|-------|--|------|-------------------------------|
| T2133 | REP | 2 | LAST 120 | B7,1537 | DELVOV | EQUALS | RACT3 | | I(6) | DSP NOUN 84 FOR X-V84, P34-35 |
|-------|-----|---|----------|---------|--------|--------|-------|--|------|-------------------------------|

AT2134

RT214 INITVEL/MIDGIM STORAGE. (34D)

RT216 (CALLED BY S34.1,2, S35.1,2, AND S40.9)

RT217 (CALLS LAMBERT, CONIC SUBROUTINES)

| | | | | | | | | | | |
|------|-----|---|--|---------|---------|--------|---------|----|------|--------------------------------------|
| T218 | REP | 1 | | B7,1567 | RINIT | EQUALS | VPASS3 | +6 | I(6) | IN ACTIVE VEHICLE RADIUS VECTOR |
| T219 | REP | 1 | | B7,1575 | VINIT | EQUALS | RINIT | +6 | I(6) | IN ACTIVE VEHICLE VELOCITY VECTOR |
| T220 | REP | 1 | | B7,1603 | RTARG1 | EQUALS | VINIT | +6 | I(6) | TMP SHIFTED RTARG |
| T221 | REP | 1 | | B7,1611 | VIPRIME | EQUALS | RTARG1 | +6 | I(6) | OUT NEW VEL REQ AT INITIAL RADIUS |
| T222 | REP | 1 | | B7,1617 | VTPRIME | EQUALS | VIPRIME | +6 | I(6) | OUT TOTAL VELOCITY AT DESIRED RADIUS |
| T223 | REP | 1 | | B7,1625 | +MGA | EQUALS | VTPRIME | +6 | I(2) | DSP NOUN 45 FOR P30,34,35. +MID GIM. |
| T224 | REP | 1 | | B7,1627 | COZY4 | EQUALS | +MGA | +2 | I(2) | TMP COSINE OF ANGLE WHEN ROT STARTS |

RT225 (THE FOLLOWING OVERLAYS MEASUREMENT INCORP AND CAN NOT SHARE WITH TPI

L ERASABLE ASSIGNMENTS

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| | | | | | | | | | |
|--------|-----|---|------|----------------------|---|-----------------|----------|---------|--|
| 7227 | REP | 1 | | E7,1502 | INTIME | EQUALS | AXISCODE | +3 | |
| 7228 | REP | 1 | | E7,1504 | ITCTR | EQUALS | INTIME | +2 | I(1) TMP ITERATION COUNTER |
| 7229 | REP | 1 | | E7,1531 | END-IN/M | EQUALS | COZY4 | +2 | **NEXT AVAIL LOC AFTER INITVEL/MIDGIM** |
| R7230 | | | | P34 AND P33 STORAGE. | (OVERLAYS | INITVEL/MIDGIM) | | | (24D) |
| 7232 | REP | 2 | LAST | 120 | E7,1567 | VAPREC | EQUALS | RINIT | I(6) S-S PREC VEC FOR NOM TPI TIME(ACT V |
| 7233 | REP | 2 | LAST | 120 | E7,1575 | RAPREC | EQUALS | VINIT | I(6) S-S PREC VEC FOR NOM TPI TIME(ACT V |
| 7234 | REP | 2 | LAST | 120 | E7,1611 | VPPREC | EQUALS | VIPRIME | I(6) S-S PREC VEC FOR NOM TPI TIME(PASS |
| 7235 | REP | 2 | LAST | 120 | E7,1617 | RPPREC | EQUALS | VIPRIME | I(6) S-S PREC VEC FOR NOM TPI TIME(PASS |
| R7236 | | | | | | | | | |
| R7237 | | | | | P30, P40 INTERFACE. | | | | (20D) |
| 7239 | REP | 1 | | E7,1631 | RTIG | EQUALS | END-IN/M | | I(6)TMP |
| 7240 | REP | 1 | | E7,1637 | VTIG | EQUALS | RTIG | +6 | I(6)TMP |
| 7241 | REP | 1 | | E7,1645 | DELVSIN | EQUALS | VTIG | +6 | I(6)TMP |
| 72414 | REP | 1 | | E7,1645 | DELVEET3 | EQUALS | DELVSIN | | TMP DELTA VEL VECT INERTIAL COORDS. |
| 72416 | REP | 1 | | E7,1645 | VOTEMP | EQUALS | DELVEET3 | | |
| 7242 | REP | 2 | LAST | 121 | E7,1653 | DELVSAB | EQUALS | DELVSIN | +6 |
| 7243 | REP | 1 | | E7,1653 | VODISP | = | DELVSAB | | I(2)TMP |
| R7244 | | | | | P35-P40 INTERFACE STORAGE. (OVERLAYS P30-P40 I/P STORAGE) | | | | DSP NOUN 40,42,99FOR P30,34,35,40,41 |
| 7246 | REP | 2 | LAST | 121 | E7,1631 | RPASS4 | EQUALS | RTIG | +6 |
| 7247 | REP | 1 | | E7,1637 | VPASS4 | EQUALS | RPASS4 | +6 | I(6)TMP POSITION OF PASSIVE AT INTERCEPT |
| R72472 | | | | | TPI SEARCH (P17) | | | | I(6)TMP VELOCITY OF PASSIVE AT INTERCEPT |
| 72476 | REP | 1 | | E7,1645 | E2 | EQUALS | VPASS4 | +6 | I(6)TMP |
| AT2476 | | | | | | | | | |
| R7248 | | | | | P30-P40 COMMON STORAGE. | | | | (3D) |
| 7250 | REP | 2 | LAST | 121 | E7,1655 | TPASS4 | EQUALS | DELVSAB | +2 |
| 7251 | REP | 1 | | E7,1655 | TINT | = | TPASS4 | | I(2)TMP |
| 7254 | REP | 2 | LAST | 121 | E7,1657 | QTEMP | EQUALS | TPASS4 | +2 |
| AT2545 | | | | | | | | | |
| R7255 | | | | | P30-P40 STORAGE. | | | | (4D) |
| 7257 | REP | 1 | | E7,1660 | TTOGO | EQUALS | QTEMP | +1 | B(2)DSP NOUN 35,40,45,59,99 |
| AT258 | | | | | | | | | FOR P30,34,35,40,41,47, R30. |
| 7259 | REP | 1 | | E7,1662 | TTFI | EQUALS | TTOGO | +2 | B(2)DSP NOUN 37 FOR P34 TPI TIME, CSECS. |



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| | | | | | |
|--|--|--|--|----------------------------------|---|
| 7260 R7261 | REP 1 | E7,1664 P40 STORAGE. | END-P30S EQUALS TTP1 | +2 | **NEXT AVAIL LOC AFTER P30-40 STORAGE.** (8D) |
| 7263 7264 7265 R7266 | REP 1 REP 1 REP 2 | E7,1664 E7,1664 LAST 122 P47 STORAGE. | VGBODY EQUALS END-P30S DELACTL = VGBODY P40TMP EQUALS VGBODY | +6 +6 | B(6)DSP NOUN 85 FOR P40,41,42 VG-SC COOR B(2)TMP |
| 7267 7268 A72685 R7269 | REP 2 REP 3 | LAST 120 LAST 32 S40.1 STORAGE. | DV47TEMP EQUALS VG DELVIMU EQUALS P40TMP | +2 | I(6) DSP NOUN 83 FOR P47 DELTAV(IMU) (23D) |
| 7271 7273 7274 7275 7276 7277 | REP 1 REP 1 REP 1 REP 1 REP 1 REP 2 | E7,1702 E7,1704 E7,1712 E7,1720 E7,1720 LAST 122 E7,1726 | CSTEER EQUALS DELVIMU BDT EQUALS CSTEER UT EQUALS BDT VGTIG EQUALS UT VGPREV = VGTIG P EQUALS VGTIG | +6 +2 +6 +6 +6 +6 | I(2)IN I(6)IN I(6)OUT THRUST DIRECTION I(6)OUT I(2)OUT S40.3 NEEDS THIS |
| 7278 | REP 1 | E7,1730 | QTEMP1 EQUALS P | +2 | I(1)TMP HOLDS RETURN |

L ERASABLE ASSIGNMENTS

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| | | | | | | |
|-------|-----|---|----------|--|-----------------------------|-------------------------------|
| P7279 | | | | *-*-*- OVERLAY 4 IN EBANK 7 *-*-*- | | |
| R7280 | | | | S35.1 STORAGE. | | (2D) |
| 7292 | REP | 2 | LAST 122 | E7,1664 | TSTRT EQUALS END-P30S | I(2) IN MIDCOURSE START TIME |
| R7283 | | | | S34.1 STORAGE. | (OVERLAYS S35.1 STORAGE) | (1D) |
| 7285 | REP | 1 | | E7,1664 | TITER EQUALS TSTRT | I(1) TMP ITERATION COUNTER |
| R7288 | | | | (P30-31 Q-SAVES) | | (1) |
| 7286 | REP | 1 | | E7,1664 | P30/31RT EQUALS TITER | B(1) RETURN POINT |
| A7289 | | | | | | |
| R7290 | | | | P20-S(COLOSSUS) STORAGE. | | (8D) |
| 7292 | REP | 2 | LAST 123 | E7,1666 | S22WNL EQUALS TSTRT +2 | 1 WNL W8 UNKNOWN INIT VALUE |
| 7294 | REP | 1 | | E7,1667 | S22TOPF EQUALS S22WNL +1 | 2 T SUB OFF |
| 7295 | REP | 1 | | E7,1671 | S22TPRM EQUALS S22TOPF +2 | 2 SAVE TP |
| 7296 | REP | 1 | | E7,1673 | S22BORM EQUALS S22TPRM +2 | 0 = EARTH -- NON-ZERO = MOON |
| A7297 | | | | | | |
| R7298 | | | | DOWNLINK ERASABLES FOR P22,P20 MARK DATA. | | (8D) |
| 7300 | REP | 1 | | E7,1674 | MARKDOWN EQUALS S22BORM +1 | B(1) |
| 7301 | REP | 1 | | E7,1703 | RM EQUALS S22RTNEX | DOWNLINK OF VHP RANGE |
| A7302 | | | | | | |
| R7303 | | | | S22.1 | | (1D) |
| 7305 | REP | 3 | LAST 32 | E7,1703 | S22RTNEX EQUALS MARKDOWN +7 | B(1) |
| A7306 | | | | | | |
| R7307 | | | | CRS61.1 STORAGE. | -A SUBSET OF P20- | (14D) |
| 7309 | REP | 1 | | E7,1704 | OS11 EQUALS RM +1 | I(1) TMP OSAVE |
| 7310 | REP | 1 | | E7,1705 | OS111 EQUALS OS11 +1 | I(1) TMP OSAVE |
| 7311 | REP | 1 | | E7,1706 | SAVEPOS EQUALS OS111 +1 | I(6) TMP LEM POSITION VECTOR- |
| 7312 | REP | 1 | | E7,1714 | SAVEVEL EQUALS SAVEPOS +6 | I(6) TMP LEM VELOCITY VECTOR- |
| R7313 | | | | ATTITUDE MANEUVER -CALLED BY P20,R61,R63,CRS61.1 | | (3D) |

L ERASABLE ASSIGNMENTS

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| | | | | | | | | | |
|---|------|---|----------|--|---|--|---|--|---|
| 1315 R7318 | RESP | 1 | | B7,1722 MARK ROUTINE (R21) STORAGE. | PRAXIS -IS SUBSET OF R22- | EQUALS SAVEVEL | +8 | B(3) S-S DISP RES FOR PREP AXIS N05 (14D) | |
| 7316 7319 R7320 | RESP | 1 | | B7,1725 LAST 32 B7,1734 MORE CONICS STORAGE. | MRGRUP1 MRGRUP2 | EQUALS EQUALS | PRAXIS MRGRUP1 | +3 +7 | B(7)TMP R21 MARK BUFFER B(7)TMP R21 MARK BUFFER (4) |
| 7322 1323 1314 A7325 | RESP | 1 | | B7,1774 B7,1774 LAST 124 B7,1778 | COGA INDEP EPSILON | EQUALS EQUALS EQUALS | 3774 COGA COGA | +2 | I(2) COTAN OF INITIAL FLIGHT PATH ANGLE I(1) USED BY SUBROUTINE 'ITERATOR' I(2) TMP |
| R7326 | | | | RENDEZVOUS GUIDANCE STORAGE. - P32...P35 - | | | | (10D) | |
| 7328 7329 7330 7331 7332 7333 A7334 | RESP | 1 | | B7,1743 B7,1745 B7,1746 B7,1747 B7,1751 B7,1753 | ELEV RTX1 RTX2 RTMU RTSR1/MU CENTANG | EQUALS EQUALS EQUALS EQUALS EQUALS EQUALS | MRGRUP2 ELEV RTX1 RTX2 RTMU RTSR1/MU | +7 +2 +1 +1 +2 +2 | I(2)TMP (1) (1) (2) (2) (2) I(2) S-S CENTRAL ANGLE COVERED(TPI-TFF) |
| R7335 | | | | TPI SEARCH(S17.1,S17.2) P17 STORAGE. | | | | (10D) | |
| 7337 7338 7339 7340 7341 | RESP | 2 | LAST 124 | B7,1743 B7,1745 B7,1747 B7,1751 B7,1753 | DELTEE XRS THRTL TP DELHITS | EQUALS EQUALS EQUALS EQUALS EQUALS | MRGRUP2 DELTEE XRS THRTL TP | +7 +2 +2 +2 +2 | I(2) I(2) I(2) I(2) I(2) |

L ERASABLE ASSIGNMENTS

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P703392 *-*-* OVERLAY 5 IN EBANK 7 -*-*-*

R90005 P17,P34

(2D)

90007 REP 2 LAST 121 E7,1645 NN1 EQUALS DELVST3 I(2) DSP NOUN 55,R1

R9001 ***** THE FOLLOWING ARE FOR FLIGHT 504 ONLY *****

R9002 RETURN-TO-EARTH STORAGE.

(93D)

| | | | | | | | | | | | | | | | | | | |
|-------|-----|---|------|-----|---------|--|--------|----------|--------|---------|------------|-----------|----------|---------|-----------|----------|-------|-----|
| 9004 | REP | 2 | LAST | 121 | E7,1631 | RTEVD | EQUALS | END-IN/M | I(2)IN | DELTA | VELOCITY | DESIRED | M/CS | B7 | | | | |
| 9005 | REP | 1 | | | E7,1633 | RTEGAM2D | EQUALS | RTEVD | +2 | I(2)IN | REENTRY | ANGLE | DESIRED | REVS | B0 | | | |
| 9006 | REP | 1 | | | E7,1635 | RCON | EQUALS | RTEGAM2D | +2 | I(2)TMP | CONIC | R2 | RADIUS | M | B29 | | | |
| 9007 | REP | 1 | | | E7,1637 | R(T1)/ | EQUALS | RCON | +2 | I(6)TMP | POSITION | VECTOR | AT | TIG | M | B29/B27 | | |
| 9008 | REP | 1 | | | E7,1645 | R(T1) | EQUALS | R(T1)/ | +6 | I(2)TMP | MAGNITUDE | OF | R(T1)/ | M | B29/B27 | | | |
| 9009 | REP | 1 | | | E7,1647 | DT21PR | EQUALS | R(T1) | +2 | I(2) | TMP | PREVIOUS | DT21 | CS | B30 | | | |
| 9010 | REP | 1 | | | E7,1651 | MAMAX1 | EQUALS | DT21PR | +2 | I(2) | TMP | MAJ | AXIS | LOW | BOUND | LMT | M | B30 |
| 9011 | REP | 1 | | | E7,1653 | MAMAX2 | EQUALS | MAMAX1 | +2 | I(2) | TMP | MAJ | AXIS | UP | BOUND | LMT | M | B30 |
| 9012 | REP | 1 | | | E7,1655 | R(T2)/ | EQUALS | MAMAX2 | +2 | I(6)TMP | FINAL | POSITION | VECTOR | M | B29/B27 | | | |
| 9013 | REP | 1 | | | E7,1663 | RD | EQUALS | R(T2)/ | +6 | I(2)TMP | FINAL | R | DESIRED | M | B29/B27 | | | |
| 9014 | REP | 1 | | | E7,1665 | DRCON | EQUALS | RD | +2 | I(2)TMP | RCON | SLOPE | ITERATOR | M | B29/B27 | | | |
| 9015 | REP | 1 | | | E7,1667 | RPRE | EQUALS | DRCON | +2 | I(2)TMP | PREVIOUS | RPRE | M | B29/B27 | | | | |
| 9016 | REP | 1 | | | E7,1671 | V(T1)/ | EQUALS | RPRE | +2 | I(6)TMP | VEL | VECTOR | AT | TIG | M/CS | B7/B5 | | |
| 9017 | REP | 1 | | | E7,1677 | V2(T1)/ | EQUALS | V(T1)/ | +6 | I(6)TMP | POST | IMP | VEL | AT | TIG | M/CS | B7/B5 | |
| 9018 | REP | 1 | | | E7,1705 | DV | EQUALS | V2(T1)/ | +6 | I(2)TMP | DELTA | VELOCITY | AT | TIG | M/CS | B7/B5 | | |
| 9019 | REP | 1 | | | E7,1707 | V(T2)/ | EQUALS | DV | +2 | I(6)TMP | FINAL | VELOCITY | VECTOR | M/CS | B7/B5 | | | |
| 9020 | REP | 1 | | | E7,1715 | T1 | EQUALS | V(T2)/ | +6 | I(2)TMP | INITIAL | VECTOR | TIME | CS | B28 | | | |
| 9022 | REP | 1 | | | E7,1717 | PCON | EQUALS | T1 | +2 | I(2)TMP | SEMI-LATUS | RECTUM | M | B29 | | | | |
| 9023 | REP | 1 | | | E7,1721 | X(T1) | EQUALS | PCON | +2 | I(2)TMP | COTANGENT | GAMMA1 | B5 | | | | | |
| 9024 | REP | 1 | | | E7,1723 | T12 | EQUALS | X(T1) | +2 | I(2)TMP | INIT | TO | FINL | POSIT | TIME | CS | B28 | |
| 9025 | REP | 1 | | | E7,1725 | DELTAT | EQUALS | T12 | +2 | I(2) | TMP | DELTA | T | IN | SAFE | PERILLNE | CS | B28 |
| 9026 | REP | 1 | | | E7,1727 | NN1A | EQUALS | DELTAT | +2 | I(2) | TMP | ITERATION | COUNTER | 1 | | | | |
| 9027 | REP | 1 | | | E7,1731 | NN2 | EQUALS | NN1A | +2 | I(2) | TMP | ITERATION | COUNTER | 2 | | | | |
| 9028 | REP | 1 | | | E7,1733 | RTENCKEX | EQUALS | NN2 | +2 | I(1)TMP | RTENCK | RETURN | ADDRESS | | | | | |
| 9029 | REP | 1 | | | E7,1734 | CONICX1 | EQUALS | RTENCKEX | +1 | I(1)TMP | CONICS | MJ | TABLE | INDEX | | | | |
| 9030 | REP | 1 | | | E7,1735 | T2 | EQUALS | CONICX1 | +1 | I(2)TMP | FINAL | TIME | CS | B28 | | | | |
| 9031 | REP | 1 | | | E7,1737 | UR1/ | EQUALS | T2 | +2 | I(6)TMP | UNIT | R(T1)/ | B1 | | | | | |
| 9032 | REP | 1 | | | E7,1745 | UV1/ | EQUALS | UR1/ | +6 | I(6)TMP | UNIT | V(T1)/ | B1 | | | | | |
| 9033 | REP | 1 | | | E7,1753 | BETA1 | EQUALS | UV1/ | +6 | I(2)TMP | 1+X(T2)**2 | B1 | | | | | | |
| 9034 | REP | 1 | | | E7,1755 | P(T1) | EQUALS | BETA1 | +2 | I(1)TMP | PRIMARY | BODY | STATE | TIME | 1 | B14 | | |
| 9036 | REP | 1 | | | E7,1756 | CFPA | EQUALS | P(T1) | +1 | I(2) | TMP | COSINE | FLIGHT | PATH | ANGLE | B1 | | |
| 9037 | REP | 1 | | | E7,1760 | PHI2 | EQUALS | CFPA | +2 | I(2) | TMP | PERI | OR | APO | INDICATOR | B2 | | |
| 9038 | REP | 1 | | | E7,1762 | SPRTEX | EQUALS | PHI2 | +2 | I(1)TMP | ROUTINE | RETURN | ADDRESS | | | | | |
| 9039 | REP | 1 | | | E7,1763 | VNSTORE | EQUALS | SPRTEX | +1 | I(1)TMP | VERRNCLN | STORAGE | | | | | | |
| 9040 | REP | 1 | | | E7,1764 | BETA12 | EQUALS | VNSTORE | +1 | I(2)TMP | SIGN | FOR | TIMERAD | | | | | |
| R9041 | | | | | | OVERLAYS WITHIN RETURN-TO-EARTH STORAGE. | | | | | | | | | | | | |
| 9042 | | | | | 0030 | RPRE | EQUALS | 24D | | I(2)TMP | COMPUTED | PREC | RADIUS | M | B29/B27 | | | |



L ERASABLE ASSIGNMENTS

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9043 0032
 9044 0034
 9045 REP 2 LAST 125 E7,1723
 9046 REP 2 LAST 125 E7,1725
 9048 REP 2 LAST 125 E7,1745
 9049 REP 2 LAST 115 E7,1412
 9050 REP 2 LAST 88 E4,1721
 R0051
 9900 E7,1777
 9901 REP 1 E7,1777
 *** END OF KILERASE.080 ***

P/RPRE EQUALS 28D
 R/APRE EQUALS 28D
 X(T2)PRE EQUALS T12
 X(T2) EQUALS DELTAT
 LH/ EQUALS UV1/
 SPRTETIG EQUALS TIG
 RETLOCN EQUALS XR1HOLD +1
 WHOCARBS = 3777
 END-E7 EQUALS WHOCARBS

I(2)TMP P/R B4
 I(2)TMP R/A B6
 I(2)TMP PREC COTAN GAMMA2 B0
 I(2)TMP COTAN GAMMA2 B0
 I(2)TMP UNIT HORIZONTAL VECTOR. B1
 I(2)IN TIME OF IGNITION C8 B28

A DUMMY FOR E-BANK INSENSITIVE 2CADRS.
 ***** LAST LOCATION IN E7



L INTERRUPT LEAD INS

USER=8 PAGE NO. 1 80 83

| Address | Instruction | Count | Address | Instruction | Count | Label |
|---------|----------------|-------|---------|-------------|----------|------------|
| 0001 | | | 4000 | SETLOC | 4000 | |
| 0002 | REP 1 | | | COUNT | 02/RUPTS | |
| 0003 | | | 4000 | INHINT | | GO |
| 0004 | REP 1 | | 4001 | CAP | GOBB | |
| 0005 | REP 1 | | 4002 | XCH | BRANK | |
| 0006 | REP 1 | | 4003 | TCP | GOPROG | |
| 0007 | REP 1 | | 4004 | DxCH | ARUPT | T6RUPT |
| 0008 | | | 4005 | EXTEND | | |
| 0009 | REP 1 | | 4006 | DCA | T6LOC | |
| 0010 | | | 4007 | DTCH | | |
| 0011 | REP 2 LAST 127 | | 4010 | DxCH | ARUPT | T5RUPT |
| 0012 | REP 1 | | 4011 | CS | TIMES | |
| 0013 | REP 1 | | 4012 | AD | .5 SEC | |
| 0014 | REP 1 | | 4013 | TCP | T5RUPT | |
| 0015 | REP 3 LAST 127 | | 4014 | DxCH | ARUPT | T3RUPT |
| 0016 | REP 1 | | 4015 | CAP | T3RPTTR | |
| 0017 | REP 2 LAST 127 | | 4016 | XCH | BRANK | |
| 0018 | REP 1 | | 4017 | TCP | T3RUPT | |
| 0019 | REP 4 LAST 127 | | 4020 | DxCH | ARUPT | T4RUPT |
| 0020 | REP 1 | | 4021 | CAP | T4RPTTR | |
| 0021 | REP 3 LAST 127 | | 4022 | XCH | BRANK | |
| 0022 | REP 1 | | 4023 | TCP | T4RUPT | |
| 0023 | REP 5 LAST 127 | | 4024 | DxCH | ARUPT | KEYRUPT1 |
| 0024 | REP 1 | | 4025 | CAP | KEYRPTTR | |
| 0025 | REP 4 LAST 127 | | 4026 | XCH | BRANK | |
| 0026 | REP 1 | | 4027 | TCP | KEYRUPT1 | |
| 0027 | REP 6 LAST 127 | | 4030 | DxCH | ARUPT | KEYRUPT2 |
| 0028 | REP 1 | | 4031 | CAP | MKRPTTR | |
| 0029 | REP 5 LAST 127 | | 4032 | XCH | BRANK | |
| 0030 | REP 1 | | 4033 | TCP | MARKRUPT | |
| 0031 | REP 7 LAST 127 | | 4034 | DxCH | ARUPT | UPRUPT |
| 0032 | REP 1 | | 4035 | CAP | UPRPTTR | |
| 0033 | REP 6 LAST 127 | | 4036 | XCH | BRANK | |
| 0034 | REP 1 | | 4037 | TCP | UPRUPT | |
| 0035 | REP 8 LAST 127 | | 4040 | DxCH | ARUPT | DOWNRUPT |
| 0036 | REP 1 | | 4041 | CAP | DWNRPTTR | |
| 0037 | REP 7 LAST 127 | | 4042 | XCH | BRANK | |
| 0038 | REP 1 | | 4043 | TCP | DDOWNTM | |
| 0039 | REP 9 LAST 127 | | 4044 | DxCH | ARUPT | RADAR RUPT |

L INTERRUPT LEAD INS

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| | | | | | | | | |
|------|-----|----|------|------|---------|--------|-----|-------------------------|
| 0040 | REP | 1 | | 4045 | 3 4061 | 1 | CAP | RDRPTBB |
| 0041 | REP | 8 | LAST | 127 | 4046 | 56 008 | 1 | XCH BRANK |
| 0042 | REP | 1 | | | 4047 | 1 2478 | 1 | TCP VHPREAD |
| 0043 | REP | 10 | LAST | 127 | 4050 | 52 011 | 0 | DYCH ARUPT |
| 0044 | REP | 1 | | | 4051 | 3 4062 | 1 | CAP HCRUPTBB |
| 0045 | REP | 9 | LAST | 128 | 4052 | 56 008 | 1 | XCH BRANK |
| 0046 | REP | 1 | | | 4053 | 1 5225 | 0 | TCP RESUME +3 |
| 0047 | REP | 1 | | | E3,1400 | | | BRANK= LST1 |
| 0048 | REP | 2 | LAST | 127 | 4054 | 12063 | 1 | GORB BRCON GOPROG |
| 0049 | REP | 2 | LAST | 128 | E3,1400 | | | BRANK= LST1 |
| 0050 | REP | 2 | LAST | 127 | 4055 | 02063 | 0 | T3RPTBB BRCON T3RUPT |
| 0051 | REP | 1 | | | 0073 | | | BRANK= KEYTEMP1 |
| 0052 | REP | 2 | LAST | 127 | 4056 | 16060 | 0 | KEYRPTBB BRCON KEYRUPT1 |
| 0053 | REP | 4 | LAST | 124 | E7,1725 | | | BRANK= MRKRUPT1 |
| 0054 | REP | 2 | LAST | 127 | 4057 | 16067 | 1 | MKRUPTBB BRCON MARKRUPT |
| 0055 | REP | 2 | LAST | 127 | 4056 | | | UPRPTBB = KEYRPTBB |
| 0056 | REP | 1 | | | 0340 | | | BRANK= DNTMRUPT |
| 0057 | REP | 2 | LAST | 127 | 4060 | 12060 | 1 | DNRPTBB BRCON DODOWNTM |
| 0058 | REP | 1 | | | E7,1603 | | | BRANK= DATATRST |
| 0059 | REP | 2 | LAST | 128 | 4061 | 56067 | 0 | RDRPTBB BRCON VHPREAD |
| 0060 | REP | 1 | | | 0025 | | | BRANK= TIME1 |
| 0061 | REP | 2 | LAST | 128 | 4062 | 04060 | 0 | HCRUPTBB BRCON RESUME |
| 0062 | REP | 1 | | | 1302 | | | BRANK= DSRUPTSW |
| 0063 | REP | 2 | LAST | 127 | 4063 | 14062 | 0 | T4RPTBB BRCON T4RUPT |
| 0064 | REP | 2 | LAST | 128 | 0025 | | | BRANK= TIME1 |
| 0065 | REP | 2 | LAST | 127 | 4064 | 04060 | 0 | T5RPTBB BRCON T5RUPT |
| 0066 | | | | | 4065 | 0 0006 | 1 | T6RUPT EXTEND |
| 0067 | REP | 1 | | | 4066 | 0 5228 | 1 | RZMP NOORSM |
| 0068 | | | | | 4067 | 0 0006 | 1 | EXTEND |
| 0069 | REP | 1 | | | 4070 | 3 1313 | 1 | DCA TSLOC |
| 0070 | | | | | 4071 | 52 008 | 0 | DTCB |

HAND CONTROL RUPT

NOT USED
RESTART USES E0, E3

NOT USA)

L T4RUPT PROGRAM

USER=5 PAGE NO. 1 E0 53

| | | | | | | |
|------|--|--|------------------|----------|----------------|------------------------------|
| 0001 | | | 12,2000 | | BANK 12 | |
| 0002 | REP 1 | | 06,2000 | | SETLOC T4RUP | |
| 0003 | | | 06,2000 | | BANK | |
| 0004 | REP 1 | | | | COUNT 06/T4RPT | |
| 0005 | REP 1 | | 06,2000 54 016 1 | T4RUPT | TS BANKRUPT | |
| 0006 | | | 06,2001 8 0006 1 | | EXTEND | |
| 0007 | REP 1 | | 06,2002 22 012 1 | | QKCH CRUPT | |
| 0008 | REP 2 LAST 128 | | 06,2003 11=302 0 | | CCS DSRUPTSW | CCES 7(-)0 AROUND AND AROUND |
| 0009 | REP 1 | | 06,2004 1 2010 0 | | TCP NORMTA +1 | |
| 0010 | REP 2 LAST 129 | | 06,2005 1 2007 0 | | TCP NORMTA | |
| 0011 | REP 1 | | 06,2006 1 2136 0 | | TCP QUIKOSP | |
| 0012 | REP 1 | | 06,2007 3 4716 0 | NORMTA | CAP SEVEN | |
| 0013 | REP 1 | | 06,2010 54 070 1 | | TS RUPTREQ1 | |
| 0014 | REP 3 LAST 129 | | 06,2011 55=302 0 | | TS DSRUPTSW | |
| 0015 | REP 1 | | | | COUNT 02/T4RPT | |
| 0016 | REP 1 | | 7711 | 74K | = HIGH4 | |
| 0017 | RELTAB IS A PACKED TABLE. RELAYWORD CODE IN UPPER 4 BITS, RELAY CODE | | | | | |
| 0018 | IN LOWER 5 BITS. | | | | | |
| 0019 | | | 4072 | | BLOCK 02 | |
| 0020 | REP 1 | | 4000 | | SETLOC FPTAG12 | |
| 0021 | | | 4072 | | BANK | |
| 0022 | | | 4072 04025 1 | RELTAB | OCT 04025 | |
| 0023 | | | 4073 10003 0 | | OCT 10003 | |
| 0024 | | | 4074 14031 0 | | OCT 14031 | |
| 0025 | | | 4075 20033 0 | | OCT 20033 | |
| 0026 | | | 4076 24017 1 | | OCT 24017 | |
| 0027 | | | 4077 30038 1 | | OCT 30038 | |
| 0028 | | | 4100 34034 1 | | OCT 34034 | |
| 0029 | | | 4101 40023 1 | | OCT 40023 | |
| 0030 | | | 4102 44035 1 | | OCT 44035 | |
| 0031 | | | 4103 50037 0 | | OCT 50037 | |
| 0032 | | | 4104 54000 0 | | OCT 54000 | |
| 0033 | | | 4105 60000 1 | RELTAB11 | OCT 60000 | |



L T4RPT PROGRAM

P0034 SWITCHED-BANK PORTION.

| | | | | | | | | | |
|------|-----|---|------|-------------|---------|--------|---|--------|-------------|
| 0035 | | | | 12,2000 | | | | BANK | 12 |
| 0036 | REP | 2 | LAST | 129 | 06,2000 | | | SETLOC | T4RUP |
| 0037 | | | | | 06,2012 | | | BANK | |
| 0038 | REP | 2 | LAST | 129 TO 129' | 10 | 10* | | COUNT | 06/T4RPT |
| 0039 | REP | 1 | | | 06,2012 | 11=036 | 1 | CDRVE | |
| 0040 | REP | 1 | | | 06,2013 | 0 2063 | 0 | CCS | DSPTAB +11D |
| 0041 | REP | 2 | LAST | 130 | 06,2014 | 0 2063 | 0 | TC | DSPQUT |
| | | | | | | | | TC | DSPQUT |
| 0042 | REP | 2 | LAST | 130 | 06,2015 | 57=036 | 0 | XCH | DSPTAB +11D |
| 0043 | REP | 1 | | | 06,2016 | 7 4372 | 1 | MASK | LOW11 |
| 0044 | REP | 3 | LAST | 130 | 06,2017 | 55=036 | 1 | TS | DSPTAB +11D |
| 0045 | REP | 1 | | | 06,2020 | 6 4105 | 1 | AD | RELTAH11 |
| 0046 | | | | | 06,2021 | 0 0006 | 1 | EXTEND | |
| 0047 | REP | 1 | | | 06,2022 | 01 010 | 1 | WRITE | OUTO |
| 0048 | REP | 1 | | | 06,2023 | 0 2071 | 0 | TC | HANG20 |



L T4RUPT PROGRAM

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P0049 DSPOUT PROGRAM, PUTS OUT DISPLAYS.

| | | | | | | | | | |
|------|-----|---|------|---------|----------|----------|----------|------------|--|
| 0050 | REP | 1 | | 06,2024 | 55=016 0 | DSPQUTSB | TS | NQUT | |
| 0051 | REP | 1 | | 06,2025 | 4 4714 0 | | CS | ZERO | |
| 0052 | REP | 1 | | 06,2026 | 54 073 1 | | TS | DSRUPTM | SET TO -0 FOR 1ST PASS THRU DSPTAB |
| 0053 | REP | 1 | | 06,2027 | 56 776 1 | | XCH | DSPCNT | |
| 0054 | REP | 1 | | 06,2030 | 6 4713 0 | | AD | NEC0 | TO PREVENT +0 |
| 0055 | REP | 2 | LAST | 131 | 06,2031 | 54 776 0 | | TS | DSPCNT |
| 0056 | REP | 3 | LAST | 131 | 06,2032 | 50 776 1 | DSPSCAN | INDEX | DSPCNT |
| 0057 | REP | 4 | LAST | 130 | 06,2033 | 11=023 0 | | CCS | DSPTAB |
| 0058 | REP | 4 | LAST | 131 | 06,2034 | 10 776 0 | | CCS | DSPCNT |
| 0059 | REP | 1 | | 06,2035 | 1 2030 1 | | TCP | DSPSCAN -2 | IF DSPTAB ENTRY +, SKIP |
| 0060 | REP | 1 | | 06,2036 | 1 2047 1 | | TCP | DISPLAY | IF DSPCNT +, AGAIN |
| 0061 | REP | 1 | | 06,2037 | 00012 1 | TARLNTH | OCT | 12 | IF DSPTAB ENTRY -, DISPLAY |
| 0062 | REP | 2 | LAST | 131 | 06,2040 | 10 073 1 | | CCS | DSRUPTM |
| 0063 | REP | 2 | LAST | 131 | 06,2041 | 37764 0 | 120MRUPT | DEC | 16372 |
| 0064 | REP | 2 | LAST | 131 | 06,2042 | 55=016 0 | | TS | NQUT |
| 0065 | REP | 2 | LAST | 39 | 06,2043 | 0 0002 0 | | TC | 0 |
| 0066 | REP | 3 | LAST | 131 | 06,2044 | 54 073 1 | | TS | DSRUPTM |
| 0067 | REP | 1 | | 06,2045 | 3 2037 1 | | CAP | TARLNTH | IF DSRUPTM=-0, 1ST PASS THRU DSPTAB |
| 0068 | REP | 2 | LAST | 131 | 06,2046 | 1 2031 0 | | TCP | DSPTAB (DSPCNT=0). +0 INTO DSRUPTM. PASS AGAIN |
| 0069 | REP | 1 | | 06,2047 | 6 4712 1 | DISPLAY | AD | ONE | |
| 0070 | REP | 5 | LAST | 131 | 06,2050 | 50 776 1 | | INDEX | DSPCNT |
| 0071 | REP | 5 | LAST | 131 | 06,2051 | 55=023 0 | | TS | DSPTAB |
| 0072 | REP | 2 | LAST | 130 | 06,2052 | 7 4372 1 | | MASK | LOW11 |
| 0073 | REP | 4 | LAST | 131 | 06,2053 | 54 073 1 | | TS | DSRUPTM |
| 0074 | REP | 1 | | 06,2054 | 3 4364 1 | | CAP | HIS | |
| 0075 | REP | 6 | LAST | 131 | 06,2055 | 50 776 1 | | INDEX | DSPCNT |
| 0076 | REP | 1 | | 06,2056 | 7 4072 1 | | MASK | RELTAR | PICK UP BITS 12 TO 15 OF RELTAR ENTRY |
| 0077 | REP | 5 | LAST | 131 | 06,2057 | 6 0073 0 | | AD | DSRUPTM |
| 0078 | REP | 1 | | 06,2060 | 0 0006 1 | | EXTEND | | |
| 0079 | REP | 2 | LAST | 130 | 06,2061 | 01 010 1 | | WRITE | OUTO |
| 0080 | REP | 1 | | 06,2062 | 1 6706 1 | | TCP | 0+1 | WRITE CHANNEL 10 |
| 0081 | REP | 1 | | 06,2063 | 10 101 0 | DSPQUT | CCS | FLAGWRD5 | ***NORMAL RETURN SKIPS ONE |
| 0082 | REP | 2 | LAST | 131 | 06,2064 | 3 4714 1 | | CAP | ZERO |
| 0083 | REP | 1 | | 06,2065 | 1 2132 1 | | TCP | NODSPQUT | DONT DISPLAY UNLESS DSKY FLAG ON |
| 0084 | REP | 3 | LAST | 131 | 06,2066 | 11=016 0 | | CCS | NQUT |
| 0085 | REP | 1 | | 06,2067 | 0 2024 0 | | TC | DSPQUTSB | |
| 0086 | REP | 2 | LAST | 131 | 06,2070 | 1 2132 1 | | TCP | NODSPQUT |
| 0087 | REP | 1 | | 06,2071 | 4 2173 1 | HANG20 | CS | 11,14,9 | NO DISPLAY REQUESTS |
| 0088 | REP | 4 | LAST | 129 | 06,2072 | 27=302 0 | | ADS | DSRUPTSW |
| 0089 | REP | 1 | | 06,2073 | 3 7700 1 | | CAP | 20MRUPT | |
| 0090 | REP | 1 | | 06,2074 | 54 027 0 | SETTIME4 | TS | TIME4 | |

L T4RUPT PROGRAM

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P0116 JUMP TO APPROPRIATE ONCE-PER SECOND (.96 SEC ACTUALLY) ACTIVITY

| | | | | | | | | | | |
|-------|-----|----|------|-----|---------|----------|-----------|----------|----------|---------------------------------------|
| 0119 | REP | 2 | LAST | 129 | 06,2116 | 50 070 0 | T4JUMP | INDEX | RUPTRG1 | |
| 0120 | | | | | 06,2117 | 1 2120 1 | | TCP | +1 | |
| 0121 | REP | 1 | | | 06,2120 | 1 2130 0 | | TCP | OPTTEST | |
| 0122 | REP | 1 | | | 06,2121 | 1 2765 0 | | TCP | OPTMON | |
| 0123 | REP | 1 | | | 06,2122 | 1 2174 0 | | TCP | IMLMON | |
| 0124 | REP | 3 | LAST | 128 | 06,2123 | 1 5222 1 | | TCP | RESUME | |
| 0125 | REP | 2 | LAST | 133 | 06,2124 | 1 2130 0 | | TCP | OPTTEST | |
| 0126 | REP | 2 | LAST | 133 | 06,2125 | 1 2765 0 | | TCP | OPTMON | |
| 0127 | REP | 2 | LAST | 133 | 06,2126 | 1 2174 0 | | TCP | IMLMON | |
| 0128 | REP | 4 | LAST | 133 | 06,2127 | 1 5222 1 | | TCP | RESUME | |
| 0129 | REP | 1 | | | 06,2130 | 0 4633 0 | OPTTEST | TC | IBNCALL | |
| 0130 | REP | 1 | | | 06,2131 | 20000 0 | | CADR | OPTDRIVE | |
| 0131 | REP | 1 | | | 7700 | | 20MRUPT = | | OCT37776 | (DEC 16382) |
| 0132 | REP | 1 | | | 06,2132 | 0 0006 1 | NODSPOUT | EXTEND | | TURN OFF RELAYS |
| 0133 | REP | 3 | LAST | 131 | 06,2133 | 01 010 1 | | WRITE | OUT0 | |
| 0134 | REP | 1 | | | 06,2134 | 3 2041 0 | | CAP | 120MRUPT | SET FOR NEXT DRIVE |
| 0135 | REP | 1 | | | 06,2135 | 1 2074 1 | | TCP | SETTIME4 | |
| 0136 | REP | 12 | LAST | 132 | 06,2136 | 3 4675 1 | QUIKDSP | CAP | BIT14 | |
| 0137 | REP | 5 | LAST | 131 | 06,2137 | 7 1302 0 | | MASK | DSRUPTSW | |
| 0138 | REP | 1 | | | 06,2140 | 0 0006 1 | | EXTEND | | |
| 0139 | REP | 1 | | | 06,2141 | 1 2167 1 | | BZF | QUIKOFF | WROTE LAST TIME, NOW TURN OFF RELAYS. |
| 01395 | REP | 4 | LAST | 131 | 06,2142 | 11=016 0 | CCS | NOUT | | |
| 0140 | REP | 2 | LAST | 131 | 06,2143 | 0 2024 0 | TC | DSPOUTSR | | |
| 0141 | REP | 1 | | | 06,2144 | 1 2154 1 | TCP | NODSPY | | NOUT=0 OR BAD RETURN FROM DSPOUTSR |
| 0142 | REP | 13 | LAST | 133 | 06,2145 | 4 4675 0 | CS | BIT14 | | GOOD RETURN (WE DISPLAYED SOMETHING) |
| 0143 | REP | 6 | LAST | 133 | 06,2146 | 27=302 0 | QUIKRUPT | ADS | DSRUPTSW | |
| 0144 | REP | 2 | LAST | 131 | 06,2147 | 3 7700 1 | | CAP | 20MRUPT | |
| 0145 | REP | 2 | LAST | 131 | 06,2150 | 54 027 0 | | TS | TIME4 | |
| 0146 | REP | 11 | LAST | 62 | 06,2151 | 3 4702 0 | | CAP | BIT9 | |
| 0147 | REP | 7 | LAST | 133 | 06,2152 | 27=302 0 | | ADS | DSRUPTSW | |
| 0148 | REP | 5 | LAST | 133 | 06,2153 | 0 5222 0 | | TC | RESUME | |
| 0149 | REP | 1 | | | 06,2154 | 0 0006 1 | NODSPY | EXTEND | | |
| 0150 | REP | 4 | LAST | 133 | 06,2155 | 01 010 1 | | WRITE | OUT0 | |
| 0151 | REP | 3 | LAST | 133 | 06,2156 | 3 7700 1 | SYNCT4 | CAP | 20MRUPT | |
| 0152 | REP | 3 | LAST | 133 | 06,2157 | 26 027 0 | | ADS | TIME4 | |
| 0153 | REP | 12 | LAST | 133 | 06,2160 | 3 4702 0 | | CAP | BIT9 | |

L T4RUPT PROGRAM

| | | | | | | | | | |
|------|-----|----|------|-----|---------|--------|---|----------|-----------|
| 0154 | REP | 8 | LAST | 133 | 06,2161 | 27-302 | 0 | ADS | DSRUPTSW |
| 0155 | REP | 9 | LAST | 134 | 06,2162 | 11-302 | 0 | CC8 | DSRUPTSW |
| 0156 | REP | 6 | LAST | 133 | 06,2163 | 0 5222 | 0 | TC | RESUME |
| 0157 | | | | | 06,2164 | 37737 | 0 | OCT37737 | OCT 37737 |
| 0158 | REP | 1 | | | 06,2165 | 0 2156 | 1 | TC | SYNCT4 |
| 0159 | REP | 7 | LAST | 134 | 06,2166 | 0 5222 | 0 | TC | RESUME |
| 0160 | | | | | 06,2167 | 0 0006 | 1 | QUIKOFF | EXTEND |
| 0161 | REP | 5 | LAST | 133 | 06,2170 | 01 010 | 1 | WRITE | OUT0 |
| 0162 | REP | 14 | LAST | 133 | 06,2171 | 3 4675 | 1 | CAP | BIT14 |
| 0163 | REP | 1 | | | 06,2172 | 1 2146 | 1 | TCP | QUIKRUPT |
| 0164 | | | | | 06,2173 | 22400 | 0 | 11,14,9 | OCT 22400 |

RESET DSRUPTSW TO SEND DISPLAY NEXT PASS



L TURTLE PROGRAM

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R0165 PROGRAM NAME' IMMON

R0166 FUNCTIONAL DESCRIPTION' THIS PROGRAM IS ENTERED EVERY 480 MS. IT DETECTS CHANGES OF THE IMU STATUS BITS IN
R0168 CHANNEL 30 AND CALLS THE APPROPRIATE SUBROUTINES. THE BITS PROCESSED AND THEIR RELEVANT SUBROUTINES ARE'

| R0170 | FUNCTION | BIT | SUBROUTINE CALLED |
|-------|---------------------|-----|--------------------|
| R0171 | ----- | --- | ----- |
| R0172 | TEMP IN LIMITS | 15 | TLIM |
| R0173 | ISS TURN-ON REQUEST | 14 | ITURNON |
| R0174 | IMU FAIL | 13 | IMFAIL (SETISSW) |
| R0175 | IMU CDU FAIL | 12 | ICDUFAIL (SETISSW) |
| R0176 | IMU CAGE | 11 | IMCAGE |
| R0177 | IMU OPERATE | 9 | IMJOP |

R0178 THE LAST SAMPLED STATE OF THESE BITS IS LEFT IN IMODES30. ALSO, EACH SUBROUTINE CALLED FINDS THE NEW
R0180 VALUE OF THE BIT IN A, WITH Q SET TO THE PROPER RETURN LOCATION, NKTIFAIL.

R0182 CALLING SEQUENCE' TURTLE EVERY 480 MILLISECONDS.

R0183 JOBS OR TASKS INITIATED' NONE.

R0184 SUBROUTINES CALLED' TLIM, ITURNON, SETISSW, IMCAGE, IMJOP.

R0185 ERASABLE INITIALIZATION'

R0186 FRESH START OR RESTART WITH NO GROUPS ACTIVE' C(IMODES30) = OCT 37411.

R0188 RESTART WITH ACTIVE GROUPS' C(IMODES30) = (R(IMODES30)AND(OCT 00035)) PLUS OCT 37400.

R0190 THIS LEAVES IMU FAIL BITS INTACT.

R0191 ALARMS' NONE.

R0192 EXIT' TNONTEST.

R0193 OUTPUT' UPDATED IMODES30 WITH CHANGES PROCESSED BY APPROPRIATE SUBROUTINE.

| | | | | | | | | | |
|------|-----|---|------|---------|----------|----------|--------|----------|---------------------------------------|
| 0195 | REP | 1 | | 06,2174 | 3 1320 1 | IMMON | CA | IMODES30 | SEE IF THERE HAS BEEN A CHANGE IN THE |
| 0196 | | | | 06,2175 | 0 0006 1 | | EXTEND | | RELEVANT BITS OF CHAN 30. |
| 0197 | REP | 1 | | 06,2176 | 06 030 1 | | RXOR | CHAN30 | CHECK IF BITS 9,11-15 CHANGED |
| 0198 | REP | 1 | | 06,2177 | 7 2743 1 | | MASK | 30RDMASK | |
| 0199 | | | | 06,2200 | 0 0006 1 | | EXTEND | | |
| 0200 | REP | 1 | | 06,2201 | 1 2231 1 | | BZF | TNONTEST | NO CHANGE IN STATUS. |
| 0201 | REP | 3 | LAST | 133 | 06,2202 | 54 070 1 | TS | RUPTRG1 | SAVE BITS WHICH HAVE CHANGED. |
| 0202 | REP | 2 | LAST | 135 | 06,2203 | 23=320 1 | LXCH | IMODES30 | UPDATE IMODES30. |
| 0203 | | | | | 06,2204 | 0 0006 1 | EXTEND | | |
| 0204 | REP | 2 | LAST | 132 | 06,2205 | 06 001 0 | RXOR | ICHAN | |
| 0205 | REP | 3 | LAST | 135 | 06,2206 | 55=320 0 | TS | IMODES30 | |
| 0206 | REP | 2 | LAST | 131 | 06,2207 | 4 4712 0 | CS | ONE | |
| 0207 | REP | 4 | LAST | 135 | 06,2210 | 56 070 0 | XCH | RUPTRG1 | |
| 0208 | | | | | 06,2211 | 0 0006 1 | EXTEND | | |

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| | | | | | | | | | | |
|------|-----|----|------|---------|----------|----------|----------|---------------------|-------------|---------------------------------|
| 0209 | REP | 1 | | 06,2212 | 6 2507 1 | BZMP | TLIN | CHANGE IN IMU TEMP. | | |
| 0210 | REP | 1 | | 06,2213 | 1 2215 1 | TCP | NXTIPBIT | BEGIN BIT SCAN. | | |
| 0211 | REP | 3 | LAST | 135 | 06,2214 | 6 4712 1 | -1 | AD | ONE | (RE-ENTERS HERE FROM NXTIPAIL.) |
| 0212 | REP | 5 | LAST | 135 | 06,2215 | 24 070 0 | NXTIPBIT | INCR | RUPTRG1 | ADVANCE BIT POSITION NUMBER. |
| 0213 | | | | | 06,2216 | 6 0000 1 | +1 | DOUBLE | | |
| 0214 | REP | 3 | LAST | 132 | 06,2217 | 54 000 0 | | TS | A | SKIP IF OVERFLOW. |
| 0215 | REP | 2 | LAST | 136 | 06,2220 | 1 2215 1 | | TCP | NXTIPBIT | LOOK FOR BIT. |
| 0216 | REP | 1 | | | 06,2221 | 56 071 1 | | XCH | RUPTRG2 | SAVE OVERFLOW-CORRECTED DATA. |
| 0217 | REP | 6 | LAST | 136 | 06,2222 | 50 070 0 | | INDEX | RUPTRG1 | SELECT NEW VALUE OF THIS BIT. |
| 0218 | REP | 15 | LAST | 134 | 06,2223 | 3 4075 1 | | CAP | BIT14 | |
| 0219 | REP | 4 | LAST | 135 | 06,2224 | 7 1320 0 | | MASK | IMODES30 | |
| 0220 | REP | 7 | LAST | 136 | 06,2225 | 50 070 0 | | INDEX | RUPTRG1 | |
| 0221 | REP | 1 | | | 06,2226 | 0 2737 0 | | TC | IPAILMP | |
| 0222 | REP | 2 | LAST | 136 | 06,2227 | 10 071 0 | NXTIPAIL | CCS | RUPTRG2 | PROCESS ANY ADDITIONAL CHANGES. |
| 0223 | REP | 3 | LAST | 136 | 06,2230 | 1 2214 0 | | TCP | NXTIPBIT -1 | |



L T4RUPT PROGRAM

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P0224 PROGRAM NAME' TNONTEST.

R0227 AND ISS OPERATE (CHANNEL 30 BIT 9) REQUESTS ARE TREATED AS A PAIR AND PROCESSING TAKES PLACE .480 SECONDS
 R0229 AFTER EITHER ONE APPEARS. THIS INITIALIZATION TAKES ON ONE OF THE FOLLOWING THREE FORMS'

R0231 1) ISS TURN-ON' IN THIS SITUATION THE COMPUTER IS OPERATING WHEN THE ISS IS TURNED ON. NOMINALLY,
 R0233 BOTH ISS TURN-ON AND ISS OPERATE APPEAR. THE PLATFORM IS CAGED FOR 90 SECONDS AND THE ICDU'S ZEROED
 R0235 SO THAT AT THE END OF THE PROCESS THE GIMBAL LOCK MONITOR WILL FUNCTION PROPERLY.

R0237 2) ICDU INITIALIZATION' IN THIS CASE THE COMPUTER WAS PROBABLY TURNED ON WITH THE ISS IN OPERATE OR
 R0239 A FRESH START WAS DONE WITH THE ISS IN OPERATE. IN THIS CASE ONLY ISS OPERATE IS ON. THE ICDU'S ARE
 R0241 ZEROED SO THE GIMBAL LOCK MONITOR WILL FUNCTION. AN EXCEPTION IS IF THE ISS IS IN GIMBAL LOCK AFTER
 A RESTART. THE ICDU'S WILL NOT BE ZEROED.

R0244 3) RESTART WITH RESTARTABLE PROGRAM USING THE IMU' IN THIS CASE, NO INITIALIZATION TAKES PLACE SINCE
 R0246 IT IS ASSUMED THAT THE USING PROGRAM DID THE INITIALIZATION AND THEREFORE T4RUPT SHOULD NOT INTERFERE.

R0248 IMODES30 BIT 7 IS SET = 1 BY THE FIRST BIT (CHANNEL 30 BIT 14 OR 9) WHICH ARRIVES. FOLLOWING THIS, TNONTEST IS
 R0250 ENTERED, FINDS BIT 7 = 1 BUT BIT 8 = 0, SO IT SETS BIT 8 = 1 AND EXITS. THE NEXT TIME IT FINDS BIT 8 = 1 AND
 R0252 PROCEEDS, SETTING BITS 8 AND 7 = 0. AT PROCTON, IF ISS TURN-ON REQUEST IS PRESENT, THE ISS IS CAGED (ZERO +
 R0254 COARSE). IF ISS OPERATE IS NOT PRESENT PROGRAM ALARM 00213 IS ISSUED. AT THE END OF A 90 SECOND CAGE, BIT 2
 R0256 OF IMODES30 IS TESTED. IF IT IS = 1, ISS TURN-ON WAS NOT PRESENT FOR THE ENTIRE 90 SECONDS. IN THAT CASE, IF
 R0260 WAS WAITING FOR THE INITIALIZATION IN WHICH CASE THE PROGRAM IS GIVEN AN IMSTALL ERROR RETURN. IF THE DELAY
 R0262 WENT PROPERLY, THE ISS DELAY OUTBIT IS SENT AND THE ICDU'S ZEROED. A TASK IS INITIATED TO REMOVE THE PIPA FAIL
 R0264 INHIBIT BIT IN 10.24 SECONDS. IF A MISSION PROGRAM WAS WAITING IT IS INFORMED VIA ENDIMU.

R0266 AT PROCTON, IF ONLY ISS OPERATE IS PRESENT (OPONLY), THE CDU'S ARE ZEROED UNLESS THE PLATFORM IS IN COARSE
 R0268 ALIGN (= GIMBAL LOCK HERE) OR A MISSION PROGRAM IS USING THE IMU (IMUSEPLG = 1).

R0270 CALLING SEQUENCE' T4RUPT EVERY 480 MILLISECONDS AFTER IMMON.

R0271 JOBS OR TASKS INITIATED' 1) ENDINON, 90 SECONDS AFTER CAGING STARTED. 2) ISSUP, 4 SECONDS AFTER CAGING DONE.
 R0273 3) PFAILOK, 10.24 SECONDS AFTER INITIALIZATION COMPLETED. 4) UNZ2, 320 MILLISECONDS AFTER ZEROING
 R0275 STARTED.

R0276 SUBROUTINES CALLED' CAGESUB, CAGESUB2, ZEROICDU, ENDIMU, IMRAD, NOATTOFF, SETISSW, VARDELAY.

R0278 BRASABLE INITIALIZATION' SEE IMMON.

R0279 ALARMS' PROGRAM ALARM 00213 IF ISS TURN-ON REQUESTED WITHOUT ISS OPERATE.

R0281 EXIT' ENDINON EXITS TO C33TEST. TASKS HAVING TO DO WITH INITIALIZATION EXIT AS FOLLOWS' MISSION PROGRAM
 R0283 WAITING AND INITIALIZATION COMPLETE, EXIT TO ENDIMU, MISSION PROGRAM WAITING AND INITIALIZATION FAILED, EXIT TO
 R0285 IMRAD, IMU NOT IN USE, EXIT TO TASKOVER.

R0286 OUTPUT' ISS INITIALIZED.

0287 REF 5 LAST 138 06,2231 4 1320 0 TNONTEST C8 IMODES30 AFTER PROCESSING ALL CHANGES, SEE IF IT

L. INTERRUPT PROGRAM

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| | | | | | | | | | | |
|------|-----|----|------|-----|---------|--------|---|----------|----------|--|
| 0288 | REP | 13 | LAST | 64 | 06,2232 | 7 4704 | 1 | MASK | BIT7 | IS TIME TO ACT ON A TURN-ON SEQUENCE. |
| 0289 | REP | 4 | LAST | 138 | 06,2233 | 10 000 | 0 | CCS | A | |
| 0290 | REP | 1 | | | 06,2234 | 1 2367 | 0 | TCP | C33TEST | NO - EXAMINE CHANNEL 33. |
| 0291 | REP | 12 | LAST | 62 | 06,2235 | 3 4703 | 1 | CAP | BIT8 | SEE IF FIRST SAMPLE OR SECOND. |
| 0292 | REP | 6 | LAST | 137 | 06,2236 | 7 1320 | 0 | MASK | IMODES30 | |
| 0293 | REP | 5 | LAST | 138 | 06,2237 | 10 000 | 0 | CCS | A | |
| 0294 | REP | 1 | | | 06,2240 | 1 2244 | 0 | TCP | PROCTNON | REACT AFTER SECOND SAMPLE. |
| 0295 | REP | 13 | LAST | 138 | 06,2241 | 3 4703 | 1 | CAP | BIT8 | IF FIRST SAMPLE, SET BIT TO REACT NEXT |
| 0296 | REP | 7 | LAST | 138 | 06,2242 | 27-320 | 0 | ADS | IMODES30 | TIME. |
| 0297 | REP | 2 | LAST | 138 | 06,2243 | 1 2367 | 0 | TCP | C33TEST | |
| 0298 | | | | | | | | | | PROCESS IMU TURN-ON REQUESTS AFTER WAITING 1 SAMPLE FOR ALL SIGNALS TO ARRIVE. |
| 0300 | REP | 1 | | | 06,2244 | 4 2757 | 1 | PROCTNON | CS | BIT8dB |
| 0301 | REP | 8 | LAST | 138 | 06,2245 | 7 1320 | 0 | MASK | IMODES30 | |
| 0302 | REP | 9 | LAST | 138 | 06,2246 | 55-320 | 0 | TS | IMODES30 | |
| 0303 | REP | 16 | LAST | 138 | 06,2247 | 7 4675 | 0 | MASK | BIT14 | SEE IF TURN-ON REQUEST. |
| 0304 | REP | 6 | LAST | 138 | 06,2250 | 10 000 | 0 | CCS | A | |
| 0305 | REP | 1 | | | 06,2251 | 1 2342 | 1 | TCP | OPONLY | OPERATE ON ONLY. |
| 0306 | REP | 10 | LAST | 138 | 06,2252 | 4 1320 | 0 | CS | IMODES30 | IF TURN-ON REQUEST, WE SHOULD HAVE IMU |
| 0307 | REP | 13 | LAST | 133 | 06,2253 | 7 4702 | 1 | MASK | BIT9 | OPERATE. |
| 0308 | REP | 7 | LAST | 138 | 06,2254 | 10 000 | 0 | CCS | A | |
| 0309 | | | | | 06,2255 | 1 2280 | 0 | TCP | +3 | |
| 0310 | REP | 1 | | | 06,2256 | 0 5537 | 0 | TC | ALARM | ALARM IF NOT. |
| 0311 | | | | | 06,2257 | 00213 | 1 | OCT | 213 | |
| 0312 | REP | 1 | | | 06,2260 | 0 2717 | 1 | +3 | TC | CAGESUR |
| 0313 | REP | 1 | | | 06,2261 | 3 2764 | 0 | CAP | 90SECS | |
| 0314 | REP | 1 | | | 06,2262 | 0 5140 | 1 | TC | WAITLIST | |
| 0315 | REP | 1 | | | E3,1474 | | | BRANK= | CDUIND | |
| 0316 | REP | 1 | | | 06,2263 | 02270 | 0 | 2CADR | ENDINON | |
| 0316 | REP | 1 | | | 06,2264 | 14063 | 1 | | | |
| 0317 | REP | 3 | LAST | 138 | 06,2265 | 1 2367 | 0 | TCP | C33TEST | |
| 0318 | REP | 2 | LAST | 138 | 06,2266 | 3 2764 | 0 | RETNON | CAP | 90SECS |
| 0319 | REP | 1 | | | 06,2267 | 0 5161 | 1 | TC | VARDRLAY | |
| 0320 | REP | 8 | LAST | 63 | 06,2270 | 4 4711 | 0 | ENDINON | CS | RIT2 |
| 0321 | REP | 11 | LAST | 138 | 06,2271 | 7 1320 | 0 | MASK | IMODES30 | RESET TURN-ON REQUEST FAIL. BIT. |
| 0322 | REP | 12 | LAST | 138 | 06,2272 | 57-320 | 1 | XCH | IMODES30 | |
| 0323 | REP | 9 | LAST | 138 | 06,2273 | 7 4711 | 0 | MASK | RIT2 | IF IT WAS OFF, SEND ISS DELAY COMPLETE. |
| 0324 | | | | | 06,2274 | 0 0006 | 1 | EXTEND | | |
| 0325 | REP | 1 | | | 06,2275 | 1 2310 | 0 | RZF | ENDINON2 | |



L TRUPT PROGRAM

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| | | | | | | | | |
|------|-----|----|------|-----|---------|----------|----------|-------------|
| 0326 | REP | 17 | LAST | 138 | 06,2276 | 3 4675 1 | CAP | BIT14 |
| 0327 | REP | 13 | LAST | 138 | 06,2277 | 7 1320 0 | MASK | IMODES30 |
| 0328 | | | | | 06,2300 | 0 0006 1 | EXTEND | |
| 0329 | REP | 1 | | | 06,2301 | 1 2266 0 | BZF | RETNON |
| 0330 | REP | 14 | LAST | 64 | 06,2302 | 4 0074 0 | CS | STATE |
| 0331 | REP | 1 | | | 06,2303 | 7 4703 0 | MASK | IMUSEPLO |
| 0332 | REP | 8 | LAST | 138 | 06,2304 | 10 000 0 | CCS | A |
| 0333 | REP | 1 | | | 06,2305 | 1 5213 0 | TCF | TASKOVER |
| 0334 | REP | 1 | | | 06,2306 | 0 4574 0 | TC | POSTJUMP |
| 0335 | REP | 1 | | | 06,2307 | 17441 0 | CADR | IMLEAD |
| 0336 | REP | 10 | LAST | 61 | 06,2310 | 3 4674 0 | ENDINON2 | CAP BIT15 |
| 0337 | | | | | 06,2311 | 0 0006 1 | EXTEND | |
| 0338 | REP | 1 | | | 06,2312 | 05 012 1 | WOR | CHAN12 |
| 0339 | REP | 2 | LAST | 133 | 06,2313 | 0 4633 0 | TC | IBNKCALL |
| 0340 | REP | 1 | | | 06,2314 | 17070 0 | CADR | NOATTOPF |
| 0341 | REP | 1 | | | 06,2315 | 0 5410 1 | UNZ2 | TC ZEROICDU |
| 0342 | REP | 1 | | | 06,2316 | 4 4722 0 | CS | BITS4d5 |
| 0343 | | | | | 06,2317 | 0 0006 1 | EXTEND | |
| 0344 | REP | 2 | LAST | 139 | 06,2320 | 03 012 1 | WAND | CHAN12 |
| 0345 | REP | 11 | LAST | 61 | 06,2321 | 3 4700 1 | CAP | BIT11 |
| 0346 | REP | 2 | LAST | 138 | 06,2322 | 0 5161 1 | TC | VARDELAY |
| 0347 | REP | 1 | | | 06,2323 | 4 2754 1 | ISSUP | CS OCT54 |
| 0348 | REP | 14 | LAST | 139 | 06,2324 | 7 1320 0 | MASK | IMODES30 |
| 0349 | REP | 15 | LAST | 139 | 06,2325 | 55-320 0 | TS | IMODES30 |
| 0350 | REP | 11 | LAST | 62 | 06,2326 | 4 4705 0 | CS | BIT6 |
| 0351 | REP | 4 | LAST | 132 | 06,2327 | 7 1321 1 | MASK | IMODES33 |
| 0352 | REP | 5 | LAST | 139 | 06,2330 | 55-321 1 | TS | IMODES33 |
| 0353 | REP | 1 | | | 06,2331 | 0 2665 0 | TC | SETISSW |
| 0354 | REP | 11 | LAST | 139 | 06,2332 | 4 4674 1 | CS | BIT15 |
| 0355 | | | | | 06,2333 | 0 0006 1 | EXTEND | |
| 0356 | REP | 3 | LAST | 139 | 06,2334 | 03 012 1 | WAND | CHAN12 |
| 0357 | REP | 1 | | | 06,2335 | 3 4740 0 | CAP | 4SECS |
| 0358 | REP | 2 | LAST | 138 | 06,2336 | 0 5140 1 | TC | WAITLIST |
| 0359 | REP | 2 | LAST | 138 | E3,1474 | | BRANK= | CDUIND |
| 0360 | REP | 1 | | | 06,2337 | 03056 1 | 2CADR | PPAIIQK |
| 0360 | REP | 1 | | | 06,2340 | 16063 0 | | |
| 0364 | REP | 2 | LAST | 139 | 06,2341 | 1 5213 0 | TCF | TASKOVER |
| 0367 | REP | 11 | LAST | 62 | 06,2342 | 3 4707 0 | OPONLY | CAP BIT4 |

IF IT WAS ON AND TURN-ON REQUEST NOW PRESENT, RE-ENTER 90 SEC DELAY IN WL.

IF IT IS NOT ON NOW, SEE IF A PROG WAS WAITING.

UNSUCCESSFUL TURN-ON.

SEND ISS DELAY COMPLETE.

TURN OFF ISS DELAY COUNTER
TURN OFF NO ATT LAMP.

REMOVE ZERO AND COARSE.

WAIT 10 SECS FOR CTRS TO FIND GIMBALS

REMOVE CAGING, IMU FAIL INHIBIT, AND
ICDUPAIL INHIBIT FLAGS.

ENABLE DAP

ISS WARNING MIGHT HAVE BEEN INHIBITED.

REMOVE IMU DELAY COMPLETE DISCRET.

DONT ENABLE PROG ALARM ON PIP FAIL FOR
ANOTHER 4 SECS.

L T4RUPT PROGRAM

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```

0368          06,2343 0 0006 1
0369 REP 4 LAST 139 06,2344 02 012 0
0370 REP 9 LAST 139 06,2345 10 000 0
0371 REP 4 LAST 138 06,2346 1 2367 0

0372 REP 2 LAST 139 06,2347 3 4703 1
0373 REP 15 LAST 139 06,2350 7 0074 0
0374 REP 10 LAST 140 06,2351 10 000 0
0375 REP 5 LAST 140 06,2352 1 2367 0

0376 REP 1          06,2353 0 2730 1

0377 REP 3 LAST 139 06,2354 0 4633 0
0378 REP 2 LAST 139 06,2355 17070 0

0379 REP 10 LAST 62 06,2356 3 4706 1
0380          06,2357 0 0006 1
0381 REP 5 LAST 140 06,2360 05 012 1

03811 REP 2 LAST 139 06,2361 0 5410 1
0382 REP 12 LAST 139 06,2362 3 4705 1
0383 REP 3 LAST 139 06,2363 0 5140 1
0384 REP 1          1331
0385 REP 1          06,2364 02315 1
0385 REP 1          06,2365 14062 0

0386 REP 6 LAST 140 06,2366 1 2367 0
    
```

```

EXTEND
RAND CHAN12
CCS A
TCP C33TEST

CAP IMUSEFLG
MASK STATE
CCS A
TCP C33TEST

TC CAGEBUR2

ISSZERO TC IRKCALL
CADR NOATTOPF

CAP BITS
EXTEND
WOR CHAN12

TC ZEROICDU
CAP BITS
TC WAITLIST
ERANK= OPTMODES
2CADR UNZ2

TCP C33TEST
    
```

IF OPERATE ON ONLY AND WE ARE IN COARSE ALIGN, DONT ZERO THE CDUS BECAUSE WE MIGHT BE IN GIMBAL LOCK. USE V41N20 TO RECOVER.

OTHERWISE, ZERO THE COUNTERS UNLESS SOMEONE IS USING THE IMU.

SET TURNON FLAGS.

TURN OFF NO ATT LAMP IMU CAGE OFF ENTRY

ISS CDU ZERO

WAIT 300 MS FOR AGS TO RECEIVE SIGNAL.



R0387 PROGRAM NAME: C33TEST

R0388 FUNCTIONAL DESCRIPTION: THIS PROGRAM MONITORS THREE FLIP-FLOP INBITS OF CHANNEL 33 AND CALLS THE APPROPRIATE
 R0390 SUBROUTINE TO PROCESS A CHANGE. IT IS ANALOGOUS TO IMMON, WHICH MONITORS CHANNEL 30, EXCEPT THAT IT READS
 R0392 CHANNEL 33 WITH A WAND INSTRUCTION BECAUSE A "WRITE" PULSE IS REQUIRED TO RESET THE FLIP-FLOPS. THE BITS
 R0394 PROCESSED AND THE SUBROUTINES CALLED ARE:

| R0395 | BIT | FUNCTION | SUBROUTINE |
|-------|-----|-------------------|------------|
| R0396 | --- | ----- | ----- |
| R0397 | 13 | PIPA FAIL | PIPFAIL |
| R0398 | 12 | DOWNLINK TOO FAST | DNTMPAST |
| R0399 | 11 | UPLINK TOO FAST | UPTMPAST |

R0400 UPON ENTRY TO THE SUBROUTINE, THE NEW BIT STATE IS IN A.

R0401 CALLING SEQUENCE: EVERY 480 MILLISECONDS AFTER TONTEST.

R0402 JOBS OR TASKS INITIATED: NONE.

R0403 SUBROUTINES CALLED: PIPFAIL, DNTMPAST AND UPTMPAST ON BIT CHANGES.

R0404 ERASABLE INITIALIZATION: C(IMODES33) = OCT 16000 ON A FRESH START OR RESTART, THEREFORE, THESE ALARMS WILL
 R0406 REAPPEAR IF THE CONDITIONS PERSIST.

R0407 ALARMS: NONE.

R0408 EXIT: GLOCKMON.

R0409 OUTPUT: UPDATED BITS 13, 12 AND 11 OF IMODES33 WITH CHANGES PROCESSED.

| | | | | | | | | | | |
|------|-----|---|------|-----|---------|----------|---------|--------|----------|-----------------------------------|
| 0410 | REP | 8 | LAST | 139 | 06,2367 | 3 1321 0 | C33TEST | CA | IMODES33 | SEE IF RELEVANT CHAN 33 BITS HAVE |
| 0411 | REP | 1 | | | 06,2370 | 7 4763 0 | | MASK | 33RDMSK | CHANGED. |
| 0412 | REP | 2 | LAST | 39 | 06,2371 | 54 001 1 | | TS | L | |
| 0413 | REP | 2 | LAST | 141 | 06,2372 | 3 4763 1 | | CAP | 33RDMSK | |
| 0414 | | | | | 06,2373 | 0 0008 1 | | EXTEND | | |
| 0415 | REP | 1 | | | 06,2374 | 03 033 1 | | WAND | CHAN33 | RESETS FLIP-FLOP INPUTS. |
| 0416 | | | | | 06,2375 | 0 0008 1 | | EXTEND | | |
| 0417 | REP | 3 | LAST | 135 | 06,2376 | 06 001 0 | | R/OR | LCHAN | |
| 0418 | | | | | 06,2377 | 0 0008 1 | | EXTEND | | |
| 0419 | REP | 1 | | | 06,2400 | 1 2427 0 | | BZF | GLOCKMON | ON NO CHANGE. |
| 0420 | REP | 8 | LAST | 138 | 06,2401 | 54 070 1 | | TS | RUPTR01 | SAVE BITS WHICH HAVE CHANGED. |
| 0421 | REP | 7 | LAST | 141 | 06,2402 | 23=321 0 | | LXCH | IMODES33 | |
| 0422 | | | | | 06,2403 | 0 0008 1 | | EXTEND | | |
| 0423 | REP | 4 | LAST | 141 | 06,2404 | 06 001 0 | | R/OR | LCHAN | |
| 0424 | REP | 8 | LAST | 141 | 06,2405 | 55=321 1 | | TS | IMODES33 | UPDATED IMODES33. |
| 0425 | REP | 3 | LAST | 131 | 06,2406 | 3 4714 1 | | CAP | ZERO | |
| 0426 | REP | 9 | LAST | 141 | 06,2407 | 56 070 0 | | XCH | RUPTR01 | |
| 0427 | | | | | 06,2410 | 6 0000 1 | | DOUBLE | | |

L T4RUPT PROGRAM

| | | | | | | | | | |
|------|-----|----|------|---------|----------|----------|---------|--------|---------------|
| 0428 | REP | 1 | | 06,2411 | 1 2414 0 | | | TCP | NXTIBT +1 |
| 0429 | REP | 4 | LAST | 136 | 06,2412 | 6 4712 1 | -1 | AD | ONE |
| 0430 | REP | 10 | LAST | 141 | 06,2413 | 24 070 0 | | NXTIBT | INCR RUPTR001 |
| 0431 | | | | | 06,2414 | 6 0000 1 | +1 | DOUBLE | |
| 0432 | REP | 11 | LAST | 140 | 06,2415 | 54 000 0 | | TS | A |
| 0433 | REP | 2 | LAST | 142 | 06,2416 | 1 2413 1 | | TCP | NXTIBT |
| 0434 | REP | 3 | LAST | 136 | 06,2417 | 56 071 1 | | XCH | RUPTR002 |
| 0435 | REP | 11 | LAST | 142 | 06,2420 | 50 070 0 | | INDEX | RUPTR001 |
| 0436 | REP | 11 | LAST | 61 | 06,2421 | 3 4676 1 | | CAP | BIT13 |
| 0437 | REP | 9 | LAST | 141 | 06,2422 | 7 1321 1 | | MASK | INDEX333 |
| 0438 | REP | 12 | LAST | 142 | 06,2423 | 50 070 0 | | INDEX | RUPTR001 |
| 0439 | REP | 1 | | | 06,2424 | 0 2745 0 | | TC | C33JMP |
| 0440 | REP | 4 | LAST | 142 | 06,2425 | 10 071 0 | | CCS | RUPTR002 |
| 0441 | REP | 3 | LAST | 142 | 06,2426 | 1 2412 0 | NXTPL33 | TCP | NXTIBT -1 |

SCAN FOR BIT CHANGES.

(CODING IDENTICAL TO CHAN 30).

GET NEW VALUE OF BIT WHICH CHANGED.

PROCESS POSSIBLE ADDITIONAL CHANGES.



L TRUPT PROGRAM

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R0442 PROGRAM NAME' GLOCKON

R0443 FUNCTIONAL DESCRIPTION' THIS PROGRAM MONITORS THE CDUZ COUNTER TO DETERMINE WHETHER THE ISS IS IN GIMBAL LOCK
R0445 AND TAKES ACTION IF IT IS. THREE REGIONS OF MIDDLE GIMBAL ANGLE (MGA) ARE USED'

R0447 1) ABS(MGA) LESS THAN OR EQUAL TO 70 DEGREES - NORMAL MODE.
R0448 2) ABS(MGA) GREATER THAN 70 DEGREES AND LESS THAN OR EQUAL TO 85 DEGREES - GIMBAL LOCK LAMP TURNED ON.
R0450 3) ABS(MGA) GREATER THAN 85 DEGREES - ISS PUT IN COARSE ALIGN AND NO ATT LAMP TURNED ON.

R0452 CALLING SEQUENCE' EVERY 480 MILLISECONDS AFTER C33TEST.

R0453 JOBS OR TASKS INITIATED' NONE.

R0454 SUBROUTINES CALLED' 1) SETCOARS WHEN ABS(MGA) GREATER THAN 85 DEGREES AND ISS NOT IN COARSE ALIGN.
R0456 2) LAMPTEST BEFORE TURNING OFF GIMBAL LOCK LAMP.

R0457 ERASABLE INITIALIZATION'

R0458 1) FRESH START OR RESTART WITH NO GROUPS ACTIVE' C(CDUZ) = 0, IMODES30 BIT 6 = 0, IMODES33 BIT 1 = 0.
R0460 2) RESTART WITH GROUPS ACTIVE' SAME AS FRESH START EXCEPT C(CDUZ) NOT CHANGED SO GIMBAL MONITOR
R0462 PROCEEDS AS BEFORE.

R0463 ALARMS' 1) MGA REGION (2) CAUSES GIMBAL LOCK LAMP TO BE LIT.
R0464 2) MGA REGION (3) CAUSES THE ISS TO BE PUT IN COARSE ALIGN AND THE NO ATT LAMP TO BE LIT IF EITHER NOT
R0466 SO ALREADY.

| | | | | | | | | | |
|------|-----|----|----------|---------|----------|----------|--------|-------------|---|
| 0467 | REP | 1 | | 06,2427 | 10 034 1 | GLOCKON | CCS | CDUZ | |
| 0468 | REP | 1 | | 06,2430 | 1 2434 1 | | TCF | GLOCKCHK | SEE IF MAGNITUDE OF MGA IS GREATER THAN |
| 0469 | REP | 1 | | 06,2431 | 1 2460 0 | | TCF | SETGLOCK | 70 DEGREES. |
| 0470 | REP | 2 | LAST 143 | 06,2432 | 1 2434 1 | | TCF | GLOCKCHK | |
| 0471 | REP | 2 | LAST 143 | 06,2433 | 1 2460 0 | | TCF | SETGLOCK | |
| 0472 | REP | 1 | | 06,2434 | 6 2505 0 | GLOCKCHK | AD | -70DEGS | |
| 0473 | | | | 06,2435 | 0 0006 1 | | EXTEND | | |
| 0474 | REP | 3 | LAST 143 | 06,2436 | 6 2457 0 | | BZMP | SETGLOCK -1 | NO LOCK. |
| 0475 | REP | 1 | | 06,2437 | 6 2506 0 | | AD | -15DEGS | SEE IF ABS(MGA) GREATER THAN 85 DEGS. |
| 0476 | | | | 06,2440 | 0 0006 1 | | EXTEND | | |
| 0477 | REP | 1 | | 06,2441 | 6 2455 1 | | BZMP | NOGIMRLN | |
| 0478 | REP | 12 | LAST 139 | 06,2442 | 3 4707 0 | | CAP | RIT4 | IF SO, SYSTEM SHOULD BE IN COARSE ALIGN |
| 0479 | | | | 06,2443 | 0 0006 1 | | EXTEND | | TO PREVENT GIMBAL RUN-AWAY. |
| 0480 | REP | 6 | LAST 140 | 06,2444 | 02 012 0 | | RAND | CHAN12 | |
| 0481 | REP | 12 | LAST 142 | 06,2445 | 10 000 0 | | CCS | A | |
| 0482 | REP | 2 | LAST 143 | 06,2446 | 1 2455 0 | | TCF | NOGIMRLN | |
| 0483 | REP | 4 | LAST 140 | 06,2447 | 0 4633 0 | | TC | IRNKCALL | GO INTO COARSE ALIGN. |
| 0484 | REP | 1 | | 06,2450 | 16746 0 | | CADR | SETCOARS | |
| 0485 | REP | 1 | | 06,2451 | 3 6211 0 | | CAP | SIX | ENABLE ISS ERROR COUNTERS IN 60 MS |
| 0486 | REP | 4 | LAST 140 | 06,2452 | 0 5140 1 | | TC | WAITLIST | |

L TRUPT PROGRAM

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| | | | | | | | | | | | | |
|------|-----|----|------|-----|---------|--------|---|----------|---------|-------------|--|--|
| 0487 | REP | 3 | LAST | 139 | 03,1474 | | | BRANK= | CUIND | | | |
| 0488 | REP | 1 | | | 06,2453 | 02742 | 1 | 2CADR | CA.ECB | | | |
| 0480 | REP | 1 | | | 06,2454 | 16063 | 0 | | | | | |
| 0480 | REP | 13 | LAST | 140 | 06,2455 | 3 4705 | 1 | NOGIMRLN | CAP | BITS | | TURN ON GIMBAL LOCK LAMP. |
| 0490 | REP | 4 | LAST | 143 | 06,2456 | 1 2460 | 0 | TCP | SETLOCK | | | |
| 0401 | REP | 4 | LAST | 141 | 06,2457 | 3 4714 | 1 | -1 | CAP | ZERO | | |
| 0492 | REP | 6 | LAST | 131 | 06,2460 | 6 1036 | 0 | SETLOCK | AD | DSPTAB +11D | | SEE IF PRESENT STATE OF GIMBAL LOCK LAMP |
| 0493 | REP | 14 | LAST | 144 | 06,2461 | 7 4705 | 0 | | MASK | BITS | | AGREES WITH DESIRED STATE BY HALF ADDING |
| 0494 | REP | | | | 06,2462 | 0 0008 | 1 | | EXTEND | | | THE TWO. |
| 0495 | REP | 1 | | | 06,2463 | 1 5222 | 1 | | BZP | GLOCKOK | | OK AS IS. |
| 0496 | REP | 7 | LAST | 144 | 06,2464 | 7 1036 | 1 | | MASK | DSPTAB +11D | | IF OFF, DONT TURN ON IF IMU BEING CAGED. |
| 0497 | REP | 13 | LAST | 143 | 06,2465 | 10 000 | 0 | | CCS | A | | |
| 0498 | REP | 1 | | | 06,2466 | 1 2502 | 0 | | TCP | GLAMPTST | | TURN OFF UNLESS LAMP TEST IN PROGRESS. |
| 0409 | REP | 15 | LAST | 144 | 06,2467 | 3 4705 | 1 | | CAP | BITS | | |
| 0500 | REP | 16 | LAST | 139 | 06,2470 | 7 1320 | 0 | | MASK | IMODES30 | | |
| 0501 | REP | 14 | LAST | 144 | 06,2471 | 10 000 | 0 | | CCS | A | | |
| 0502 | REP | 2 | LAST | 144 | 06,2472 | 1 5222 | 1 | | TCP | GLOCKOK | | |
| 0503 | REP | 8 | LAST | 144 | 06,2473 | 4 1036 | 1 | GLINVERT | CS | DSPTAB +11D | | INVERT GIMBAL LOCK LAMP. |
| 0504 | REP | 16 | LAST | 144 | 06,2414 | 7 4705 | 0 | | MASK | BITS | | |
| 0505 | REP | 12 | LAST | 139 | 06,2475 | 6 4674 | 0 | | AD | BIT15 | | TO INDICATE CHANGE IN DSPTAB +11D. |
| 0506 | REP | 9 | LAST | 144 | 06,2476 | 57*038 | 0 | | XCH | DSPTAB +11D | | |
| 0507 | REP | 1 | | | 06,2477 | 7 2164 | 1 | | MASK | OCT37137 | | |
| 0508 | REP | 10 | LAST | 144 | 06,2500 | 27*036 | 1 | | ADS | DSPTAB +11D | | |
| 0509 | REP | 3 | LAST | 144 | 06,2501 | 1 5222 | 1 | | TCP | GLOCKOK | | |
| 0510 | REP | 1 | | | 06,2502 | 0 2750 | 1 | GLAMPTST | TC | LAMPTST | | TURN OFF UNLESS LAMP TEST IN PROGRESS. |
| 0511 | REP | 4 | LAST | 144 | 06,2503 | 1 5221 | 1 | | TCP | GLOCKOK | | |
| 0812 | REP | 1 | | | 06,2504 | 1 2473 | 1 | | TCP | GLINVERT | | |
| 0513 | | | | | 06,2505 | 03434 | 1 | -70DEGS | DEC | - .38888 | | -70 DEGREES SCALED IN HALF-REVOLUTIONS. |
| 0514 | | | | | 06,2506 | 75252 | 0 | -18DEGS | DEC | - .08333 | | |



L TRUPT PROGRAM

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R0545 PROGRAM NAME' ITURNON.

R0546 FUNCTIONAL DESCRIPTION' THIS PROGRAM IS CALLED BY IMJMN WHEN A CHANGE OF BIT 14 OF CHANNEL 30 (ISS TURN-ON
R0548 REQUEST) IS DETECTED. UPON ENTRY, ITURNON CHECKS IF A TURN-ON DELAY SEQUENCE HAS FAILED, AND IF SO, IT EXITS.
R0550 IF NOT, IT CHECKS WHETHER THE TURN-ON REQUEST CHANGE IS TO ON OR OFF. IF ON, IT SETS BIT 7 OF IMODES30 TO 1 SO
R0552 THAT ITURNON WILL INITIATE THE ISS INITIALIZATION SEQUENCE. IF OFF, THE TURN-ON DELAY SIGNAL, CHANNEL 12 BIT
R0554 15, IS CHECKED AND IF IT IS ON, ITURNON EXITS. IF THE DELAY SIGNAL IS OFF, PROGRAM ALARM 00207 IS ISSUED, BIT 2
R0556 OF IMODES30 IS SET TO 1 AND THE PROGRAM EXITS.
R0557 THE SETTING OF BIT 2 OF IMODES30 (ISS DELAY SEQUENCE FAIL) INHIBITS THIS ROUTINE AND IMJOP FROM
R0559 PROCESSING ANY CHANGES. THIS BIT WILL BE RESET BY THE ENDJMN ROUTINE WHEN THE CURRENT 90 SECOND DELAY PERIOD
R0561 ENDS.

R0562 CALLING SEQUENCE' FROM IMJMN WHEN ISS TURN-ON REQUEST CHANGES STATE.

R0563 JOBS OR TASKS INITIATED' NONE.

R0564 SUBROUTINES CALLED' ALARM, IF THE ISS TURN-ON REQUEST IS NOT PRESENT FOR 90 SECONDS.

R0566 ERASABLE INITIALIZATION' FRESH START AND RESTART SET BIT 15 OF CHANNEL 12 AND BITS 2 AND 7 OF IMODES30 TO 0,
R0568 AND BIT 14 OF IMODES30 TO 1.

R0569 ALARMS' PROGRAM ALARM 00207 IS ISSUED IF THE ISS TURN-ON REQUEST SIGNAL IS NOT PRESENT FOR 90 SECONDS.

R0571 EXIT' NKTIFAIL.

R0572 OUTPUT' BIT 7 OF IMODES30 TO START ISS INITIALIZATION, OR BIT 2 OF IMODES30 AND PROGRAM ALARM 00207 TO INDICATE
R0574 A FAILED TURN-ON SEQUENCE.

| | | | | | | | | | | |
|------|-----|----|------|-----|---------|----------|---------|--------|----------|---|
| 0575 | REP | 10 | LAST | 138 | 06,2526 | 3 4711 1 | ITURNON | CAP | BIT2 | IF DELAY REQUEST HAS GONE OFF |
| 0576 | REP | 18 | LAST | 145 | 06,2527 | 7 1320 0 | | MASK | IMODES30 | PREMATURELY, DO NOT PROCESS ANY CHANGES |
| 0577 | REP | 15 | LAST | 144 | 06,2530 | 10 000 0 | | CCS | A | UNTIL THE CURRENT 90 SEC WAIT EXPIRES. |
| 0578 | REP | 4 | LAST | 145 | 06,2531 | 1 2227 0 | | TCP | NKTIFAIL | |
| 0579 | REP | 18 | LAST | 139 | 06,2532 | 3 4675 1 | | CAP | BIT14 | SEE IF JUST ON OR OFF. |
| 0580 | REP | 19 | LAST | 146 | 06,2533 | 7 1320 0 | | MASK | IMODES30 | |
| 0581 | | | | | 06,2534 | 0 0006 1 | | EXTEND | | |
| 0582 | REP | 1 | | | 06,2535 | 1 2551 0 | | BZF | ITURNON2 | IF JUST ON. |
| 0583 | REP | 13 | LAST | 144 | 06,2536 | 3 4674 0 | | CAP | BIT15 | |
| 0584 | | | | | 06,2537 | 0 0006 1 | | EXTEND | | |
| 0585 | REP | 7 | LAST | 143 | 06,2540 | 02 012 0 | | RAND | CHAN12 | SEE IF DELAY PRESENT DISCRETE HAS BEEN |
| 0586 | | | | | 06,2541 | 0 0006 1 | | EXTEND | | SENT. IF SO, ACTION COMPLETE. |
| 0587 | | | | | 06,2542 | 1 2544 1 | | BZF | +2 | |
| 0588 | REP | 5 | LAST | 146 | 06,2543 | 1 2227 0 | | TCP | NKTIFAIL | |
| 0589 | REP | 11 | LAST | 146 | 06,2544 | 3 4711 1 | | CAP | BIT2 | IF NOT, SET BIT TO INDICATE REQUEST NOT |
| 0590 | REP | 20 | LAST | 146 | 06,2545 | 27-320 0 | | ADS | IMODES30 | PRESENT FOR FULL DURATION. |
| 0591 | REP | 2 | LAST | 138 | 06,2546 | 0 5537 0 | | TC | ALARM | |
| 0592 | | | | | 06,2547 | 00207 1 | | OCT | 207 | |
| 0593 | REP | 6 | LAST | 146 | 06,2550 | 1 2227 0 | | TCP | NKTIFAIL | |



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L T4RUPT PROGRAM

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| | | | | | | | | | | | |
|------|-----|----|------|-----|---------|----|------|---|----------|------|----------|
| 0594 | REP | 21 | LAST | 146 | 06,2551 | 4 | 1320 | 0 | ITURNON2 | CS | IMDES30 |
| 0595 | REP | 14 | LAST | 138 | 06,2552 | 7 | 4704 | 1 | | MASK | BIT7 |
| 0596 | REP | 22 | LAST | 147 | 06,2553 | 27 | 320 | 0 | | ADS | IMDES30 |
| 0597 | REP | 7 | LAST | 146 | 06,2554 | 1 | 2227 | 0 | | TCP | NXTIFAIL |

SET BIT7 TO INDICATE WAIT OF 1 SAMPLE



L T4RUPT PROGRAM

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R0598 PROGRAM NAME' IMUCAGE.

R0599 FUNCTIONAL DESCRIPTION' THIS PROGRAM PROCESSES CHANGES OF THE IMUCAGE INBIT, CHANNEL 30 BIT 11. IF THE BIT CHANGES TO 0 (CAGE BUTTON PRESSED), THE ISS IS CAGED (ICDU ZERO + COARSE ALIGN + NO ATT LAMP) UNTIL THE
 R0600 ASTRONAUT SELECTS ANOTHER PROGRAM TO ALIGN THE ISS. ANY PULSE TRAINS TO THE ICDUs AND GYROs ARE TERMINATED,
 R0601 THE ASSOCIATED COUNTERS ARE ZEROED AND THE GYROs ARE D3-SELECTED. NO ACTION OCCURS WHEN THE BUTTON IS
 R0602 RELEASED (INBIT CHANGES TO 1).

R0608 CALLING SEQUENCE' BY IMUMON WHEN IMU CAGE BIT CHANGES.

R0609 JOBS OR TASKS INITIATED' NONE.

R0610 SUBROUTINES CALLED' CAGESUB.

R0611 ERASABLE INITIALIZATION' FRESH START AND RESTART SET BIT 11 OF IMODES30 TO 1.

R0613 ALARMS' NONE.

R0614 EXIT' NCTIPAIL.

R0615 OUTPUT' ISS CAGED, COUNTERS ZEROED, PULSE TRAINS TERMINATED AND NO ATT LAMP LIT.

| | | | | | | | | | | |
|------|-----|----|------|-----|---------|----------|---------|--------|----------|---|
| 0617 | REP | 16 | LAST | 146 | 06,2555 | 10 000 0 | IMUCAGE | CCS | A | NO ACTION IF GOING OFF. |
| 0618 | REP | 1 | | | 06,2556 | 1 2354 0 | | TCP | ISSZERO | |
| 0619 | REP | 1 | | | 06,2557 | 4 2762 1 | | CS | OCT77000 | TERMINATE ICDU, OPTICS, GYRO PULSE TRAINS |
| 0620 | | | | | 06,2560 | 0 0006 1 | | EXTEND | | |
| 0621 | REP | 1 | | | 06,2561 | 03 014 1 | | WAND | CHAN14 | |
| 0622 | REP | 1 | | | 06,2562 | 4 2756 0 | | CS | OCT272 | KNOCK DOWN TVC ENABLE, IMU ERROR COUNTER |
| 0623 | | | | | 06,2563 | 0 0006 1 | | EXTEND | | ENABLE, ZERO ICDU, COARSE ALIGN |
| 0624 | REP | 8 | LAST | 146 | 06,2564 | 03 012 1 | | WAND | CHAN12 | ENABLE, OPTICS ERR CNTR ENABLE |
| 0625 | REP | 12 | LAST | 142 | 06,2565 | 4 4676 0 | | CS | RIT13 | TURN OFF ENGINE |
| 0626 | | | | | 06,2566 | 0 0006 1 | | EXTEND | | |
| 0627 | REP | 3 | LAST | 145 | 06,2567 | 03 011 1 | | WAND | DSAIMQUT | |
| 0628 | REP | 1 | | | 06,2570 | 0 2725 0 | | TC | CAGESUB1 | |
| 0629 | REP | 5 | LAST | 143 | 06,2571 | 0 4633 0 | | TC | IRN/CALL | KNOCK DOWN TRACK, REFSMMAT, DRIFT FLAGS |
| 0630 | REP | 1 | | | 06,2572 | 16777 1 | | CADR | RNDREFDR | |
| 0631 | REP | 5 | LAST | 144 | 06,2573 | 4 4714 0 | | CS | ZERO | ZERO COMMAND OUT-COUNTERS |
| 0632 | REP | 1 | | | 06,2574 | 54 050 0 | | TS | CDUXCMD | |
| 0633 | REP | 1 | | | 06,2575 | 54 051 1 | | TS | CDUYCMD | |
| 0634 | REP | 1 | | | 06,2576 | 54 052 1 | | TS | CDUZCMD | |
| 0635 | REP | 1 | | | 06,2577 | 54 047 0 | | TS | GYROCMD | |
| 0636 | REP | 1 | | | 06,2600 | 4 2761 1 | | CS | OCT140 | HAVING WAITED AT LEAST 27 MCT FROM |
| 0637 | | | | | 06,2601 | 0 0006 1 | | EXTEND | | GYRO PULSE TRAIN TERMINATION, WE CAN |
| 0638 | REP | 2 | LAST | 148 | 06,2602 | 03 014 1 | | WAND | CHAN14 | D3-SELECT THE GYROS. |



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L T4RUPT PROGRAM

USER'S PAGE NO. 21 E0 53

0639 REP 8 LAST 147 06,2603 1 2227 0

TCP NKTIFAIL



L TRUPT PROGRAM

USER'S PAGE NO. 22 E0 53

P0640 PROGRAM NAME' IMJOP.

R0641 FUNCTIONAL DESCRIPTION' THIS PROGRAM PROCESSES CHANGES IN THE ISS OPERATE DISCRETE, BIT 9 OF CHANNEL 30.
 R0643 IF THE INBIT CHANGES TO 0, INDICATING ISS ON, IMJOP GENERALLY SETS BIT 7 OF IMODES30 TO 1 TO REQUEST ISS
 R0645 INITIALIZATION VIA TMONTEST. AN EXCEPTION IS DURING A FAILED ISS DELAY DURING WHICH BIT 2 OF IMODES30 IS SET
 R0647 TO 1 AND NO FURTHER INITIALIZATION IS REQUIRED. WHEN THE INBIT CHANGES TO 1, INDICATING ISS OFF, IMUSEPLO IS
 R0649 TESTED TO SEE IF ANY PROGRAM WAS USING THE ISS. IF SO, PROGRAM ALARM 00214 IS ISSUED.

R0651 CALLING SEQUENCE' BY IMMUN WHEN BIT 9 OF CHANNEL 30 CHANGES.

R0652 JOBS OR TASKS INITIATED' NONE.

R0653 SUBROUTINES CALLED' ALARM, IF ISS IS TURNED OFF WHILE IN USE.

R0654 ERASABLE INITIALIZATION' ON FRESH START AND RESTART, BIT 9 OF IMODES30 IS SET TO 1 EXCEPT WHEN THE GIMBAL LOCK
 R0656 LAMP IS ON, IN WHICH CASE IT IS SET TO 0. THIS PREVENTS IC0U ZERO BY TMONTEST WITH THE ISS IN GIMBAL LOCK.

R0658 ALARMS' PROGRAM ALARM 00214 IF THE ISS IS TURNED OFF WHILE IN USE.

R0659 EXIT' NKTIPAIL.

R0660 OUTPUT' ISS INITIALIZATION REQUEST (IMODES30 BIT 7) OR PROGRAM ALARM 00214.

| | | | | | | | | | | | | |
|------|-----|----|------|---------|---------|------|------|-------|--------|----------|--|--|
| 0662 | | | | 06,2604 | 0 | 0006 | 1 | IMJOP | EXTEND | | IF OPERATE JUST ON, WAIT 1 SAMPLE. | |
| 0663 | REP | 1 | | 06,2605 | 1 | 2625 | 0 | | BZF | IMJOP2 | | |
| 0664 | REP | 10 | LAST | 142 | 06,2606 | 4 | 1321 | 1 | CS | IMODES33 | DISABLE DAP | |
| 0665 | REP | 17 | LAST | 144 | 06,2607 | 7 | 4705 | 0 | MASK | BIT6 | | |
| 0666 | REP | 11 | LAST | 150 | 06,2610 | 27 | 321 | 1 | ADS | IMODES33 | | |
| 0667 | REP | 6 | LAST | 148 | 06,2611 | 0 | 4633 | 0 | TC | IRKCALL | KNOCK DOWN TRACK, REFSMAT, DRIFT FLAGS | |
| 0668 | REP | 2 | LAST | 148 | 06,2612 | 16 | 777 | 1 | CADR | RNDREFDR | | |
| 0669 | REP | 2 | LAST | 138 | 06,2613 | 4 | 2757 | 1 | CS | BIT5d8 | KNOCK DOWN RENDEVOUS, IMUSE FLAGS | |
| 0670 | REP | 16 | LAST | 140 | 06,2614 | 7 | 0074 | 0 | MASK | STATE | | |
| 0671 | REP | 17 | LAST | 150 | 06,2615 | 56 | 074 | 1 | XCH | STATE | IF GOING OFF, ALARM IF PROG USING IMJ | |
| 0672 | | | | | 06,2616 | 4 | 0000 | 0 | COM | | | |
| 0673 | REP | 3 | LAST | 140 | 06,2617 | 7 | 4703 | 0 | MASK | IMUSEPLO | | |
| 0674 | REP | 17 | LAST | 148 | 06,2620 | 10 | 000 | 0 | CCS | A | | |
| 0675 | REP | 9 | LAST | 149 | 06,2621 | 1 | 2227 | 0 | TCF | NKTIPAIL | | |
| 0676 | REP | 3 | LAST | 148 | 06,2622 | 0 | 5537 | 0 | TC | ALARM | | |
| 0677 | | | | | 06,2623 | 00 | 214 | 0 | OCT | 214 | | |
| 0678 | REP | 10 | LAST | 150 | 06,2624 | 1 | 2227 | 0 | TCF | NKTIPAIL | | |
| 0679 | REP | 12 | LAST | 148 | 06,2625 | 3 | 4711 | 1 | IMJOP2 | CAP | BIT2 | SEE IF FAILED ISS TURN-ON SEQ IN PROG. |
| 0680 | REP | 23 | LAST | 147 | 06,2626 | 7 | 1320 | 0 | MASK | IMODES30 | | |
| 0681 | REP | 18 | LAST | 150 | 06,2627 | 10 | 000 | 0 | CCS | A | | |
| 0682 | REP | 11 | LAST | 150 | 06,2630 | 1 | 2227 | 0 | TCF | NKTIPAIL | IF SO, DONT PROCESS UNTIL PRESENT 90 | |
| 0683 | REP | 2 | LAST | 146 | 06,2631 | 1 | 2551 | 0 | TCF | ITURNON2 | SECONDS EXPIRES. | |

L TRUPT PROGRAM

USER'S PAGE NO. 23 E0 53

P0684 PROGRAM NAME' PIPFAIL

R0685 FUNCTIONAL DESCRIPTION' THIS PROGRAM PROCESSES CHANGES OF BIT 13 OF CHANNEL 33, PIPA FAIL. IT SETS BIT 10 OF
 R0687 IMODES30 TO AGREE. IT CALLS SETISSW IN CASE A PIPA FAIL NECESSITATES AN ISS WARNING. IF NOT, I.E., IMODES30
 R0689 BIT 1 = 1, AND A PIPA FAIL IS PRESENT AND THE ISS IS NOT BEING INITIALIZED, PROGRAM ALARM 00212 IS ISSUED.

R0691 CALLING SOURCE' BY C33TEST ON CHANGES OF CHANNEL 33 BIT 13.

R0692 JOBS OR TASKS INITIATED' NONE.

R0693 SUBROUTINES CALLED' 1) SETISSW, AND 2) ALARM (SEE FUNCTIONAL DESCRIPTION).

R0695 ERASABLE INITIALIZATION' SEE IMUNON FOR INITIALIZATION OF IMODES30. THE RELAVANT BITS ARE 5, 7, 8, 9, AND 10.

R0697 ALARMS' PROGRAM ALARM 00212 IF PIPA FAIL IS PRESENT BUT NEITHER ISS WARNING IS TO BE ISSUED NOR THE ISS IS
 R0699 BEING INITIALIZED.

R0700 EXIT' NKTPL33.

R0701 OUTPUT' PROGRAM ALARM 00212 AND ISS WARNING MAINTENANCE.

| | | | | | | | | | | |
|------|-----|----|------|-----|---------|----------|---------|------|----------|--|
| 0702 | REP | 19 | LAST | 150 | 06,2632 | 10 000 0 | PIPFAIL | CCS | A | SET BIT10 IN IMODES30 SO ALL ISS WARNING |
| 0703 | REP | 12 | LAST | 62 | 06,2633 | 3 4701 0 | | CAP | BIT10 | INFO IS IN ONE REGISTER. |
| 0704 | REP | 24 | LAST | 150 | 06,2634 | 57=320 1 | | XCH | IMODES30 | |
| 0705 | REP | 1 | | | 06,2635 | 7 2763 0 | | MASK | _BIT10 | |
| 0706 | REP | 25 | LAST | 151 | 06,2636 | 27=320 0 | | ADS | IMODES30 | |
| 0707 | REP | 2 | LAST | 139 | 06,2637 | 0 2665 0 | | TC | SETISSW | |
| 0708 | REP | 26 | LAST | 151 | 06,2640 | 4 1320 0 | | CS | IMODES30 | IF PIP FAIL DOESNT LIGHT ISS WARNING, DO |
| 0709 | REP | 11 | LAST | 63 | 06,2641 | 7 4712 0 | | MASK | BIT1 | A PROGRAM ALARM IF IMU OPERATING BUT NOT |
| 0710 | REP | 20 | LAST | 151 | 06,2642 | 10 000 0 | | CCS | A | CAGED OR BEING TURNED ON. |
| 0711 | REP | 1 | | | 06,2643 | 1 2425 1 | | TCP | NKTPL33 | |
| 0712 | REP | 27 | LAST | 151 | 06,2644 | 3 1320 1 | | CA | IMODES30 | |
| 0713 | REP | 1 | | | 06,2645 | 7 2760 0 | | MASK | OCT1720 | |
| 0714 | REP | 21 | LAST | 151 | 06,2646 | 10 000 0 | | CCS | A | |
| 0715 | REP | 2 | LAST | 151 | 06,2647 | 1 2425 1 | | TCP | NKTPL33 | ABOVE CONDITION NOT MET. |
| 0716 | REP | 4 | LAST | 150 | 06,2650 | 0 5537 0 | | TC | ALARM | |
| 0717 | | | | | 06,2651 | 00212 0 | | OCT | 212 | |
| 0718 | REP | 3 | LAST | 151 | 06,2652 | 1 2425 1 | | TCP | NKTPL33 | |

L TARIPT PROGRAM

USER=8 PAGE NO. 24 E0 53

R0719 PROGRAM NAMES' DNTMPAST, UPTMPAST

R0720 FUNCTIONAL DESCRIPTION' THESE PROGRAMS PROCESS CHANGES OF BITS 12 AND 11 OF CHANNEL 33. IF A BIT CHANGES TO A
R0722 0, A PROGRAM ALARM IS ISSUED. THE ALARMS ARE'

| R0723 | BIT | ALARM | CAUSE |
|-------|-----|-------|-------------------|
| R0724 | --- | ----- | ----- |
| R0725 | 12 | 01105 | DOWNLINK TOO FAST |
| R0726 | 11 | 01106 | UPLINK TOO FAST |

R0727 CALLING SEQUENCE' BY C33TEST ON A BIT CHANGE.

R0728 SUBROUTINES CALLED' ALARM, IF A BIT CHANGES TO A 0.

R0729 ERASABLE INITIALIZATION' FRESH START OR RESTART, BITS 12 AND 11 OF IMODES33 ARE SET TO 1.

R0731 ALARMS' SEE FUNCTIONAL DESCRIPTION.

R0732 EXIT' NKTPL33.

R0733 INPUT' CHANNEL 33 BIT 12 OR 11 CHANGES TO 0.

| | | | | | | | | | | | |
|-------|-----|----|------|-----|---------|--------|---|----------|-----|---------|--|
| R0734 | REP | 22 | LAST | 151 | 06,2653 | 10,000 | 0 | DNTMPAST | CCS | A | DO PROG ALARM IF TM TOO FAST. |
| R0735 | REP | 4 | LAST | 131 | 06,2654 | 1,2425 | 1 | | TCP | NKTPL33 | |
| R0736 | REP | 5 | LAST | 151 | 06,2655 | 0,5537 | 0 | | TC | ALARM | SAME AS DNLINK TOO FAST WITH DIFFERENT ALARM CODE. |
| R0737 | | | | | 06,2656 | 01105 | 1 | | OCT | 1105 | |
| R0738 | REP | 5 | LAST | 152 | 06,2657 | 1,2425 | 1 | | TCP | NKTPL33 | |
| R0739 | REP | 23 | LAST | 152 | 06,2660 | 10,000 | 0 | UPTMPAST | CCS | A | SAME AS DNLINK TOO FAST WITH DIFFERENT ALARM CODE. |
| R0740 | REP | 6 | LAST | 152 | 06,2661 | 1,2425 | 1 | | TCP | NKTPL33 | |
| R0741 | REP | 6 | LAST | 152 | 06,2662 | 0,5537 | 0 | | TC | ALARM | SAME AS DNLINK TOO FAST WITH DIFFERENT ALARM CODE. |
| R0742 | | | | | 06,2663 | 01106 | 1 | | OCT | 1106 | |
| R0743 | REP | 7 | LAST | 152 | 06,2664 | 1,2425 | 1 | | TCP | NKTPL33 | |



L TRUPT PROGRAM

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P0744 PROGRAM NAME' SETISSW

R0745 FUNCTIONAL DESCRIPTION' THIS PROGRAM TURNS THE ISS WARNING LAMP-ON AND OFF (CHANNEL 11 BIT 1 = 1 FOR ON,
R0747 0 FOR OFF) DEPENDING ON THE STATUS OF IMODES30 BITS 13 (IMJ FAIL) AND 4 (INHIBIT IMJ FAIL), 12 (ICDU FAIL) AND
R0749 3 (INHIBIT ICDU FAIL), AND 10 (PIPA FAIL) AND 1 (INHIBIT PIPA FAIL). THE LAMP IS LEFT ON IF A LAMP TEST IS IN
R0751 PROGRESS.

R0752 CALLING SEQUENCE' CALLED BY IMMON ON CHANGES TO IMJ FAIL AND ICDU FAIL. CALLED BY IPAILQK AND PFALQK UPON
R0754 REMOVAL OF THE FAIL INHIBITS. CALLED BY PIPAIL WHEN THE PIPA FAIL DISCRETE CHANGES. IT IS CALLED BY PIPUSE
R0756 SINCE THE PIPA FAIL PROGRAM ALARM MAY NECESSITATE AN ISS WARNING, AND LIKEWISE BY PIPFRE WHEN THE ALARM DEPARTS
R0758 AND IT IS CALLED BY IMZER03 AND ISSUP AFTER THE FAIL INHIBITS HAVE BEEN REMOVED.

R0760 JOBS OR TASKS INITIATED' NONE.

R0761 SUBROUTINES CALLED' NONE.

R0762 BRVABLE INITIALIZATION'

R0763 1) IMODES30 - SEE IMMON.
R0764 2) IMODES33 BIT 1 = 0 (LAMP TEST NOT IN PROGRESS).

R0765 ALARMS' ISS WARNING.

R0766 EXIT' VIA Q.

R0767 OUTPUT' ISS WARNING LAMP SET PROPERLY.

| | | | | | | | | | | |
|------|-----|----|------|---------|----------|----------|---------|----------|------|---|
| 0768 | REP | 1 | | 06,2665 | 3 4720 0 | SETISSW | CAP | OCT15 | | |
| 0769 | REP | 28 | LAST | 151 | 06,2666 | 7 1320 0 | MASK | IMODES30 | | SET ISS WARNING USING THE FAIL BITS IN |
| 0770 | | | | | 06,2667 | 0 0008 1 | EXTEND | | | BITS 13, 12, AND 10 OF IMODES30 AND THE |
| 0771 | REP | 13 | LAST | 151 | 06,2670 | 7 4701 1 | MF | BIT10 | | FAILURE INHIBIT BITS IN POSITIONS |
| 0772 | REP | 29 | LAST | 153 | 06,2671 | 3 1320 1 | CA | IMODES30 | | 4, 3, AND 1. |
| 0773 | | | | | 06,2672 | 0 0008 1 | EXTEND | | | |
| 0774 | REP | 5 | LAST | 141 | 06,2673 | 04 001 1 | ROR | LCHAN | | 0 INDICATES FAILURE. |
| 0775 | | | | | 06,2674 | 4 0000 0 | COM | | | |
| 0776 | REP | 1 | | | 06,2675 | 7 4762 1 | MASK | OCT15000 | | |
| 0777 | REP | 24 | LAST | 152 | 06,2676 | 10 000 0 | CCS | A | | |
| 0778 | REP | 1 | | | 06,2677 | 1 2710 1 | TCF | ISSWON | | FAILURE. |
| 0779 | REP | 12 | LAST | 151 | 06,2700 | 3 4712 1 | ISSWOFF | CAP | BIT1 | DONT TURN OFF ISS WARNING IF LAMP TEST |
| 0780 | REP | 12 | LAST | 150 | 06,2701 | 7 1321 1 | MASK | IMODES33 | | IN PROGRESS. |
| 0781 | REP | 25 | LAST | 153 | 06,2702 | 10 000 0 | CCS | A | | |
| 0782 | REP | 3 | LAST | 131 | 06,2703 | 0 0002 0 | TC | Q | | |
| 0783 | REP | 13 | LAST | 153 | 06,2704 | 4 4712 0 | CS | BIT1 | | |
| 0784 | | | | | 06,2705 | 0 0008 1 | EXTEND | | | |
| 0785 | REP | 4 | LAST | 148 | 06,2706 | 03 011 1 | WAND | DSALMOUT | | TURN OFF ISS WARNING |
| 0786 | REP | 4 | LAST | 153 | 06,2707 | 0 0002 0 | TC | Q | | |
| 0787 | | | | | 06,2710 | 0 0008 1 | ISSWON | EXTEND | | |



L T4RUPPT PROGRAM

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| | | | | | | | | | | | |
|-------|-----|----|------|---------|----------|----------|-----------|--------|-------------|--|--|
| 07871 | REP | 1 | | 06,2711 | 22 066 1 | | | | | | |
| 07872 | REP | 1 | | 06,2712 | 0 5651 0 | | | | | | |
| 07873 | REP | 14 | LAST | 153 | 06,2713 | 3 4712 1 | | | | | |
| 0788 | REP | | | | 06,2714 | 0 0006 1 | | | | | |
| 0789 | REP | 5 | LAST | 153 | 06,2715 | 05 011 1 | | | | | |
| 0790 | REP | 2 | LAST | 154 | 06,2716 | 0 0066 1 | | | | | |
| 0791 | REP | 1 | | | 06,2717 | 4 7703 0 | CAGESUB | CS | BIT15+6 | | |
| 0792 | REP | | | | 06,2720 | 0 0006 1 | | | | | |
| 0793 | REP | 9 | LAST | 148 | 06,2721 | 03 012 1 | | | | | |
| 0794 | REP | 2 | LAST | 139 | 06,2722 | 3 4122 1 | | | | | |
| 0795 | REP | | | | 06,2723 | 0 0006 1 | | | | | |
| 0796 | REP | 10 | LAST | 154 | 06,2724 | 05 012 1 | | | | | |
| 0797 | REP | 11 | LAST | 144 | 06,2725 | 4 1036 1 | CAGESUB1 | CS | DSPTAB +11D | | |
| 0798 | REP | 1 | | | 06,2726 | 7 2753 0 | | | | | |
| 0799 | REP | 12 | LAST | 154 | 06,2727 | 27-036 1 | | | | | |
| 0600 | REP | 30 | LAST | 153 | 06,2730 | 4 1320 0 | CAGESUB2 | CS | IMODES30 | | |
| 0601 | REP | 1 | | | 06,2731 | 7 2755 0 | | | | | |
| 0602 | REP | 31 | LAST | 154 | 06,2732 | 27-320 0 | | | | | |
| 0803 | REP | 13 | LAST | 153 | 08,2733 | 4 1321 1 | | | | | |
| 0804 | REP | 18 | LAST | 150 | 06,2734 | 7 4705 0 | | | | | |
| 0805 | REP | 14 | LAST | 154 | 06,2735 | 27-321 I | | | | | |
| 0806 | REP | 5 | LAST | 153 | 06,2736 | 0 0002 0 | | | | | |
| 0807 | REP | 3 | LAST | 151 | 06,2865 | | IMUPAII, | EQUALS | SETISSW | | |
| 0808 | REP | 4 | LAST | 154 | 06,2865 | | ICDUPAII, | EQUALS | SETISSW | | |

TELL EVERYONE WHAT CAUSED THE ISSWARNING

TURN ON ISS WARNING

SET OUTHITS + INTERNAL FLAGS FOR SYSTEM TURN-ON OR CAGE, DISABLE THE ERROR COUNTER AND REMOVE IMU DELAY COMP. SEND ZERO AND COARSE.

TURN ON NO ATT LAMP

SET FLAGS TO INDICATE CAGING OR TURN-ON AND INHIBIT ALL ISS WARNING INFO

DISABLE DAP AUTO AND HOLD MODES

L T4RUPT PROGRAM

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P0809 JUMP TABLES AND CONSTANTS.

| | | | | | | | | | | |
|------|-----|---|--|---------|-------|------|---|----------|-----|----------|
| 0810 | REP | 1 | | 08,2737 | 1 | 2528 | 0 | IFAILJMP | TCP | ITURNON |
| 0811 | REP | 1 | | 08,2740 | 1 | 2665 | 1 | | TCP | IMJFAIL |
| 0812 | REP | 1 | | 08,2741 | 1 | 2665 | 1 | | TCP | ICDUFAIL |
| 0813 | REP | 1 | | 08,2742 | 1 | 2555 | 1 | | TCP | IMJGAGE |
| 0814 | REP | 1 | | 08,2743 | 76400 | 1 | | 30RDMK | OCT | 76400 |
| 0815 | REP | 1 | | 08,2744 | 1 | 2604 | 0 | | TCP | IMJOP |
| 0816 | REP | 1 | | 08,2745 | 1 | 2632 | 0 | C33JMP | TCP | PIPPAIL |
| 0817 | REP | 1 | | 08,2746 | 1 | 2653 | 1 | | TCP | DNTMPAST |
| 0818 | REP | 1 | | 08,2747 | 1 | 2660 | 1 | | TCP | UPTMPAST |

CHANNEL 30 DISPATCH.

(BIT 10 NOT SAMPLED HERE).

CHANNEL 33 DISPATCH.

R0819 SUBROUTINE TO SKIP IF LAMP TEST NOT IN PROGRESS.

| | | | | | | | | | | |
|------|-----|----|----------|---------|---|------|---|----------|------|---------|
| 0820 | REP | 15 | LAST 154 | 08,2750 | 4 | 1321 | 1 | LAMPTEST | CS | IMDES33 |
| 0821 | REP | 15 | LAST 154 | 08,2751 | 7 | 4712 | 0 | | MASK | BIT1 |
| 0822 | REP | 1 | | 08,2752 | 1 | 3065 | 0 | | TCP | ZOPFIN3 |

BIT 1 OF IMDES33 = 1 IF LAMP TEST IN PROGRESS.

| | | | | | | | | | | |
|------|-----|---|--|---------|-------|---|--|----------|--------|--------|
| 0823 | REP | 1 | | 4763 | | | | 33RDMK | EQUALS | PRIO16 |
| 0824 | | | | 08,2753 | 40010 | 1 | | CC40010 | OCT | 40010 |
| 0826 | | | | 08,2754 | 00054 | 0 | | OCT54 | OCT | 54 |
| 0827 | | | | 08,2755 | 00075 | 0 | | OCT75 | OCT | 75 |
| 0828 | | | | 08,2756 | 00272 | 0 | | OCT272 | OCT | 00272 |
| 0829 | | | | 08,2757 | 00300 | 1 | | RITS748 | OCT | 300 |
| 0830 | | | | 08,2760 | 01720 | 0 | | OCT1720 | OCT | 1720 |
| 0831 | | | | 08,2761 | 00740 | 1 | | OCT740 | OCT | 00740 |
| 0832 | REP | 1 | | 4762 | | | | OCT15000 | EQUALS | PRIO15 |
| 0833 | | | | 08,2762 | 77000 | 1 | | OCT77000 | OCT | 77000 |
| 0834 | | | | 08,2763 | 76777 | 1 | | -BIT10 | OCT | -1000 |

| | | | | | | | | | | |
|------|-----|---|----------|---------|-------|---|--|---------|--------|--------|
| 0835 | | | | 08,2764 | 21450 | 0 | | 90SECS | DRC | 9000 |
| 0836 | REP | 1 | | 5656 | | | | 120MS | = | OCT14 |
| 0837 | REP | 8 | LAST 134 | 5222 | | | | GLOCKOK | EQUALS | RESUME |

(DEC 12)



L TRUPT PROGRAM

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| | | | | | | | | | | | |
|------|------|----|------|-----|---------|--------|---|----------|--------|----------|---|
| 0873 | RESP | 2 | LAST | 156 | 06,3027 | 11-314 | 1 | ZOPTDES | CCS | SWSAMPLE | IS SWITCH STILL AT ZOPTICS |
| 0874 | RESP | 1 | | | 06,3030 | 0 3047 | 1 | | TC | ZTOCSC | NOW AT CSC |
| 0875 | RESP | 1 | | | 06,3031 | 0 3037 | 0 | | TC | ZTOMAN | MANUAL |
| 0876 | RESP | 1 | | | 06,3032 | 0 3057 | 0 | | TC | ZOPFINI | ZOPTICS-SEE IF ZOPT PROCESSING |
| 0877 | RESP | 1 | | | 06,3033 | 0 3154 | 1 | | TC | SETDESMD | ZOPT NOT PROCESSING-NO ACTION |
| 0878 | RESP | 1 | | | 06,3034 | 11-317 | 1 | | CCS | ZOPTCNT | ZOPT PROCESSING-CHECK COUNTER |
| 0879 | RESP | 1 | | | 06,3035 | 0 3153 | 0 | | TC | SETCNT | 32 SAMPLE NOT FINISHED-SET COUNTER |
| 0880 | RESP | 1 | | | 06,3036 | 0 3157 | 1 | | TC | SETZOEND | 32 SAMPLE WAIT COMPLETED-SET UP ZOP END |
| 0881 | RESP | 2 | LAST | 157 | 06,3037 | 0 3057 | 0 | ZTOMAN | TC | ZOPFINI | ZOP TO MANUAL-IS ZOPT DONE |
| 0882 | RESP | 2 | LAST | 157 | 06,3040 | 0 3154 | 1 | | TC | SETDESMD | YES-NORMAL EXIT |
| 0883 | RESP | 7 | LAST | 152 | 06,3041 | 0 5537 | 0 | ZOPALARM | TC | ALARM | ALARM-SWITCHED ALTERED WHILE ZOPTICS |
| 0884 | RESP | 1 | | | 06,3042 | 00116 | 1 | | OCT | 00116 | |
| 0885 | RESP | 1 | | | 06,3043 | 3 4717 | 1 | | CAP | OCT13 | PROCESSING-SET RETURN OPTION |
| 0886 | RESP | 1 | | | 06,3044 | 55-316 | 0 | | TS | WTOPTION | |
| 0887 | RESP | 1 | | | 06,3045 | 0 3070 | 0 | | TC | CANZOPT | CANCEL ZOPT |
| 0888 | RESP | 3 | LAST | 157 | 06,3046 | 0 3154 | 1 | | TC | SETDESMD | |
| 0889 | RESP | 3 | LAST | 157 | 06,3047 | 0 3057 | 0 | ZTOCSC | TC | ZOPFINI | SEE IF ZOPT PROCESSING |
| 0890 | RESP | 1 | | | 06,3050 | 0 3115 | 1 | | TC | MANTOCSC | NO-CHECK RETURN TO COARS OPT |
| 0891 | RESP | 8 | LAST | 157 | 06,3051 | 0 5537 | 0 | | TC | ALARM | ZOPT PROCESSING-ALARM |
| 0892 | RESP | 1 | | | 06,3052 | 00116 | 1 | | OCT | 00116 | |
| 0893 | RESP | 2 | LAST | 157 | 06,3053 | 0 3070 | 0 | | TC | CANZOPT | CANCEL ZOPT |
| 0894 | RESP | 2 | LAST | 157 | 06,3054 | 0 3112 | 0 | | TC | MANTOCSC | ZERO CNT-LOCK FOR COARS OPT RETURN |
| 0895 | RESP | 14 | LAST | 138 | 06,3055 | 3 4702 | 0 | COARSLQK | CAP | RIT9 | IF COARS OPT SINCE PSTART GO TO L+2 |
| 0896 | RESP | 1 | | | 06,3056 | 1 3064 | 1 | | TCF | ZOPFIN2 | IF NOT GO TO L+1 |
| 0897 | RESP | 18 | LAST | 155 | 06,3057 | 3 4712 | 1 | ZOPFINI | CAP | BIT1 | SEE IF END ZOPT TASK WORKING |
| 0898 | RESP | 8 | LAST | 156 | 06,3060 | 7 1331 | 0 | | MASK | OPTMODES | |
| 0899 | RESP | 28 | LAST | 156 | 06,3061 | 10 000 | 0 | | CCS | A | |
| 0900 | RESP | 10 | LAST | 156 | 06,3062 | 0 5222 | 0 | | TC | RESUME | ZOPT TASK WORKING-WAIT ONE SAMPLE PERIOD |
| 0901 | RESP | 11 | LAST | 82 | 06,3063 | 3 4710 | 0 | | CAP | RIT3 | TEST IF ZOPTICS PROCESSING |
| 0902 | RESP | 7 | LAST | 157 | 06,3064 | 7 1331 | 0 | ZOPFIN2 | MASK | OPTMODES | RETURNS TO L+1 PROCESSING AND |
| 0903 | RESP | 29 | LAST | 157 | 06,3065 | 10 000 | 0 | ZOPFIN3 | CCS | A | |
| 0904 | RESP | 8 | LAST | 154 | 06,3066 | 24 002 | 0 | | INCR | 0 | L+2 IF NOT |
| 0905 | RESP | 7 | LAST | 157 | 06,3067 | 0 0002 | 0 | | TC | 0 | |
| 0906 | RESP | 2 | LAST | 143 | 06,3070 | 4 6211 | 1 | CANZOPT | CS | SIX | CANCEL ZERO OPTICS |
| 0907 | RESP | 8 | LAST | 157 | 06,3071 | 7 1331 | 0 | | MASK | OPTMODES | ZERO ZOPT PROCESSING RIT-RNABLE OCTUFAIL. |
| 0908 | RESP | 9 | LAST | 157 | 06,3072 | 55-331 | 0 | | TS | OPTMODES | |
| 0909 | RESP | 17 | LAST | 157 | 06,3073 | 4 4712 | 0 | | CS | RIT1 | MAKE SURE ZERO OCCU IS OFF |
| 0910 | RESP | 1 | | | 06,3074 | 0 0006 | 1 | | EXTEND | | |
| 0911 | RESP | 11 | LAST | 154 | 06,3075 | 03 012 | 1 | | WAND | CHAN12 | |
| 0912 | RESP | 8 | LAST | 157 | 06,3076 | 0 0002 | 0 | | TC | 0 | |



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| | | | | | | | | | | | |
|------|-----|----|------|-----|---------|--------|---|----------|--------|----------|---|
| 0913 | REP | 3 | LAST | 157 | 06,3077 | 11=314 | 1 | MANDES | CCS | SWSAMPLE | SEE IF SWITCH STILL IN MANUAL MODE |
| 0914 | REP | 3 | LAST | 157 | 06,3100 | 0 3112 | 0 | | TC | MANTOCSC | NOW AT CSC |
| 0915 | REP | 1 | | | 06,3101 | 0 3107 | 1 | | TC | MANTOMAN | STILL MANUAL |
| 0916 | REP | 2 | LAST | 157 | 06,3102 | 11=316 | 0 | | CCS | WTOPTION | ZOPTICS-LOOK AT ZOPTICS RETURN OPTION |
| 0917 | | | | | 06,3103 | 0 3105 | 0 | | TC | +2 | 5 SEC RETURN GOOD-CONTINUE ZOPTICS |
| 0918 | REP | 1 | | | 06,3104 | 0 3151 | 1 | | TC | OPTZERO | ZOPTICS MUST START ANEW |
| 0919 | REP | 1 | | | 06,3105 | 0 3216 | 1 | | TC | INITZOPT | SHOW ZERO OPTICS PROCESSING |
| 0920 | REP | 4 | LAST | 157 | 06,3106 | 0 3154 | 1 | | TC | SETIDESM | NORMAL EXIT |
| 0922 | REP | 3 | LAST | 158 | 06,3107 | 11=316 | 0 | MANTOMAN | CCS | WTOPTION | DECREMENT RETURN OPTION TIME |
| 0923 | REP | 4 | LAST | 158 | 06,3110 | 55=316 | 0 | | TS | WTOPTION | |
| 0924 | REP | 5 | LAST | 158 | 06,3111 | 0 3154 | 1 | | TC | SETIDESM | |
| 0925 | REP | 6 | LAST | 148 | 06,3112 | 3 4714 | 1 | MANTOCSC | CAP | ZERO | CANCEL ZOFT RETURN OPTION IF SET |
| 0926 | REP | 5 | LAST | 158 | 06,3113 | 55=316 | 0 | | TS | WTOPTION | |
| 0927 | REP | 2 | LAST | 157 | 06,3114 | 55=317 | 1 | | TS | ZOPTCNT | |
| 0928 | REP | 1 | | | 06,3115 | 0 3055 | 1 | | TC | COARSLOK | CHECK FOR COARS OPT RETURN |
| 0929 | REP | 6 | LAST | 158 | 06,3116 | 0 3154 | 1 | | TC | SETIDESM | NO COARS TASK-NO ACTION |
| 0930 | REP | 5 | LAST | 142 | 06,3117 | 3 4712 | 1 | | CAP | ONE | SET COARS OPT WORKING |
| 0931 | REP | 2 | LAST | 158 | 06,3120 | 55=303 | 1 | | TS | OPTIND | |
| 0932 | REP | 13 | LAST | 150 | 06,3121 | 3 4711 | 1 | | CAP | BIT2 | ENABLE OPTICS CDU ERROR CNTS |
| 0933 | | | | | 06,3122 | 0 0006 | 1 | | EXTEND | | |
| 0934 | REP | 12 | LAST | 157 | 06,3123 | 05 012 | 1 | | WOR | CHAN12 | |
| 0935 | REP | 7 | LAST | 158 | 06,3124 | 0 3154 | 1 | | TC | SETIDESM | |
| 0936 | REP | 4 | LAST | 158 | 06,3125 | 11=314 | 1 | CSCDES | CCS | SWSAMPLE | SEE IF SWITCH STILL AT CSC |
| 0937 | REP | 6 | LAST | 158 | 06,3126 | 0 3154 | 1 | | TC | SETIDESM | STILL AT CSC |
| 0938 | REP | 1 | | | 06,3127 | 0 3133 | 0 | | TC | CSCOMAN | MANUAL |
| 0939 | REP | 1 | | | 06,3130 | 3 4705 | 1 | CSCZOZOP | CAP | OCT40 | ZOPTICS-INITIALIZE FOR ZOFT |
| 0940 | REP | 3 | LAST | 158 | 06,3131 | 55=317 | 1 | | TS | ZOPTCNT | |
| 0941 | REP | 2 | LAST | 158 | 06,3132 | 0 3216 | 1 | | TC | INITZOPT | |
| 0942 | REP | 3 | LAST | 158 | 06,3133 | 11=303 | 1 | CSCOMAN | CCS | OPTIND | SEE IF COARS WORKING |
| 0943 | REP | 1 | | | 06,3134 | 0 3140 | 1 | | TC | CANCOARS | COARS WORKING-SWITCH NOT CSC-KILL COARS |
| 0944 | REP | 2 | LAST | 158 | 06,3135 | 0 3140 | 1 | | TC | CANCOARS | |
| 0945 | | | | | 06,3136 | 0 3137 | 1 | | TC | +1 | NO COARS-NORMAL EXIT |
| 0946 | REP | 9 | LAST | 158 | 06,3137 | 0 3154 | 1 | | TC | SETIDESM | |



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|------|-----|----|------|-----|---------|----------|----------|--------|----------|---------------------------------------|
| 0947 | REP | 2 | LAST | 156 | 06,3140 | 3 7716 0 | CANCOARS | CA | NEOONE | |
| 0948 | REP | 4 | LAST | 156 | 06,3141 | 55=303 1 | | TS | OPTIND | SET OPTIND (-1) TO SHOW NOT WORKING |
| 0949 | REP | 14 | LAST | 156 | 06,3142 | 4 4711 0 | | CS | BIT2 | DISABLE OCDU ERR CNTS |
| 0950 | | | | | 06,3143 | 0 0006 1 | | EXTEND | | |
| 0951 | REP | 13 | LAST | 156 | 06,3144 | 03 012 1 | | WAND | CHAN12 | |
| 0952 | REP | 10 | LAST | 157 | 06,3145 | 4 1331 0 | | CS | OPTMODES | SET RETURN-TO-COARS BIT |
| 0953 | REP | 15 | LAST | 157 | 06,3146 | 7 4702 1 | | MASK | BIT9 | |
| 0954 | REP | 11 | LAST | 159 | 06,3147 | 27=331 0 | | ADS | OPTMODES | |
| 0955 | REP | 10 | LAST | 158 | 06,3150 | 0 3154 1 | | TC | SETDESMD | |
| 0956 | REP | 3 | LAST | 158 | 06,3151 | 0 3216 1 | OPTZERO | TC | INITZOPT | INITIALIZE ZERO OPTICS |
| 0957 | REP | 2 | LAST | 158 | 06,3152 | 3 4705 1 | | CA | OCT40 | SET UP 32 SAMPLE WAIT |
| 0958 | REP | 4 | LAST | 158 | 06,3153 | 55=317 1 | SETCNT | TS | ZOPTCNT | |
| 0959 | REP | 5 | LAST | 158 | 06,3154 | 3 1314 0 | SETDESMD | CA | S/SAMPLE | SET CURRENT SWITCH INDICATION-RESUME |
| 0960 | REP | 2 | LAST | 156 | 06,3155 | 55=315 0 | | TS | DESFORMD | |
| 0961 | REP | 11 | LAST | 157 | 06,3156 | 0 5222 0 | | TC | RESUME | |
| 0962 | REP | 18 | LAST | 157 | 06,3157 | 3 4712 1 | SETZOFND | CAP | BIT1 | SEND ZERO OPTICS CDU |
| 0963 | | | | | 06,3160 | 0 0006 1 | | EXTEND | | |
| 0964 | REP | 14 | LAST | 159 | 06,3161 | 05 012 1 | | WOR | CHAN12 | |
| 0965 | REP | 1 | | | 06,3162 | 3 4112 1 | | CA | 200MS | HOLD ZERO CDU FOR 200 MS |
| 0966 | REP | 5 | LAST | 143 | 06,3163 | 0 5140 1 | | TC | WAITLIST | |
| 0967 | REP | 12 | LAST | 159 | | 1331 | | FRANK= | OPTMODES | |
| 0968 | REP | 1 | | | 06,3164 | 03172 0 | | ZCADR | ENDZOPT | |
| 0968 | REP | 1 | | | 06,3165 | 14062 0 | | | | |
| 0969 | REP | 13 | LAST | 159 | 06,3166 | 4 1331 0 | | CS | OPTMODES | SHOW ZOPTICS TASK WORKING |
| 0970 | REP | 19 | LAST | 159 | 06,3167 | 7 4712 0 | | MASK | RIT1 | |
| 0971 | REP | 14 | LAST | 159 | 06,3170 | 27=331 0 | | ADS | OPTMODES | |
| 0972 | REP | 11 | LAST | 159 | 06,3171 | 0 3154 1 | | TC | SETDESMD | |
| 0973 | REP | 1 | | | 06,3172 | 0 3210 1 | ENDZOPT | TC | ZEROPCDU | ZERO OCDU COUNTERS |
| 0974 | REP | 20 | LAST | 159 | 06,3173 | 4 4712 0 | | CS | RIT1 | TURN OFF ZERO OCDU |
| 0975 | | | | | 06,3174 | 0 0006 1 | | EXTEND | | |
| 0976 | REP | 15 | LAST | 159 | 06,3175 | 03 012 1 | | WAND | CHAN12 | |
| 0977 | REP | 2 | LAST | 159 | 06,3176 | 3 4112 1 | | CAP | 200MS | DELAY 200MS FOR CDUS TO RESYNCHRONIZE |
| 0978 | REP | 3 | LAST | 139 | 06,3177 | 0 5161 1 | | TC | VARDELAY | |
| 0979 | REP | 15 | LAST | 159 | 06,3200 | 4 1331 0 | | CS | OPTMODES | SHOW ZOPTICS SINCE LAST FRESH START |
| 0980 | REP | 14 | LAST | 153 | 06,3201 | 7 4701 1 | | MASK | RIT10 | OR RESTART |
| 0981 | REP | 16 | LAST | 159 | 06,3202 | 27=331 0 | | ADS | OPTMODES | |
| 0982 | REP | 2 | LAST | 129 | 06,3203 | 4 4716 1 | | CS | SEVRN | ENABLE OCDU FAIL-SHOW OPTICS COMPLETE |
| 0983 | REP | 17 | LAST | 159 | 06,3204 | 7 1331 0 | | MASK | OPTMODES | |
| 0984 | REP | 18 | LAST | 159 | 06,3205 | 55=331 0 | | TS | OPTMODES | |
| 0985 | REP | 2 | LAST | 156 | 06,3206 | 0 3224 0 | | TC | OCDUPTST | CHECK OCDU FAIL BIT AFTER ENABLE |



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|-------|-----|----|------|-----|---------|----------|--------------|---------|
| 0086 | REP | 3 | LAST | 139 | 06,3207 | 0 5213 1 | TC | TAKOVER |
| 0087 | REP | 7 | LAST | 158 | 06,3210 | 3 4714 1 | ZEROPCDU CAP | ZERO |
| 0088 | REP | 2 | LAST | 37 | 06,3211 | 54 038 0 | TS | CDUS |
| 00881 | REP | 1 | | | 06,3212 | 55=307 0 | TS | ZONE |
| 0089 | REP | 1 | | | 06,3213 | 4 3281 0 | CS | 20DEGS |
| 0090 | REP | 2 | LAST | 37 | 06,3214 | 54 035 0 | TS | CDUT |
| 0091 | REP | 9 | LAST | 157 | 06,3215 | 0 0002 0 | TC | 0 |
| 0092 | REP | 8 | LAST | 160 | 06,3216 | 3 4714 1 | INITZOPT CAP | ZERO |
| 0093 | REP | 6 | LAST | 158 | 06,3217 | 55=318 0 | TS | WTOPTON |
| 0094 | REP | 19 | LAST | 159 | 06,3220 | 4 1331 0 | CS | OPTMDEB |
| 0095 | REP | 3 | LAST | 157 | 06,3221 | 7 6211 1 | MASK | SIX |
| 0096 | REP | 20 | LAST | 160 | 06,3222 | 27=331 0 | ADS | OPTMDEB |
| 0097 | REP | 10 | LAST | 160 | 06,3223 | 0 0002 0 | TC | 0 |

ZERO IN CDUS, -20 IN CDUT
INITIALIZE SHAPT MONITOR ZONE

INITIALIZE ZOPTICS-INHIBIT OCDUFAIL
AND SHOW OPTICS PROCESSING
SET ZERO OPTICS PROCESSING
OPTICS CDU FAIL INHIBITED

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| | | | | | | | | | | |
|------|-----|----|------|-----|---------|----------|-----------|--------|-------------|------------------------------------|
| 0998 | REP | 16 | LAST | 156 | 06,3224 | 3 4704 0 | OCDFUPTST | CAP | BIT7 | SEE IF OCCUPAIL ON OR OFF |
| 0999 | | | | | 06,3225 | 0 0006 1 | | EXTEND | | |
| 1000 | REP | 3 | LAST | 156 | 06,3226 | 02 030 0 | | RAND | CHAN30 | |
| 1001 | REP | 30 | LAST | 157 | 06,3227 | 10 000 0 | | CCS | A | |
| 1002 | REP | 1 | | | 06,3230 | 1 3252 0 | | TCF | OPFAILOF | OCCUPAIL LIGHT OFF |
| 1003 | REP | 15 | LAST | 159 | 06,3231 | 3 4711 1 | | CAP | BIT2 | OCCUPAIL LIGHT ON UNLESS INHIBITED |
| 1004 | REP | 21 | LAST | 160 | 06,3232 | 7 1331 0 | | MARK | OPTMODES | |
| 1005 | REP | 31 | LAST | 161 | 06,3233 | 10 000 0 | | CCS | A | |
| 1006 | REP | 11 | LAST | 160 | 06,3234 | 0 0002 0 | | TC | 0 | OCCUPAIL INHIBITED |
| 1007 | REP | 14 | LAST | 138 | 06,3235 | 3 4703 1 | OPFAILOF | CAP | BIT8 | ON BIT |
| 1008 | REP | 13 | LAST | 154 | 06,3236 | 6 1036 0 | | AD | DSPTAB +11D | |
| 1009 | REP | 15 | LAST | 161 | 06,3237 | 7 4703 0 | | MARK | BIT8 | |
| 1010 | | | | | 06,3240 | 0 0006 1 | SETOFF | EXTEND | | |
| 1011 | REP | 1 | | | 06,3241 | 1 6711 1 | | BZF | TC0 | NO CHANGE |
| 1012 | REP | 3 | LAST | 141 | 06,3242 | 54 001 1 | | TS | L | |
| 1013 | REP | 14 | LAST | 161 | 06,3243 | 3 1036 0 | | CA | DSPTAB +11D | |
| 1014 | | | | | 06,3244 | 0 0006 1 | | EXTEND | | |
| 1015 | REP | 7 | LAST | 156 | 06,3245 | 06 001 0 | | ROR | LCHAN | |
| 1016 | REP | 2 | LAST | 145 | 06,3246 | 7 4672 1 | | MARK | POS MAX | |
| 1017 | REP | 14 | LAST | 146 | 06,3247 | 6 4674 0 | | AD | BIT15 | SHOW ACTION WANTED |
| 1018 | REP | 15 | LAST | 161 | 06,3250 | 55-036 1 | | TS | DSPTAB +11D | |
| 1019 | REP | 12 | LAST | 161 | 06,3251 | 0 0002 0 | | TC | 0 | |
| 1020 | REP | 21 | LAST | 159 | 06,3252 | 3 4712 1 | OPFAILOF | CAP | BIT1 | DONT TURN OFF IF LAMP TEST |
| 1021 | REP | 16 | LAST | 155 | 06,3253 | 7 1321 1 | | MARK | IMODES33 | |
| 1022 | REP | 32 | LAST | 161 | 06,3254 | 10 000 0 | | CCS | A | |
| 1023 | REP | 13 | LAST | 161 | 06,3255 | 0 0002 0 | | TC | 0 | LAMP TEST IN PROGRESS |
| 1024 | REP | 16 | LAST | 161 | 06,3256 | 3 4703 1 | | CAP | BIT8 | TURN OFF OCCUPAIL LIGHT |
| 1025 | REP | 16 | LAST | 161 | 06,3257 | 7 1036 1 | | MARK | DSPTAB +11D | |
| 1026 | REP | 1 | | | 06,3260 | 1 3240 0 | | TCF | SETOFF | |
| 1027 | REP | 1 | | | 4717 | | OCT13 | = | FLEVEN | |
| 1028 | REP | 3 | LAST | 154 | 4722 | | OCTHIRTY | EQUALS | BIT84d5 | |
| 1029 | | | | | 06,3261 | 16037 1 | 20DROS | DEC | 7199 | |
| 1030 | REP | 19 | LAST | 154 | 4705 | | OCT40 | EQUALS | BIT8 | |
| 1031 | REP | 1 | | | 4112 | | 200MS | EQUALS | OCT24 | |



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F1032 OPTICS CDU DRIVING PROGRAM

| | | | | | | | |
|------|-----|---|--|---------|--|--|---------------|
| 1033 | | | | 10,2000 | | | BANK 10 |
| 1034 | REP | 1 | | 10,2000 | | | SETLOC OPIDRV |
| 1035 | | | | 10,2000 | | | BANK |
| 1036 | REP | 1 | | | | | COUNT# SS/RPT |

R1037 SHAFT STOP MONITOR-ZONE UPDATE

| | | | | | | | | | |
|------|-----|----|------|-----|---------|----------|------------|----------|--|
| 1038 | REP | 3 | LAST | 160 | 10,2000 | 3 0036 1 | OPTIDRV CA | CDUS | GRAB OPTIC SHAFT CDU |
| 1039 | REP | 4 | LAST | 161 | 10,2001 | 54 001 1 | TS | L | |
| 1040 | REP | 33 | LAST | 161 | 10,2002 | 10 000 0 | CCS | A | GET ABS(CDUS) |
| 1041 | REP | 1 | | | 10,2003 | 0 7707 0 | AD | 13,14,15 | |
| 1042 | | | | | 10,2004 | 1 2006 1 | TOP | +2 | ABS(CDUS) - 45 DEG |
| 1043 | | | | | 10,2005 | 1 2003 1 | TOP | -2 | |
| 1044 | | | | | 10,2006 | 0 0006 1 | EXTEND | | |
| 1045 | REP | 1 | | | 10,2007 | 0 2016 1 | BZPF | OZONE | LESS THAN 45 DEG-SET ZONE 0 |
| 1046 | REP | 2 | LAST | 160 | 10,2010 | 3 1307 1 | CA | ZONE | IF ZONE ZERO, CHANGE TO + OR - OTHERWISE |
| 1047 | | | | | 10,2011 | 0 0006 1 | EXTEND | | DONT MESS WITH ZONE |
| 1048 | | | | | 10,2012 | 1 2014 1 | RZP | +2 | |
| 1049 | REP | 1 | | | 10,2013 | 1 2020 0 | TOP | CONTRV | JUST CONTINUE |
| 1050 | REP | 5 | LAST | 162 | 10,2014 | 56 001 0 | XCH | L | GREATER THAN 45 DEG-SET ZONE TO SIGN CDU |
| 1051 | REP | 2 | LAST | 162 | 10,2015 | 1 2017 1 | TOP | OZONE +1 | |
| 1052 | REP | 9 | LAST | 160 | 10,2016 | 3 4714 1 | OZONE | CAP | ZERO |
| 1053 | REP | 3 | LAST | 162 | 10,2017 | 55=307 0 | TS | ZONE | ABS(CDUS) LESS THEN 90 DEG-ZONE ZERO |
| 1054 | REP | 1 | | | | | COUNT# | SS/TARPT | |
| 1055 | REP | 5 | LAST | 159 | 10,2020 | 11=303 1 | CONTRV | CCS | OPTIND |
| 1056 | | | | | 10,2021 | 0 2025 1 | TC | +4 | WORK COARS OPTICS |
| 1057 | | | | | 10,2022 | 0 2025 1 | TC | +3 | WORK COARS OPTICS |
| 1058 | REP | 12 | LAST | 159 | 10,2023 | 0 5222 0 | TC | RESUME | NO OPT |
| 1059 | REP | 13 | LAST | 162 | 10,2024 | 0 5222 0 | TC | RESUME | NO OPT |
| 1060 | REP | 6 | LAST | 159 | 10,2025 | 3 1314 0 | CA | SWSAMPLE | SEE IF SWITCH AT CMC |
| 1061 | | | | | 10,2026 | 0 0006 1 | EXTEND | | |
| 1062 | REP | 14 | LAST | 162 | 10,2027 | 0 5222 0 | BZPF | RESUME | ZERO (-1) MANUAL (+0) |
| 1063 | REP | 15 | LAST | 159 | 10,2030 | 3 4701 0 | CAP | RIT10 | SEE IF CDUS ZEROED SINCE LAST FSTART |
| 1064 | REP | 22 | LAST | 161 | 10,2031 | 7 1331 0 | MASK | OPTIMDRS | |
| 1065 | REP | 34 | LAST | 162 | 10,2032 | 10 000 0 | CCS | A | |
| 1066 | | | | | 10,2033 | 0 2036 0 | TC | +3 | |
| 1067 | REP | 9 | LAST | 157 | 10,2034 | 0 5537 0 | TC | ALARM | OPTICS NOT ZEROED |
| 1068 | | | | | 10,2035 | 00120 1 | OCT | 00120 | |
| 1069 | REP | 16 | LAST | 161 | 10,2036 | 3 4711 1 | CA | RIT2 | SEE IF ERR CNTS ENABLED |
| 1070 | | | | | 10,2037 | 0 0006 1 | EXTEND | | |
| 1071 | REP | 16 | LAST | 159 | 10,2040 | 02 012 0 | RAND | CHAN12 | |
| 1072 | | | | | 10,2041 | 0 0006 1 | EXTEND | | |
| 1073 | REP | 1 | | | 10,2042 | 1 2175 1 | RZP | SETRIT | CNTS NOT ENABLED-DO IT AND RESUME |
| 1074 | REP | 6 | LAST | 158 | 10,2043 | 3 4712 1 | CAP | ONE | INITIALIZE OPTIND |

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| | | | | | | | | | | | |
|-------|----------------------|----|------|-------------|---------|--------|------|----------|--------|-------------|--|
| 1075 | REP | 6 | LAST | 162 | 10,2044 | 55=303 | 1 | OPT2 | TS | OPTIND | |
| 1076 | | | | | 10,2045 | 0 | 0006 | | EXTEND | | |
| 1077 | REP | 1 | | | 10,2046 | 1 | 2132 | | BZF | TRUNCMD | CHECK TRUNION COMMAND |
| 1078 | REP | 7 | LAST | 163 | 10,2047 | 51=303 | 0 | GETOPCMD | INDEX | OPTIND | |
| 1079 | REP | 2 | LAST | 96 | 10,2050 | 3 | 1160 | | CA | DESOPTT | PICK UP DESIRED OPT ANGLE |
| 1080 | | | | | 10,2051 | 0 | 0006 | | EXTEND | | |
| 1081 | REP | 8 | LAST | 163 | 10,2052 | 5 | 1303 | | INDEX | OPTIND | |
| 1082 | REP | 3 | LAST | 160 | 10,2053 | 20 | 035 | | MSU | CDUT | GET DIFFERENCE |
| 1083 | | | | | 10,2054 | 0 | 0006 | | EXTEND | | |
| 1084 | REP | 13 | LAST | 148 | 10,2055 | 7 | 4676 | | MP | BIT13 | |
| 1085 | REP | 6 | LAST | 162 | 10,2056 | 56 | 001 | | XCH | L | |
| 1086 | | | | | 10,2057 | 6 | 0000 | | DOUBLE | | |
| 1087 | REP | 3 | LAST | 66 | 10,2060 | 54 | 061 | | TS | ITEMP1 | |
| 1088 | | | | | 10,2061 | 1 | 2063 | | TCF | +2 | NO OVFL |
| 1089 | REP | 7 | LAST | 163 | 10,2062 | 26 | 001 | | ADS | L | WITH OVFL |
| 1090 | REP | 9 | LAST | 163 | 10,2063 | 51=303 | 0 | STORCMD | INDEX | OPTIND | |
| 1091 | REP | 1 | | | 10,2064 | 23=305 | 0 | | LXCH | COMMANDO | STORE COMMAND |
| 1092 | REP | 10 | LAST | 163 | 10,2065 | 11=303 | 1 | | CCS | OPTIND | |
| 1093 | REP | 1 | | | 10,2066 | 1 | 2044 | | TCF | OPT2 | GET NEXT COMMAND |
| 1094 | REP | 4 | LAST | 163 | 10,2067 | 54 | 061 | | TS | ITEMP1 | INITIALIZE SEND INDICATOR TO ZERO |
| 1095 | REP | 2 | LAST | 162 TO 162' | 16 | 16 | 16* | | COUNT* | SS/SXT | |
| R1096 | SHAFT STOP AVOIDANCE | | | | | | | | | | |
| 10981 | REP | 4 | LAST | 162 | 10,2070 | 10 | 036 | | CCS | CDUS | IF CDUS GREATER THAN +OR- 90 DEG CHECK FOR POSSIBLE STOP PROBLEM |
| 10982 | REP | 1 | | | 10,2071 | 6 | 4673 | | AD | NEG1/2 | |
| 10983 | | | | | 10,2072 | 1 | 2074 | | TCF | +2 | |
| 10984 | | | | | 10,2073 | 1 | 2071 | | TCF | -2 | |
| 10985 | | | | | 10,2074 | 0 | 0006 | | EXTEND | | |
| 10986 | REP | 1 | | | 10,2075 | 6 | 2122 | | BZF | CMDSETUP | CDUS LESS THAN 90 DEG, NO PROBLEMS |
| 1097 | REP | 4 | LAST | 162 | 10,2076 | 3 | 1307 | | CA | ZONE | |
| 1098 | | | | | 10,2077 | 0 | 0006 | | EXTEND | | |
| 1099 | REP | 2 | LAST | 163 | 10,2100 | 1 | 2122 | | BZF | CMDSETUP | ZONE=3,NORMAL COMMAND |
| 1100 | REP | 15 | LAST | 161 | 10,2101 | 7 | 4674 | | MASK | BIT15 | GRAB SIGN OF ZONE |
| 1101 | REP | 8 | LAST | 163 | 10,2102 | 54 | 001 | | TS | L | |
| 1102 | REP | 2 | LAST | 163 | 10,2103 | 3 | 1306 | | CA | COMMANDO +1 | GRAB SIGN OF SHAFT COMMAND |
| 1103 | REP | 16 | LAST | 163 | 10,2104 | 7 | 4674 | | MASK | BIT15 | |
| 1104 | | | | | 10,2105 | 0 | 0006 | | EXTEND | | |
| 1105 | REP | 8 | LAST | 161 | 10,2106 | 06 | 001 | | RXOR | LCHAN | |
| 1106 | REP | 35 | LAST | 162 | 10,2107 | 10 | 000 | | CCS | A | |
| 1107 | REP | 3 | LAST | 163 | 10,2110 | 1 | 2122 | | TCF | CMDSETUP | SIGN ZONE NOT EQUAL TO SIGN COMMAND |
| 1108 | REP | 2 | LAST | 96 | 10,2111 | 11=161 | 1 | | CCS | DESOPTS | SEE IF DESOPTS BETWEEN -90 AND +90 |
| 1109 | REP | 2 | LAST | 163 | 10,2112 | 6 | 4673 | | AD | NEG1/2 | |
| 1110 | | | | | 10,2113 | 1 | 2115 | | TCF | +2 | ARS(DESOPTS) - 90 DEG |
| 1111 | | | | | 10,2114 | 1 | 2112 | | TCF | -2 | |
| 1112 | | | | | 10,2115 | 0 | 0006 | | EXTEND | | |

L T4RUPT PROGRAM

USER'S PAGE NO. 36 EQ 53

| | | | | | | | | | |
|------|-----|----|------|-------------|------------------|----------|-----------------|---------|--|
| 1113 | | | | 10,2116 | 6 2120 0 | BZMP | +2 | | DESOPTS IN FIRST OR FOURTH QUAD |
| 1114 | REP | 4 | LAST | 163 | 10,2117 1 2122 0 | TCP | QMSSTUP | | |
| 1115 | REP | 3 | LAST | 163 | 10,2120 4 1306 1 | CS | COMMANDO +1 | | REVERSE REGULAR COMMAND |
| 1116 | REP | 4 | LAST | 164 | 10,2121 55=306 1 | TS | COMMANDO +1 | | |
| 1117 | REP | 2 | LAST | 162 TO 163' | 40 40* | | COUNT# 88/T4RPT | | |
| 1118 | REP | 7 | LAST | 162 | 10,2122 3 4712 1 | QMSSTUP | CAP | ONE | SET OPTIND |
| 1119 | REP | 11 | LAST | 163 | 10,2123 55=303 1 | TS | OPTIND | | |
| 1120 | REP | 36 | LAST | 163 | 10,2124 50 000 1 | INDEX | A | | |
| 1121 | REP | 5 | LAST | 164 | 10,2125 11=305 1 | CCS | COMMANDO | | GET SIGN OF COMMAND |
| 1122 | REP | 1 | | | 10,2126 0 2144 1 | TC | POSOPCMD | | |
| 1123 | REP | 1 | | | 10,2127 0 2151 0 | TC | NEXTOPT +1 | | ZERO COMMAND-SKIP SEND INDICATOR |
| 1124 | REP | 1 | | | 10,2130 0 2161 0 | TC | NEGOPCMD | | |
| 1125 | REP | 2 | LAST | 164 | 10,2131 0 2151 0 | TC | NEXTOPT +1 | | ZERO COMMAND |
| 1126 | REP | 4 | LAST | 163 | 10,2132 4 0035 0 | TRUNCMD | CS | CDUT | IF COMMAND GREATER THAN 45 DEG-COMMAND |
| 1127 | REP | 3 | LAST | 163 | 10,2133 6 1160 1 | AD | DESOPTT | | 45 DEG |
| 1128 | REP | 14 | LAST | 161 | 10,2134 54 002 1 | TS | 0 | | |
| 1129 | REP | 1 | | | 10,2135 0 2047 0 | TC | GETOPCMD | | LESS THAN 45 DEG-NORMAL OPERATION |
| 1130 | REP | 37 | LAST | 164 | 10,2136 10 000 0 | CCS | A | | GREATER THAN 45 DEG-USE OPSMAX WITH |
| 1131 | REP | 3 | LAST | 161 | 10,2137 3 4672 0 | CA | POSMAX | | CORRECT SIGN |
| 1132 | | | | | 10,2140 0 2142 1 | TC | +2 | | |
| 1133 | REP | 4 | LAST | 164 | 10,2141 4 4672 1 | CS | POSMAX | | |
| 1134 | REP | 9 | LAST | 163 | 10,2142 54 001 1 | TS | L | | |
| 1135 | REP | 1 | | | 10,2143 0 2063 0 | TC | STORCMD | | |
| 1136 | REP | 1 | | | 10,2144 6 2202 0 | POSOPCMD | AD | MAXPLS1 | |
| 1137 | | | | | 10,2145 0 0006 1 | | EXTEND | | |
| 1138 | REP | 1 | | | 10,2146 6 2166 1 | BZMP | DELOPCMD | | COMMAND LESS THAN MAX PULSE |
| 1139 | REP | 1 | | | 10,2147 4 2201 1 | CS | MAXPLS | | GREATER THAN MAX PULSE-USE MAX PULSE |
| 1140 | REP | 5 | LAST | 163 | 10,2150 24 061 0 | NEXTOPT | INCR | ITEMP1 | SET SEND INDICATOR |
| 1141 | REP | 2 | LAST | 131 | 10,2151 6 4713 0 | AD | NEGO | | MAKE SURE ZERO COMMAND IS -ZERO |
| 1142 | REP | 12 | LAST | 164 | 10,2152 51=303 0 | INDEX | OPTIND | | |
| 1143 | REP | 3 | LAST | 38 | 10,2153 54 053 0 | TS | CDUTCMD | | STORE PULSE IN SEND REG |
| 1144 | REP | 13 | LAST | 164 | 10,2154 11=303 1 | CCS | OPTIND | | |
| 1145 | REP | 5 | LAST | 164 | 10,2155 0 2123 0 | TC | QMSSTUP +1 | | GET NEXT OPT |
| 1146 | REP | 6 | LAST | 164 | 10,2156 10 061 1 | CCS | ITEMP1 | | ARE ANY PULSES TO GO |
| 1147 | REP | 1 | | | 10,2157 1 2171 0 | TCP | SENDOPCMD | | YES-SEND RM |
| 1148 | REP | 15 | LAST | 162 | 10,2160 0 5222 0 | TC | RESUME | | NO |
| 1149 | REP | 2 | LAST | 164 | 10,2161 6 2202 0 | NEGOPCMD | AD | MAXPLS1 | |
| 1150 | | | | | 10,2162 0 0006 1 | | EXTEND | | |
| 1151 | REP | 2 | LAST | 164 | 10,2163 6 2166 1 | BZMP | DELOPCMD | | LESS THAN MAX PULSE |
| 1152 | REP | 2 | LAST | 164 | 10,2164 3 2201 0 | CA | MAXPLS | | MAX PULSES |
| 1153 | REP | 3 | LAST | 164 | 10,2165 1 2150 0 | TCP | NEXTOPT | | |



L TRUPT PROGRAM

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| | | | | | | | | | | |
|------|-----|----|------|-----|---------|--------|---|----------|---------|--------|
| 1154 | REP | 14 | LAST | 164 | 10,2166 | 51-303 | 0 | DELOPCND | INDEX | OPTIND |
| 1155 | REP | 6 | LAST | 164 | 10,2167 | 57-305 | 0 | XCH | COMANDO | |
| 1156 | REP | 4 | LAST | 164 | 10,2170 | 1 2150 | 0 | TCF | NEXTOPT | |
| 1157 | REP | 1 | | | 10,2171 | 3 4755 | 1 | SENDOPND | CAP | 11,12 |
| 1158 | | | | | 10,2172 | 0 0006 | 1 | EXTEND | | |
| 1159 | REP | 3 | LAST | 148 | 10,2173 | 05 014 | 1 | WOR | CHAN14 | |
| 1160 | REP | 16 | LAST | 164 | 10,2174 | 0 5222 | 0 | TC | RESUME | |
| 1161 | REP | 17 | LAST | 162 | 10,2175 | 3 4711 | 1 | SETBIT | CAP | BIT2 |
| 1162 | | | | | 10,2176 | 0 0000 | 1 | EXTEND | | |
| 1163 | REP | 17 | LAST | 162 | 10,2177 | 05 012 | 1 | WOR | CHAN12 | |
| 1164 | REP | 17 | LAST | 165 | 10,2200 | 0 5222 | 0 | TC | RESUME | |
| 1165 | | | | | 10,2201 | 77532 | 0 | MAXPLS | DEC | -165 |
| 1166 | | | | | 10,2202 | 77533 | 1 | MAXPLS1 | DEC | -164 |
| 1167 | REP | 1 | | | 4755 | | | 11,12 | EQUALS | PRIO6 |

SET UP SMALL COMMAND

SEND OCCU DRIVE COMMANDS

ENABLE OCCU ERR CNTS

START COARS NEXT TIME AROUND

WAS -80

WAS -79



L DOWNLINK LISTS

USER'S PAGE NO. 1 E0 53

0001 22,2000
 0002 REP 1 05,2000
 0003 05,2000

BANK 22
 SETLOC DOWNTELM
 BANK

0004 REP 2 LAST 128 0340

ERANK= DNTMBUFF

R0005 SPECIAL DOWNLINK OF CODES

A0006
 A0007
 A0008
 A0009
 A0010
 A0011
 A0012
 A0013
 A0014
 A0015
 A0016
 A0017
 A0018
 A0019

| OF CODE ADDRESS(EXAMPLE) SENDS.. | BIT 15 | BITS 14-12 | BITS 11 |
|----------------------------------|------------------------|------------|-----------------|
| 1DNADR TIME2 | (2 AGC WDS) 0 | 0 | ECADR |
| 2DNADR TEPHEM | (4 AGC WDS) 0 | 1 | ECADR |
| 3DNADR VGHODY | (6 AGC WDS) 0 | 2 | ECADR |
| 4DNADR STATE | (8 AGC WDS) 0 | 3 | ECADR |
| 5DNADR UPFRUFF | (10AGC WDS) 0 | 4 | ECADR |
| 6DNADR DSPTAB | (12AGC WDS) 0 | 5 | ECADR |
| DNCHAN 30 | CHANNELS 0 | 7 | CHANNEL ADDRESS |
| DNPTR NEXTLIST | POINTS TO NEXT LIST. 0 | 6 | ADRES |

R0020 DOWNLIST FORMAT DEFINITIONS AND RULES-

- R0021 1. END OF A LIST = -XDNADR (X = 1 TO 6), -DNPTR, OR -DNCHAN.
- R0022 2. SNAPSHOT SUBLIST = LIST WHICH STARTS WITH A -1DNADR.
- R0023 3. SNAPSHOT SUBLIST CAN ONLY CONTAIN 1DNADRS.
- R0024 4. TIME2 1DNADR MUST BE LOCATED IN THE CONTROL LIST OF A DOWNLIST.
- R0025 5. ERASABLE DOWN TELEMETRY WORDS SHOULD BE GROUPED IN SEQUENTIAL LOCATIONS AS MUCH AS POSSIBLE TO SAVE STORAGE USED BY DOWNLINK LISTS.
- R0026 6. THE DOWNLINK LISTS (INCLUDING SUBLISTS) ARE ORGANIZED SUCH THAT THE ITEMS LISTED FIRST (IN FRONT OF FRANK) ARE SENT FIRST. EXCEPTION--- SNAPSHOT SUBLISTS. IN THE SNAPSHOT SUBLISTS THE DATA REPRESENTED BY THE FIRST 11 1DNADRS IS PRESERVED (IN ORDER) IN DNTMBUFF AND SENT BY THE NEXT 11 DOWNRUPTS. THE DATA REPRESENTED BY THE LIST IS SENT IMMEDIATELY.

R0027 REP 1
 0028 0007
 0029 REP 1 0007
 0030 05,2000 77340 0
 0031 REP 1 05,2113
 0032 REP 1 05,2214

COUNT 05/DLIST
 ERASZERO EQUALS 7
 SPARE EQUALS ERASZERO
 LOWIDCODE OCT 77340
 NONDLST EQUALS CMCSTADL
 UPDLIST EQUALS CMCSTADL

USE SPARE TO INDICATE AVAILABLE SPACE
 LOW ID CODE
 FRESH START AND POST P27 DOWNLIST
 UPDATE PROGRAM (P27) DOWNLIST

L DOWNLINK LISTS

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P0033 CAN POWERED FLIGHT DOWNLIST

R0034 -----CONTROL LIST-----

| REP | REF | TYPE | VAL | TIME | DATA | PARAMETER | DESCRIPTION |
|--------|-----------------|------|-----|---------|---------|-------------------|-------------------------|
| 0035 | | | | 05,2001 | | CMPOWERL EQUALS | |
| 0036 | REP 1 | | | 05,2001 | 32047 0 | DNPTR CMPOWER01 | COLLECT SNAPSHOT |
| 0037 | REP 3 LAST 166 | | | 05,2002 | 24340 0 | 6DNADR DNTMRUFF | SEND SNAPSHOT |
| 0038 | REP 1 | | | 05,2003 | 32056 0 | DNPTR CMPOWER02 | COLLECT SECOND SNAPSHOT |
| 0039 | REP 4 LAST 167 | | | 05,2004 | 14340 0 | 4DNADR DNTMRUFF | SEND SNAPSHOT |
| 0040 | REP 1 | | | 05,2005 | 32063 0 | DNPTR CMPOWER03 | COMMON DATA |
| 0041 | REP 3 LAST 126 | | | 05,2006 | 03412 0 | 1DNADR TIG | TIG,+1 |
| 0042 | REP 2 LAST 115 | | | 05,2007 | 03422 0 | 1DNADR DELTA4 | DELTA4,+1 |
| 0043 | REP 2 LAST 115 | | | 05,2010 | 13414 1 | 3DNADR RTARG | RTARG,+1,+2,...+5 |
| 0044 | REP 2 LAST 115 | | | 05,2011 | 03427 0 | 1DNADR TGO | TGO,+1 |
| 0045 | REP 2 LAST 77 | | | 05,2012 | 01245 0 | 1DNADR PIPTIME1 | PIPTIME1,+1 |
| 0046 | REP 4 LAST 77 | | | 05,2013 | 11182 1 | 3DNADR DELV | DELV,+1,...+4,+5 |
| 0047 | REP 1 | | | 05,2014 | 03025 0 | 1DNADR FACTOFF | FACTOFF,YACTOFF |
| 0048 | REP 2 LAST 102 | | | 05,2015 | 03231 1 | 1DNADR PCMD | PCMD,YCMD |
| 0049 | REP 2 LAST 122 | | | 05,2016 | 03702 1 | 1DNADR CSTEER | CSTEER,+1 |
| 0050 | REP 1 | | | 05,2017 | 00007 0 | 1DNADR SPARE | |
| 0051 | REP 2 LAST 167 | | | 05,2020 | 00007 0 | 1DNADR SPARE | |
| 0052 | REP 3 LAST 167 | | | 05,2021 | 00007 0 | 1DNADR SPARE | |
| 0053 | REP 1 | | | 05,2022 | 25735 1 | 6DNADR REFSMAT | REFSMAT,+1,...+10,+11 |
| 0054 | REP 1 | | | 05,2023 | 32065 0 | DNPTR CMPOWER04 | COMMON DATA |
| 0055 | REP 1 | | | 05,2024 | 00024 1 | 1DNADR TIME2 | TIME2,TIME1 |
| 0056 | REP 1 | | | 05,2025 | 32067 1 | DNPTR CMPOWER05 | COLLECT SNAPSHOT |
| 0057 | REP 5 LAST 167 | | | 05,2026 | 24340 0 | 6DNADR DNTMRUFF | SEND SNAPSHOT |
| 0058 | REP 2 LAST 167 | | | 05,2027 | 32056 0 | DNPTR CMPOWER02 | COLLECT SNAPSHOT |
| 0059 | REP 6 LAST 167 | | | 05,2030 | 14340 0 | 4DNADR DNTMRUFF | SEND SNAPSHOT |
| 0060 | REP 2 LAST 167 | | | 05,2031 | 32063 0 | DNPTR CMPOWER03 | |
| 0061 | REP 1 | | | 05,2032 | 32076 1 | DNPTR CMPOWER06 | COMMON DATA |
| 0062 | REP 2 LAST 124 | | | 05,2033 | 03743 1 | 1DNADR ELEV | ELEV,+1 |
| 006205 | REP 1 | | | 05,2034 | 03753 0 | 1DNADR CENTANG | CENTANG,+1 |
| 00621 | REP 2 LAST 91 | | | 05,2035 | 02810 1 | 1DNADR DELTAR | DELTAR,+1 |
| 0063 | REP 18 LAST 150 | | | 05,2036 | 00106 0 | 1DNADR STATE +10D | STATE10 AND 11 |
| 0064 | REP 2 LAST 79 | | | 05,2037 | 01336 0 | 1DNADR TEVENT | TEVENT,+1 |
| 0065 | REP 3 LAST 167 | | | 05,2040 | 03231 1 | 1DNADR PCMD | PCMD,YCMD |
| 0066 | REP 23 LAST 162 | | | 05,2041 | 01331 1 | 1DNADR OPTMODES | OPTMODES,HOLDFLAG |
| 0067 | REP 1 | | | 05,2042 | 32101 0 | DNPTR CMPOWER07 | COMMON DATA |
| 0068 | REP 3 LAST 122 | | | 05,2043 | 13720 0 | 3DNADR VOTIG | VOTIG,+1,...+4,+5 |
| 0069 | REP 4 LAST 167 | | | 05,2044 | 00007 0 | 1DNADR SPARE | |
| 0070 | REP 5 LAST 167 | | | 05,2045 | 00007 0 | 1DNADR SPARE | |
| 0071 | REP 6 LAST 167 | | | 05,2046 | 77770 1 | -1DNADR SPARE | |

R0072 -----SUB LISTS-----

| | | | | | | | | |
|------|----------------|--|--|---------|---------|------------------------|---------|---------------|
| 0073 | REP 1 | | | 05,2047 | 76605 0 | CMPOWER01-1DNADR RN +2 | RN+2,+3 | SNAPSHOT DATA |
| 0074 | REP 2 LAST 167 | | | 05,2050 | 01174 1 | 1DNADR RN +4 | RN+4,+5 | |
| 0075 | REP 1 | | | 05,2051 | 01176 0 | 1DNADR VN | VN,+1 | |
| 0076 | REP 2 LAST 167 | | | 05,2052 | 01200 1 | 1DNADR VN +2 | VN+2,+3 | |



L DOWNLINK LISTS

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| | | | | | | | | | |
|------|-----|----|------|-----|---------|---------|-----------------------------|---------------------------------|---------------|
| 0077 | REP | 3 | LAST | 167 | 05,2053 | 01202 0 | 1DNADR VN +4 | VN+4,+5 | |
| 0078 | REP | 2 | LAST | 77 | 05,2054 | 01204 0 | 1DNADR PIPTIME | PIPTIME,+1 | |
| 0079 | REP | 3 | LAST | 167 | 05,2055 | 76607 1 | -1DNADR RN | RN,+1 | |
| 0080 | REP | 2 | LAST | 143 | 05,2056 | 77743 1 | COMPONE02-1DNADR CDUZ | CDUZ,CDUT | SNAPSHOT DATA |
| 0081 | REP | 3 | LAST | 114 | 05,2057 | 03133 0 | 1DNADR ADOT | ADOT,+1/OGARATE,+1 | |
| 0082 | REP | 4 | LAST | 168 | 05,2060 | 03135 0 | 1DNADR ADOT +2 | ADOT+2,+3/OMEGAB+2,+3 | |
| 0083 | REP | 5 | LAST | 168 | 05,2061 | 03137 1 | 1DNADR ADOT +4 | ADOT+4,+5/OMEGAB+4,+5 | |
| 0084 | REP | 1 | | | 05,2062 | 77745 1 | -1DNADR CDUX | CDUX,CDUY | |
| 0085 | REP | 2 | LAST | 111 | 05,2063 | 07076 1 | COMPONE03 2DNADR AK | AK,AK1,AK2,RCPLAGS | COMMON DATA |
| 0086 | REP | 3 | LAST | 111 | 05,2064 | 70605 0 | -2DNADR THETADX | THETADX,THETADY,THETADZ,GARBAGE | |
| 0087 | REP | 19 | LAST | 167 | 05,2065 | 20074 0 | COMPONE04 8DNADR STATE | FLAGWRD0 THRU FLAGWRD9 | COMMON DATA |
| 0088 | REP | 17 | LAST | 161 | 05,2066 | 52754 0 | -8DNADR DSPTAB | DISPLAY TABLES | |
| 0089 | REP | 1 | | | 05,2067 | 76054 1 | COMPONE05-1DNADR R-OTHER +2 | R-OTHER+2,+3 | SNAPSHOT DATA |
| 0090 | REP | 2 | LAST | 168 | 05,2070 | 01725 0 | 1DNADR R-OTHER +4 | R-OTHER+4,+5 | |
| 0091 | REP | 1 | | | 05,2071 | 01727 1 | 1DNADR V-OTHER | V-OTHER,+1 | |
| 0092 | REP | 2 | LAST | 168 | 05,2072 | 01731 0 | 1DNADR V-OTHER +2 | V-OTHER+2,+3 | |
| 0093 | REP | 3 | LAST | 168 | 05,2073 | 01733 1 | 1DNADR V-OTHER +4 | V-OTHER+4,+5 | |
| 0094 | REP | 1 | | | 05,2074 | 01842 0 | 1DNADR T-OTHER | T-OTHER,+1 | |
| 0095 | REP | 3 | LAST | 168 | 05,2075 | 76056 0 | -1DNADR R-OTHER | R-OTHER,+1 | |
| 0096 | REP | 1 | | | 05,2076 | 01432 0 | COMPONE06 1DNADR RSBRO | RSBRO,+1 | COMMON DATA |
| 0097 | REP | 1 | | | 05,2077 | 10372 0 | 3DNADR CADRPLSH | CADRPLSH,+1,+2,FAILREQ,+1,+2 | |
| 0098 | REP | 5 | LAST | 163 | 05,2100 | 73741 1 | -2DNADR CDUS | CDUS,PIPAK,PIPAY,PIPAZ | |
| 0099 | REP | 2 | LAST | 100 | 05,2101 | 03073 0 | COMPONE07 1DNADR LEMASS | LEMASS,CSMASS | COMMON DATA |
| 0100 | REP | 1 | | | 05,2102 | 03066 1 | 1DNADR DAPDATR1 | DAPDATR1,DAPDATR2 | |
| 0101 | REP | 3 | LAST | 111 | 05,2103 | 07167 0 | 2DNADR ERRORX | ERRORX,ERRORY,ERRORZ,GARBAGE | |
| 0102 | REP | 4 | LAST | 114 | 05,2104 | 13125 0 | 3DNADR WRDXY | WRDXY,...+5/OMEGAC,...+5 | |
| 0103 | REP | 1 | | | 05,2105 | 05154 1 | 2DNADR REDOCTR | REDOCTR,THETAD,+1,+2 | |
| 0104 | REP | 32 | LAST | 154 | 05,2106 | 01320 1 | 1DNADR IMODES30 | IMODES30,IMODES33 | |
| 0105 | | | | | 05,2107 | 34011 0 | DNCHAN 11 | CHANNELS 11,12 | |
| 0106 | | | | | 05,2110 | 34013 1 | DNCHAN 13 | CHANNELS 13,14 | |
| 0107 | | | | | 05,2111 | 34030 0 | DNCHAN 30 | CHANNELS 30,31 | |
| 0108 | | | | | 05,2112 | 43745 0 | -DNCHAN 32 | CHANNELS 32,33 | |

R0109



L DOWNLINK LISTS

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R0150



L DOWNLINK LISTS

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0193 REP 3 LAST 169 05,2085
0194 REP 3 LAST 169 05,2087
0195 REP 3 LAST 169 05,2076
0196 REP 3 LAST 169 05,2101

CMEND04 EQUALS CMPOZE04
CMEND05 EQUALS CMPOZE05
CMEND06 EQUALS CMPOZE06
CMEND07 EQUALS CMPOZE07

COMMON DOWNLIST DATA
COMMON DOWNLIST DATA
COMMON DOWNLIST DATA
COMMON DOWNLIST DATA

R0197



L DOWNLINK LISTS

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| | | | | | | | | |
|------|-----|---|------|-----|---------|---------|--------------------------|-----------------------|
| 0246 | REF | 5 | LAST | 171 | 05,2056 | | QMENTR02 EQUALS CNP0RE02 | COMMON DOWNLIST DATA |
| 0247 | REF | 5 | LAST | 171 | 05,2063 | | QMENTR03 EQUALS CNP0RE03 | COMMON DOWNLIST DATA |
| 0248 | REF | 4 | LAST | 172 | 05,2065 | | QMENTR04 EQUALS CNP0RE04 | COMMON DOWNLIST DATA |
| 0249 | REF | 5 | LAST | 167 | 05,2264 | 76615 1 | QMENTR05-1DNADR DELV | DELV,+1 SNAPSHOT DATA |
| 0250 | REF | 8 | LAST | 174 | 05,2265 | 01164 0 | 1DNADR DELV +2 | DELV+2,+3 |
| 0251 | REF | 7 | LAST | 174 | 05,2266 | 01166 1 | 1DNADR DELV +4 | DELV+4,+5 |
| 0252 | REF | 3 | LAST | 117 | 05,2267 | 03726 1 | 1DNADR TIS | TIS,+1 |
| 0253 | REF | 3 | LAST | 117 | 05,2270 | 03724 0 | 1DNADR VIO | VIO,+1 |
| 0254 | REF | 4 | LAST | 171 | 05,2271 | 03760 0 | 1DNADR VPRED | VPRED,+1 |
| 0255 | REF | 3 | LAST | 167 | 05,2272 | 76532 1 | -1DNADR PIPTIME1 | PIPTIME1,+1 |
| 0256 | REF | 4 | LAST | 172 | 05,2101 | | QMENTR07 EQUALS CNP0RE07 | COMMON DOWNLIST DATA |

R0257



L DOWNLINK LISTS

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| | | | | | | | | | | |
|------|-----|---|------|-----|---------|---------|----------|---------|----------|----------------------|
| 0301 | REP | 5 | LAST | 174 | 05,2065 | | CMPO2204 | EQUALS | CMPO2504 | COMMON DOWNLIST DATA |
| 0302 | REP | 2 | LAST | 76 | 05,2337 | 76672 0 | CMPO2205 | -1DNADR | LONG | LONG,+1 |
| 0303 | REP | 2 | LAST | 76 | 05,2340 | 01107 0 | | | | SNAPSHOT DATA |
| 0304 | REP | 3 | LAST | 76 | 05,2341 | 76674 0 | | | | ALT,+1 |
| | | | | | | | | | | LAT,+1 |
| 0305 | REP | 4 | LAST | 172 | 05,2076 | | CMPO2206 | EQUALS | CMPO2506 | COMMON DOWNLIST DATA |
| 0306 | REP | 5 | LAST | 174 | 05,2101 | | CMPO2207 | EQUALS | CMPO2507 | COMMON DOWNLIST DATA |

R0307

| | | | | | | | | | |
|------|-----|---|------|-----|---------|---------|--------|--------|----------|
| 0308 | REP | 2 | LAST | 166 | 05,2342 | 02113 0 | DNABLE | GENADR | CMCSTADL |
| 0309 | REP | 2 | LAST | 166 | 05,2343 | 02214 1 | | GENADR | CMENTRDL |
| 0310 | REP | 1 | | | 05,2344 | 02147 1 | | GENADR | CMENDDL |
| 0311 | REP | 1 | | | 05,2345 | 02001 1 | | GENADR | CMPCEDL |
| 0312 | REP | 1 | | | 05,2346 | 02273 0 | | GENADR | CMPO22DL |

R0313



L FRESH START AND RESTART

P00001 PROGRAM DESCRIPTION 8 APRIL, 1967
 P0001 . SUNDISK REV 120
 P0002 FUNCTIONAL DESCRIPTION

 P0003 SLAP1 MAN INITIATED FRESH START
 P0004 1. EXECUTE STARTSUB
 P0005 2. TURN OFF DSKY DISCRETE-LAMPS
 P0006 3. CLEAR FAIL REGISTERS, SELF CHECK ERROR COUNTER AND RESTART
 P0007 COUNTER
 P0008 4. EXECUTE DOPSTART

 P0009 DOPSTART MACHINE INITIATED FRESH START
 P0010 1. CLEAR SELF-CHECK REGISTERS, MODE REGISTER AND CDUZ REGISTER
 P0011 2. CLEAR PHASE TABLE
 P0012 3. INITIALIZE IMJ FLAGS
 P0013 4. INITIALIZE FLAGWORDS
 P0014 5. TRANSFER CONTROL TO IDLE LOOP IN DUMMYJOB

 P0015 GOPROG HARDWARE RESTART
 P0016 0. EXECUTE STARTSUB
 P0017 1. TRANSFER CONTROL TO DOPSTART IF ANY OF THE FOLLOWING CONDITIONS
 P0018 EXIST.
 P0019 A. RESTART OCCURED DURING EXECUTION OF ERASCHK
 P0020 B. BOTH OSCILLATOR FAIL AND AGC WARNING ARE ON.
 P0021 C. MARK REJECT AND EITHER NAV OR MAIN DSKY ERROR LIGHT RESET
 P0022 ARE ON.
 P0023 2. SCHEDULE A TRUPT PROGRAM FOR THE DAP
 P0024 3. SET FLAGWRD5 BITS FOR INTWAKE ROUTINE
 P0025 4. EXTINGUISH ALL DSKY LAMPS, EXCEPT PROGRAM ALARM, GIMBAL LOCK AND
 P0026 NO ATT
 P0027 5. INITIALIZE IMJ FLAGS
 P0028 6. IF ENGINE COMMAND IS ON (FLAGWRD5, BIT 7), SET ENGINE ON (CHAN-
 P0029 NEL 11, BIT 13)
 P0030 7. TRANSFER CONTROL TO GOPROG3

 P0031 ENEMA SOFTWARE RESTART INITIATED BY MAJOR MODE CHANGE
 P0032 1. EXECUTE STARTSR2
 P0033 2. KILL PROGRAMS THAT WERE INTEGRATING OR WAITING FOR INTEGRATION
 P0034 ROUTINE
 P0035 3. TRANSFER CONTROL TO GOPROG3

 P0036 GOPROG3 SUBROUTINE COMMON TO GOPROG AND ENEMA
 P0037 1. TEST PHASE TABLES - IF INCORRECT, DISPLAY ALARM 1107 AND
 P0038 TRANSFER CONTROL TO DOPSTART
 P0039 2. DISPLAY MAJOR MODE
 P0040 3. IF ANY GROUPS WERE ACTIVE UPON RESTART, TRANSFER CONTROL TO THE



L FRESH START AND RESTART

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R0041 RESTARTS SUBROUTINE TO RESCHEDULE PENDING TASKS, LONGCALLS, AND
 R0042 JOBS (P20 IS RESTARTED VIA FINDVAC)
 R0043 4. IF NO GROUPS WERE ACTIVE UPON RESTART, DISPLAY ALARM CODE
 R0044 1110 (RESTART WITH NO ACTIVE GROUPS).
 R0045 5. TRANSFER CONTROL TO IDLE LOOP IN DUMMYJOB

R0046 STARTSUB SUBROUTINE COMMON TO SLAP1 AND GOPROG

R0047 1. CLEAR OUTBIT CHANNELS 5 AND 6
 R0048 2. INITIALIZE TIMES, TIME4, TIME3
 R0049 3. TRANSFER CONTROL TO STARTSB2

R0050 STARTSB2 SUBROUTINE COMMON TO STARTSUB AND ENEMA

R0051 1. INITIALIZE OUTBIT CHANNELS 11,12,13 AND 14
 R0052 2. REPLACE ALL TASKS ON WAITLIST WITH ENDTASK
 R0053 3. MAKE ALL EXECUTIVE REGISTERS AVAILABLE
 R0054 4. MAKE ALL VAC AREAS AVAILABLE
 R0055 5. CLEAR DSKY REGISTERS
 R0056 6. ZERO NUMEROUS SWITCHES
 R0057 7. INITIALIZE OPTICS FLAGS
 R0058 8. INITIALIZE PIPA AND TELEMETRY FAIL FLAGS
 R0059 9. INITIALIZE DOWN TELEMETRY
 R0060 INPUT/OUTPUT INITIALIZATION

R0061 A. CALLING SEQUENCE

R0062 SLAP1 - TC POSTJUMP OR VERR 36,ENTER
 R0063 CADR SLAP1

R0064 ENEMA - TC POSTJUMP *** DO NOT CALL ENEMA WITHOUT ***
 R0065 CADR ENEMA *** CONSULTING POCH PEOPLE ***

R0066 B. OUTPUT

R0067 ERASABLE MEMORY INITIALIZATION

***** PROGRAM ANALYSIS

R0069 A. SUBROUTINES CALLED

R0070 MR.KLEAN, WAITLIST, DSPMM, ALARM, RESTARTS, FINDVAC

R0071 B. ALARMS

R0072 1107 PHASE TABLE ERROR
 R0073 1110 RESTART WITH NO ACTIVE GROUPS



L FRESH START AND RESTART

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| | | | | | | | | |
|-------|-----|----|------|---------|---------|--------|---|------------------------|
| 0074 | | | | 10,2203 | | | | BANK 10 |
| 0075 | REP | 1 | | 05,2000 | | | | SETLOC FRANDRES |
| 0076 | | | | 05,2347 | | | | BANK |
| 0077 | REP | 3 | LAST | 128 | 05,1400 | | | EBANK= LST1 |
| 0078 | REP | 1 | | | | | | COUNT 05/START |
| 0079 | | | | | 05,2347 | 0 0004 | 0 | SLAP1 INHINT |
| 0080 | REP | 1 | | | 05,2350 | 0 2767 | 0 | TC STARTSUB |
| 0081 | REP | 1 | | | 05,2351 | 1 2356 | 1 | STARTSW TOP SKIPSIM |
| 0082 | REP | 10 | LAST | 146 | 05,2352 | 3 4675 | 1 | STARTSIM CAP BIT14 |
| 0083 | REP | 1 | | | 05,2353 | 0 5042 | 0 | TC FINDVAC |
| 0084 | | | | | 05,2354 | 77777 | 0 | SIM2CADR OCT 77777 |
| 0085 | | | | | 05,2355 | 77777 | 0 | OCT 77777 |
| 0086 | REP | 19 | LAST | 169 | 05,2356 | 3 1036 | 0 | SKIPSIM CA DSPTAB +11D |
| 00861 | REP | 1 | | | 05,2357 | 7 4726 | 1 | MASK BITS4d6 |
| 00862 | REP | 17 | LAST | 163 | 05,2360 | 6 4674 | 0 | AD BIT15 |
| 0087 | REP | 20 | LAST | 179 | 05,2361 | 55=036 | 1 | TS DSPTAB +11D |
| 0088 | REP | 10 | LAST | 162 | 05,2362 | 3 4714 | 1 | CAP ZERO |
| 0089 | REP | 2 | LAST | 80 | 05,2363 | 55=365 | 1 | TS ERCLNT |
| 0092 | REP | 1 | | | 05,2364 | 54 375 | 1 | TS FAILREG |
| 0093 | REP | 2 | LAST | 179 | 05,2365 | 54 376 | 1 | TS FAILREG +1 |
| 0094 | REP | 3 | LAST | 179 | 05,2366 | 54 377 | 0 | TS FAILREG +2 |
| 0096 | REP | 3 | LAST | 173 | 05,2367 | 55=154 | 1 | TS REDOCTR |
| 0100 | REP | 1 | | | 05,2370 | 4 4603 | 1 | CS PRIO12 |
| 0101 | REP | 10 | LAST | 134 | 05,2371 | 55=302 | 0 | TS DSRUPTSW |
| 0102 | REP | 11 | LAST | 179 | 05,2372 | 3 4714 | 1 | DOFSTART CAP ZERO |
| 0103 | REP | 2 | LAST | 80 | 05,2373 | 55=360 | 1 | TS ERSTORE |
| 0104 | REP | 2 | LAST | 80 | 05,2374 | 55=362 | 0 | TS SNODE |
| 01045 | REP | 2 | LAST | 83 | 05,2375 | 55=501 | 0 | TS UPSVLAG |
| 01046 | | | | | 05,2376 | 0 0006 | 1 | EXTEND |
| 01047 | REP | 1 | | | 05,2377 | 01 005 | 0 | WRITE CHAN5 |
| 01048 | | | | | 05,2400 | 0 0006 | 1 | EXTEND |
| 01049 | REP | 1 | | | 05,2401 | 01 006 | 0 | WRITE CHAN6 |
| 0105 | | | | | 05,2402 | 0 0006 | 1 | EXTEND |
| 0106 | REP | 6 | LAST | 154 | 05,2403 | 01 011 | 0 | WRITE DSALMOUT |
| 0107 | | | | | 05,2404 | 0 0006 | 1 | EXTEND |
| 0108 | REP | 16 | LAST | 165 | 05,2405 | 01 012 | 0 | WRITE CHAN12 |
| 0109 | | | | | 05,2406 | 0 0006 | 1 | EXTEND |
| 0110 | REP | 1 | | | 05,2407 | 01 013 | 1 | WRITE CHAN13 |
| 0111 | | | | | 05,2410 | 0 0006 | 1 | EXTEND |
| 0112 | REP | 4 | LAST | 165 | 05,2411 | 01 014 | 0 | WRITE CHAN14 |
| 0114 | REP | 7 | LAST | 160 | 05,2412 | 55=316 | 0 | TS WTOPTION |
| 0116 | REP | 2 | LAST | 71 | 05,2413 | 54 332 | 1 | TS DNI.STCOP |

FRESH START. COMES HERE FROM PINBALL. SUBROUTINE DOES MOST OF THE WORK.

PATCH....TOP STARTSIM...FOR SIMULATION

PATCH 2CADR (AND EBANK DESIGNATION) OF SIMULATION START ADDRESS.

REQUESTED FRESH START.

SAME STORY ON ZEROING FAILREG.

DO A FRESH START.
 **** MUST NOT BE REMOVED FROM DOFSTART
 **** MUST NOT BE REMOVED FROM DOFSTART
 UPDATE STATE VECTOR REQUEST FLAGWORD

TURN OFF RCS JETS

TURN OFF RCS JETS

ZERO CHANNEL. 11

ZERO CHANNEL. 12

ZERO CHANNEL. 13

ZERO CHANNEL. 14



L FRESH START AND RESTART

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| | | | | | | | |
|--------|-----|----|----------|---------|----------|--------|-------------|
| 0117 | REP | 1 | | 05,2414 | 54 371 0 | TS | NVSAVE |
| 0118 | REP | 1 | | 05,2415 | 55=071 1 | TS | EBANKTRM |
| 0120 | REP | 1 | | 05,2416 | 55=130 0 | TS | RATEINDX |
| 01201 | REP | 2 | LAST 76 | 05,2417 | 55=126 1 | TS | TRM(C)NT |
| 01202 | REP | 2 | LAST 171 | 05,2420 | 55=125 1 | TS | VIFCNT |
| 01203 | REP | 1 | | 05,2421 | 55=044 1 | TS | EXTVACT |
| 01204 | REP | 21 | LAST 179 | 05,2422 | 4 1036 1 | CS | DSPTAB +11D |
| 012045 | REP | 2 | LAST 179 | 05,2423 | 7 4726 1 | MASK | BITS4d6 |
| 01205 | REP | 38 | LAST 184 | 05,2424 | 10 000 0 | CCS | A |
| 01206 | REP | | | 05,2425 | 0 2431 0 | TC | +4 |
| 01207 | REP | 3 | LAST 180 | 05,2426 | 3 4728 0 | CA | BITS4d6 |
| 01208 | REP | | | 05,2427 | 0 0006 1 | EXTEND | |
| 01209 | REP | 19 | LAST 179 | 05,2430 | 05 012 1 | WOR | CHAN12 |
| 0121 | REP | 1 | | 05,2431 | 0 2474 1 | TC | MR.KLEAN |
| 01215 | REP | 12 | LAST 179 | 05,2432 | 4 4714 0 | CS | ZERO |
| 01216 | REP | 1 | | 05,2433 | 55=011 1 | TS | MODREG |
| 01217 | REP | 1 | | 05,2434 | 3 4371 0 | CAP | PRIO30 |
| 01218 | REP | 1 | | 05,2435 | 54 386 0 | TS | RESTRG |
| 0122 | REP | 1 | | 05,2436 | 3 3167 1 | CAP | IM30 INIP |
| 0123 | REP | 34 | LAST 173 | 05,2437 | 55=320 0 | TS | IMODES30 |
| 0126 | REP | 3 | LAST 159 | 05,2440 | 3 7716 0 | CAP | NEGONE |
| 0127 | REP | 15 | LAST 165 | 05,2441 | 55=303 1 | TS | OPTIND |
| 0129 | REP | 28 | LAST 175 | 05,2443 | 55=331 0 | CAP | OPTMODES |
| 0130 | REP | 1 | | 05,2444 | 3 4755 1 | CAP | SWINIT |
| 0131 | REP | 17 | LAST 161 | 05,2445 | 55=321 1 | TS | IMODES33 |
| 0132 | REP | | | 05,2446 | 0 0006 1 | EXTEND | |
| 0133 | REP | 1 | | 05,2447 | 3 3146 1 | DCA | TS IDLER |
| 0134 | REP | 2 | LAST 126 | 05,2450 | 53=313 0 | DXCH | TSLOC |
| 0135 | REP | | | 05,2451 | 0 0006 1 | EXTEND | |
| 0136 | REP | 1 | | 05,2452 | 3 3175 1 | DCA | SWINIT |
| 0137 | REP | 24 | LAST 175 | 05,2453 | 52 075 1 | DXCH | STATE |
| 0139 | REP | | | 05,2454 | 0 0006 1 | EXTEND | |
| 0140 | REP | 2 | LAST 180 | 05,2455 | 3 3177 0 | DCA | SWINIT +2 |
| 01405 | REP | 25 | LAST 180 | 05,2456 | 52 077 0 | DXCH | STATE +2 |
| 0141 | REP | | | 05,2457 | 0 0006 1 | EXTEND | |
| 0142 | REP | 3 | LAST 180 | 05,2458 | 0 0006 1 | DCA | SWINIT +4 |
| 0143 | REP | 26 | LAST 180 | 05,2461 | 52 101 0 | DXCH | STATE +4 |
| 0144 | REP | | | 05,2462 | 0 0006 1 | EXTEND | |
| 0145 | REP | 4 | LAST 180 | 05,2463 | 3 3203 0 | DCA | SWINIT +6 |
| 0146 | REP | 27 | LAST 180 | 05,2464 | 52 103 1 | DXCH | STATE +6 |

THE IMU WAS IN COARSE ALIGN IN GIMBAL LOCK, SO PUT IT BACK INTO COARSE ALIGN.

FRESH START IMU INITIALIZATION.

KILL COARSE OPTICS

LET TS IDLE.

INITIALIZE SWITCHES ONLY ON FRESH START.



L FRESH START AND RESTART

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| | | | | | | | | | |
|-------|-----|----|------|---------|---------|--------|---|----------|---|
| 01462 | | | | 05,2465 | 0 0006 | 1 | | EXTEND | |
| 01464 | REP | 5 | LAST | 180 | 05,2466 | 3 3205 | 0 | DCA | SWINIT +8D |
| 01466 | REP | 28 | LAST | 180 | 05,2467 | 52 105 | 1 | DXCH | STATE +9D |
| 0147 | REP | 6 | LAST | 181 | 05,2470 | 3 3206 | 0 | CA | SWINIT +10D |
| 0148 | REP | 29 | LAST | 181 | 05,2471 | 54 106 | 1 | TS | STATE +10D |
| 0155 | REP | 2 | LAST | 139 | 05,2472 | 0 4574 | 0 | ENDRSTRT | TC POSTRUMP |
| 0158 | REP | 1 | | | 05,2473 | 03225 | 1 | CADR | DUMMYJOB + 2 DOES A RELINT. (IN A SWITCHED BANK.) |
| 0157 | | | | | 05,2474 | 0 0004 | 0 | MR.KLEAN | INHINT |
| 01571 | | | | | 05,2475 | 0 0006 | 1 | | EXTEND |
| 0158 | REP | 3 | LAST | 184 | 05,2476 | 3 4714 | 1 | DCA | NEC0 |
| 0159 | REP | 1 | | | 05,2477 | 52 755 | 1 | DXCH | -PHASE2 |
| 0160 | | | | | 05,2509 | 0 0006 | 1 | POOKLEAN | EXTEND |
| 0161 | REP | 4 | LAST | 181 | 05,2501 | 3 4714 | 1 | DCA | NEC0 |
| 0162 | REP | 1 | | | 05,2502 | 52 761 | 0 | DXCH | -PHASE4 |
| 0163 | | | | | 05,2503 | 0 0006 | 1 | | EXTEND |
| 0164 | REP | 5 | LAST | 181 | 05,2504 | 3 4714 | 1 | DCA | NEC0 |
| 0165 | REP | 1 | | | 05,2505 | 52 753 | 1 | DXCH | -PHASE1 |
| 0166 | | | | | 05,2506 | 0 0006 | 1 | V37KLEAN | EXTEND |
| 0167 | REP | 6 | LAST | 181 | 05,2507 | 3 4714 | 1 | DCA | NEC0 |
| 0168 | REP | 1 | | | 05,2510 | 52 757 | 0 | DXCH | -PHASE3 |
| 0169 | | | | | 05,2511 | 0 0006 | 1 | | EXTEND |
| 0170 | REP | 7 | LAST | 181 | 05,2512 | 3 4714 | 1 | DCA | NEC0 |
| 0171 | REP | 1 | | | 05,2513 | 52 763 | 1 | DXCH | -PHASE5 |
| 0172 | | | | | 05,2514 | 0 0006 | 1 | | EXTEND |
| 0173 | REP | 8 | LAST | 181 | 05,2515 | 3 4714 | 1 | DCA | NEC0 |
| 0174 | REP | 1 | | | 05,2516 | 52 765 | 1 | DXCH | -PHASE6 |
| 0175 | REP | 15 | LAST | 184 | 05,2517 | 0 0002 | 0 | TC | Q |

L FRESH START AND RESTART

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P0177 COMES HERE FROM LOCATION 4000, GOJAM. RESTART ANY PROGRAMS WHICH MAY HAVE BEEN RUNNING AT THE TIME.

| | | | | | | | | | | | |
|-------|-----|----|------|-----|---------|--------|------|--------|--------|-----------|--------------------------|
| 0179 | REP | 4 | LAST | 179 | 05,2520 | 25=154 | 0 | GOPROG | INCR | REDOCTR | ADVANCE RESTART COUNTER. |
| 0180 | REP | 16 | LAST | 181 | 05,2521 | 22 | 002 | 0 | LXCH | 0 | |
| 01805 | | | | | 05,2522 | 0 | 0008 | 1 | EXTEND | | |
| 01806 | REP | 1 | | | 05,2523 | 04 | 007 | 1 | ROR | SUPERBANK | |
| 0181 | REP | 3 | LAST | 173 | 05,2524 | 53=433 | 0 | | DXCH | RSEBQ | |
| 0182 | REP | 2 | LAST | 179 | 05,2525 | 0 | 2767 | 0 | TC | STARTSUB | |

R0183
R0185
R0187
R0189
R0191

BRASCK TEMPORARILY STORES THE CONTENTS OF TWO ERASABLE LOCATIONS, X AND X+1 INTO SKEEP5 AND SKEEP6. IT ALSO STORES X INTO SKEEP7 AND ERSTORE. IF BRASCK IS INTERRUPTED BY A RESTART, C(ERSTORE) SHOULD EQUAL C(SKEEP7), AND BE A + NUMBER LESS THAN 2000 OCT. OTHERWISE C(ERSTORE) SHOULD EQUAL +0.

| | | | | | | | | | | | |
|------|-----|----|------|-----|---------|--------|------|---|----------|----------|---|
| 0192 | REP | 2 | LAST | 131 | 05,2526 | 3 | 4364 | 1 | CAP | H15 | |
| 0193 | REP | 3 | LAST | 179 | 05,2527 | 7 | 1360 | 1 | MARK | ERSTORE | |
| 0194 | | | | | 05,2530 | 0 | 0006 | 1 | EXTEND | | |
| 0195 | | | | | 05,2531 | 1 | 2533 | 1 | BZP | +2 | IF ERSTORE NOT = +0 OR +N LESS THAN 2K, DOUBT E MEMORY AND DO A FRESH START. |
| 0196 | REP | 1 | | | 05,2532 | 1 | 2372 | 1 | TCP | DOFSTART | |
| 0197 | REP | 4 | LAST | 182 | 05,2533 | 4 | 1360 | 1 | CS | ERSTORE | |
| 0198 | | | | | 05,2534 | 0 | 0006 | 1 | EXTEND | | |
| 0199 | REP | 1 | | | 05,2535 | 1 | 2552 | 0 | BZP | DORSTART | = +0 CONTINUE WITH RESTART. |
| 0200 | REP | 1 | | | 05,2536 | 6 | 1377 | 0 | AD | SKEEP7 | |
| 0201 | | | | | 05,2537 | 0 | 0006 | 1 | EXTEND | | |
| 0202 | | | | | 05,2540 | 1 | 2542 | 1 | BZP | +2 | = SKEEP7, RESTORE E MEMORY. |
| 0203 | REP | 2 | LAST | 182 | 05,2541 | 1 | 2372 | 1 | TCP | DOFSTART | NOT= SKEEP7, DOUBT E MEM, DO FRESH START. |
| 0204 | REP | 2 | LAST | 80 | 05,2542 | 3 | 1374 | 0 | CA | SKEEP4 | |
| 0205 | REP | 1 | | | 05,2543 | 54 | 003 | 0 | TS | BRANK | BRANK OF E MEMORY THAT WAS UNDER TEST. (NOT DXCH SINCE THIS MIGHT HAPPEN AGAIN) |
| 0206 | | | | | 05,2544 | 0 | 0006 | 1 | EXTEND | | |
| 0207 | REP | 2 | LAST | 80 | 05,2545 | 3 | 1376 | 1 | DCA | SKEEP5 | |
| 0208 | REP | 2 | LAST | 182 | 05,2546 | 51=377 | 0 | | INDEX | SKEEP7 | |
| 0209 | | | | | 05,2547 | 52 | 001 | 1 | DXCH | 0000 | E MEMORY RESTORED. |
| 0210 | REP | 13 | LAST | 180 | 05,2550 | 3 | 4714 | 1 | CA | ZERO | |
| 0211 | REP | 5 | LAST | 182 | 05,2551 | 55=360 | 1 | | TS | ERSTORE | |
| 0212 | REP | 18 | LAST | 179 | 05,2552 | 3 | 4674 | 0 | DORSTART | CA | BIT15 |
| 0213 | | | | | 05,2553 | 0 | 0006 | 1 | EXTEND | | TEST OSC FAIL BIT TO SEE IF WE HAVE HAD A POWER TRANSIENT. IF SO, ATTEMPT A RESTART. IF NOT, CHECK THE PRESENT STATE OF AGC WARNING. |
| 0214 | REP | 3 | LAST | 156 | 05,2554 | 03 | 033 | 1 | WAND | CHAN33 | |
| 0215 | | | | | 05,2555 | 0 | 0006 | 1 | EXTEND | | |
| 0216 | REP | 1 | | | 05,2556 | 1 | 2564 | 0 | BZP | BUTTONS | |
| 0217 | REP | 20 | LAST | 179 | 05,2557 | 3 | 4675 | 1 | CA | BIT14 | IF AGC WARNING ON (BIT = 0), DO A FRESH START ON THE ASSUMPTION THAT WE'RE IN A RESTART LOOP. |
| 0218 | | | | | 05,2560 | 0 | 0006 | 1 | EXTEND | | |
| 0219 | REP | 4 | LAST | 182 | 05,2561 | 02 | 033 | 0 | RAND | CHAN33 | |
| 0220 | | | | | 05,2562 | 0 | 0006 | 1 | EXTEND | | |
| 0221 | REP | 3 | LAST | 182 | 05,2563 | 1 | 2372 | 1 | BZP | DOFSTART | |
| 0222 | REP | 1 | | | 05,2564 | 0 | 2744 | 1 | BUTTONS | TC | LIGHTSET |
| 0223 | | | | | | | | | | | EXIT MARK REJECT DEPRESSD SIMULTANEOUSLY |

L FRESH START AND RESTART

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| Address | REP | Count | Label | Address | Count | Label | Comments |
|---------|-------------|-------|-------|---------|----------|-----------------------|---------------------------------------|
| 0236 | REP 1 | | | 05,2565 | 3 0102 1 | ELRSKIP CA FLAGWRD6 | RESTART AUTOPILOTS |
| 0239 | | | | 05,2566 | 0 0006 1 | EXTEND | |
| 0240 | REP 12 LAST | 157 | | 05,2567 | 7 4710 1 | MP BIT3 | BITS 15,14 00 TS IDLOC |
| 0241 | REP 4 LAST | 160 | | 05,2570 | 7 6211 1 | MASK SIX | 01 REDORCS |
| 0242 | | | | 05,2571 | 0 0006 1 | EXTEND | 10 REDOIVC |
| 0243 | REP 39 LAST | 180 | | 05,2572 | 5 0000 1 | INDEX A | 11 REDOSAT |
| 0244 | REP 2 LAST | 180 | | 05,2573 | 3 3146 1 | DCA TS IDLER | |
| 0245 | REP 3 LAST | 180 | | 05,2574 | 53=313 0 | DXCH TSLOC | |
| 0246 | REP 1 | | | 05,2575 | 4 4675 0 | CS INTPLBIT | |
| 0247 | REP 1 | | | 05,2576 | 7 0104 1 | MASK RASFLAG | |
| 0248 | REP 2 LAST | 183 | | 05,2577 | 54 106 1 | TS RASFLAG | |
| 0256 | REP 29 LAST | 180 | | 05,2600 | 3 1331 1 | CA OPTMODES | |
| 0257 | REP 1 | | | 05,2601 | 7 3173 0 | MASK OPTINITR | |
| 0258 | REP 17 LAST | 161 | | 05,2602 | 6 4704 0 | AD BIT7 | |
| 0259 | REP 30 LAST | 183 | | 05,2603 | 55=331 0 | TS OPTMODES | |
| 0260 | REP 20 LAST | 161 | | 05,2604 | 3 4705 1 | CAF BIT6 | |
| 0261 | REP 18 LAST | 180 | | 05,2605 | 7 1321 1 | MASK IMDES33 | |
| 0262 | REP 2 LAST | 180 | | 05,2606 | 6 4763 1 | AD IM33INIT | |
| 0263 | REP 19 LAST | 183 | | 05,2607 | 55=321 1 | TS IMDES33 | |
| 0264 | REP 1 | | | 05,2610 | 3 3171 0 | CA 9,6,4 | LEAVE PROG ALARM, GIMRAL LOCK, NO ATT |
| 0265 | REP 22 LAST | 180 | | 05,2611 | 7 1036 1 | MASK DSPTAB +11D | LAMPS INTACT ON HARDWARE RESTART |
| 0266 | REP 19 LAST | 182 | | 05,2612 | 6 4674 0 | AD BIT15 | |
| 0267 | REP 23 LAST | 183 | | 05,2613 | 57=036 0 | XCH DSPTAB +11D | |
| 0268 | REP 15 LAST | 145 | | 05,2614 | 7 4707 1 | MASK BIT4 | IF NO ATT LAMP WAS ON, LEAVE ISS IN |
| 0269 | | | | 05,2615 | 0 0006 1 | EXTEND | COURSE ALIGN |
| 0270 | REP 1 | | | 05,2616 | 1 2625 0 | BZF NOCOARSE | |
| 0271 | REP 7 LAST | 150 | | 05,2617 | 0 4633 0 | TC IRKCALL | IF NO ATT LAMP ON, RETURN ISS TO |
| 0272 | REP 2 LAST | 143 | | 05,2620 | 16746 0 | CADR SETCOARS | COARSE ALIGN |
| 02721 | REP 5 LAST | 183 | | 05,2621 | 3 6211 0 | CAF SIX | |
| 02722 | REP 6 LAST | 159 | | 05,2622 | 0 5140 1 | TC WAITLIST | |
| 02723 | REP 4 LAST | 144 | | E3,1474 | | ERANK= CDUIND | |
| 02724 | REP 2 LAST | 144 | | 05,2623 | 02742 1 | 2CADR CA+RCE | |
| 02724 | | | | 05,2624 | 16063 0 | | |
| 0273 | REP 1 | | | 05,2625 | 3 3155 0 | NOCOARSE CAF IPAILINH | LEAVE FAILURE INHIBITS INTACT ON |
| 0274 | REP 35 LAST | 180 | | 05,2626 | 7 1320 0 | MASK IMDES30 | HARDWARE RESTART. RESET ALL |
| 0275 | REP 1 | | | 05,2627 | 6 3170 1 | AD IM30INIR | FAILURE CODES. |
| 0276 | REP 36 LAST | 183 | | 05,2630 | 55=320 0 | TS IMDES30 | |
| 0277 | REP 2 LAST | 131 | | 05,2631 | 4 0101 0 | CS FLAGWRD5 | |
| 0278 | REP 10 LAST | 183 | | 05,2632 | 7 4704 1 | MASK BIT7 | |
| 0279 | REP 40 LAST | 183 | | 05,2633 | 10 000 0 | CCS A | |
| 0280 | REP 1 | | | 05,2634 | 1 2657 0 | TCP GOPROG3 | |
| 0281 | REP 14 LAST | 163 | | 05,2635 | 3 4676 1 | CAF BIT13 | |
| 0282 | | | | 05,2636 | 0 0006 1 | EXTEND | |
| 0283 | REP 7 LAST | 179 | | 05,2637 | 05 011 1 | WOR DSAIMOUT | TURN ENGINE ON |



L FRESH START AND RESTART

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| | | | | | | | | | |
|--------|-----|----|------|-----|---------|----------|---------|-----------|---|
| 0284 | REP | 2 | LAST | 183 | 05,2640 | 1 2657 0 | TCP | GOPROG3 | |
| 0285 | | | | | 05,2641 | 0 0004 0 | ENEMA | INHINT | |
| 028505 | REP | 2 | LAST | 182 | 05,2642 | 0 2744 1 | TC | LIGHTSET | EXIT TO DOPSTART IF ERROR RESET AND |
| 02851 | REP | 1 | | | 05,2643 | 0 2777 1 | TC | STARTSR2 | MARK REJECT DEPRESSED SIMULTANEOUSLY |
| 0289 | REP | 1 | | | 05,2644 | 4 3162 0 | CS | INTKASK | RESET INTEGRATION BITS |
| 02891 | REP | 3 | LAST | 183 | 05,2645 | 7 0106 1 | MASK | RASFLAG | |
| 0290 | REP | 4 | LAST | 184 | 05,2646 | 54 106 1 | TS | RASFLAG | |
| 02901 | REP | 2 | LAST | 183 | 05,2647 | 4 0102 0 | CS | FLAGSR6 | IS TVC ON |
| 02902 | REP | 1 | | | 05,2650 | 7 4105 0 | MASK | OCT60000 | |
| 02903 | | | | | 05,2651 | 0 0006 1 | EXTEND | | |
| 02904 | REP | 3 | LAST | 184 | 05,2652 | 6 2657 1 | BZNP | GOPROG3 | NO |
| 02905 | REP | 2 | LAST | 127 | 05,2653 | 3 4731 0 | CAP | .5SEC | YES, CALL TVC(X)C TASK WHICH WAS KILLED |
| 02906 | REP | 7 | LAST | 183 | 05,2654 | 0 5140 1 | TC | WAITLIST | IN STARTSR2. |
| 02907 | REP | 1 | | | 05,2655 | 0 2660 0 | BRANK- | BZBRO | |
| 02908 | REP | 1 | | | 05,2656 | 34086 0 | ZCADR | TVCE(X)C | |
| 0291 | REP | 1 | | | 05,2657 | 3 4715 0 | GOPROG3 | CAP | NUMGRPS |
| 0292 | REP | 1 | | | 05,2660 | 54 161 0 | PCLOOP | TS | MPAC +5 |
| 0293 | | | | | 05,2661 | 6 0000 1 | | DOUBLE | |
| 0294 | | | | | 05,2662 | 0 0006 1 | | EXTEND | |
| 0295 | REP | 41 | LAST | 183 | 05,2663 | 5 0000 1 | INDEX | A | |
| 0296 | REP | 2 | LAST | 181 | 05,2664 | 3 0753 0 | DCA | -PHASE1 | COMPLEMENT INTO A, DIRECT INTO L. |
| 0297 | | | | | 05,2665 | 0 0006 1 | EXTEND | | |
| 0298 | REP | 9 | LAST | 183 | 05,2666 | 08 001 0 | ROR | LCHAN | RESULT MUST BE -0 FOR AGREEMENT. |
| 0299 | REP | 42 | LAST | 184 | 05,2667 | 10 000 0 | CCS | A | |
| 0300 | REP | 1 | | | 05,2670 | 1 2737 1 | TCP | PTBAD | RESTART FAILURE. |
| 0301 | REP | 2 | LAST | 184 | 05,2671 | 1 2737 1 | TCP | PTBAD | |
| 0302 | REP | 3 | LAST | 184 | 05,2672 | 1 2737 1 | TCP | PTBAD | |
| 0303 | REP | 2 | LAST | 184 | 05,2673 | 10 161 0 | CCS | MPAC +5 | PROCESS ALL RESTART GROUPS. |
| 0304 | REP | 1 | | | 05,2674 | 1 2660 1 | TCP | PCLOOP | |
| 0305 | REP | 3 | LAST | 184 | 05,2675 | 54 162 0 | TS | MPAC +6 | SET TO +0. |
| 0306 | REP | 1 | | | 05,2676 | 0 5247 0 | TC | MDSPLAY | DISPLAY MAJOR MODE |
| 0307 | | | | | 05,2677 | 0 0004 0 | INHINT | | RELINT DONE IN MDSPLAY |
| 03071 | REP | 3 | LAST | 184 | 05,2700 | 30 102 1 | CAB | FLAGSR6 | IS RCS DAP RUNNING (BITS 15 14 OF |
| 030715 | REP | 2 | LAST | 184 | 05,2701 | 7 4105 0 | MASK | OCT60000 | FLAGSR6 = 01) |
| 03072 | | | | | 05,2702 | 0 0006 1 | EXTEND | | YES, DO STOPRATE |
| 030725 | REP | 1 | | | 05,2703 | 6 2712 1 | BZNP | NXTRST -1 | NO, SKIP TO NXTRST -1 |
| 03073 | REP | 1 | | | 05,2704 | 3 4752 0 | CAP | ERANK6 | STOPRATE IS DONE IN ERANK 6 |
| 03074 | REP | 2 | LAST | 182 | 05,2705 | 54 003 0 | TS | ERANK | |
| 03075 | REP | 6 | LAST | 183 | 05,2706 | 0 4633 0 | TC | IRKCALL | ZERO DELCDS, WRDYS, AND PHASES THIS |
| 03076 | REP | 1 | | | 05,2707 | 45245 0 | CADR | STOPRATE | STOPING AUTOMATIC MANANRRING |
| 03077 | REP | 1 | | | 05,2710 | 3 4744 1 | CAP | ERANK3 | |
| 03078 | REP | 3 | LAST | 184 | 05,2711 | 54 003 0 | TS | ERANK | |
| 0308 | REP | 2 | LAST | 184 | 05,2712 | 3 4715 0 | CAP | NUMGRPS | SEE IF ANY GROUPS RUNNING. |



L FRESH START AND RESTART

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| | | | | | | | | | |
|-------|-----|----|------|-----|---------|----------|---------|--------|----------|
| 0309 | REP | 4 | LAST | 184 | 05,2713 | 54 161 0 | NXTRST | TS | MPAC +5 |
| 0310 | | | | | 05,2714 | 6 0000 1 | | DOUBLE | |
| 0311 | REP | 43 | LAST | 184 | 05,2715 | 50 000 1 | | INDEX | A |
| 0312 | REP | 1 | | | 05,2716 | 10 753 1 | | CCS | PHASE1 |
| 0313 | REP | 1 | | | 05,2717 | 1 2721 0 | | TCP | PACTIVE |
| 0314 | REP | 1 | | | 05,2720 | 1 2726 1 | | TCP | PINACT |
| 0315 | REP | 5 | LAST | 185 | 05,2721 | 54 154 0 | PACTIVE | TS | MPAC |
| 0316 | REP | 6 | LAST | 185 | 05,2722 | 24 154 1 | | INCR | MPAC |
| 0317 | REP | 7 | LAST | 185 | 05,2723 | 24 162 1 | | INCR | MPAC +6 |
| 0318 | REP | 1 | | | 05,2724 | 3 2743 0 | | CA | RACADR |
| 0319 | REP | 1 | | | 05,2725 | 0 4561 1 | | TC | SWCALL |
| 0320 | REP | 8 | LAST | 185 | 05,2726 | 10 161 0 | PINACT | CCS | MPAC +5 |
| 0321 | REP | 2 | LAST | 184 | 05,2727 | 1 2713 1 | | TCP | NXTRST |
| 0326 | REP | 9 | LAST | 185 | 05,2730 | 10 162 0 | | CCS | MPAC +6 |
| 0327 | REP | 1 | | | 05,2731 | 1 2472 0 | | TCP | ENDRSTRT |
| 0328 | REP | 20 | LAST | 183 | 05,2732 | 3 4674 0 | | CAF | BIT15 |
| 0329 | REP | 2 | LAST | 180 | 05,2733 | 7 1011 1 | | MARK | MODREG |
| 03291 | | | | | 05,2734 | 0 0006 1 | | EXTEND | |
| 03292 | REP | 1 | | | 05,2735 | 1 4106 0 | | RZP | GOTOPOCH |
| 03293 | REP | 2 | LAST | 185 | 05,2736 | 1 2472 0 | | TCP | ENDRSTRT |
| 0336 | REP | 10 | LAST | 182 | 05,2737 | 0 5537 0 | PIRAD | TC | ALARM |
| 0337 | | | | | 05,2740 | 01107 0 | | OCT | 1107 |
| 0338 | REP | 4 | LAST | 182 | 05,2741 | 1 2372 1 | | TCP | DOFSTART |

PNZ - GROUP ACTIVE.
+0 - GROUP NOT RUNNING.

ABS OF PHASE.
INDICATE GROUP DEMANDS PRESENT.

MUST RETURN TO SWRETURN.

PROCESS ALL RESTART GROUPS.

NO, CHECK PHASE ACTIVITY FLAG
PHASE ACTIVE
IS MODE -0

NO
YES
SET ALARM TO SHOW PHASE TABLE FAILURE.

IN R2).

R0339 *****

R0340

R0341

R0342

R0343

R0344

R0345

R0346

R0347

R0348

R0349

R0350

R0351

R0352

R0353

R0354

R0355

R0356

R0357

R0358

R0359

R0360

DO NOT USE GOPROG2 OR ENEMA WITHOUT CONSULTING POCH PEOPLE

| | | | | | | | | | | |
|------|-----|----|------|-----|---------|----------|----------|----------|-------------|----------|
| 0343 | REP | 1 | | | 05,2841 | | | GOPROG2 | EQUALS | ENEMA |
| 0344 | REP | 15 | LAST | 183 | 4676 | | | OCT10000 | = | BIT13 |
| 0345 | REP | 2 | LAST | 180 | 4371 | | | OCT30000 | = | PRI030 |
| 0346 | | | | | 05,2742 | 07777 1 | | OCT7777 | OCT | 7777 |
| 0347 | REP | 1 | | | 05,2743 | 03520 0 | | RACADR | CADR | RESTARTS |
| 0348 | REP | 19 | LAST | 183 | 05,2744 | 3 4704 0 | LIGHTSET | CAF | BIT7 | |
| 0349 | | | | | 05,2745 | 0 0006 1 | | EXTEND | | |
| 0350 | REP | 1 | | | 05,2746 | 02 016 1 | | RAND | NAVKEYIN | |
| 0351 | | | | | 05,2747 | 0 0006 1 | | EXTEND | | |
| 0352 | REP | 1 | | | 05,2750 | 1 2764 1 | | RZP | NONAVKEY | |
| 0353 | REP | 1 | | | 05,2751 | 3 4362 1 | | CAF | OCT37 | |
| 0354 | | | | | 05,2752 | 0 0006 1 | | EXTEND | | |
| 0355 | REP | 2 | LAST | 185 | 05,2753 | 02 016 1 | | RAND | NAVKEYIN | |
| 0356 | REP | 1 | | | 05,2754 | 6 3166 0 | | AD | -ELR | |
| 0357 | | | | | 05,2755 | 0 0006 1 | | EXTEND | | |
| 0358 | REP | 2 | LAST | 185 | 05,2756 | 1 2765 0 | | RZP | NONAVKEY +1 | |
| 0359 | | | | | 05,2757 | 0 0006 1 | | EXTEND | | |
| 0360 | REP | 1 | | | 05,2760 | 00 015 0 | | READ | MNKEYIN | |

DOFSTART IF MARK REJECT AND EITHER
ERROR LIGHT RESET BUTTONS ARE DEPRESSED

NO MARK REJECT

NAV DSKY KEYCODES, MARK, MARK REJECT.

MAIN DSKY KEYCODES



L FRESH START AND RESTART

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| | | | | | | | | | | |
|-------|-----|----|------|-----|---------|----|------|---|----------|----------|
| 0361 | REP | 2 | LAST | 185 | 05,2761 | 6 | 3166 | 0 | AD | -ELR |
| 0362 | | | | | 05,2762 | 0 | 0000 | 1 | EXTEND | |
| 0363 | | | | | 05,2763 | 1 | 2765 | 0 | REP | +2 |
| 0364 | REP | 17 | LAST | 182 | 05,2764 | 0 | 0002 | 0 | NONAVKEY | TC |
| 0365 | REP | 3 | LAST | 182 | 05,2765 | 0 | 2767 | 0 | TC | STARTSUB |
| 0366 | REP | 5 | LAST | 185 | 05,2766 | 1 | 2372 | 1 | TC | DOFSTART |
| 0367 | REP | 1 | | | 05,2767 | 3 | 3156 | 0 | STARTSUB | CAP |
| 0368 | REP | 1 | | | 05,2770 | 54 | 335 | 0 | TS | DNTMOTO |
| A0369 | | | | | | | | | | |
| A0370 | | | | | | | | | | |
| 0371 | REP | 5 | LAST | 184 | 05,2771 | 3 | 4672 | 0 | CA | POSMAK |
| 0372 | REP | 1 | | | 05,2772 | 54 | 028 | 1 | TS | TIME3 |
| 0373 | REP | 1 | | | 05,2773 | 6 | 7715 | 0 | AD | MINUS2 |
| 0374 | REP | 4 | LAST | 133 | 05,2774 | 54 | 027 | 0 | TS | TIME4 |
| 0375 | REP | 4 | LAST | 180 | 05,2775 | 6 | 7716 | 0 | AD | NEGONE |
| 0376 | REP | 2 | LAST | 127 | 05,2776 | 54 | 030 | 0 | TS | TIME5 |
| 0377 | REP | 1 | | | 05,2777 | 3 | 3163 | 0 | STARTSUB | CAP |
| 0378 | | | | | 05,3000 | 0 | 0006 | 1 | EXTEND | OCT77603 |
| 0379 | REP | 8 | LAST | 183 | 05,3001 | 03 | 011 | 1 | WAND | DSALMOUT |
| 0383 | REP | 1 | | | 05,3002 | 3 | 3164 | 1 | CAP | OCT77777 |
| 0384 | | | | | 05,3003 | 0 | 0006 | 1 | EXTEND | |
| 0385 | REP | 2 | LAST | 179 | 05,3004 | 03 | 013 | 0 | WAND | CHAN13 |
| 03881 | REP | 21 | LAST | 182 | 05,3005 | 4 | 4675 | 0 | CS | BIT14 |
| 03882 | REP | 1 | | | 05,3006 | 7 | 0076 | 1 | MASK | FLAGWR2 |
| 03883 | REP | 2 | LAST | 186 | 05,3007 | 54 | 076 | 1 | TS | FLAGWR2 |
| 0389 | REP | 4 | LAST | 179 | E3,1400 | | | | EBANK | LST1 |
| 0390 | REP | 1 | | | 05,3010 | 3 | 3165 | 0 | CAP | STARTER |
| 0391 | REP | 4 | LAST | 184 | 05,3011 | 54 | 003 | 0 | TS | BRANK |
| 0392 | REP | 3 | LAST | 183 | 05,3012 | 3 | 4673 | 1 | CAP | NEG1/2 |
| 0393 | REP | 5 | LAST | 186 | 05,3013 | 55 | 407 | 1 | TS | LST1 +7 |
| 0394 | REP | 6 | LAST | 186 | 05,3014 | 55 | 406 | 0 | TS | LST1 +6 |
| 0395 | REP | 7 | LAST | 186 | 05,3015 | 55 | 405 | 0 | TS | LST1 +5 |
| 0396 | REP | 8 | LAST | 186 | 05,3016 | 55 | 404 | 1 | TS | LST1 +4 |
| 0397 | REP | 9 | LAST | 186 | 05,3017 | 55 | 403 | 0 | TS | LST1 +3 |
| 0398 | REP | 10 | LAST | 186 | 05,3020 | 55 | 402 | 1 | TS | LST1 +2 |
| 0399 | REP | 11 | LAST | 186 | 05,3021 | 55 | 401 | 1 | TS | LST1 +1 |
| 0400 | REP | 12 | LAST | 186 | 05,3022 | 55 | 400 | 0 | TS | LST1 |
| 0401 | REP | 1 | | | 05,3023 | 4 | 5173 | 0 | CS | ENDTASK |
| 0402 | REP | 1 | | | 05,3024 | 55 | 410 | 1 | TS | LST2 |
| 0403 | REP | 2 | LAST | 186 | 05,3025 | 55 | 412 | 0 | TS | LST2 +2 |
| 0404 | REP | 3 | LAST | 186 | 05,3026 | 55 | 414 | 0 | TS | LST2 +4 |
| 0405 | REP | 4 | LAST | 186 | 05,3027 | 55 | 416 | 1 | TS | LST2 +6 |
| 0406 | REP | 5 | LAST | 186 | 05,3030 | 55 | 420 | 1 | TS | LST2 +8D |

SET POINTER SO NEXT 20MS DOWNRUPT WILL CAUSE THE CURRENT DOWNLIST TO BE INTERRUPTED AND START SENDING FROM THE BEGINNING OF THE CURRENT DOWNLIST.

37777 TO TIME3.

37775 TO TIME4.

37774 TO TIME5.

TURN OFF UPLINK ACTY, TEMP CAUTION, KR, FLASH, OP. ERROR. LEAVE OTHERS UNCHANGED

TURN OFF TEST ALARMS, STANDBY ENABLE.

CLEAR R21MARK
R21 SETS R21MARK AND RESETS IT IF R21 IS TERMINATED NORMALLY

SET FOR E3

INITIALIZE WAITLIST DELTA-TS.

L FRESH START AND RESTART

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| | | | | | | | | | |
|-------|-----|----|------|-----|---------|----------|--------|---------------|--|
| 0407 | REP | 8 | LAST | 186 | 05,3031 | 55=422 0 | TS | LST2 +10D | |
| 0408 | REP | 7 | LAST | 187 | 05,3032 | 55=424 0 | TS | LST2 +12D | |
| 0409 | REP | 8 | LAST | 187 | 05,3033 | 55=426 1 | TS | LST2 +14D | |
| 0410 | REP | 9 | LAST | 187 | 05,3034 | 55=430 0 | TS | LST2 +16D | |
| 0411 | REP | 2 | LAST | 186 | 05,3035 | 4 5174 1 | CS | ENDTASK +1 | |
| 0412 | REP | 10 | LAST | 187 | 05,3036 | 55=411 0 | TS | LST2 +1 | |
| 0413 | REP | 11 | LAST | 187 | 05,3037 | 55=413 1 | TS | LST2 +3 | |
| 0414 | REP | 12 | LAST | 187 | 05,3040 | 55=415 1 | TS | LST2 +5 | |
| 0415 | REP | 13 | LAST | 187 | 05,3041 | 55=417 0 | TS | LST2 +7 | |
| 0416 | REP | 14 | LAST | 187 | 05,3042 | 55=421 0 | TS | LST2 +9D | |
| 0417 | REP | 15 | LAST | 187 | 05,3043 | 55=423 1 | TS | LST2 +11D | |
| 0418 | REP | 16 | LAST | 187 | 05,3044 | 55=425 1 | TS | LST2 +13D | |
| 0419 | REP | 17 | LAST | 187 | 05,3045 | 55=427 0 | TS | LST2 +15D | |
| 0420 | REP | 18 | LAST | 187 | 05,3046 | 55=431 1 | TS | LST2 +17D | |
| 0421 | REP | 14 | LAST | 182 | 05,3047 | 4 4714 0 | CS | ZERO | MAKE ALL EXECUTIVE REGISTER SETS AVAILABLE. |
| 0422 | REP | 1 | | | 05,3050 | 54 167 0 | TS | PRIORITY | |
| 0423 | REP | 2 | LAST | 187 | 05,3051 | 54 203 1 | TS | PRIORITY +12D | |
| 0424 | REP | 3 | LAST | 187 | 05,3052 | 54 217 1 | TS | PRIORITY +24D | |
| 0425 | REP | 4 | LAST | 187 | 05,3053 | 54 233 1 | TS | PRIORITY +36D | |
| 0426 | REP | 5 | LAST | 187 | 05,3054 | 54 247 1 | TS | PRIORITY +48D | |
| 0427 | REP | 6 | LAST | 187 | 05,3055 | 54 263 1 | TS | PRIORITY +60D | |
| 0428 | REP | 7 | LAST | 187 | 05,3056 | 54 277 1 | TS | PRIORITY +72D | |
| 0429 | REP | 11 | LAST | 179 | 05,3057 | 55=302 0 | TS | DSRUPTSW | |
| 0430 | REP | 1 | | | 05,3060 | 54 067 1 | TS | NEWJOB | SHOWS NO ACTIVE JOBS. |
| 0431 | REP | 1 | | | 05,3061 | 3 3160 0 | CAP | VAC1ADRC | MAKE ALL VAC AREAS AVAILABLE. |
| 0432 | REP | 1 | | | 05,3062 | 54 400 1 | TS | VAC1USE | |
| 0433 | REP | 1 | | | 05,3063 | 6 3161 1 | AD | LTHVACA | |
| 0434 | REP | 1 | | | 05,3064 | 54 454 0 | TS | VAC2USE | |
| 0435 | REP | 2 | LAST | 187 | 05,3065 | 6 3161 1 | AD | LTHVACA | |
| 0436 | REP | 1 | | | 05,3066 | 54 530 0 | TS | VAC3USE | |
| 0437 | REP | 3 | LAST | 187 | 05,3067 | 6 3161 1 | AD | LTHVACA | |
| 0438 | REP | 1 | | | 05,3070 | 54 604 1 | TS | VAC4USE | |
| 0439 | REP | 4 | LAST | 187 | 05,3071 | 6 3161 1 | AD | LTHVACA | |
| 0440 | REP | 1 | | | 05,3072 | 54 660 0 | TS | VAC5USE | |
| 0441 | REP | 1 | | | 05,3073 | 3 4377 0 | CAP | TEN | BLANK DSKY REGISTERS (PROGRAM, VERR, NOUN, R1, R2, R3) |
| A0442 | | | | | | | | | |
| 0443 | REP | 10 | LAST | 185 | 05,3074 | 54 154 0 | DSPOFF | MPAC | |
| 0444 | REP | 0 | LAST | 81 | 05,3075 | 4 4677 1 | CS | RT12 | |
| 0445 | REP | 11 | LAST | 187 | 05,3076 | 50 154 1 | INDEX | MPAC | |
| 0446 | REP | 24 | LAST | 183 | 05,3077 | 55=023 0 | TS | DSPTAB | |
| 0447 | REP | 12 | LAST | 187 | 05,3100 | 10 154 0 | CCS | MPAC | |
| 0448 | REP | 1 | | | 05,3101 | 1 3074 0 | TCF | DSPOFF | |
| 0449 | REP | 1 | | | 05,3102 | 55=141 0 | TS | DELAYLOC | |
| 0450 | REP | 2 | LAST | 187 | 05,3103 | 55=142 0 | TS | DELAYLOC +1 | |
| 0451 | REP | 3 | LAST | 187 | 05,3104 | 55=143 1 | TS | DELAYLOC +2 | |



L FRESH START AND RESTART

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| | | | | | | | | |
|-------|-----|----|------|-----|---------|----------|----------|----------------|
| 04515 | REP | 4 | LAST | 187 | 05,3105 | 55=144 0 | TS | DELAYLOC +3 |
| 0452 | REP | 1 | | | 05,3106 | 55=073 0 | TS | R1SAVE |
| 0453 | REP | 1 | | | 05,3107 | 54 045 1 | TS | INLINK |
| 0454 | REP | 7 | LAST | 131 | 05,3110 | 84 776 0 | TS | DSPCNT |
| 0455 | REP | 1 | | | 05,3111 | 55=042 1 | TS | CADRSTOR |
| 0456 | REP | 1 | | | 05,3112 | 55=013 0 | TS | REQRBT |
| 0457 | REP | 1 | | | 05,3113 | 55=015 0 | TS | CLPASS |
| 0458 | REP | 1 | | | 05,3114 | 55=012 1 | TS | DSPLOCK |
| 0459 | REP | 1 | | | 05,3115 | 55=020 0 | TS | MCONSAVE |
| 0460 | REP | 1 | | | 05,3116 | 55=021 1 | TS | MCONSAVE1 |
| 0461 | REP | 1 | | | 05,3117 | 85=001 0 | TS | VERBREQ |
| 0462 | REP | 1 | | | 05,3120 | 55=002 0 | TS | NOUNREQ |
| 0463 | REP | 1 | | | 05,3121 | 55=043 0 | TS | DSPLIST |
| 0464 | REP | 1 | | | 05,3122 | 55=330 1 | TS | MARKSTAT |
| 0465 | REP | 1 | | | 05,3123 | 55=322 1 | TS | IMJCADR |
| 0466 | REP | 1 | | | 05,3124 | 55=323 0 | TS | OPTCADR |
| 0467 | REP | 1 | | | 05,3125 | 55=324 1 | TS | RADCADR |
| 0468 | REP | 2 | LAST | 79 | 05,3126 | 55=325 0 | TS | ATTCADR |
| 0469 | REP | 1 | | | 05,3127 | 55=304 0 | TS | LOYRO |
| 0470 | REP | 1 | | | 05,3130 | 54 100 1 | TS | FLAGWRD4 |
| 0471 | REP | 1 | | | 05,3131 | 3 4717 1 | CAP | NQUTCON |
| 0472 | REP | 5 | LAST | 133 | 05,3132 | 55=016 0 | TS | NQUT |
| 0473 | REP | 22 | LAST | 186 | 05,3133 | 3 4675 1 | CAP | BIT14 |
| 0474 | REP | 2 | LAST | 180 | 05,3134 | 7 1044 1 | MASK | EXTRACT |
| 0475 | REP | 3 | LAST | 188 | 05,3135 | 55=044 1 | TS | EXTRACT |
| 0476 | REP | 1 | | | 05,3136 | 3 3157 1 | CAP | LESCHK |
| 0477 | REP | 2 | LAST | 80 | 05,3137 | 55=361 0 | TS | SELPRFT |
| 0478 | REP | 1 | | | 05,3140 | 4 4374 1 | CS | VD1 |
| 0479 | REP | 2 | LAST | 132 | 05,3141 | 54 777 1 | TS | DSPCOUNT |
| 0480 | REP | 18 | LAST | 186 | 05,3142 | 0 0002 0 | TC | 0 |
| 0481 | REP | 10 | LAST | 164 | 05,3143 | 3 0001 0 | TS IDLOC | CA L |
| 0482 | REP | 1 | | | 05,3144 | 1 5225 0 | TOP | NOQRSM +1 |
| 0483 | REP | 2 | LAST | 103 | E6,1672 | | ERANK= | OGANOW |
| 0484 | REP | 1 | | | 05,3145 | 03143 1 | TS IDLER | 2CADR TS IDLOC |
| 0484 | REP | 1 | | | 05,3146 | 12066 1 | | |
| 0485 | REP | 3 | LAST | 188 | E6,1672 | | ERANK= | OGANOW |
| 0486 | REP | 1 | | | 05,3147 | 02071 0 | 2CADR | REDORCS |
| 0486 | REP | 1 | | | 05,3150 | 42066 1 | | |
| 0487 | REP | 4 | LAST | 188 | E6,1672 | | ERANK= | OGANOW |
| 0488 | REP | 1 | | | 05,3151 | 03165 0 | 2CADR | REDOTVC |
| 0488 | REP | 1 | | | 05,3152 | 34066 0 | | |
| 0489 | REP | 5 | LAST | 188 | E6,1672 | | ERANK= | OGANOW |
| 0490 | REP | 1 | | | 05,3153 | 02765 1 | 2CADR | REDOSAT |
| 0490 | REP | 1 | | | 05,3154 | 46066 0 | | |
| 0491 | REP | 1 | | | 05,3155 | 00435 0 | IFAILINH | OCT 435 |
| 0492 | REP | 1 | | | 05,3156 | 03381 0 | IDNPHAS1 | ORNADR DNPHAS1 |

KILL MONITOR

KILL INTERFACE DISPLAYS

SELF CHECK GO-TO REGISTER.

TSRUPT COMES HERE EVERY 163.84 SECS
WHEN NOBODY IS USING IT.



L FRESH START AND RESTART

USER'S PAGE NO. 13 B3 B3

| | | | | | | | | | |
|-------|-----|----|---------|-------|---------|----------|--------|----------|--------|
| 0493 | REF | 1 | 05,3157 | 03334 | 0 | LESCHK | GENADR | SELCHK | |
| 0494 | REF | 2 | LAST | 167 | 05,3160 | 00400 | 0 | VAC1ADRC | ADRES |
| 0495 | | | 05,3161 | 00054 | 0 | LTRVACA | DEC | 44 | |
| 04955 | | | 05,3162 | 20100 | 1 | INTMAX | OCT | 20100 | |
| 0496 | | | 05,3163 | 77603 | 1 | OCT77603 | OCT | 77603 | |
| 0497 | | | 05,3164 | 74777 | 0 | OCT74777 | OCT | 74777 | |
| 0498 | REF | 13 | LAST | 166 | 05,3165 | 01400 | 1 | STARTER | ECADR |
| 0499 | REF | 1 | | | 4715 | | | NUMORPS | EQUALS |
| 0500 | | | 05,3166 | 77755 | 0 | -ELR | OCT | -22 | |
| 0501 | | | 05,3167 | 37411 | 1 | IM30INIP | OCT | 37411 | |
| 0502 | | | 05,3170 | 37000 | 0 | IM30INIR | OCT | 37000 | |
| 0503 | REF | 2 | LAST | 155 | 4763 | | | IM33INIT | = |
| 0504 | | | 05,3171 | 00450 | 0 | 9,6,4 | OCT | 450 | |
| 0505 | | | 05,3172 | 00130 | 0 | OPTINITP | OCT | 130 | |
| 0506 | | | 05,3173 | 00430 | 0 | OPTINITR | OCT | 430 | |
| 0507 | | | 05,3174 | 00000 | 1 | SWINIT | OCT | 0 | |
| 0508 | | | 05,3175 | 00000 | 1 | | OCT | 0 | |
| 0509 | | | 05,3176 | 00000 | 1 | | OCT | 0 | |
| 0510 | | | 05,3177 | 00000 | 1 | | OCT | 0 | |
| 0511 | | | 05,3200 | 00000 | 1 | | OCT | 0 | |
| 0512 | | | 05,3201 | 00200 | 0 | | OCT | 00200 | |
| 0513 | | | 05,3202 | 00000 | 1 | | OCT | 0 | |
| 0514 | | | 05,3203 | 00100 | 0 | | OCT | 00100 | |
| 0515 | | | 05,3204 | 00000 | 1 | | OCT | 0 | |
| 0516 | | | 05,3205 | 00000 | 1 | | OCT | 0 | |
| 05162 | | | 05,3206 | 00000 | 1 | | OCT | 0 | |

-ERROR LIGHT RESET KEY CODE.
INHIBITS IMJ FAIL FOR 5 SEC AND PIP ISSW
NO PIP OR TM FAIL SIGNALS.



L FRESH START AND RESTART

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R0517 PROGRAM NAME GOTOPOOH ASSEMBLY SUNDISK
R0518 LOC SECTION FRESH START AND RESTART

R0519 FUNCTIONAL DESCRIPTION

R0520 1. DISPLAY MAJOR MODE NUMBER 00 IN DSKY REGISTER R1 AND R3. FLASH V50 N67 ON DSKY. (M M CHANGE REQUEST)
R0522 2. PERMIT A CURRENT PENDING REQUEST (FLASH ON DSKY) TO BE REPLACED (WITHOUT AN ABORT) BY THE MAJOR MODE
R0524 CHANGE REQUEST

R0525 INPUT/OUTPUT INFORMATION

R0526 A. CALLING SEQUENCE TC GOTOPOOH

R0527 B. ERASABLE INITIALIZATION NONE

R0528 C. OUTPUT FLASH VERB 50 NOUN 07 ON DSKY

R0529 D. DERRIS L

R0530 PROGRAM ANALYSIS

R0531 A. SUBROUTINES CALLED GOPRRF3, LINUS

R0532 B. NORMAL EXIT TCP ENDOPJOB

R0533 C. ALARM AND ABORT EXITS NONE

| | | | | | | | | |
|-------|-----|---|---------|----------|-------------|----------------|--|------------------|
| 0534 | | | 4106 | | | BLOCK 02 | | |
| 0535 | REP | 1 | 4000 | | | SETLOC PPTAG10 | | |
| 0536 | | | 4106 | | | BANK | | |
| 0537 | REP | 1 | | | | COUNT 02/P00 | | |
| 0538 | REP | 1 | 4106 | 0 5301 0 | GOTOPOOH TC | PHASCHNG | | RESTART GOTOPOOH |
| 0539 | | | 4107 | 00014 1 | OCT | 14 | | |
| 0540 | REP | 3 | 4110 | 0 4574 0 | TC | POSTLMP | | |
| 0541 | REP | 1 | 4111 | 10000 0 | CADR | GOPOOFIX | | |
| 0542 | | | 10,2203 | | BANK | 10 | | |
| 0543 | REP | 1 | 04,2000 | | SETLOC | VERR37 | | |
| 0544 | | | 04,2000 | | BANK | | | |
| 0545 | REP | 1 | | | | COUNT 04/P00 | | |
| 0546 | REP | 1 | 04,2000 | 0 2315 1 | GOPOOFIX TC | INITSUB | | |
| 05465 | REP | 1 | 04,2001 | 3 2007 1 | CAP | V37N99 | | |
| 0547 | REP | 1 | 04,2002 | 0 4555 0 | TC | BANKCALL | | |
| 0548 | REP | 1 | 04,2003 | 20624 0 | CADR | GOFLASH | | |
| 0549 | | | 04,2004 | 1 2001 0 | TCP | -3 | | |
| 0550 | | | 04,2005 | 1 2001 0 | TCP | -4 | | |



L. FRESH START AND RESTART

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| | | | | | | |
|------|---------|-------|------|--------|-----|------|
| 0551 | 04,2006 | 1 | 2001 | 0 | TCP | -5 |
| 0552 | 04,2007 | 11343 | 0 | V37N99 | VN | 3799 |



L FRESH START AND RESTART

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R0553 PROGRAM NAME V37 ASSEMBLY RUNDISK
R0554 LOG SECTION FRESH START AND RESTART

R0555 FUNCTIONAL DESCRIPTION

- R0556 1. CHECK IF NEW PROGRAM ALLOWED. IF BIT 1 OF FLAG2/D2(NODOFLAG) ISSET, AN ALARM 1520 IS CALLED.
R0558 2. CHECK FOR VALIDITY OF PROGRAM SELECTED. IF AN INVALID PROGRAM IS SELECTED, THE OPERATOR ERROR LIGHT IS
R0560 SET AND CURRENT ACTIVITY, IF ANY, CONTINUES.
R0561 3. SERVICES IS TERMINATED IF IT HAS BEEN RUNNING.
R0562 4. INSTALL IS EXECUTED TO AVOID INTERRUPTING INTEGRATION.
R0563 5. THE ENGINE IS TURNED OFF AND THE DAP IS INITIALIZED FOR COAST.
R0564 6. TRACK, UPDATE AND TARD1 FLAGS ARE SET TO ZERO.
R0565 7. DISPLAY SYSTEM IS RELEASED.
R0566 8. THE FOLLOWING ARE PERFORMED FOR EACH OF THE THREE CASES.
R0567 A. PROGRAM SELECTED IS P00.
R0568 1. RENDEZVOUS FLAG IS RESET (KILL P20).
R0569 2. STATINT1 IS SCHEDULED BY SETTING RESTART GROUP 2.
R0570 3. MAJOR MODE 00 IS STORED IN THE MODE REGISTER(MODREG).
R0571 4. SUPERBANK 3 IS SELECTED.
R0572 5. NODOFLAG IS RESET.
R0573 6. ALL RESTART GROUPS EXCEPT GROUP 2 ARE CLEARED. CONTROL IS TRANSFERRED TO RESTART PROGRAM (GOPROG2)
R0575 WHICH CAUSES ALL CURRENT ACTIVITY TO BE DISCONTINUED AND A 9 MINUTE INTEGRATION CYCLE TO BE
R0577 INITIATED.
R0578 B. PROGRAM SELECTED IS P20
R0579 1. IF THE CURRENT MAJOR MODE IS THE SAME AS THE SELECTED NEWPROGRAM, THE PROGRAM IS RE-INITIALIZED
R0581 VIA V37XEQ, ALL RESTART GROUPS, EXCEPT GROUP 4 ARE CLEARED.
R0583 2. IF THE CURRENT MAJOR MODE IS NOT EQUAL TO THE NEW REQUEST, A CHECK IS MADE TO SEE IF THE REQUEST-
R0585 ED MAJOR MODE HAS BEEN RUNNING IN THE BACKGROUND,
R0586 AND IF IT HAS, NO NEW PROGRAM IS SCHEDULED, THE EXISTING
R0587 P20 IS RESTARTED TO CONTINUE, AND ITS MAJOR MODE IS SET.
R0588 3. CONTROL IS TRANSFERRED TO GOPROG2.
R0589 C. PROGRAM SELECTED IS NEITHER P00 NOR P20
R0590 1. V37XEQ IS SCHEDULED (AS A JOB) BY SETTING RESTART GROUP 4
R0591 2. ALL CURRENT ACTIVITY EXCEPT RENDEZVOUS AND TRACKING IS DISCONTINUED BY CLEARING ALL RESTART
R0593 GROUPS. GROUP 2 IS CLEARED. IF THE RENDEZVOUS FLAG IS ON P20 IS RESTARTED IN GOPROG2 VIA REDOP20.
R0595 TO CONTINUE.

R0596 INPUT/OUTPUT INFORMATION

R0597 A. CALLING SEQUENCE

R0598 CONTROL IS DIRECTED TO V37 BY THE VERBPAN ROUTINE.
R0599 VERBPAN GOES TO C(VERBTAB+C(VERRREG)). VERR 37 = MMCHANG.
R0600 MMCHANG EXECUTES A .TC POSTJUMP, CADR V37.

R0601 B. BRASABLE INITIALIZATION NONE

R0602 C. OUTPUT
R0603 MAJOR MODE CHANGE



L FRESH START AND RESTART

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R0604      D. DEBRIS
R0605      MNUMBER, MPAC +1, MINDEX, BASSTEMP +C(MINDEX), FLAGWRD0, FLAGWRD1, FLAGWRD2, MODREQ, GOLOC -1,
R0607      GOLOC, GOLOC +1, GOLOC +2, BASSTEMP, -PHASE2, PHASE2, -PHASE4

R0608      PROGRAM ANALYSIS

R0609      A. SUBROUTINES CALLED
R0610      ALARM, RELDSP, PINBRNCH, INTSTALL, ENGINOP2, ALLCOAST, V37KLEAN, GOPROG2, FALTON, FINDVAC, SUPERSW,
R0612      DSPMM

R0613      B. NORMAL EXIT      TC ENDOFJOB

R0614      C. ALARMS      1520 (MAJOR MODE CHANGE NOT PERMITTED)

0615      4112      BLOCK 02
0616      REP 2 LAST 190      4000      SETLOC PPTAG10
0617      4112      BANK

0618      REP 1      COUNT 02/V37

0619      4112      00024 1 OCT24      MM 20
0620      4113      00031 0 OCT31      MM 25
0621      27,2000      BANK 27
0622      REP 2 LAST 190      04,2000      SETLOC VRR837
0623      04,2010      BANK

0624      REP 1      COUNT 04/V37

0625      REP 1      04,2010      54 775 0 V37      TS      MNUMBER      SAVE MAJOR MODE
0626      REP 3 LAST 185      04,2011      3 4371 0      CAP      PRIO30      RESTART AT PINBALL PRIORITY
0627      REP 2 LAST 180      04,2012      54 366 0      TS      RESTRFG

0628      REP 37 LAST 183      04,2013      3 1320 1      CA      IMODES30      IS IMU BEING INITIALIZED
0629      REP 21 LAST 183      04,2014      7 4705 0      MASK      BIT6
0630      REP 44 LAST 185      04,2015      10 000 0      CCS      A
0631      REP 1      04,2016      1 2070 0      TCP      CANTROO

0632      REP 16 LAST 185      04,2017      3 4676 1      CAP      BIT13      IS ENGINE ON
0633      04,2020      0 0006 1      EXTEND
0634      REP 9 LAST 186      04,2021      02 011 0      RAND      DSALMOUT
0635      REP 45 LAST 193      04,2022      10 000 0      CCS      A
0636      REP 1      04,2023      1 2030 1      TCP      ROOTOPOO      YES, SET UP FOR POO

0637      REP 4 LAST 184      04,2024      4 0102 0      CS      FLAGWRD6      NO, IS TVC DAP ON
0638      REP 3 LAST 184      04,2025      7 4105 0      MASK      OCT60000
0639      04,2026      0 0006 1      EXTEND
0640      REP 1      04,2027      6 2061 1      RZMP      ISITPOO      NO, CONTINUE WITH ROO

0641      04,2030      0 0004 0      ROOTOPOO      INHINT
06412      REP 2 LAST 184      04,2031      3 4752 0      CAP      FRANK6
    
```



L FRESH START AND RESTART

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| | | | | | | | | | | |
|-------|-----|----|------|-----|---------|----------|----------|-------------|---|---------------------------------|
| 0642 | REP | 5 | LAST | 186 | 04,2032 | 54 003 0 | TS | EBANK | | |
| 0643 | REP | 3 | LAST | 173 | 04,1466 | | EBANK | DAPDTR1 | | |
| 0644 | REP | 1 | | | 04,2033 | 31=474 1 | CAR | CSM4SS | | |
| 0645 | REP | 2 | LAST | 103 | 04,2034 | 55=662 0 | TS | MASSTP | | |
| 0647 | REP | 9 | LAST | 184 | 04,2035 | 0 4633 0 | TC | IRKCALL | | |
| 0648 | REP | 1 | | | 04,2036 | 50737 1 | CADR | SPSOPF | | |
| 0649 | REP | 10 | LAST | 194 | 04,2037 | 0 4633 0 | TC | IRKCALL | | |
| 0650 | REP | 1 | | | 04,2040 | 13207 0 | CADR | MASPROP | | |
| 0651 | REP | 1 | | | 04,2041 | 3 2402 0 | CAP | 3.1SEC | | |
| 0652 | REP | 11 | LAST | 194 | 04,2042 | 0 4633 0 | TC | IRKCALL | | |
| 0653 | REP | 1 | | | 04,2043 | 42011 1 | CADR | RCSDAPCN +1 | | |
| 0654 | REP | 12 | LAST | 194 | 04,2044 | 0 4633 0 | TC | IRKCALL | | |
| 0655 | REP | 1 | | | 04,2045 | 51003 0 | CADR | TVCZAP | DISABLE TVC | |
| 0656 | REP | 15 | LAST | 187 | 04,2046 | 3 4714 1 | CAP | ZERO | | |
| 0657 | REP | 2 | LAST | 193 | 04,2047 | 54 775 0 | TS | MNUMBER | | |
| 0658 | REP | 1 | | | 04,2050 | 0 0003 1 | RELINT | | | |
| 0659 | REP | 2 | LAST | 189 | 04,2051 | 3 4715 0 | CAP | FIVE | | |
| 0660 | REP | 2 | LAST | 190 | 04,2052 | 0 4555 0 | TC | BANKCALL | | |
| 06602 | REP | 1 | | | 04,2053 | 01732 0 | CADR | DELAYJOB | | |
| 06604 | REP | 16 | LAST | 194 | 04,2054 | 3 4714 1 | CAP | ZERO | | |
| 06606 | REP | 1 | | | 04,2055 | 0 0006 1 | EXTEND | | | |
| 06608 | REP | 1 | | | 04,2056 | 01 005 0 | WRITE | 5 | | |
| 0661 | REP | 1 | | | 04,2057 | 0 0006 1 | EXTEND | | | |
| 06615 | REP | 1 | | | 04,2060 | 01 006 0 | WRITE | 6 | | |
| 0662 | REP | 3 | LAST | 194 | 04,2061 | 3 0775 1 | ISITPOO | CA | MNUMBER | |
| 0663 | REP | 1 | | | 04,2062 | 0 0006 1 | EXTEND | | | |
| 0664 | REP | 1 | | | 04,2063 | 1 2112 0 | BZF | ISSERVON | YES, CHECK SERVICER STATUS | |
| 0665 | REP | 3 | LAST | 186 | 04,2064 | 4 0076 1 | CS | FLAGRD2 | NO, IS NODO V37 FLAG SET | |
| 0666 | REP | 22 | LAST | 161 | 04,2065 | 7 4712 0 | MASK | RIT1 | | |
| 0667 | REP | 48 | LAST | 193 | 04,2066 | 10 000 0 | CCS | A | | |
| 0668 | REP | 1 | | | 04,2067 | 1 2075 0 | TCF | CHECKTAB | NO | |
| 0669 | REP | 11 | LAST | 185 | 04,2070 | 0 5537 0 | CANTROO | TC | ALARM | |
| 0670 | REP | 1 | | | 04,2071 | 01520 1 | OCT | 1520 | | |
| 0671 | REP | 1 | | | 04,2072 | 0 4473 0 | V37RAD | TC | RELDSP | RELEASES DISPLAY FROM ASTRONAUT |
| 0672 | REP | 4 | LAST | 190 | 04,2073 | 0 4574 0 | TC | POSTRUMP | BRING BACK LAST NORMAL DISPLAY IF THERE WAS ONE. OY | |
| 0673 | REP | 1 | | | 04,2074 | 21176 1 | CADR | PINBRNCH | | |
| 0674 | REP | 1 | | | 04,2075 | 3 2475 0 | CHECKTAB | CA | NOV37MM | THE NO. OF MM |
| 0675 | REP | 13 | LAST | 187 | 04,2076 | 54 155 1 | AGAINMM | TS | MPAC +1 | |
| 0676 | REP | 14 | LAST | 194 | 04,2077 | 50 155 0 | NDX | MPAC +1 | | |
| 0677 | REP | 1 | | | 04,2100 | 3 2440 0 | CA | PREMM1 | OBTAIN WHICH MM THIS IS FOR | |
| 0678 | REP | 1 | | | 04,2101 | 7 6043 1 | MASK | LOW7 | | |
| 0679 | REP | 1 | | | 04,2102 | 4 0000 0 | COM | | | |
| 0680 | REP | 4 | LAST | 194 | 04,2103 | 6 0775 1 | AD | MNUMBER | | |
| 0681 | REP | 47 | LAST | 194 | 04,2104 | 10 000 0 | CCS | A | | |
| 0682 | REP | 15 | LAST | 194 | 04,2105 | 10 155 1 | CCS | MPAC +1 | IF GR, SEE IF ANYMORE IN LIST | |

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| | | | | | | | | |
|--------|-----|----|------------------|---------|----------|----------|----------|---------------------------------------|
| 0683 | REP | 1 | | 04,2106 | 1 2076 0 | TCP | AGAINMM | YES, GET NEXT ONE |
| 0684 | REP | 1 | | 04,2107 | 1 2257 1 | TCP | V37NNO | LAST TIME OR PASSED MM |
| 0685 | REP | 16 | LAST 194 | 04,2110 | 3 0155 0 | CA | MPAC +1 | SAVE INDEX FOR LATER |
| 0686 | REP | 1 | | 04,2111 | 54 774 1 | TS | MINDEX | |
| 0687 | REP | 1 | | 04,2112 | 4 0103 1 | ISSERVON | CS | FLAGWRD7 |
| 0688 | REP | 22 | LAST 193 | 04,2113 | 7 4705 0 | MASK | BITS | V37 FLAG SET - I.E. IS SERVICER GOING |
| 0689 | REP | 48 | LAST 194 | 04,2114 | 10 000 0 | CCS | A | |
| 0690 | REP | 1 | | 04,2115 | 1 2123 1 | TCP | CANV37 | NO |
| 0691 | | | | 04,2116 | 0 0004 0 | INHINT | | |
| 0692 | REP | 23 | LAST 194 | 04,2117 | 4 4712 0 | CS | BIT1 | YES, TURN OFF AVERAGE G FLAG AND WAIT |
| 0693 | REP | 1 | | 04,2120 | 7 0075 1 | MASK | FLAGWRD1 | FOR SERVICER TO RETURN TO CANV37 |
| 0694 | REP | 2 | LAST 195 | 04,2121 | 54 075 1 | TS | FLAGWRD1 | |
| 0695 | REP | 1 | | 04,2122 | 1 5112 1 | TCP | ENDOFJOB | |
| 0714 | REP | 1 | | 04,2123 | 3 2377 0 | CANV37 | CAP | ROAD |
| 0715 | REP | 1 | | 04,2124 | 54 374 0 | TS | TEMPFLSH | |
| 0716 | REP | 2 | LAST 190 | 04,2125 | 0 5301 0 | TC | PHASCHNG | |
| 0717 | | | | 04,2126 | 00014 1 | OCT | 14 | |
| 0718 | REP | 1 | | 04,2127 | 0 8008 1 | ROO | TC | INTPRET |
| 0719 | | | | 04,2130 | 77624 1 | CALL | | WAIT FOR INTEGRATION TO FINISH |
| 0720 | REP | 1 | | 04,2131 | 27371 1 | | | |
| 0721 | | | | 04,2132 | 77776 1 | DUMMYAD | EXIT | |
| 07211 | REP | 2 | LAST 190 | 04,2133 | 0 2315 1 | TC | INITSR | |
| 07212 | REP | 1 | | 04,2134 | 0 5447 0 | TC | DOWNFLAG | |
| 07213 | REP | 1 | | 04,2135 | 00020 0 | ADRES | STIKFLAG | |
| 072133 | REP | 3 | LAST 194 | 04,2136 | 0 4555 0 | TC | BANKCALL | |
| 072134 | REP | 1 | | 04,2137 | 57750 1 | CADR | UPACTOFF | TURN OFF UPLINK ACTIV LIGHT |
| 072135 | REP | 2 | LAST 195 | 04,2140 | 0 5447 0 | TC | DOWNFLAG | |
| 072136 | REP | 1 | | 04,2141 | 00215 1 | ADRES | VHPRFLAG | |
| 07214 | REP | 3 | LAST 195 | 04,2142 | 0 5447 0 | TC | DOWNFLAG | |
| 07215 | REP | 1 | | 04,2143 | 00037 0 | ADRES | R21MARK | |
| 0722 | REP | 5 | LAST 194 | 04,2144 | 10 775 0 | CCS | MMNUMBER | IS THIS A POCH REQUEST |
| 0723 | REP | 1 | | 04,2145 | 1 2245 1 | TCP | NOLVEAU | NO, PICK UP NEW PROGRAM |
| 0724 | REP | 2 | LAST 190 TO 193' | | 8 8* | COUNT | 04/P00 | |
| 0725 | REP | 2 | LAST 194 | 04,2146 | 0 4473 0 | POCH | TC | RELDSP |
| | | | | | | | | RELEASE DISPLAY SYSTEM |



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| | | | | | | | |
|-------|-----|----|------|---------|----------|----------|----------------------|
| 07255 | REP | 1 | | 04,2147 | 3 4754 0 | CAP | PRIO5 |
| 07256 | REP | 1 | | 04,2150 | 55=056 1 | TS | FHSPRDT2 |
| 0726 | | | | 04,2151 | 0 0004 0 | | INHINT |
| 0727 | REP | 24 | LAST | 195 | 04,2152 | 4 4712 0 | CS BIT1 |
| 0728 | REP | 4 | LAST | 194 | 04,2153 | 7 0076 1 | MASK FLAGRD2 |
| 0729 | REP | 5 | LAST | 196 | 04,2154 | 54 076 1 | TS FLAGRD2 |
| 0730 | REP | 3 | LAST | 194 | 04,2155 | 3 4715 0 | CA FIVE |
| 0731 | REP | 11 | LAST | 186 | 04,2156 | 54 001 1 | TS L |
| 0732 | REP | | | | 04,2157 | 4 0000 0 | CON |
| 0733 | REP | 2 | LAST | 181 | 04,2160 | 52 755 1 | DXCH -PHASE2 |
| 0734 | REP | 1 | | | 04,2161 | 4 2374 1 | CS BIT7-8 |
| 0735 | REP | 1 | | | 04,2162 | 7 0074 0 | MASK FLAGRD0 |
| 0736 | REP | 2 | LAST | 196 | 04,2163 | 54 074 0 | TS FLAGRD0 |
| 0737 | REP | 1 | | | 04,2164 | 3 4714 1 | CAP DNLADP00 |
| 0738 | REP | 2 | LAST | 183 | TO 185* | 04 04* | COUNT 04/27 |
| 0739 | REP | 3 | LAST | 179 | 04,2165 | 54 332 1 | SELDOPOO TS DNLST00D |
| 0740 | REP | 1 | | | 04,2166 | 4 2375 0 | CS OCT01120 |
| 0741 | REP | 2 | LAST | 180 | 04,2167 | 55=071 1 | TS EBANKTRM |
| 0742 | REP | 3 | LAST | 195 | 04,2170 | 7 0075 1 | MASK FLAGRD1 |
| 0743 | REP | 4 | LAST | 196 | 04,2171 | 54 075 1 | TS FLAGRD1 |
| 0751 | REP | 13 | LAST | 194 | 04,2172 | 0 4633 0 | GROUPKIL TC TRKCALL |
| 0752 | REP | 1 | | | 04,2173 | 12506 1 | CADR V37KLEAN |
| 0753 | REP | 6 | LAST | 195 | 04,2174 | 10 775 0 | CCS MNUMBER |
| 0754 | REP | 1 | | | 04,2175 | 1 2204 1 | TCP RENDV00 |
| 0755 | REP | 14 | LAST | 196 | 04,2176 | 0 4633 0 | TC TRKCALL |
| 0756 | REP | 1 | | | 04,2177 | 12500 1 | CADR POOKLEAN |
| 0757 | REP | 7 | LAST | 196 | 04,2200 | 3 0775 1 | GCMOD CA MNUMBER |
| 0758 | REP | 3 | LAST | 185 | 04,2201 | 55=011 1 | TS MODREG |
| 0759 | REP | 5 | LAST | 194 | 04,2202 | 0 4574 0 | GCGOPROD TC POSTLAMP |
| 0760 | REP | 1 | | | 04,2203 | 12641 1 | CADR GOPROD2 |
| 0761 | REP | 8 | LAST | 196 | 04,2204 | 4 0775 0 | RENDV00 CS MNUMBER |
| 0762 | REP | 2 | LAST | 161 | 04,2205 | 6 4112 1 | AD OCT24 |
| 0763 | REP | 1 | | | 04,2206 | 0 0008 1 | EXTEND |
| 0764 | REP | 1 | | | 04,2207 | 1 2211 0 | RZF RENDV00 |
| 0765 | REP | 1 | | | 04,2210 | 1 2221 0 | TCP POOP1ZZ |

SET VARIABLE RESTART REGISTER FOR P00.

TURN OFF NCDOPLAG

SET 2.5 RESTART FOR STATEINT1

RESET IMUSE + KILL P20 BY TURNING OFF

RENDPLG

SET UP APPROPRIATE DOWNLIST.

(OLD ONE WILL BE FINISHED FIRST)
TURN OFF TRACK, TARG1, UPDATE FLAGS

KILL GROUPS 3,5,6

IS IT POOH
NO

REDUNDANT EXCEPT FOR GROUP 4.

IS NEW PROC = 20
20

YES



L FRESH START AND RESTART

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| | | | | | | | | | | | |
|------|-----|----|------|-----|---------|----------|---------|--------|----------|--|--|
| 0766 | REP | 0 | LAST | 196 | 04,2211 | 4 0775 0 | RENDNOO | CS | MNUMSER | | |
| 0767 | REP | 4 | LAST | 196 | 04,2212 | 6 1011 0 | | AD | MODREG | | |
| 0768 | | | | | 04,2213 | 0 0008 1 | | EXTEND | | | |
| 0769 | REP | 1 | | | 04,2214 | 1 2225 1 | | BZF | KILL20 | | |
| 0770 | REP | 3 | LAST | 196 | 04,2215 | 3 0074 1 | | CA | FLAGWR0 | IS RENDEZVOO FLAG SET | |
| 0771 | REP | 20 | LAST | 195 | 04,2216 | 7 4704 1 | | MASK | BIT7 | | |
| 0772 | REP | 49 | LAST | 195 | 04,2217 | 10 000 0 | | CCS | A | | |
| 0773 | REP | 1 | | | 04,2220 | 1 2236 0 | | TCP | STATQJO | | |
| 0774 | REP | 21 | LAST | 197 | 04,2221 | 3 4704 0 | POOPIZZ | CAP | BIT7 | | |
| 0775 | REP | 4 | LAST | 197 | 04,2222 | 7 0074 0 | | MASK | FLAGWR0 | | |
| 0776 | REP | 50 | LAST | 197 | 04,2223 | 10 000 0 | | CCS | A | | |
| 0777 | REP | 1 | | | 04,2224 | 1 2233 0 | | TCP | RSV37 | | |
| 0778 | | | | | 04,2225 | 0 0008 1 | KILL-20 | EXTEND | | NO, KILL GROUPS 1 + 2 | |
| 0779 | REP | 9 | LAST | 181 | 04,2226 | 3 4714 1 | | DCA | NEG0 | | |
| 0780 | REP | 3 | LAST | 184 | 04,2227 | 52 753 1 | | DXCH | -PHASE1 | | |
| 0781 | | | | | 04,2230 | 0 0008 1 | | EXTEND | | | |
| 0782 | REP | 10 | LAST | 197 | 04,2231 | 3 4714 1 | | DCA | NEG0 | | |
| 0783 | REP | 3 | LAST | 196 | 04,2232 | 52 755 1 | | DXCH | -PHASE2 | | |
| 0784 | REP | 1 | | | 04,2233 | 3 2376 1 | RSV37 | CAP | V37OCAD | SET RESTART POINT | |
| 0785 | REP | 2 | LAST | 195 | 04,2234 | 54 374 0 | | TS | TEMPPLSH | | |
| 0786 | REP | 1 | | | 04,2235 | 1 2202 1 | | TCP | G00OPROG | | |
| 0787 | REP | 5 | LAST | 196 | 04,2236 | 4 0075 1 | STATQJO | CS | FLAGWR1 | SET TRACK FLAG AND UPDATE FLAG | |
| 0788 | REP | 1 | | | 04,2237 | 7 4732 1 | | MASK | OCT120 | | |
| 0789 | REP | 6 | LAST | 197 | 04,2240 | 26 075 1 | | ADS | FLAGWR1 | | |
| 0790 | | | | | 04,2241 | 0 0008 1 | | EXTEND | | KILL GROUP 4 | |
| 0791 | REP | 11 | LAST | 197 | 04,2242 | 3 4714 1 | | DCA | NEG0 | | |
| 0792 | REP | 2 | LAST | 181 | 04,2243 | 52 761 0 | | DXCH | -PHASE4 | | |
| 0793 | REP | 1 | | | 04,2244 | 1 2200 0 | | TCP | G0MCD | | |
| 0794 | REP | 22 | LAST | 197 | 04,2245 | 3 4704 0 | NOLVBAU | CAP | BIT7 | | |
| 0795 | REP | 5 | LAST | 197 | 04,2246 | 7 0074 0 | | MASK | FLAGWR0 | | |
| 0796 | REP | 51 | LAST | 197 | 04,2247 | 10 000 0 | | CCS | A | | |
| 0797 | | | | | 04,2250 | 1 2253 0 | | TCP | +3 | | |
| 0798 | REP | 4 | LAST | 195 | 04,2251 | 0 5447 0 | | TC | DOWNFLAG | NO, RESET IMJSE FLAG. | |
| 0799 | REP | 1 | | | 04,2252 | 00007 0 | | ADRES | IMJSE | BIT 8 FLAG 0 | |
| 0800 | REP | 2 | LAST | 195 | 04,2253 | 50 774 0 | +3 | INDEX | MINDEX | | |
| 0801 | REP | 1 | | | 04,2254 | 3 2476 0 | | CAP | DNLADM1 | OBTAIN NEW DOWNLIST ADDRESS | |
| 0802 | | | | | 04,2255 | 0 0004 0 | | INHINT | | | |
| 0803 | REP | 1 | | | 04,2256 | 1 2165 0 | | TCP | SPADPOPO | | |
| 0804 | REP | 1 | | | 04,2257 | 0 4400 1 | V37NQNO | TC | FALTON | COME HERE IF MM REQUESTED DOESNT EXIST | |

L FRESH START AND RESTART

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| | | | | | | | | |
|-------|------------------|----|------|---------|------------------|----------|-------------|-------|
| 0805 | REP | 1 | | 04,2260 | 1 2072 1 | TCP | V37BAD | |
| 0809 | REP | 16 | LAST | 183 | 4707 | OCT00010 | EQUALS BIT4 | |
| 0811 | REP | 3 | LAST | 197 | 04,2262 50 774 0 | INDEX | MINDEX | |
| 0812 | REP | 2 | LAST | 194 | 04,2263 3 2440 0 | CAP | PREM1 | |
| 0813 | REP | 1 | | | 04,2264 55-080 1 | TS | MTEMP | |
| 0814 | REP | 1 | | | 04,2265 54 020 1 | TS | CYR | |
| 0815 | REP | 2 | LAST | 198 | 04,2266 3 0020 0 | CA | CYR | |
| 0816 | REP | 1 | | | 04,2267 7 7874 1 | MASK | PRIO37 | |
| 0817 | REP | 1 | | | 04,2270 55-082 0 | TS | PHSPROT4 | |
| 0818 | REP | 1 | | | 04,2271 54 083 0 | TS | NEWPRIO | |
| 0819 | REP | 2 | LAST | 198 | 04,2272 3 1060 0 | CA | MTEMP | |
| 0820 | REP | 1 | | | 04,2273 0 0006 1 | EXTEND | | |
| 0821 | REP | 17 | LAST | 161 | 04,2274 7 4703 0 | MP | RIT8 | |
| 0822 | REP | 1 | | | 04,2275 7 4716 1 | MASK | LOW3 | |
| 0823 | REP | 12 | LAST | 196 | 04,2276 54 001 1 | TS | L | |
| 0824 | REP | 4 | LAST | 198 | 04,2277 50 774 0 | INDEX | MINDEX | |
| 0825 | REP | 1 | | | 04,2300 3 2403 1 | CAP | PCADRM1 | |
| 0826 | REP | 1 | | | 04,2301 55-081 0 | TS | BASETEMP | |
| 0827 | REP | 3 | LAST | 182 | 04,2302 7 4384 0 | MASK | HIS | |
| 0828 | REP | 13 | LAST | 198 | 04,2303 26 001 1 | ADS | L | |
| 0829 | REP | 2 | LAST | 198 | 04,2304 3 1081 1 | CA | BASETEMP | |
| 0830 | REP | 2 | LAST | 32 | 04,2305 7 4747 0 | MASK | LOW10 | |
| 0831 | REP | 12 | LAST | 139 | 04,2306 6 4700 1 | AD | BIT11 | |
| 0832 | REP | 1 | | | 04,2307 0 5053 1 | TC | SPVAC | |
| 0833 | REP | 3 | LAST | 198 | 04,2310 3 1060 0 | V37XPOC | CA | MTEMP |
| 0834 | REP | 2 | LAST | 194 | 04,2311 7 8043 1 | MASK | LOW7 | |
| 0835 | REP | 1 | | | 04,2312 0 5246 1 | TC | NEWMODEA | |
| 0836 | FOR SUNDISK ONLY | | | | | | | |
| 0837 | REP | 3 | LAST | 195 | 04,2313 0 4473 0 | TC | RELDSP | |
| 0838 | REP | 2 | LAST | 195 | 04,2314 0 5112 0 | TC | ENDOFJCR | |
| 0839 | REP | 1 | | | 04,2315 0 0006 1 | INITSLR | EXTEND | |
| 0840 | REP | 17 | LAST | 195 | 04,2316 22 155 0 | CRCH | MPAC +1 | |
| 0841 | REP | 3 | LAST | 193 | 04,2317 3 4752 0 | CAP | ERANK8 | |
| 0842 | REP | 6 | LAST | 194 | 04,2320 54 003 0 | TS | ERANK | |
| 0843 | REP | 1 | | | 04,2321 0 0004 0 | INHINT | | |
| 08435 | REP | 4 | LAST | 195 | 04,2322 0 4555 0 | TC | RANKCALL | |
| 08436 | REP | 2 | LAST | 184 | 04,2323 45245 0 | CADR | STOPRATE | |
| 0844 | REP | 1 | | | 04,2324 3 0105 0 | CA | FLACWRD9 | |
| 0845 | REP | 10 | LAST | 187 | 04,2325 7 4677 1 | MASK | RIT12 | |

OBTAIN PRIORITY BITS 15 - 11
SHIFT RIGHT TO BITS 14 - 10

PRESET GROUP4 RESTART PRIORITY
STORE PRIO FOR SPVAC

OBTAIN ERANK - BITS 8, 9, 10 OF MTEMP.

OBTAIN GENADR PORTION OF 2CADR.

UPON RETURN FROM FINDVAC PLACE THE
NEW MM IN MODREG (THE LOW 7 BITS OF
PHSRDT1)

RELEASE DISPLAY
AND EXIT

SET E8 FOR DRADRAND CODING
WILL BE RESET IN STARTSR2.

RESTORE DRADRAND



L FRESH START AND RESTART

USER'S PAGE NO. 23 Pg 53

| | | | | | | | | | |
|-------|-----|----|------|-----|---------|----------|----------|----------|-----------------|
| 0646 | REP | 52 | LAST | 197 | 04,2326 | 10 000 0 | CCS | A | |
| 0647 | REP | 1 | | | 04,2327 | 1 2333 1 | TCF | SETMAXRR | MAX DB SELECTED |
| 0648 | REP | 5 | LAST | 198 | 04,2330 | 0 4555 0 | TC | BANKCALL | MIN DB SELECTED |
| 0649 | REP | 1 | | | 04,2331 | 50213 1 | CADR | SETMINDB | |
| 0650 | REP | 1 | | | 04,2332 | 1 2335 1 | TCF | RAKE | |
| 0651 | REP | 6 | LAST | 199 | 04,2333 | 0 4555 0 | SETMAXRR | TC | BANKCALL |
| 0652 | REP | 1 | | | 04,2334 | 50227 0 | CADR | SETMAXDB | |
| 0653 | REP | 2 | LAST | 181 | 04,2335 | 3 4717 1 | RAKE | CAP | ELEVEN |
| 0654 | REP | 18 | LAST | 198 | 04,2336 | 54 154 0 | +1 | TS | MPAC |
| 0655 | REP | 19 | LAST | 199 | 04,2337 | 50 154 1 | | INDEX | MPAC |
| 0656 | REP | 1 | | | 04,2340 | 4 2356 1 | | CS | FLAGTABL |
| 0657 | REP | 20 | LAST | 199 | 04,2341 | 50 154 1 | | INDEX | MPAC |
| 0658 | REP | 6 | LAST | 197 | 04,2342 | 7 0074 0 | | MASK | FLAGWRD0 |
| 0659 | REP | 21 | LAST | 199 | 04,2343 | 50 154 1 | | INDEX | MPAC |
| 0660 | REP | 7 | LAST | 199 | 04,2344 | 54 074 0 | | TS | FLAGWRD0 |
| 0661 | REP | 22 | LAST | 199 | 04,2345 | 10 154 0 | | CCS | MPAC |
| 0662 | REP | 2 | LAST | 199 | 04,2346 | 1 2338 1 | | TCF | RAKE +1 |
| 0663 | | | | | 04,2347 | 0 0003 1 | | RELINT | |
| 0664 | REP | 1 | | | 04,2350 | 0 5435 0 | | TC | UPFLAG |
| 0665 | REP | 1 | | | 04,2351 | 00044 1 | | ADRES | IMPULSW |
| 0666 | REP | 1 | | | 04,2352 | 0 5425 1 | | TC | CLEARMRK |
| 06684 | REP | 5 | LAST | 186 | 04,2353 | 3 7716 0 | | CA | NEQONE |
| 06686 | REP | 16 | LAST | 180 | 04,2354 | 55=303 1 | | TS | OPTIND |
| 0669 | REP | 23 | LAST | 199 | 04,2355 | 0 0155 0 | | TC | MPAC +1 |
| 0670 | | | | | 04,2356 | 00000 1 | FLAGTABL | OCT | 0 |
| 0671 | | | | | 04,2357 | 00040 0 | | OCT | 00040 |
| 0672 | | | | | 04,2360 | 02000 0 | | OCT | 02000 |
| 0673 | | | | | 04,2361 | 00000 1 | | OCT | 0 |
| 0674 | | | | | 04,2362 | 00000 1 | | OCT | 0 |
| 0675 | | | | | 04,2363 | 04140 0 | | OCT | 04140 |
| 0676 | | | | | 04,2364 | 10000 0 | | OCT | 10000 |
| 0677 | | | | | 04,2365 | 18020 1 | | OCT | 18020 |
| 0678 | | | | | 04,2366 | 00000 1 | | OCT | 0 |
| 0679 | | | | | 04,2367 | 42000 1 | | OCT | 42000 |
| 0680 | | | | | 04,2370 | 00000 1 | | OCT | 0 |
| 0681 | | | | | 04,2371 | 00000 1 | | OCT | 0 |
| 0682 | REP | 1 | | | 5630 | | NEGT | EQUALS | OCT77770 |
| 0683 | REP | 2 | LAST | 187 | E6,1425 | | | BRANK= | PACTOFF |
| 0684 | REP | 2 | LAST | 188 | 04,2372 | 03143 1 | POODAPAD | 2CADR | TS IDLOC |
| 0684 | | | | | 04,2373 | 12066 1 | | | |
| 0685 | REP | 1 | | | 1060 | | MTEMP | EQUALS | PHSPRDT3 |
| 0686 | REP | 1 | | | 1061 | | RASPTMP | EQUALS | TRASE4 |
| 0687 | | | | | 04,2374 | 00300 1 | RIT7-8 | OCT | 300 |

THIS PART CLEARS FLAGWORD BITS.
LOOP COMES HERE.

PUT REVISED FLAGWORD BACK.

GET THE NEXT FLAGWORD.

NOW SET IMPULSW

RETURN FROM INITSUB

IDLEFAIL
STEERSW

V59FLAG, ENGNFLAG, 3AXISFLAG
STRLLSW
IGNFLAG, ASTNFLAG, TIMRFLAG, NOJPFLAG
SWTOVER, V94FLAG



L FRESH START AND RESTART

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0886 04,2375 01120 0 OCT01120 OCT 01120
 0889 REP 1 04,2376 10264 0 V37QCAD CADR V37XBO +3
 0890 REP 1 04,2377 10132 0 RCOAD CADR DUMMYAD
 0891 REP 4 LAST 194 04,1466 EBANK= DAPDTR1
 0892 REP 1 04,2400 02106 1 RCSADDR4 2CADR RCSATT
 0892 REP 1 04,2401 42066 1
 0893 04,2402 37312 0 3.1SEC OCT 37312 2.5 + 0.6 SEC
 R0894 FOR VERB 37 TWO TABLES ARE MAINTAINED. EACH TABLE HAS AN ENTRY FOR EACH
 R0895 MAJOR MODE THAT CAN BE STARTED FROM THE KEYBOARD. THE ENTRIES ARE PUT
 R0896 INTO THE TABLE WITH THE ENTRY FOR THE HIGHEST MAJOR MODE COMING FIRST,

R0897 TO THE LOWEST MAJOR MODE WHICH IS THE LAST ENTRY IN EACH TABLE.

R0898 THE FCADRM1 TABLE CONTAINS THE FCADR OF THE STARTING JOB OF
 R0899 THE MAJOR MODE. FOR EXAMPLE,

| | | | | | | |
|-------|--|--|---------|-------|--------|---------------|
| A0900 | | | FCADRM1 | FCADR | P79 | START OF P 79 |
| A0901 | | | | FCADR | PROG18 | START OF P 18 |
| A0902 | | | | FCADR | P01 | START OF P 01 |

| | | | | | | |
|-------|-------|---------|---------|--------|-------|--------|
| 0903 | | 04,2403 | FCADRM1 | EQUALS | | |
| 0904 | REP 1 | 04,2403 | 11334 | 0 | FCADR | P79 |
| 0905 | REP 1 | 04,2404 | 11108 | 0 | FCADR | P78 |
| 0906 | REP 1 | 04,2405 | 73433 | 1 | FCADR | P77 |
| 09065 | REP 1 | 04,2406 | 28036 | 0 | FCADR | P76 |
| 0907 | REP 1 | 04,2407 | 72157 | 1 | FCADR | P75 |
| 0908 | REP 1 | 04,2410 | 72002 | 0 | FCADR | P74 |
| 0909 | REP 1 | 04,2411 | 54320 | 1 | FCADR | P62 |
| 0910 | REP 1 | 04,2412 | 54217 | 1 | FCADR | P61 |
| 0911 | REP 1 | 04,2413 | 32000 | 0 | FCADR | P54 |
| 0912 | REP 1 | 04,2414 | 31054 | 1 | FCADR | P53 |
| 0913 | REP 1 | 04,2415 | 32000 | 0 | FCADR | PROG52 |
| 0914 | REP 1 | 04,2416 | 31054 | 1 | FCADR | P51 |
| 0915 | REP 1 | 04,2417 | 50410 | 1 | FCADR | P47CSM |
| 0916 | REP 1 | 04,2420 | 50235 | 0 | FCADR | P41CSM |
| 0917 | REP 1 | 04,2421 | 50002 | 0 | FCADR | P40CSM |
| 0918 | REP 1 | 04,2422 | 11327 | 1 | FCADR | P39 |
| 0919 | REP 1 | 04,2423 | 11103 | 0 | FCADR | P38 |
| 0920 | REP 1 | 04,2424 | 74502 | 0 | FCADR | P37 |
| 0921 | REP 1 | 04,2425 | 72153 | 0 | FCADR | P35 |
| 0922 | REP 1 | 04,2426 | 72000 | 1 | FCADR | P34 |
| 0923 | REP 1 | 04,2427 | 73620 | 1 | FCADR | P31 |
| 0924 | REP 1 | 04,2430 | 73604 | 1 | FCADR | P30 |
| 0925 | REP 1 | 04,2431 | 62021 | 0 | FCADR | P23 |
| 0926 | REP 1 | 04,2432 | 60000 | 1 | FCADR | PROG22 |
| 0927 | REP 1 | 04,2433 | 76001 | 1 | FCADR | PROG21 |
| 0928 | REP 1 | 04,2434 | 76207 | 0 | FCADR | PROG20 |
| 0929 | REP 1 | 04,2435 | 73431 | 0 | FCADR | P17 |
| 0930 | REP 1 | 04,2436 | 55655 | 1 | FCADR | P06 |

L FRESH START AND RESTART

OTROCOMPASS STANDARD LEAD IN.

0931 REP 1 04,2437 66001 0 FCADR OTSCPPSS1
 0932 THE PREM TABLE CONTAINS THE E-BANK, MAJOR MODE, AND PRIORITY
 0933 INFORMATION, IT IS IN THE FOLLOWING FORM,

0934 PPP PPS EEM MM MM

0935 WHERE THE 7 M BITS CONTAIN THE MAJOR MODE NUMBER
 0936 J E BITS CONTAIN THE E-BANK NUMBER
 0937 S P BITS CONTAIN THE PRIORITY AT WHICH THE JOB IS
 0938 TO BE STARTED

FOR EXAMPLE,

| 0939 | PREM1 | OCT | 07213 | PRIORITY | 33 |
|-------|-------|-----|-------|------------|----|
| A0940 | | | | E-BANK | 5 |
| A0941 | | | | MAJOR MODE | 11 |
| A0942 | | | | PRIORITY | 12 |
| A0943 | | | | E-BANK | 6 |
| A0944 | | | | MAJOR MODE | 31 |

| 0946 | 04,2440 | 27117 0 | PREM1 | EQUALS | MM 79 | ERANK 4 | PRIO 13 |
|-------|---------|---------|-------|--------|-------|---------|---------|
| 0947 | 04,2440 | 27116 1 | OCT | 27117 | MM 78 | ERANK 4 | PR23 13 |
| 0948 | 04,2441 | 27115 1 | OCT | 27116 | MM 77 | ERANK 4 | PRIO 13 |
| 0949 | 04,2442 | 27115 1 | OCT | 27115 | MM 76 | ERANK 7 | PRIO 13 |
| 0949S | 04,2443 | 27714 0 | OCT | 27714 | MM 75 | ERANK 4 | PRIO 13 |
| 0950 | 04,2444 | 27113 1 | OCT | 27113 | MM 74 | ERANK 4 | PRIO13 |
| 0951 | 04,2445 | 27112 0 | OCT | 27112 | MM 62 | ERANK 6 | PRIO 13 |
| 0952 | 04,2446 | 27476 1 | OCT | 27476 | MM 61 | ERANK 6 | PRIO 13 |
| 0953 | 04,2447 | 27475 1 | OCT | 27475 | MM 54 | ERANK 5 | PRIO 13 |
| 0954 | 04,2450 | 27285 0 | OCT | 27285 | MM 53 | ERANK 5 | PRIO 13 |
| 0955 | 04,2451 | 27285 0 | OCT | 27285 | MM 52 | ERANK 5 | PRIO 13 |
| 0956 | 04,2452 | 27284 1 | OCT | 27284 | MM 51 | ERANK 5 | PRIO 13 |
| 0957 | 04,2453 | 27283 0 | OCT | 27283 | MM 47 | ERANK 7 | PRIO 13 |
| 0958 | 04,2454 | 27657 0 | OCT | 27657 | MM 41 | ERANK 6 | PRIO 13 |
| 0959 | 04,2455 | 27451 1 | OCT | 27451 | MM 40 | ERANK 6 | PRIO 13 |
| 0960 | 04,2456 | 27450 0 | OCT | 27450 | MM 39 | ERANK 4 | PRIO13 |
| 0961 | 04,2457 | 27047 1 | OCT | 27047 | MM 38 | ERANK 4 | PRIO 13 |
| 0962 | 04,2460 | 27046 0 | OCT | 27046 | MM 37 | ERANK 7 | PRIO13 |
| 0963 | 04,2461 | 27645 0 | OCT | 27645 | MM 35 | ERANK 4 | PRIO 13 |
| 0964 | 04,2462 | 27043 0 | OCT | 27043 | MM 34 | ERANK 4 | PRIO13 |
| 0965 | 04,2463 | 27042 1 | OCT | 27042 | MM 31 | ERANK 7 | PRIO 13 |
| 0966 | 04,2464 | 27637 0 | OCT | 27637 | MM 30 | ERANK 7 | PRIO 13 |
| 0967 | 04,2465 | 27636 1 | OCT | 27636 | MM 23 | ERANK 5 | PRIO 13 |
| 0968 | 04,2466 | 27227 0 | OCT | 27227 | MM 22 | ERANK 5 | PRIO 13 |
| 0969 | 04,2467 | 27226 1 | OCT | 27226 | MM 21 | ERANK 4 | PRIO 13 |
| 0970 | 04,2470 | 27025 0 | OCT | 27025 | MM 20 | ERANK 6 | PRIO 13 |
| 0971 | 04,2471 | 27424 0 | OCT | 27424 | MM 17 | ERANK 4 | PRIO 13 |
| 0972 | 04,2472 | 27021 1 | OCT | 27021 | | | |



L FRESH START AND RESTART

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0973 04,2473 27006 1 OCT 27006 MM 06 EBANK 4 PRIO 13
 0974 04,2474 41201 1 OCT 41201 MM 01 EBANK 5 PRIO 20
 R0975
 R0976

THE FOLLOWING LIST IS FOR THE PURPOSE OF VERIFYING THAT THE ERA

| | | | | | | | |
|------|-----|---|------|-----|---------|-----------------|---------------------------------|
| 0977 | REP | 6 | LAST | 171 | E7,1412 | EBANK= TIG | EBANK SETTING REQUIRED BY MM 76 |
| 0978 | REP | 4 | LAST | 90 | E4,1763 | EBANK= KT | EBANK SETTING REQUIRED BY MM 75 |
| 0979 | REP | 2 | LAST | 90 | E4,1770 | EBANK= SUBEXIT | EBANK SETTING REQUIRED BY MM 74 |
| 0980 | REP | 2 | LAST | 109 | E8,1661 | EBANK= AOC | EBANK SETTING REQUIRED BY MM 62 |
| 0981 | REP | 3 | LAST | 202 | E8,1661 | EBANK= AOC | EBANK SETTING REQUIRED BY MM 61 |
| 0982 | REP | 3 | LAST | 169 | 0302 | EBANK= BESTI | EBANK SETTING REQUIRED BY MM 54 |
| 0983 | REP | 1 | | | 0304 | EBANK= STARIND | EBANK SETTING REQUIRED BY MM 53 |
| 0984 | REP | 4 | LAST | 202 | 0302 | EBANK= BESTI | EBANK SETTING REQUIRED BY MM 52 |
| 0985 | REP | 2 | LAST | 202 | 0304 | EBANK= STARIND | EBANK SETTING REQUIRED BY MM 51 |
| 0986 | REP | 4 | LAST | 122 | E7,1672 | EBANK= P40IMP | EBANK SETTING REQUIRED BY MM 47 |
| 0987 | REP | 2 | LAST | 121 | E7,1477 | EBANK= AXISCODE | EBANK SETTING REQUIRED BY MM 41 |
| 0988 | REP | 2 | LAST | 106 | E8,1510 | EBANK= KMPAC | EBANK SETTING REQUIRED BY MM 40 |
| 0989 | REP | 5 | LAST | 202 | E4,1763 | EBANK= KT | EBANK SETTING REQUIRED BY MM 35 |
| 0990 | REP | 3 | LAST | 202 | E4,1770 | EBANK= SUBEXIT | EBANK SETTING REQUIRED BY MM 34 |
| 0991 | REP | 2 | LAST | 120 | E7,1625 | EBANK= MGA | EBANK SETTING REQUIRED BY MM 30 |
| 0992 | REP | 3 | LAST | 175 | E5,1751 | EBANK= LANDMARK | EBANK SETTING REQUIRED BY MM 23 |
| 0993 | REP | 2 | LAST | 70 | 0301 | EBANK= MARKINDX | EBANK SETTING REQUIRED BY MM 22 |
| 0994 | REP | 2 | LAST | 126 | E7,1777 | EBANK= WHOCARES | EBANK SETTING REQUIRED BY MM 21 |
| 0995 | REP | 1 | | | E8,1412 | EBANK= ESTROKER | EBANK SETTING REQUIRED BY MM 20 |
| 0996 | REP | 2 | LAST | 77 | 1150 | EBANK= TIME2SAV | EBANK SETTING REQUIRED BY MM 06 |
| 0997 | REP | 1 | | | E5,1425 | EBANK= QPLACE | EBANK SETTING REQUIRED BY MM 01 |

R0998 NOTE, THE FOLLOWING CONSTANT IS THE NUMBER OF ENTRIES IN EACH OF
 R0999 ----- THE ABOVE LISTS-1 (IE, THE NUMBER OF MAJOR MODES (EXCEPT P00)
 R1000 THAT CAN BE CALLED FROM THE KEYBOARD MINUS ONE)

| | | | | | | | |
|-------|-----|---|------|-----|---------|---------|-----------------|
| 1001 | | | | | 04,2475 | EPREMM1 | EQUALS |
| 1002 | REP | 3 | LAST | 198 | 04,2440 | SETLOC | PREMM1 |
| 1003 | REP | 1 | | | 0035 | NO,MMS | =MINUS EPREMM1 |
| 1004 | REP | 3 | LAST | 193 | 04,2000 | SETLOC | VERR37 |
| 1005 | | | | | 04,2475 | BANK | |
| 1006 | REP | 1 | | | 04,2475 | NOV37MM | ADRES NO,MMS -1 |
| 1007 | | | | | 04,2476 | DNLADM1 | EQUALS |
| 1008 | REP | 1 | | | 04,2476 | ADRES | RENDEZVU |
| 1009 | REP | 2 | LAST | 202 | 04,2477 | ADRES | RENDEZVU |
| 1010 | REP | 3 | LAST | 202 | 04,2500 | ADRES | RENDEZVU |
| 10105 | REP | 4 | LAST | 202 | 04,2501 | ADRES | RENDEZVU |
| 1011 | REP | 5 | LAST | 202 | 04,2502 | ADRES | RENDEZVU |
| 1012 | REP | 6 | LAST | 202 | 04,2503 | ADRES | RENDEZVU |

END OF PREMM1 TABLE
 THIS CODING WILL AUTOMATICALLY CHANGE
 THE «NOV37MM» CONSTANT AS ENTRIES ARE
 INSERTED (IN) OR DELETED (FROM) THE
 «PREMM1» TABLE.

ITEMS IN «PREMM1» TABLE - 1. *DON'T MOVE*
 P79
 P78
 P77
 P76
 P75
 P74

L FRESH START AND RESTART

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| | | | | | | | | |
|------|-----|----|----------|---------|---------|------------|----------|-----|
| 1013 | REP | 1 | | 04,2504 | 00001 0 | ADRES | ENTRYUPD | P62 |
| 1014 | REP | 1 | | 04,2505 | 00003 1 | ADRES | POWERED | P61 |
| 1015 | REP | 1 | | 04,2506 | 00000 1 | ADRES | COSTALIN | |
| 1016 | REP | 2 | LAST 203 | 04,2507 | 00000 1 | ADRES | COSTALIN | |
| 1017 | REP | 3 | LAST 203 | 04,2510 | 00000 1 | ADRES | COSTALIN | P52 |
| 1018 | REP | 4 | LAST 203 | 04,2511 | 00000 1 | ADRES | COSTALIN | P61 |
| 1019 | REP | 2 | LAST 203 | 04,2512 | 00003 1 | ADRES | POWERED | P47 |
| 1020 | REP | 3 | LAST 203 | 04,2513 | 00003 1 | ADRES | POWERED | P41 |
| 1021 | REP | 4 | LAST 203 | 04,2514 | 00003 1 | ADRES | POWERED | P40 |
| 1022 | REP | 7 | LAST 202 | 04,2515 | 00002 0 | ADRES | RENDEZVU | P39 |
| 1023 | REP | 8 | LAST 203 | 04,2516 | 00002 0 | ADRES | RENDEZVU | P38 |
| 1024 | REP | 9 | LAST 203 | 04,2517 | 00002 0 | ADRES | RENDEZVU | P37 |
| 1025 | REP | 10 | LAST 203 | 04,2520 | 00002 0 | ADRES | RENDEZVU | P35 |
| 1026 | REP | 11 | LAST 203 | 04,2521 | 00002 0 | ADRES | RENDEZVU | P34 |
| 1027 | REP | 12 | LAST 203 | 04,2522 | 00002 0 | ADRES | RENDEZVU | |
| 1028 | REP | 13 | LAST 203 | 04,2523 | 00002 0 | ADRES | RENDEZVU | P30 |
| 1029 | REP | 14 | LAST 203 | 04,2524 | 00002 0 | ADRES | RENDEZVU | P23 |
| 1030 | REP | 1 | | 04,2525 | 00004 0 | ADRES | P22DNLST | P22 |
| 1031 | REP | 15 | LAST 203 | 04,2526 | 00002 0 | ADRES | RENDEZVU | P21 |
| 1032 | REP | 16 | LAST 203 | 04,2527 | 00002 0 | ADRES | RENDEZVU | P20 |
| 1033 | REP | 17 | LAST 203 | 04,2530 | 00002 0 | ADRES | RENDEZVU | P17 |
| 1034 | REP | 5 | LAST 203 | 04,2531 | 00000 1 | ADRES | COSTALIN | P06 |
| 1035 | REP | 6 | LAST 203 | 04,2532 | 00000 1 | ADRES | COSTALIN | P01 |
| 1036 | REP | 17 | LAST 194 | 4714 | | DNLADP00 = | ZERO | |
| 1037 | | | | 0000 | | COSTALIN = | 0 | |
| 1038 | | | | 0001 | | ENTRYUPD = | 1 | |
| 1039 | | | | 0002 | | RENDEZVU = | 2 | |
| 1040 | | | | 0003 | | POWERED = | 3 | |
| 1041 | | | | 0004 | | P22DNLST = | 4 | |

R1042 ORBITAL INTEGRATION CONSTANTS

R1043 THESE CONSTANTS ARE USED IN COMPUTING THE SETTING OF MIDFLAG.

| | | | | | | | | | |
|------|-----|---|---------|---------|---------|---------|--------|-----------------|-----------------------------|
| 1044 | | | | 04,2533 | 00465 0 | RMM | ZDEC | 2538.09 E3 R-27 | 800 KM ABOVE LUNAR SURFACE |
| 1044 | | | | 04,2534 | 32324 0 | | | | |
| 1045 | | | | 04,2535 | 00333 1 | RME | ZDEC | 7178165 R-29 | 800 KM ABOVE EQ. RADIUS |
| 1046 | | | | 04,2536 | 01733 1 | | | | |
| 1046 | | | | 13,2000 | | | BANK | 13 | |
| 1047 | REP | 1 | | 13,2000 | | | SETLOC | INTINIT | |
| 1048 | | | | 13,2000 | | | BANK | | |
| 1049 | REP | 1 | | | | | COUNT* | SS/INTIN | |
| 1050 | REP | 2 | LAST 84 | E3,1554 | | | ERANK= | RRECTSM | |
| 1051 | | | | 13,2000 | 43014 0 | STATEUP | SET | ROP | EXTRAPOLATE CM STATE VECTOR |
| 1052 | REP | 1 | | 13,2001 | 01474 1 | | | VINTFLAG | |
| 1053 | REP | 1 | | 13,2002 | 01751 0 | | | ORFWFLAG | ALSO 6X6 W-MATRIX IF VALID |
| 1054 | | | | 13,2003 | 26008 0 | | | +3 | FOR ORBITAL NAVIGATION |
| 1055 | | | | 13,2004 | 77614 1 | | SET | | |



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P0001 RESTART TABLES

R0002 -----

R0003 THERE ARE TWO FORMS OF RESTART TABLES FOR EACH GROUP. THEY ARE KNOWN AS THE EVEN RESTART TABLES AND THE ODD
R0005 RESTART TABLES. THE ODD TABLES HAVE ONLY ONE ENTRY OF THREE LOCATIONS WHILE THE EVEN TABLES HAVE TWO ENTRIES
R0007 EACH USING THREE LOCATIONS. THE INFORMATION AS TO WHETHER IT IS A JOB, WAITLIST, OR A LONGCALL IS GIVEN BY THE
R0009 WAY THINGS ARE PUT INTO THE TABLES.

R0010 A JOB HAS ITS PRIORITY STORED IN PROTTAB OF THE CORRECT PHASE SPOT - A POSITIVE PRIORITY INDICATES A
R0012 FINDVAC JOB, A NEGATIVE PRIORITY A NOVAC. THE 2CADR OF THE JOB IS STORED IN THE CADRTAB.
R0014 FOR EXAMPLE,

A0015 5.7SPOT OCT 23000
A0016 2CADR SOMEJOB

R0017 A RESTART OF GROUP 5 WITH PHASE SEVEN WOULD THEN CAUSE SOMEJOB TO BE RESTARTED AS A FINDVAC WITH PRIORITY 23.

R0019 5.5SPOT OCT -23000
A0020 2CADR ANYJOB

R0021 HERE A RESTART OF GROUP 5 WITH PHASE 7 WOULD CAUSE ANYJOB TO BE RESTARTED AS A NOVAC WITH PRIORITY 23.
R0023 A LONGCALL HAS ITS GENADR OF ITS 2CADR STORED NEGATIVELY AND ITS BRCON STORED POSITIVELY. IN ITS PROTTAB IS
R0025 PLACED THE LOCATION OF A DP REGISTER THAT CONTAINS THE DELTA TIME THAT LONGCALL HAD BEEN ORIGINALLY STARTED
R0027 WITH. EXAMPLE,

A0028 3.6SPOT GENADR DELTAT
A0029 -GENADR LONGTASK
A0030 BRCON LONGTASK

A0031 OCT 31000
A0032 2CADR JORAGAIN

R0033 THIS WOULD START UP LONGTASK AT THE APPROPRIATE TIME, OR IMMEDIATELY IF THE TIME HAD ALREADY PASSED. IT SHOULD
R0035 BE NOTED THAT IF DELTAT IS IN A SWITCHED E BANK, THIS INFORMATION SHOULD BE IN THE BRCON OF THE 2CADR OF THE
R0037 TASK. FROM ABOVE, WE SEE THAT THE SECOND PART OF THIS PHASE WOULD BE STARTED AS A JOB WITH A PRIORITY OF 31.

R0039 WAITLIST CALLS ARE IDENTIFIED BY THE FACT THAT THEIR 2CADR IS STORED NEGATIVELY. IF PROTTAB OF THE PHASE SPOT
R0041 IS POSITIVE, THEN IT CONTAINS THE DELTA TIME, IF PROTTAB IS NEGATIVE THEN IT IS THE -GENADR OF AN ERASABLE
R0043 LOCATION CONTAINING THE DELTA TIME, THAT IS, THE TIME IS STORED INDIRECTLY. IT SHOULD BE NOTED AS ABOVE, THAT
R0045 IF THE TIME IS STORED INDIRECTLY, THE BRCON MUST CONTAIN THE NECESSARY E BANK INFORMATION IF APPLICABLE. WITH
R0047 WAITLIST WE HAVE ONE FURTHER OPTION, IF -0 IS STORED IN PROTTAB, IT WILL CAUSE AN IMMEDIATE RESTART OF THE
R0049 TASK. EXAMPLES,

A0050 OCT 77777 THIS WILL CAUSE AN IMMEDIATE RESTART
A0051 -2CADR ATASK OF THE TASK 'ATASK'

A0052 DEC 200 IF THE TIME OF THE 2 SECONDS SINCE DUMMY
A0053 -2CADR DUMMY WAS PUT ON WAITLIST IS UP, IT WILL BEGIN
A0054 IN 10 MS, OTHERWISE IT WILL BEGIN WHEN
A0055 IT NORMALLY WOULD HAVE BEGIN.

L RESTART TABLES

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A0056
A0057

-GENADR DTIME
-ZCADR TASKTASK

WHERE DTIME CONTAINS THE DELTA TIME
OTHERWISE THIS IS AS ABOVE

R0056 ***** NOW THE TABLES THEMSELVES *****

0059 REF 1 01,2000 BANK 01
0060 REF 1 01,2000 SETLOC RESTART
0061 REF 1 01,2000 BANK
0062 REF 1 COUNT 01/RSTAB
0063 REF 1 01,2000 PHOTTAB EQUALS 12000
0064 REF 1 01,2001 CADRTAB EQUALS 12001
A0065

USED TO FIND THE PRIORITY OR DELTATIME
THIS AND THE NEXT RELATIVE LOC CONTAIN
RESTART ZCADR

0066 REF 1 01,2000 0 0063 1 SIZETAB TC 1.2SPOT -12006
0067 REF 1 01,2001 0 0010 0 TC 1.3SPOT -12004
0068 REF 1 01,2002 0 0063 1 TC 2.2 --- -12008
0069 REF 1 01,2003 0 0024 1 TC 2.3SPOT -12004
0070 REF 1 01,2004 0 0063 1 TC 3.2SPOT -12006
0071 REF 1 01,2005 0 0043 0 TC 3.3SPOT -12004
0072 REF 1 01,2006 0 0063 1 TC 4.2SPOT -12008
0073 REF 1 01,2007 0 0107 1 TC 4.3SPOT -12004
0074 REF 1 01,2010 0 0242 0 TC 5.2SPOT -12006
0075 REF 1 01,2011 0 0260.0 TC 5.3SPOT -12004
0076 REF 1 01,2012 0 0336 1 TC 6.2SPOT -12006
0077 REF 1 01,2013 0 0346 0 TC 6.3SPOT -12004
0078 REF 2 LAST 206 01,2071 1.2SPOT EQUALS 3.2SPOT
R0079 ANY MORE GROUP 1.EVEN RESTART VALUES SHOULD GO HERE

0080 REF 4 LAST 202 01,2014 00170 1 1.3SPOT DEC 120
0081 REF 1 01,1861 ERANK= AGC
0082 REF 1 01,2015 74550 1 -ZCADR SETJTAG
0082 REF 1 01,2016 45711 1
0083 REF 5 LAST 200 01,2017 10000 0 1.5SPOT OCT 10000
0084 REF 1 01,1466 ERANK= DAPDATR1
0085 REF 1 01,2020 02362 1 ZCADR REDC40.9
0085 REF 1 01,2021 34066 0
0086 REF 2 LAST 202 01,2022 10000 0 1.7SPOT OCT 10000
0087 REF 1 01,1412 ERANK= ESTRCKER
0088 REF 1 01,2023 02074 0 ZCADR RELINUS
0088 REF 1 01,2024 56066 1
0089 REF 3 LAST 206 01,2025 10000 0 1.11SPOT OCT 10000
0090 REF 1 01,1412 ERANK= ESTRCKER
0091 REF 1 01,2026 02273 0 ZCADR PIKUP20
0091 REF 1 01,2027 76066 0
R0092 ANY MORE GROUP 1.ODD RESTART VALUES SHOULD GO HERE

THIS NUMBER MUST EQUAL C(JTAGTIME)

0093 REF 2 LAST 206 01,2071 2.2SPOT EQUALS 1.2SPOT
R0094 ANY MORE GROUP 2.EVEN RESTART VALUES SHOULD GO HERE



L RESTART TABLES

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| | | | | | | | | | |
|------|--|---|------|---------|---------|----------|-----------------|----------------|--|
| 0095 | REP | 1 | | 01,2030 | 02005 0 | 2.3SPOT | GENADR | 6005CS | |
| 0096 | REP | 1 | | 01,2031 | 75216 0 | | -GENADR | STATBINT | |
| 0097 | REP | 3 | LAST | 203 | E3,1554 | | ERANK= | RECTCSM | |
| 0098 | REP | 2 | LAST | 207 | 01,2032 | 26063 0 | BBCON | STATBINT | |
| 0099 | | | | 01,2033 | 65000 1 | 2.5SPOT | OCT | 05000 | |
| 0100 | REP | 4 | LAST | 207 | E3,1554 | | ERANK= | RECTCSM | |
| 0101 | REP | 1 | | 01,2034 | 02570 1 | | 2CADR | STATINT1 | |
| 0101 | REP | 1 | | 01,2035 | 26063 0 | | | | |
| 0102 | | | | 01,2038 | 10000 0 | 2.7SPOT | OCT | 10000 | |
| 0103 | REP | 3 | LAST | 124 | E7,1734 | | ERANK= | MRKBUF2 | |
| 0104 | REP | 1 | | 01,2037 | 02512 0 | | 2CADR | R22 | |
| 0104 | REP | 1 | | 01,2040 | 70067 1 | | | | |
| 0105 | | | | 01,2041 | 14000 1 | 2.11SPOT | OCT | 14000 | |
| 0106 | REP | 4 | LAST | 202 | E5,1751 | | ERANK= | LANDMARK | |
| 0107 | REP | 1 | | 01,2042 | 02173 0 | | 2CADR | V94ENTER | |
| 0107 | REP | 1 | | 01,2043 | 62065 0 | | | | |
| 0108 | | | | 01,2044 | 10000 0 | 2.13SPOT | OCT | 10000 | |
| 0109 | REP | 4 | LAST | 207 | E7,1734 | | ERANK= | MRKBUF2 | |
| 0110 | REP | 1 | | 01,2045 | 02377 0 | | 2CADR | REDOR22 | |
| 0110 | REP | 1 | | 01,2048 | 56067 0 | | | | |
| 0111 | ANY MORE GROUP 2. ODD RESTART VALUES SHOULD GO HERE | | | | | | | | |
| 0112 | REP | 2 | LAST | 206 | 01,2071 | | 3.2SPOT | EQUALS 4.2SPOT | |
| 0113 | ANY MORE GROUP 3. EVEN RESTART VALUES SHOULD GO HERE | | | | | | | | |
| 0114 | | | | 01,2047 | 20000 0 | 3.3SPOT | OCT | 20000 | |
| 0115 | REP | 3 | LAST | 167 | E7,1427 | | ERANK= | TGO | |
| 0116 | REP | 1 | | 01,2050 | 02404 0 | | 2CADR | S40.13 | |
| 0116 | REP | 1 | | 01,2051 | 34067 1 | | | | |
| 0117 | | | | 01,2052 | 00000 1 | 3.5SPOT | DEC | 0 | |
| 0118 | | | | 01,2053 | 00000 1 | | DEC | 0 | |
| 0119 | | | | 01,2054 | 00000 1 | | DEC | 0 | |
| 0120 | | | | 01,2055 | 22000 1 | 3.7SPOT | OCT | 22000 | |
| 0121 | REP | 2 | LAST | 85 | E3,1706 | | ERANK= | TEPHEN | |
| 0122 | REP | 1 | | 01,2056 | 02127 1 | | 2CADR | MATRIXJCH | |
| 0122 | REP | 1 | | 01,2057 | 70063 0 | | | | |
| 0123 | | | | 01,2060 | 22000 1 | 3.11SPOT | OCT | 22000 | |
| 0124 | REP | 3 | LAST | 207 | E3,1706 | | ERANK= | TEPHEN | |
| 0125 | REP | 1 | | 01,2061 | 02247 1 | | 2CADR | REP11 | |
| 0125 | REP | 1 | | 01,2062 | 70063 0 | | | | |
| 0126 | | | | 01,2063 | 22000 1 | 3.13SPOT | OCT | 22000 | |
| 0127 | REP | 4 | LAST | 207 | E3,1706 | | ERANK= | TEPHEN | |
| 0128 | REP | 1 | | 01,2064 | 02026 1 | | 2CADR | REP11A | |
| 0128 | REP | 1 | | 01,2065 | 70063 0 | | | | |
| 0129 | REP | 4 | LAST | 207 | 01,2068 | 76347 0 | 3.15SPOT-GENADR | TGO +1 | |
| 0130 | REP | 5 | LAST | 207 | E7,1427 | | ERANK= | TGO | |
| 0131 | REP | 1 | | 01,2067 | 75071 0 | | -2CADR | ENGINEOFF | |
| 0131 | REP | 1 | | 01,2070 | 27710 1 | | | | |

L RESTART TABLES

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R0132 ANY MORE GROUP 3. ODD RESTART VALUES SHOULD GO HERE

| | | | | | | | | |
|------|-----|----|------|---------|---------|---------|--------|----------|
| 0133 | | | | 01,2071 | 77777 0 | 4.2SPOT | OCT | 77777 |
| 0134 | REP | 7 | LAST | 202 | E7,1412 | | EBANK= | TIG |
| 0135 | REP | 1 | | | 01,2072 | 75282 0 | -2CADR | PRECHECK |
| 0135 | REP | 1 | | | 01,2073 | 27710 1 | | |
| 0136 | | | | 01,2074 | 30000 1 | | OCT | 30000 |
| 0137 | REP | 2 | LAST | 122 | E7,1674 | | EBANK= | DELVIMJ |
| 0138 | REP | 1 | | | 01,2075 | 02481 0 | 2CADR | P47BODY |
| 0138 | REP | 1 | | | 01,2076 | 50087 0 | | |
| 0139 | | | | 01,2077 | 77777 0 | 4.4SPOT | OCT | 77777 |
| 0140 | REP | 8 | LAST | 208 | E7,1412 | | EBANK= | TIG |
| 0141 | REP | 2 | LAST | 208 | 01,2100 | 75282 0 | -2CADR | PRECHECK |
| 0141 | | | | 01,2101 | 27710 1 | | | |
| 0142 | | | | 01,2102 | 05664 0 | | DEC | 2998 |
| 0143 | REP | 6 | LAST | 206 | E6,1466 | | EBANK= | DAPDATR1 |
| 0144 | REP | 1 | | | 01,2103 | 75517 0 | -2CADR | TIG/0 |
| 0144 | REP | 1 | | | 01,2104 | 27711 0 | | |
| 0145 | | | | 01,2105 | 77777 0 | 4.6SPOT | OCT | 77777 |
| 0146 | REP | 9 | LAST | 208 | E7,1412 | | EBANK= | TIG |
| 0147 | REP | 3 | LAST | 208 | 01,2106 | 75282 0 | -2CADR | PRECHECK |
| 0147 | | | | 01,2107 | 27710 1 | | | |
| 0148 | | | | 01,2110 | 04700 1 | | DEC | 2496 |
| 0149 | REP | 10 | LAST | 208 | E7,1412 | | EBANK= | TIG |
| 0150 | REP | 1 | | | 01,2111 | 75256 1 | -2CADR | TIG-5 |
| 0150 | REP | 1 | | | 01,2112 | 27710 1 | | |

R0163 ANY MORE GROUP 4. EVEN RESTART VALUES SHOULD GO HERE

| | | | | | | | | |
|------|-----|---|------|---------|---------|----------|--------|----------|
| 0164 | | | | 01,2113 | 00050 1 | 4.3SPOT | DEC | 40 |
| 0165 | REP | 3 | LAST | 199 | E6,1425 | | EBANK= | PACTOFF |
| 0166 | REP | 1 | | | 01,2114 | 75170 0 | -2CADR | DOTVCON |
| 0166 | REP | 1 | | | 01,2115 | 27711 0 | | |
| 0167 | | | | 01,2116 | 00240 1 | 4.5SPOT | DEC | 160 |
| 0168 | REP | 4 | LAST | 208 | E6,1425 | | EBANK= | PACTOFF |
| 0169 | REP | 1 | | | 01,2117 | 75142 1 | -2CADR | DOSTRULL |
| 0169 | REP | 1 | | | 01,2120 | 27711 0 | | |
| 0170 | | | | 01,2121 | 00764 1 | 4.7SPOT | DEC | 500 |
| 0171 | REP | 5 | LAST | 208 | E6,1425 | | EBANK= | PACTOFF |
| 0172 | REP | 1 | | | 01,2122 | 75240 0 | -2CADR | TIG-0 |
| 0172 | REP | 1 | | | 01,2123 | 27711 0 | | |
| 0173 | | | | 01,2124 | 00372 1 | 4.11SPOT | DEC | 250 |
| 0174 | REP | 7 | LAST | 208 | E6,1466 | | EBANK= | DAPDATR1 |
| 0175 | REP | 1 | | | 01,2125 | 74317 1 | -2CADR | V97E40.6 |
| 0175 | REP | 1 | | | 01,2126 | 27711 0 | | |
| 0176 | | | | 01,2127 | 00310 0 | 4.13SPOT | DEC | 200 |
| 0177 | REP | 3 | LAST | 202 | E7,1777 | | EBANK= | WHOCARES |
| 0178 | REP | 1 | | | 01,2130 | 74352 0 | -2CADR | R40FNARL |
| 0178 | REP | 1 | | | 01,2131 | 27710 1 | | |
| 0179 | | | | 01,2132 | 16000 0 | 4.15SPOT | OCT | 16000 |
| 0180 | REP | 3 | LAST | 169 | E5,1757 | | EBANK= | OCC |

PRELAUNCH OPTICAL VERIFICATION



L RESTART TABLES

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| | | | | | | | |
|------|-----|----|----------|---------|---------|----------|---------------|
| 0181 | REP | 1 | | 01,2133 | 02000 0 | 2CADR | COMPVER |
| 0181 | REP | 1 | | 01,2134 | 66065 1 | | |
| 0182 | REP | 1 | | 01,2135 | 16000 0 | 4.17SPOT | OCT 16000 |
| 0183 | REP | 3 | LAST 93 | E5,1671 | | BRANK= | XSM |
| 0184 | REP | 1 | | 01,2136 | 03736 0 | 2CADR | AZMTHCG1 |
| 0184 | REP | 1 | | 01,2137 | 66065 1 | | |
| 0185 | REP | 5 | LAST 202 | 01,2140 | 01672 0 | 4.21SPOT | GENADR P40TMP |
| 0186 | REP | 1 | | 01,2141 | 75413 0 | -GENADR | TIGBLNK |
| 0187 | REP | 6 | LAST 209 | E7,1672 | | BRANK= | P40TMP |
| 0188 | REP | 2 | LAST 209 | 01,2142 | 50067 0 | BRCOR | TIGBLNK |
| 0189 | REP | 1 | | 01,2143 | 12000 1 | 4.23SPOT | OCT 12000 |
| 0190 | REP | 11 | LAST 208 | E7,1412 | | BRANK= | TIG |
| 0191 | REP | 1 | | 01,2144 | 02113 0 | 2CADR | P40S/SV |
| 0191 | REP | 1 | | 01,2145 | 50067 0 | | |
| 0192 | REP | 1 | | 01,2146 | 24000 1 | 4.25SPOT | OCT 24000 |
| 0193 | REP | 5 | LAST 202 | 0302 | | BRANK= | BESTI |
| 0194 | REP | 2 | LAST 200 | 01,2147 | 02000 0 | 2CADR | PROGS2 |
| 0194 | REP | 1 | | 01,2150 | 32060 0 | | |
| 0195 | REP | 1 | | 01,2151 | 00372 1 | 4.27SPOT | DRC 250 |
| 0196 | REP | 6 | LAST 208 | E6,1425 | | BRANK= | FACTOFF |
| 0197 | REP | 1 | | 01,2152 | 75055 0 | -2CADR | DOTVCRCS |
| 0197 | REP | 1 | | 01,2153 | 27711 0 | | |
| 0198 | REP | 1 | | 01,2154 | 13000 0 | 4.31SPOT | OCT 13000 |
| 0199 | REP | 2 | LAST 93 | E6,1765 | | BRANK= | STAR |
| 0200 | REP | 1 | | 01,2155 | 02524 0 | 2CADR | RS1 +1 |
| 0200 | REP | 1 | | 01,2156 | 30065 1 | | |
| 0201 | REP | 1 | | 01,2157 | 04064 1 | 4.33SPOT | DRC 2100 |
| 0202 | REP | 5 | LAST 206 | E6,1661 | | BRANK= | AOG |
| 0203 | REP | 1 | | 01,2160 | 75403 1 | -2CADR | WAKEP62 |
| 0203 | REP | 1 | | 01,2161 | 23711 1 | | |
| 0204 | REP | 1 | | 01,2162 | 12000 1 | 4.35SPOT | OCT 12000 |
| 0205 | REP | 8 | LAST 208 | E6,1466 | | BRANK= | DAPDATR1 |
| 0206 | REP | 1 | | 01,2163 | 02155 1 | 2CADR | POSTRAIRN |
| 0206 | REP | 1 | | 01,2164 | 50066 1 | | |
| 0207 | REP | 1 | | 01,2165 | 00764 1 | 4.37SPOT | DRC 500 |
| 0208 | REP | 12 | LAST 209 | E7,1412 | | BRANK= | TIG |
| 0209 | REP | 1 | | 01,2166 | 75275 0 | -2CADR | TIGAVEG |
| 0209 | REP | 1 | | 01,2167 | 27710 1 | | |
| 0210 | REP | 1 | | 01,2170 | 17000 1 | 4.41SPOT | OCT 17000 |
| 0211 | REP | 6 | LAST 209 | E6,1661 | | BRANK= | AOG |
| 0212 | REP | 1 | | 01,2171 | 02511 0 | 2CADR | P67.1 |
| 0212 | REP | 1 | | 01,2172 | 54066 0 | | |
| 0213 | REP | 1 | | 01,2173 | 76003 0 | 4.43SPOT | GENADR S61DT |
| 0214 | REP | 2 | LAST 209 | E6,1774 | | BRANK= | S61DT |
| 0215 | REP | 1 | | 01,2174 | 75213 0 | -2CADR | S61.1C |
| 0215 | REP | 1 | | 01,2175 | 23711 1 | | |
| 0216 | REP | 1 | | 01,2176 | 13000 0 | 4.45SPOT | OCT 13000 |
| 0217 | REP | 7 | LAST 209 | E6,1661 | | BRANK= | AOG |

CALLS FOR OPTICS DATA AGAIN (STD LEADIN)
PRELAUNCH AZIMUTH CHANGE

DELTA TIME USED IN SETTING UP
LONG CALL, OF TIGBLNK BY P40,P41

PROTECT P40S/SV BY P40 P41

PROTECT CONTINUING JOB TO START P63

PROTECT DISPLAY JOB IN P67

PROTECT TASK TO START PRERRAD, ENTRY
S61.1C WILL CHANGE BRANK=RR7 FOR PRERRAD

PROTECT CONTINUING JOB S61.1
(ENTRY IM) ALIGNMENT)



L RESTART TABLES

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| | | | | | | | | | | |
|--------|-----|----|------|---------|---------|-------|----------|-----------------|----------|-------|
| 0218 | REP | 1 | | 01,2177 | 02802 | 1 | | 2CADR | 561.1A | -1 |
| 0218 | REP | 1 | | 01,2200 | 54066 | 0 | | | | |
| 0219 | | | | 01,2201 | 17000 | 1 | 4.47SPOT | OCT | 17000 | |
| 0220 | REP | 8 | LAST | 209 | E6,1661 | | | EBANK= | ACG | |
| 0221 | REP | 1 | | 01,2202 | 03006 | 1 | | 2CADR | PRE-HUNT | |
| 0221 | REP | 1 | | 01,2203 | 52066 | 0 | | | | |
| 0222 | | | | 01,2204 | 77777 | 0 | 4.51SPOT | OCT | 77777 | |
| 0223 | REP | 2 | LAST | 113 | E6,1704 | | | EBANK= | BODY3 | |
| 0224 | REP | 1 | | 01,2205 | 75463 | 1 | | -2CADR | ATERTASK | |
| 0224 | REP | 1 | | 01,2208 | 07711 | 1 | | | | |
| 0225 | | | | 01,2207 | 77777 | 0 | 4.53SPOT | DEC | -0 | |
| 0226 | REP | 1 | | E7,1777 | | | | EBANK= | END-E7 | |
| 0227 | REP | 1 | | 01,2210 | 74336 | 1 | | -2CADR | V97BTASK | |
| 0227 | REP | 1 | | 01,2211 | 27710 | 1 | | | | |
| 0228 | | | | 01,2212 | 13000 | 0 | 4.55SPOT | OCT | 13000 | |
| 0229 | REP | 2 | LAST | 116 | E7,1451 | | | EBANK= | RTINIT | |
| 0230 | REP | 1 | | 01,2213 | 02456 | 1 | | 2CADR | P65.1 | |
| 0230 | REP | 1 | | 01,2214 | 54087 | 1 | | | | |
| 0231 | REP | 7 | LAST | 209 | 01,2215 | 76105 | 1 | 4.57SPOT-GENADR | P40TMP | |
| 0232 | REP | 8 | LAST | 210 | E7,1672 | | | EBANK= | P40TMP | |
| 0233 | REP | 1 | | 01,2216 | 75352 | 1 | | -2CADR | TIGON | |
| 0233 | REP | 1 | | 01,2217 | 27710 | 1 | | | | |
| 0234 | | | | 01,2220 | 77777 | 0 | 4.61SPOT | OCT | 77777 | |
| 0235 | REP | 7 | LAST | 209 | E6,1425 | | | EBANK= | PACTOFF | |
| 0236 | REP | 1 | | 01,2221 | 75225 | 0 | | -2CADR | IGNITION | |
| 0236 | REP | 1 | | 01,2222 | 27711 | 0 | | | | |
| 0237 | | | | 01,2223 | 77777 | 0 | 4.63SPOT | OCT | 77777 | |
| 0238 | REP | 8 | LAST | 210 | E6,1425 | | | EBANK= | PACTOFF | |
| 0239 | REP | 1 | | 01,2224 | 75063 | 0 | | -2CADR | DOSPSOFF | |
| 0239 | REP | 1 | | 01,2225 | 27711 | 0 | | | | |
| 0240 | | | | 01,2226 | 00012 | 1 | 4.65SPOT | DEC | 10 | |
| 0241 | REP | 13 | LAST | 209 | E7,1412 | | | EBANK= | TIG | |
| 0242 | REP | 2 | LAST | 208 | 01,2227 | 75256 | 1 | | -2CADR | TIG-5 |
| 0242 | | | | 01,2230 | 27710 | 1 | | | | |
| 02421 | | | | 01,2231 | 77777 | 0 | 4.67SPOT | DEC | -0 | |
| 024211 | REP | 2 | LAST | 194 | E6,1474 | | | EBANK= | CS-MASS | |
| 024212 | REP | 1 | | 01,2232 | 74420 | 1 | | -2CADR | V97TTASK | |
| 024212 | REP | 1 | | 01,2233 | 27711 | 0 | | | | |
| 02422 | | | | 01,2234 | 00372 | 1 | 4.71SPOT | DEC | 250 | |
| 024221 | REP | 9 | LAST | 209 | E6,1466 | | | EBANK= | DAPDATR1 | |
| 024222 | REP | 1 | | 01,2235 | 74403 | 0 | | -2CADR | V97TRCS | |
| 024222 | REP | 1 | | 01,2236 | 27711 | 0 | | | | |
| 02423 | | | | 01,2237 | 77777 | 0 | 4.73SPOT | DEC | -0 | |
| 024231 | REP | 1 | | E6,1444 | | | | EBANK= | V97VCNTR | |
| 024232 | REP | 1 | | 01,2240 | 74366 | 1 | | -2CADR | V97PTASK | |
| 024232 | REP | 1 | | 01,2241 | 27711 | 0 | | | | |
| 024233 | | | | 01,2242 | 77777 | 0 | 4.75SPOT | DEC | -0 | |
| 024234 | REP | 10 | LAST | 210 | E6,1466 | | | EBANK= | DAPDATR1 | |
| 024235 | REP | 1 | | 01,2243 | 74324 | 1 | | -2CADR | SPSOFF07 | |
| 024235 | REP | 1 | | 01,2244 | 27711 | 0 | | | | |

PROTECT HUNTEST ITERATION.

PROTECT FDI ATTITUDE
ERROR DISPLAY IN P11

EBANK7 FOR TIG

PROTECT P65 RESPONSIVE DISPLAY.

(FOR RCS DAPON)



L RESTART TABLES

| | | | | | | | | |
|--------|--|----|------|---------|---------|----------|--------|----------|
| 024236 | | | | 01,2245 | 77777 0 | 4.77SPOT | DEC | -0 |
| 024237 | REP | 9 | LAST | 210 | E6,1425 | | BRANK= | FACTOFF |
| 024238 | REP | 2 | LAST | 208 | 01,2246 | 75240 0 | -2CADR | TIG-0 |
| 024238 | | | | 01,2247 | 27711 0 | | | |
| R0243 | ANY MORE GROUP 4. ODD RESTART VALUES SHOULD GO HERE | | | | | | | |
| 0244 | | | | 01,2250 | 32000 0 | 5.2SPOT | OCT | 32000 |
| 0245 | REP | 6 | LAST | 115 | E7,1431 | | BRANK= | DVCNTR |
| 0246 | REP | 1 | | | 01,2251 | 03141 0 | 2CADR | NORMLIZE |
| 0246 | REP | 1 | | | 01,2252 | 76067 1 | | |
| 0247 | | | | 01,2253 | 00310 0 | | DEC | 200 |
| 0248 | REP | 9 | LAST | 210 | E6,1661 | | BRANK= | ACG |
| 0249 | REP | 1 | | | 01,2254 | 74567 0 | -2CADR | REREADAC |
| 0249 | REP | 1 | | | 01,2255 | 01711 1 | | |
| 0250 | | | | 01,2256 | 20000 0 | 5.4SPOT | OCT | 20000 |
| 0251 | REP | 7 | LAST | 211 | E7,1431 | | BRANK= | DVCNTR |
| 0252 | REP | 1 | | | 01,2257 | 03007 0 | 2CADR | SERVICER |
| 0252 | REP | 1 | | | 01,2260 | 76067 1 | | |
| 0253 | | | | 01,2261 | 00310 0 | | DEC | 200 |
| 0254 | REP | 10 | LAST | 211 | E6,1661 | | BRANK= | ACG |
| 0255 | REP | 2 | LAST | 211 | 01,2262 | 74567 0 | -2CADR | REREADAC |
| 0255 | | | | 01,2263 | 01711 1 | | | |
| R0256 | ANY MORE GROUP 5. EVEN RESTART VALUES SHOULD GO HERE | | | | | | | |
| 0257 | | | | 01,2264 | 00310 0 | 5.3SPOT | DEC | 200 |
| 0258 | REP | 11 | LAST | 211 | E6,1661 | | BRANK= | ACG |
| 0259 | REP | 3 | LAST | 211 | 01,2265 | 74567 0 | -2CADR | REREADAC |
| 0259 | | | | 01,2266 | 01711 1 | | | |
| 0260 | | | | 01,2267 | 77777 0 | 5.5SPOT | OCT | 77777 |
| 0261 | REP | 12 | LAST | 211 | E6,1661 | | BRANK= | ACG |
| 0262 | REP | 1 | | | 01,2270 | 75123 0 | -2CADR | REDO5.5 |
| 0262 | REP | 1 | | | 01,2271 | 01711 1 | | |
| 0263 | | | | 01,2272 | 20000 0 | 5.7SPOT | OCT | 20000 |
| 0264 | REP | 4 | LAST | 209 | E5,1671 | | BRANK= | XSM |
| 0265 | REP | 1 | | | 01,2273 | 02456 1 | 2CADR | RSTOTS1 |
| 0265 | REP | 1 | | | 01,2274 | 66065 1 | | |
| 0266 | | | | 01,2275 | 77777 0 | 5.11SPOT | OCT | 77777 |
| 0267 | REP | 5 | LAST | 211 | E5,1671 | | BRANK= | XSM |
| 0268 | REP | 1 | | | 01,2276 | 75174 1 | -2CADR | ALLOOP1 |
| 0268 | REP | 1 | | | 01,2277 | 11712 0 | | |
| 0269 | | | | 01,2300 | 20000 0 | 5.13SPOT | OCT | 20000 |
| 0270 | REP | 6 | LAST | 211 | E5,1671 | | BRANK= | XSM |
| 0271 | REP | 1 | | | 01,2301 | 02527 0 | 2CADR | WTLISTNT |
| 0271 | REP | 1 | | | 01,2302 | 66065 1 | | |
| 0272 | | | | 01,2303 | 20000 0 | 5.15SPOT | OCT | 20000 |
| 0273 | REP | 7 | LAST | 211 | E5,1671 | | BRANK= | XSM |
| 0274 | REP | 1 | | | 01,2304 | 03317 1 | 2CADR | RSTEST1 |
| 0274 | REP | 1 | | | 01,2305 | 66065 1 | | |
| 0275 | | | | 01,2306 | 20000 0 | 5.17SPOT | OCT | 20000 |
| 0276 | REP | 8 | LAST | 211 | E5,1671 | | BRANK= | XSM |

USED BY PRELAUNCH

L RESTART TABLES

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| | | | | | | | | | |
|-------|--|----|----------|---------|---------|----------|--------|-----------|--|
| 0277 | REP | 1 | | 01,2307 | 05112 0 | | 2CADR | GEOSTRT4 | |
| 0277 | REP | 1 | | 01,2310 | 04065 0 | | | | |
| 0278 | REP | 1 | | 01,2311 | 20000 0 | 5.215POT | OCT | 20000 | |
| 0279 | REP | 9 | LAST 211 | E8,1671 | | | ERANK= | XSM | |
| 0280 | REP | 1 | | 01,2312 | 02637 1 | | 2CADR | ALPLT1 | |
| 0280 | REP | 1 | | 01,2313 | 66065 1 | | | | |
| 0281 | REP | 1 | | 01,2314 | 77777 0 | 5.235POT | OCT | 77777 | |
| 0282 | REP | 10 | LAST 212 | E8,1671 | | | ERANK= | XSM | |
| 0283 | REP | 1 | | 01,2315 | 75151 0 | | -2CADR | SPECSTS | |
| 0283 | REP | 1 | | 01,2316 | 11712 0 | | | | |
| 0284 | REP | 1 | | 01,2317 | 20000 0 | 5.255POT | OCT | 20000 | |
| 0285 | REP | 11 | LAST 212 | E8,1671 | | | ERANK= | XSM | |
| 0286 | REP | 1 | | 01,2320 | 03330 1 | | 2CADR | RETEST3 | |
| 0286 | REP | 1 | | 01,2321 | 66065 1 | | | | |
| 0287 | REP | 1 | | 01,2322 | 20000 0 | 5.275POT | OCT | 20000 | |
| 0288 | REP | 12 | LAST 212 | E8,1671 | | | ERANK= | XSM | |
| 0289 | REP | 1 | | 01,2323 | 03276 1 | | 2CADR | RESTARTER | |
| 0289 | REP | 1 | | 01,2324 | 66065 1 | | | | |
| 0290 | REP | 1 | | 01,2325 | 77777 0 | 5.315POT | OCT | 77777 | |
| 0291 | REP | 6 | LAST 211 | E7,1431 | | | ERANK= | DVCNTR | |
| 0292 | REP | 1 | | 01,2326 | 75167 0 | | -2CADR | REDO5.31 | |
| 0292 | REP | 1 | | 01,2327 | 01710 0 | | | | |
| 0293 | REP | 1 | | 01,2330 | 20000 0 | 5.335POT | OCT | 20000 | |
| 0294 | REP | 13 | LAST 212 | E8,1671 | | | ERANK= | XSM | |
| 0295 | REP | 1 | | 01,2331 | 03353 1 | | 2CADR | RESCING | |
| 0295 | REP | 1 | | 01,2332 | 66065 1 | | | | |
| 0296 | REP | 1 | | 01,2333 | 00000 1 | 5.355POT | DEC | 0 | |
| 0297 | REP | 1 | | 01,2334 | 00000 1 | | 2DEC | 0 | |
| 0297 | REP | 1 | | 01,2335 | 00000 1 | | | | |
| 0298 | REP | 1 | | 01,2336 | 77777 0 | 5.375POT | OCT | 77777 | |
| 0299 | REP | 13 | LAST 211 | E8,1661 | | | ERANK= | AOG | |
| 0300 | REP | 1 | | 01,2337 | 75041 0 | | -2CADR | CHEKAVEG | |
| 0300 | REP | 1 | | 01,2340 | 01711 1 | | | | |
| 0301 | REP | 1 | | 01,2341 | 77777 0 | 5.415POT | OCT | 77777 | |
| 0302 | REP | 9 | LAST 212 | E7,1431 | | | ERANK= | DVCNTR | |
| 0303 | REP | 1 | | 01,2342 | 75173 0 | | -2CADR | PREREAD | |
| 0303 | REP | 1 | | 01,2343 | 01710 0 | | | | |
| R0304 | ANY MORE GROUP 5.000 RESTART VALUES SHOULD GO HERE | | | | | | | | |
| 0305 | REP | 4 | LAST 173 | 01,2344 | 77777 0 | 6.25POT | OCT | 77777 | |
| 0306 | REP | 1 | | E8,1476 | | | ERANK= | AK | |
| 0307 | REP | 1 | | 01,2345 | 75737 0 | | -2CADR | PRE40.6 | |
| 0307 | REP | 1 | | 01,2346 | 37711 1 | | | | |
| 0308 | REP | 1 | | 01,2347 | 00144 0 | | DEC | 100 | |
| 0309 | REP | 2 | LAST 121 | E7,1660 | | | ERANK= | TTCOO | |
| 0310 | REP | 1 | | 01,2350 | 74605 1 | | -2CADR | CLCKTASK | |
| 0310 | REP | 1 | | 01,2351 | 27710 1 | | | | |
| R0311 | ANY MORE 6.000 RESTART VALUES SHOULD GO HERE | | | | | | | | |

TO PROTECT PREREAD AT TIG-30A
TIG-15 T+60

USED BY P40 AFTER GIMR DR TST TO REPOS=N
ENGINE UNTIL TVCDAPON



L RESTART TABLES

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| | | | | | | | | | |
|------|-----|----|------|---------|---------|---------|-----------------|-----------|-------|
| 0312 | | | | 01,2352 | 00144 0 | 6.3SPOT | DEC | 100 | |
| 0313 | REP | 14 | LAST | 210 | E7,1412 | | BRANK= | TIG | |
| 0314 | REP | 2 | LAST | 212 | 01,2353 | 74605 1 | -2CADR | CLOCKTASK | |
| 0314 | | | | | 01,2354 | 27710 1 | | | |
| 0315 | | | | | 01,2355 | 30000 1 | 6.5SPOT | OCT | 30000 |
| 0316 | REP | 5 | LAST | 207 | E3,1706 | | BRANK= | TEPHEN | |
| 0317 | REP | 1 | | | 01,2356 | 03564 0 | 2CADR | TIMEDIDR | |
| 0317 | REP | 1 | | | 01,2357 | 50063 1 | | | |
| 0318 | | | | | 01,2360 | 00000 1 | 6.7SPOT | OCT | 0 |
| 0319 | | | | | 01,2361 | 00000 1 | | OCT | 0 |
| 0320 | | | | | 01,2362 | 00000 1 | | OCT | 0 |
| 0321 | REP | 2 | LAST | 110 | 01,2363 | 76052 1 | 6.11SPOT-GENADR | CM/GYMDT | |
| 0322 | REP | 3 | LAST | 213 | E6,1725 | | BRANK= | CM/GYMDT | |
| 0323 | REP | 1 | | | 01,2364 | 75323 1 | -2CADR | READGYMR | |
| 0323 | REP | 1 | | | 01,2365 | 45711 1 | | | |
| 0324 | | | | | 01,2366 | 00000 1 | 6.13SPOT | DEC | 0 |
| 0325 | | | | | 01,2367 | 00000 1 | | DEC | 0 |
| 0326 | | | | | 01,2370 | 00000 1 | | DEC | 0 |

PROTECT INCREMENTING OF TIME2, TIME1 BY P27NUPDATE PROGRAM)

PROTECT TASK TO READ CDUS. FOR ENTRY DAP



L RESTART TABLES

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R0330 PROGRAM DESCRIPTION' NEWPHASE
R0332 MOD' 1
R0334 MOD BY' COPPS
R0336 FUNCTIONAL DESCRIPTION'

DATE' 11 NOV 1968
ASSEMBLY' SUNBURST REV
LOG SECTION' PHASE TABLE MAINTENANCE

R0337 NEWPHASE IS THE QUICK WAY TO MAKE A NON VARIABLE PHASE CHANGE. IT INCLUDES THE OPTION OF SETTING
R0339 TRASE OF THE GROUP. IF TRASE IS TO BE SET, -(TIME1) IS STORED IN THE TRASE TABLE AS FOLLOWS'

- R0341 (L-1) TRASE0
- R0342 (L) TRASE1 (IF GROUP=1)
- R0343 (L+1)
- R0344 (L+2) TRASE2 (IF GROUP=2)
- R0345 -----
- R0346 (L+6) TRASE4 (IF GROUP=4)
- R0347 (L+7)
- R0348 (L+8) TRASE5 (IF GROUP=5)

R0349 IN ANY CASE, THE NEGATIVE OF THE PHASE, FOLLOWED (IN THE NEXT REGISTER) BY THE PHASE, IS STORED IN THE
R0351 PHASE TABLE AS FOLLOWS'

- R0352 (L) -PHASE1 (IF GROUP=1)
- R0353 (L+1) PHASE1
- R0354 (L+2) -PHASE2 (IF GROUP=2)
- R0355 (L+3) PHASE2
- R0356 -----
- R0357 (L+7) PHASE4
- R0358 (L+8) -PHASE5 (IF GROUP=5)
- R0359 (L+9) PHASE5

R0360 CALLING SEQUENCE'

R0361 EXAMPLE IS FOR PLACING A PHASE OF FIVE INTO GROUP THREE'

R0362 1) IF TRASE IS NOT TO BE SET'

| | | | |
|-------|-----|-----|----------|
| A0363 | L-1 | CA | FIVE |
| A0364 | L | TC | NEWPHASE |
| A0365 | L+1 | OCT | 00003 |

R0366 2) IF TRASE IS TO BE SET'

| | | | |
|-------|-----|-----|----------|
| A0367 | L-1 | CS | FIVE |
| A0368 | L | TC | NEWPHASE |
| A0369 | L+1 | OCT | 00003 |

R0370 SUBROUTINES CALLED' NONE

R0371 NORMAL EXIT MODE' AT L+2 OF CALLING SEQUENCE

R0372 ALARM OR ABORT EXITS' NONE

R0373 OUTPUT' PHASE TABLE AND TRASE TABLE UPDATED

R0374 ERASABLE INITIALIZATION REQ,D' NONE



L RESTART TABLES

0375 DEBRIS' A,L,TEMPO

0376 ***WARNING*** THIS PROGRAM IS TO BE PLACED IN FIXED-FIXED AND UNSWITCHED ERASABLE.

| | | | | | | | | | |
|------|-----|----|------|------|----------|-----------------|----------|------------|--|
| 0378 | | | | 4114 | | BLOCK 02 | | | |
| 0379 | REP | 1 | | 4000 | | SETLOC PPTAG1 | | | |
| 0380 | | | | 4114 | | BANK | | | |
| 0381 | REP | 1 | | | | COUNT# 88/PHASE | | | |
| 0382 | | | | 4114 | 0 0004 0 | NEWPHASE | INHINT | | |
| 0383 | REP | 14 | LAST | 198 | 4115 | 54 001 1 | TS | L | SAVE FOR FURTHER USE |
| 0384 | REP | 19 | LAST | 188 | 4116 | 50 002 0 | NDX | 0 | OBTAIN THE GROUP NUMBER |
| 0385 | | | | | 4117 | 3 0000 1 | CA | 0 | |
| 0386 | REP | 20 | LAST | 215 | 4120 | 24 002 0 | INCR | 0 | OBTAIN THE RETURN ADDRESS |
| 0387 | | | | | 4121 | 6 0000 1 | DOUBLE | | SAVE THE GROUP IN A FORM USED FOR INDEXING |
| 0388 | REP | 1 | | | 4122 | 54 061 1 | TS | TEMPO | |
| 0389 | REP | 15 | LAST | 215 | 4123 | 10 001 1 | CCS | L | SEE IF WE ARE TO SET TRASE |
| 0390 | | | | | 4124 | 1 4133 0 | TCP | +7 | NO, THE DELTA T WAS POSITIVE |
| 0391 | | | | | 4125 | 1 4133 0 | TCP | +8 | |
| 0392 | REP | 53 | LAST | 199 | 4126 | 24 000 1 | NUFAZ+10 | INCR | A |
| 0393 | REP | 16 | LAST | 215 | 4127 | 54 001 1 | TS | L | SET TRASE AND STORE PHASE CORRECTLY |
| 0394 | REP | 3 | LAST | 128 | 4130 | 4 0025 1 | CS | TIME1 | SET TRASE |
| 0395 | REP | 2 | LAST | 215 | 4131 | 50 061 0 | NDX | TEMPO | |
| 0396 | REP | 1 | | | 4132 | 55-051 0 | TS | TRASE1 -2 | |
| 0397 | REP | 17 | LAST | 215 | 4133 | 4 0001 1 | CS | L | NOW PUT THE PHASE IN THE RIGHT TABLE LOC |
| 0398 | REP | 3 | LAST | 215 | 4134 | 50 061 0 | NDX | TEMPO | |
| 0399 | REP | 4 | LAST | 197 | 4135 | 52 751 0 | DXCH | -PHASE1 -2 | |
| 0400 | | | | | 4136 | 0 0003 1 | RELINT | | |
| 0401 | REP | 21 | LAST | 215 | 4137 | 0 0002 0 | TC | 0 | NOW RETURN TO CALLER |



| L | EXTMARK | | | | | | | | | |
|------|---------|----------|---------|----------|----------|-----------|--------------------------|----------------------------------|--|--|
| 0044 | REP 18 | LAST 165 | 07,2010 | 3 4711 1 | CAP | BIT2 | NOT SET | | | |
| 0045 | REP 5 | LAST 216 | 07,2011 | 27=044 1 | ADS | ISCTVBACT | SET IT, RESET IN ENDMARK | | | |
| 0046 | REP 1 | | 07,2012 | 0 2015 1 | TC | MARKCK | YES, FIND VAC AREA | | | |
| 0047 | REP 1 | | 07,2013 | 0 5604 0 | MCABORT | TC | BAILOUT | | | |
| 0048 | | | 07,2014 | 01211 1 | | OCT | 01211 | | | |
| 0049 | REP 3 | LAST 189 | 07,2015 | 10 400 1 | MARKCK | CCS | VAC1USE | FIND VAC AREA | | |
| 0050 | REP 1 | | 07,2016 | 0 2031 1 | | TC | MKVACFND | | | |
| 0051 | REP 2 | LAST 187 | 07,2017 | 10 454 0 | | CCS | VAC2USE | | | |
| 0052 | REP 2 | LAST 217 | 07,2020 | 0 2031 1 | | TC | MKVACFND | | | |
| 0053 | REP 2 | LAST 187 | 07,2021 | 10 530 0 | | CCS | VAC3USE | | | |
| 0054 | REP 3 | LAST 217 | 07,2022 | 0 2031 1 | | TC | MKVACFND | | | |
| 0055 | REP 2 | LAST 187 | 07,2023 | 10 604 1 | | CCS | VAC4USE | | | |
| 0056 | REP 4 | LAST 217 | 07,2024 | 0 2031 1 | | TC | MKVACFND | | | |
| 0057 | REP 2 | LAST 187 | 07,2025 | 10 680 0 | | CCS | VAC5USE | | | |
| 0058 | REP 5 | LAST 217 | 07,2026 | 0 2031 1 | | TC | MKVACFND | | | |
| 0059 | REP 2 | LAST 217 | 07,2027 | 0 5604 0 | | TC | BAILOUT | | | |
| 0060 | | | 07,2030 | 01207 0 | | OCT | 01207 | | | |
| 0061 | REP 1 | | 07,2031 | 6 4711 1 | MKVACFND | AD | TWO | ADDRESS OF VAC AREA | | |
| 0062 | REP 2 | LAST 188 | 07,2032 | 55=330 1 | | TS | MARKSTAT | | | |
| 0063 | REP 55 | LAST 216 | 07,2033 | 50 000 1 | | INDEX | A | | | |
| 0064 | REP 1 | | 07,2034 | 54 052 1 | | TS | QPRET | STORE NEXT AVAILABLE MARK SLOT | | |
| 0065 | REP 18 | LAST 203 | 07,2035 | 3 4714 1 | | CAP | ZERO | SHOW VAC AREA OCCUPIED | | |
| 0066 | REP 3 | LAST 217 | 07,2036 | 51=330 0 | | INDEX | MARKSTAT | | | |
| 0067 | | | 07,2037 | 53=777 0 | | TS | 0 -1 | | | |
| 0068 | REP 1 | | 07,2040 | 0 5253 0 | | TC | CHECKOM | BACKUP MARK ROUTINE USES SXTMARK | | |
| 0069 | | | 07,2041 | 00065 1 | | MM | 53 | | | |
| 0070 | | | 07,2042 | 1 2044 1 | | TCF | +2 | | | |
| 0071 | REP 1 | | 07,2043 | 1 4570 0 | | TCF | SWRSTURN | | | |
| 0072 | REP 2 | LAST 217 | 07,2044 | 0 5253 0 | | TC | CHECKOM | | | |
| 0073 | | | 07,2045 | 00066 1 | | MM | 54 | | | |
| 0074 | | | 07,2046 | 1 2050 1 | | TCF | +2 | | | |
| 0075 | REP 2 | LAST 217 | 07,2047 | 1 4570 0 | | TCF | SWRSTURN | | | |
| 0076 | REP 11 | LAST 198 | 07,2050 | 3 4877 0 | | CAP | BIT12 | DESIRED NUMBER OF MARKS IN 12-14 | | |
| 0077 | | | 07,2051 | 0 0006 1 | | EXTEND | | | | |
| 0078 | REP 16 | LAST 216 | 07,2052 | 7 0070 1 | | MP | RUPTRBO1 | | | |
| 0079 | REP 18 | LAST 215 | 07,2053 | 56 001 0 | | XCH | L | | | |
| 0080 | REP 4 | LAST 217 | 07,2054 | 27=330 1 | | ADS | MARKSTAT | | | |
| 0081 | REP 1 | | 07,2055 | 3 7667 1 | | CAP | PRIO32 | ENTER MARK JOB | | |
| 0082 | REP 2 | LAST 132 | 07,2056 | 0 5027 1 | | TC | NOVAC | | | |
| 0083 | REP 5 | LAST 217 | 1330 | | | BRANK= | MARKSTAT | | | |
| 0084 | REP 1 | | 07,2057 | 02346 1 | | ZCADR | MKVR51 | | | |
| 0084 | REP 1 | | 07,2060 | 16062 1 | | | | | | |
| 0085 | | | 07,2061 | 0 0003 1 | | REL.INT | | | | |
| 0086 | REP 3 | LAST 217 | 07,2062 | 1 4570 0 | | TCF | SWRSTURN | SAME AS MODRFXIT | | |



L SKTMARK

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R0067 PROGRAM NAME - MKRELEAS DATE- 5 APRIL 1967
 R0068 PROGRAM MODIFIED BY 258/278 PROGRAMMERS LOG SECTION SKTMARK
 R0069 MOD BY- R. MELANSON TO ADD DOCUMENTATION ASSEMBLY SUNDISK REV. 116

R0090 FUNCTIONAL DESCRIPTION-
 R0091 MKRELEAS IS EXECUTED BY INTERNAL ROUTINES TO RELEASE THE MARK SYSTEM TO MAKE IT AVAILABLE TO OTHER INTERNAL
 R0093 SYSTEM ROUTINES. IT ALSO CLEARS THE COARSE OPTICS FLAG BIT AND DISABLES THE OPTICS ERROR COUNTER.

R0095 CALLING SEQUENCE-

R0096 TC BANKCALL
 R0097 CADR MKRELEAS

R0098 NORMAL EXIT MODE-
 R0099 SWRETURN

R0100 ALARM OR ABORT EXIT MODE- NONE

R0101 OUTPUT-

- R0102 1) BIT9 OPTMODES SET TO 0
- R0103 2) OPTIND SET TO -1
- R0104 3) 1ST WORD OF VAC AREA SET TO VAC ADDRESS TO SIGNIFY AVAILABILITY.
- R0105 4) MARKSTAT CLEARED
- R0106 5) BIT2 CHANNEL 12 SET TO 0

R0107 ERASABLE INITIALIZATION- NONE

R0108 DERRIS-

R0109 A, MARKSTAT, BIT9 OPTMODES, OPTIND, BIT2 CHANNEL 12

| | | | | | | | | | | |
|------|-----|----|------|-----|---------|----------|----------|---------|----------|--------------------------------|
| 0110 | REP | 19 | LAST | 217 | 07,2063 | 3 4714 1 | MKRELEAS | CAP | ZERO | SHOW MARK SYSTEM NOW AVAILABLE |
| 0111 | REP | 8 | LAST | 217 | 07,2064 | 57=330 0 | | XCH | MARKSTAT | |
| 0112 | REP | 56 | LAST | 217 | 07,2065 | 10 000 0 | | CCS | A | |
| 0113 | REP | 57 | LAST | 218 | 07,2066 | 50 000 1 | | INDEX | A | |
| 0114 | | | | | 07,2067 | 54 000 0 | | TS | 0 | |
| 0115 | | | | | 07,2070 | 0 0004 0 | MKRELEAS | INHINT | | |
| 0116 | REP | 16 | LAST | 159 | 07,2071 | 4 4702 1 | | CS | BIT9 | COARSE OPTICS RETURN FLAG. |
| 0117 | REP | 31 | LAST | 183 | 07,2072 | 7 1331 0 | | MASK | OPTMODES | |
| 0118 | REP | 32 | LAST | 218 | 07,2073 | 55=331 0 | | TS | OPTMODES | |
| 0119 | REP | 6 | LAST | 199 | 07,2074 | 3 7716 0 | | CA | NEGONE | |
| 0120 | REP | 17 | LAST | 199 | 07,2075 | 55=303 1 | | TS | OPTIND | KILL COARS OPTICS |
| 0121 | REP | 19 | LAST | 217 | 07,2076 | 4 4711 0 | | CS | BIT2 | DISABLE OPTICS ERROR COUNTER |
| 0122 | | | | | 07,2077 | 0 0006 1 | | EXTEND | | |
| 0123 | REP | 20 | LAST | 180 | 07,2100 | 03 012 1 | | WAND | CHAN12 | |
| 0124 | | | | | 07,2101 | 0 0003 1 | | REL.INT | | |
| 0125 | REP | 4 | LAST | 217 | 07,2102 | 0 4570 1 | | TC | SWRETURN | |



L SKYMARK USER=5 PAGE NO. 4 E7 53

R0126 PROGRAM NAME - MARKRUPT DATE- 5 APRIL 1967
 R0127 PROGRAM MODIFIED BY 258/278 PROGRAMMERS L00 SECTION SKYMARK
 R0128 MOD BY- R. MELANSON TO ADD DOCUMENTATION ASSEMBLY BUNDISK REV. 116

R0129 FUNCTIONAL DESCRIPTION-
 R0130 MARKRUPT STORES CDUS,OPTICS AND TIME AND TRANSFERS CONTROL TO THE MARKIT,MARK REJECT OR KEYCOM ROUTINES IF
 R0132 BITS IN CHANNEL 16 ARE SET AS REQUIRED.

R0133 CALLING SEQUENCE-
 R0134 ROUTINE ENTERED VIA KEYRUPT2 WHEN MARK,MARK REJECT OR DSKY KEYS DEPRESSED BY THE OPERATOR.

R0136 NORMAL EXIT MODE-
 R0137 MARKIT, MKREJECT OR POSTJUMP ROUTINES (MARK,MARK REJECT OR DSKY CODE)

R0138 ALARM OR ABORT EXIT MODE-
 R0139 ALARM AND RESUME

R0140 OUTPUT-
 R0141 RUPTSTOR+5 = CDUT, RUPTSTOR+3 = CDUS, RUPTSTOR+2 = CDUY,
 R0142 RUPTREG3 = CDUZ, RUPTSTOR+8 = CDUX, RUPTSTOR+1 AND SAMPTIME+1 = TIME1,
 R0143 RUPTSTOR AND SAMPTIME = TIME2

R0144 REASABLE INITIALIZATION-
 R0145 CDUT,CDUS,CDUY,CDUZ,CDUX,TIME2,TIME1,CHANNEL 16 BITS 6,7 OR 1-5

R0146 DEBRIS-
 R0147 A,GRUPT,RUPTREG3,SAMPTIME,SAMPTIME+1,RUPTSTOR TO RUPTSTOR+6 EXCEPT RUPTSTOR+4 (LOCATION 67)

| | | | | | | | | | | | | | |
|------|-----|----|------|-----|---------|----|------|---|----------|--------|----------|-------|---------------------|
| 0149 | REF | 2 | LAST | 129 | 07,2103 | 54 | 016 | 1 | MARKRUPT | TS | BANKRUPT | STORE | CDUS AND OPTICS NOW |
| 0150 | REF | 5 | LAST | 164 | 07,2104 | 3 | 0035 | 1 | | CA | CDUT | | |
| 0151 | REF | 1 | | | 07,2105 | 54 | 362 | 1 | | TS | MKCDUT | | |
| 0152 | REF | 6 | LAST | 168 | 07,2106 | 3 | 0036 | 1 | | CA | CDUS | | |
| 0153 | REF | 1 | | | 07,2107 | 54 | 360 | 0 | | TS | MKCDUS | | |
| 0154 | REF | 1 | | | 07,2110 | 3 | 0033 | 1 | | CA | CDUY | | |
| 0155 | REF | 1 | | | 07,2111 | 54 | 357 | 1 | | TS | MKCDUY | | |
| 0156 | REF | 3 | LAST | 168 | 07,2112 | 3 | 0034 | 0 | | CA | CDUZ | | |
| 0157 | REF | 1 | | | 07,2113 | 54 | 361 | 1 | | TS | MKCDUZ | | |
| 0158 | REF | 2 | LAST | 168 | 07,2114 | 3 | 0032 | 0 | | CA | CDUX | | |
| 0159 | REF | 1 | | | 07,2115 | 54 | 363 | 0 | | TS | MKCDUX | | |
| 0160 | | | | | 07,2116 | 0 | 0006 | 1 | | EXTEND | | | |
| 0161 | REF | 6 | LAST | 175 | 07,2117 | 3 | 0025 | 0 | | DCA | TIME2 | GET | TIME |
| 0162 | REF | 1 | | | 07,2120 | 52 | 356 | 0 | | DxCH | MKT2T1 | | |
| 0163 | | | | | 07,2121 | 0 | 0006 | 1 | | EXTEND | | | |
| 0164 | REF | 2 | LAST | 219 | 07,2122 | 3 | 0356 | 1 | | DCA | MKT2T1 | | |
| 0165 | REF | 1 | | | 07,2123 | 52 | 014 | 0 | | DxCH | SAMPTIME | RUPT | TIME FOR NOLN 65. |
| 0166 | REF | 22 | LAST | 215 | 07,2124 | 56 | 002 | 0 | | XCH | 0 | | |
| 0167 | REF | 2 | LAST | 129 | 07,2125 | 54 | 012 | 0 | | TS | GRUPT | | |
| 0168 | REF | 23 | LAST | 195 | 07,2126 | 3 | 4705 | 1 | | CAP | BITS | SEE | IF MARK OR MKREJECT |

L SXTMARK

| | | | | | | | |
|------|-----|----|------|---------|------------------|---------|-----------|
| 0169 | | | | 07,2127 | 0 0008 1 | EXTEND | |
| 0170 | REP | 3 | LAST | 185 | 07,2130 02 016 1 | RAND | NAVKEYIN |
| 0171 | REP | 58 | LAST | 218 | 07,2131 10 000 0 | CCS | A |
| 0172 | REP | 1 | | | 07,2132 0 2427 1 | TC | MARKIT |
| 0173 | REP | 23 | LAST | 197 | 07,2133 3 4704 0 | CAP | BIT7 |
| 0174 | | | | | 07,2134 0 0008 1 | EXTEND | |
| 0175 | REP | 4 | LAST | 220 | 07,2135 02 016 1 | RAND | NAVKEYIN |
| 0176 | REP | 59 | LAST | 220 | 07,2138 10 000 0 | CCS | A |
| 0177 | REP | 1 | | | 07,2137 0 2300 0 | TC | MCREJECT |
| 0178 | REP | 2 | LAST | 185 | 07,2140 3 4362 1 | KEYCALL | CAP OCT37 |
| 0179 | | | | | 07,2141 0 0008 1 | EXTEND | |
| 0180 | REP | 6 | LAST | 220 | 07,2142 02 016 1 | RAND | NAVKEYIN |
| 0181 | | | | | 07,2143 0 0008 1 | EXTEND | |
| 0182 | | | | | 07,2144 1 2147 0 | BZF | +3 |
| 0183 | REP | 6 | LAST | 196 | 07,2145 0 4574 0 | TC | POSTJUMP |
| 0184 | REP | 1 | | | 07,2146 17622 1 | CADR | KEYCOM |
| 0185 | REP | 12 | LAST | 194 | 07,2147 0 5537 0 | +3 | TC ALARM |
| 0186 | | | | | 07,2150 00113 1 | OCT | 113 |
| 0187 | REP | 18 | LAST | 165 | 07,2151 0 5222 0 | TC | RESUME |

ITS A MARK

NOT A MARK, SEE IF MCREJECT

ITS A MARK REJECT

NOT MARK OR MCREJECT, SEE IF KEYCODE

IF NO INBITS

IT,S A KEY CODE, NOT A MARK.

ALARM IF NO INBITS



L EXTMARK

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R0188 PROGRAM NAME - MARKCONT DATE- 19 SEPT 1967
R0189 PROGRAM MODIFIED BY 258/278 PROGRAMMERS LOG SECTION EXTMARK
R0190 MOD BY- R. MELANSON TO ADD DOCUMENTATION ASSEMBLY SUNDISK REV. 116

R0191 FUNCTIONAL DESCRIPTION-
R0192 MARKCONT IS USED TO PERFORM A SPECIAL MARK FUNCTION FOR R21, TO EXECUTE A SPECIAL DISPLAY OF OPTICS AND TIME OR
R0194 TO PERFORM A MARK OF A STAR OR LAND SIGHTING BASED UPON FLASHING V-N.

R0195 CALLING SEQUENCE-
R0196 FROM MARKDIP

R0197 NORMAL EXIT MODE-
R0198 TAKEOVER

R0199 ALARM OR ABORT EXIT MODE-
R0200 ALARM AND TAKEOVER

R0201 OUTPUT-
R0202 1) FOR R21-
R0203 EBANK=EBANK7
R0204 MRKBUF1 TO MRKBUF1+6 = TIME2, TIME1, CDUY, OPTICX, CDUZ, OPTICSY, CDUX OF CURRENT R21 MARK FUNCTION.
R0206 MRKBUF2 TO MRKBUF2+6 CONTAINS PREVIOUS R21 MARK VALUES.
R0207 2) FOR SPECIAL DISPLAY JOB-
R0208 RUPTREG1 AND MRKBUF1 = CDUS, RUPTREG2 AND MRKBUF1 +1 = CDUT,
R0209 RUPTREG3 AND MRKBUF1 +2 = TIME2, RUPTREG4 AND MRKBUF1 +3 = TIME1
R0210 3) FOR NORMAL MARKING-
R0211 DECREMENT BITS14-12 OF MARKSTAT BY 1,
R0212 BIT10 MARKSTAT SET TO 1, INCREMENT OPRET BY 7,
R0213 STORE TIME2, TIME1, CDUY, CDUS, CDUZ, CDUT AND CDUX IN VAC+1 TO VAC+7

R0214 ERASABLE INITIALIZATION-
R0215 1) FOR R21-
R0216 BIT14 OF STATE+2 =1, MRKBUF1 TO MRKBUF1+6, ITEMP1, RUPTREG3,
R0217 RUPTSTOR TO RUPTSTOR+6 EXCEPT RUPTSTOR+4
R0218 2) FOR SPECIAL DISPLAY JOB-
R0219 BIT14 OF STATE+2 =0, MARKSTAT =+0, RUPTREG1, RUPTREG2, RUPTREG3
R0220 RUPTREG4, RUPTSTOR, RUPTSTOR+1, RUPTSTOR+3, RUPTSTOR+5,
R0221 BIT12 OF STATE+5 (V59 FLAG), MRKBUF1 THRU MRKBUF1+3
R0222 3) FOR NORMAL MARKING-
R0223 BIT14 OF STATE+2 =0, MARKSTAT =VAC ADDRESS, A REG, ITEMP1, RUPTREG3,
R0224 RUPTSTOR TO RUPTSTOR+6 EXCEPT RUPTSTOR+4

R0225 DERRIS-
R0226 1) FOR R21-
R0227 A, ITEMP1, MRKBUF1, MRKBUF2
R0228 2) FOR SPECIAL DISPLAY JOB-
R0229 A, RUPTREG1, RUPTREG2, RUPTREG3, RUPTREG4, MPAC TO MPAC+3
R0230 3) FOR NORMAL MARKING-
R0231 A, MARKSTAT, ITEMP1, OPRET, VAC+1 TO VAC+7 OF VAC AREA IN USE



L. SKD-MARK

USER=8 PAGE NO. 7 B7 53

| ID | REP | TYPE | VAL | TIME | MARK | COND | CAP | BIT14 |
|-------|-----|------|------|------|---------|--------|-----|---------------------|
| 0232 | REP | 23 | LAST | 188 | 07,2152 | 3 4675 | 1 | MARKCONT |
| 0233 | REP | 30 | LAST | 181 | 07,2153 | 7 0076 | 1 | CAP |
| 0234 | | | | | 07,2154 | 0 0006 | 1 | MASK STATE +2 |
| 0235 | REP | 1 | | | 07,2155 | 1 2167 | 1 | EXTEND |
| 0236 | REP | 7 | LAST | 216 | 07,2156 | 3 8211 | 0 | BZF MARKET |
| 0237 | REP | 1 | | | 07,2157 | 0 5475 | 1 | CAP SIX |
| 0238 | REP | 6 | LAST | 216 | 07,2160 | 01725 | 0 | TC CENTRAN |
| 0239 | REP | 5 | LAST | 207 | 07,2161 | 01734 | 0 | ADRES MRKBUF1 |
| | | | | | | | | ADRES MRKBUF2 |
| 0240 | REP | 6 | LAST | 222 | 07,2162 | 3 6211 | 0 | CAP SIX |
| 0241 | REP | 2 | LAST | 222 | 07,2163 | 0 5475 | 1 | TC CENTRAN |
| 0242 | REP | 3 | LAST | 219 | 07,2164 | 00355 | 1 | ADRES MCT2T1 |
| 0243 | REP | 7 | LAST | 222 | 07,2165 | 01725 | 0 | ADRES MRKBUF1 |
| 0244 | REP | 4 | LAST | 160 | 07,2166 | 1 5213 | 0 | TCF TASKOVER |
| 0245 | REP | 7 | LAST | 216 | 07,2167 | 11+330 | 1 | MARKET CCS MARKSTAT |
| 0246 | REP | 1 | | | 07,2170 | 0 2224 | 1 | TC MARK2 |
| 0255 | REP | 2 | LAST | 217 | 07,2171 | 3 4711 | 1 | CAP TWO |
| 0256 | REP | 6 | LAST | 217 | 07,2172 | 7 1044 | 1 | MASK EXTRACT |
| 0257 | | | | | 07,2173 | 0 0006 | 1 | EXTEND |
| 0258 | REP | 1 | | | 07,2174 | 1 2216 | 1 | BZF MARKET3 |
| 0259 | REP | 12 | LAST | 217 | 07,2175 | 3 4677 | 0 | CAP BIT12 |
| 0260 | REP | 31 | LAST | 222 | 07,2176 | 7 0101 | 0 | MASK STATE +5 |
| 0261 | | | | | 07,2177 | 0 0006 | 1 | EXTEND |
| 0262 | REP | 2 | LAST | 222 | 07,2200 | 1 2216 | 1 | BZF MARKET3 |
| 0263 | REP | 2 | LAST | 196 | 07,2201 | 3 4754 | 0 | CAP PRIOS |
| 0264 | REP | 3 | LAST | 217 | 07,2202 | 0 5027 | 1 | TC NOVAC |
| 0265 | REP | 6 | LAST | 222 | 07,1725 | | | EBANK= MRKBUF1 |
| 0266 | REP | 1 | | | 07,2203 | 02405 | 1 | 2CADR MARKDISP |
| 0266 | REP | 1 | | | 07,2204 | 76067 | 1 | |
| 02661 | REP | 9 | LAST | 222 | 07,2205 | 3 6211 | 0 | CAP SIX |
| 02662 | REP | 3 | LAST | 222 | 07,2206 | 0 5475 | 1 | TC CENTRAN |
| 02663 | REP | 4 | LAST | 222 | 07,2207 | 00355 | 1 | ADRES MCT2T1 |
| 02664 | REP | 6 | LAST | 171 | 07,2210 | 01674 | 0 | ADRES MARKDOWN |
| 02665 | REP | 10 | LAST | 222 | 07,2211 | 3 6211 | 0 | CAP SIX |
| 02666 | REP | 4 | LAST | 222 | 07,2212 | 0 5475 | 1 | TC CENTRAN |
| 02667 | REP | 5 | LAST | 222 | 07,2213 | 00355 | 1 | ADRES MCT2T1 |
| 02668 | REP | 9 | LAST | 222 | 07,2214 | 01725 | 0 | ADRES MRKBUF1 |
| 0267 | REP | 5 | LAST | 222 | 07,2215 | 1 5213 | 0 | TCF TASKOVER |
| 0268 | REP | 13 | LAST | 220 | 07,2216 | 0 5537 | 0 | MARKET3 TC ALARM |
| 0269 | | | | | 07,2217 | 00122 | 0 | OCT 122 |
| 0270 | REP | 6 | LAST | 222 | 07,2220 | 1 5213 | 0 | TCF TASKOVER |
| 0271 | REP | 14 | LAST | 222 | 07,2221 | 0 5537 | 0 | 114ALM TC ALARM |
| 0272 | | | | | 07,2222 | 00114 | 0 | OCT 114 |
| 0273 | REP | 7 | LAST | 222 | 07,2223 | 1 5213 | 0 | TCF TASKOVER |

R21 MARK (SPECIAL MARKING FOR R21)

NOT SET THEREFORE REGULAR MARKING SPECIAL FOR R21 TRANSFER MRKBUF1 TO MRKBUF2

TRANSFER CURRENT MARK DATA TO MRKBUF1

SEE IF MARKS CALLED FOR COLLECT MARKS

IS MARKING SYSTEM IN USE (BIT2)

MARKING NOT CALLED FOR

V59FLAG

IF V59FLAG NOT SET-MARK UNCALLED FOR CALIBRATION MARK (SST) FOR P23 SPECIAL DISPLAY JOB

TRANSFER MARK DATA TO MARKDOWN

TRANSFER MARK DATA TO MRKBUF1 FOR SPECIAL DISPLAY OF SHAFT AND TRUNNION IF V59 ACTING

MARKING NOT CALLED FOR

MARK NOT WANTED



L EXTMARK

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P0274 STORE MARK DATA IN MKVAC AND INCREMENT POINTER

| | | | | | | | | |
|------|-----|----|------|---------|----------|----------|--------|----------|
| 0275 | REP | 1 | | 07,2224 | 6 7711 1 | MARK2 | AD | 74K |
| 0276 | | | | 07,2225 | 0 0008 1 | | EXTEND | |
| 0277 | REP | 1 | | 07,2226 | 6 2221 1 | | BZMP | 114ALM |
| 0278 | REP | 6 | LAST | 222 | 07,2227 | 55=330 1 | TS | MARKSTAT |
| 0279 | | | | 07,2230 | 4 0000 0 | | COM | |
| 0280 | REP | 16 | LAST | 162 | 07,2231 | 7 4701 1 | MASK | BIT10 |
| 0281 | REP | 9 | LAST | 223 | 07,2232 | 27=330 1 | ADS | MARKSTAT |
| 0282 | REP | 1 | | 07,2233 | 7 4741 0 | | MASK | LOW9 |
| 0283 | REP | 7 | LAST | 164 | 07,2234 | 54 061 1 | TS | ITEMP1 |
| 0284 | REP | 60 | LAST | 220 | 07,2235 | 50 000 1 | INDEX | A |
| 0285 | REP | 2 | LAST | 217 | 07,2236 | 56 052 0 | XCH | QPRST |
| 0286 | REP | 3 | LAST | 66 | 07,2237 | 54 062 1 | TS | ITEMP2 |
| 0287 | REP | 3 | LAST | 159 | 07,2240 | 6 4716 0 | AD | SEVEN |
| 0288 | REP | 8 | LAST | 223 | 07,2241 | 50 061 0 | INDEX | ITEMP1 |
| 0289 | REP | 3 | LAST | 223 | 07,2242 | 54 052 1 | TS | QPRST |
| 0290 | | | | 07,2243 | 0 0006 1 | VACSTOR | EXTEND | |
| 0291 | REP | 6 | LAST | 222 | 07,2244 | 3 0356 1 | DCA | MKT2T1 |
| 0292 | REP | 4 | LAST | 223 | 07,2245 | 50 062 0 | INDEX | ITEMP2 |
| 0293 | | | | 07,2246 | 52 001 1 | | DYCH | 0 |
| 0294 | REP | 2 | LAST | 219 | 07,2247 | 3 0357 0 | CA | MKCDUY |
| 0295 | REP | 5 | LAST | 223 | 07,2250 | 50 062 0 | INDEX | ITEMP2 |
| 0296 | | | | 07,2251 | 54 002 1 | | TS | 2 |
| 0297 | REP | 2 | LAST | 219 | 07,2252 | 3 0360 1 | CA | MKCDUS |
| 0298 | REP | 6 | LAST | 223 | 07,2253 | 50 062 0 | INDEX | ITEMP2 |
| 0299 | | | | 07,2254 | 54 003 0 | | TS | 3 |
| 0300 | REP | 2 | LAST | 219 | 07,2255 | 3 0361 0 | CA | MKCDUZ |
| 0301 | REP | 7 | LAST | 223 | 07,2256 | 50 062 0 | INDEX | ITEMP2 |
| 0302 | | | | 07,2257 | 54 004 1 | | TS | 4 |
| 0303 | REP | 2 | LAST | 219 | 07,2260 | 3 0362 0 | CA | MKCDUT |
| 0304 | REP | 8 | LAST | 223 | 07,2261 | 50 062 0 | INDEX | ITEMP2 |
| 0305 | | | | 07,2262 | 54 005 0 | | TS | 5 |
| 0306 | REP | 2 | LAST | 219 | 07,2263 | 3 0363 1 | CA | MKCDUX |
| 0307 | REP | 9 | LAST | 223 | 07,2264 | 50 062 0 | INDEX | ITEMP2 |
| 0308 | | | | 07,2265 | 54 006 0 | | TS | 6 |
| 0309 | REP | 1 | | 07,2266 | 3 7671 0 | | CAP | PRI034 |
| 0310 | REP | 10 | LAST | 223 | 07,2267 | 7 1330 1 | MASK | MARKSTAT |
| 0311 | | | | 07,2270 | 0 0006 1 | | EXTEND | |
| 0312 | | | | 07,2271 | 1 2273 1 | | BZP | +2 |
| 0313 | REP | 8 | LAST | 222 | 07,2272 | 1 5213 0 | TCP | TASKOVER |
| 0314 | REP | 2 | LAST | 217 | 07,2273 | 3 7667 1 | CAP | PRI032 |
| 0315 | REP | 4 | LAST | 222 | 07,2274 | 0 5027 1 | TC | NOVAC |
| 0316 | REP | 11 | LAST | 223 | 1330 | | BRANK= | MARKSTAT |
| 0317 | REP | 1 | | 07,2275 | 02421 1 | | 2CADR | MKVR50 |
| 0317 | REP | 1 | | 07,2276 | 16062 1 | | | |
| 0318 | REP | 9 | LAST | 223 | 07,2277 | 1 5213 0 | TCP | TASKOVER |

SEE IF MARKS WANTED-REDUCE MARKS WANTED

MARK NOT WANTED-ALARM

SET BIT10 TO ENABLE REJECT

PICK UP MARK SLOT-POINTER
SAVE CURRENT POINTER
INCREMENT POINTER

STORE ADVANCED POINTER

IF ALL MARKS MADE FLASH VR50

L. SKYMARK USER-S PAGE NO. 9 BY 53

R0319 PROGRAM NAME - MKREJECT DATE- 5 APRIL 1967
 R0320 PROGRAM MODIFIED BY 258/278 PROGRAMMERS LOG SECTION SKYMARK
 R0321 MOD BY- R. MELANSON TO ADD DOCUMENTATION ASSEMBLY SUNDISK REV. 118

R0322 FUNCTIONAL DESCRIPTION-
 R0323 ROUTINE ALLOWS OPERATOR TO REJECT MARK MADE PRIOR TO ACCEPTANCE AND ALLOWS A NEW MARK TO BE MADE BY ASTRONAUT

R0325 CALLING SEQUENCE-
 R0326 FROM MARKRUPT IF BIT7 OF CHANNEL 16 IS 1.

R0327 NORMAL EXIT MODE-
 R0328 RESUME

R0329 ALARM OR ABORT EXIT MODE-
 R0330 ALARM AND RESUME

R0331 OUTPUT-
 R0332 1) FOR R21-
 R0333 MKRUP1 SET TO -1
 R0334 2) FOR NORMAL MARKING-
 R0335 BIT10 MARKSTAT =0, INCREMENT NO. MARKS BY 1, DECREMENT OPRST BY 7

R0336 ERASABLE INITIALIZATION-
 R0337 1) FOR R21-
 R0338 BIT14 OF STATE+2 SET TO 1
 R0339 2) FOR NORMAL MARKING-
 R0340 BIT14 OF STATE+2 SET TO 0, MARKSTAT, OPRST

R0341 DERRIS-
 R0342 1) FOR R21-
 R0343 A, MARKSTAT, ERANK
 R0344 2) FOR NORMAL MARKING-
 R0345 A, MARKSTAT, ITEMP1, OPRST

| | | | | | | | | | | | |
|------|-----|----|------|-----|---------|--------|---|----------|--------|----------|--|
| 0346 | REP | 24 | LAST | 222 | 07,2300 | 3 4675 | 1 | MKREJECT | CAP | BIT14 | |
| 0347 | REP | 32 | LAST | 222 | 07,2301 | 7 0076 | 1 | | MASK | STATE +2 | R21 MARK (SPECIAL MARKING FOR R21) |
| 0348 | | | | | 07,2302 | 0 0006 | 1 | | EXTEND | | |
| 0349 | REP | 1 | | | 07,2303 | 1 2307 | 0 | | BZF | MKREJECT | NOT SET THEREFORE REGULAR REJECT |
| 0350 | REP | 7 | LAST | 218 | 07,2304 | 3 7718 | 0 | | CA | NEQNE | -1 (FOR R22) |
| 0351 | REP | 10 | LAST | 222 | 07,2305 | 55=725 | 1 | | TS | MKRUPT1 | -0 IN TIME IS FLAG TO R22 SIGNIFYING A |
| 0352 | REP | 19 | LAST | 220 | 07,2306 | 0 5222 | 0 | | TC | RESUME | REJECTED MARK |
| 0353 | REP | 12 | LAST | 223 | 07,2307 | 11=330 | 1 | MKREJECT | CCS | MARKSTAT | SEE IF MARKS BEING ACCEPTED |
| 0354 | REP | 1 | | | 07,2310 | 0 2314 | 0 | | TC | REJECT2 | |
| 0355 | REP | 15 | LAST | 222 | 07,2311 | 0 5537 | 0 | | TC | ALARM | MARKS NOT BEING ACCEPTED |
| 0356 | | | | | 07,2312 | 00112 | 0 | | OCT | 112 | |
| 0357 | REP | 20 | LAST | 224 | 07,2313 | 0 5222 | 0 | | TC | RESUME | |
| 0358 | REP | 17 | LAST | 223 | 07,2314 | 4 4701 | 1 | REJECT2 | CS | BIT10 | SEE IF MARK HAD BEEN MADE SINCE LAST |
| 0359 | REP | 13 | LAST | 224 | 07,2315 | 7 1330 | 1 | | MASK | MARKSTAT | REJECT, AND SET BIT10 TO ZERO TO |
| 0360 | REP | 14 | LAST | 224 | 07,2316 | 57=330 | 0 | | XCH | MARKSTAT | SHOW MARK REJECT |

L EXTMARK

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| | | | | | | | | | |
|------|-----|----|------|-----|---------|-----------|---------|----------|-------------------------------------|
| 0361 | REP | 18 | LAST | 224 | 07,2317 | 7 4701 1 | MASK | BIT10 | |
| 0362 | REP | 61 | LAST | 223 | 07,2320 | 10 000 0 | CCS | A | |
| 0363 | REP | 1 | | | 07,2321 | 0 2325 1- | TC | REJECT3 | |
| 0364 | REP | 16 | LAST | 224 | 07,2322 | 0 5537 0 | TC | ALARM | DONT ACCEPT TWO REJECTS TOGETHER |
| 0365 | | | | | 07,2323 | 00110 1 | OCT | 110 | |
| 0366 | REP | 21 | LAST | 224 | 07,2324 | 0 5222 0 | TC | RESUME | |
| 0367 | REP | 2 | LAST | 223 | 07,2325 | 3 4741 1 | REJECT3 | CAP | LOW9 |
| 0368 | REP | 16 | LAST | 224 | 07,2326 | 7 1330 1 | MASK | MARKSTAT | DECREMENT POINTER TO REJECT MARK |
| 0369 | REP | 9 | LAST | 223 | 07,2327 | 54 061 1 | TS | ITEMP1 | |
| 0370 | REP | 4 | LAST | 223 | 07,2330 | 4 4716 1 | CS | SEVEN | |
| 0371 | REP | 10 | LAST | 225 | 07,2331 | 50 061 0 | INDEX | ITEMP1 | NEW POINTER |
| 0372 | REP | 4 | LAST | 223 | 07,2332 | 26 052 1 | ADS | QPRET | |
| 0373 | REP | 13 | LAST | 222 | 07,2333 | 3 4677 0 | CAP | BIT12 | INCREMENT MARKS WANTED AND IF FIELD |
| 0374 | REP | 16 | LAST | 225 | 07,2334 | 6 1330 0 | AD | MARKSTAT | IS NOW NON-ZERO, CHANGE TO VB51 TO |
| 0375 | REP | 17 | LAST | 225 | 07,2335 | 57*330 0 | XCH | MARKSTAT | INDICATE MORE MARKS WANTED |
| 0376 | REP | 2 | LAST | 223 | 07,2336 | 7 7671 1 | MASK | PRI034 | INDICATE MORE MARKS WANTED |
| 0377 | REP | 62 | LAST | 225 | 07,2337 | 10 000 0 | CCS | A | |
| 0378 | REP | 22 | LAST | 225 | 07,2340 | 0 5222 0 | TC | RESUME | |
| 0379 | REP | 3 | LAST | 223 | 07,2341 | 3 7667 1 | CAP | PRI032 | |
| 0380 | REP | 5 | LAST | 223 | 07,2342 | 0 5027 1 | TC | NOVAC | |
| 0381 | REP | 18 | LAST | 225 | 1330 | | BRANK= | MARKSTAT | |
| 0382 | REP | 2 | LAST | 217 | 07,2343 | 02346 1 | 2CADR | MKV851 | |
| 0382 | | | | | 07,2344 | 16062 1 | | | |
| 0383 | REP | 23 | LAST | 225 | 07,2345 | 0 5222 0 | TC | RESUME | |

L. MARK

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| | | | | | | | | | | |
|-------|--|----|------|---------|---------|--------|--------|----------|-----------|---|
| 0421 | | | | 07,2375 | 0 0008 | 1 | EXTEND | | | |
| 0422 | REP | 1 | | 07,2376 | 6 2402 | 0 | BZMP | JAMIT | | NO MARKS MADE, SHOW IT IN QPRET, R53 |
| 0423 | | | | 07,2377 | 0 0008 | 1 | EXTEND | | | WILL PICK IT UP AND RECYCLE |
| 0424 | REP | 14 | LAST | 225 | 07,2400 | 7 4677 | 1 | MP | BIT12 | THIS PUTS NUMBER MARKS-1 IN A |
| 0425 | REP | 8 | LAST | 164 | 07,2401 | 6 4712 | 1 | AD | ONE | |
| 0426 | REP | 22 | LAST | 226 | 07,2402 | 51=330 | 0 | JAMIT | INDEX | MARKSTAT |
| 0427 | REP | 6 | LAST | 226 | 07,2403 | 54 052 | 1 | TS | QPRET | STORE NO OF MARKS MADE |
| 0434 | | | | 07,2404 | 0 0004 | 0 | INHINT | | | SERVICE OPTSTALL. INTERFACE WITH |
| 0435 | REP | 4 | LAST | 196 | 07,2405 | 3 4715 | 0 | CAP | FIVE | |
| 0436 | REP | 8 | LAST | 184 | 07,2406 | 0 5140 | 1 | TC | WAITLIST | |
| 0437 | REP | 23 | LAST | 227 | | 1330 | | EBANK= | MARKSTAT | |
| 0438 | REP | 1 | | | 07,2407 | 02412 | 1 | 2CADR | ENDMARKS | |
| 0438 | REP | 1 | | | 07,2410 | 16062 | 1 | | | |
| 0439 | REP | 1 | | | 07,2411 | 0 5423 | 1 | TC | ENDMARK | KNOCKS DOWN MARKING FLAG + DOES ENDOPJC |
| 0440 | REP | 9 | LAST | 227 | 07,2412 | 3 4712 | 1 | ENDMARKS | CAP | ONE |
| 0441 | REP | 15 | LAST | 196 | 07,2413 | 0 4633 | 0 | TC | IRKCALL | |
| 0442 | REP | 1 | | | 07,2414 | 17467 | 1 | CADR | GOODEND | |
| 0443 | REP | 3 | LAST | 225 | 07,2415 | 3 7671 | 0 | MKVR5X | CAP | PRIO34 |
| 0444 | REP | 24 | LAST | 227 | 07,2416 | 7 1330 | 1 | TS | MARKSTAT | RE-DISPLAY VR51 IF MORE MARKS WANTED |
| 0445 | REP | 63 | LAST | 225 | 07,2417 | 10 000 | 0 | CCS | A | AND VR50 IF ALL IN |
| 0446 | REP | 3 | LAST | 225 | 07,2420 | 1 2346 | 0 | TCP | MKVR51 | |
| 0447 | REP | 1 | | | 07,2421 | 3 4333 | 0 | MKVR50 | CAP | R1D1 |
| 0448 | REP | 2 | LAST | 74 | 07,2422 | 55=045 | 0 | TS | DSPTERM1 | OCT 16 |
| 0449 | REP | 1 | | | 07,2423 | 3 2425 | 0 | CAP | V50N25 | |
| 0450 | REP | 4 | LAST | 227 | 07,2424 | 1 2351 | 0 | TCP | MKVR51 +3 | |
| 0451 | | | | | 07,2425 | 14431 | 1 | V50N25 | VN | 5025 |
| 0452 | | | | | 07,2426 | 14600 | 1 | VR51 | VN | 5100 |
| 0454 | REP | 1 | | | 4362 | | | OCT37 | = | LOW5 |
| R0455 | PROGRAM NAME - MARKIT | | | | | | | | | DATE- 19 SEPT 1967 |
| R0456 | CALLING SEQUENCE | | | | | | | | | |
| R0457 | FROM MARKRUPT IF CHAN 16 BIT 6 = 1 | | | | | | | | | |
| R0458 | EXIT | | | | | | | | | |
| R0459 | RESUME | | | | | | | | | |
| R0460 | INPUT | | | | | | | | | |
| R0461 | CDUORWD. ALSO ALL INITIALIZATION FOR MARKCONT | | | | | | | | | |
| R0462 | OUTPUT | | | | | | | | | |
| R0463 | MKT2T1, MKCDUX, MKCDUY, MKCDUZ, MKCDUS, MKCDUT | | | | | | | | | |
| R0464 | ALARM EXIT | | | | | | | | | |
| R0465 | NONE | | | | | | | | | |
| 0466 | REP | 1 | | | 07,2427 | 11=341 | 1 | MARKIT | CCS | CDUORWD |
| 0467 | | | | | 07,2430 | 1 2433 | 0 | | TCP | +3 |

DELAY OF CDUORWD CS IF FNZ

L SXTMARK

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0468
 0469 REP 20 LAST 218 07,2431 1 2433 0
 0470 REP 10 LAST 227 07,2432 3 4714 1
 0471 REP 9 LAST 227 07,2433 6 4712 1
 0472 REP 11 LAST 224 07,2434 0 5140 1
 0473 REP 1 07,1725 02203 1
 0473 REP 1 07,2435 20067 1
 0474 REP 24 LAST 225 07,2436 1 5222 1

TCP +2
 CAP ZERO
 AD ONE
 TC WAITLIST
 EBANK= MARKDIP1
 2CADR MARKDIP
 10 MS IF NO CHECK

0475 REP 1 10,2000
 0476 10,2203

TCP RESUME
 SETLOC SXTMARK1
 BANK

0477 REP 1

COUNT 10/SXTMK

R0478 PROGRAM NAME - MARKDIP

DATE- 19 SEPT 1967

R0479 CALLING SEQUENCE

R0480 WAITLIST FROM MARKIT

R0481 EXIT

R0482 TAKEOVER OF IRKCALL TO MARKCONT

R0483 INPUT

R0484 OUTPUT FROM MARKIT, INPUT TO MARKCONT, CDUORWD

R0485 OUTPUT

R0486 RUPTSTOR - RUPTSTOR+3, RUPTREG3, RUPTSTOR+5 - RUPTSTOR +8

R0487 ALARM EXIT

R0488 ALARM AND TAKEOVER

0489 REP 2 LAST 227 10,2203 3 1341 0 MARKDIP CA CDUORWD
 0490 10,2204 0 0006 1 EXTEND
 0491 REP 1 10,2205 6 2216 0 BZMP MKACPT
 0492 REP 25 LAST 196 10,2206 4 4712 0 CS RTI1
 0493 REP 1 10,2207 54 354 1 TS MNDX
 0494 REP 3 LAST 223 10,2210 3 0363 1 CA MKCDUX
 0495 REP 1 10,2211 0 2220 0 TC DIPCHK
 0496 REP 3 LAST 223 10,2212 3 0357 0 CA MKCDUY
 0497 REP 2 LAST 228 10,2213 0 2220 0 TC DIPCHK
 0498 REP 3 LAST 223 10,2214 3 0361 0 CA MKCDUZ
 0499 REP 3 LAST 228 10,2215 0 2220 0 TC DIPCHK

IF DELAY CHECK IS ZERO OR NEG, ACP MARK

SET INDEX -1

SEE IF VEHICLE RATE TOO MUCH AT MARK

0500 REP 16 LAST 227 10,2216 0 4633 0 MKACPT TC IRKCALL
 0501 REP 1 10,2217 16152 0 CADR MARKCONT

MARK DATA OK, WHAT DO WE DO WITH IT

0503 REP 2 LAST 228 10,2220 24 354 0 DIPCHK INCR MNDX

INCREMENT INDEX

0504 10,2221 0 0006 1 EXTEND
 0505 REP 3 LAST 228 10,2222 5 0354 0 INDEX MNDX



| L | MARK | REP | LAST | 219 | 10,2223 | 20 032 1 |
|------|------|-----|------|-----|---------|----------|
| 0506 | REP | 3 | LAST | 219 | 10,2223 | 20 032 1 |
| 0507 | REP | 64 | LAST | 227 | 10,2224 | 10 000 0 |
| 0508 | | | | | 10,2225 | 1 2231 1 |
| 0509 | REP | 23 | LAST | 219 | 10,2226 | 0 0002 0 |
| 0510 | | | | | 10,2227 | 1 2231 1 |
| 0511 | REP | 24 | LAST | 229 | 10,2230 | 0 0002 0 |
| 0512 | REP | 1 | | | 10,2231 | 6 7715 0 |
| 0513 | | | | | 10,2232 | 0 0006 1 |
| 0514 | | | | | 10,2233 | 6 2230 1 |
| 0518 | REP | 17 | LAST | 225 | 10,2234 | 0 5537 0 |
| 0519 | | | | | 10,2235 | 00121 0 |
| 0520 | REP | 10 | LAST | 223 | 10,2236 | 1 5213 0 |

MSJ COLK
 CDS A
 TCP +4
 TO 0
 TCP +2
 TO 0
 AD NEG2
 EXTEND
 BZP -3
 TC ALARM
 OCT 00121
 TCP TASKOVER

GET MARK(ICDU) - CURRENT(ICDU)

SEE IF DIFFERENCE GREATER THAN 3 BITS

NOT GREATER

COUPLED WITH PROGRAM ALARM

DO NOT ACCEPT

L EXTENDED VERBS

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| Address | Verb | Count | Index | MPAC | Verb Description |
|---------|-----------------|------------------|---------|-----------------|---|
| 0001 | | 07,2440 | | BANK 7 | |
| 0002 | REP 1 | 43,2000 | | SETLOC EXTVERBS | |
| 0003 | | 43,2000 | | BANK | |
| 0004 | REP 4 LAST 208 | 05,1757 | | BRANK= 000 | |
| 0005 | REP 1 | | | COUNT* 88/EXTVB | |
| 0006 | PAN-OUT | | | | |
| 0007 | REP 24 LAST 199 | 43,2000 50 154 1 | 00EXTVB | INDEX MPAC | VERB-40 IS IN MPAC |
| 0008 | REP 1 | 43,2001 0 2002 1 | TC | TC LST2PAN | PAN AS BEFORE. |
| 0009 | REP 1 | 43,2002 0 2124 1 | LST2PAN | TC VBZERO | VB40 ZERO (USED WITH NOUN 20 ONLY). |
| 0010 | REP 1 | 43,2003 0 2150 1 | TC | TC VB0ARK | VB41 COARSE ALIGN (USED WITH NOUN 20 OR 91 ONLY) |
| A0011 | | | | | |
| 0012 | REP 1 | 43,2004 0 2240 0 | TC | TC IMUPINEK | VB42 FINE ALIGN IMU |
| 0013 | REP 1 | 43,2005 0 2412 1 | TC | TC IMUATICK | VB43 LOAD IMU ATTITUDE ERROR METERS. |
| 0014 | REP 1 | 43,2006 0 3203 0 | TC | TC SETSRP | VB44 SET SURFACE FLAG |
| 0015 | REP 1 | 43,2007 0 3206 0 | TC | TC RSTSRP | VB45 RESET SURFACE FLAG |
| 0016 | REP 1 | 43,2010 0 2516 1 | TC | TC STABLISH | VB46 ESTABLISH G.C CONTROL. |
| 0017 | REP 1 | 43,2011 0 3100 0 | TC | TC LMTCOMSV | VB47 MOVE LM STATE VECTOR INTO CM |
| 0018 | REP 1 | 43,2012 0 2536 0 | TC | TC DARDISP | VB48 LOAD A/P DATA. |
| 0019 | REP 1 | 43,2013 1 2527 1 | TC | TC CRWMANU | VB 49 START AUTOMATIC ATTITUDE MANEUVER |
| 0020 | REP 1 | 43,2014 0 2275 0 | TC | TC GOLOADLV | VB50 PLEASE PERFORM |
| 0021 | REP 2 LAST 230 | 43,2015 0 2275 0 | TC | TC GOLOADLV | VB51 PLEASE MARK |
| 0022 | REP 1 | 43,2016 0 3153 0 | TC | TC V52 | VB52 SET OFFSET NO. FOR P22 |
| 0023 | REP 3 LAST 230 | 43,2017 0 2275 0 | TC | TC GOLOADLV | VB 53 PLEASE PERFORM COAS MARK |
| 0024 | REP 1 | 43,2020 0 2576 1 | TC | TC GOTOR23 | V54 START R23 (R21-BACKUP) |
| 0025 | REP 1 | 43,2021 0 2326 1 | TC | TC ALINTIME | VB55 ALIGN TIME |
| 0026 | REP 1 | 43,2022 0 2637 1 | TC | TC TRACKTRM | VB56 TERMINATE TRACKING (P20 +P25) |
| 0027 | REP 1 | 43,2023 0 2573 1 | TC | TC GOTOR21 | V57 START R21 REND TRACK SIGHT MARK ROLT |
| 0028 | REP 1 | 43,2024 0 2502 1 | TC | TC ENATMA | VB58 ENABLE AUTOMATIC ATTITUDE MANEUVER |
| 0029 | REP 4 LAST 230 | 43,2025 0 2275 0 | TC | TC GOLOADLV | VB59 PLEASE CALIBRATE |
| 0030 | REP 1 | 43,2026 0 2303 0 | TC | TC V60 | VB60 SET CHIX (N17) EQUAL TO CDU |
| 0031 | REP 1 | 43,2027 0 2311 0 | TC | TC V61 | VB61 SELECT MODE I |
| 0032 | REP 1 | 43,2030 0 2314 0 | TC | TC V62 | VB62 SELECT MODE II, ERROR WRT N22 |
| 0033 | REP 1 | 43,2031 0 2321 0 | TC | TC V63 | VB63 SELECT MODE III, ERROR WRT N17 |
| 0034 | REP 1 | 43,2032 0 2472 1 | TC | TC VB64 | VB64 CALCULATE, DISPLAY S-HAND ANT ANGLES |
| 0035 | REP 1 | 43,2033 0 2367 1 | TC | TC CKOPTVB | V 65 B OPTICAL VERIFICATION FOR PRELAUNCH |
| 0036 | REP 1 | 43,2034 0 3032 0 | TC | TC ATTACHED | VB 66 ATTACHED. MOVE THIS TO OTHER STATE |
| 0037 | REP 1 | 43,2035 0 3175 1 | TC | TC V67 | VB67 MATRIX MONITOR |
| 0038 | REP 1 | 43,2036 0 2505 0 | TC | TC STRCKON | VB68 CS4 STROKE TEST ON. |
| 0039 | REP 1 | 43,2037 0 2037 1 | TC | TC VERB69 | VB 69 CAUSE RESTART |
| 0040 | REP 1 | 43,2040 0 3722 0 | TC | TC V70UPDAT | VB70 UPDATE LIPTOFF TIME. |
| 0041 | REP 1 | 43,2041 0 3724 0 | TC | TC V71UPDAT | VB71 UNIVERSAL UPDATE - BLOCK ADDRESS. |
| 0042 | REP 1 | 43,2042 0 3726 1 | TC | TC V72UPDAT | VB72 UNIVERSAL UPDATE - SINGLE ADDRESS. |
| 0043 | REP 1 | 43,2043 0 3730 0 | TC | TC V73UPDAT | VB73 UPDATE AGC TIME (OCTAL). |
| 0044 | REP 1 | 43,2044 0 2706 1 | TC | TC DNEEDUMP | VB74 INITIALIZE DOWN-TELEMETRY PROGRAM FOR BRASARIE DUMP. |
| A0045 | | | | | |
| 0046 | REP 1 | 43,2045 0 2712 1 | TC | TC LPTFLCON | VB75 SET LIPTOFF FLAG. |

L EXTENDED VERBS

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| | | | | | | | | | | | | |
|-------|---------------------------|----|------|---------|---------|------|------|----|----------|---|---------------------------------------|---|
| 0047 | REP | 1 | | 43,2046 | 0 | 3013 | 0 | TC | SETPRPLG | VB76 SET PREFERRED ATTITUDE FLAG | | |
| 0048 | REP | 1 | | 43,2047 | 0 | 3016 | 0 | TC | RESSTPRP | VB77 RESET PREFERRED ATT. FLAG | | |
| 0049 | REP | 1 | | 43,2050 | 0 | 2400 | 1 | TC | CHAZPOOC | CHANGE GYROCOMPASS LAUNCH AZIMUTH V78 | | |
| 0050 | REP | 1 | | 43,2051 | 0 | 3004 | 0 | TC | CALLR35 | VB79 REQD LUNAR LINDRCK SELECTION (R35) | | |
| 0051 | REP | 1 | | 43,2052 | 0 | 2700 | 1 | TC | LEN/EC | VB80 UPDATE LEM STATE VECTOR | | |
| 0052 | REP | 1 | | 43,2053 | 0 | 2703 | 1 | TC | CSM/EC | VB81 UPDATE CSM STATE VECTOR | | |
| 0053 | REP | 1 | | 43,2054 | 0 | 2546 | 1 | TC | VB2PERP | VB82 REQUEST ORBIT PARAM DISPLAY (R30) | | |
| 0054 | REP | 1 | | 43,2055 | 0 | 2553 | 0 | TC | VB3PERP | VB83 RANGE, RANGE RATE, +X AXIS (R31) | | |
| 0055 | REP | 1 | | 43,2056 | 0 | 2120 | 0 | TC | ALM/END | VB84 SPARE | | |
| 0056 | REP | 1 | | 43,2057 | 0 | 2565 | 0 | TC | VB5PERP | VB85 RANGE, RANGE RATE, SLOS (R34) | | |
| 0057 | REP | 1 | | 43,2060 | 0 | 2632 | 1 | TC | VB6PERP | VB86 BACKUP MARK REJECT | | |
| 0058 | REP | 1 | | 43,2061 | 0 | 3021 | 1 | TC | SETVHP | VB87 SET VHP RANGE FLAG | | |
| 0059 | REP | 1 | | 43,2062 | 0 | 3025 | 0 | TC | RESSTVHP | VB88 RESET VHP RANGE FLAG | | |
| 0060 | REP | 1 | | 43,2063 | 0 | 2732 | 0 | TC | VB9PERP | VB89-ALIGN X OR PRF CSM AXIS TO LOS (R63) | | |
| 0061 | REP | 1 | | 43,2064 | 0 | 3140 | 1 | TC | VB9PERP | VB90-CUT OF PLANE PARAMETERS ER36A | | |
| 0062 | REP | 1 | | 43,2065 | 0 | 2751 | 0 | TC | GOSHOSUM | VB91 TEMP FOR HYBRID AND STG. | | |
| 0063 | REP | 1 | | 43,2066 | 0 | 2360 | 0 | TC | SYSTEST | VB92 OPERATE IMU PERFORMANCE TEST | | |
| 0064 | REP | 1 | | 43,2067 | 0 | 2742 | 1 | TC | WMATRNG | VB93 CLEAR RENDWFLG | | |
| 0065 | REP | 1 | | 43,2070 | 0 | 3124 | 0 | TC | VB994 | VB94 DO R64 | | |
| 0066 | REP | 2 | LAST | 231 | 43,2071 | 0 | 2120 | 0 | TC | ALM/END | VB95 SPARE | |
| 0067 | REP | 1 | | 43,2072 | 1 | 3146 | 0 | TC | VB996 | VB96 SET QUITFLAG TO STOP INTEGRATION | | |
| 0068 | REP | 5 | LAST | 230 | 43,2073 | 0 | 2275 | 0 | TC | GOLOADLV | VB97 PLEASE PERFORM ENGINE-FAIL (R41) | |
| 0069 | REP | 3 | LAST | 231 | 43,2074 | 0 | 2120 | 0 | TC | ALM/END | VB98 SPARE | |
| 0070 | REP | 6 | LAST | 231 | 43,2075 | 0 | 2275 | 0 | TC | GOLOADLV | VB99 PLEASE ENABLE ENGINE | |
| R0071 | END OF EXTENDED VERB FAN. | | | | | | | | | | | |
| 0072 | REP | 7 | LAST | 222 | 43,2076 | 11 | 044 | 1 | TESTACT | CCS | EXTVRACT | |
| 0073 | REP | 4 | LAST | 231 | 43,2077 | 0 | 2120 | 0 | TC | ALM/END | | YES. TURN ON OPERATOR ERROR LIGHT |
| 00731 | REP | 2 | LAST | 188 | 43,2100 | 3 | 0100 | 0 | CA | FLAGRD4 | | ARE PRIOS USING DSKY |
| 00732 | REP | 1 | | 43,2101 | 7 | 2123 | 1 | | MASK | CC24100 | | |
| 00733 | REP | 65 | LAST | 229 | 43,2102 | 10 | 000 | 0 | CCS | A | | |
| 00734 | REP | 5 | LAST | 231 | 43,2103 | 0 | 2120 | 0 | TC | ALM/END | | |
| 0074 | REP | 3 | LAST | 196 | 43,2104 | 3 | 4112 | 1 | CAP | OCT24 | | SET BITS 3 AND 5 |
| 0075 | REP | 8 | LAST | 231 | 43,2105 | 55 | 044 | 1 | SETXTACT | TS | EXTVRACT | NO. SET FLAG TO SHOW EXT VERR DISPLAY |
| A0076 | | | | | | | | | | | | |
| 0077 | REP | 25 | LAST | 229 | 43,2106 | 3 | 0002 | 0 | CA | 0 | | |
| 0078 | REP | 25 | LAST | 230 | 43,2107 | 54 | 155 | 1 | TS | MPAC +1 | | |
| 0083 | REP | 3 | LAST | 222 | 43,2110 | 4 | 4711 | 0 | CS | TWO | | BLANK EVERYTHING EXCEPT MM AND VERR |
| 0084 | REP | 1 | | 43,2111 | 0 | 4170 | 0 | TC | NVSLR | | | |
| 0085 | REP | 1 | | 43,2112 | 0 | 2113 | 0 | TC | +1 | | | |
| 0086 | REP | 26 | LAST | 231 | 43,2113 | 0 | 0155 | 0 | TC | MPAC +1 | | |
| 0087 | REP | 2 | LAST | 197 | 43,2114 | 0 | 4400 | 1 | XACTALM | TC | PALTON | TURN ON OPERATOR ERROR LIGHT. |
| 0088 | REP | 1 | | 43,2115 | 0 | 5423 | 1 | TC | ENDACT | | | RELEASE MARK AND EXT. VERR DISPLAY SYS. |



L EXTENDED VERBS

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| | | | | | | | | | | | |
|-------|-----|----|------|-----|---------|--------|---|---------|----------|----------|--------|
| 0089 | REP | 2 | LAST | 231 | 5423 | | | | TERMEXTV | EQUALS | ENDEXT |
| 0090 | REP | 3 | LAST | 232 | 5423 | | | | ENDEXTVB | EQUALS | ENDEXT |
| 0091 | REP | 21 | LAST | 228 | 43,2116 | 3 4714 | 1 | XACTO | CAP | ZERO | |
| 0092 | REP | 1 | | | 43,2117 | 0 2105 | 1 | | TC | SEXTACT | |
| 0093 | REP | 3 | LAST | 231 | 43,2120 | 0 4400 | 1 | ALM/END | TC | FALTON | |
| 0094 | REP | 8 | LAST | 228 | 43,2121 | 0 4574 | 0 | GOPIN | TC | POSTULMP | |
| 0095 | REP | 2 | LAST | 194 | 43,2122 | 21176 | 1 | | CADR | PINBRNCH | |
| 00955 | | | | | 43,2123 | 24100 | 0 | OC24100 | OCT | 24100 | |

RELEASE MARK AND EXT. VERB DISPLAY SYS.

TURN ON OPERATOR ERROR LIGHT

L EXTENDED VERBS

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| PC0096 | VBZERO | VERB 40 | DESCRIPTION |
|--------|-----------------|------------------|--|
| PC0097 | ZERO | | |
| PC0098 | | | 1. REQUIRES NOUN 20 (ICDU ANGLES) |
| PC0099 | | | 2. REQUIRES AVAILABILITY OF EXT VERB DISPLAY SYSTEM |
| PC1000 | | | 3. IF EITHER OF ABOVE CONDITIONS NOT PRESENT, TURN ON OPERATOR ERROR LIGHT AND GO TO PINBRNCH. |
| PC1001 | | | 4. SET EXT VERB DISPLAY ACTIVE FLAG. |
| PC1002 | | | 5. EXECUTE IMUZERO (ZERO IMU CDU ANGLES). |
| PC1003 | | | 6. EXECUTE IMUSTALL (ALLOW TIME FOR DATA TRANSFER). |
| PC1004 | | | 7. RELEASE EXT. VERB DISPLAY SYSTEM. |
| PC1005 | | | |
| 0106 | REP 1 | 43,2124 0 2138 1 | VBZERO TC OP/INERT |
| 0107 | REP 1 | 43,2125 0 2127 1 | TC IMUZEROK |
| 0108 | REP 6 LAST 231 | 43,2126 0 2120 0 | TC ALM/END |
| A0109 | | | RETURN HERE IF NOUN = ICDU(20) RETURN HERE IF NOUN = ICDU(91) (NOT IN USE YET) |
| 0110 | REP 1 | 43,2127 0 2271 1 | IMUZEROK TC CQMDCAD |
| 01101 | REP 9 LAST 226 | 43,2130 0 4555 0 | TC BANKCALL |
| 0111 | REP 1 | 43,2131 16516 1 | CADR IMUZERO |
| 0112 | REP 10 LAST 233 | 43,2132 0 4555 0 | TC BANKCALL |
| 0113 | REP 1 | 43,2133 17516 0 | CADR IMUSTALL |
| 0114 | | 43,2134 0 2135 1 | TC +1 |
| 0115 | REP 1 | 43,2135 0 2121 1 | TC GOPIN |
| 0116 | REP 4 LAST 231 | 43,2136 4 4112 0 | OP/INERT CS OCT24 |
| 0117 | REP 2 LAST 188 | 43,2137 6 1002 1 | AD NOUNREG |
| 0118 | | 43,2140 0 0008 1 | EXTEND |
| 0119 | REP 1 | 43,2141 1 2470 1 | BZF XACT00 |
| 0120 | REP 26 LAST 231 | 43,2142 24 002 0 | INCR 0 |
| 0121 | REP 1 | 43,2143 6 2147 1 | AD OPIMDIFF |
| 0122 | | 43,2144 0 0008 1 | EXTEND |
| 0123 | REP 2 LAST 233 | 43,2145 1 2470 1 | BZF XACT00 |
| 0124 | REP 7 LAST 233 | 43,2146 0 2120 0 | TC ALM/END |
| 0125 | | 43,2147 77670 0 | OPIMDIFF DEC -71 |
| | | | ILLEGAL. |

L EXTENDED VERBS

VBCOARK VERB 41 DESCRIPTION
COURSE ALIGN IMU OR OPTICS
 1. REQUIRE NOLN 20 OR NOLN 91 OR TURN ON OPERATOR ERROR
 2. REQUIRE EXT VERB DISPLAY SYS AVAILABLE OR TURN ON OPERATOR ERROR LIGHT AND GO TO PINBRNCH.
CASE 1 NOLN 20 (ICDU ANGLES)
 3. SET EXT VERB DISPLAY ACTIVE FLAG.
 4. DISPLAY FLASHING V25,N22 (LOAD NEW ICDU ANGLES).
RESPONSES
A. TERMINATE
 1. RELEASE EXT VERB DISPLAY SYSTEM
B. PROCEED
 1. DISPLAY FLASHING V25,N23 (LOAD DELTA ICDU ANGLES).
RESPONSES
A. TERMINATE
 1. RELEASE EXT VERB DISPLAY SYSTEM.
B. PROCEED
 1. EXECUTE ICORK2.
C. ENTER
 1. INCREMENT CDU ANGLES
 2. EXECUTE ICORK2.
C. ENTER
 1. EXECUTE ICORK2.
ICORK2
 1. RE-DISPLAY VERB 41.
 2. EXECUTE IMUCOARS (IMU COARSE ALIGN).
 3. EXECUTE IMUSTALL (ALLOW TIME FOR DATA TRANSFER).
 4. RELEASE EXT VERB DISPLAY SYSTEM.
CASE 2 NOLN 91 (CCDU ANGLES)
 5. (REQUIRE OPTICS SWITCH TO BE AT COMPUTER OR TURN ON OPERATOR ERROR AND ALARM 115) AND (REQUIRE OPTICS AVAILABLE AND DISPLAY FLASHING V24,N92....LOAD NEW OPTICS ANGLES....OR TURN ON ALARM 117 AND RELEASE EXT VERB DISPLAY SYSTEM).
 6. RESPONSES TO V29,N92.
A. TERMINATE
 RELEASE EXT VERB DISPLAY SYSTEM
B. PROCEED OR ENTER
 RE-DISPLAY V41, SET SWITCH TO INDICATE COURSE ALIGN OPTICS WORKING.
 RELEASE EXT VERB DISPLAY SYSTEM.

| | | | | | | | | | | | | | | |
|-------|-----|----|------|-----|---|-------|------|---|---------|------|----------|--------------------------------|--|--|
| 0168 | REP | 2 | LAST | 233 | 43,2150 | 0 | 2138 | 1 | VBCOARK | TC | OP/INERT | | | |
| 0169 | REP | 1 | | | 43,2151 | 0 | 2153 | 1 | | TC | IMUOARK | RETURN HERE IF NOLN = ICDU(20) | | |
| 0170 | REP | 1 | | | 43,2152 | 0 | 2175 | 0 | | TC | OPTCOARK | RETURN HERE IF NOLN = CCDU(91) | | |
| 0171 | REP | 1 | | | RETURN TO L-1 IF NOLN 20 - TO L-2 IF NOLN 91. | | | | | | | | | |
| 0172 | REP | 2 | LAST | 233 | 43,2153 | 0 | 2271 | 1 | IMUOARK | TC | CKKDCAD | COURSE ALIGN FROM KEYBOARD | | |
| 01721 | REP | 1 | | | 43,2154 | 0 | 2076 | 1 | | TC | TESTXACT | | | |
| 0173 | REP | 1 | | | 43,2155 | 3 | 2173 | 0 | | CAP | VNLOCCDU | CALL FOR THETA D LOAD | | |
| 0174 | REP | 11 | LAST | 233 | 43,2156 | 0 | 4555 | 0 | | TC | RANKCALL | | | |
| 0175 | REP | 1 | | | 43,2157 | 20465 | 1 | | | CADR | GOKDSPP | | | |
| 0176 | REP | 1 | | | 43,2160 | 0 | 5423 | 1 | | TC | TR-EXTV | | | |
| 0177 | REP | 1 | | | 43,2161 | 1 | 2162 | 1 | | TCF | +1 | | | |

L EXTENDED VERBS

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| | | | | | | | | | |
|------|-----|----|------|---------|---------|--------|----------|------|----------|
| 0178 | REP | 1 | | 43,2162 | 3 2174 | 1 | ICORC2 | CAP | IMUCOARV |
| 0179 | REP | 12 | LAST | 234 | 43,2163 | 0 4555 | 0 | TC | BANKCALL |
| 0180 | REP | 1 | | 43,2164 | 20746 | 0 | | CADR | ISOSPRET |
| 0181 | REP | 13 | LAST | 235 | 43,2165 | 0 4555 | 0 | TC | BANKCALL |
| 0182 | REP | 1 | | 43,2166 | 16602 | 1 | | CADR | IMUCOARS |
| 0183 | REP | 14 | LAST | 235 | 43,2167 | 0 4555 | 0 | TC | BANKCALL |
| 0184 | REP | 2 | LAST | 233 | 43,2170 | 17516 | 0 | CADR | IMUSTALL |
| 0185 | REP | 1 | | 43,2171 | 0 5423 | 1 | | TC | ENDEXTVB |
| 0186 | REP | 2 | LAST | 235 | 43,2172 | 0 5423 | 1 | TC | ENDEXTVB |
| 0187 | | | | 43,2173 | 06226 | 1 | VNLODCDU | VN | 2522 |
| 0188 | | | | 43,2174 | 12200 | 0 | IMUCOARV | VN | 4100 |

RE-DISPLAY COARSE ALIGN VERB.

CALL MODE SWITCHING PROG

STALL

L EXTENDED VERBS

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P0169 TEMPORARY ROUTINE TO RUN THE OPTICS CDUS FROM THE KEYBOARD

| | | | | | | | | | | |
|--------|-----|----|------|-----|---------|----------|----------|--------|----------|-------------------------------|
| 0190 | REP | 2 | LAST | 188 | 43,2175 | 3 1323 1 | OPTCOARK | CA | OPTCADR | |
| 019001 | REP | 3 | LAST | 234 | 43,2176 | 0 2272 1 | | TC | OKMDCAD | +1 |
| 019002 | REP | 2 | LAST | 234 | 43,2177 | 0 2076 1 | | TC | TESTACT | |
| 01901 | REP | 1 | | | 43,2200 | 3 4751 0 | | CAP | EBANKS | |
| 01902 | REP | 7 | LAST | 198 | 43,2201 | 54 003 0 | | TS | EBANK | |
| 0191 | REP | 7 | LAST | 162 | 43,2202 | 11=314 1 | | CCS | SWSAMPLE | SEE IF SWITCH AT COMPUTER |
| 0192 | | | | | 43,2203 | 0 2210 0 | | TC | +5 | SWITCH AT COMPUTER |
| 0193 | | | | | 43,2204 | 0 2205 1 | | TC | +1 | NOT ON COMPUTER |
| 0194 | REP | 4 | LAST | 232 | 43,2205 | 0 4400 1 | | TC | PALTON | TURN ON OPERATOR ERR |
| 0195 | REP | 18 | LAST | 229 | 43,2206 | 0 5537 0 | | TC | ALARM | AND ALARM |
| 0196 | | | | | 43,2207 | 00115 1 | | OCT | 00115 | |
| 0197 | REP | 16 | LAST | 218 | 43,2210 | 11=303 1 | | CCS | OPTIND | SEE IF OPTICS AVAILABLE |
| 0198 | REP | 1 | | | 43,2211 | 0 2217 1 | | TC | OPTC1 | IN USE |
| 0199 | REP | 2 | LAST | 236 | 43,2212 | 0 2217 1 | | TC | OPTC1 | IN USE |
| 0200 | REP | 3 | LAST | 236 | 43,2213 | 0 2217 1 | | TC | OPTC1 | IN USE |
| 0201 | REP | 19 | LAST | 236 | 43,2214 | 0 5537 0 | | TC | ALARM | OPTICS RESERVED (OPTIND=-0) |
| 0202 | | | | | 43,2215 | 00117 0 | | OCT | 00117 | |
| 0203 | REP | 4 | LAST | 232 | 43,2216 | 0 5423 1 | | TC | ENDEXT | |
| 0204 | REP | 1 | | | 43,2217 | 3 2237 0 | OPTC1 | CAP | VNLD0CDU | VERB-NQIN TO LOAD OPTICS CDUS |
| 0205 | REP | 15 | LAST | 235 | 43,2220 | 0 4555 0 | | TC | BANKCALL | |
| 0206 | REP | 2 | LAST | 234 | 43,2221 | 20465 1 | | CADR | CONDSPF | |
| 0207 | REP | 2 | LAST | 234 | 43,2222 | 0 5423 1 | | TC | TERMEXTV | |
| 0208 | | | | | 43,2223 | 0 2224 1 | | TC | +1 | PROCEED |
| 02082 | REP | 2 | LAST | 93 | 43,2224 | 3 1773 0 | | CA | SAC | |
| 02084 | REP | 3 | LAST | 163 | 43,2225 | 55=161 1 | | TS | DESOPTS | |
| 02086 | REP | 2 | LAST | 93 | 43,2226 | 3 1775 0 | | CA | PAC | |
| 02088 | REP | 4 | LAST | 164 | 43,2227 | 55=160 0 | | TS | DESOPTT | |
| 0209 | REP | 1 | | | 43,2230 | 3 2174 1 | | CAP | OPTCOARV | RE-DISPLAY OUR OWN VERB |
| 0210 | REP | 16 | LAST | 236 | 43,2231 | 0 4555 0 | | TC | BANKCALL | |
| 0211 | REP | 2 | LAST | 235 | 43,2232 | 20746 0 | | CADR | ENDSPRET | |
| 0212 | REP | 11 | LAST | 228 | 43,2233 | 3 4712 1 | | CAP | ONE | |
| 0213 | REP | 19 | LAST | 236 | 43,2234 | 55=303 1 | | TS | OPTIND | SET COARS WORKING |
| 0214 | REP | 3 | LAST | 235 | 43,2235 | 0 5423 1 | | TC | ENDEXTVR | |
| 0215 | REP | 4 | LAST | 236 | 43,2236 | 0 5423 1 | | TC | ENDEXTVR | |
| 0216 | | | | | 43,2237 | 08134 1 | VNLD0CDU | VN | 2492 | |
| 0217 | REP | 2 | LAST | 235 | 43,2174 | | OPTCOARV | EQUALS | IMUCOARV | DIFFERENT NQINS. |

L EXTENDED VERBS

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| PO218 | IMUPINEK | VERB 42 | DESCRIPTION |
|-------|---|-------------|---|
| R0219 | FINE ALIGN IMU | | |
| R0220 | 1. REQUIRE EXT VERB DISPLAY AVAILABLE AND SET BUSY FLAG OR TURN ON OPER ERROR AND GO TO PINBRNCH. | | |
| R0222 | 2. DISPLAY FLASHING V25,N93....LOAD DELTA GYRO ANGLES.... | | |
| R0223 | RESPONSES | | |
| R0224 | A. TERMINATE | | |
| R0225 | 1. RELEASE EXT VERB DISPLAY SYSTEM. | | |
| R0226 | B. PROCEED OR ENTER | | |
| R0227 | 1. RE-DISPLAY VERB 42 | | |
| R0228 | 2. EXECUTE IMUPINE (IMU FIVE ALIGN MODE SWITCHING). | | |
| R0229 | 3. EXECUTE IMUSTALL (ALLOW FOR DATA TRANSFER) | | |
| R0230 | A. FAILED | | |
| R0231 | 1. RELEASE EXT VERB DISPLAY SYSTEM. | | |
| R0232 | B. GOOD | | |
| R0233 | 1. EXECUTE IMPULSE (TORQUE IRIGS). | | |
| R0234 | 2. EXECUTE IMUSTALL AND RELEASE EXT VERB DISPLAY SYSTEM. | | |
| 0236 | REP | 4 LAST 236 | 43,2240 0 2271 1 IMUPINEK TC QMODCAD FINE ALIGN WITH GYRO TORQUING |
| 02361 | REP | 3 LAST 236 | 43,2241 0 2076 1 TC TESTACT |
| 0237 | REP | 1 | 43,2242 3 2287 0 CAP VNLDDOYR CALL FOR LOAD OF GYRO COMMANDS |
| 0238 | REP | 17 LAST 236 | 43,2243 0 4555 0 TC BANKCALL |
| 0239 | REP | 3 LAST 236 | 43,2244 20485 1 CADR QOKDSPP |
| 0240 | REP | 3 LAST 236 | 43,2245 0 5423 1 TC TERMEXTV |
| 0241 | | | 43,2246 0 2247 1 TC +1 PROCEED WITHOUT A LOAD |
| 0242 | REP | 1 | 43,2247 3 2270 0 CAP IMUPINEV RE-DISPLAY OUR OWN VERB |
| 0243 | REP | 18 LAST 237 | 43,2250 0 4555 0 TC BANKCALL |
| 0244 | REP | 3 LAST 236 | 43,2251 20748 0 CADR EXDSPRET |
| 0245 | REP | 19 LAST 237 | 43,2252 0 4555 0 TC BANKCALL CALL MODE SWITCH PROG |
| 0246 | REP | 1 | 43,2253 17012 1 CADR IMUPINE |
| 0247 | REP | 20 LAST 237 | 43,2254 0 4555 0 TC BANKCALL HIBERNATION |
| 0248 | REP | 3 LAST 235 | 43,2255 17516 0 CADR IMUSTALL |
| 0249 | REP | 5 LAST 236 | 43,2256 0 5423 1 TC ENDEXTVR |
| 0250 | REP | 1 | 43,2257 3 2266 1 FINEK2 CAP LOYRCBIN PINBALL LEFT COMMANDS IN OOC REGISTERS |
| 0251 | REP | 21 LAST 237 | 43,2260 0 4555 0 TC BANKCALL |
| 0252 | REP | 1 | 43,2261 17125 1 CADR IMPULSE |
| 0253 | REP | 22 LAST 237 | 43,2262 0 4555 0 TC BANKCALL WAIT FOR PULSES TO GET OUT. |
| 0254 | REP | 4 LAST 237 | 43,2263 17516 0 CADR IMUSTALL |
| 0255 | REP | 6 LAST 237 | 43,2264 0 5423 1 TC ENDEXTVR |
| 0256 | REP | 7 LAST 237 | 43,2265 0 5423 1 TC ENDEXTVR |
| 0257 | REP | 5 LAST 230 | 43,2266 02757 0 LOYRCBIN BCADR OOC |
| 0258 | | | 43,2267 08335 1 VNLDDOYR VN 2593 |
| 0259 | | | 43,2270 12400 0 IMUPINEV VN 4200 FINE ALIGN VERB |
| 02591 | REP | 4 LAST 79 | 43,2271 3 1322 0 QMODCAD CA MODRCADR |

L EXTENDED VERBS

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| Address | Verb | Code | Address | Code | Address | Code | Description |
|---------|-------|----------|----------|---------|---------|-------------|---|
| 02582 | | | 43,2272 | 0 0006 | 1 | | EXTEND |
| 02583 | REP 2 | LAST 161 | 43,2273 | 1 6711 | 1 | | BZF TCQ |
| 02584 | REP 8 | LAST 233 | 43,2274 | 0 2120 | 0 | | TC ALM/END |
| R0260 | | | GOLOADLV | VERB 50 | | | DESCRIPTION |
| R0261 | | | | | | | AND OTHER PLEASE |
| R0262 | | | | | | | DO SOMETHING VERBS |
| R0263 | | | | | | | PLEASE PERFORM, MARK, CALIBRATE, ETC. |
| R0264 | | | | | | | 1. PRESSING ENTER ON DSKY INDICATES REQUESTED ACTION HAS BEEN PERFORMED, AND THE PROGRAM DOES THE |
| R0265 | | | | | | | SAME RECALL AS A COMPLETED LOAD. |
| R0267 | | | | | | | 2. THE EXECUTION OF A VERB 33 (PROCEED WITHOUT DATA) INDICATES THE REQUESTED ACTION IS NOT DESIRED. |
| 0269 | REP 1 | | 43,2275 | 0 4447 | 1 | GOLOADLV TC | FLASHOFF |
| 0270 | REP 1 | | 43,2276 | 3 4215 | 0 | CAP | PINSUPST |
| 0271 | | | 43,2277 | 0 0006 | 1 | | EXTEND |
| 0272 | REP 2 | LAST 182 | 43,2300 | 01 007 | 1 | WRITE | SUPERBANK |
| 0273 | REP 9 | LAST 232 | 43,2301 | 0 4574 | 0 | TC | POSTRUMP |
| 0274 | REP 1 | | 40,2000 | | | SRANK= | PINSUPER |
| 0275 | REP 1 | | 43,2302 | 62001 | 1 | CADR | LOADLV1 |
| R0276 | | | V60 | VERB 60 | | | |
| 0277 | | | 43,2303 | 0 0006 | 1 | V60 | EXTEND |
| 0278 | REP 4 | LAST 229 | 43,2304 | 3 0033 | 1 | DCA | CDUX |
| 0279 | REP 1 | | 43,2305 | 53=334 | 0 | DXCH | CPHIX |
| 0280 | REP 4 | LAST 219 | 43,2306 | 3 0034 | 0 | CA | CDUZ |
| 0281 | REP 2 | LAST 238 | 43,2307 | 55=335 | 1 | TS | CPHIX +2 |
| 0282 | REP 2 | LAST 233 | 43,2310 | 0 2121 | 1 | TC | GOPIN |
| R0283 | | | V61 | VERB 61 | | | |
| 0284 | REP 5 | LAST 197 | 43,2311 | 0 5447 | 0 | V61 | TC DOWNFLAG |
| 0285 | REP 1 | | 43,2312 | 00006 | 1 | ADRES | NEEDLFLG |
| 0286 | REP 3 | LAST 238 | 43,2313 | 0 2121 | 1 | TC | GOPIN |
| R0287 | | | V62 | VERB 62 | | | |
| 0288 | REP 3 | LAST 228 | 43,2314 | 0 5435 | 0 | V62 | TC UPFLAG |
| 0289 | REP 2 | LAST 238 | 43,2315 | 00006 | 1 | ADRES | NEEDLFLG |
| 0290 | REP 4 | LAST 238 | 43,2316 | 0 5435 | 0 | TC | UPFLAG |
| 02902 | REP 1 | | 43,2317 | 00220 | 1 | ADRES | N22ORN17 |
| 02904 | REP 4 | LAST 238 | 43,2320 | 0 2121 | 1 | TC | GOPIN |
| R02905 | | | V63 | VERB 63 | | | |
| 02906 | REP 5 | LAST 238 | 43,2321 | 0 5435 | 0 | V63 | TC UPFLAG |
| 02907 | REP 3 | LAST 238 | 43,2322 | 00006 | 1 | ADRES | NEEDLFLG |
| 02908 | REP 6 | LAST 238 | 43,2323 | 0 5447 | 0 | TC | DOWNFLAG |



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L EXTENDED VERBS

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02909 REP 2 LAST 238 43,2324 00220 1
02903 REP 5 LAST 238 43,2325 0 2121 1

ADRES N22ORN17
TC GOPIN

COMPUTE TOTAL ASTRONAUT ATTITUDE ERROR

L EXTENDED VERBS

USER=8 PAGE NO. 11 E5 84

| PO201 | ALINTIME | VERB 55 | DESCRIPTION |
|--------|-----------------|------------------|--|
| NO292 | | | 1. SET EXT VERB DISPLAY BUSY FLAG. |
| NO293 | | | 2. DISPLAY FLASHING V25,N24 (LOAD DELTA TIME FOR AGC CLOCK. |
| 110204 | | | 3. REQUIRE EXECUTION OF VERB 23. |
| NO295 | | | 4. ADD DELTA TIME, RECEIVED FROM INPUT REGISTER, TO THE COMPUTER TIME. |
| 110207 | | | 5. RELEASE EXT VERB DISPLAY SYSTEM |
| 0298 | REP 1 | | COUNT 04/R33 |
| 0299 | REP 4 LAST 237 | 43,2326 0 2076 1 | ALINTIME TC TESTACT |
| 0300 | REP 1 | 43,2327 3 2357 1 | CAP VNLDDT |
| 0301 | REP 23 LAST 237 | 43,2330 0 4555 0 | TC BANCALL |
| 0302 | REP 1 | 43,2331 20465 1 | CADR COMARCP |
| 0303 | REP 5 LAST 236 | 43,2332 0 5423 1 | TC ENDEXT |
| 0304 | REP 6 LAST 240 | 43,2333 0 5423 1 | TC ENDEXT |
| 0305 | REP 1 | 43,2334 4 2356 1 | CS DEC23 |
| 0306 | REP 27 LAST 231 | 43,2335 6 0154 1 | AD MPAC |
| 0307 | | 43,2336 0 0006 1 | EXTEND |
| 0308 | REP 1 | 43,2337 1 2341 1 | RZP UPDATIME |
| 0309 | REP 7 LAST 240 | 43,2340 0 5423 1 | TC ENDEXT |
| 0310 | | 43,2341 0 0004 0 | UPDATIME INHINT |
| 0311 | REP 22 LAST 232 | 43,2342 3 4714 1 | CAP ZERO |
| 0312 | REP 28 LAST 240 | 43,2343 54 156 1 | TS MPAC +2 |
| 0313 | REP 19 LAST 217 | 43,2344 54 001 1 | TS L |
| 0314 | REP 7 LAST 219 | 43,2345 52 025 1 | DXCH TIME2 |
| 0315 | REP 29 LAST 240 | 43,2346 52 155 1 | DXCH MPAC |
| 0316 | REP 2 LAST 74 | 43,2347 53-052 0 | DXCH DSPTM2 +1 |
| 0317 | REP 30 LAST 240 | 43,2350 20 155 1 | DAS MPAC |
| 0310 | REP 1 | 43,2351 0 7226 0 | TC TPAGRE |
| 0310 | REP 31 LAST 240 | 43,2352 52 155 1 | DXCH MPAC |
| 0320 | REP 8 LAST 240 | 43,2353 20 025 1 | DAS TIME2 |
| 0321 | | 4312354 0 0003 1 | RELINT |
| 0322 | REP 8 LAST 240 | 43,2355 0 5423 1 | UPDTMND TC ENDEXT |
| 0323 | | 43,2356 00027 1 | DEC23 DEC 23 |
| 0324 | | 43,2357 06230 0 | VNLDDT VN 2524 |

TERMINATE
 PROCEED
 DATA IN OR RESSEQUENCE(UNLIKELY)
 RECALL LEFT VERB IN MPAC
 GO AHEAD WITH UPDATE ONLY IF RECALL
 WITH V23 (DATA IN).
 DELTA TIME IS IN DSPTM1, +1.
 NEEDED FOR TP AGREE
 ZERO T1 d 2 WHILE ALIGNING.
 INCREMENT
 FORCE SIGN AGREEMENT.
 NEW CLOCK.
 V 23
 V25N24 FOR LOAD DELTA TIME



L EXTENDED VERBS

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P0325 SYSTEST VERB 92 DESCRIPTION
 R0326 OPERATE SELECTED SYSTEM TEST
 R0327 1. REQUIRE P00 OR P00- OR TURN ON OPERATOR ERROR.
 R0328 2. TURN OFF DAP IF IT IS ON.
 R0329 3. DISPLAY FLASHING V21,N01 (LOAD TEST NUMBER 1 THRU 17).
 R0330 4. UPON ENTRY OF TEST NUMBER, SCHEDULE TSELECT WITH PRIORITY 20.
 R0331 TSELECT
 R0332 1. IF LOADED TEST NUMBER IS VALID, GO TO THAT TEST ROUTINE, OTHERWISE TURN ON OPERATOR ERROR AND
 R0333 REPEAT LOAD REQUEST DISPLAY. (NO. 3 ABOVE)
 R0335

0336 REP 2 LAST 202 E5,1425 EBANK= OPLACE
 0337 REP 1 COUNT 04/EXTVB
 0338 REP 1 43,2360 0 2715 0 SYSTEST TC CRKPOOH
 0339 REP 1 43,2361 0 2721 1 TC EXDAPOPP
 0340 REP 1 43,2362 3 4675 1 CAP PRIO20
 0342 REP 2 LAST 179 43,2363 0 5042 1 TC FINDVAC
 0343 REP 3 LAST 241 E5,1425 EBANK= OPLACE
 0344 REP 1 30,2000 SBANK= INUSUPP
 0345 REP 1 43,2364 02002 1 2CADR REDO
 0345 REP 1 43,2365 66065 1

0346 REP 6 LAST 239 43,2366 0 2121 1 TC GOPIN
 R0347 REDO AND TSELECT ARE NOW IN SYSTEM TEST.

0348 REP 2 LAST 230 TO 240' 214 214* COUNT* 33/EXTVB
 R0349 CKOPTVB VERB 65 DESCRIPTION

R0350 OPTICAL VERIFICATION FOR PRELAUNCH.
 R0351 1. SCHEDULE GCOMPVER, OPTICAL VERIFICATION SUBPROGRAM, WITH PRIORITY 17.

0353 REP 4 LAST 226 43,2367 0 5253 0 CKOPTVB TC CHECKMM
 0354 43,2370 00002 0 MM 02 I WONDER IF PRELAUNCH IS RUNNING
 0355 REP 9 LAST 238 43,2371 0 2120 0 TC ALM/END NOT RUNNING OPERATOR ERROR
 0356 43,2372 0 0004 0 INHINT
 0357 REP 3 LAST 169 43,2373 3 4763 1 CAP PRIO16 PRELAUNCH OPTICAL VERIFICATION
 0358 REP 3 LAST 241 43,2374 0 5042 1 TC FINDVAC
 0359 REP 4 LAST 241 E5,1425 EBANK= OPLACE
 0360 REP 2 LAST 209 43,2375 02000 0 2CADR COMPVER STANDARD LEADIN TO GCOMPVER.
 0360 43,2376 66065 1
 0361 REP 7 LAST 241 43,2377 0 2121 1 TC GOPIN
 R0362 V 76.... TO CHANGE GYROCOMPASS AZIMUTH

0363 REP 5 LAST 241 43,2400 0 5253 0 CHAZPOCC TC CHECKMM IS IT PRELAUNCH
 03631 43,2401 00002 0 MM 02
 03632 REP 10 LAST 241 43,2402 0 2120 0 TC ALM/END NO - OPERA TOR ERROR



L EXTENDED VERBS

| | | | | | | |
|------|-----|----|------|-----|---------|----------|
| 0364 | REP | 4 | LAST | 241 | 43,2403 | 3 4783 1 |
| 0365 | REP | 4 | LAST | 241 | 43,2404 | 0 5041 1 |
| 0366 | REP | 14 | LAST | 212 | 85,1671 | |
| 0367 | REP | 8 | LAST | 209 | 43,2408 | 03736 0 |
| 0367 | | | | | 43,2406 | 60055 1 |
| 0368 | REP | 3 | LAST | 195 | 43,2407 | 0 8301 0 |
| 0369 | | | | | 4382410 | 00174 0 |
| 0370 | REP | 8 | LAST | 241 | 43,2411 | 0 2111 1 |

| | |
|-------|----------|
| CAP | PRI016 |
| TC | PINDVAC |
| BRANK | YBM |
| SCADR | AZIMH001 |
| TC | PHASCH0 |
| OCT | 00174 |
| TC | GOPIN |

PRELAUNCH AZIMUTH CHANGE



L EXTENDED VERBS

| PC371 | IMJATTCK | VERB 43 | DESCRIPTION |
|-------|----------|----------|--|
| R0372 | | | LOAD IMJ ATTITUDE ERROR METERS |
| R0373 | | | 1. REQUIRE PROGRAM 00 ACTIVE, COARSE ALIGN ENABLE BIT OFF AND ZERO ICDU BIT OFF. |
| R0375 | | | 2. IF QUID REP RELEASE OR LIPTOFF HAS OCCURRED REQUIRE EXT VERB DISPLAY AVAILABLE AND SET BUSY FLAG, OTHERWISE ALLOW CURRENT EXT VERB DISPLAY TO BE OVER-RIDDEN. |
| R0377 | | | 3. REMOVE COARSE ALIGN ENABLE AND IMJ ERROR COUNTER ENABLE |
| R0379 | | | 4. DISPLAY FLASHING V25,N22 (LOAD NEW ICDU ANGLES). |
| R0380 | | | 5. UPON PROCEED OR ENTER RESPONSE, INITIALIZE CURRENT DAC AND COMMAND VALUES, ENABLE ERROR COUNTERS. |
| R0381 | | | TRANSFER LOADED VALUES TO REGISTERS, AND SEND COMMANDS. |
| R0383 | | | 6. IF BUSY FLAG SET, RESET IT TO RELEASE EXT VERB DISPLAY. |
| R0384 | | | |
| 0385 | REP 2 | LAST 241 | 43,2412 0 2715 0 IMJATTCK TC QKPOOH |
| 0386 | REP 1 | | 43,2413 3 2471 1 CA OCTAL30 CHECK IF IMU ZERO AND IMU COARSE ARE ON |
| 0387 | | | 43,2414 0 0006 1 EXTEND |
| 0388 | REP 21 | LAST 218 | 43,2415 02 012 0 RAND CHAN12 |
| 0389 | REP 66 | LAST 231 | 43,2416 10 000 0 CCS A |
| 0390 | REP 11 | LAST 241 | 43,2417 1 2120 1 TCP ALM/END NOT ALLOWED IF IMU COARSE OR IMU ZERO ON |
| 0391 | REP 1 | | 43,2420 0 2457 0 TC QKLPRTS |
| 0392 | REP 5 | LAST 240 | 43,2421 0 2076 1 TC TESTACT |
| 0393 | REP 1 | | 43,2422 4 4726 1 CS OCT50 REMOVE COARSE AND ECTR ENABLE. |
| 0394 | | | 43,2423 0 0006 1 EXTEND |
| 0395 | REP 22 | LAST 243 | 43,2424 03 012 1 WAND CHAN12 |
| 0396 | REP 2 | LAST 234 | 43,2425 3 2173 0 CAP VNLDCDU |
| 0397 | REP 24 | LAST 240 | 43,2426 0 4555 0 TC BANKCALL |
| 0398 | REP 4 | LAST 237 | 43,2427 20485 J CADR QOWDAPP |
| 0399 | REP 1 | | 43,2430 1 2444 0 TCP TRMATTCK |
| 0400 | | | 43,2431 0 2432 0 TC +1 |
| 0401 | REP 4 | LAST 198 | 43,2432 3 4752 0 CAP BRANK6 |
| 0402 | REP 8 | LAST 236 | 43,2433 54 003 0 TS BRANK SET E6 FOR NEEDLES. |
| 0403 | REP 5 | LAST 212 | E6,1476 BRANK= AK |
| 0404 | REP 25 | LAST 243 | 43,2434 0 4555 0 TC BANKCALL INITIALIZE CURRENT DAC AND |
| 0405 | REP 1 | | 43,2435 42427 0 CADR NEEDLE11 COMMAND VALUES |
| 0406 | REP 26 | LAST 243 | 43,2436 0 4555 0 TC BANKCALL |
| 0407 | REP 1 | | 43,2437 42446 1 CADR NEEDLER2 |
| 0408 | REP 4 | LAST 231 | 43,2440 3 4711 1 CAP TWO |
| 0410 | REP 10 | LAST 228 | 43,2441 0 5140 1 TC WAITLIST |
| 0411 | REP 6 | LAST 243 | E6,1476 BRANK= AK |
| 0412 | REP 1 | | 43,2442 02447 1 2CADR ATTCK1 |
| 0412 | REP 1 | | 43,2443 66106 0 |
| 0413 | REP 2 | LAST 243 | 43,2444 0 2457 0 TRMATTCK TC QKLPRTS |
| 0414 | REP 9 | LAST 240 | 43,2445 1 5423 0 TCP ENDEXT |
| 0415 | REP 9 | LAST 242 | 43,2446 0 2121 1 TC COPIN |

L EXTENDED VERBS

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| | | | | | | | | | |
|------|-----|----|------|---------|----------|----------|----------|-----------|--|
| 0416 | | | | 43,2447 | 0 0006 1 | ATTCK1 | EXTEND | | TRANSFER LOADED VALUES TO DESIRED REGS. |
| 0417 | REP | 5 | LAST | 77 | 43,2450 | 3 1156 1 | DCA | THSTAD | |
| 0418 | REP | 7 | LAST | 243 | 43,2451 | 53=477 0 | DCKH | AK | |
| 0419 | REP | 8 | LAST | 244 | 43,2452 | 31=157 0 | CAS | THSTAD +2 | |
| 0420 | REP | 8 | LAST | 244 | 43,2453 | 55=500 1 | TS | AK +2 | |
| 0421 | REP | 17 | LAST | 228 | 43,2454 | 0 4633 0 | TC | IBKCALL | SENDS COMMANDS LIMITED TO +/- 384 PULSES |
| 0422 | REP | 1 | | | 43,2455 | 42462 1 | CADR | NEEDLES | AND LEAVES ERROR COUNTERS ENABLED. |
| 0423 | REP | 11 | LAST | 229 | 43,2456 | 0 5213 1 | TC | TASKOVER | |
| 0424 | REP | 12 | LAST | 156 | 43,2457 | 3 4706 1 | OKLPTSTS | CAP | HAS LIPTOFF OCCURRED |
| 0425 | REP | 3 | LAST | 183 | 43,2460 | 7 0101 0 | MARK | FLAGWRD6 | |
| 0426 | REP | 67 | LAST | 243 | 43,2461 | 10 000 0 | CCS | A | |
| 0427 | REP | 27 | LAST | 233 | 43,2462 | 0 0002 0 | TC | Q | YES |
| 0428 | REP | 13 | LAST | 244 | 43,2463 | 3 4706 1 | CAP | BITS | |
| 0429 | | | | | 43,2464 | 0 0006 1 | EXTEND | | |
| 0430 | REP | 4 | LAST | 181 | 43,2465 | 02 030 0 | RAND | CHAN30 | |
| 0431 | REP | 68 | LAST | 244 | 43,2466 | 10 000 0 | CCS | A | |
| 0432 | REP | 2 | LAST | 131 | 43,2467 | 1 6706 1 | TCF | Q+1 | |
| 0433 | REP | 28 | LAST | 244 | 43,2470 | 0 0002 0 | XACT00 | TC | YES |
| 0434 | | | | | 43,2471 | 00030 1 | OCTAL30 | OCT | 30 |
| 0435 | REP | 3 | LAST | 243 | 43,2472 | 0 2715 0 | VB64 | TC | CRKPOOH |
| 0436 | REP | 8 | LAST | 243 | 43,2473 | 0 2076 1 | TC | TRSTXACT | DEMAND PROGRAM 00. |
| 0437 | | | | | 43,2474 | 0 0004 0 | | INHINT | IF DISPLAY SYS. NOT BUSY, MAKE IT BUSY. |
| 0438 | REP | 1 | | | 43,2475 | 3 4677 0 | CAP | PRIO4 | |
| 0439 | REP | 5 | LAST | 242 | 43,2476 | 0 5042 1 | TC | FINDVAC | |
| 0440 | REP | 2 | LAST | 88 | 54,1720 | | ERANK= | RHOSB | |
| 0441 | REP | 1 | | | 43,2477 | 03565 1 | 2CADR | SRANDANT | CALC., DISPLAY S-RAND ANTENNA ANGLES. |
| 0441 | REP | 1 | | | 43,2500 | 64104 0 | | | |
| 0442 | REP | 3 | LAST | 198 | 43,2501 | 0 5112 0 | TC | ENDOPJOB | |

R0443 ENATMA VERB 58 DESCRIPTION
R0444 ENABLE AUTOMATIC ATTITUDE MANEUVER

R0445 VERB 58 RESETS STIKFLAG TO ENABLE R61 TO PERFORM AUTOMATIC TRACKING MANEUVERS, AFTER INTERRUPTIONS BY RHC ACT-
R0447 IVITY.

| | | | | | | | | | | |
|------|-----|----|------|-----|---------|----------|--------|----------|----------|-----------------|
| 0448 | REP | 7 | LAST | 238 | 43,2502 | 0 5447 0 | ENATMA | TC | DOWNFLAG | RESET STIKFLAG. |
| 0449 | REP | 2 | LAST | 195 | 43,2503 | 00020 0 | ADRES | STIKFLAG | BIT 14 | FLAG 1 |
| 0450 | REP | 10 | LAST | 243 | 43,2504 | 0 2121 1 | TC | GOPIN | | |

R0451 STRKON VERB 68 DESCRIPTION
R0452 STRIKE TEST SETUP/ENABLE
R0453 1. SET EXT VERR DISPLAY BUSY FLAG
R0454 2. SCHEDULE STRKST1 WITH PRIORITY 30.
R0455 3. RELEASE EXT VERR DISPLAY.



L EXTENDED VERBS

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| REP | REP | LAST | LAST | EB, 1635 | 43,2506 | 1 4105 0 | 43,2507 | 0 0008 1 | 43,2511 | 3 4371 0 | 43,2512 | 0 5027 1 | EB, 1614 | 43,2513 | 03448 1 | 43,2514 | 40108 1 | 43,2515 | 0 2121 1 | DESCRIPTION |
|-------|-----|------|------|----------|---|----------|----------|----------|---------|----------|---------|----------|----------|---------|---------|---------|---------|---------|----------|----------------|
| 0456 | REP | 2 | LAST | 102 | EB, 1635 | | | | | | | | | | | | | | | EBANK= TSTVCDT |
| 0458 | REP | 7 | LAST | 185 | 43,2506 | 1 4105 0 | | | | | | | | | | | | | | MASK OCT60000 |
| 0459 | | | | | 43,2507 | 0 0008 1 | | | | | | | | | | | | | | EXTEND |
| 0461 | REP | 4 | LAST | 193 | 43,2511 | 3 4371 0 | | | | | | | | | | | | | | CAP PRIO30 |
| 0463 | REP | 6 | LAST | 225 | 43,2512 | 0 5027 1 | | | | | | | | | | | | | | TC NOVAC |
| 0464 | REP | 2 | LAST | 102 | EB, 1614 | | | | | | | | | | | | | | | EBANK= STRCKBR |
| 0465 | REP | 1 | | | 43,2513 | 03448 1 | | | | | | | | | | | | | | 2CADR STRKTSTI |
| 0466 | REP | 1 | | | 43,2514 | 40108 1 | | | | | | | | | | | | | | TC GOPIN |
| 0466 | REP | 11 | LAST | 244 | 43,2515 | 0 2121 1 | | | | | | | | | | | | | | TC GOPIN |
| R0467 | | | | | STARLISH | VERB 46 | | | | | | | | | | | | | | DESCRIPTION |
| R0468 | | | | | ESTABLISH G AND N CONTROL | | | | | | | | | | | | | | | |
| R0469 | | | | | 1. IF TVC DAP IS ON, ALARM AND RETURN OTHERWISE REQUIRE EXT VERB DISPLAY SYSTEM | | | | | | | | | | | | | | | |
| R0471 | | | | | AVAILABLE, SET BUSY FLAG AND GO TO DAPPIG TO DETERMINE VEHICLE CONFIGURATION. | | | | | | | | | | | | | | | |
| 0473 | REP | 6 | LAST | 245 | 43,2516 | 4 0102 0 | STARLISH | CS | FLAGRD6 | VB 46 | | | | | | | | | | |
| 0474 | REP | 5 | LAST | 245 | 43,2517 | 7 4105 0 | | | | | | | | | | | | | | |
| 0475 | | | | | 43,2520 | 0 0008 1 | | | | | | | | | | | | | | |
| 0476 | | | | | 43,2521 | 6 2523 1 | | | | | | | | | | | | | | |
| 0477 | REP | 13 | LAST | 245 | 43,2522 | 0 2120 0 | | | | | | | | | | | | | | |
| 0478 | REP | 5 | LAST | 243 | 43,2523 | 3 4752 0 | | | | | | | | | | | | | | |
| 0479 | REP | 9 | LAST | 243 | 43,2524 | 54 003 0 | | | | | | | | | | | | | | |
| 0480 | REP | 10 | LAST | 238 | 43,2525 | 0 4574 0 | | | | | | | | | | | | | | |
| 0481 | REP | 1 | | | 43,2526 | 65521 1 | | | | | | | | | | | | | | |

JOB REQUEST, TO SET UP STROKE TEST, INCLUDING INITIALIZATIONS

NOT PERMITTED WHEN TVC DAP IS ON.

SET BRANK TO E6

L EXTENDED VERBS

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P0482 CREWMANU VERB 49 DESCRIPTION
R0483 START AUTOMATIC ATTITUDE MANEUVER
R0484 1. REQUIRE PROGRAM 00 ACTIVE.
R0485 2. SET EXT VERB DISPLAY BUSY FLAG.
R0486 3. SCHEDULE R62DISP WITH PRIORITY 10.
R0487 4. RELEASE EXT VERB DISPLAY.

R0488 R62DISP
R0489 1. DISPLAY FLASHING V06,N22 (DECIMAL DISPLAY NEW ICDU ANGLES). UPON IMMEDIATE RETURN, SET-UP GROUP
R0491 4 FOR RESTART OF DISPLAY SEQUENCE.
R0492 RESPONSES
R0493 A. TERMINATE
R0494 1. GO TO GOTOPOCH.
R0495 B. PROCEED
R0496 1. SET 3AXISPLG TO INDICATE MANEUVER IS SPECIFIED BY 3 AXIS.
R0498 2. EXECUTE R60CSM (ATTITUDE MANEUVER).
R0499 3. ZERO GROUP 4 (END R62).
R0500 C. ENTER
R0501 1. REPEAT FLASHING V06,N22.

| | | | | | | | | | | | |
|-------|-----|---|------|-----|---------|-------|------|---|-------------|----------|------------|
| 0502 | REP | 4 | LAST | 244 | 43,2527 | 0 | 2715 | 0 | CREWMANU TC | CHKPOCH | DEMAND POO |
| 0503 | REP | 7 | LAST | 244 | 43,2530 | 0 | 2076 | 1 | TC | TESTACT | |
| 05031 | REP | 1 | | | 43,2531 | 3 | 4876 | 1 | CAP | PRI010 | |
| 05032 | REP | 6 | LAST | 244 | 43,2532 | 0 | 5042 | 1 | TC | FINDVAC | |
| 0504 | REP | 1 | | | 1155 | | | | EBANK= | CPHI | |
| 0505 | REP | 1 | | | 43,2533 | 0 | 2330 | 0 | 2CADR | R62DISP | |
| 0505 | REP | 1 | | | 43,2534 | 56102 | 1 | | | | |
| 0506 | REP | 4 | LAST | 244 | 43,2535 | 0 | 5112 | 0 | TC | ENDOPJOB | |

L EXTENDED VERBS

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| | | | | | | | | | | | | |
|--------|-----|----|------|-------------|---|----------|----------|-------------|--|----------|-------|----|
| 0551 | REP | 30 | LAST | 247 | 42,2023 | 0 4555 0 | TC | BANKCALL | CSM WOT. | LEN WOT. | BLANK | |
| 0552 | REP | 6 | LAST | 247 | 42,2024 | 20465 1 | CADR | GOODSPP | | | | |
| 0553 | REP | 11 | LAST | 247 | 42,2025 | 0 5423 1 | TC | ENDEXT | | | | |
| 0554 | | | | | 42,2026 | 0 2030 0 | TC | +2 | | | | |
| 0555 | REP | 1 | | | 42,2027 | 0 2022 0 | TC | DONQUN47 | | | | |
| 055501 | REP | 12 | LAST | 247 | 42,2030 | 31=466 1 | CAB | DAPDATR1 | DO MASS PROPERTIES CALCULATION ONLY IF | | | |
| 055502 | REP | 5 | LAST | 245 | 42,2031 | 7 4371 1 | MASK | PRIO30 | CONFIG = 1(CSM), 2(CSM/LM), 6(CSM/LMA) | | | |
| 055503 | | | | | 42,2032 | 0 0006 1 | EXTEND | | | | | |
| 055504 | REP | 1 | | | 42,2033 | 1 2046 0 | BZF | DONQUN48 | SKIP IF 0, 4 | | | |
| 055505 | | | | | 42,2034 | 4 0000 0 | COM | | | | | |
| 055506 | REP | 6 | LAST | 248 | 42,2035 | 7 4371 1 | MASK | PRIO30 | | | | |
| 055507 | | | | | 42,2036 | 0 0006 1 | EXTEND | | | | | |
| 055508 | REP | 2 | LAST | 248 | 42,2037 | 1 2046 0 | BZF | DONQUN48 | SKIP IF 3, 7 | | | |
| 055509 | | | | | 42,2040 | 0 0004 0 | INHINT | | | | | |
| 05551 | REP | 18 | LAST | 244 | 42,2041 | 0 4633 0 | TC | IBKCALL | | | | |
| 05552 | REP | 2 | LAST | 194 | 42,2042 | 13207 0 | CADR | MASSPROP | UPDATE IXX, IAVG, IAVG/TLX | | | |
| 055525 | | | | | 42,2043 | 0 0003 1 | RELINT | | | | | |
| 0556 | REP | 31 | LAST | 248 | 42,2044 | 0 4555 0 | TC | BANKCALL | | | | |
| 0557 | REP | 1 | | | 42,2045 | 40277 1 | CADR | S40.14 | COMPUTE RCS DAP STUFF | | | |
| 0558 | REP | 1 | | | 42,2046 | 3 2057 1 | DONQUN48 | CAP | V0648 | R1 | R2 | R3 |
| 0559 | REP | 32 | LAST | 248 | 42,2047 | 0 4555 0 | TC | BANKCALL | PTRIM | YTRIM | BLANK | |
| 0560 | REP | 7 | LAST | 248 | 42,2050 | 20465 1 | CADR | GOODSPP | | | | |
| 0561 | REP | 12 | LAST | 248 | 42,2051 | 0 5423 1 | TC | ENDEXT | | | | |
| 0562 | REP | 13 | LAST | 248 | 42,2052 | 0 5423 1 | TC | ENDEXT | | | | |
| 0563 | REP | 3 | LAST | 248 | 42,2053 | 0 2046 1 | TC | DONQUN48 | | | | |
| 0564 | REP | 6 | LAST | 238 | 42,2054 | 0 5435 0 | MAXIN | TC | UPFLAG | | | |
| 0565 | REP | 2 | LAST | 247 | 42,2055 | 00212 0 | ADRES | MAXDRFLG | | | | |
| 0566 | REP | 1 | | | 42,2056 | 0 2020 1 | TC | MAXOUT | | | | |
| 05661 | | | | | 42,2057 | 01460 1 | V0648 | VN | 0648 | | | |
| 056611 | | | | | 42,2060 | 01457 0 | V06N47 | VN | 0647 | | | |
| 056612 | | | | | 42,2061 | 01056 0 | V04N48 | VN | 0446 | | | |
| 05662 | | | | | 43,2546 | | | BANK | 43 | | | |
| 05664 | REP | 2 | LAST | 230 | 43,2000 | | | SETLOC | EXTVERBS | | | |
| 05666 | | | | | 43,2546 | | | BANK | | | | |
| 0570 | REP | 4 | LAST | 247 TO 247' | | 8 325* | | COUNT* | SS/EXTVR | | | |
| R0571 | | | | | V82PERP | VERB 82 | | DESCRIPTION | | | | |
| R0572 | | | | | REQUEST ORBIT PARAMETERS DISPLAY (R30) | | | | | | | |
| R0574 | | | | | 1. IF AVERAGE G IS OFF' | | | | | | | |
| R0575 | | | | | FLASH DISPLAY V04N06. R2 INDICATES WHICH SHIP=5 STATE VECTOR IS | | | | | | | |
| R0576 | | | | | TO BE UPDATED. INITIAL CHOICE IS THIS SHIP (R2=1). ASTRONAUT | | | | | | | |
| R0577 | | | | | CAN CHANGE TO OTHER SHIP BY V22EXE, WHERE X NOT EQ 1. | | | | | | | |
| R0578 | | | | | SELECTED STATE VECTOR UPDATED BY THISPREC (OTHPREC). | | | | | | | |
| R0579 | | | | | CALLS SR30.1 (WHICH CALLS TFFCONM + TFFRP/RA) TO CALCULATE | | | | | | | |



L EXTENDED VERBS USR=5 PAGE NO. 20 Pg 54

R0580 RPER (PERIGEE RADIUS), RAPO (APOGEE RADIUS), HPER (PERIGEE
R0581 HEIGHT ABOVE LAUNCH PAD OR LUNAR LANDING SITE), HAPO (APOGEE
R0582 HEIGHT AS ABOVE), TPER (TIME TO PERIGEE), TPF (TIME TO
R0583 INTERSECT 300 KFT ABOVE PAD OR 35KFT ABOVE LANDING SITE).
R0584 FLASH MONITOR V16N44 (HAPO, HPER, TPF). TPF IS -50MS98 IF IT WAS
R0585 NOT COMPUTABLE, OTHERWISE IT INCREMENTS ONCE PER SECOND.
R0586 ASTRONAUT HAS OPTION TO MONITOR TPER BY KEYING IN N 32 E.
R0587 DISPLAY IS IN HRS, IS NEGATIVE (AS WAS TPF), AND INCREMENTS
R0588 ONCE PER SECOND ONLY IF TPF DISPLAY WAS -50MS98.

R0589 2. IF AVERAGE G IS ON'
R0590 CALLS SR30.1 APPROX EVERY TWO SECS. STATE VECTOR IS ALWAYS
R0591 FOR THIS VEHICLE, V82 DOES NOT DISTURB STATE VECTOR. RESULTS
R0592 OF SR30.1 ARE RAPO, HPER, HAPO, HPER, TPER, TPF.
R0593 FLASH MONITOR V16N44 (HAPO, HPER, TPF).
R0594 IF MODE IS P11, THEN CALL DELRSPL SO ASTRONAUT CAN MONITOR
R0595 RESULTS BY N50E. SPLASH COMPUTATION DONE ONCE PER TWO SECS.
R05951 ADDENDUM' HAPO AND HPER SHOULD BE CHANGED TO READ HAPOK AND HPERK IN THE
R05952 ABOVE REMARKS.

| | | | | | | | | | | | |
|-------|-----|----|------|-----|---------|-------|------|---|---------|------|----------|
| R0596 | REP | 9 | LAST | 247 | 43,2546 | 0 | 2076 | 1 | V82PERF | TC | TESTACT |
| R0597 | REP | 1 | | | 43,2547 | 3 | 4756 | 1 | | CAP | PRI07 |
| R0598 | REP | 2 | LAST | 247 | 43,2550 | 0 | 5103 | 0 | | TC | PRICRNG |
| R0599 | REP | 11 | LAST | 245 | 43,2551 | 0 | 4574 | 0 | | TC | POSTJUMP |
| R0600 | REP | 1 | | | 43,2552 | 46332 | 1 | | | CADR | V82CALL. |

**** V82CALL MUST NOT BE A FINDVAC JOB

R0601 V83PERF VERB 83 DESCRIPTION
R0602 REQUEST RENDEZVOUS PARAMETER DISPLAY (R31)
R0603 1. SET EXT VERB DISPLAY BUSY FLAG.
R0604 2. SCHEDULE V83CALL WITH PRIORITY 10.
R0605 A. DISPLAY
R0606 R1 RANGE
R0607 R2 RANGE RATE
R0608 R3 THETA

| | | | | | | | | | | | |
|-------|-----|----|------|-----|---------|-------|------|---|---------|--------|----------|
| R0609 | REP | 10 | LAST | 249 | 43,2553 | 0 | 2076 | 1 | V83PERF | TC | TESTACT |
| R0610 | | | | | 43,2554 | 0 | 0004 | 0 | | INHINT | |
| R0611 | REP | 2 | LAST | 198 | 43,2555 | 4 | 0105 | 1 | | CS | FLAGWRD9 |
| R0612 | REP | 18 | LAST | 247 | 43,2556 | 7 | 4707 | 1 | | MASK | BIT4 |
| R0613 | REP | 3 | LAST | 249 | 43,2557 | 26 | 105 | 1 | | ADS | FLAGWRD9 |
| R0614 | REP | 3 | LAST | 222 | 43,2560 | 3 | 4754 | 0 | | CAP | PRI05 |
| R0615 | REP | 7 | LAST | 245 | 43,2561 | 0 | 5027 | 1 | | TC | NOVAC |
| R0616 | REP | 4 | LAST | 202 | 84,1770 | | | | | ERANK= | SUREXIT |
| R0617 | REP | 1 | | | 43,2562 | 03150 | 0 | | | 2CADR | R31CALL |
| R0617 | REP | 1 | | | 43,2563 | 72064 | 0 | | | | |
| R0618 | REP | 5 | LAST | 246 | 43,2564 | 0 | 5112 | 0 | | TC | ENDOFJOB |

SET R31 FLAG-BIT 4 FLAGWRD9



L EXTENDED VERBS

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| | | | | | | | | | | | |
|------|-----|----|------|-----|---------|----|------|---|---------|--------|------------|
| 0619 | REP | 11 | LAST | 249 | 43,2565 | 0 | 2076 | 1 | V83PERP | TC | TESTACT |
| 0620 | | | | | 43,2566 | 0 | 0004 | 0 | | INHINT | |
| 0621 | REP | 10 | LAST | 249 | 43,2567 | 4 | 4707 | 1 | | CS | BIT4 |
| 0622 | REP | 4 | LAST | 249 | 43,2570 | 7 | 0105 | 1 | | MASK | FLAGTRD9 |
| 0623 | REP | 5 | LAST | 250 | 43,2571 | 54 | 105 | 1 | | TS | FLAGTRD9 |
| 0624 | REP | 2 | LAST | 231 | 43,2572 | 0 | 2560 | 0 | | TC | V83PERP +5 |

RESST R31 FLAG TO INDICATE R34



L EXTENDED VERBS

| PO665 | VERB 86 | DESCRIPTION |
|-------|-----------------|---|
| R0666 | V86 | IS TO R23 AS MARK REJECT IS TO R21 |
| R0667 | V86 | IS THE MARK REJECT FOR R23 (THE BACKUP MARKING ROUTINE) |
| 0668 | REP 14 LAST 251 | BY, 1725 EBANK= MRKREP1 |
| 0669 | REP 1 | 43,2632 3 4753 1 V86PERF CAP EBANK7 |
| 0670 | REP 11 LAST 247 | 43,2633 56 003 1 XCH EBANK BACKUP MARK REJECT (R23) |
| 0671 | REP 8 LAST 224 | 43,2634 3 7710 0 CA NBOQNE |
| 0672 | REP 15 LAST 252 | 43,2635 55-725 1 TS MRKREP1 |
| 0673 | REP 12 LAST 245 | 43,2636 0 2121 1 TC GOPIN |



L EXTENDED VERBS

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P0689 TRACKTRM VERB 56 DESCRIPTION
 R0690 TERMINATE TRACKING (P20)
 R0691 1. KNOCK DOWN RENDEZVOUS, TRACK, AND UPDATE FLAGS.
 R0692 2. REQUIRE P20 NOT RUNNING ALONE OR GO TO GOTOPOCH (REQUEST PROGRAM 00).
 R0694 3. REQUIRE R22 RUNNING OR GO TO PINBRICH.
 R0695 4. IF INTEGRATION RUNNING, STALL UNTIL IT IS COMPLETED, THEN ZERO GROUPS 2 AND 3 TO KILL R21 + R22.
 R0697 3. KNOCK DOWN RENDEZVOUS, R22, R21, TRACK, UPDATE, AND TARG1 FLAGS.
 R0699 4. GO TO ENEMA (SOFTWARE RESTART).
 R0700 REFERENCE
 R0701 P20 RENDEZVOUS NAVIGATION.
 R0702 R21 RENDEZVOUS TRACKING SIGHTING MARK.
 R0703 R22 RENDEZVOUS TRACKING DATA PROCESSING.

| OP | REP | COND | LAST | ADDR | DATA | DESCRIPTION | IS REND FLAG ON |
|--------|-----|------|------|------|------------------|-------------|----------------------------|
| 0704 | REP | 25 | LAST | 251 | 43,2637 3 4704 0 | TRACKTRM CA | IS REND FLAG ON |
| 0705 | REP | 9 | LAST | 251 | 43,2640 7 0074 0 | BITT | |
| 0706 | | | | | 43,2641 0 0006 1 | FLAGWRD0 | |
| 0707 | REP | 13 | LAST | 252 | 43,2642 1 2121 0 | EXTEND | NO |
| | | | | | | BZF | |
| 0708 | REP | 19 | LAST | 251 | 43,2643 0 5447 0 | TC | DOWNFLAG |
| 0709 | REP | 1 | | | 43,2644 00010 0 | ADRES | RNDVZFLG |
| 0710 | REP | 15 | LAST | 251 | 43,2645 3 4706 1 | CA | IS TRACK FLAG ON |
| 0711 | REP | 9 | LAST | 251 | 43,2646 7 0075 1 | BITT | |
| 0712 | | | | | 43,2647 0 0006 1 | FLAGWRD1 | |
| 0713 | REP | 14 | LAST | 253 | 43,2650 1 2121 0 | EXTEND | NO |
| | | | | | | BZF | |
| 0714 | REP | 11 | LAST | 253 | 43,2651 0 5447 0 | TC | DOWNFLAG |
| 0715 | REP | 1 | | | 43,2652 00031 0 | ADRES | TRACKFLG |
| 07151 | REP | 12 | LAST | 253 | 43,2653 0 5447 0 | TC | DOWNFLAG |
| 07152 | REP | 1 | | | 43,2654 00027 1 | ADRES | UPDATFLG |
| 0716 | REP | 13 | LAST | 253 | 43,2655 0 5447 0 | TC | DOWNFLAG |
| 0717 | REP | 2 | LAST | 197 | 43,2656 00007 0 | ADRES | IMUSE |
| 07173 | REP | 7 | LAST | 247 | 43,2657 3 4752 0 | CAP | ERANK6 |
| 07174 | REP | 12 | LAST | 252 | 43,2660 54 003 0 | TS | ERANK |
| 071749 | | | | | 43,2661 0 0004 0 | INHINT | |
| 07175 | REP | 33 | LAST | 246 | 43,2662 0 4555 0 | TC | RANKCALL |
| 07176 | REP | 3 | LAST | 196 | 43,2663 45245 0 | CADR | STOPRATE |
| 07177 | REP | 9 | LAST | 252 | 43,2664 3 7716 0 | CAP | NEGONE |
| 07178 | REP | 20 | LAST | 236 | 43,2665 55=303 1 | TS | OPTIND |
| 0718 | REP | 2 | LAST | 195 | 43,2666 0 6006 1 | TC | INTPRET |
| 0719 | | | | | 43,2667 77624 1 | CALL | |
| 0720 | REP | 3 | LAST | 204 | 43,2670 27371 1 | INTSTALL | DONT INTERRUPT INTEGRATION |
| 0721 | | | | | 43,2671 77776 1 | EXIT | |

L EXTENDED VERBS

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| | | | | | | | | | |
|-------|-----|----|------|---------|----------|----------|----------|-----------|--|
| 0722 | REP | 1 | | 43,2672 | 0 5201 1 | | TC | 2PHSQRNG | |
| 0723 | | | | 43,2673 | 00002 0 | | OCT | 2 | KILL GROUP 2 TO HALT P20 ACTIVITY |
| 0724 | | | | 43,2674 | 00001 0 | | OCT | 1 | ALSO KILL GROUP 1 |
| 0725 | | | | 43,2675 | 0 0004 0 | CLEANOUT | INHINT | | |
| 0726 | REP | 12 | LAST | 249 | 43,2676 | 0 4574 0 | TC | POSTLAMP | |
| 0727 | REP | 2 | LAST | 185 | 43,2677 | 12641 1 | CADR | ENEMA | CAUSE RESTART |
| R0728 | | | | | | | | | |
| R0729 | | | | | | | | | |
| R0730 | | | | | | | | | |
| 0731 | REP | 14 | LAST | 253 | 43,2700 | 0 5447 0 | LEWBC | TC | DOWNFLAG |
| 0732 | REP | 1 | | | 43,2701 | 00026 0 | ADRES | VERUPFLG | VERUPFLG DOWN INDICATES LEM |
| 0733 | REP | 15 | LAST | 253 | 43,2702 | 1 2121 0 | TCF | GOPIN | |
| R0734 | | | | | | | | | |
| R0735 | | | | | | | | | |
| R0736 | | | | | | | | | |
| 0737 | REP | 8 | LAST | 251 | 43,2703 | 0 5435 0 | CSWBC | TC | UPFLAG |
| 0738 | REP | 2 | LAST | 254 | 43,2704 | 00026 0 | ADRES | VERUPFLG | VERUPFLG UP INDICATES CM. |
| 07383 | REP | 16 | LAST | 254 | 43,2705 | 1 2121 0 | TCF | GOPIN | |
| R0749 | | | | | | | | | |
| R0750 | | | | | | | | | |
| R0751 | | | | | | | | | |
| R0752 | | | | | | | | | |
| R0753 | | | | | | | | | |
| 0754 | | | | | 0010 | | | BRANK= 10 | |
| 0756 | REP | 1 | | | 43,2706 | 3 2711 1 | DNEMLP | CAP | LNDLMP1 |
| 0757 | REP | 2 | LAST | 186 | 43,2707 | 54 335 0 | TS | DNMGOTO | |
| 0758 | REP | 17 | LAST | 254 | 43,2710 | 0 2121 1 | TC | GOPIN | |
| 0759 | REP | 2 | LAST | 230 | 43,2706 | | V74 | EQUALS | DNEMLP |
| 0760 | REP | 1 | | | 43,2711 | 03543 0 | LNDLMP1 | REMA DR | DNDLMP1 |
| R0761 | | | | | | | | | |
| R0762 | | | | | | | | | |
| R0763 | | | | | | | | | |
| R0764 | | | | | | | | | |
| 0765 | REP | 9 | LAST | 254 | 43,2712 | 0 5435 0 | LPTFLOON | TC | UPFLAG |
| 0766 | REP | 1 | | | 43,2713 | 00125 1 | ADRES | GRRKFLG | VR 75 - SET LIPTOFF FLAG BIT BIT 5 FLAG 5 |



L EXTENDED VERBS

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| | | | | | | | | | |
|------|-----|----|------|-----|---------|--------|---|----------|----------------|
| 0767 | REP | 18 | LAST | 254 | 43,2714 | 0 2121 | 1 | TC | GOPIN |
| 0768 | A | 5 | UHL | 197 | 43,2715 | 3 1011 | 0 | CHKPOH | CA MODREG |
| 0769 | | | | | 43,2716 | 0 0006 | 1 | | EXTEND |
| 0770 | DA | 3 | UHL | 238 | 43,2711 | 1 6711 | 1 | BZF | TCO |
| 0771 | REP | 15 | LAST | 247 | 43,2720 | 1 2120 | 1 | TCF | ALM/END |
| 0772 | | | | | 43,2721 | 0 0006 | 1 | EXDAPOFF | EXTEND |
| 0773 | REP | 1 | | | 43,2722 | 3 2731 | 0 | DCA | IDLECADR |
| 0774 | REP | 4 | LAST | 183 | 43,2723 | 53=313 | 0 | DYCH | TSLOC |
| 0775 | REP | 7 | LAST | 247 | 43,2724 | 4 4105 | 0 | CS | OCT6000 |
| 0776 | REP | 8 | LAST | 247 | 43,2725 | 7 0102 | 0 | MASK | FLAGWRD6 |
| 0777 | REP | 9 | LAST | 255 | 43,2726 | 54 102 | 0 | TS | FLAGWRD6 |
| 0778 | REP | 20 | LAST | 244 | 43,2727 | 0 0002 | 0 | TC | Q |
| 0779 | REP | 10 | LAST | 211 | E6,1425 | | | BRANK= | PACTOFF |
| 0780 | REP | 3 | LAST | 199 | 43,2730 | 03143 | 1 | IDLECADR | 2CADR TS IDLOC |
| 0780 | | | | | 43,2731 | 12108 | 0 | | |

SET TS TO IDLE.

RESET DAPBITS 1 AND 2.



L EXTENDED VERBS

R0781 VERB 89 DESCRIPTION RENDEZVOUS FINAL ATTITUDE ROUTINE (R83)

R0782 CALLED BY VERB 89 ENTER DURING P00. PRIO 10 USED. CALCULATES AND
R0783 DISPLAYS FINAL GIMBAL ANGLES TO POINT CSM +X AXIS OR PREFERRED AXIS
R0784 $(UNIT(X) \cos \delta + UNIT(Y) \sin \delta)$ AT LM.

R0785 1. KEY IN V 89 E ONLY IF IN PROG 00. IF NOT IN P00, OPERATOR ERROR AND
R0786 EXIT R83, OTHERWISE CONTINUE.

R0787 2. IF IN P00, DO IMU STATUS CHECK (R02BOTH). IF IMU ON AND ITS
R0788 ORIENTATION KNOWN TO CGC, CONTINUE.

R0789 3. FLASH DISPLAY V 04 N 06. R2 INDICATES WHICH SPACECRAFT AXIS IS TO
R0790 BE POINTED AT LM. INITIAL CHOICE IS PREFERRED AXIS. (R2=1).
R0791 ASTRONAUT CAN CHANGE TO (+X) AXIS (R2 NOT= 1) BY V 22 E 2 E. CONTINUE
R0792 AFTER KEYING IN PROCEED.

R0793 4. SET PREFERRED ATTITUDE FLAG ACCORDING TO OPTION DESIRED. SET FLAG
R0794 FOR PREFERRED AXIS. RESET FLAG FOR X AXIS.

R0795 5. CURRENT TIME IS STORED AND R83COMP IS CALLED

R0796 R83COMP JOB

R0797 UPDATES CSM AND LM STATE VECTORS USING CONIC EQUATIONS

R0798 CALCULATES BOTH PREFERRED AND X AXIS TRACKING ATT FROM CSM TO LM.

R0799 DESIRED GIMBAL ANGLES AS INDICATED BY PREFERRED ATTITUDE FLAG
R0800 ARE STORED FOR LATER R80CSM CALL.

R0801 6. FLASH DISPLAY V 06 N18 AND AWAIT RESPONSE.

R0802 7. RECYCLE- RETURN TO STEP 5.

R0803 TERMINATE- EXIT R83 ROUTINE

R0804 PROCEED- RESET 3AXISPLG AND CALL R80CSM FOR ATTITUDE MANEUVER.

| | | | | | | | | | | | | |
|------|-----|----|------|-----|---------|---|-------|---|---------|--------|----------|------------|
| 0805 | REP | 5 | LAST | 246 | 43,2732 | 0 | 2715 | 0 | V89PERP | TC | CHKPOH | DEMAND P00 |
| 0806 | REP | 13 | LAST | 251 | 43,2733 | 0 | 2076 | 1 | | TC | TESTACT | |
| 0807 | | | | | 43,2734 | 0 | 0004 | 0 | | INHINT | | |
| 0808 | REP | 3 | LAST | 247 | 43,2735 | 3 | 4676 | 1 | | CAP | PRIO10 | |
| 0809 | REP | 7 | LAST | 246 | 43,2736 | 0 | 5042 | 1 | | TC | PINDVAC | |
| 0810 | REP | 2 | LAST | 88 | E4,1716 | | | | | EBANK | P21TIME | |
| 0811 | REP | 1 | | | 43,2737 | 0 | 03601 | 0 | | 2CADR | V89CALL | |
| 0811 | REP | 1 | | | 43,2740 | 7 | 0064 | 1 | | | | |
| 0812 | REP | 8 | LAST | 251 | 43,2741 | 1 | 5112 | 1 | | TCP | ENDOFJOB | |

0813 REP 26 LAST 228 43,2742 0 0004 0 WMATRONG INHINT

0814 REP 26 LAST 228 43,2743 4 4712 0 CS BIT1

VR 86 - CLEAR RENDWPLG TO REINITIALIZE W-MATRIX



L EXTENDED VERBS

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| | | | | | | | | | | | |
|-------|------|----|------|-----|---------|----------|----------|--------|----------|--|---------|
| 0015 | REP | 4 | LAST | 244 | 43,2744 | 7 0101 0 | | MASK | FLAGRDS | | |
| 0016 | REP | 5 | LAST | 257 | 43,2745 | 54 101 0 | | TS | FLAGRDS | | |
| 00164 | REP | 15 | LAST | 254 | 43,2746 | 0 5447 0 | | TC | DOWNFLAG | RESIST ORBNFLAG | |
| 00166 | REP | 2 | LAST | 203 | 43,2747 | 00036 1 | | ADRES | ORBNFLAG | | |
| 0017 | REP | 19 | LAST | 255 | 43,2750 | 0 2121 1 | | TC | GOPIN | | |
| 0018 | REP | 1 | | | 43,2751 | | | | QOSHSUM | EQUALS | SHOWSLM |
| 0019 | REP | 6 | LAST | 256 | 43,2751 | 0 2715 0 | SHOWSLM | TC | CHKPOOH | | |
| 0020 | REP | 14 | LAST | 256 | 43,2752 | 0 2076 1 | | TC | TESTACT | * | |
| 0021 | REP | 1 | | | 43,2753 | 3 4712 1 | | CAP | S+1 | * | |
| 0022 | REP | 2 | LAST | 80 | 43,2754 | 55-376 0 | | TS | SKEEP6 | * SHOWSLM OPTION | |
| 0023 | REP | 1 | | | 43,2755 | 3 4714 1 | | CAP | S+ZERO | * | |
| 0024 | REP | 3 | LAST | 179 | 43,2756 | 55-362 0 | | TS | SMODE | * TURN OFF SELF-CHECK | |
| 0025 | REP | 1 | | | 43,2757 | 3 3243 1 | | CA | SELPADRS | * | |
| 0026 | REP | 3 | LAST | 188 | 43,2760 | 55-361 0 | | TS | SELPRET | * | |
| 0027 | REP | 1 | | | 43,2761 | 0 3520 0 | | TC | STSHOSLM | * ENTER ROPECHK | |
| 0028 | REP | 2 | LAST | 80 | 43,2762 | 23-372 0 | SDISPLAY | LXCH | SKEEP2 | * BNK NO FOR DSP | |
| 0029 | REP | 2 | LAST | 80 | 43,2763 | 23-373 1 | | LXCH | SKEEP3 | * BUGGER WORD FOR DSP | |
| 0030 | REP | 1 | | | 43,2764 | 3 3242 0 | NKILL | CA | ADRS1 | * | |
| 0031 | REP | 32 | LAST | 240 | 43,2765 | 54 156 1 | | TS | MPAC +2 | * | |
| 0032 | REP | 1 | | | 43,2766 | 3 2777 1 | | CA | VNCON | * 0501 | |
| 0033 | REP | 34 | LAST | 253 | 43,2767 | 0 4555 0 | | TC | BANKCALL | * | |
| 0034 | REP | 8 | LAST | 248 | 43,2770 | 20465 1 | | CADR | QQDSPF | * | |
| 0035 | REP | 1 | | | 43,2771 | 0 2774 1 | | TC | +3 | * | |
| 0036 | REP | 1 | | | 43,2772 | 0 3631 0 | | TC | NKTRK | * | |
| 0037 | REP | 1 | | | 43,2773 | 0 2764 0 | | TC | NKILL | * | |
| 00375 | REP | 2 | LAST | 257 | 43,2774 | 3 3243 1 | | CA | SELPADRS | | |
| 00376 | REP | 2 | LAST | 80 | 43,2775 | 55-371 1 | | TS | SKEEP1 | | |
| 0038 | REP | 15 | LAST | 251 | 43,2776 | 0 5423 1 | | TC | ENDECT | * | |
| 0039 | | | | | 43,2777 | 01201 0 | VNCON | VN | 501 | * | |
| 0040 | REP | 3 | LAST | 257 | 43,3000 | 3 1376 1 | ENDSLMS | CA | SKEEP6 | * | |
| 0041 | REP | 1 | | | 43,3001 | 0 0006 1 | | EXTEND | | * | |
| 0042 | REP | 2 | LAST | 189 | 43,3002 | 1 3334 1 | | BZF | SELPCHK | * ROPECHK, START SELPCHK AGAIN. | |
| 0043 | REP | 2 | LAST | 257 | 43,3003 | 0 3520 0 | | TC | STSHOSLM | * START SHOWSLM AGAIN. | |
| 00644 | VERB | 79 | | | | | | | | REQUEST LINAR LANDMARK SELECTION. RESTRICTED TO POO. | |
| 0045 | REP | 7 | LAST | 257 | 43,3004 | 0 2715 0 | CALLR3S | TC | CHKPOOH | | |
| 0046 | REP | 15 | LAST | 257 | 43,3005 | 0 2076 1 | | TC | TESTACT | | |
| 0047 | REP | 4 | LAST | 249 | 43,3006 | 3 4754 0 | | CAP | PRIOS | | |
| 0049 | REP | 8 | LAST | 256 | 43,3007 | 0 5042 1 | | TC | PINDVAC | | |
| 0050 | REP | 2 | LAST | 88 | 54,1725 | | | BRANK= | KLOOPCNT | | |
| 0051 | REP | 1 | | | 43,3010 | 03215 1 | | 2CADR | LNDRKSEL | | |
| 0051 | REP | 1 | | | 43,3011 | 62064 1 | | | | | |

L EXTENDED VERBS

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0852 REP 9 LAST 256 43,3012 0 5112 0 TC ENDOFJOB R35 WILL DO ENDEXT

R0853 VB 16 SET PREFERRED ATTITUDE FLAG - DRIVE TO PREFERRED.

0854 REP 10 LAST 254 43,3013 0 5435 0 SETPRFLG TC UPFLAG
 0855 REP 1 LAST 258 43,3014 00120 1 ADRES PRPTRCAT BIT 10 FLAG 5

0856 REP 20 LAST 257 43,3015 0 2121 1 TC GOPIN
 R0857 VB 77 RESET PREFERRED ATTITUDE FLAG - DRIVE TO +X-AXIS ATT.

0858 REP 16 LAST 257 43,3016 0 5447 0 RESETPRF TC DOWNFLAG
 0859 REP 2 LAST 258 43,3017 00120 1 ADRES PRPTRCAT BIT 10 FLAG 5

0860 REP 21 LAST 258 43,3020 0 2121 1 TC GOPIN
 R0861 VB 87 SET VHP RANGE FLAG - ALLOWS R22 TO ACCEPT RANGE DATA.

0862 REP 3 LAST 253 43,3021 0 6008 1 SETVHFLG TC INTPRET
 0863 REP 1 LAST 258 43,3022 77414 0 SET EXIT
 0864 REP 2 LAST 195 43,3023 04488 1 VHPRFLAG
 0865 REP 22 LAST 258 43,3024 0 2121 1 TC GOPIN
 R0866 VB 88 RESET VHP RANGE FLAG - STOPS ACCEPTANCE OF RANGE DATA.

0867 REP 4 LAST 258 43,3025 0 6008 1 RESETVHP TC INTPRET
 0868 REP 1 LAST 258 43,3026 77414 0 CLEAR EXIT
 0869 REP 3 LAST 258 43,3027 04666 0 VHPRFLAG
 08695 REP 1 LAST 258 43,3030 0 5520 0 TC TRPAILOP TRACKER FAIL LIGHT

0870 REP 23 LAST 258 43,3031 0 2121 1 TC GOPIN
 R0871 VERB 66. VEHICLES ARE ATTACHED. - MOVE THIS VEHICLE STATE VECTOR TO
 R0872 OTHER VEHICLE STATE VECTOR.

R0873 USE SUBROUTINE CENTRAN.

0874 REP 1 E3,1554 ERANK= RRECHIS
 0875 REP 4 LAST 256 43,3032 3 4676 1 ATTACHED CAP PRIO10
 0876 REP 9 LAST 257 43,3033 0 5042 1 TC FINDVAC
 08761 REP 2 LAST 258 E3,1554 ERANK= RRECHIS
 08762 REP 1 43,3034 03037 0 ZCADR ATTACHIT
 08762 REP 1 43,3035 86103 0
 08763 REP 10 LAST 258 43,3036 0 5112 0 TC ENDOFJOB

0877 REP 5 LAST 258 43,3037 0 6008 1 ATTACHIT TC INTPRET
 0878 REP 1 LAST 258 43,3040 77624 1 CALL
 0879 REP 4 LAST 253 43,3041 27371 1 INTSTALL

L EXTENDED VERBS

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| | | | | | | | | |
|---|-----|----|---------|-------|---------|---------|----------|----------|
| 08791 | | | 43,3042 | 43014 | 0 | SET | RCN | |
| 08792 | REP | 1 | 43,3043 | 04084 | 1 | | MOONOTH | |
| 08793 | REP | 1 | 43,3044 | 04303 | 0 | | MOONTHIS | |
| 08794 | | | 43,3045 | 67050 | 0 | | +3 | |
| 08795 | | | 43,3046 | 11019 | 1 | | | |
| 08796 | REP | 2 | LAST | 259 | 43,3047 | 04284 | 0 | MOONOTH |
| 08800 | | | 43,3050 | 77776 | 1 | EXIT | | |
| 08801 | REP | 1 | 43,3051 | 3 | 3076 | 0 | CAP | WTS1 |
| 08802 | REP | 5 | LAST | 222 | 43,3052 | 0 | 5475 | 1 |
| 08803 | REP | 3 | LAST | 258 | 43,3053 | 01554 | 1 | TC |
| 08804 | REP | 1 | 43,3054 | 01626 | 1 | ADRES | RRECTHIS | |
| | | | | | | ADRES | RRECTOIH | |
| 08845 | | | 43,3055 | 0 | 0003 | 1 | TACHEXIT | RELINT |
| 088455 | REP | 6 | LAST | 258 | 43,3056 | 0 | 6006 | 1 |
| 088457 | | | 43,3057 | 77624 | 1 | CALL | INTPRET | |
| 088459 | REP | 1 | 43,3060 | 26662 | 1 | | PTOACM | |
| 088461 | | | 43,3061 | 45154 | 0 | LXA,2 | CALL | |
| 088463 | REP | 2 | LAST | 87 | 43,3062 | 02150 | 1 | PBODY |
| 088465 | REP | 1 | 43,3063 | 20237 | 0 | | SVDW1 | |
| 088467 | | | 43,3064 | 77624 | 1 | CALL | | |
| 088469 | REP | 1 | 43,3065 | 20263 | 1 | | SVDW2 | |
| 088471 | | | 43,3066 | 77776 | 1 | EXIT | | |
| 0885 | REP | 1 | 43,3067 | 3 | 3077 | 1 | CAP | TCPINAD |
| 0886 | REP | 1 | 43,3070 | 50 | 120 | 1 | INDEX | PIXLOC |
| 0887 | REP | 7 | LAST | 227 | 43,3071 | 54 | 052 | 1 |
| 0888 | REP | 13 | LAST | 254 | 43,3072 | 0 | 4574 | 0 |
| 0889 | REP | 1 | 43,3073 | 27406 | 0 | CADR | INTWAKE | |
| 0890 | | | 43,3074 | 77634 | 0 | TCPIN | RTB | |
| 0891 | REP | 3 | LAST | 232 | 43,3075 | 21176 | 1 | PINRNCH |
| 0892 | | | 43,3076 | 00051 | 0 | OCTS1 | OCT | 51 |
| 0893 | REP | 1 | 43,3077 | 67074 | 0 | TCPINAD | CADR | TCPIN |
| R089302 VERB 47. MOVE LM STATE VECTOR INTO CM STATE VECTOR. | | | | | | | | |
| 089304 | REP | 5 | LAST | 258 | 43,3100 | 3 | 4676 | 1 |
| 089305 | REP | 10 | LAST | 258 | 43,3101 | 0 | 5042 | 1 |
| 089306 | REP | 4 | LAST | 259 | E3,1554 | | | |
| 089307 | REP | 1 | 43,3102 | 03105 | 0 | | | |
| 089307 | REP | 1 | 43,3103 | 66103 | 0 | | | |
| 089308 | REP | 11 | LAST | 258 | 43,3104 | 0 | 5112 | 0 |
| 089309 | REP | 7 | LAST | 259 | 43,3105 | 0 | 6006 | 1 |
| 08931 | | | 43,3106 | 77624 | 1 | LMTCCM | TC | INTPRET |
| 089312 | REP | 5 | LAST | 258 | 43,3107 | 27371 | 1 | CALL |
| 089314 | | | 43,3110 | 43014 | 0 | SET | RCN | |
| 089316 | REP | 2 | LAST | 259 | 43,3111 | 04063 | 0 | MOONTHIS |
| 089316 | REP | 3 | LAST | 259 | 43,3112 | 04304 | 1 | MOONOTH |

OUR STATE VECTOR INTO OTHER VIA CENTRAN

UPDATE RN, VN, R-OTHER, V-OTHER



L EXTENDED VERBS

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| | | | | | | | |
|-------|-----|----|------|---------|------------------|----------|----------|
| 0031 | REP | 1 | | 43,3147 | 00221 0 | ADRES | QUITFLAG |
| 0032 | REP | 23 | LAST | 240 | 43,3150 3 4714 1 | CAP | ZERO |
| 0033 | REP | 14 | LAST | 259 | 43,3151 0 4574 0 | TC | POSTJUMP |
| 0034 | REP | 1 | | 43,3152 | 10010 1 | CADR | V37 |
| 0040 | REP | 5 | LAST | 207 | E5,1751 | ERANK | LANDMARK |
| 0050 | REP | 7 | LAST | 260 | 43,3153 0 5253 0 | TC | CHECKSUM |
| 0051 | | | | 43,3154 | 00026 0 | MM | 22 |
| 0052 | REP | 18 | LAST | 260 | 43,3155 0 2120 0 | TC | ALM/END |
| 00521 | REP | 1 | | 43,3156 | 3 3174 0 | CAP | LANDBANK |
| 00522 | REP | 13 | LAST | 253 | 43,3157 54 003 0 | TS | ERANK |
| 0053 | REP | 3 | LAST | 260 | 43,3160 4 4756 0 | CS | PRIOT |
| 0054 | REP | 6 | LAST | 261 | 43,3161 7 1751 1 | MARK | LANDMARK |
| 0055 | REP | 7 | LAST | 261 | 43,3162 55=751 1 | TS | LANDMARK |
| 0056 | REP | 25 | LAST | 227 | 43,3163 3 1330 0 | CA | MARKSTAT |
| 0057 | REP | 1 | | 43,3164 | 54 021 0 | TS | SR |
| 0058 | REP | 2 | LAST | 261 | 43,3165 3 0021 1 | CA | SR |
| 0059 | REP | 3 | LAST | 261 | 43,3166 3 0021 1 | CA | SR |
| 0060 | REP | 4 | LAST | 261 | 43,3167 7 4756 0 | MARK | PRIOT |
| 00601 | REP | 70 | LAST | 247 | 43,3170 4 0000 0 | CS | A |
| 0061 | REP | 5 | LAST | 257 | 43,3171 6 4754 0 | AD | PRIO5 |
| 0062 | REP | 8 | LAST | 261 | 43,3172 27=751 1 | ADS | LANDMARK |
| 0063 | REP | 24 | LAST | 258 | 43,3173 0 2121 1 | TC | GOPIN |
| 00631 | REP | 9 | LAST | 261 | 43,3174 02751 0 | LANDRANK | ECADR |

AT NEXT TIMESTEP

GO TO POO

IS P22 OPERATING

NO

YES SET BITS 12,11,10 OF LANDMARK = BITS 14,13,12 OF MARKSTAT AFTER ADDING 1 TO THEM TO GET OFFSET MARK NO.

R2000

R20001 VERB 67 ASTRONAUT DISPLAY OP W MATRIX

| | | | | | | | | |
|-------|-----|----|------|---------|------------------|-----|-------|----------|
| 20002 | REP | 17 | LAST | 260 | 43,3175 0 2076 1 | V67 | TC | TESTXACT |
| 2001 | REP | 6 | LAST | 261 | 43,3176 3 4754 0 | | CAP | PRIO5 |
| 2003 | REP | 12 | LAST | 260 | 43,3177 0 5042 1 | | TC | FINDVAC |
| 2004 | REP | 4 | LAST | 91 | E5,1400 | | ERANK | W |
| 2005 | REP | 1 | | 43,3200 | 03574 1 | | ZCADR | V67CALL |
| 2005 | REP | 1 | | 43,3201 | 60105 0 | | | |
| 2006 | REP | 13 | LAST | 260 | 43,3202 0 5112 0 | | TC | ENDOFJOB |

R2007 VB 44. SET SURFACE FLAG.

| | | | | | | | | |
|------|-----|----|------|-----|------------------|--------|-------|----------|
| 2008 | REP | 12 | LAST | 260 | 43,3203 0 5435 0 | SETSRF | TC | UPFLAG |
| 2009 | REP | 2 | LAST | 204 | 43,3204 00177 0 | | ADRES | SURPFLAG |
| 2010 | REP | 25 | LAST | 261 | 43,3205 1 2121 0 | | TCF | GOPIN |

R2011 VB 45. RESET SURFACE FLAG.

| | | | | | | | | |
|------|-----|----|------|-----|------------------|---------|-------|----------|
| 2012 | REP | 18 | LAST | 260 | 43,3206 0 5447 0 | RESTSRF | TC | DOWNFLAG |
| 2013 | REP | 3 | LAST | 261 | 43,3207 00177 0 | | ADRES | SURPFLAG |
| 2014 | REP | 26 | LAST | 261 | 43,3210 1 2121 0 | | TCF | GOPIN |



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L EXTENDED VERBS

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L PINBALL NOUN TABLES

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F1000 THE FOLLOWING REFERS TO THE NOUN TABLES

R1001 COMPONENT CODE NUMBER INTERPRETATION

R1002 00000 1 COMPONENT
 R1003 00001 2 COMPONENT
 R1004 00010 3 COMPONENT
 R1005 X1XXX BIT4 = 1. DECIMAL ONLY
 R1006 1XXXX BITS = 1. NO LOAD

R1007 END OF COMPONENT CODE NUMBERS

R1008 SF ROUTINE CODE NUMBER INTERPRETATION

R1009 00000 OCTAL ONLY
 R1010 00001 STRAIGHT FRACTIONAL
 R1011 00010 CDU DEGREES (XXX.XX)
 R1012 00011 ARITHMETIC SP
 R1013 00100 ARITH DP1 OUT(MULT BY 2EXP14 AT END) IN(STRAIGHT)
 R1014 00101 ARITH DP2 OUT(STRAIGHT) IN(SL 7 AT END)
 R1015 00110 Y OPTICS DEGREES (XX.XXX MAX 89.999)
 R1016 00111 ARITH DP3 OUT (SL 7 AT END) IN (STRAIGHT)
 R1017 01000 WHOLE HOURS IN R1, WHOLE MINUTES (MOD 60) IN R2,
 R1018 SECONDS (MOD 60) 0XX.XX IN R3. *** ALARMS IF USED WITH OCTAL
 R1019 MINUTES (MOD 60) IN D1D2, D3 BLANK. SECONDS (MOD 60) IN D4D5
 R1020 LIMITS TO 59999 IF MAG EXCEEDS THIS VALUE.
 R1021 ALARMS IF USED WITH OCTAL ***** IN (ALARM)
 R1022 01010 ARITH DP4 OUT (STRAIGHT) IN (SL 3 AT END)
 R10221 01011 ARITH1 SP OUT(MULT BY 2EXP14 AT END) IN(STRAIGHT)
 R10222 01100 2 INTEGERS IN D1D2, D4D5, D3 BLANK.
 R10223 ALARMS IF USED WITH OCTAL ***** IN (ALARM)

R1023 END OF SF ROUTINE CODE NUMBERS

R1024 SF CONSTANT CODE NUMBER INTERPRETATION

R1025 00000 WHOLE USE ARITH
 R1026 00000 DP TIME SEC (XXX.XX SEC) USE ARITHDP1
 R1027 00001 SPARE
 R1028 00010 CDU DEGREES USE CDU DEGREES
 R1029 00010 Y OPTICS DEGREES USE Y OPTICS DEGREES
 R1030 00011 DP DEGREES (90) XX.XXX DEG USE ARITHDP3
 R1031 00100 DP DEGREES (360) XXX.XX DEG USE ARITHDP4
 R1032 00101 DEGREES (180) XXX.XX DEG USE ARITH
 R1034 00110 WEIGHT2 (XXXXX. LBS) USE ARITH1
 R1035 00111 POSITIONS (XXX.XX NAUTICAL MILES)
 R10351 USE ARITHDP3
 R1037 01000 POSITION4 (XXX.X NAUTICAL MILES)
 R10371 USE ARITHDP3

L PINBALL NOUN TABLES

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| | | | |
|---------|-------|--------------------------------|--------------|
| R1038 | 01001 | VELOCITY2 (XXXXX. FT/SEC) | USE ARITHDP4 |
| R1039 | 01010 | VELOCITY3 (XXXXX. FT/SEC) | USE ARITHDP3 |
| R1040 | 01011 | ELEVATION DEGREES(99.999MAX) | USE ARITH |
| R10401 | 01100 | TRIM DEGRESS (XXX.XX DDD) | USE ARITH |
| R10402 | 01101 | INERTIA (XXXXXXB. SLUG FT FT) | USE ARITH |
| R104025 | 01101 | THRUST MOMENT (XXXXXXB.FT LBS) | USE ARITH |
| R10403 | 01110 | VELOCITY/ZVS (XXXXX. FT/SEC) | USE ARITHDP4 |
| R10404 | 01111 | POSITION6 (XXXXX NAUT MI) | USE ARITHDP3 |
| R10405 | 10000 | DRAG ACCELERATION (XXX.XX G) | USE ARITHDP2 |
| R10406 | 10001 | POSITION7 (XXXXX NAUT MI) | USE ARITHDP3 |
| R10407 | 10010 | POSITION9 (XXX.XX NAUT MI) | USE ARITHDP4 |
| R10408 | 10011 | VELOCITY4 (XXXXX. FT/SEC) | USE ARITHDP2 |

R1042 FOR GREATER THAN SINGLE PRECISION SCALES, PUT ADDRESS OF MAJOR PART INTO NOUN TABLES.

R1043 OCTAL LOADS PLACE 00 INTO MAJOR PART, 0000 INTO MINOR PART.

R1045 OCTAL DISPLAYS SHOW MINOR PART ONLY.

R1046 TO GET AT BOTH MAJOR AND MINOR PARTS (IN OCTAL), USE NOUN 01.

R1047 A NOUN MAY BE DECLARED 'DECIMAL ONLY' BY MAKING BIT4=1 OF ITS COMPONENT CODE NUMBER. IF THIS NOUN IS USED WITH ANY OCTAL DISPLAY VERR, OR IF DATA IS LOADED IN OCTAL, IT ALARMS.

R1050 IN LOADING AN 'HOURS, MINUTES, SECONDS' NOUN, ALL 3 WORDS MUST BE LOADED, OR ALARM.

R1052 ALARM IF AN ATTEMPT IS MADE TO LOAD 'SPLIT MINUTES/SECONDS' (MMSS).

R1053 THIS IS USED FOR DISPLAY ONLY.

L PINBALL NOUN TABLES

| | | | | | | | | |
|--------|--|----|------|---------|----------|----------|--------|--------------|
| 1233 | REP | 1 | | 42,2120 | 52 124 1 | OTSPOUT | DYCH | SPTEMP1 |
| 1234 | | | | 42,2121 | 0 0000 1 | | EXTEND | |
| 1235 | REP | 72 | LAST | 265 | 42,2122 | 5 0000 1 | | INDEX A |
| 1236 | REP | 1 | | 42,2123 | 3 2514 0 | | DCA | SFOUTAB |
| 1237 | REP | 2 | LAST | 266 | 42,2124 | 52 124 1 | RPCOM | DYCH SPTEMP1 |
| 1238 | REP | 2 | LAST | 265 | 42,2125 | 52 000 0 | | DYCH Z |
| R1239 | OTSPIN LOADS SPTEMP1, SPTEMP2 WITH THE DP SPINTAB ENTRIES. | | | | | | | |
| 1240 | REP | 3 | LAST | 266 | 42,2126 | 52 124 1 | OTSPIN | DYCH SPTEMP1 |
| 1241 | | | | 42,2127 | 0 0000 1 | | EXTEND | |
| 1242 | REP | 73 | LAST | 266 | 42,2130 | 5 0000 1 | | INDEX A |
| 1243 | REP | 1 | | 42,2131 | 3 2444 1 | | DCA | SPINTAB |
| 1244 | REP | 1 | | 42,2132 | 1 2124 0 | | TOP | SPCOM |
| A1400 | | | | | | | | |
| 1401 | | | | 42,2133 | 00000 1 | NNADTAB | OCT | 00000 |
| 1402 | | | | 42,2134 | 40000 0 | | OCT | 40000 |
| 1403 | | | | 42,2135 | 40000 0 | | OCT | 40000 |
| 1404 | | | | 42,2136 | 40000 0 | | OCT | 40000 |
| 1405 | | | | 42,2137 | 00000 1 | | OCT | 0 |
| 1406 | REP | 3 | LAST | 227 | 42,2140 | 01045 1 | ECADR | DSPTM1 |
| 1407 | REP | 1 | | 42,2141 | 01131 0 | | ECADR | OPTION1 |
| 1408 | REP | 1 | | 42,2142 | 01003 0 | | ECADR | XREG |
| A14081 | | | | | | | | |
| A14082 | | | | | | | | |
| 1409 | REP | 2 | LAST | 80 | 42,2143 | 01363 0 | ECADR | ALMADR |
| 1410 | REP | 4 | LAST | 179 | 42,2144 | 00375 0 | ECADR | FAILREG |
| 1411 | | | | 42,2145 | 77776 1 | | OCT | 77776 |
| 1412 | | | | 42,2146 | 00000 1 | | OCT | 00000 |
| 1413 | REP | 1 | | 42,2147 | 01051 1 | | ECADR | OPTIONX |
| A14131 | | | | | | | | |
| 1414 | | | | 42,2150 | 00000 1 | | OCT | 00000 |
| 1415 | | | | 42,2151 | 00000 1 | | OCT | 0 |
| 1416 | | | | 42,2152 | 77777 0 | | OCT | 77777 |
| 1417 | REP | 2 | LAST | 74 | 42,2153 | 01051 1 | ECADR | DSPTM1 |
| 1418 | REP | 3 | LAST | 238 | 42,2154 | 01333 0 | ECADR | CPHX |
| 1419 | REP | 7 | LAST | 244 | 42,2155 | 01155 1 | ECADR | THETAD |
| 1420 | REP | 8 | LAST | 266 | 42,2156 | 01155 1 | ECADR | THETAD |
| 1421 | REP | 5 | LAST | 238 | 42,2157 | 00032 0 | ECADR | CDUX |
| 1422 | REP | 1 | | 42,2160 | 00037 0 | | ECADR | PIPAK |
| 1423 | REP | 9 | LAST | 266 | 42,2161 | 01155 1 | ECADR | THETAD |
| 1424 | | | | 42,2162 | 00000 1 | | OCT | 00000 |
| 1425 | REP | 3 | LAST | 240 | 42,2163 | 01051 1 | ECADR | DSPTM2 +1 |
| 1426 | REP | 4 | LAST | 266 | 42,2164 | 01045 1 | ECADR | DSPTM1 |
| A14261 | | | | | | | | |
| 1427 | REP | 5 | LAST | 266 | 42,2165 | 01045 1 | ECADR | DSPTM1 |
| 1428 | REP | 4 | LAST | 257 | 42,2166 | 01362 1 | ECADR | SMODE |

2X(SPCONUM) ARRIVES IN SPTEMP1.

2X(SPCONUM) ARRIVES IN SPTEMP1.

NY NORMAL NOUNS

- 00 NOT IN USE
- 01 SPECIFY MACHINE ADDRESS (FRACTIONAL)
- 02 SPECIFY MACHINE ADDRESS (WHOLE)
- 03 SPECIFY MACHINE ADDRESS (DEGREES)
- 04 SPARE
- 05 ANGULAR ERROR/DIFFERENCE
- 06 OPTION CODE
- 07 ECADR OF WORD TO BE MODIFIED
ONES FOR BITS TO BE MODIFIED
1 TO SET OR 0 TO RESET SELECTED BITS
- 08 ALARM DATA
- 09 ALARM CODES
- 10 CHANNEL TO BE SPECIFIED
- 11 SPARE
- 12 OPTION CODE
(USED BY EXTENDED VERRS ONLY)
- 13 SPARE
- 14 SPARE
- 15 INCREMENT MACHINE ADDRESS
- 16 TIME OF EVENT (HRS, MIN, SEC)
- 17 ASTRONAUT TOTAL ATTITUDE
- 18 AUTO MANEUVER BALL ANGLES
- 19 BYPASS ATTITUDE TRIM MANEUVER
- 20 ICDU ANGLES
- 21 PIPAS
- 22 NEW ICDU ANGLES
- 23 SPARE
- 24 DELTA TIME FOR AGC CLOCK (HRS, MIN, SEC)
- 25 CHECKLIST
(USED WITH PLEASE PERFORM ONLY)
- 26 PRIO/DELAY, ADRES, RRCOM
- 27 SELF TEST ON/OFF SWITCH



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| | | | | | | |
|--------|---------------------------------|----------|---------|---------|--------------|---|
| 1429 | | | 42,2167 | 00000 1 | OCT 0 | 28 SPARE |
| 1430 | REP 6 | LAST 266 | 42,2170 | 01045 1 | ECADR DSPTM1 | 29 XSM LAUNCH AZIMUTH |
| 1431 | REP 7 | LAST 267 | 42,2171 | 01045 1 | ECADR DSPTM1 | 30 TARGET CODES |
| 1432 | REP 8 | LAST 267 | 42,2172 | 01045 1 | ECADR DSPTM1 | 31 TIME OF LANDING SITE (HRS,MIN,SEC) |
| 1433 | REP 2 | LAST 89 | 42,2173 | 02345 1 | ECADR -TPER | 32 TIME TO PERIGEE (HRS,MIN,SEC) |
| 1434 | REP 15 | LAST 213 | 42,2174 | 03412 0 | ECADR TIG | 33 TIME OF IGNITION (HRS,MIN,SEC) |
| 1435 | REP 9 | LAST 267 | 42,2175 | 01045 1 | ECADR DSPTM1 | 34 TIME OF EVENT (HRS,MIN,SEC) |
| 1436 | REP 3 | LAST 212 | 42,2176 | 03660 1 | ECADR TGOO | 35 TIME TO GO TO EVENT (HRS,MIN,SEC) |
| 1437 | REP 9 | LAST 240 | 42,2177 | 00024 1 | ECADR TIME2 | 36 TIME OF AGC CLOCK (HRS,MIN,SEC) |
| 1438 | REP 3 | LAST 171 | 42,2200 | 03662 0 | ECADR TTP1 | 37 TIG OF TPI (HRS,MIN,SEC) |
| 1439 | REP 2 | LAST 83 | 42,2201 | 01516 1 | ECADR TET | 38 TIME OF STATE VECTOR |
| 1440 | REP 1 | | 42,2202 | 02640 1 | ECADR T3TOT4 | 39 DELTA TIME TO TRANSFER (HRS,MIN,SEC) |
| R14401 | END OF NNADTAB FOR NORMAL NOUNS | | | | | |
| A14402 | | | | | | NN MIXED NOUNS |
| 1441 | | | 42,2203 | 64000 0 | OCT 64000 | 40 TIME TO IGNITION/CUTOFF |
| A14411 | | | | | | VG |
| A14412 | | | | | | DELTA V (ACCUMULATED) |
| 1442 | | | 42,2204 | 02003 0 | OCT 02003 | 41 TARGET AZIMUTH |
| A14421 | | | | | | ELEVATION |
| 1443 | | | 42,2205 | 24006 1 | OCT 24006 | 42 APOGEE |
| A14431 | | | | | | PERIGEE |
| A14432 | | | | | | DELTA V (REQUIRED) |
| 1444 | | | 42,2206 | 24011 1 | OCT 24011 | 43 LATITUDE |
| A14441 | | | | | | LONGITUDE |
| A14442 | | | | | | ALTITUDE |
| 1445 | | | 42,2207 | 64014 0 | OCT 64014 | 44 APOGEE |
| A14451 | | | | | | PERIGEE |
| A14452 | | | | | | TFP |
| 1446 | | | 42,2210 | 64017 0 | OCT 64017 | 45 MARKS (VHP - OPTICS) |
| A14461 | | | | | | TTI OF NEXT BURN |
| A14462 | | | | | | MCA |
| 1447 | | | 42,2211 | 02022 0 | OCT 02022 | 46 AUTOPILOT CONFIGURATION |
| 1448 | | | 42,2212 | 22025 0 | OCT 22025 | 47 THIS VEHICLE WEIGHT |
| A14481 | | | | | | OTHER VEHICLE WEIGHT |
| 1449 | | | 42,2213 | 22030 1 | OCT 22030 | 48 PITCH TRIM |
| A14491 | | | | | | YAW TRIM |
| 1450 | | | 42,2214 | 24033 1 | OCT 24033 | 49 DELTA R |
| A14501 | | | | | | DELTA V |
| A14502 | | | | | | VHP OR OPTICS CODE |
| 1451 | | | 42,2215 | 64036 0 | OCT 64036 | 50 SPLASH ERROR |
| A14511 | | | | | | PERIGEE |
| A14512 | | | | | | TFP |
| 1452 | | | 42,2216 | 22041 1 | OCT 22041 | 51 S-RAND ANTENNA PITCH |
| A14521 | | | | | | YAW |
| 1453 | | | 42,2217 | 00044 1 | OCT 00044 | 52 CENTRAL ANGLE OF ACTIVE VEHICLE |
| 1454 | | | 42,2220 | 24047 1 | OCT 24047 | 53 RANGE |
| A14541 | | | | | | RANGE RATE |
| A14542 | | | | | | PHI |

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| | | | | | |
|--------|---------|---------|-----|-------|-------------------------------------|
| 1455 | 42,2221 | 24052 0 | OCT | 24052 | 54 RANGE |
| A14551 | | | | | RANGE RATE |
| A14552 | | | | | THETA |
| 1458 | 42,2222 | 24055 1 | OCT | 24055 | 55 PERIGEE CODE |
| A14581 | | | | | ELEVATION ANGLE |
| A14582 | | | | | CENTRAL ANGLE |
| 1459 | 42,2223 | 22060 1 | OCT | 22060 | 56 REENTRY ANGLE, |
| A14591 | | | | | DELTA V |
| 1460 | 42,2224 | 20063 0 | OCT | 20063 | 57 DELTA R |
| 1461 | 42,2225 | 24066 1 | OCT | 24066 | 58 PERIGEE ALT |
| A14611 | | | | | DELTA V TPI |
| A14612 | | | | | DELTA V TPF |
| 1462 | 42,2226 | 24071 1 | OCT | 24071 | 59 DELTA VELOCITY LOS |
| 1463 | 42,2227 | 24074 1 | OCT | 24074 | 60 GMAX |
| A14631 | | | | | VPRED |
| A14632 | | | | | GAMMA BI |
| 1464 | 42,2230 | 24077 1 | OCT | 24077 | 61 IMPACT LATITUDE |
| A14641 | | | | | IMPACT LONGITUDE |
| A14642 | | | | | HEADS UP/DOWN |
| 1465 | 42,2231 | 24102 1 | OCT | 24102 | 62 INERTIAL VEL MAG (VI) |
| A14651 | | | | | ALT RATE CHANGE (HDOT) |
| A14652 | | | | | ALT ABOVE PAD RADIUS (H) |
| 1466 | 42,2232 | 64105 1 | OCT | 64105 | 63 RANGE 297,431 TO SPLASH (RTGO) |
| A14661 | | | | | PREDICTED INERT VEL (VIO) |
| A14662 | | | | | TIME TO GO TO 297,431 (TTE) |
| 1467 | 42,2233 | 24110 1 | OCT | 24110 | 64 DRAG ACCELERATION |
| A14671 | | | | | INERTIAL VELOCITY (VI) |
| A14672 | | | | | RANGE TO SPLASH |
| 1468 | 42,2234 | 24113 1 | OCT | 24113 | 65 SAMPLED AGC TIME (HRS, MIN, SEC) |
| A14681 | | | | | (FETCHED IN INTERRUPT) |
| 1470 | 42,2235 | 24116 1 | OCT | 24116 | 66 COMMAND BANK ANGLE (BETA) |
| A14701 | | | | | CROSS RANGE ERROR |
| A14702 | | | | | DOWN RANGE ERROR |
| 1471 | 42,2236 | 24121 0 | OCT | 24121 | 67 RANGE TO TARGET |
| A14711 | | | | | PRESENT LATITUDE |
| A14712 | | | | | PRESENT LONGITUDE |
| 1472 | 42,2237 | 24124 0 | OCT | 24124 | 68 COMMAND BANK ANGLE (BETA) |
| A14721 | | | | | INERTIAL VELOCITY (VI) |
| A14722 | | | | | ALT RATE CHANGE (RDOT) |
| 1473 | 42,2240 | 24127 0 | OCT | 24127 | 69 BETA |
| A14731 | | | | | DL |
| A14732 | | | | | VL |
| 1474 | 42,2241 | 04132 0 | OCT | 04132 | 70 STAR CODE |
| A14741 | | | | | LANDMARK DATA |
| A14742 | | | | | HORIZON DATA |
| 1475 | 42,2242 | 04135 1 | OCT | 04135 | 71 STAR CODE |
| A14751 | | | | | LANDMARK |
| A14752 | | | | | HORIZON |
| 1476 | 42,2243 | 24140 1 | OCT | 24140 | 72 DRIFT ANG |
| A14761 | | | | | DRIFT ALT |

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| Label | Code | Value 1 | Value 2 | Unit | Option | Value 3 | Search Option | |
|--------|--------------------------------|---------|---------|----------|--------|---------|------------------------------------|--|
| A14762 | | | | | | | SEARCH OPTION | |
| 1477 | 42,2244 | 00000 | 1 | OCT | 0 | | 73 SPARE | |
| 1478 | 42,2245 | 00000 | 1 | OCT | 0 | | 74 SPARE | |
| 1479 | 42,2246 | 00000 | 1 | OCT | 0 | | 75 SPARE | |
| 1480 | 42,2247 | 00000 | 1 | OCT | 0 | | 76 SPARE | |
| 1481 | 42,2250 | 00000 | 1 | OCT | 0 | | 77 SPARE | |
| 1482 | 42,2251 | 00000 | 1 | OCT | 0 | | 78 SPARE | |
| 1483 | 42,2252 | 00000 | 1 | OCT | 0 | | 79 SPARE | |
| 1484 | 42,2253 | 04170 | 0 | OCT | 04170 | | 80 TIME TO IGNITION/CUTOFF VG | |
| A14841 | | | | | | | DELTA V (ACCUMULATED) | |
| A14842 | | | | | | | 81 DELTA V (LV) | |
| 1485 | 42,2254 | 24173 | 1 | OCT | 24173 | | 82 SPARE | |
| 1486 | 42,2255 | 00000 | 1 | OCT | 00000 | | 83 DELTA V (BODY) | |
| 1487 | 42,2256 | 24201 | 1 | OCT | 24201 | | 84 DELTA V (OTHER VEHICLE) | |
| 1488 | 42,2257 | 24204 | 1 | OCT | 24204 | | 85 VG (BODY) | |
| 1489 | 42,2260 | 24207 | 1 | OCT | 24207 | | 86 DELTA V (LV) | |
| 1490 | 42,2261 | 24212 | 0 | OCT | 24212 | | 87 MARK DATA SHAFT TRUNION | |
| 1491 | 42,2262 | 02215 | 0 | OCT | 02215 | | 88 HALF UNIT SUN OR PLANET VECTOR | |
| A14911 | | | | | | | 89 LANDMARK LATITUDE | |
| 1492 | 42,2263 | 24220 | 1 | OCT | 24220 | | LONGITUDE/2 | |
| 1493 | 42,2264 | 24223 | 1 | OCT | 24223 | | ALTITUDE | |
| A14931 | | | | | | | 90 Y | |
| A14932 | | | | | | | Y DOT | |
| 1494 | 42,2265 | 24226 | 1 | OCT | 24226 | | PSI | |
| A14941 | | | | | | | 91 OCPU ANGLES SHAFT TRUNION | |
| A14942 | | | | | | | 92 NEW OPTICS ANGLES SHAFT TRUNION | |
| 1495 | 42,2266 | 02231 | 0 | OCT | 02231 | | 93 DELTA GYRO ANGLES | |
| A14951 | | | | | | | 94 NEW OPTICS ANGLES SHAFT TRUNION | |
| 1496 | 42,2267 | 02234 | 0 | OCT | 02234 | | 95 PREFERRED ATTITUDE ICPU ANGLES | |
| A14961 | | | | | | | 96 +X-AXIS ATTITUDE ICPU ANGLES | |
| 1497 | 42,2270 | 04237 | 0 | OCT | 04237 | | 97 SYSTEM TEST INPUTS | |
| 1498 | 42,2271 | 02242 | 1 | OCT | 02242 | | 98 SYSTEM TEST RESULTS | |
| A14981 | | | | | | | 99 RMS IN POSITION | |
| 1499 | 42,2272 | 04245 | 0 | OCT | 04245 | | RMS IN VELOCITY | |
| 1500 | 42,2273 | 04250 | 1 | OCT | 04250 | | RMS OPTION | |
| 1501 | 42,2274 | 04253 | 1 | OCT | 04253 | | | |
| 1502 | 42,2275 | 04256 | 1 | OCT | 04256 | | | |
| 1503 | 42,2276 | 24261 | 1 | OCT | 24261 | | | |
| A15031 | | | | | | | | |
| A15032 | | | | | | | | |
| R1504 | END OF NNADTAB FOR MIXED NOUNS | | | | | | | |
| A1800 | | | | | | | NN NORMAL NOUNS | |
| 1801 | 42,2277 | 00000 | 1 | NNTYPTAB | OCT | 00000 | 00 NOT IN USE | |
| 1802 | 42,2300 | 04040 | 1 | | OCT | 04040 | 01 3COMP FRACTIONAL | |
| 1803 | 42,2301 | 04140 | 0 | | OCT | 04140 | 02 3COMP WHOLE | |
| 1804 | 42,2302 | 04102 | 0 | | OCT | 04102 | 03 3COMP CPU DEGREES | |
| 1805 | 42,2303 | 00000 | 1 | | OCT | 0 | 04 SPARE | |
| 1806 | 42,2304 | 00504 | 0 | | OCT | 00504 | 05 1COMP DPROG(360) | |



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|--------|---------------------------------|---------|-----|-------|----------|--|
| 1807 | 42,2305 | 02000 0 | OCT | 02000 | 06 2COMP | OCTAL ONLY |
| 1808 | 42,2306 | 04000 0 | OCT | 04000 | 07 3COMP | OCTAL ONLY |
| 1809 | 42,2307 | 04000 0 | OCT | 04000 | 08 3COMP | OCTAL ONLY |
| 1810 | 42,2310 | 04000 0 | OCT | 04000 | 09 3COMP | OCTAL ONLY |
| 1811 | 42,2311 | 00000 1 | OCT | 00000 | 10 1COMP | OCTAL ONLY |
| 1812 | 42,2312 | 00000 1 | OCT | 00000 | 11 | SPARE |
| 1813 | 42,2313 | 02000 0 | OCT | 02000 | 12 2COMP | OCTAL ONLY |
| 1814 | 42,2314 | 00000 1 | OCT | 00000 | 13 | SPARE |
| 1815 | 42,2315 | 00000 1 | OCT | 0 | 14 | SPARE |
| 1816 | 42,2316 | 00000 1 | OCT | 00000 | 15 1COMP | OCTAL ONLY |
| 1817 | 42,2317 | 24400 0 | OCT | 24400 | 16 3COMP | HMS (DEC ONLY) |
| 1818 | 42,2320 | 04102 0 | OCT | 04102 | 17 3COMP | CDU DEG |
| 1819 | 42,2321 | 04102 0 | OCT | 04102 | 18 3COMP | CDU DEG |
| 1820 | 42,2322 | 04102 0 | OCT | 04102 | 19 3COMP | CDU DEG |
| 1821 | 42,2323 | 04102 0 | OCT | 04102 | 20 3COMP | CDU DEGRES |
| 1822 | 42,2324 | 04140 0 | OCT | 04140 | 21 3COMP | WHOLE |
| 1823 | 42,2325 | 04102 0 | OCT | 04102 | 22 3COMP | CDU DEGRES |
| 1824 | 42,2326 | 00000 1 | OCT | 00000 | 23 | SPARE |
| 1825 | 42,2327 | 24400 0 | OCT | 24400 | 24 3COMP | HMS (DEC ONLY) |
| 1826 | 42,2330 | 04140 0 | OCT | 04140 | 25 3COMP | WHOLE |
| 1827 | 42,2331 | 04000 0 | OCT | 04000 | 26 3COMP | OCTAL ONLY |
| 1828 | 42,2332 | 00140 1 | OCT | 00140 | 27 1COMP | WHOLE |
| 1829 | 42,2333 | 00000 1 | OCT | 0 | 28 | SPARE |
| 1830 | 42,2334 | 20102 0 | OCT | 20102 | 29 1COMP | CDU DEG (DEC ONLY) |
| 1831 | 42,2335 | 04140 0 | OCT | 04140 | 30 3COMP | WHOLE |
| 1832 | 42,2336 | 24400 0 | OCT | 24400 | 31 3COMP | HMS (DEC ONLY) |
| 1833 | 42,2337 | 24400 0 | OCT | 24400 | 32 3COMP | HMS (DEC ONLY) |
| 1834 | 42,2340 | 24400 0 | OCT | 24400 | 33 3COMP | HMS (DEC ONLY) |
| 1835 | 42,2341 | 24400 0 | OCT | 24400 | 34 3COMP | HMS (DEC ONLY) |
| 1836 | 42,2342 | 24400 0 | OCT | 24400 | 35 3COMP | HMS (DEC ONLY) |
| 1837 | 42,2343 | 24400 0 | OCT | 24400 | 36 3COMP | HMS (DEC ONLY) |
| 1838 | 42,2344 | 24400 0 | OCT | 24400 | 37 3COMP | HMS (DEC ONLY) |
| 1839 | 42,2345 | 24400 0 | OCT | 24400 | 38 3COMP | HMS (DEC ONLY) |
| 1840 | 42,2346 | 24400 0 | OCT | 24400 | 39 3COMP | HMS (DEC ONLY) |
| R18401 | END OF NNTYPAR FOR NORMAL NOUNS | | | | | |
| A18402 | | | | | | |
| 1841 | 42,2347 | 24500 1 | OCT | 24500 | NN | MIXED NOUNS |
| A18411 | | | | | 40 3COMP | MIN/SEC, VEL3, VEL3 (NO LOAD, DEC ONLY) |
| 1842 | 42,2350 | 00542 1 | OCT | 00542 | 41 2COMP | CDU DEG, REV DEG |
| 1843 | 42,2351 | 24410 1 | OCT | 24410 | 42 3COMP | POS4, POS4, VEL3 (DEC ONLY) |
| A18431 | | | | | 43 3COMP | DPDEG(360), DPDEG(360), POS4 (DEC ONLY) |
| 1844 | 42,2352 | 20204 0 | OCT | 20204 | 44 3COMP | POS4, POS4, MIN/SEC (NO LOAD, DEC ONLY) |
| A18441 | | | | | 45 3COMP | 2INT, MIN/SEC, DPDEG(360) (NO LOAD, DEC ONLY) |
| 1845 | 42,2353 | 00410 1 | OCT | 00410 | 46 2COMP | OCTAL ONLY FOR EACH |
| A18451 | | | | | | |
| 1846 | 42,2354 | 10000 0 | OCT | 10000 | | |
| A18461 | | | | | | |
| 1847 | 42,2355 | 00000 1 | OCT | 00000 | | |



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|--------|---------|---------|-----|-------|--|
| 1848 | 42,2356 | 00308 1 | OCT | 00308 | 47 2COMP WEIGHT2 FOR EACH (DEC ONLY) |
| A18481 | | | | | |
| 1849 | 42,2357 | 00614 1 | OCT | 00614 | 48 2COMP TRIM DEG, TRIM DEG (DEC ONLY) |
| A18491 | | | | | |
| 1850 | 42,2360 | 00510 0 | OCT | 00510 | 49 3COMP POS4, VEL3, WHOLE (DEC ONLY) |
| A18501 | | | | | |
| 1851 | 42,2361 | 00417 0 | OCT | 00417 | 50 3COMP POS6, POS4, MIN/SEC (NO LOAD, DEC ONLY) |
| A18511 | | | | | |
| 1852 | 42,2362 | 00204 1 | OCT | 00204 | 51 2COMP DPDEG(360), DPDEG(360) (DEC ONLY) |
| A18521 | | | | | |
| 1853 | 42,2363 | 00004 0 | OCT | 00004 | 52 1COMP DPDEG(360) |
| 1854 | 42,2364 | 10507 1 | OCT | 10507 | 53 3COMP POS5, VEL3, DPDEG(360) (DEC ONLY) |
| A18541 | | | | | |
| 1855 | 42,2365 | 10507 1 | OCT | 10507 | 54 3COMP POS5, VEL3, DPDEG(360) (DEC ONLY) |
| A18551 | | | | | |
| 1856 | 42,2366 | 10200 1 | OCT | 10200 | 55 3COMP WHOLE, DPDEG(360), DPDEG(360) (DEC ONLY) |
| A18561 | | | | | |
| 1859 | 42,2367 | 00444 0 | OCT | 00444 | 56 2COMP DPDEG(360), VEL2 (DEC ONLY) |
| A18591 | | | | | |
| 1860 | 42,2370 | 00010 0 | OCT | 00010 | 57 1COMP POS4 (DEC ONLY) |
| A18601 | | | | | |
| 1861 | 42,2371 | 24510 0 | OCT | 24510 | 58 3COMP POS4, VEL3, VEL3 (DEC ONLY) |
| A18611 | | | | | |
| 1862 | 42,2372 | 24512 1 | OCT | 24512 | 59 3COMP VEL3 FOR EACH (DEC ONLY) |
| A18621 | | | | | |
| 1863 | 42,2373 | 10440 0 | OCT | 10440 | 60 3COMP WHOLE, VEL2, DPDEG(360) (DEC ONLY) |
| A18631 | | | | | |
| 1864 | 42,2374 | 00204 1 | OCT | 00204 | 61 3COMP DPDEG(360), DPDEG(360), WHOLE (DEC ONLY) |
| A18641 | | | | | |
| 1865 | 42,2375 | 20451 0 | OCT | 20451 | 62 3COMP VEL2, VEL2, POS4 (DEC ONLY) |
| A18651 | | | | | |
| 1866 | 42,2376 | 00457 1 | OCT | 00457 | 63 3COMP POS6, VEL2, MIN/SEC (NO LOAD, DEC ONLY) |
| A18661 | | | | | |
| 1867 | 42,2377 | 36460 0 | OCT | 36460 | 64 3COMP DRAG ACCEL, VEL2, POS6 (DEC ONLY) |
| A18671 | | | | | |
| 1868 | 42,2400 | 00000 1 | OCT | 00000 | 65 3COMP HMS (DEC ONLY) |
| 1869 | 42,2401 | 37044 0 | OCT | 37044 | 66 3COMP DPDEG(360), POS6, POS6 (DEC ONLY) |
| A18691 | | | | | |
| 1870 | 42,2402 | 10217 1 | OCT | 10217 | 67 3COMP POS6, DPDEG(360), DPDEG(360) (DEC ONLY) |
| A18701 | | | | | |
| 1871 | 42,2403 | 34444 1 | OCT | 34444 | 68 3COMP DPDEG(360), VEL2, VEL/2VS (DEC ONLY) |
| A18711 | | | | | |
| 1872 | 42,2404 | 35004 0 | OCT | 35004 | 69 3COMP DPDEG(360), DRAG ACCEL, VEL/2VS (DEC ONLY) |
| A18721 | | | | | |
| 1873 | 42,2405 | 00000 1 | OCT | 00000 | 70 3COMP OCTAL ONLY FOR EACH |
| 1874 | 42,2406 | 00000 1 | OCT | 0 | 71 3COMP OCTAL ONLY FOR EACH |
| 1875 | 42,2407 | 00404 1 | OCT | 00404 | 72 3COMP DPDEG(360), POS4, WHOLE (DEC ONLY) |
| A18751 | | | | | |
| 1876 | 42,2410 | 00000 1 | OCT | 0 | 73 SPARE |
| 1877 | 42,2411 | 00000 1 | OCT | 0 | 74 SPARE |

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|--------|---------------------------------|---------|---------|-------|-------|--|
| 1878 | 42,2412 | 00000 1 | OCT | 0 | 75 | SPARE |
| 1879 | 42,2413 | 00000 1 | OCT | 0 | 76 | SPARE |
| 1880 | 42,2414 | 00000 1 | OCT | 0 | 77 | SPARE |
| 1881 | 42,2415 | 00000 1 | OCT | 0 | 78 | SPARE |
| 1882 | 42,2416 | 00000 1 | OCT | 0 | 79 | SPARE |
| 1883 | 42,2417 | 22440 1 | OCT | 22440 | 80 | 3COMP MIN/SEC, VEL2, VEL2 (NO LOAD, DEC ONLY) |
| A18831 | | | | | 81 | 3COMP VEL3 FOR EACH (DEC ONLY) |
| 1884 | 42,2420 | 24512 1 | OCT | 24512 | 82 | SPARE |
| A18841 | | | | | 83 | 3COMP VEL3 FOR EACH (DEC ONLY) |
| 1885 | 42,2421 | 00000 1 | OCT | 00000 | 84 | 3COMP VEL3 FOR EACH (DEC ONLY) |
| 1886 | 42,2422 | 24512 1 | OCT | 24512 | 85 | 3COMP VEL3 FOR EACH (DEC ONLY) |
| A18861 | | | | | 86 | 3COMP VEL2 FOR EACH (DEC ONLY) |
| 1887 | 42,2423 | 24512 1 | OCT | 24512 | 87 | 2COMP CDU DEG, Y OPTICS DEG |
| A18871 | | | | | 88 | 3COMP PRAC FOR EACH (DEC ONLY) |
| 1888 | 42,2424 | 24512 1 | OCT | 24512 | 89 | 3COMP DPDEG(90), DPDEG(90), POSS (DEC ONLY) |
| A18881 | | | | | 90 | 3COMP POSS, VEL3, DPDEG(360) (DEC ONLY) |
| 1889 | 42,2425 | 22451 1 | OCT | 22451 | 91 | 2COMP CDU DEG, Y OPTICS DEG |
| A18891 | | | | | 92 | 2COMP CDU DEG, Y OPTICS DEG |
| 1890 | 42,2426 | 00102 1 | OCT | 00102 | 93 | 3COMP DPDEG(90) FOR EACH |
| 1891 | 42,2427 | 00000 1 | OCT | 0 | 94 | 2COMP CDU DEG, Y OPTICS DEG |
| A18912 | | | | | 95 | 3COMP CDU DEG FOR EACH |
| 1892 | 42,2430 | 16143 0 | OCT | 16143 | 96 | 3COMP CDU DEG FOR EACH |
| A18921 | | | | | 97 | 3COMP WHOLE FOR EACH |
| 1893 | 42,2431 | 10507 1 | OCT | 10507 | 98 | 3COMP WHOLE, PRAC, WHOLE |
| A18931 | | | | | 99 | 3COMP POSS, VEL4, WHOLE (DEC ONLY) |
| 1894 | 42,2432 | 00102 1 | OCT | 00102 | | WHOLE, DP TIME (SEC) |
| 1895 | 42,2433 | 00102 1 | OCT | 00102 | | SPARE |
| 1896 | 42,2434 | 06143 1 | OCT | 06143 | | CDU DEGREES, Y OPTICS DEGREES (SPCONS IN DEGINSP, OPTDEGIN) |
| 1897 | 42,2435 | 00102 1 | OCT | 00102 | | DP DEGREES (90) UPPED BY 1 |
| 1898 | 42,2436 | 04102 0 | OCT | 04102 | | DP DEGREES (360)(POINT BRTWN BITS 11-12) UPPED BY 1 |
| 1899 | 42,2437 | 04102 0 | OCT | 04102 | | DPDEG(180) |
| 1900 | 42,2440 | 00000 1 | OCT | 00000 | | |
| 1901 | 42,2441 | 00000 1 | OCT | 00000 | | |
| 1902 | 42,2442 | 01162 0 | OCT | 01162 | | |
| A19021 | | | | | | |
| R1903 | END OF NNTYPTAB FOR MIXED NOUNS | | | | | |
| 2200 | 42,2443 | 00006 1 | SPINTAB | OCT | 00006 | |
| 2201 | 42,2444 | 03240 1 | | OCT | 03240 | |
| 2202 | 42,2445 | 00000 1 | | OCT | 00000 | |
| 2203 | 42,2446 | 00000 1 | | OCT | 00000 | |
| 2204 | 42,2447 | 00000 1 | | OCT | 00000 | |
| 2205 | 42,2450 | 00000 1 | | OCT | 00000 | |
| 2206 | 42,2451 | 10707 0 | | OCT | 10707 | |
| 2207 | 42,2452 | 03435 0 | | OCT | 03435 | |
| 2208 | 42,2453 | 13070 1 | | OCT | 13070 | |
| 2209 | 42,2454 | 34345 1 | | OCT | 34345 | |
| 2210 | 42,2455 | 00005 1 | | OCT | 00005 | |
| 2211 | 42,2456 | 21616 0 | | OCT | 21616 | |

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| 2212 | 42,2457 | 26113 0 | OCT | 26113 | WEIGHT2 |
| 2213 | 42,2460 | 31713 0 | OCT | 31713 | |
| 2214 | 42,2461 | 00070 0 | OCT | 00070 | POSITION5 |
| 2215 | 42,2462 | 20460 1 | OCT | 20460 | |
| 2216 | 42,2463 | 01065 0 | OCT | 01065 | POSITION4 |
| 2217 | 42,2464 | 05740 1 | OCT | 05740 | |
| 2218 | 42,2465 | 11414 0 | OCT | 11414 | VELOCITY2 (POINT BTWN BITS 11-12) |
| 2219 | 42,2466 | 31463 1 | OCT | 31463 | |
| 2220 | 42,2467 | 07475 0 | OCT | 07475 | VELOCITY3 |
| 2221 | 42,2470 | 16051 1 | OCT | 16051 | |
| 2222 | 42,2471 | 00001 0 | OCT | 00001 | ELEVATION DEGREES |
| 2223 | 42,2472 | 03434 1 | OCT | 03434 | |
| 2224 | 42,2473 | 00002 0 | OCT | 00002 | TRIM DEGREES |
| 2225 | 42,2474 | 22245 1 | OCT | 22245 | |
| 2226 | 42,2475 | 00014 1 | OCT | 00014 | INERTIA, THRUST MOMENT |
| 2227 | 42,2476 | 35607 0 | OCT | 35607 | |
| 2228 | 42,2477 | 07606 0 | OCT | 07606 | VELOCITY/2VS |
| 2229 | 42,2500 | 06300 1 | OCT | 06300 | |
| 2230 | 42,2501 | 16631 1 | OCT | 16631 | POSITION 6 |
| 2231 | 42,2502 | 11307 0 | OCT | 11307 | |
| 2232 | 42,2503 | 12000 1 | OCT | 12000 | DRAG ACCELERATION (POINT BTWN BITS 7-8) |
| 2233 | 42,2504 | 00000 1 | OCT | 00000 | |
| 2234 | 42,2505 | 27176 1 | OCT | 27176 | POSITION 8 |
| 2235 | 42,2506 | 14235 0 | OCT | 14235 | |
| 2236 | 42,2507 | 16102 0 | 2DEC | 1652 R3 R-22 | POSITION9 |
| 2236 | 42,2510 | 14000 1 | | | |
| 2237 | 42,2511 | 07475 0 | 2DEC | 30.48 R-7 | VELOCITY4 |
| 2237 | 42,2512 | 16051 1 | | | |
| 2290 | | | | | END OF SPINTAR |
| 2300 | 42,2513 | 05174 0 | SPOUTAR OCT | 05174 | WHOLE, DP TIME (SEC) |
| 2301 | 42,2514 | 13261 0 | OCT | 13261 | |
| 2302 | 42,2515 | 00000 1 | OCT | 00000 | SPARE |
| 2303 | 42,2516 | 00000 1 | OCT | 00000 | |
| 2304 | 42,2517 | 00000 1 | OCT | 00000 | ODU DEGREES, Y OPTICS DEGREES |
| 2305 | 42,2520 | 00000 1 | OCT | 00000 | (SPCONS IN DEGLITSF, OPTDEGLUT) |
| 2306 | 42,2521 | 00714 0 | OCT | 00714 | DP DEGREES (90) (POINT BTWN BITS 7-8) |
| 2307 | 42,2522 | 31463 1 | OCT | 31463 | |
| 2308 | 42,2523 | 13412 1 | OCT | 13412 | DP DEGREES (360) |
| 2309 | 42,2524 | 07534 1 | OCT | 07534 | |
| 2310 | 42,2525 | 05605 1 | OCT | 05605 | DEGREES (180) |
| 2311 | 42,2526 | 03656 1 | OCT | 03656 | |
| 2312 | 42,2527 | 00001 0 | OCT | 00001 | WEIGHT2 |
| 2313 | 42,2530 | 16170 0 | OCT | 16170 | |
| 2314 | 42,2531 | 00441 0 | OCT | 00441 | POSITION5 |
| 2315 | 42,2532 | 34306 0 | OCT | 34306 | |
| 2316 | 42,2533 | 07176 0 | OCT | 07176 | POSITION4 |
| 2317 | 42,2534 | 21803 1 | OCT | 21803 | |
| 2318 | 42,2535 | 15340 1 | OCT | 15340 | VELOCITY2 |



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| 2319 | | | | 42,2536 | 15340 | 1 | OCT | 15340 | | | | |
| 2320 | | | | 42,2537 | 01031 | 1 | OCT | 01031 | VELOCITY3 | (POINT BTWN BITS 7-8) | | |
| 2321 | | | | 42,2540 | 21032 | 0 | OCT | 21032 | | | | |
| 2322 | | | | 42,2541 | 34631 | 1 | OCT | 34631 | ELEVATION DEGREES | | | |
| 2323 | | | | 42,2542 | 23146 | 0 | OCT | 23146 | | | | |
| 2324 | | | | 42,2543 | 14340 | 0 | OCT | 14340 | TRIM DEGREES | | | |
| 2325 | | | | 42,2544 | 24145 | 1 | OCT | 24145 | | | | |
| 2326 | | | | 42,2545 | 02363 | 0 | OCT | 02363 | INERTIA, THRUST MOMENT | | | |
| 2327 | | | | 42,2546 | 03721 | 0 | OCT | 03721 | | | | |
| 2328 | | | | 42,2547 | 20373 | 1 | OCT | 20373 | VELOCITY/ZVS | | | |
| 2329 | | | | 42,2550 | 02122 | 1 | OCT | 02122 | | | | |
| 2330 | | | | 42,2551 | 00424 | 0 | OCT | 00424 | POSITION 6 | (POINT BTWN BITS 7-8) | | |
| 2331 | | | | 42,2552 | 30446 | 1 | OCT | 30446 | | | | |
| 2332 | | | | 42,2553 | 00631 | 0 | OCT | 00631 | DRAG ACCELERATION | | | |
| 2333 | | | | 42,2554 | 23146 | 0 | OCT | 23146 | | | | |
| 2334 | | | | 42,2555 | 00260 | 0 | OCT | 00260 | POSITION 8 | | | |
| 2335 | | | | 42,2556 | 06213 | 1 | OCT | 06213 | | | | |
| 2336 | | | | 42,2557 | 11036 | 1 | 2DEC | .283092873 | POSITION9 | | | |
| 2336 | | | | 42,2560 | 06144 | 0 | | | | | | |
| 2337 | | | | 42,2561 | 01031 | 1 | 2DEC | .032808399 | VELOCITY4 | | | |
| 2337 | | | | 42,2562 | 21032 | 0 | | | | | | |
| A2390 | | | | | | | | | END OF SPOLTAB | | | |
| A2400 | | | | | | | | | NN SP CONSTANT | SP ROUTINE | | |
| 2401 | REP | 4 | LAST | 267 | 42,2563 | 03660 | 1 | IDADDTAB | ECADR | TTOGO | 40 MIN/SEC | M/S |
| 2402 | REP | 1 | | | 42,2564 | 03653 | 1 | | ECADR | VGDISP | 40 VEL3 | DP3 |
| 2403 | REP | 2 | LAST | 115 | 42,2565 | 03425 | 1 | | ECADR | DVTOTAL | 40 VEL3 | DP3 |
| 2404 | REP | 10 | LAST | 267 | 42,2566 | 01045 | 1 | | ECADR | DSPTM1 | 41 CDU DEG | CDU |
| 2405 | REP | 11 | LAST | 274 | 42,2567 | 01046 | 1 | | ECADR | DSPTM1 +1 | 41 ELEV DEG | ARTH |
| 2406 | | | | | 42,2570 | 00000 | 1 | | OCT | 0 | 41 SPARE COMPONENT | |
| 2407 | REP | 3 | LAST | 169 | 42,2571 | 02363 | 0 | | ECADR | HAP0 | 42 POS4 | DP3 |
| 2408 | REP | 1 | | | 42,2572 | 02365 | 0 | | ECADR | HPER | 42 POS4 | DP3 |
| 2409 | REP | 2 | LAST | 274 | 42,2573 | 03653 | 1 | | ECADR | VGDISP | 42 VEL3 | DP3 |
| 2410 | REP | 4 | LAST | 176 | 42,2574 | 01103 | 1 | | ECADR | LAT | 43 DPDEG(360) | DP4 |
| 2411 | REP | 3 | LAST | 176 | 42,2575 | 01105 | 1 | | ECADR | LONG | 43 DPDEG(360) | DP4 |
| 2412 | REP | 3 | LAST | 176 | 42,2576 | 01107 | 0 | | ECADR | ALT | 43 POS4 | DP3 |
| 2413 | REP | 2 | LAST | 89 | 42,2577 | 02351 | 1 | | ECADR | HAPCK | 44 POS4 | DP3 |
| 2414 | REP | 2 | LAST | 89 | 42,2600 | 02353 | 0 | | ECADR | HPERX | 44 POS4 | DP3 |
| 2415 | REP | 2 | LAST | 89 | 42,2601 | 02343 | 1 | | ECADR | TFP | 44 MIN/SEC | M/S |
| 2416 | REP | 3 | LAST | 180 | 42,2602 | 01125 | 0 | | ECADR | VHPCNT | 45 2INT | 2INT |
| 2417 | REP | 5 | LAST | 274 | 42,2603 | 03660 | 1 | | ECADR | TTOGO | 45 MIN/SEC | M/S |
| 2418 | REP | 3 | LAST | 202 | 42,2604 | 03625 | 0 | | ECADR | AMGA | 45 DPDEG(360) | DP4 |
| 2419 | REP | 13 | LAST | 248 | 42,2605 | 03066 | 1 | | ECADR | DAPDATR1 | 46 OCTAL ONLY | OCT |
| 2420 | REP | 1 | | | 42,2606 | 03067 | 0 | | ECADR | DAPDATR2 | 46 OCTAL ONLY | OCT |
| 2421 | | | | | 42,2607 | 00000 | 1 | | OCT | 0 | 46 SPARE COMPONENT | |
| 2422 | REP | 3 | LAST | 210 | 42,2610 | 03074 | 1 | | ECADR | CSMASS | 47 WEIGHT2 | ARTH1 |
| 2423 | REP | 4 | LAST | 173 | 42,2611 | 03073 | 0 | | ECADR | LENMASS | 47 WEIGHT2 | ARTH1 |
| 2424 | | | | | 42,2612 | 00000 | 1 | | OCT | 00000 | 47 SPARE COMPONENT | |

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| 2425 | REP | 11 | LAST | 255 | 42,2613 | 03025 0 | ECADR | FACTOFF | 48 | TRIM DEG | ARTH |
| 2426 | REP | 1 | | | 42,2614 | 03026 0 | ECADR | YACTOFF | 48 | TRIM DEG | ARTH |
| 2427 | | | | | 42,2615 | 00000 1 | OCT | 00000 | 48 | SPARE COMPONENT | |
| 2428 | REP | 1 | | | 42,2616 | 03501 0 | ECADR | N49DISP | 49 | POS4 | DP3 |
| 2429 | REP | 2 | LAST | 275 | 42,2617 | 03503 1 | ECADR | N49DISP +2 | 49 | VEL3 | DP3 |
| 2430 | REP | 3 | LAST | 275 | 42,2620 | 03505 1 | ECADR | N49DISP +4 | 49 | WHOLE | ARTH |
| 2431 | REP | 2 | LAST | 169 | 42,2621 | 02355 0 | ECADR | RSP-RREC | 50 | POS6 | DP3 |
| 2432 | REP | 3 | LAST | 274 | 42,2622 | 02353 0 | ECADR | HFSRX | 50 | POS4 | DP3 |
| 2433 | REP | 3 | LAST | 274 | 42,2623 | 02343 1 | ECADR | TFF | 50 | MIN/SEC | M/S |
| 2434 | REP | 3 | LAST | 244 | 42,2624 | 02320 1 | ECADR | RHOSS | 51 | DPDEG(360) | |
| 2435 | REP | 1 | | | 42,2625 | 02322 0 | ECADR | GAMMASR | 51 | DPDEG(360) | DP4 |
| 2436 | | | | | 42,2626 | 00000 1 | OCT | 0 | 51 | SPARE COMPONENT | |
| 2437 | REP | 2 | LAST | 91 | 42,2627 | 02632 1 | ECADR | ACTCENT | 52 | DPDEG(360) | DP4 |
| 2438 | | | | | 42,2630 | 00000 1 | OCT | 00000 | 52 | SPARE COMPONENT | |
| 2439 | | | | | 42,2631 | 00000 1 | OCT | 00000 | 52 | SPARE COMPONENT | |
| 2440 | REP | 6 | LAST | 171 | 42,2632 | 02320 1 | ECADR | RANCE | 53 | POS6 | DP1 |
| 2441 | REP | 2 | LAST | 88 | 42,2633 | 02322 0 | ECADR | RRATE | 53 | VEL3 | DP3 |
| 2442 | REP | 3 | LAST | 171 | 42,2634 | 02324 0 | ECADR | RHETA | 53 | DPDEG(360) | DP4 |
| 2443 | REP | 7 | LAST | 275 | 42,2635 | 02320 1 | ECADR | RANCE | 54 | POS6 | DP1 |
| 2444 | REP | 3 | LAST | 275 | 42,2636 | 02322 0 | ECADR | RRATE | 54 | VEL3 | DP3 |
| 2445 | REP | 4 | LAST | 275 | 42,2637 | 02324 0 | ECADR | RHETA | 54 | DPDEG(360) | DP4 |
| 2446 | REP | 1 | | | 42,2640 | 03645 0 | ECADR | NN1 | 55 | WHOLE | ARTH |
| 2447 | REP | 4 | LAST | 171 | 42,2641 | 03743 1 | ECADR | ELEV | 55 | DPDEG(360) | DP4 |
| 2448 | REP | 3 | LAST | 171 | 42,2642 | 03753 0 | ECADR | CENTANG | 55 | DPDEG(360) | DP4 |
| 2449 | REP | 2 | LAST | 125 | 42,2643 | 03633 1 | ECADR | RTGAM2D | 56 | DPDEG(360) | DP4 |
| 2450 | REP | 2 | LAST | 125 | 42,2644 | 03631 0 | ECADR | RTEDVD | 56 | VEL2 | DP4 |
| 2451 | | | | | 42,2645 | 00000 1 | OCT | 0 | 56 | SPARE COMPONENT | |
| 2452 | REP | 4 | LAST | 171 | 42,2646 | 02610 1 | ECADR | DELTA | 57 | POS4 | DP3 |
| 2453 | | | | | 42,2647 | 00000 1 | OCT | 0 | 57 | SPARE COMPONENT | |
| 2454 | | | | | 42,2650 | 00000 1 | OCT | 0 | 57 | SPARE COMPONENT | |
| 2455 | REP | 1 | | | 42,2651 | 02640 1 | ECADR | POSTTPI | 58 | POS4 | DP3 |
| 2456 | REP | 3 | LAST | 91 | 42,2652 | 02634 1 | ECADR | DELVTPI | 58 | VEL3 | DP3 |
| 2457 | REP | 3 | LAST | 171 | 42,2653 | 02636 0 | ECADR | DELVTFF | 58 | VEL3 | DP3 |
| 2458 | REP | 7 | LAST | 92 | 42,2654 | 02610 1 | ECADR | DVLOS | 59 | VEL3 | DP3 |
| 2459 | REP | 8 | LAST | 275 | 42,2655 | 02612 0 | ECADR | DVLOS +2 | 59 | VEL3 | DP3 |
| 2460 | REP | 9 | LAST | 275 | 42,2656 | 02614 0 | ECADR | DVLOS +4 | 59 | VEL3 | DP3 |
| 2461 | REP | 2 | LAST | 117 | 42,2657 | 03721 0 | ECADR | OMAX | 60 | WHOLE | ARTH |
| 2462 | REP | 5 | LAST | 174 | 42,2660 | 03766 0 | ECADR | VPRED | 60 | VEL2 | DP4 |
| 2463 | REP | 4 | LAST | 173 | 42,2661 | 03770 1 | ECADR | GAMMAB1 | 60 | DPDEG(360) | DP4 |
| 2464 | REP | 4 | LAST | 173 | 42,2662 | 03400 0 | ECADR | LATN(SPL) | 61 | DPDEG(360) | DP4 |
| 2465 | REP | 2 | LAST | 115 | 42,2663 | 03402 1 | ECADR | LNG(SPL) | 61 | DPDEG(360) | DP4 |
| 2466 | REP | 2 | LAST | 110 | 42,2664 | 03326 0 | ECADR | HEADSUP | 61 | WHOLE | ARTH |
| 2467 | REP | 2 | LAST | 117 | 42,2665 | 03722 0 | ECADR | VMAGI | 62 | VEL2 | DP4 |
| 2468 | REP | 1 | | | 42,2666 | 03736 0 | ECADR | HDOT | 62 | VEL2 | DP4 |
| 2469 | REP | 2 | LAST | 118 | 42,2667 | 03734 1 | ECADR | ALTI | 62 | POS4 | DP3 |
| 2470 | REP | 4 | LAST | 118 | 42,2670 | 03713 1 | ECADR | RTGO | 63 | POS6 | DP3 |
| 2471 | REP | 4 | LAST | 174 | 42,2671 | 03724 0 | ECADR | VIO | 63 | VEL2 | DP4 |
| 2472 | REP | 4 | LAST | 174 | 42,2672 | 03726 1 | ECADR | TTE | 63 | MIN/SEC | M/S |
| 2473 | REP | 2 | LAST | 116 | 42,2673 | 03637 0 | ECADR | D | 64 | DRAG ACCEL. | DP2 |
| 2474 | REP | 3 | LAST | 275 | 42,2674 | 03722 0 | ECADR | VMAGI | 64 | VEL2 | DP4 |

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| 2525 | REP | 2 | LAST | 276 | 42,2757 | 03406 0 | BCADR | DELV/LVC | +2 | 81 | VEL3 | DP3 |
| 2526 | REP | 3 | LAST | 277 | 42,2760 | 03410 1 | BCADR | DELV/LVC | +4 | 81 | VEL3 | DP3 |
| 2527 | | | | | 42,2761 | 00000 1 | OCT | 00000 | | 82 | SPARE | |
| 2528 | | | | | 42,2762 | 00000 1 | OCT | 00000 | | 82 | SPARE | |
| 2529 | | | | | 42,2763 | 00000 1 | OCT | 00000 | | 82 | SPARE | |
| 2530 | REP | 3 | LAST | 208 | 42,2764 | 03874 1 | BCADR | DELV/IMU | | 83 | VEL3 | DP3 |
| 2531 | REP | 4 | LAST | 277 | 42,2765 | 03678 0 | BCADR | DELV/IMU | +2 | 83 | VEL3 | DP3 |
| 2532 | REP | 5 | LAST | 277 | 42,2766 | 03700 0 | BCADR | DELV/IMU | +4 | 83 | VEL3 | DP3 |
| 2533 | REP | 1 | | | 42,2767 | 03537 0 | BCADR | DELV/VOV | | 84 | VEL3 | DP3 |
| 2534 | REP | 2 | LAST | 277 | 42,2770 | 03541 1 | BCADR | DELV/VOV | +2 | 84 | VEL3 | DP3 |
| 2535 | REP | 3 | LAST | 277 | 42,2771 | 03543 0 | BCADR | DELV/VOV | +4 | 84 | VEL3 | DP3 |
| 2536 | REP | 3 | LAST | 122 | 42,2772 | 03864 0 | BCADR | VORBODY | | 85 | VEL3 | DP3 |
| 2537 | REP | 4 | LAST | 277 | 42,2773 | 03866 1 | BCADR | VORBODY | +2 | 85 | VEL3 | DP3 |
| 2538 | REP | 5 | LAST | 277 | 42,2774 | 03870 0 | BCADR | VORBODY | +4 | 85 | VEL3 | DP3 |
| 2539 | REP | 4 | LAST | 277 | 42,2775 | 03404 1 | BCADR | DELV/LVC | | 86 | VEL2 | DP4 |
| 2540 | REP | 5 | LAST | 277 | 42,2776 | 03406 0 | BCADR | DELV/LVC | +2 | 86 | VEL2 | DP4 |
| 2541 | REP | 6 | LAST | 277 | 42,2777 | 03410 1 | BCADR | DELV/LVC | +4 | 86 | VEL2 | DP4 |
| 2542 | REP | 16 | LAST | 252 | 42,3000 | 03730 0 | BCADR | MRK/RUP1 | +3 | 87 | CDU DEG | CDU |
| 2543 | REP | 17 | LAST | 277 | 42,3001 | 03732 1 | BCADR | MRK/RUP1 | +5 | 87 | Y OPTICS DEG | YOPT |
| 2544 | | | | | 42,3002 | 00000 1 | OCT | 0 | | 87 | SPARE COMPONENT | |
| 2545 | REP | 3 | LAST | 209 | 42,3003 | 02765 1 | BCADR | STAR | | 88 | PRAC | PRAC |
| 2546 | REP | 4 | LAST | 277 | 42,3004 | 02767 0 | BCADR | STAR | +2 | 88 | PRAC | PRAC |
| 2547 | REP | 5 | LAST | 277 | 42,3005 | 02771 1 | BCADR | STAR | +4 | 88 | PRAC | PRAC |
| 2548 | REP | 1 | | | 42,3006 | 01103 1 | BCADR | LANDLAT | | 89 | DPDEG(90) | DP3 |
| 2549 | REP | 2 | LAST | 89 | 42,3007 | 02357 1 | BCADR | LANDLONG | | 89 | DPDEG(90) | DP3 |
| 2550 | REP | 2 | LAST | 89 | 42,3010 | 02361 1 | BCADR | LANDALT | | 89 | POSS | DP1 |
| 2551 | REP | 8 | LAST | 275 | 42,3011 | 02320 1 | BCADR | RANGE | | 90 | POSS | DP1 |
| 2552 | REP | 4 | LAST | 275 | 42,3012 | 02322 0 | BCADR | RRATE | | 90 | VEL3 | DP3 |
| 2553 | REP | 5 | LAST | 275 | 42,3013 | 02324 0 | BCADR | RTHETA | | 90 | DPDEG(360) | DP4 |
| 2554 | REP | 7 | LAST | 219 | 42,3014 | 00036 1 | BCADR | CDUS | | 91 | CDU DEG | CDU |
| 2555 | REP | 8 | LAST | 210 | 42,3015 | 00035 1 | BCADR | CDUT | | 91 | Y OPTICS DEG | YOPT |
| 2556 | | | | | 42,3016 | 00000 1 | OCT | 0 | | 91 | SPARE COMPONENT | |
| 2557 | REP | 3 | LAST | 236 | 42,3017 | 02773 0 | BCADR | SAC | | 92 | CDU DEG | CDU |
| 2558 | REP | 3 | LAST | 236 | 42,3020 | 02775 0 | BCADR | PAC | | 92 | Y OPTICS DEG | YOPT |
| 2559 | | | | | 42,3021 | 00000 1 | OCT | 0 | | 92 | SPARE COMPONENT | |
| 2560 | REP | 6 | LAST | 237 | 42,3022 | 02757 0 | BCADR | OGC | | 93 | DPDEG(90) | DP3 |
| 2561 | REP | 7 | LAST | 277 | 42,3023 | 02761 0 | BCADR | OGC | +2 | 93 | DPDEG(90) | DP3 |
| 2562 | REP | 8 | LAST | 277 | 42,3024 | 02763 1 | BCADR | OGC | +4 | 93 | DPDEG(90) | DP3 |
| 2563 | REP | 18 | LAST | 277 | 42,3025 | 03730 0 | BCADR | MRK/RUP1 | +3 | 94 | CDU DEG | CDU |
| 2564 | REP | 19 | LAST | 277 | 42,3026 | 03732 1 | BCADR | MRK/RUP1 | +5 | 94 | Y OPTICS DEG | YOPT |
| 2565 | | | | | 42,3027 | 00000 1 | OCT | 0 | | 94 | SPARE | |
| 2566 | REP | 2 | LAST | 124 | 42,3030 | 03722 0 | BCADR | PRAXIS | | 95 | CDU DEG | CDU |
| 2567 | REP | 3 | LAST | 277 | 42,3031 | 03723 1 | BCADR | PRAXIS | +1 | 95 | CDU DEG | CDU |
| 2568 | REP | 4 | LAST | 277 | 42,3032 | 03724 0 | BCADR | PRAXIS | +2 | 95 | CDU DEG | CDU |
| 2569 | REP | 4 | LAST | 266 | 42,3033 | 01333 0 | BCADR | CPHIX | | 96 | CDU DEG | CDU |
| 2570 | REP | 5 | LAST | 277 | 42,3034 | 01334 1 | BCADR | CPHIX | +1 | 96 | CDU DEG | CDU |
| 2571 | REP | 6 | LAST | 277 | 42,3035 | 01335 0 | BCADR | CPHIX | +2 | 96 | CDU DEG | CDU |
| 2572 | REP | 12 | LAST | 274 | 42,3036 | 01045 1 | BCADR | DSPTM1 | | 97 | WHOLE | ARTH |
| 2573 | REP | 13 | LAST | 277 | 42,3037 | 01046 1 | BCADR | DSPTM1 | +1 | 97 | WHOLE | ARTH |
| 2574 | REP | 14 | LAST | 277 | 42,3040 | 01047 0 | BCADR | DSPTM1 | +2 | 97 | WHOLE | ARTH |

L PINBALL MAIN TABLES

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2575 REF 4 LAST 266 42,3041 01050 0
 2576 REF 5 LAST 276 42,3042 01051 1
 2577 REF 6 LAST 278 42,3043 01052 1
 2578 REF 1 42,3044 02320 1
 2579 REF 1 42,3045 02322 0
 2580 REF 1 42,3046 02324 0
 R2600 END OF IDADDTAB
 A2600

ECADR DSPTM2
 ECADR DSPTM2 +1
 ECADR DSPTM2 +2
 ECADR WWPOS
 ECADR WWVEL
 ECADR WWOPT

98 WHOLE
 98 FRAC
 98 WHOLE
 99 POS9
 99 VEL4
 99 WHOLE
 ARTH
 PRAC
 ARTH
 DP4
 DP2
 ARTH

NR SP ROUTINES

2801 42,3047 16351 1
 2802 42,3050 00142 0
 2803 42,3051 16347 0
 2804 42,3052 16512 0
 2805 42,3053 22347 1
 2806 42,3054 24454 1
 2807 42,3055 00000 1
 2808 42,3058 00553 1
 2809 42,3057 00143 1
 2810 42,3060 06347 1
 2811 42,3061 22347 1
 2812 42,3062 00512 1
 2813 42,3063 00012 1
 2814 42,3064 24344 1
 2815 42,3065 24344 1
 2816 42,3066 24503 1
 2817 42,3067 00512 1
 2818 42,3070 00007 0
 2819 42,3071 16347 0
 2820 42,3072 16347 0
 2821 42,3073 24503 1
 2822 42,3074 06512 1
 2823 42,3075 16512 0
 2824 42,3076 22507 0
 2825 42,3077 16505 0
 2826 42,3100 20410 0
 2827 42,3101 16352 1
 2828 42,3102 24507 0
 2829 42,3103 24512 1
 2830 42,3104 24252 1
 2831 42,3105 00000 1
 2832 42,3106 00000 1
 2833 42,3107 06352 0
 2834 42,3110 00000 1
 2835 42,3111 00000 1
 2836 42,3112 00000 1
 2837 42,3113 00000 1
 2838 42,3114 00000 1
 2839 42,3115 00000 1

R/JIMTAB OCT 16351
 OCT 00142
 OCT 16347
 OCT 16512
 OCT 22347
 OCT 24454
 OCT 00000
 OCT 00553
 OCT 00143
 OCT 06347
 OCT 22347
 OCT 00512
 OCT 00012
 OCT 24344
 OCT 24344
 OCT 24503
 OCT 00512
 OCT 00007
 OCT 16347
 OCT 16347
 OCT 24503
 OCT 06512
 OCT 16512
 OCT 22507
 OCT 16505
 OCT 20410
 OCT 16352
 OCT 24507
 OCT 24512
 OCT 24252
 OCT 00000
 OCT 0
 OCT 06352
 OCT 0
 OCT 0
 OCT 0
 OCT 0
 OCT 0
 OCT 0

40 M/S, DP3, DP3
 41 CDU, ARTH
 42 DP3, DP3, DP3
 43 DP4, DP4, DP3
 44 DP3, DP3, M/S
 45 2INT, M/S, DP4
 46 OCT, OCT
 47 ARITH1, ARITH1
 48 ARTH, ARTH
 49 DP3, DP3, ARTH
 50 DP3, DP3, M/S
 51 DP4, DP4
 52 DP4
 53 DP1, DP3, DP4
 54 DP1, DP3, DP4
 55 ARTH, DP4, DP4
 56 DP4, DP4
 57 DP3
 58 DP3, DP3, DP3
 59 DP3, DP3, DP3
 60 ARTH, DP4, DP4
 61 DP4, DP4, ARTH
 62 DP4, DP4, DP3
 63 DP3, DP4, M/S
 64 DP2, DP4, DP3
 65 HMS, HMS, HMS
 66 DP4, DP3, DP3
 67 DP3, DP4, DP4
 68 DP4, DP4, DP4
 69 DP4, DP2, DP4
 70 OCT, OCT, OCT
 71 OCT, OCT, OCT
 72 DP4, DP3, ARTH
 73 SPARR
 74 SPARR
 75 SPARR
 76 SPARR
 77 SPARR
 78 SPARR



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| | | | | | |
|-------|-----------------|---------|------|-------|---------------------|
| 2840 | 42,3116 | 00000 1 | OCT | 0 | 79 SPARE |
| 2841 | 42,3117 | 24511 1 | OCT | 24511 | 80 M/S, DP4, DP4 |
| 2842 | 42,3120 | 16347 0 | OCT | 16347 | 81 DP3, DP3, DP3 |
| 2843 | 42,3121 | 00000 1 | OCT | 00000 | 82 SPARE |
| 2844 | 42,3122 | 16347 0 | OCT | 16347 | 83 DP3, DP3, DP3 |
| 2845 | 42,3123 | 16347 0 | OCT | 16347 | 84 DP3, DP3, DP3 |
| 2846 | 42,3124 | 16347 0 | OCT | 16347 | 85 DP3, DP3, DP3 |
| 2847 | 42,3126 | 24512 1 | OCT | 24512 | 86 DP4, DP4, DP4 |
| 2848 | 42,3126 | 00302 0 | OCT | 00302 | 87 CDU, YOFT |
| 2849 | 42,3127 | 02041 0 | OCT | 02041 | 88 FRAC FOR EACH |
| 2850 | 42,3130 | 10347 0 | OCT | 10347 | 89 DP3, DP3, DP1 |
| 2851 | 42,3131 | 24344 1 | OCT | 24344 | 90 DP1, DP3, DP4 |
| 2852 | 42,3132 | 00302 0 | OCT | 00302 | 91 CDU, YOFT |
| 2853 | 42,3133 | 00302 0 | OCT | 00302 | 92 CDU, YOFT |
| 2854 | 42,3134 | 16347 0 | OCT | 16347 | 93 DP3, DP3, DP3 |
| 2855 | 42,3135 | 00302 0 | OCT | 00302 | 94 CDU, YOFT |
| 2856 | 42,3136 | 04102 0 | OCT | 04102 | 95 CDU, CDU, CDU |
| 2857 | 42,3137 | 04102 0 | OCT | 04102 | 96 CDU, CDU, CDU |
| 2858 | 42,3140 | 06143 1 | OCT | 06143 | 97 ARTH, ARTH, ARTH |
| 2859 | 42,3141 | 06043 0 | OCT | 06043 | 98 ARTH, FRAC, ARTH |
| 2860 | 42,3142 | 06252 1 | OCT | 06252 | 99 DP4, DP2, ARTH |
| R2870 | END OF RUTMXTAR | | | | |
| 2871 | REP | 2 | LAST | 32 | 30,2000 |

BRANK= LOWSUPER



L CSM GEOMETRY

R0045. CALCSXA COMPUTES THE SEXTANT SHAFT AND TRUNNION ANGLES REQUIRED TO POSITION THE OPTICS SUCH THAT A STAR LINE-
 R0047 OF-SIGHT LIES ALONG THE STAR VECTOR. THE ROUTINE TAKES THE GIVEN STAR VECTOR AND EXPRESSES IT AS A VECTOR REF-
 R0049 ERENCED TO THE OPTICS COORDINATE SYSTEM. IN ADDITION IT SETS UP THREE UNIT VECTORS DEFINING THE X,Y, AND Z AXES
 R0051 REFERENCED TO THE OPTICS COORDINATE SYSTEM.

R0052 THE INPUTS ARE 1) THE STAR VECTOR REFERRED TO PRESENT STABLE MEMBER COORDINATES STORED AT STAR. 2) SAME ANGLE
 R0054 INPUT AS *SINB*, I.E. SINES AND COSINES OF THE CDU ANGLES, IN THE ORDER Y Z X, AT SINCDU AND COSCDU. A CALL
 R0056 TO COUTRIG WILL PROVIDE THIS INPUT.

R0057 THE OUTPUTS ARE THE SEXTANT SHAFT AND TRUNNION ANGLES STORED DP AT SAC AND PAC RESPECTIVELY. (LOW ORDER PART
 R0059 EQUAL TO ZERO).

| Address | Operation | Address | Value | Label | Operation | Address | Value | Label |
|---------|----------------|---------|---------|---------|-----------|---------|-------|---------------------------------|
| 0060 | | 23,2034 | 77220 1 | CALCSXA | ITA | VLOAD | | PUSHDOWN 00-26D,28D,30D,32D-36D |
| 0061 | | 23,2035 | 00034 0 | | | 26D | | |
| 0062 | REP 6 LAST 277 | 23,2036 | 02766 1 | | | STAR | | |
| 0063 | | 23,2037 | 77624 1 | | CALL | | | |
| 0064 | REP 1 | 23,2040 | 47577 1 | | | *SINB* | | |
| 0065 | | 23,2041 | 76521 0 | | MKV | VSL1 | | |
| 0066 | REP 1 | 23,2042 | 06260 0 | | | NB2NB1 | | |
| 0067 | REP 7 LAST 281 | 23,2043 | 26766 1 | | STOVL | STAR | | |
| 0068 | REP 1 | 23,2044 | 15330 0 | | | HIUNITX | | |
| 0069 | REP 2 LAST 91 | 23,2045 | 26555 0 | | STOVL | XNB1 | | |
| 0070 | REP 1 | 23,2046 | 15328 1 | | | HIUNITY | | |
| 0071 | REP 2 LAST 91 | 23,2047 | 26563 0 | | STOVL | YNB1 | | |
| 0072 | REP 1 | 23,2050 | 15324 0 | | | HIUNITZ | | |
| 0073 | REP 2 LAST 91 | 23,2051 | 36571 1 | | STCALL | ZNB1 | | |
| 0074 | REP 1 | 23,2052 | 46076 1 | | | SKTANG1 | | |

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R0075 SXTANG COMPUTES THE SEXTANT SHAFT AND TRUNNION ANGLES REQUIRED TO POSITION THE OPTICS SUCH THAT A STAR LINE-OF-SIGHT LIES ALONG THE STAR VECTOR.
R0077

R0078 THE INPUTS ARE 1) THE STAR VECTOR REFERRED TO ANY COORDINATE SYSTEM STORED AT STAR. 2) THE NAVIGATION BASE COORDINATES REFERRED TO THE SAME COORDINATE SYSTEM. THESE THREE HALF-UNIT VECTORS ARE STORED AT XNB, YNB, AND ZNB.
R0080
R0082

R0083 THE OUTPUTS ARE THE SEXTANT SHAFT AND TRUNNION ANGLES STORED DP AT SAC AND PAC RESPECTIVELY. (LOW ORDER PART EQUAL TO ZERO).
R0085

| | | | | | | | | | | |
|------|-----|---|------|---------|---------|---------|--------|---------|----------------------|---------------------|
| 0086 | | | | 23,2053 | 47020 0 | SXTANG | ITA | RTB | PUSHDOWN | 16D,16D,22D-26D,26D |
| 0087 | | | | 23,2054 | 00034 0 | | | 26D | | |
| 0088 | REP | 1 | | 23,2055 | 45657 1 | | | TRANSP1 | BREP WRT NB2 | |
| 0089 | | | | 23,2056 | 84375 1 | | VLOAD | MKV | | |
| 0090 | REP | 1 | | 23,2057 | 02714 1 | | | XNB | | |
| 0091 | REP | 2 | LAST | 281 | 23,2060 | | | NB2NR1 | | |
| 0092 | | | | 23,2061 | 77772 0 | | VSL1 | | | |
| 0093 | REP | 3 | LAST | 281 | 23,2062 | | STOVL | XNB1 | | |
| 0094 | REP | 1 | | 23,2063 | 02722 1 | | | YNB | | |
| 0095 | | | | 23,2064 | 76521 0 | | MKV | VSL1 | | |
| 0096 | REP | 3 | LAST | 282 | 23,2065 | | | NB2NR1 | | |
| 0097 | REP | 3 | LAST | 281 | 23,2066 | | STOVL | YNB1 | | |
| 0098 | REP | 1 | | 23,2067 | 02730 1 | | | ZNB | | |
| 0099 | | | | 23,2070 | 76521 0 | | MKV | VSL1 | | |
| 0100 | REP | 4 | LAST | 282 | 23,2071 | | | NB2NR1 | | |
| 0101 | REP | 3 | LAST | 281 | 23,2072 | | STORE | ZNR1 | | |
| 0102 | | | | 23,2073 | 47034 0 | | RTB | RTB | | |
| 0103 | REP | 2 | LAST | 282 | 23,2074 | | | TRANSP1 | | |
| 0104 | REP | 1 | | 23,2075 | 45673 1 | | | TRANSP2 | | |
| 0105 | | | | 23,2076 | 47375 0 | SXTANG1 | VLOAD | VXV | | |
| 0106 | REP | 4 | LAST | 282 | 23,2077 | | | ZNR1 | | |
| 0107 | REP | 6 | LAST | 281 | 23,2100 | | | STAR | | |
| 0108 | | | | 23,2101 | 77600 1 | | ROV | | | |
| 0109 | | | | 23,2102 | 46103 1 | | | +1 | | |
| 0110 | | | | 23,2103 | 40056 0 | | UNIT | ROV | | |
| 0111 | REP | 1 | | 23,2104 | 46145 0 | | | ZNR-S1 | | |
| 0112 | REP | 1 | | 23,2105 | 00027 1 | | STORE | PDA | PDA = UNITY(ZNR X S) | |
| 0113 | | | | 23,2106 | 57441 1 | | DOT | DCOMP | | |
| 0114 | REP | 4 | LAST | 282 | 23,2107 | | | XNB1 | | |
| 0115 | REP | 1 | | 23,2110 | 24023 0 | | STOVL | SINTH | SIN(SA) = PDA . -XNB | |
| 0116 | REP | 2 | LAST | 282 | 23,2111 | | | PDA | | |
| 0117 | | | | 23,2112 | 77641 1 | | DOT | | | |
| 0118 | REP | 4 | LAST | 282 | 23,2113 | | | YNR1 | | |
| 0119 | REP | 1 | | 23,2114 | 34021 0 | | STCALL | COSTH | COS(SA) = PDA . YNB | |
| 0120 | REP | 1 | | 23,2115 | 47211 0 | | | ARCTRG | | |



L CEN GEOMETRY

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| | | | | | | | |
|------|-------|----------|---------|---------|----------|----------|---------------------------------------|
| 0121 | | | 23,2116 | 77634 0 | RTR | | |
| 0122 | REP 1 | | 23,2117 | 45543 1 | | 1STO2S | |
| 0123 | REP 4 | LAST 277 | 23,2120 | 28774 1 | STOVL | SAC | |
| 0124 | REP 9 | LAST 282 | 23,2121 | 02766 1 | | STAR | |
| 0125 | | | 23,2122 | 77600 1 | BOV | | |
| 0126 | | | 23,2123 | 46124 1 | | +1 | |
| 0127 | | | 23,2124 | 72441 0 | DOT | SL1 | |
| 0128 | REP 5 | LAST 282 | 23,2125 | 02571 0 | | ZNB1 | |
| 0129 | | | 23,2126 | 77726 1 | ACOS | | |
| 0131 | | | 23,2127 | 62440 0 | RNN | SL2 | |
| 0132 | REP 1 | | 23,2130 | 46142 1 | | SXTALARM | TRUNTON ANGLE NEGATIVE |
| 0133 | | | 23,2131 | 45200 1 | BOV | DSU | |
| 0134 | REP 2 | LAST 283 | 23,2132 | 46142 1 | | SXTALARM | TRUNTON ANGLE GREATER THAN 90 DEGREES |
| 0135 | REP 1 | | 23,2133 | 66331 0 | | 20DEG- | |
| 0136 | | | 23,2134 | 77634 0 | RTR | | |
| 0137 | REP 2 | LAST 283 | 23,2135 | 45543 1 | | 1STO2S | |
| 0138 | REP 4 | LAST 277 | 23,2136 | 02776 0 | STORE | PAC | FOR FLIGHT USE, CULFLAG IS ON IF |
| 0139 | | | 23,2137 | 77614 1 | CLRCO | | TRUNTON IS GREATER THAN 90 DEG |
| 0140 | REP 1 | | 23,2140 | 01630 0 | | CULFLAG | |
| 0141 | | | 23,2141 | 00034 0 | | 28D | |
| 0142 | | | 23,2142 | 77614 1 | SXTALARM | SETGO | ALARM HAS BEEN REMOVED FROM THIS |
| 0143 | REP 2 | LAST 283 | 23,2143 | 01430 1 | | CULFLAG | |
| 0144 | | | 23,2144 | 00034 0 | | 28D | SUBROUTINE, ALARM WILL BE SET BY MPI |
| 0145 | | | 23,2145 | 77745 1 | ZNR=S1 | DLOAD | |
| 0146 | REP 1 | | 23,2146 | 06325 0 | | 270DEG | |
| 0147 | REP 5 | LAST 283 | 23,2147 | 16774 1 | STOVL | SAC | |
| 0148 | REP 1 | | 23,2150 | 06327 1 | | 20DEGS- | |
| 0149 | REP 5 | LAST 283 | 23,2151 | 02776 0 | STORE | PAC | |
| 0150 | | | 23,2152 | 77614 1 | CLRCO | | |
| 0151 | REP 3 | LAST 283 | 23,2153 | 01630 0 | | CULFLAG | |
| 0152 | | | 23,2154 | 00034 0 | | 28D | |

L CSM GEOMETRY

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R0153 THESE TWO ROUTINES COMPUTE THE ACTUAL STATE VECTOR FOR LM, CSM BY ADDING
 R0154 THE CONIC R,V AND THE DEVIATIONS,R,V. THE STATE VECTORS ARE CONVERTED TO
 R0155 METERS B-29 AND METERS/SEC B-7 AND STORED APPROPRIATELY IN RN,VN OR
 R0156 R-OTHER, V-OTHER FOR DOWNLINK. THE ROUTINES NAMES ARE SWITCHED IN THE
 R0157 OTHER VEHICLES COMPUTER.

R0158 INPUT
 R0159 STATE VECTOR IN TEMPORARY STORAGE AREA
 R0160 IF STATE VECTOR IS SCALED POS B27 AND VEL B6
 R0161 SET X2 TO +2
 R0162 IF STATE VECTOR IS SCALED POS B29 AND VEL B7
 R0163 SET X2 TO 0

R0164 OUTPUT
 R0165 R(T) IN RN, V(T) IN VN, T IN PIPTIME
 R0166 OR
 R0167 R(T) IN R-OTHER, V(T) IN V-OTHER (T IS DEFINED BY T-OTHER)

| | | | | | | | | | | |
|-------|-----|---|---------|-------|---|-------|--|--|--------|----------|
| 0168 | | | 23,2155 | | | | | | BANK | 23 |
| 0169 | REP | 1 | 10,2000 | | | | | | SETLOC | COMBOM2 |
| 0170 | | | 10,2231 | | | | | | BANK | |
| 0171 | REP | 1 | | | | | | | COUNT | 10/CECH |
| 0172 | | | 10,2237 | 43414 | 1 | SVDW1 | | | ROP | RVO |
| 01721 | REP | 1 | 10,2240 | 04756 | 1 | | | | | AVENIDSW |
| 01722 | | | 10,2241 | 20242 | 1 | | | | | +1 |
| 01723 | | | 10,2242 | 53115 | 1 | | | | VLOAD | VSL* |
| 0173 | REP | 2 | LAST | 83 | | | | | | TDELTA |
| 0174 | | | 10,2243 | 01521 | 0 | | | | | 0 -1,2 |
| 0174 | | | 10,2244 | 57605 | 0 | | | | VAD | VSL* |
| 0175 | | | 10,2245 | 53855 | 1 | | | | | RCV |
| 0176 | REP | 2 | LAST | 83 | | | | | | 0,2 |
| 0177 | | | 10,2246 | 01535 | 0 | | | | STOVL | RN |
| 0177 | | | 10,2247 | 57576 | 1 | | | | | TNU |
| 0178 | REP | 4 | LAST | 168 | | | | | | VAD |
| 0179 | REP | 2 | LAST | 83 | | | | | | 0 -4,2 |
| 0180 | | | 10,2250 | 25171 | 1 | | | | | VCV |
| 0180 | | | 10,2251 | 01527 | 0 | | | | VSL* | |
| 0181 | | | 10,2252 | 53251 | 1 | | | | | 0,2 |
| 0181 | | | 10,2253 | 57602 | 1 | | | | STOVL | VN |
| 0182 | REP | 2 | LAST | 83 | | | | | | TET |
| 0183 | | | 10,2254 | 01543 | 1 | | | | STORE | PIPTIME |
| 0184 | | | 10,2255 | 77657 | 0 | | | | RVO | |
| 0184 | | | 10,2256 | 57576 | 1 | | | | VLOAD | VSL* |
| 0185 | REP | 4 | LAST | 168 | | | | | | TDELTA |
| 0185 | | | 10,2251 | 15177 | 1 | | | | | 0 -1,2 |
| 0186 | REP | 3 | LAST | 267 | | | | | | VAD |
| 0186 | | | 10,2260 | 01517 | 0 | | | | | RCV |
| 0187 | REP | 3 | LAST | 168 | | | | | | |
| 0187 | | | 10,2261 | 01205 | 1 | | | | | |
| 0188 | | | 10,2262 | 77616 | 0 | | | | | |
| 0189 | | | 10,2263 | 53115 | 1 | SVDW2 | | | | |
| 0190 | REP | 3 | LAST | 264 | | | | | | |
| 0190 | | | 10,2264 | 01521 | 0 | | | | | |
| 0191 | | | 10,2265 | 57605 | 0 | | | | | |
| 0192 | | | 10,2266 | 53855 | 1 | | | | | |
| 0193 | REP | 3 | LAST | 264 | | | | | | |
| 0193 | | | 10,2267 | 01535 | 0 | | | | | |

SW=1=AVETOMID DOING W-MATRIX INTEG



L CSM GEOMETRY

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| | | | | | | | |
|------|-----|---|------|---------|---------|---------|--------------|
| 0194 | | | | 10,2270 | 57576 1 | | 0.2 |
| 0195 | REP | 4 | LAST | 168 | 10,2271 | 25722 1 | STOVL R-ORGR |
| 0196 | REP | 3 | LAST | 284 | 10,2272 | 01527 0 | TRW |
| 0197 | | | | 10,2273 | 53257 1 | | VSL* VAD |
| 0198 | | | | 10,2274 | 57602 1 | | 0 -4.2 |
| 0199 | REP | 3 | LAST | 284 | 10,2275 | 01543 1 | VCV |
| 0200 | | | | 10,2276 | 77657 0 | | VSL* |
| 0201 | | | | 10,2277 | 57576 1 | | 0.2 |
| 0202 | REP | 4 | LAST | 168 | 10,2300 | 01730 1 | STORE V-ORGR |
| 0203 | | | | 10,2301 | 77616 0 | | RVD |

L CSM GEOMETRY

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P0204 SUBROUTINE TO COMPUTE THE NATURAL LOG OF C(MPAC, MPAC +1).

R0205 ENTRY CALL LOG
R0206

R0207 SUBROUTINE RETURNS WITH -LOG IN DP MPAC.

R0208 BRANK IS ARBITRARY.

| | | | | | | | | | |
|------|-----|----|-----------------|---------|--------|---------|--------|-------------|--|
| 0209 | | | 14,2000 | | | | BANK | 14 | |
| 0210 | REP | 1 | 23,2000 | | | | SETLOC | POWPLIT2 | |
| 0211 | | | 23,2155 | | | | BANK | | |
| 0212 | REP | 2 | LAST 280 TO 284 | 109 | 109* | | COUNT | 23/GEOM | |
| 0213 | | | 23,2155 | 44301 | 0 | LOG | NORM | BDSJ | |
| 0214 | REP | 34 | LAST 280 | 23,2156 | 00160 | 0 | | MPAC +3 | |
| 0215 | REP | 1 | | 23,2157 | 06212 | 0 | | NEARLY1 | |
| 0216 | | | 23,2160 | 77776 | 1 | | EXIT | | |
| 0217 | REP | 1 | | 23,2161 | 0 7171 | 1 | TC | POLY | |
| 0218 | | | 23,2162 | 00002 | 0 | | DEC | 2 | |
| 0219 | | | 23,2163 | 00000 | 1 | | ZDEC | 0 | |
| 0219 | | | 23,2164 | 00000 | 1 | | | | |
| 0220 | | | 23,2165 | 01001 | 1 | | ZDEC | .031335467 | |
| 0220 | | | 23,2166 | 14636 | 1 | | | | |
| 0221 | | | 23,2167 | 00325 | 0 | | ZDEC | .0130145859 | |
| 0221 | | | 23,2170 | 07310 | 1 | | | | |
| 0222 | | | 23,2171 | 00541 | 1 | | ZDEC | .0215736898 | |
| 0222 | | | 23,2172 | 16735 | 1 | | | | |
| 0223 | REP | 24 | LAST 261 | 23,2173 | 3 4714 | 1 | CAP | ZERO | |
| 0224 | REP | 35 | LAST 286 | 23,2174 | 54 156 | 1 | TS | MPAC +2 | |
| 0225 | | | 23,2175 | 0 0006 | 1 | | EXTEND | | |
| 0226 | REP | 1 | | 23,2176 | 3 2214 | 1 | DCA | CLOG2/32 | |
| 0227 | REP | 36 | LAST 286 | 23,2177 | 52 155 | 1 | DXCH | MPAC | |
| 0228 | REP | 37 | LAST 286 | 23,2200 | 52 160 | 1 | DXCH | MPAC +3 | |
| 0229 | | | 23,2201 | 4 0000 | 0 | | COM | | |
| 0230 | REP | 2 | LAST 280 | 23,2202 | 0 7256 | 1 | TC | SHORTMP | |
| 0231 | REP | 38 | LAST 286 | 23,2203 | 52 156 | 1 | DXCH | MPAC +1 | |
| 0232 | REP | 39 | LAST 286 | 23,2204 | 52 155 | 1 | DXCH | MPAC | |
| 0233 | REP | 40 | LAST 286 | 23,2205 | 52 160 | 1 | DXCH | MPAC +3 | |
| 0234 | REP | 41 | LAST 286 | 23,2206 | 20 155 | 1 | DAS | MPAC | |
| 0235 | REP | 8 | LAST 259 | 23,2207 | 0 6006 | 1 | TC | INTPRET | |
| 0236 | | | 23,2210 | 77616 | 0 | | RVO | | |
| 0237 | | | 23,2211 | 37777 | 1 | NEARLY1 | ZDEC | .999999999 | |
| 0237 | | | 23,2212 | 37777 | 1 | | | | |

GENERATES LOG BY SHIFTING ARG UNTIL IT LIES BETWEEN .5 AND 1. THE LOG OF THIS PART IS FOUND AND THE LOG OF THE SHIFTED PART IS COMPUTED

AND ADDED IN. SHIFT COUNT STORED

(N-1, SUPPLIED BY SMERZ) IN MPAC +3.

LOAD POSITIVE SHIFT COUNT IN A. MULTIPLY BY SHIFT COUNT.

RESULT IN MPAC, MPAC +1



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| | | | | |
|------|---------|---------|---------------|-------------|
| 0238 | 23,2213 | 00542 1 | CLOG2/32 2DEC | .0216608494 |
| 0238 | 23,2214 | 34414 1 | | |



L CSN GEOMETRY

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R0239 SUBROUTINE NAME' EARTH ROTATOR (EARROT1 OR EARROT2) DATE' 15 FEB 67
R0241 MOD NO' N +1
R0243 MOD BY' ENTRY GROUP (BAIRNSPATER) LOG SECTION' POWERED FLIGHT SUBROG
R0244 FUNCTIONAL DESCRIPTION' THIS ROUTINE PROJECTS THE INITIAL EARTH TARGET VECTOR RTINIT AHEAD THROUGH
THE ESTIMATED TIME OF FLIGHT. INITIAL CALL RESOLVES THE INITIAL TARGET VECTOR RTINIT INTO EASTERNLY
AND NORMAL COMPONENTS RTEAST AND RINORM. INITIAL AND SUBSEQUENT CALLS ROTATE THIS VECTOR
ABOUT THE (PULL) UNIT POLAR AXIS UNITW THROUGH THE ANGLE WIS DTEAROT TO OBTAIN THE ROTATED
TARGET VECTOR RT. ALL VECTORS EXCEPT UNITW ARE HALF UNIT.
THE EQUATIONS ARE
R0255
R0256 $RT = RTINIT + RINORM (\cos(WT) - 1) + RTEAST \sin(WT)$
R0257 WHERE $WT = WIS \cdot DTEAROT$
R0258 $RTINIT = \text{INITIAL TARGET VECTOR}$
R0259
R0260 $RTEAST = UNITW \cdot RTINIT$
R0261
R0262 $RINORM = RTEAST \cdot UNITW$
R0263 FOR CONTINUOUS UPDATING, ONLY ONE ENTRY TO EARROT1 IS REQUIRED, WITH SUBSEQUENT ENTRIES AT EARROT2.
R0265 CALLING SEQUENCE' FIRST CALL SUBSEQUENT CALL
R0266 STCALL DTEAROT STCALL DTEAROT
R0267 EARROT1 EARROT2
R0268 C(MPAC) UNSPECIFIED C(MPAC) = DTEAROT
R0269 PUSHLOC = PDL+0, ARBITRARY. 6 LOCATIONS USED.
R0270 SUBROUTINES USED' NONE
R0271 NORMAL EXIT MODES' RVO
R0272 ALARMS' NONE
R0273 OUTPUT' RTEAST (-1) .5 UNIT VECTOR EAST, COMPNT OF RTINIT LEFT BY FIRST CALL
R0275 RINORM (-1) .5 UNIT VECTOR NORML, COMPNT OF RTINIT LEFT BY FIRST CALL
R0277 RT (-1) .5 UNIT TARGET VECTOR, ROTATED LEFT BY ALL CALLS
R0279 DTEAROT (-28) CS MAY BE CHANGED BY EARROT2, IF OVER 1 DAY
R0280 ERASABLE INITIALIZATION REQUIRED'
R0281 UNITW (0) UNIT POLAR VECTOR PAD LOADED
R0283 RTINIT (-1) .5 UNIT INITIAL TARGET VECTOR LEFT BY ENTRY
R0285 DTEAROT (-28) CS TIME OF FLIGHT LEFT BY CALLER
R0287 DERRIS' OPRRT, PDL+0 ... PDL+6



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P0208

| | | | | | | | | | |
|-------|-----|---|------|-----|---------|---------|----------|--------|-----------------------|
| 0289 | REP | 3 | LAST | 210 | E7,1451 | | EBANK= | RTINIT | |
| 0290 | | | | | 23,2215 | 47375 0 | BARROT1 | VLOAD | VXV |
| 0291 | REP | 3 | LAST | 84 | 23,2216 | 01714 1 | | | |
| 0292 | REP | 4 | LAST | 289 | 23,2217 | 03452 1 | | | FULL UNIT VECTOR |
| 0293 | REP | 2 | LAST | 116 | 23,2220 | 03460 0 | | STORE | RTINIT |
| | | | | | | | | | .5 UNIT |
| | | | | | | | | | .5 UNIT |
| 0294 | | | | | 23,2221 | 77635 1 | | VXV | |
| 0295 | REP | 4 | LAST | 289 | 23,2222 | 01714 1 | | | FULL UNIT |
| 0296 | REP | 2 | LAST | 116 | 23,2223 | 17466 0 | | STOCL | RTINCM |
| 0297 | REP | 2 | LAST | 116 | 23,2224 | 03606 1 | | | DTEAROT |
| | | | | | | | | | (-28) CS |
| 0298 | | | | | 23,2225 | 56204 1 | BARROT2 | BOVB | DDV |
| 0299 | REP | 1 | | | 23,2226 | 57343 1 | | | TCDANZIG |
| 0300 | REP | 1 | | | 23,2227 | 06256 0 | | | 1/WIE |
| 0301 | | | | | 23,2230 | 41400 0 | | ROV | PUSH |
| 0302 | REP | 1 | | | 23,2231 | 46245 0 | | | OVERADAY |
| 0303 | | | | | 23,2232 | 45346 1 | | COS | DSU |
| 0304 | REP | 1 | | | 23,2233 | 15330 0 | | | HIDPHALP |
| 0305 | | | | | 23,2234 | 65381 0 | | VXSC | PDDL |
| 0306 | REP | 3 | LAST | 289 | 23,2235 | 03466 0 | | | RTINCM |
| 0307 | | | | | 23,2236 | 74356 1 | | SIN | VXSC |
| 0308 | REP | 3 | LAST | 289 | 23,2237 | 03460 0 | | | RTEAST |
| 0309 | | | | | 23,2240 | 76455 1 | | VAD | VSL1 |
| 0310 | | | | | 23,2241 | 53455 0 | | VAD | UNIT |
| 0311 | REP | 5 | LAST | 289 | 23,2242 | 03452 1 | | | RTINIT |
| 0312 | REP | 2 | LAST | 116 | 23,2243 | 03474 0 | | STORE | RT |
| | | | | | | | | | .5 UNIT TARGET VECTOR |
| 0313 | | | | | 23,2244 | 77616 0 | | RVO | |
| 0314 | | | | | 23,2245 | 75345 1 | OVERADAY | DLOAD | SIGN |
| 0315 | REP | 2 | LAST | 289 | 23,2246 | 06256 0 | | | 1/WIE |
| 0316 | REP | 3 | LAST | 289 | 23,2247 | 03606 1 | | | DTEAROT |
| 0317 | | | | | 23,2250 | 77621 1 | | RDSU | |
| 0318 | REP | 4 | LAST | 289 | 23,2251 | 03606 1 | | | DTEAROT |
| 0319 | REP | 5 | LAST | 289 | 23,2252 | 03606 1 | | STORE | DTEAROT |
| 0320 | | | | | 23,2253 | 77650 1 | | GOTO | |
| 0321 | REP | 1 | | | 23,2254 | 46225 0 | | | BARROT2 |
| A0322 | | | | | | | WIE | 2DFC | .1901487997 |
| 0323 | | | | | 23,2255 | 01015 1 | 1/WIE | 2DFC | 8616410 |
| 0323 | | | | | 23,2256 | 34732 0 | | | |
| 1036 | | | | | 23,2257 | 15373 1 | NR2NR1 | 2DFC | +.8431756920 R-1 |
| 1036 | | | | | 23,2260 | 11346 0 | | | |
| 1037 | | | | | 23,2261 | 00000 1 | | 2DFC | 0 |
| 1037 | | | | | 23,2262 | 00000 1 | | | |
| 1038 | | | | | 23,2263 | 67313 1 | | 2DFC | -.5376381241 R-1 |
| 1038 | | | | | 23,2264 | 65307 0 | | | |



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| | | | | | |
|------|---------|---------|----------|------|------------------|
| 1039 | 23,2265 | 00000 1 | ZBRINFLT | 2DEC | 0 |
| 1039 | 23,2266 | 00000 1 | | | |
| 1040 | 23,2267 | 20000 0 | HALPNFLT | 2DEC | .5 |
| 1040 | 23,2270 | 00000 1 | | | |
| 1041 | 23,2271 | 00000 1 | | 2DEC | 0 |
| 1041 | 23,2272 | 00000 1 | | | |
| 1042 | 23,2273 | 10464 0 | | 2DEC | +.5376381241 R-1 |
| 1042 | 23,2274 | 12470 1 | | | |
| 1043 | 23,2275 | 00000 1 | | 2DEC | 0 |
| 1043 | 23,2276 | 00000 1 | | | |
| 1044 | 23,2277 | 15373 1 | | 2DEC | +.8431756920 R-1 |
| 1044 | 23,2300 | 11346 0 | | | |
| 1045 | 23,2301 | 15373 1 | NR1NR2 | 2DEC | +.8431756920 R-1 |
| 1045 | 23,2302 | 11346 0 | | | |
| 1046 | 23,2303 | 00000 1 | | 2DEC | 0 |
| 1046 | 23,2304 | 00000 1 | | | |
| 1047 | 23,2305 | 10464 0 | | 2DEC | +.5376381241 R-1 |
| 1047 | 23,2306 | 12470 1 | | | |
| 1048 | 23,2307 | 00000 1 | | 2DEC | 0 |
| 1048 | 23,2310 | 00000 1 | | | |
| 1049 | 23,2311 | 20000 0 | | 2DEC | .5 |
| 1049 | 23,2312 | 00000 1 | | | |
| 1050 | 23,2313 | 00000 1 | | 2DEC | 0 |
| 1050 | 23,2314 | 00000 1 | | | |
| 1051 | 23,2315 | 67313 1 | | 2DEC | -.5376381241 R-1 |
| 1051 | 23,2316 | 65307 0 | | | |
| 1052 | 23,2317 | 00000 1 | | 2DEC | 0 |
| 1052 | 23,2320 | 00000 1 | | | |
| 1053 | 23,2321 | 15373 1 | | 2DEC | +.8431756920 R-1 |
| 1053 | 23,2322 | 11346 0 | | | |



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| | | | | | |
|------|---------|---------|---------|-----|--------|
| 1054 | 23,2323 | 07020 1 | 10DEGS- | DEC | 3600 |
| 1055 | 23,2324 | 00000 1 | 270DEG | OCT | 00000 |
| 1056 | 23,2325 | 00000 1 | | OCT | 00000 |
| 1057 | 23,2326 | 01140 6 | 20DEGS- | DEC | -07199 |
| 1058 | 23,2327 | 77777 0 | | DEC | -00000 |
| 1059 | 23,2330 | 07020 1 | 20DEG- | DEC | 03000 |
| 1060 | 23,2331 | 00000 1 | | DEC | 00000 |

SHAFT 270 DEGREES 25 COMP.

L IMU COMPENSATION PACKAGE

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| | | | | | | | | | | |
|--------|-----|----|------|---------|---------|----------|---------|----------|----------|---|
| 0001 | | | | 07,2440 | | | BANK 7 | | | |
| 000101 | REP | 1 | | 06,2000 | | | SETLOC | IMUCOMP | | |
| 000102 | | | | 06,3262 | | | BANK | | | |
| 0002 | REP | 2 | LAST | 82 | 03,1460 | | EBANK= | NBDX | | |
| 0100 | REP | 1 | | | | | COUNT | 06/ICOMP | | |
| 0112 | REP | 1 | | | 06,3262 | 3 3516 0 | 1/PIPA | CAP | LOCMP | SAVE EBANK OF CALLING PROGRAM |
| 0113 | REP | 14 | LAST | 261 | 06,3263 | 56 003 1 | | XCH | EBANK | |
| 0114 | REP | 1 | | | 06,3264 | 54 163 1 | | TS | MODE | |
| 0115 | REP | 1 | | | 06,3265 | 11=477 0 | | CCS | GCMP5W | BYPASS IF GCMP5W NEGATIVE |
| 0116 | | | | | 06,3266 | 1 3271 1 | | TCP | +3 | |
| 0117 | | | | | 06,3267 | 1 3271 1 | | TCP | +2 | |
| 0118 | REP | 1 | | | 06,3270 | 1 3407 0 | | TCP | IRIG1 | RETURN |
| 01181 | | | | | 06,3271 | 0 0004 0 | | INHINT | | ASSURE COMPLETE COMPENSATION OF DELV=8 |
| A01182 | | | | | | | | | | FOR DOWNLINK. |
| 0119 | REP | 1 | | | 06,3272 | 3 4710 0 | 1/PIPA1 | CAP | FOUR | PIPAZ, PIPAY, PIPAX |
| 0120 | REP | 4 | LAST | 68 | 06,3273 | 54 132 0 | | TS | RUP +2 | |
| 0121 | REP | 5 | LAST | 292 | 06,3274 | 50 132 1 | | INDEX | RUP +2 | |
| 0122 | REP | 1 | | | 06,3275 | 3 1453 1 | | CA | PIPASCP | (P.P.M.) X 2(-9) |
| 0123 | | | | | 06,3276 | 0 0006 1 | | EXTEND | | |
| 0124 | REP | 6 | LAST | 292 | 06,3277 | 5 0132 1 | | INDEX | RUP +2 | |
| 0125 | REP | 1 | | | 06,3300 | 7 1162 1 | | MP | DELAX | (PP) X 2(+14) NOW (PIPA PULSES) X 2(+5) |
| 0126 | REP | 32 | LAST | 265 | 06,3301 | 54 002 1 | | TS | 0 | SAVE MAJOR PART |
| 0127 | REP | 20 | LAST | 240 | 06,3302 | 3 0001 0 | | CA | L | MINOR PART |
| 0128 | | | | | 06,3303 | 0 0006 1 | | EXTEND | | |
| 0129 | REP | 24 | LAST | 219 | 06,3304 | 7 4705 0 | | MP | BIT6 | SCALE 2(+9) SHIPT RIGHT 9 |
| 0130 | REP | 7 | LAST | 292 | 06,3305 | 50 132 1 | | INDEX | RUP +2 | |
| 0131 | REP | 2 | LAST | 292 | 06,3306 | 55=163 0 | | TS | DELAX +1 | FRACTIONAL PIPA PULSES SCALED 2(+14) |
| 0132 | REP | 33 | LAST | 292 | 06,3307 | 3 0002 0 | | CA | 0 | MAJOR PART |
| 0133 | | | | | 06,3310 | 0 0006 1 | | EXTEND | | |
| 0134 | REP | 25 | LAST | 292 | 06,3311 | 7 4705 0 | | MP | BIT6 | SCALE 2(+9) SHIPT RIGHT 9 |
| 0135 | REP | 6 | LAST | 292 | 06,3312 | 50 132 1 | | INDEX | RUP +2 | |
| 0136 | REP | 3 | LAST | 292 | 06,3313 | 21=163 0 | | DAS | DELAX | (PIPA1) + (PIPA1)(SPB) |
| 0137 | REP | 9 | LAST | 292 | 06,3314 | 50 132 1 | | INDEX | RUP +2 | |
| 0138 | REP | 1 | | | 06,3315 | 4 1452 1 | | CS | PIPARIAS | (PIPA PULSES)/(CS) X 2(-8) * |
| 0139 | | | | | 06,3316 | 0 0006 1 | | EXTEND | | |
| 0140 | REP | 2 | LAST | 75 | 06,3317 | 7 1074 1 | | MP | 1/PIPADT | (CS) X 2(+8) NOW (PIPA PULSES) X 2(+0)* |
| 0141 | | | | | 06,3320 | 0 0006 1 | | EXTEND | | |
| 0142 | REP | 27 | LAST | 256 | 06,3321 | 7 4712 0 | | MP | BIT1 | SCALE 2(+14) SHIPT RIGHT 14 * |
| 0143 | REP | 10 | LAST | 292 | 06,3322 | 50 132 1 | | INDEX | RUP +2 | |
| 0144 | REP | 4 | LAST | 292 | 06,3323 | 21=163 0 | | DAS | DELAX | (PIPA1) + (PIPA1)(SPB) - (RIAS)(DELAT) |
| 0145 | REP | 11 | LAST | 292 | 06,3324 | 10 132 0 | | CCS | RUP +2 | PIPAZ, PIPAY, PIPAX |



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| | | | | | | | |
|-------|-----|---|---------|----------|--------|------------|----------------------------|
| 0146 | REP | 1 | 06,3325 | 6 7716 0 | AD | NEG1 | |
| 0147 | REP | 1 | 06,3326 | 1 3273 0 | TCP | 1/PIPA1 +1 | |
| 0148 | | | 06,3327 | 13 330 0 | NOOP | | LESS THAN ZERO IMPOSSIBLE. |
| 01481 | | | 06,3330 | 0 0003 1 | RELINT | | |

L IMU COMPENSATION PACKAGE

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| Address | Resp | Count | Label | Address | Count | Label | Command | Command | Command | Notes | |
|---------|------|-------|-------|---------|---------|--------|---------|----------|---------|----------|--|
| P01482 | | | | | | | | | | | |
| 0149 | REP | 2 | LAST | 292 | 06,3331 | 55=477 | 0 | IRIGCOMP | TS | GCMPSW | INDICATE COMMANDS 2 PULSES OR LESS |
| 0150 | REP | 12 | LAST | 292 | 06,3332 | 54 | 130 | 1 | TS | BUF | INDEX COUNTER - IRIGX, IRIOY, IRIOZ |
| 0151 | | | | | 06,3333 | 0 | 0006 | 1 | IRIOX | EXTEND | |
| 0152 | REP | 5 | LAST | 292 | 06,3334 | 4 | 1163 | 0 | DCS | DELAV | (PIPA PULSES) X 2(+14) |
| 0153 | REP | 42 | LAST | 286 | 06,3335 | 52 | 155 | 1 | DXCH | MPAC | |
| 0154 | REP | 1 | | | 06,3336 | 3 | 1463 | 1 | CA | ADIAK | (GYRO PULSES)/(PIPA PULSE) X 2(-3) * |
| 0155 | REP | 1 | | | 06,3337 | 0 | 3412 | 0 | TC | GCMPSUB | -(ADIAK)(PIPAK) (GYRO PULSES) X 2(+14) |
| 0156 | | | | | 06,3340 | 0 | 0006 | 1 | EXTEND | | |
| 0157 | REP | 1 | | | 06,3341 | 4 | 1165 | 0 | DCS | DELAV | (PIPA PULSES) X 2(+14) |
| 0158 | REP | 43 | LAST | 294 | 06,3342 | 52 | 155 | 1 | DXCH | MPAC | |
| 0159 | REP | 1 | | | 06,3343 | 4 | 1466 | 0 | CS | ADSRAX | (GYRO PULSES)/(PIPA PULSE) X 2(-3) * |
| 0160 | REP | 2 | LAST | 294 | 06,3344 | 0 | 3412 | 0 | TC | GCMPSUB | +(ADSRAX)(PIPAY) (GYRO PULSES) X 2(+14) |
| A01603 | | | | | | | | | EXTEND | *** | |
| A01604 | | | | | | | | | DCS | DELAV | (PIPA PULSES) X 2(+14) |
| A01605 | | | | | | | | | DXCH | MPAC | *** |
| A01606 | | | | | | | | | CA | ADQAX | (GYRO PULSES)/(PIPA PULSE) X 2(-3) * |
| A01607 | | | | | | | | | TC | GCMPSUB | *** -(ADQAX)(PIPAZ) (GYRO PULSES) X 2(+14) |
| 0161 | REP | 3 | LAST | 292 | 06,3345 | 4 | 1460 | 0 | CS | NRDX | (GYRO PULSES)/(CS) X 2(-5) |
| 0162 | REP | 1 | | | 06,3346 | 0 | 3441 | 0 | TC | DRIPTSUB | -(NRDX)(DELTAT) (GYRO PULSES) X 2(+14) |
| 0163 | | | | | 06,3347 | 0 | 0006 | 1 | IRIOY | EXTEND | |
| 0164 | REP | 2 | LAST | 294 | 06,3350 | 4 | 1165 | 0 | DCS | DELAV | (PIPA PULSES) X 2(+14) |
| 0165 | REP | 44 | LAST | 294 | 06,3351 | 52 | 155 | 1 | DXCH | MPAC | |
| 0166 | REP | 1 | | | 06,3352 | 3 | 1464 | 0 | CA | ADIAK | (GYRO PULSES)/(PIPA PULSE) X 2(-3) * |
| 0167 | REP | 3 | LAST | 294 | 06,3353 | 0 | 3412 | 0 | TC | GCMPSUB | -(ADIAK)(PIPAY) (GYRO PULSES) X 2(+14) |
| 0168 | | | | | 06,3354 | 0 | 0006 | 1 | EXTEND | | |
| 0169 | REP | 1 | | | 06,3355 | 4 | 1167 | 1 | DCS | DELAV | (PIPA PULSES) X 2(+14) |
| 0170 | REP | 45 | LAST | 294 | 06,3356 | 52 | 155 | 1 | DXCH | MPAC | |
| 0171 | REP | 1 | | | 06,3357 | 4 | 1467 | 1 | CS | ADSRAY | (GYRO PULSES)/(PIPA PULSE) X 2(-3) * |
| 0172 | REP | 4 | LAST | 294 | 06,3358 | 0 | 3412 | 0 | TC | GCMPSUB | +(ADSRAY)(PIPAZ) (GYRO PULSES) X 2(+14) |
| A01723 | | | | | | | | | EXTEND | *** | |
| A01724 | | | | | | | | | DCS | DELAV | (PIPA PULSES) X 2(+14) |
| A01725 | | | | | | | | | DXCH | MPAC | *** |
| A01726 | | | | | | | | | CA | ADQAY | (GYRO PULSES)/(PIPA PULSE) X 2(-3) * |
| A01727 | | | | | | | | | TC | GCMPSUB | *** -(ADQAY)(PIPAK) (GYRO PULSES) X 2(+14) |
| 0173 | REP | 1 | | | 06,3361 | 4 | 1461 | 1 | CS | NRDY | (GYRO PULSES)/(CS) X 2(-5) |
| 0174 | REP | 2 | LAST | 294 | 06,3362 | 0 | 3441 | 0 | TC | DRIPTSUB | -(NRDY)(DELTAT) (GYRO PULSES) X 2(+14) |
| 0175 | | | | | 06,3363 | 0 | 0006 | 1 | IRIOZ | EXTEND | |
| 0176 | REP | 3 | LAST | 294 | 06,3364 | 4 | 1165 | 0 | DCS | DELAV | (PIPA PULSES) X 2(+14) |
| 0177 | REP | 46 | LAST | 294 | 06,3365 | 52 | 155 | 1 | DXCH | MPAC | |
| 0178 | REP | 1 | | | 06,3366 | 3 | 1470 | 0 | CA | ADSRAX | (GYRO PULSES)/(PIPA PULSE) X 2(-3) * |



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0179 RESP 5 LAST 294 06,3367 0 3412 0
 0180 06,3370 0 0008 1
 0181 RESP 2 LAST 294 06,3371 4 1167 1
 0182 RESP 47 LAST 294 06,3372 52,155 1
 A184 RESP 4 LAST 294 06,3374 0 2419 0
 A01843
 A01844
 A01845
 A01846
 A01847
 0185 RESP 1 06,3375 3 1462 0
 0186 RESP 3 LAST 294 06,3376 0 3441 0

TC GCOMPUB -(ADSRZ)(PIPAY) (GYRO PULSES) X 2(+14)
 EXTEND
 DCB DELVZ (PIPA PULSES) X 2(+14)
 DXCH MPAC
 TC GCOMPUB -(ADIAZ)(PIPAZ) (GYRO PULSES) X 2(+14)
 EXTEND ***
 DCB DELVZ *** (PIPA PULSE) X 2(+14)
 DXCH MPAC ***
 CS ADOAZ *** (GYRO PULSES)/(PIPA PULSE) X 2(-3)
 TC GCOMPUB *** +(ADCAZ)(PIPAZ) (GYRO PULSES) X 2(+14)
 CA NRDZ (GYRO PULSES)/(CS) X 2(-5)
 TC DRIFTSUB +(NRDZ)(DELTA) (GYRO PULSES) X 2(+14)

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| | | | | | | | | | |
|------|-----|----|------|-----|---------|----------|--------|----------|---|
| 0187 | REP | 3 | LAST | 294 | 06,3377 | 11=477 0 | CCS | GCOMP | ARE GYRO COMMANDS GREATER THAN 2 PULSES |
| 0188 | | | | | 06,3400 | 1 3402 0 | TCP | +2 | YES |
| 0189 | REP | 2 | LAST | 292 | 06,3401 | 1 3407 0 | TCP | IRIG1 | NO |
| 0191 | REP | 1 | | | 06,3402 | 3 4764 0 | CAP | PRIOT | LEM PRIORITY HIGHER-THIS FOR PRELAUNCH |
| 0192 | REP | 10 | LAST | 251 | 06,3403 | 0 5027 1 | TC | NOVAC | |
| 0193 | REP | 4 | LAST | 294 | E3,1460 | | BRANK= | HEBX | |
| 0194 | REP | 1 | | | 06,3404 | 03474 0 | ZCADR | 1/GYRO | |
| 0194 | REP | 1 | | | 06,3405 | 14063 1 | | | |
| 0195 | | | | | 06,3406 | 0 0003 1 | RELINT | | |
| 0196 | REP | 2 | LAST | 292 | 06,3407 | 3 0163 0 | IRIG1 | CA | MODE |
| 0197 | REP | 15 | LAST | 292 | 06,3410 | 54 003 0 | TS | BRANK | SET BRANK FOR RETURN |
| 0198 | REP | 5 | LAST | 218 | 06,3411 | 1 4570 0 | TCP | SWRETURN | |
| 0199 | REP | 48 | LAST | 295 | 06,3412 | 58 154 1 | GCOMP | XCH | MPAC |
| 0200 | | | | | 06,3413 | 0 0006 1 | EXTEND | | ADIA OR ADSRA COEFFICIENT ARRIVES IN A |
| 0201 | REP | 49 | LAST | 296 | 06,3414 | 7 0154 0 | MP | MPAC | C(MPAC) = (PIPA PULSES) X 2(+14) |
| 0202 | REP | 14 | LAST | 68 | 06,3415 | 52 123 0 | DYCH | VRUF | (GYRO PULSES)/(PIPA PULSE) X 2(-3) * |
| 0203 | REP | 50 | LAST | 296 | 06,3416 | 3 0155 0 | CA | MPAC +1 | NOW = (GYRO PULSES) X 2(+11) * |
| 0204 | | | | | 06,3417 | 0 0006 1 | EXTEND | | MINOR PART PIPA PULSES |
| 0205 | REP | 51 | LAST | 296 | 06,3420 | 7 0154 0 | MP | MPAC | ADIA OR ADSRA |
| 0206 | REP | 21 | LAST | 292 | 06,3421 | 54 001 1 | TS | L | |
| 0207 | REP | 25 | LAST | 286 | 06,3422 | 3 4714 1 | CAP | ZERO | |
| 0208 | REP | 15 | LAST | 296 | 06,3423 | 20 123 0 | DAS | VRUF | .NOW = (GYRO PULSES) X 2(+11) * |
| 0209 | REP | 18 | LAST | 296 | 06,3424 | 3 0122 0 | CA | VRUF | PARTIAL RESULT - MAJOR |
| 0210 | | | | | 06,3425 | 0 0006 1 | EXTEND | | |
| 0211 | REP | 15 | LAST | 227 | 06,3426 | 7 4677 1 | MP | BIT12 | SCALE 2(+3) SHIPT RIGHT 3 * |
| 0212 | REP | 13 | LAST | 294 | 06,3427 | 50 130 0 | INDEX | RUF | RESULT = (GYRO PULSES) X 2(+14) |
| 0213 | REP | 3 | LAST | 83 | 06,3430 | 21=472 0 | DAS | GCOMP | HI(ADIA)(PIPA) OR HI(ADSRA)(PIPA) |
| 0214 | REP | 17 | LAST | 296 | 06,3431 | 3 0123 1 | CA | VRUF +1 | PARTIAL RESULT - MINOR |
| 0215 | | | | | 06,3432 | 0 0006 1 | EXTEND | | |
| 0216 | REP | 16 | LAST | 296 | 06,3433 | 7 4677 1 | MP | BIT12 | SCALE 2(+3) SHIPT RIGHT 3 * |
| 0217 | REP | 22 | LAST | 296 | 06,3434 | 54 001 1 | TS | L | |
| 0218 | REP | 26 | LAST | 296 | 06,3435 | 3 4714 1 | CAP | ZERO | |
| 0219 | REP | 14 | LAST | 296 | 06,3436 | 50 130 0 | INDEX | RUF | RESULT = (GYRO PULSES) X 2(+14) |
| 0220 | REP | 4 | LAST | 296 | 06,3437 | 21=472 0 | DAS | GCOMP | (ADIA)(PIPA) OR (ADSRA)(PIPA) |
| 0221 | REP | 34 | LAST | 292 | 06,3440 | 0 0002 0 | TC | 0 | |



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| | | | | | | | | | | |
|------|-----|----|------|-----|---------|----------|---------|--------|-----------|--|
| 0249 | REP | 2 | LAST | 292 | 06,3474 | 3 4710 0 | 1/OYRO | CAP | FOUR | PIPZ, PIPY, PIPX |
| 0250 | REP | 22 | LAST | 297 | 06,3475 | 54 130 1 | | TS | BUF | |
| 0251 | REP | 23 | LAST | 298 | 06,3476 | 50 130 0 | | INDEX | BUF | SCALE GYRO COMMANDS FOR IMPULSE |
| 0252 | REP | 6 | LAST | 297 | 06,3477 | 3 1472 1 | | CA | GCOMP +1 | FRACTIONAL PULSES |
| 0253 | | | | | 06,3500 | 0 0006 1 | | EXTEND | | |
| 0254 | REP | 18 | LAST | 198 | 06,3501 | 7 4703 0 | | MP | BITS | SHIFT RIGHT 7 |
| 0255 | REP | 24 | LAST | 298 | 06,3502 | 50 130 0 | | INDEX | BUF | |
| 0256 | REP | 9 | LAST | 298 | 06,3503 | 55-472 0 | | TS | GCOMP +1 | FRACTIONAL PULSES SCALED |
| 0257 | REP | 26 | LAST | 297 | 06,3504 | 3 4714 1 | | CAP | ZERO | SET GCOMP = 0 FOR DAS INSTRUCTION |
| 0258 | REP | 25 | LAST | 298 | 06,3505 | 50 130 0 | | INDEX | BUF | |
| 0259 | REP | 10 | LAST | 298 | 06,3506 | 57-471 1 | | XCH | GCOMP | GYRO PULSES |
| 0260 | | | | | 06,3507 | 0 0006 1 | | EXTEND | | |
| 0261 | REP | 19 | LAST | 298 | 06,3510 | 7 4703 0 | | MP | BITS | SHIFT RIGHT 7 |
| 0262 | REP | 28 | LAST | 298 | 06,3511 | 50 130 0 | | INDEX | BUF | |
| 0263 | REP | 11 | LAST | 298 | 06,3512 | 21-472 0 | | DAS | GCOMP | ADD THESE TO FRACTIONAL PULSES ABOVE |
| 0264 | REP | 27 | LAST | 298 | 06,3513 | 10 130 1 | | CCS | BUF | PIPZ, PIPY, PIPX |
| 0265 | REP | 2 | LAST | 293 | 06,3514 | 6 7716 0 | | AD | NSG1 | |
| 0266 | REP | 2 | LAST | 296 | 06,3515 | 1 3475 0 | | TCP | 1/OYRO +1 | |
| 0267 | REP | 12 | LAST | 298 | 06,3516 | 01471 1 | LCCOMP | ECADR | GCOMP | LESS THAN ZERO IMPOSSIBLE |
| 0268 | REP | 2 | LAST | 292 | 06,3517 | 3 3516 0 | | CAP | LCCOMP | |
| 0269 | REP | 35 | LAST | 257 | 06,3520 | 0 4555 0 | | TC | BANKCALL | |
| 0270 | REP | 2 | LAST | 237 | 06,3521 | 17125 1 | | CADR | IMPULSE | CALL GYRO TORQUING ROUTINE |
| 0271 | REP | 36 | LAST | 298 | 06,3522 | 0 4555 0 | | TC | BANKCALL | |
| 0272 | REP | 5 | LAST | 237 | 06,3523 | 17516 0 | | CADR | INSTALL | WAIT FOR PULSES TO GET OUT |
| 0273 | REP | 14 | LAST | 261 | 06,3524 | 1 5112 1 | | TCP | ENDJOB | TEMPORARY |
| 0274 | REP | 3 | LAST | 298 | 06,3525 | 3 4710 0 | GCOMP1 | CAP | FOUR | PIPZ, PIPY, PIPX |
| 0275 | REP | 28 | LAST | 298 | 06,3526 | 54 130 1 | | TS | BUF | |
| 0276 | REP | 29 | LAST | 298 | 06,3527 | 50 130 0 | | INDEX | BUF | RESCALE |
| 0277 | REP | 13 | LAST | 298 | 06,3530 | 3 1472 1 | | CA | GCOMP +1 | |
| 0278 | | | | | 06,3531 | 0 0006 1 | | EXTEND | | |
| 0279 | REP | 20 | LAST | 298 | 06,3532 | 7 4703 0 | | MP | BITS | SHIFT MINOR PART LEFT 7 - MAJOR PART = 0 |
| 0280 | REP | 30 | LAST | 298 | 06,3533 | 50 130 0 | | INDEX | BUF | |
| 0281 | REP | 14 | LAST | 298 | 06,3534 | 23-472 1 | | LCH | GCOMP +1 | BITS 8-14 OF MINOR PART WERE = 0 |
| 0282 | REP | 31 | LAST | 298 | 06,3535 | 10 130 1 | | CCS | BUF | PIPZ, PIPY, PIPX |
| 0283 | REP | 3 | LAST | 298 | 06,3536 | 6 7716 0 | | AD | NSG1 | |
| 0284 | REP | 1 | | | 06,3537 | 1 3526 1 | | TCP | GCOMP1 +1 | |
| 0285 | | | | | 06,3540 | 01436 1 | V06N30S | VN | 0630 | |
| 0286 | REP | 15 | LAST | 298 | 06,3541 | 1 5112 1 | | TCP | ENDJOB | |



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| | | | | | | |
|------|-----|----|------|-----|---------|----------|
| 0323 | REF | 7 | LAST | 299 | 06,3814 | 11=477 0 |
| 0324 | REF | 3 | LAST | 298 | 06,3815 | 1 3474 1 |
| 0325 | REF | 20 | LAST | 299 | 06,3816 | 1 5112 1 |

| | |
|-----|----------|
| CCS | CCOMPSW |
| TCP | 1/GYRO |
| TCP | ENDOFJOB |

| |
|---|
| ARE GYRO COMMANDS GREATER THAN 2 PULSES |
| YES |
| NO |

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| | | | | | | | | | | | |
|-------|-----|----|------|-----|---------|----------|----------|--------|-------------|----|---|
| 0326 | REP | 35 | LAST | 298 | 06,3617 | 56 002 0 | PBIASSUB | XCH | 0 | | |
| 0327 | REP | 33 | LAST | 299 | 06,3620 | 54 131 0 | | TS | BUF | +1 | |
| 0328 | REP | 36 | LAST | 301 | 06,3621 | 3 0002 0 | | CA | 0 | | NRD SCALED (GYRO PULSES)/(CS) X 2(-5) |
| 0329 | | | | | 06,3622 | 0 0006 1 | | EXTEND | | | |
| 0330 | REP | 57 | LAST | 299 | 06,3623 | 7 0154 0 | | MP | MPAC | | DELTA T SCALED (CS) X 2(+19) |
| 0331 | REP | 34 | LAST | 301 | 06,3624 | 50 130 0 | | INDEX | BUF | | |
| 0332 | REP | 15 | LAST | 298 | 06,3625 | 21=472 0 | | DAS | GCMP | | HI(NRD)(DELTA T) (GYRO PULSES) X 2(+14) |
| 0333 | REP | 37 | LAST | 301 | 06,3626 | 3 0002 0 | | CA | 0 | | NOW FRACTIONAL PART |
| 0334 | | | | | 06,3627 | 0 0006 1 | | EXTEND | | | |
| 0335 | REP | 58 | LAST | 301 | 06,3630 | 7 0155 1 | | MP | MPAC | +1 | |
| 0336 | REP | 24 | LAST | 297 | 06,3631 | 54 001 1 | | TS | L | | |
| 0337 | REP | 30 | LAST | 299 | 06,3632 | 3 4714 1 | | CAP | ZERO | | |
| 0338 | REP | 35 | LAST | 301 | 06,3633 | 50 130 0 | | INDEX | BUF | | |
| 0339 | REP | 16 | LAST | 301 | 06,3634 | 21=472 0 | | DAS | GCMP | | (NRD)(DELTA T) (GYRO PULSES) X 2(+14) |
| 0340 | REP | 1 | | | 06,3635 | 1 3481 0 | | TCP | DRPTSUR2 | | CHECK MAGNITUDE OF COMPENSATION |
| 03401 | REP | 37 | LAST | 298 | 06,3636 | 0 4555 0 | LASTBIAS | TC | BANKCALL | | |
| 03402 | REP | 1 | | | 06,3637 | 17075 0 | | CADR | PIPUSE | | |
| 0341 | REP | 8 | LAST | 300 | 06,3640 | 11=477 0 | | CCS | GCMP SW | | BYPASS IF GCMP SW NEGATIVE |
| 0342 | | | | | 06,3641 | 1 3644 0 | | TCP | +3 | | |
| 0343 | | | | | 06,3642 | 1 3644 0 | | TCP | +2 | | |
| 0344 | REP | 21 | LAST | 300 | 06,3643 | 1 5112 1 | | TCP | ENDOPJOP | | |
| 0345 | REP | 1 | | | 06,3644 | 3 7665 0 | | CAP | PRIO31 | | 2 SECONDS SCALED (CS) X 2(+8) |
| 0346 | REP | 6 | LAST | 299 | 06,3645 | 57=074 0 | | XCH | 1/PIPADT | | |
| 0347 | | | | | 06,3646 | 4 0000 0 | | COM | | | |
| 0348 | REP | 4 | LAST | 174 | 06,3647 | 6 1246 0 | | AD | PIPTIME1 +1 | | TIME AT PIPA1 =0 |
| 0349 | REP | 1 | | | 06,3650 | 1 3560 0 | | TCP | NRD2 | | |



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R0001 PROGRAM NAME - KEYBOARD AND DISPLAY PROGRAM
R0002 MOD NO - 4 DATE - 27 APRIL 1967 ASSEMBLY - PINDISK REV 17
R0003 MOD BY - FILENE
R0004 LOG SECTION - PINBALL GAME BUTTONS AND LIGHTS

R0009 FUNCTIONAL DESCRIPTION-

R0010 THE KEYBOARD AND DISPLAY SYSTEM PROGRAM OPERATES UNDER EXECUTIVE
R0011 CONTROL AND PROCESSES INFORMATION EXCHANGED BETWEEN THE AGC AND THE
R0012 COMPUTER OPERATOR. THE INPUTS TO THE PROGRAM ARE FROM THE KEYBOARD,
R0013 FROM INTERNAL PROGRAMS, AND FROM THE UPLINK.
R0014 THE LANGUAGE OF COMMUNICATION WITH THE PROGRAM IS A PAIR OF WORDS
R0015 KNOWN AS VERB AND NOUN. EACH OF THESE IS REPRESENTED BY A 2 CHARACTER
R0016 DECIMAL NUMBER. THE VERB CODE INDICATES WHAT ACTION IS TO BE TAKEN, THE
R0017 NOUN CODE INDICATES TO WHAT THIS ACTION IS APPLIED. NOUNS USUALLY
R0018 REFER TO A GROUP OF ERASABLE REGISTERS.

R0020 VERBS ARE GROUPED INTO DISPLAYS, LOADS, MONITORS (DISPLAYS THAT ARE
R0021 UPDATED ONCE PER SECOND), SPECIAL FUNCTIONS, AND EXTENDED VERBS (THESE
R0022 ARE OUTSIDE OF THE DOMAIN OF PINBALL AND CAN BE FOUND UNDER LOG SECTION
R0023 'EXTENDED VERBS').
R0024 A LIST OF VERBS AND NOUNS IS GIVEN IN LOG SECTION 'ASSEMBLY AND
R0025 OPERATION INFORMATION'.
R0026 CALLING SEQUENCES-

R0027 KEYBOARD'

R0028 EACH DEPRESSION OF A MAIN (NAVIGATION) KEYBOARD BUTTON ACTIVATES
R0029 INTERRUPT KEYRUPT1 (KEYRUPT2) AND PLACES THE 5 BIT KEY CODE INTO
R0030 CHANNEL 15 (CHANNEL 18). KEYRUPT1 (KEYRUPT2) PLACES THE KEY
R0031 CODE INTO MPAC, ENTERS AN EXECUTIVE REQUEST FOR THE KEYBOARD AND DISPLAY
PROGRAM (AT 'CHARIN'), AND EXECUTES A RESUME.

R0032 UPLINK'

R0033 EACH WORD RECEIVED BY THE UPLINK ACTIVATES INTERRUPT UPRUPT WHICH
R0034 PLACES THE 5 BIT KEY CODE INTO MPAC, ENTERS AN EXECUTIVE REQUEST FOR THE
R0035 KEYBOARD AND DISPLAY PROGRAM (AT 'CHARIN') AND EXECUTES A RESUME.

R0036 INTERNAL PROGRAMS'

R0037 INTERNAL PROGRAMS CALL PINBALL AT 'NVSUB' WITH THE DESIRED VERB/NOUN
R0038 CODE IN A (LOW 7 BITS FOR NOUN, NEXT 7 BITS FOR VERB). DETAILS
R0039 DESCRIBED ON REMARKS CARDS JUST BEFORE 'NVSUB' AND 'NVSWAIT' (SEE
R0040 SYMBOL TABLE FOR PAGE NUMBERS).
R0045 NORMAL EXIT MODES-

R0046 IF PINBALL WAS CALLED BY EXTERNAL ACTION, THERE ARE FOUR EXITS'
R004605 1) ALL BUT (2), (3), AND (4) EXIT DIRECTLY TO ENDOPJOP.

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R00461 2) EXTENDED VERBS GO TO THE EXTENDED VERB PAN AS PART OF THE
R004615 PINBALL EXECUTIVE JOB WITH PRIORITY 30000. IT IS THE
R00462 RESPONSIBILITY OF THE EXTENDED VERB CALLED TO EVENTUALLY
R00463 CHANGE PRIORITY (IF NECESSARY) AND DO AN ENDOPJOB.
R004635 ALSO PINBALL IS A NOVAC JOB. EBANK SET FOR COMMON.
R00464 3) VERB 37. CHANGE OF PROGRAM (MAJOR MODE) CALLS 'V37' IN THE
R00465 SERVICES ROUTINES AS PART OF THE PINBALL EXEC JOB WITH PRIORITY
R00466 30000. THE NEW PROGRAM CODE (MAJOR MODE) IS LEFT IN A.
R00467 4) KEY RELEASE BUTTON CALLS 'PINBRNCH' IN THE DISPLAY INTERFACE
R00468 ROUTINES AS PART OF THE PINBALL EXEC JOB WITH PRIORITY 30000 IF
R00469 THE KEY RELEASE LIGHT IS OFF AND 'CADRSTOR' IS NOT +0.

R0047 IF PINBALL WAS CALLED BY INTERNAL PROGRAMS, EXIT FROM PINBALL IS BACK
R0048 TO CALLING ROUTINE. DETAILS DESCRIBED IN REMARKS CARDS JUST BEFORE
R0049 'NVSLB' AND 'NVSWAIT' (SEE SYMBOL TABLE FOR PAGE NUMBERS).
R0050 ALARM OR ABORT EXIT MODES-

R0051 EXTERNAL INITIATION'
R0052 IF SOME IMPROPER SEQUENCE OF KEY CODES IS DETECTED, THE OPERATOR
R0053 ERROR LIGHT IS TURNED ON AND EXIT IS TO 'ENDOPJOB'.

R0054 INTERNAL PROGRAM INITIATION'
R0055 IF AN ILLEGAL V/N COMBINATION IS ATTEMPTED, AN ABORT IS CAUSED
R0056 (WITH OCTAL 01501).
R00561 IF A SECOND ATTEMPT IS MADE TO GO TO SLEEP IN PINBALL, AN ABORT IS
R00562 CAUSED (WITH OCTAL 01208). THERE ARE TWO WAYS TO GO TO SLEEP IN PINBALL:
R00563 1) ENDIDLE OR DATAWAIT.
R00564 2) NVSWAIT, PRENVBSY, OR NVSLRUSY.

R0057 CONDITIONS LEADING TO THE ABOVE ARE DESCRIBED IN FORTHCOMING MIT/IL
R0058 E-REPORT DESCRIBING KEYBOARD AND DISPLAY OPERATION FOR 278.
R0059 OUTPUT-

R0060 INFORMATION TO BE SENT TO THE DISPLAY PANEL IS LEFT IN THE 'DSPTAB'
R0061 BUFFER REGISTERS (UNDER EXEC CONTROL). 'DSPOUT' (A PART OF T4RUPT)
R0062 HANDLES THE PLACING OF THE 'DSPTAB' INFORMATION INTO OUTPUT CHANNEL 10
R0063 IN INTERRUPT.
R0064 ERASABLE INITIALIZATION-

R0065 FRESH START AND RESTART INITIALIZE THE NECESSARY E REGISTERS FOR
R0066 PINBALL IN 'STARTSLB'. REGISTERS ARE: DSPTAB BUFFER, CADRSTOR,
R0067 REORST, CLPASS, DSPLOCK, MONSAVE, MONSAVE1, VERRREG, NOUNREG, DSPLIST,
R0068 DSPCOUNT, NOUT.



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R0069 A COMPLETE LIST OF ALL THE ERASABLES (BOTH RESERVED AND TEMPORARIES) FOR
R0070 PINBALL IS GIVEN ESLOW.
R0071 THE FOLLOWING ARE OF GENERAL INTEREST-

R0072 REMARKS CARDS PRECEDE THE REFERENCED SYMBOL DEFINITION. SEE SYMBOL
R0073 TABLE TO FIND APPROPRIATE PAGE NUMBERS.

R0074 NVSUB CALLING POINT FOR INTERNAL USE OF PINBALL.
R0075 OF RELATED INTEREST NVSEWAIT
R0076 NVSUBUSY
R0077 PRENVBSY

R0083 ENDIDLE ROUTINE FOR INTERNAL PROGRAMS WISHING TO GO TO SLEEP WHILE
R0084 AWAITING OPERATORS RESPONSE.

R00851 DSPMM ROUTINE BY WHICH AN INTERNAL PROGRAM MAY DISPLAY A DECIMAL
R00852 PROGRAM CODE (MAJOR MODE) IN THE PROGRAM (MAJOR MODE) LIGHTS.
R008525 (DSPMM DOES NOT DISPLAY DIRECTLY BUT ENTERS EXEC REQUEST
R008527 FOR DSPMMUB WITH Prio 30000 AND RETURNS TO CALLER.)

R00853 BLANKSUB ROUTINE BY WHICH AN INTERNAL PROGRAM MAY BLANK ANY
R00854 COMBINATION OF THE DISPLAY REGISTERS R1, R2, R3.

R00855 JAMTERM ROUTINES BY WHICH AN INTERNAL PROGRAM MAY PERFORM THE
R00856 JAMPROC TERMINATE (V 34) OR PROCEED (V 33) FUNCTION.

R0086 MONITOR VERBS FOR PERIODIC (1 PER SEC) DISPLAY.

R00861 PLEASE PERFORM, PLEASE MARK SITUATIONS
R00862 REMARKS DESCRIBING HOW AN INTERNAL ROUTINE SHOULD HANDLE
R00863 THESE SITUATIONS CAN BE FOUND JUST BEFORE 'NVSUB' (SEE
R00864 SYMBOL TABLE FOR PAGE NUMBER).

R0087 THE NOUN TABLE FORMAT IS DESCRIBED ON A PAGE OF REMARKS CARDS JUST
R0088 BEFORE 'DSPABC' (SEE SYMBOL TABLE FOR PAGE NUMBER).

R0089 THE NOUN TABLES THEMSELVES ARE FOUND IN LOG SECTION 'PINBALL NOUN
R00891 TABLES'.

R0090 FOR FURTHER DETAILS ABOUT OPERATION OF THE KEYBOARD AND DISPLAY SYSTEM
R0091 PROGRAM, SEE THE MISSION PLAN AND/OR MIT/IL B-2129
R0092 DESCRIBING KEYBOARD AND DISPLAY OPERATION FOR 278.

R0150 THE FOLLOWING QUOTATION IS PROVIDED THROUGH THE COURTESY OF THE AUTHORS.

R0151 "IT WILL BE PROVED TO THY FACE THAT THOU HAST MEN ABOUT THEE THAT

L PINBALL GAME BUTTONS AND LIGHTS

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R0152 USUALLY TALK OF A NOUN AND A VERB, AND SUCH ABOMINABLE WORDS AS NO
 R0153 CHRISTIAN EAR CAN ENDURE TO HEAR."

R0154 HENRY 6, ACT 2, SCENE 4
 R0155 THE FOLLOWING ASSIGNMENTS FOR PINBALL ARE MADE ELSEWHERE
 R0156 RESERVED FOR PINBALL EXECUTIVE ACTION

| | | | | |
|--------|--|---------|------|---|
| R0157 | DSPCOUNT | ERASE | | DISPLAY POSITION INDICATOR |
| R0158 | DECERNCH | ERASE | | .DEC, - DEC, OCT INDICATOR |
| R0159 | VERBRBG | ERASE | | VERB CODE |
| R0160 | NOUNRBO | ERASE | | NOUN CODE |
| R0161 | XREG | ERASE | | R1 INPUT BUFFER |
| R0162 | YREG | ERASE | | R2 INPUT BUFFER |
| R0163 | ZREG | ERASE | | R3 INPUT BUFFER |
| R0164 | XREGCLP | ERASE | | LO PART OF XREG (FOR DEC CONV ONLY) |
| R0165 | YREGCLP | ERASE | | LO PART OF YREG (FOR DEC CONV ONLY) |
| R0166 | HITEMOUT = | YREGCLP | | TEMP FOR DISPLAY OF HRS, MIN, SEC MUST = LITEMOUT-1. |
| R0167 | | | | |
| R0168 | ZREGCLP | ERASE | | LO PART OF ZREG (FOR DEC CONV ONLY) |
| R0169 | LITEMOUT = | ZREGCLP | | TEMP FOR DISPLAY OF HRS, MIN, SEC MUST = HITEMOUT+1. |
| R0170 | | | | |
| R0171 | MODREG | ERASE | | MODE CODE |
| R0172 | DSPLOCK | ERASE | | KEYBOARD/SUBROUTINE CALL INTERLOCK |
| R0173 | REGRET | ERASE | | RETURN REGISTER FOR LOAD |
| R0174 | LOADSTAT | ERASE | | STATUS INDICATOR FOR LOADTST |
| R0175 | CLPASS | ERASE | | PASS INDICATOR CLEAR |
| R0176 | NOUT | ERASE | | ACTIVITY COUNTER FOR DSPTAB |
| R0177 | NOUNCADR | ERASE | | MACHINE CADR FOR NOUN |
| R0178 | MONSAVE | ERASE | | N/V CODE FOR MONITOR. (= MONSAVE1-1) |
| R0179 | MONSAVE1 | ERASE | | NOUNCADR FOR MONITOR(MATBS) =MONSAVE +1 |
| R01795 | MONSAVE2 | ERASE | | NVMNOPT OPTIONS |
| R0180 | DSPTAB | ERASE | +13D | 0-10, DISPLAY PANEL BUFFER. 11-13, C RELAYS |
| R0181 | CADRSTOR | ERASE | | ENDIBLE STORAGE |
| R0182 | NVOTEM | ERASE | | NVSLB STORAGE FOR CALLING ADDRESS MUST = NVNKTEM-1 |
| R0183 | | | | |
| R0184 | NVNKTEM | ERASE | | NVSLB STORAGE FOR CALLING BANK MUST = NVOTEM+1 |
| R0185 | | | | |
| R0186 | VERBSAVE | ERASE | | NEEDED FOR RECYCLE |
| R0187 | DSPLIST | ERASE | | WAITING REG FOR DSP SYST INTERNAL USE |
| R0188 | EXTVRACT | ERASE | | EXTENDED VERB ACTIVITY INTERLOCK |
| R0189 | DSPTM1 | ERASE | +2 | BUFFER STORAGE AREA 1 (MOSTLY FOR TIME) |
| R0190 | DSPTM2 | ERASE | +2 | BUFFER STORAGE AREA 2 (MOSTLY FOR DEG) |
| R0191 | END OF ERASABLES RESERVED FOR PINBALL EXECUTIVE ACTION | | | |
| R0192 | TEMPORARIES FOR PINBALL EXECUTIVE ACTION | | | |

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| | | | | |
|-------|--|-------|----------|--|
| R0193 | DSEKIT | = | INTB15+ | RETURN FOR DSPIN |
| R0194 | EXITEM | = | INTB15+ | RETURN FOR SCALE FACTOR ROUTINE SELECT |
| R0195 | BLANKRET | = | INTB15+ | RETURN FOR 2BLANK |
| R0196 | WDRST | = | INTBIT15 | RETURN FOR 5BLANK |
| R0197 | WDRST | = | INTBIT15 | RETURN FOR DSPID |
| R0198 | DECRST | = | INTBIT15 | RETURN FOR PUTCOM(DEC LOAD) |
| R0199 | 21/22RST | = | INTBIT15 | TEMP FOR CHARIN |
| R0200 | UPDATRST | = | POLISH | RETURN FOR UPDATNN, UPDATVB |
| R0201 | CHAR | = | POLISH | TEMP FOR CHARIN |
| R0202 | ERRCNT | = | POLISH | COUNTER FOR ERROR LIGHT RESET |
| R0203 | DECCOUNT | = | POLISH | COUNTER FOR SCALING AND DISPLAY (DEC) |
| R0204 | SONON | = | VRUP | TEMP FOR +, - ON |
| R0205 | NOUNTEM | = | VRUP | COUNTER FOR MIXNQLN FETCH |
| R0206 | DISTEM | = | VRUP | COUNTER FOR OCTAL DISPLAY VERBS |
| R0207 | DECTEM | = | VRUP | COUNTER FOR FETCH (DEC DISPLAY VERBS) |
| R0208 | SNOFF | = | VRUP +1 | TEMP FOR +, - ON |
| R0209 | NVTEMP | = | VRUP +1 | TEMP FOR NVSUB |
| R0210 | SPTEMP1 | = | VRUP +1 | STORAGE FOR SP CONST HI PART(=SPTEMP2-1) |
| R0211 | HITEMIN | = | VRUP +1 | TEMP FOR LOAD OF HRS, MIN, SEC MUST = LOITEMIN-1. |
| R0212 | | | | |
| R0213 | CODE | = | VRUP +2 | FOR DSPIN |
| R0214 | SPTEMP2 | = | VRUP +2 | STORAGE FOR SP CONST LO PART(=SPTEMP1+1) |
| R0215 | LOTEMIN | = | VRUP +2 | TEMP FOR LOAD OF HRS, MIN, SEC MUST = HITEMIN+1. |
| R0216 | | | | |
| R0217 | MIXTEMP | = | VRUP +3 | FOR MIXNQLN DATA |
| R0218 | SIGNRST | = | VRUP +3 | RETURN FOR +, - ON |
| R0219 | ALSO MIXTEMP+1 = VRUP+4, MIXTEMP+2 = VRUP+5. | | | |
| R0220 | ENTRST | = | DOTINC | EXIT FROM ENTER |
| R0221 | WDONT | = | DOTRST | CHAR COUNTER FOR DSPWD |
| R0222 | INREL | = | DOTRST | INPUT BUFFER SELECTOR (X,Y,Z, REQ) |
| R0223 | DSPMTEM | = | MATINC | DSPCOUNT SAVE FOR DSPMM |
| R0224 | MIXR | = | MATINC | INDICATOR FOR MIXED OR NORMAL NQLN |
| R0225 | TEM1 | ERASE | | EXEC TEMP |
| R0226 | DSREL | = | TEM1 | REL. ADDRESS FOR DSPIN |
| R0227 | TEM2 | ERASE | | EXEC TEMP |
| R0228 | DSMAG | = | TEM2 | MAGNITUDE STORE FOR DSPIN |
| R0229 | IDADDRM | = | TEM2 | MIXNQLN INDIRECT ADDRESS STORAGE |
| R0230 | TEM3 | ERASE | | EXEC TEMP |
| R0231 | COUNT | = | TEM3 | FOR DSPIN |

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| | | | |
|--------|--|----------|---|
| R0232 | TEM4 | ERASE | EXEC TEMP |
| R0233 | LSTPTR = | TEM4 | LIST POINTER FOR GRABUSY |
| R0234 | RELST = | TEM4 | RETURN FOR RELOSP |
| R0235 | PRESET = | TEM4 | RETURN FOR PRESDSP |
| R0236 | DSPCRST = | TEM4 | RETURN FOR DSPSIGN |
| R0237 | SEPCRST = | TEM4 | RETURN FOR SEPSOC |
| R0238 | SEPMRST = | TEM4 | RETURN FOR SEPMIN |
| R0239 | TEM5 | ERASE | EXEC TEMP |
| R0240 | NOLNADD = | TEM5 | TEMP STORAGE FOR NOLN ADDRESS |
| R0241 | NNADTEM | ERASE | TEMP FOR NOLN ADDRESS TABLE ENTRY |
| R0242 | NNTYTEM | ERASE | TEMP FOR NOLN TYPE TABLE ENTRY |
| R0243 | IDAD1TEM | ERASE | TEMP FOR INDIR ADDRESS TABLE ENTRY(MIXNN) |
| R0244 | | | MUST = IDAD2TEM-1, = IDAD3TEM-2. |
| R0245 | IDAD2TEM | ERASE | TEMP FOR INDIR ADDRESS TABLE ENTRY(MIXNN) |
| R0246 | | | MUST = IDAD1TEM+1, = IDAD3TEM-1. |
| R0247 | IDAD3TEM | ERASE | TEMP FOR INDIR ADDRESS TABLE ENTRY(MIXNN) |
| R0248 | | | MUST = IDAD1TEM+2, = IDAD2TEM+1. |
| R0249 | RUTMTEM | ERASE | TEMP FOR SF ROUT TABLE ENTRY(MIXNN ONLY) |
| R0250 | END OF TEMPORARIES FOR PINBALL EXECUTIVE ACTION | | |
| R02501 | ADDITIONAL TEMPORARIES FOR PINBALL EXECUTIVE ACTION | | |
| R02502 | MPAC, THRU MPAC +6 | | |
| R02503 | RUP, +1, +2 | | |
| R02504 | RUP2, +1, +2 | | |
| R02506 | MPTMP | | |
| R02507 | ADDRND | | |
| R02509 | END OF ADDITIONAL TEMPS FOR PINBALL EXEC ACTION | | |
| R0251 | RESERVED FOR PINBALL INTERRUPT ACTION | | |
| R0252 | DSPCNT | ERASE | COUNTER FOR DSPOUT |
| R0253 | UPLCK | ERASE | BIT1 = UPLINK INTERLOCK (ACTIVATED BY |
| R0254 | | | RECEPTION OF A RAD MESSAGE IN UPLINK) |
| R0255 | END OF ERASABLES RESERVED FOR PINBALL INTERRUPT ACTION | | |
| R0256 | TEMPORARIES FOR PINBALL INTERRUPT ACTION | | |
| R0257 | KEYTEMP1 = | WAITEXIT | TEMP FOR KEYRUPT, UPRUPT |
| R0258 | DSRUPTM = | WAITEXIT | TEMP FOR DSPOUT |
| R0259 | KEYTEMP2 = | RUPTAGN | TEMP FOR KEYRUPT, UPRUPT |
| R0260 | END OF TEMPORARIES FOR PINBALL INTERRUPT ACTION | | |

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R0261 THE INPUT CODES ASSUMED FOR THE KEYBOARD ARE,

R0262 0 10000
 R0263 1 00001
 R0264 0 01001
 R0265 VERB 10001
 R0266 ERROR RES10010
 R0267 KEY FLSE 11001
 R0268 + 11010
 R0269 - 11011
 R0270 ENTER 11100
 R0271 CLEAR 11110
 R0272 NOUN 11111

R0273 OUTPUT FORMAT FOR DISPLAY PANEL. SET OUTD TO AAAARCCCCDDDD.
 R0274 A-S SELECT A RELAYWORD. THIS DETERMINES WHICH PAIR OF CHARACTERS ARE
 R0275 ENERGIZED.
 R0276 B FOR SPECIAL RELAYS SUCH AS SIGNS ETC.
 R0277 C-S 5 BIT RELAY CODE FOR LEFT CHAR OF PAIR SELECTED BY RELAYWORD
 R0278 D-S 5 BIT RELAY CODE FOR RIGHTCHAR OF PAIR SELECTED BY RELAYWORD.

R0279 THE PANEL APPEARS AS FOLLOWS,

R0280 MD1 MD2 (MAJOR MODE)
 R0281 VD1 VD2 (VERB) ND1 ND2 (NOUN)
 R0282 R1D1 R1D2 R1D3 R1D4 R1D5 (R1)
 R0283 R2D1 R2D2 R2D3 R2D4 R2D5 (R2)
 R0284 R3D1 R3D2 R3D3 R3D4 R3D5 (R3)

R0285 EACH OF THESE IS GIVEN A DSPCOUNT NUMBER FOR USE WITHIN COMPUTATION ONLY

R0286 MD1 25 R2D1 11 ALL ARE OCTAL
 R0287 MD2 24 R2D2 10
 R0288 VD1 23 R2D3 7
 R0289 VD2 22 R2D4 6
 R0290 ND1 21 R2D5 5
 R0291 ND2 20 R3D1 4
 R0292 R1D1 16 R3D2 3
 R0293 R1D2 15 R3D3 2
 R0294 R1D3 14 R3D4 1
 R0295 R1D4 13 R3D5 0
 R0296 R1D5 12

R0297 THERE IS AN 11 REGISTER TABLE (DSPTAB) FOR THE DISPLAY PANEL.

R0298 DSPTAB RELAYWD BIT11 BITS 10-6 BITS 5-1
 R0299 RELADD
 R0300 10 1011 MD1 (25) MD2 (24)
 R0301 9 1010 VD1 (23) VD2 (22)
 R0302 8 1001 ND1 (21) ND2 (20)
 R0303 7 1000 R1D1 (16)

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| | | | | | |
|-------|---|------|-----|-----------|-----------|
| R0304 | 6 | 0111 | +R1 | R1D2 (15) | R1D3 (14) |
| R0305 | 5 | 0110 | -R1 | R1D4 (13) | R1D5 (12) |
| R0306 | 4 | 0101 | +R2 | R2D1 (11) | R2D2 (10) |
| R0307 | 3 | 0100 | -R2 | R2D3 (7) | R2D4 (6) |
| R0308 | 2 | 0011 | | R2D5 (5) | R3D1 (4) |
| R0309 | 1 | 0010 | +R3 | R3D2 (3) | R3D3 (2) |
| R0310 | 0 | 0001 | -R3 | R3D4 (1) | R3D5 (0) |

R0311 0000 NO RELAYWORD
 R0312 THE 5 BIT OUTPUT RELAY CODES ARE:

| | | |
|-------|-------|-------|
| R0313 | BLANK | 00000 |
| R0314 | 0 | 10101 |
| R0315 | 1 | 00011 |
| R0316 | 2 | 11001 |
| R0317 | 3 | 11011 |
| R0318 | 4 | 01111 |
| R0319 | 5 | 11110 |
| R0320 | 6 | 11100 |
| R0321 | 7 | 10011 |
| R0322 | 8 | 11101 |
| R0323 | 9 | 11111 |

R03231 OUTPUT BITS USED BY PINBALL:

| | | |
|--------|----------------------|-----------------------|
| R03232 | KEY RELEASE LIGHT | - BIT 5 OF CHANNEL 11 |
| R03233 | VERB/NOUN FLASH | - BIT 6 OF CHANNEL 11 |
| R03234 | OPERATOR ERROR LIGHT | - BIT 7 OF CHANNEL 11 |



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P0324 START OF EXECUTIVE SECTION OF PINBALL

| Address | Operation | Count | Address | Count | Address | Count | Address | Count | Address | Count | Address | Count |
|---------|-----------|----------|---------|----------|---------|----------|---------|-------|---------|-------|---------|-------|
| 0325 | | | 40,2000 | | BANK | 40 | | | | | | |
| 032501 | REP 1 | | 40,2000 | | SETLOC | PINBALL1 | | | | | | |
| 032502 | | | 40,2000 | | BANK | | | | | | | |
| 03255 | REP 1 | | | | COUNT | 40/PIN | | | | | | |
| 0330 | REP 14 | LAST 299 | 40,2000 | 3 4712 1 | CHARIN | CAP | ONE | | | | | |
| 0331 | REP 2 | LAST 168 | 40,2001 | 57-012 0 | XCH | DSPLOCK | | | | | | |
| 0332 | REP 1 | | 40,2002 | 54 115 0 | TS | 21/22REQ | | | | | | |
| 03321 | REP 2 | LAST 168 | 40,2003 | 11-042 1 | CCS | CADRSTOR | | | | | | |
| 03322 | | | 40,2004 | 0 2006 0 | TC | +2 | | | | | | |
| 03323 | REP 1 | | 40,2005 | 0 2013 1 | TC | CHARIN2 | | | | | | |
| 03324 | REP 1 | | 40,2006 | 4 2057 0 | CS | ELRCODE1 | | | | | | |
| 03325 | REP 59 | LAST 301 | 40,2007 | 6 0154 1 | AD | MPAC | | | | | | |
| 03326 | | | 40,2010 | 0 0006 1 | EXTEND | | | | | | | |
| 03327 | REP 2 | LAST 310 | 40,2011 | 1 2013 0 | B2P | CHARIN2 | | | | | | |
| 03328 | REP 1 | | 40,2012 | 0 4410 0 | TC | RELDSPON | | | | | | |
| 0333 | REP 60 | LAST 310 | 40,2013 | 56 154 1 | CHARIN2 | XCH | MPAC | | | | | |
| 0334 | REP 1 | | 40,2014 | 54 117 1 | TS | CHAR | | | | | | |
| 0335 | REP 77 | LAST 299 | 40,2015 | 50 000 1 | INDEX | A | | | | | | |
| 0336 | | | 40,2016 | 0 2017 0 | TC | +1 | | | | | | |
| 0337 | REP 1 | | 40,2017 | 0 3335 1 | TC | CHARALRM | | | | | | |
| 0338 | REP 1 | | 40,2020 | 0 2076 1 | TC | NLM | | | | | | |
| 0339 | REP 2 | LAST 310 | 40,2021 | 0 2076 1 | TC | NLM | | | | | | |
| 0340 | REP 3 | LAST 310 | 40,2022 | 0 2076 1 | TC | NLM | | | | | | |
| 0341 | REP 4 | LAST 310 | 40,2023 | 0 2076 1 | TC | NLM | | | | | | |
| 0342 | REP 5 | LAST 310 | 40,2024 | 0 2076 1 | TC | NLM | | | | | | |
| 0343 | REP 6 | LAST 310 | 40,2025 | 0 2076 1 | TC | NLM | | | | | | |
| 0344 | REP 7 | LAST 310 | 40,2026 | 0 2076 1 | TC | NLM | | | | | | |
| 0345 | REP 1 | | 40,2027 | 0 2062 1 | TC | 89TEST | | | | | | |
| 0346 | REP 2 | LAST 310 | 40,2030 | 0 2062 1 | TC | 89TEST | | | | | | |
| 0347 | REP 2 | LAST 310 | 40,2031 | 0 3335 1 | TC | CHARALRM | | | | | | |
| 0348 | REP 3 | LAST 310 | 40,2032 | 0 3335 1 | TC | CHARALRM | | | | | | |
| 0349 | REP 4 | LAST 310 | 40,2033 | 0 3335 1 | TC | CHARALRM | | | | | | |
| 0350 | REP 5 | LAST 310 | 40,2034 | 0 3335 1 | TC | CHARALRM | | | | | | |
| 0351 | REP 6 | LAST 310 | 40,2035 | 0 3335 1 | TC | CHARALRM | | | | | | |
| 0352 | REP 7 | LAST 310 | 40,2036 | 0 3335 1 | TC | CHARALRM | | | | | | |
| 0353 | REP 8 | LAST 310 | 40,2037 | 0 2074 0 | TC | NLM -2 | | | | | | |
| 0354 | REP 1 | | 40,2040 | 0 2255 1 | TC | VERR | | | | | | |
| 0355 | REP 1 | | 40,2041 | 0 3504 0 | TC | ERROR | | | | | | |
| 0356 | REP 8 | LAST 310 | 40,2042 | 0 3335 1 | TC | CHARALRM | | | | | | |
| 0357 | REP 9 | LAST 310 | 40,2043 | 0 3335 1 | TC | CHARALRM | | | | | | |
| 0358 | REP 10 | LAST 310 | 40,2044 | 0 3335 1 | TC | CHARALRM | | | | | | |
| 0359 | REP 11 | LAST 310 | 40,2045 | 0 3335 1 | TC | CHARALRM | | | | | | |
| 0360 | REP 12 | LAST 310 | 40,2046 | 0 3335 1 | TC | CHARALRM | | | | | | |
| 0361 | REP 13 | LAST 310 | 40,2047 | 0 3335 1 | TC | CHARALRM | | | | | | |
| 0362 | REP 1 | | 40,2050 | 0 3362 0 | TC | VRRLDSP | | | | | | |

BLOCK DISPLAY SYST
 MAKE DSP SYST BUSY, BUT SAVE OLD
 CDSFLOCK) FOR ERROR LIGHT RESET.
 ALL KEYS EXCEPT ER TURN ON KR LITE IF
 CADRSTOR IS FULL. THIS REMINDS OPERATOR
 TO RE-ESTABLISH A FLASHING DISPLAY
 WHICH HE HAS OBSURED WITH DISPLAYS OF
 HIS OWN (SEE REMARKS PRECEDING ROUTINE
 VRRLDSP).

| INPUT CODE | FUNCTION |
|------------|-------------------|
| 0 | |
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | |
| 8 | |
| 9 | |
| 10 | |
| 11 | |
| 12 | |
| 13 | |
| 14 | |
| 15 | |
| 16 | |
| 17 | |
| 18 | |
| 19 | |
| 20 | |
| 21 | VERR |
| 22 | ERROR LIGHT RESET |
| 23 | |
| 24 | |
| 25 | |
| 26 | |
| 27 | |
| 28 | |
| 29 | |
| 30 | |
| 31 | KEY RELEASE |



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| | | | | | | | | | | | |
|-------|--|----|------|---------|---------|--------|-----------|----------|----------|--|--|
| 0363 | REP | 1 | | 40,2051 | 0 2310 | 1 | TC | POSON | 32 | + | |
| 0364 | REP | 1 | | 40,2052 | 0 2275 | 0 | TC | NEGSON | 33 | - | |
| 0365 | REP | 1 | | 40,2053 | 0 2060 | 0 | TC | ENTERJMP | 34 | ENTER | |
| 0366 | REP | 14 | LAST | 310 | 40,2054 | 0 3335 | 1 | TC | CHARALRM | 35 | |
| 0367 | REP | 1 | | 40,2055 | 0 2370 | 1 | TC | CLEAR | 36 | CLEAR | |
| 0368 | REP | 1 | | 40,2056 | 0 2271 | 1 | TC | NOLN | 37 | NOLN | |
| 03685 | | | | 40,2057 | 00022 | 1 | ELRCODES1 | OCT | 22 | | |
| 0369 | REP | 15 | LAST | 261 | 40,2060 | 0 4574 | 0 | ENTERJMP | TC | POSTJUMP | |
| 0370 | REP | 1 | | 40,2061 | 02002 | 1 | CADR | ENTER | | | |
| 0371 | REP | 3 | LAST | 188 | 40,2062 | 10 777 | 1 | 89TEST | CCS | DSPCOUNT | |
| 0372 | | | | 40,2063 | 0 2067 | 1 | TC | +4 | | + | |
| 0373 | | | | 40,2064 | 0 2067 | 1 | TC | +3 | | +0 | |
| 0374 | REP | 22 | LAST | 301 | 40,2065 | 0 5112 | 0 | TC | ENDOPJOB | - BLOCK DATA IN IF DSPCOUNT IS - OR -0 | |
| 0375 | REP | 23 | LAST | 311 | 40,2066 | 0 5112 | 0 | TC | ENDOPJOB | -0 | |
| 0376 | REP | 2 | LAST | 32 | 40,2067 | 3 6214 | 0 | CAP | THREE | | |
| 0377 | REP | 1 | | 40,2070 | 7 1000 | 1 | MASK | DECBRNCH | | | |
| 0378 | REP | 78 | LAST | 310 | 40,2071 | 10 000 | 0 | CCS | A | | |
| 0379 | REP | 9 | LAST | 310 | 40,2072 | 0 2076 | 1 | TC | NUM | IF DECBRNCH IS +, 8 OR 9 OK | |
| 0380 | REP | 15 | LAST | 311 | 40,2073 | 0 3335 | 1 | TC | CHARALRM | IF DECBRNCH IS +0, REJECT 8 OR 9 | |
| R0381 | NUM ASSEMBLES OCTAL 3 BITS AT A TIME. FOR DECIMAL IT CONVERTS INCOMING | | | | | | | | | | |
| R0382 | WORD AS A FRACTION, KEEPING RESULTS TO DP. | | | | | | | | | | |
| R0383 | OCTAL RESULTS ARE LEFT IN XREG, YREG, OR ZREG. HI PART OF DEC IN XREG, | | | | | | | | | | |
| R0384 | YREG, ZREG. THE LOW PARTS IN XREGLP, YREGLP, OR ZREGLP) | | | | | | | | | | |
| R0385 | DECBRNCH IS LEFT AT +0 FOR OCT, +1 FOR + DEC, +2 FOR - DEC. | | | | | | | | | | |
| R0386 | IF DSPCOUNT WAS LEFT -, NO MORE DATA IS ACCEPTED. | | | | | | | | | | |
| 0387 | REP | 31 | LAST | 301 | 40,2074 | 3 4714 | 1 | CAP | ZERO | | |
| 0388 | REP | 2 | LAST | 310 | 40,2075 | 54 117 | 1 | TS | CHAR | | |
| 0389 | REP | 4 | LAST | 311 | 40,2076 | 10 777 | 1 | NUM | CCS | DSPCOUNT | |
| 0390 | | | | 40,2077 | 0 2103 | 1 | TC | +4 | | + | |
| 0391 | | | | 40,2100 | 0 2103 | 1 | TC | +3 | | +0 | |
| 0392 | | | | 40,2101 | 0 2102 | 0 | TC | +1 | | -BLOCK DATA IN IF DSPCOUNT IS - | |
| 0393 | REP | 24 | LAST | 311 | 40,2102 | 0 5112 | 0 | TC | ENDOPJOB | -0 | |
| 0394 | REP | 1 | | 40,2103 | 0 2225 | 0 | TC | GETINREL | | | |
| 0395 | REP | 2 | LAST | 188 | 40,2104 | 11=015 | 0 | CCS | CLPASS | IF CLPASS IS + OR +0, MAKE IT +0. | |
| 0396 | REP | 32 | LAST | 311 | 40,2105 | 3 4714 | 1 | CAP | ZERO | | |
| 0397 | REP | 3 | LAST | 311 | 40,2106 | 55=015 | 0 | TS | CLPASS | | |
| 0398 | | | | 40,2107 | 0 2110 | 0 | TC | +1 | | | |
| 0399 | REP | 3 | LAST | 311 | 40,2110 | 50 117 | 0 | INDEX | CHAR | | |
| 0400 | REP | 2 | LAST | 131 | 40,2111 | 3 4072 | 0 | CAP | RELJAR | | |
| 0401 | REP | 2 | LAST | 227 | 40,2112 | 7 4362 | 0 | MASK | LOW5 | | |
| 0402 | REP | 1 | | 40,2113 | 54 124 | 1 | TS | CODE | | | |
| 0403 | REP | 5 | LAST | 311 | 40,2114 | 3 0777 | 0 | CA | DSPCOUNT | | |
| 0404 | REP | 1 | | 40,2115 | 54 143 | 0 | TS | COUNT | | | |
| 0405 | REP | 1 | | 40,2116 | 0 3225 | 1 | TC | DSPIN | | | |



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0406 REP 3 LAST 311 40,2117 3 8214 0
 0407 REP 2 LAST 311 40,2120 7 1000 1
 0408 REP 79 LAST 311 40,2121 10 000 0
 0409 REP 1 40,2122 0 2133 1
 0410 REP 1 40,2123 50 137 1
 0411 REP 2 LAST 188 40,2124 57=001 1
 0412 REP 1 40,2125 54 022 0
 0413 REP 2 LAST 312 40,2126 4 0022 0
 0414 REP 3 LAST 312 40,2127 4 0022 0
 0415 REP 4 LAST 312 40,2130 56 022 1
 0416 REP 4 LAST 311 40,2131 6 0117 0
 0417 REP 1 40,2132 0 2150 1
 0418 REP 2 LAST 312 40,2133 50 137 1
 0419 REP 3 LAST 312 40,2134 57=001 1
 0420 REP 61 LAST 310 40,2135 54 154 0
 0421 REP 33 LAST 311 40,2136 3 4714 1
 0422 REP 62 LAST 312 40,2137 54 155 1
 0423 REP 2 LAST 187 40,2140 3 4377 0
 0424 REP 3 LAST 286 40,2141 0 7256 1
 0425 REP 63 LAST 312 40,2142 56 155 0
 0426 REP 5 LAST 312 40,2143 6 0117 0
 0427 REP 64 LAST 312 40,2144 54 155 1
 0428 REP 2 LAST 312 40,2145 0 2150 1
 0429 REP 65 LAST 312 40,2146 26 154 0
 0430 REP 1 40,2147 0 2166 1
 0431 REP 3 LAST 312 40,2150 50 137 1
 0432 REP 4 LAST 312 40,2151 55=001 0
 0433 REP 6 LAST 311 40,2152 4 0777 1
 0434 REP 4 LAST 312 40,2153 50 137 1
 0435 REP 1 40,2154 6 2216 0
 0436 40,2155 0 0006 1
 0437 REP 1 40,2156 1 2160 0
 0438 REP 1 40,2157 0 2213 0
 0439 REP 4 LAST 312 40,2160 3 8214 0
 0440 REP 3 LAST 312 40,2161 7 1000 1
 0441 REP 80 LAST 312 40,2162 10 000 0
 0442 REP 2 LAST 312 40,2163 0 2166 1
 0443 REP 7 LAST 312 40,2164 4 0777 1
 0444 REP 2 LAST 312 40,2165 0 2214 1
 0445 REP 15 LAST 310 40,2166 4 4712 0
 0446 REP 5 LAST 312 40,2167 6 0137 1
 0447 40,2170 0 0006 1
 0448 REP 1 40,2171 6 2164 0
 0449 REP 1 40,2172 0 7052 1
 A0450
 0451 REP 1 40,2173 02223 0
 0452 REP 5 LAST 312 40,2174 3 8214 0
 0453 REP 4 LAST 312 40,2175 7 1000 1
 0454 REP 61 LAST 312 40,2176 50 000 1
 0455 40,2177 0 2177 1

CAP THREE
 MASK DECBRNCH
 CCS A
 TC DECTOBIN
 INDEX INREL
 XCH VERBREG
 TS CYL
 CS CYL
 CS CYL
 XCH CYL
 AD CHAR
 TC ENDMTST
 DECTOBIN INDEX INREL
 XCH VERBREG
 TS MPAC
 CAP ZERO
 TS MPAC +1
 CAP TEN
 TC SHORTMP
 XCH MPAC +1
 AD CHAR
 TS MPAC +1
 TC ENDMTST
 ADS MPAC
 TC DECBND
 ENDMTST INDEX INREL
 TS VERBREG
 CS DSPCOUNT
 INDEX INREL
 AD CRITCON
 EXTEND
 BZF ENDMUM
 TC MORNUM
 CAP THREE
 MASK DECBRNCH
 CCS A
 TC DECBND
 CS DSPCOUNT
 TC MORNUM +1
 DECBND CS ONE
 AD INREL
 EXTEND
 BZF ENDMUM
 TC DMP
 ADRES DECON
 CAP THREE
 MASK DECBRNCH
 INDEX A
 TC +0

+0, OCTAL. +1, + DEC. +2, - DEC.
 +
 +0 OCTAL

SUM X 25XP-14 IN MPAC

10 X 25XP-14
 10SUM X 25XP-28 IN MPAC, MPAC+1

NO OP
 OP MUST BE 5TH CHAR

-0, DSPCOUNT = CRITCON
 - , DSPCOUNT G/ CRITCON

BLOCK NUMIN BY PLACING DSPCOUNT
 NEGATIVELY

IF INREL=0,1(VBREG,NNREG), LEAVE WHOLE
 IF INREL=2,3,4(R1,R2,R3), CONVERT TO FRAC
 MULT SUM X 25XP-28 IN MPAC, MPAC+1 BY
 25XP14/10FXP5. GIVRS(SUM/10FXP5)X25XP-14
 IN MPAC, +1, +2.

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| | | | | | | | | | | |
|-------|--|----|------|---------|------------------|----------|----------|----------|----------------------------|--|
| 0456 | REP | 1 | | 40,2200 | 0 2204 0 | TC | +DECSGN | | | |
| 0457 | | | | 40,2201 | 0 0008 1 | EXTEND | | | - CASE | |
| 0458 | REP | 66 | LAST | 312 | 40,2202 4 0156 1 | DCS | MPAC | +1 | | |
| 0459 | REP | 67 | LAST | 313 | 40,2203 52 156 1 | DXCH | MPAC | +1 | | |
| 0460 | REP | 68 | LAST | 313 | 40,2204 56 156 0 | +DECSGN | XCH | MPAC | +2 | |
| 0461 | REP | 6 | LAST | 312 | 40,2205 50 137 1 | | INDEX | INREL | | |
| 0462 | REP | 1 | | | 40,2206 55-004 0 | TS | XREGLP | -2 | | |
| 0463 | REP | 69 | LAST | 313 | 40,2207 56 156 0 | XCH | MPAC | +1 | | |
| 0464 | REP | 7 | LAST | 313 | 40,2210 50 137 1 | | INDEX | INREL | | |
| 0465 | REP | 5 | LAST | 312 | 40,2211 55-001 0 | TS | VERBREG | | | |
| 0466 | REP | 2 | LAST | 312 | 40,2212 0 2184 0 | TC | ENDALL | | | |
| 0467 | REP | 8 | LAST | 312 | 40,2213 10 777 1 | MORNUM | CCS | DSPCOUNT | DECREMENT DSPCOUNT | |
| 0468 | REP | 9 | LAST | 313 | 40,2214 54 777 1 | TS | DSPCOUNT | | | |
| 0469 | REP | 25 | LAST | 311 | 40,2215 0 5112 0 | TC | ENDOPJOB | | | |
| 0470 | | | | | 40,2216 00022 1 | CRITCON | OCT | 22 | (DEC 18) | |
| 0471 | | | | | 40,2217 00020 0 | | OCT | 20 | (DEC 16) | |
| 0472 | | | | | 40,2220 00012 1 | | OCT | 12 | (DEC 10) | |
| 0473 | | | | | 40,2221 00005 1 | | OCT | 5 | | |
| 0474 | | | | | 40,2222 00000 1 | | OCT | 0 | | |
| 0475 | | | | | 40,2223 05174 0 | DRCON | 2DEC | E-5 R14 | 2EXP14/10EXP5 = .16384 DEC | |
| 0476 | | | | | 40,2224 13261 0 | | | | | |
| R0476 | GETINREL GETS PROPER DATA REG REL ADDRESS FOR CURRENT (DSPCOUNT) AND | | | | | | | | | |
| R0477 | PUTS IN INTO INREL. +0 VERBREG, 1 NOUNREG, 2 XREG, 3 YREG, 4 ZREG. | | | | | | | | | |
| 0478 | REP | 10 | LAST | 313 | 40,2225 50 777 0 | GETINREL | INDEX | DSPCOUNT | | |
| 0479 | REP | 1 | | | 40,2226 3 2231 0 | CAP | INRELTAB | | | |
| 0480 | REP | 8 | LAST | 313 | 40,2227 54 137 0 | TS | INREL | | (A TEMP, REG) | |
| 0481 | REP | 38 | LAST | 301 | 40,2230 0 0002 0 | TC | Q | | | |
| 0482 | | | | | 40,2231 00004 0 | INRELTAB | OCT | 4 | R3D5 (DSPCOUNT = 0) | |
| 0483 | | | | | 40,2232 00004 0 | | OCT | 4 | R3D4 = (1) | |
| 0484 | | | | | 40,2233 00004 0 | | OCT | 4 | R3D3 = (2) | |
| 0485 | | | | | 40,2234 00004 0 | | OCT | 4 | R3D2 = (3) | |
| 0486 | | | | | 40,2235 00004 0 | | OCT | 4 | R3D1 = (4) | |
| 0487 | | | | | 40,2236 00003 1 | | OCT | 3 | R2D5 = (5) | |
| 0488 | | | | | 40,2237 00003 1 | | OCT | 3 | R2D4 = (6) | |
| 0489 | | | | | 40,2240 00003 1 | | OCT | 3 | R2D3 = (7) | |
| 0490 | | | | | 40,2241 00003 1 | | OCT | 3 | R2D2 = (8D) | |
| 0491 | | | | | 40,2242 00003 1 | | OCT | 3 | R2D1 = (9D) | |
| 0492 | | | | | 40,2243 00002 0 | | OCT | 2 | R1D5 = (10D) | |
| 0493 | | | | | 40,2244 00002 0 | | OCT | 2 | R1D4 = (11D) | |
| 0494 | | | | | 40,2245 00002 0 | | OCT | 2 | R1D3 = (12D) | |
| 0495 | | | | | 40,2246 00002 0 | | OCT | 2 | R1D2 = (13D) | |
| 0496 | | | | | 40,2247 00002 0 | | OCT | 2 | R1D1 = (14D) | |
| 0497 | REP | 1 | | | 40,2250 0 5640 0 | TC | CCSHOLE | | NO DSPCOUNT NUMBER = 15D | |
| 0498 | | | | | 40,2251 00001 0 | | OCT | 1 | ND2 = (16D) | |



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| | | | | | | | | | |
|-------|-----|----|------|---------|---------|----------|----------|-------|-----------|
| 0499 | | | | 40,2252 | 00001 0 | | OCT | 1 | |
| 0500 | | | | 40,2253 | 00000 1 | | OCT | 0 | |
| 0501 | | | | 40,2254 | 00000 1 | | OCT | 0 | |
| 0502 | REP | 34 | LAST | 312 | 40,2255 | 3 4714 1 | VERR | CAP | ZERO |
| 0503 | REP | 6 | LAST | 313 | 40,2256 | 55=001 0 | | TS | VERRREG |
| 0504 | REP | 2 | LAST | 188 | 40,2257 | 3 4374 0 | | CAP | VD1 |
| 0505 | REP | 11 | LAST | 313 | 40,2260 | 54 777 1 | NVCOM | TS | DSPCOUNT |
| 0506 | REP | 1 | | | 40,2261 | 0 2502 1 | | TC | ZBLANK |
| 0507 | REP | 16 | LAST | 312 | 40,2262 | 3 4712 1 | | CAP | ONE |
| 0508 | REP | 5 | LAST | 312 | 40,2263 | 55=000 1 | | TS | DECRNCH |
| 0509 | REP | 35 | LAST | 314 | 40,2264 | 3 4714 1 | | CAP | ZERO |
| 0510 | REP | 2 | LAST | 188 | 40,2265 | 55=013 0 | | TS | RECRST |
| 0511 | REP | 1 | | | 40,2266 | 3 4233 1 | | CAP | ENDINST |
| 0512 | REP | 1 | | | 40,2267 | 54 136 1 | | TS | ENTRET |
| A0513 | | | | | | | | | |
| 0514 | REP | 26 | LAST | 313 | 40,2270 | 0 5112 0 | | TC | ENDOFJOB |
| 0515 | REP | 36 | LAST | 314 | 40,2271 | 3 4714 1 | NOLN | CAP | ZERO |
| 0516 | REP | 7 | LAST | 265 | 40,2272 | 55=002 0 | | TS | NOLNREG |
| 0517 | REP | 1 | | | 40,2273 | 3 4375 1 | | CAP | ND1 |
| 0518 | REP | 1 | | | 40,2274 | 0 2260 1 | | TC | NVCOM |
| 0519 | REP | 1 | | | 40,2275 | 0 2347 0 | NEGSCN | TC | SIGNTEST |
| 0520 | REP | 1 | | | 40,2276 | 0 2334 1 | | TC | +ON |
| 0521 | REP | 7 | LAST | 297 | 40,2277 | 3 4711 1 | | CAP | TWO |
| 0522 | REP | 9 | LAST | 313 | 40,2300 | 50 137 1 | BOTHSCN | INDEX | INREL |
| 0523 | REP | 26 | LAST | 253 | 40,2301 | 6 4704 0 | | AD | BIT7 |
| 0524 | REP | 6 | LAST | 314 | 40,2302 | 27=000 1 | | ADS | DECRNCH |
| 0525 | REP | 4 | LAST | 311 | 40,2303 | 11=015 0 | PIXCLPAS | CCS | CLPASS |
| 0526 | REP | 37 | LAST | 314 | 40,2304 | 3 4714 1 | | CAP | ZERO |
| 0527 | REP | 5 | LAST | 314 | 40,2305 | 55=015 0 | | TS | CLPASS |
| 0528 | | | | | 40,2306 | 0 2307 1 | | TC | +1 |
| 0529 | REP | 27 | LAST | 314 | 40,2307 | 0 5112 0 | | TC | ENDOFJOB |
| 0530 | REP | 2 | LAST | 314 | 40,2310 | 0 2347 0 | POSCN | TC | SIGNTEST |
| 0531 | REP | 1 | | | 40,2311 | 0 2314 0 | | TC | +ON |
| 0532 | REP | 17 | LAST | 314 | 40,2312 | 3 4712 1 | | CAP | ONE |
| 0533 | REP | 1 | | | 40,2313 | 0 2300 0 | | TC | BOTHSCN |
| 0534 | REP | 39 | LAST | 313 | 40,2314 | 22 002 0 | +ON | LXCH | 0 |
| 0535 | REP | 2 | LAST | 311 | 40,2315 | 0 2225 0 | | TC | GETINREL |
| 0536 | REP | 10 | LAST | 314 | 40,2316 | 50 137 1 | | INDEX | INREL |
| 0537 | REP | 1 | | | 40,2317 | 3 2342 0 | | CAP | SORTAB -2 |
| 0538 | REP | 1 | | | 40,2320 | 54 123 0 | | TS | SONOFF |
| 0539 | REP | 16 | LAST | 314 | 40,2321 | 6 4712 1 | | AD | ONE |
| 0540 | REP | 1 | | | 40,2322 | 54 122 1 | | TS | SONON |
| 0541 | REP | 38 | LAST | 314 | 40,2323 | 3 4714 1 | SONCOM | CAP | ZERO |
| 0542 | REP | 2 | LAST | 311 | 40,2324 | 54 124 1 | | TS | CODE |

ND1 = (17D)
VD2 = (18D)
VD1 = (19D)

SET FOR DEC V/N CODE

SET FOR ENTPASO
IF DSPALARM OCCURS BEFORE FIRST ENTPASO
OR NVSUB, ENTRET MUST ALREADY BE SET
TO TC ENDOFJOB

ND1, OCT 21 (DEC 17)

SET DEC COMP BIT TO 1 (IN DECRNCH)
BIT 5 FOR R1, BIT 4 FOR R2,
BIT 3 FOR R3.
IF CLPASS IS + OR +0, MAKE IT +0.



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| | | | | | | | | | | |
|------|-----|----|------|-----|---------|----|------|---|-------|-----------|
| 0543 | REP | 2 | LAST | 314 | 40,2325 | 56 | 123 | 1 | XCH | SONOFF |
| 0544 | REP | 1 | | | 40,2326 | 0 | 3307 | 0 | TC | 11DSPIN |
| 0545 | REP | 14 | LAST | 260 | 40,2327 | 3 | 4700 | 1 | CAP | BIT11 |
| 0546 | REP | 3 | LAST | 314 | 40,2330 | 54 | 124 | 1 | TS | CODE |
| 0547 | REP | 2 | LAST | 314 | 40,2331 | 56 | 122 | 0 | XCH | SONON |
| 0548 | REP | 2 | LAST | 315 | 40,2332 | 0 | 3307 | 0 | TC | 11DSPIN |
| 0549 | REP | 25 | LAST | 301 | 40,2333 | 0 | 0001 | 0 | TC | L |
| 0550 | REP | 40 | LAST | 314 | 40,2334 | 22 | 002 | 0 | -CN | LKCH |
| 0551 | REP | 3 | LAST | 314 | 40,2335 | 0 | 2225 | 0 | TC | GETINREL |
| 0552 | REP | 11 | LAST | 314 | 40,2336 | 50 | 137 | 1 | INDEX | INREL |
| 0553 | REP | 2 | LAST | 314 | 40,2337 | 3 | 2342 | 0 | CAP | SONTAB -2 |
| 0554 | REP | 3 | LAST | 315 | 40,2340 | 54 | 122 | 1 | TS | SONON |
| 0555 | REP | 19 | LAST | 314 | 40,2341 | 6 | 4712 | 1 | AD | ONE |
| 0556 | REP | 3 | LAST | 315 | 40,2342 | 54 | 123 | 0 | TS | SONOFF |
| 0557 | REP | 1 | | | 40,2343 | 0 | 2323 | 1 | TC | SONCOM |

| | | | | | | | | | | | |
|------|-----|----|------|-----|---------|-------|------|--------|----------|----------|--------------------------------------|
| 0558 | | | | | 40,2344 | 00005 | 1 | SONTAB | OCT | 5 | -R1 |
| 0559 | | | | | 40,2345 | 00003 | 1 | | OCT | 3 | -R2 |
| 0560 | | | | | 40,2346 | 00000 | 1 | | OCT | 0 | -R3 |
| 0561 | REP | 41 | LAST | 315 | 40,2347 | 22 | 002 | 0 | SIGNTEST | LKCH | 0 |
| 0562 | REP | 6 | LAST | 312 | 40,2350 | 3 | 6214 | 0 | CAP | THREE | ALLOWS +,- ONLY WHEN DSPCOUNT=R1D1, |
| 0563 | REP | 7 | LAST | 314 | 40,2351 | 7 | 1000 | 1 | MASK | DECRNCH | R2D1, OR R3D1. ALLOWS ONLY FIRST OF |
| 0564 | REP | 82 | LAST | 312 | 40,2352 | 10 | 000 | 0 | CCS | A | CONSECUTIVE +/- CHARACTERS. |
| 0565 | REP | 28 | LAST | 314 | 40,2353 | 0 | 5112 | 0 | TC | ENDOPJCH | IF LOW2 BITS OF DECRNCH NOT= 0, SIGN |
| 0566 | REP | 2 | LAST | 227 | 40,2354 | 4 | 4333 | 1 | CS | R1D1 | FOR THIS WORD ALREADY IN. REJECT. |
| 0567 | REP | 1 | | | 40,2355 | 0 | 2363 | 0 | TC | SONTST1 | |
| 0568 | REP | 1 | | | 40,2356 | 4 | 4334 | 0 | CS | R2D1 | |
| 0569 | REP | 2 | LAST | 315 | 40,2357 | 0 | 2363 | 0 | TC | SONTST1 | |
| 0570 | REP | 1 | | | 40,2360 | 4 | 4335 | 1 | CS | R3D1 | |
| 0571 | REP | 3 | LAST | 315 | 40,2361 | 0 | 2363 | 0 | TC | SONTST1 | |
| 0572 | REP | 29 | LAST | 315 | 40,2362 | 0 | 5112 | 0 | AD | ENDOPJCH | NO MATCH FOUND. SIGN ILLEGAL. |
| 0573 | REP | 12 | LAST | 314 | 40,2363 | 6 | 0777 | 0 | SONTST1 | AD | DSPCOUNT |
| 0574 | | | | | 40,2364 | 0 | 0006 | 1 | EXTEND | | |
| 0575 | | | | | 40,2365 | 1 | 2367 | 0 | BZF | +2 | MATCH FOUND |
| 0576 | REP | 42 | LAST | 315 | 40,2366 | 0 | 0002 | 0 | TC | 0 | |
| 0577 | REP | 26 | LAST | 315 | 40,2367 | 0 | 0001 | 0 | TC | 1 | SIGN LEGAL |

R0578 CLEAR FLANKS WHICH R1, R2, R3 IS CURRENT OR LAST TO BE DISPLAYED (PERTINE
R0579 NT XREG, YREG, ZREG IS CLEARED). SUCCESSIVE CLEARS TAKE CARE OF EACH RX
R0580 L/ RC UNTIL R1 IS DONE. THEN NO FURTHER ACTION

R0581 THE SINGLE COMPONENT LOAD VERBS ALLOW ONLY THE SINGLE RC THAT IS
R0582 APPROPRIATE TO BE CLEARED.

R0583 CLPASS +0 PASS0, CAN BE RACKED UP
R0584 +NZ HIPASS, CAN BE RACKED UP
R0585 -NZ PASS0, CANNOT BE RACKED UP

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| | | | | | | | | | | | |
|------|-----|----|------|-----|--|----------|----------|--------|------------|--|--|
| 0586 | REP | 13 | LAST | 315 | 40,2370 | 10 777 1 | CLEAR | CCS | DSPCOUNT | | |
| 0587 | REP | 20 | LAST | 315 | 40,2371 | 6 4712 1 | | AD | ONE | | |
| 0588 | | | | | 40,2372 | 0 2374 0 | | TC | +2 | | |
| 0589 | REP | 21 | LAST | 316 | 40,2373 | 6 4712 1 | | AD | ONE | | |
| 0590 | REP | 03 | LAST | 315 | 40,2374 | 50 000 1 | | INDEX | A | DO NOT CHANGE DSPCOUNT BECAUSE MAY LATER FAIL LEGALTST. MUST SET INREL, EVEN FOR HIPASS. | |
| 0591 | REP | 2 | LAST | 313 | 40,2375 | 3 2231 0 | | CAP | INRELTAB | | |
| 0592 | REP | 12 | LAST | 315 | 40,2376 | 54 137 0 | | TS | INREL | | |
| 0593 | REP | 6 | LAST | 314 | 40,2377 | 11=015 0 | | CCS | CLPASS | | |
| 0594 | REP | 1 | | | 40,2400 | 0 2406 1 | | TC | CLPASHI | | |
| 0595 | | | | | 40,2401 | 0 2403 1 | | TC | +2 | +0 IF CLPASS IS +0 OR -, IT IS PASS0 | |
| 0596 | | | | | 40,2402 | 0 2403 1 | | CA | +1 | | |
| 0597 | REP | 13 | LAST | 316 | 40,2403 | 3 0137 1 | | TC | INREL | | |
| 0598 | REP | 1 | | | 40,2404 | 0 2430 1 | | TC | LEGALTST | | |
| 0599 | REP | 1 | | | 40,2405 | 0 2423 0 | | TC | CLEAR1 | | |
| 0600 | REP | 14 | LAST | 316 | 40,2406 | 10 137 0 | CLPASHI | CCS | INREL | | |
| 0601 | REP | 15 | LAST | 316 | 40,2407 | 54 137 0 | | TS | INREL | | |
| 0602 | REP | 2 | LAST | 316 | 40,2410 | 0 2430 1 | | TC | LEGALTST | | |
| 0603 | REP | 1 | | | 40,2411 | 3 2500 0 | | CAP | DOUBLEK +2 | +3 TO - NUMBER. RACKS DATA REQUESTS. | |
| 0604 | REP | 3 | LAST | 314 | 40,2412 | 27=013 0 | | ADS | REORET | | |
| 0605 | REP | 16 | LAST | 316 | 40,2413 | 3 0137 1 | | CA | INREL | | |
| 0606 | REP | 1 | | | 40,2414 | 54 125 0 | | TS | MIXTEMP | TEMP STORAGE FOR INREL | |
| 0607 | | | | | 40,2415 | 0 0006 1 | | EXTEND | | | |
| 0608 | REP | 7 | LAST | 314 | 40,2416 | 27=001 0 | | DIM | VERBREG | DECREMENT VERB AND RE-DISPLAY | |
| 0609 | REP | 38 | LAST | 301 | 40,2417 | 0 4555 0 | | TC | BANKCALL | | |
| 0610 | REP | 1 | | | 40,2420 | 62337 1 | | CADR | UPDATVR | | |
| 0611 | REP | 2 | LAST | 316 | 40,2421 | 3 0125 1 | | CA | MIXTEMP | | |
| 0612 | REP | 17 | LAST | 316 | 40,2422 | 54 137 0 | | TS | INREL | RESTORE INREL. | |
| 0613 | REP | 1 | | | 40,2423 | 0 2426 0 | CLEAR1 | TC | CLR5 | | |
| 0614 | REP | 7 | LAST | 316 | 40,2424 | 25=015 1 | | INCR | CLPASS | ONLY IF CLPASS IS + OR +0, SET FOR HIGHER PASS. | |
| 0615 | REP | 30 | LAST | 315 | 40,2425 | 0 5112 0 | | TC | ENDOFJOB | USES 5BLANK BUT AVOIDS ITS TC GETINREL. | |
| 0616 | REP | 43 | LAST | 315 | 40,2426 | 22 002 0 | CLR5 | LXCH | Q | | |
| 0617 | REP | 1 | | | 40,2427 | 0 2441 1 | | TC | 5BLANK +2 | | |
| 0618 | REP | 2 | LAST | 229 | 40,2430 | 6 7715 0 | LEGALTST | AD | NEG2 | | |
| 0619 | REP | 64 | LAST | 316 | 40,2431 | 10 000 0 | | CCS | A | LEGAL INREL G/ 2 | |
| 0620 | REP | 44 | LAST | 316 | 40,2432 | 0 0002 0 | | TC | Q | | |
| 0621 | REP | 2 | LAST | 313 | 40,2433 | 0 5640 0 | | TC | CCSHOLE | ILLEGAL INREL = 0,1 | |
| 0622 | REP | 31 | LAST | 316 | 40,2434 | 0 5112 0 | | TC | ENDOFJOB | LEGAL INREL = 2 | |
| 0623 | REP | 45 | LAST | 316 | 40,2435 | 0 0002 0 | | TC | Q | | |
| 0624 | | | | | 5BLANK BLANKS 5 CHAR DISPLAY WORD IN R1, R2, OR R3. IT ALSO ZEROES XREG, YREG, OR ZREG. PLACE ANY + DSPCOUNT NUMBER FOR PERTINENT RC INTO DSPCOUNT | | | | | | |
| 0625 | | | | | DSPCOUNT IS LEFT SET TO LEFT MOST DSP NUMB FOR RC JUST BLANKED. | | | | | | |
| 0627 | REP | 14 | LAST | 316 | 40,2436 | 54 777 1 | | TS | DSPCOUNT | NEEDED FOR BLANKS/R | |
| 0628 | REP | 46 | LAST | 316 | 40,2437 | 22 002 0 | 5BLANK | LXCH | Q | | |
| 0629 | REP | 4 | LAST | 315 | 40,2440 | 0 2225 0 | | TC | GETINREL | | |
| 0630 | REP | 39 | LAST | 314 | 40,2441 | 3 4714 1 | | CAP | ZERO | | |
| 0631 | REP | 18 | LAST | 316 | 40,2442 | 50 137 1 | | INDEX | INREL | | |
| 0632 | REP | 8 | LAST | 316 | 40,2443 | 55=001 0 | | TS | VERBREG | ZERO X, Y, Z REG. | |

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| | | | | | | | | | | |
|------|--|----|------|-----|---------|----------|----------|----------|--------------------------------------|--|
| 0633 | REP | 19 | LAST | 316 | 40,2444 | 50 137 1 | INDEX | INREL | | |
| 0634 | REP | 2 | LAST | 313 | 40,2445 | 55=004 0 | TS | XREGLP | -2 | |
| 0635 | REP | 4 | LAST | 316 | 40,2446 | 54 124 1 | TS | CODE | | |
| 0636 | REP | 20 | LAST | 317 | 40,2447 | 50 137 1 | INDEX | INREL | ZERO PERTINENT DEC COMP BIT. | |
| 0637 | REP | 27 | LAST | 314 | 40,2450 | 4 4704 1 | CS | BITT | PROTECT OTHERS | |
| 0638 | REP | 8 | LAST | 316 | 40,2451 | 7 1000 1 | MASK | DECBRNCH | | |
| 0639 | REP | 1 | | | 40,2452 | 7 2501 0 | MASK | BRNCHCON | ZERO LOW 2 BITS. | |
| 0640 | REP | 9 | LAST | 317 | 40,2453 | 55=000 1 | TS | DECBRNCH | | |
| 0641 | REP | 21 | LAST | 317 | 40,2454 | 50 137 1 | INDEX | INREL | | |
| 0642 | REP | 1 | | | 40,2455 | 3 2471 1 | CAF | SINBLANK | -2 BLANK ISOLATED CHAR SEPARATELY | |
| 0643 | REP | 2 | LAST | 311 | 40,2456 | 54 143 0 | TS | COUNT | | |
| 0644 | REP | 2 | LAST | 311 | 40,2457 | 0 3225 1 | TC | DSPIN | | |
| 0645 | REP | 22 | LAST | 317 | 40,2460 | 50 137 1 | INDEX | INREL | | |
| 0646 | REP | 2 | LAST | 316 | 40,2461 | 3 2474 1 | CAF | DOUBLK | -2 | |
| 0647 | REP | 15 | LAST | 316 | 40,2462 | 54 777 1 | TS | DSPCOUNT | | |
| 0648 | REP | 2 | LAST | 314 | 40,2463 | 0 2502 1 | TC | 2BLANK | | |
| 0649 | REP | 8 | LAST | 314 | 40,2464 | 4 4711 0 | CS | TWO | | |
| 0650 | REP | 16 | LAST | 317 | 40,2465 | 26 777 1 | ADS | DSPCOUNT | | |
| 0651 | REP | 3 | LAST | 317 | 40,2466 | 0 2502 1 | TC | 2BLANK | | |
| 0652 | REP | 23 | LAST | 317 | 40,2467 | 50 137 1 | INDEX | INREL | | |
| 0653 | REP | 3 | LAST | 316 | 40,2470 | 3 4331 1 | CAF | R1D1 | -2 | |
| 0654 | REP | 17 | LAST | 317 | 40,2471 | 54 777 1 | TS | DSPCOUNT | SET DSPCOUNT TO LEFT MOST DSP NUMBER | |
| 0655 | REP | 27 | LAST | 315 | 40,2472 | 0 0001 0 | TC | L | OF REG. JUST BLANKED | |
| 0656 | | | | | 40,2473 | 00016 0 | SINBLANK | OCT | 16 DEC 14 | |
| 0657 | | | | | 40,2474 | 00005 1 | | OCT | 5 | |
| 0658 | | | | | 40,2475 | 00004 0 | | OCT | 4 | |
| 0659 | | | | | 40,2476 | 00015 0 | DOUBLK | OCT | 15 DEC 13 | |
| 0660 | | | | | 40,2477 | 00011 1 | | OCT | 11 DEC 9 | |
| 0661 | | | | | 40,2500 | 00003 1 | | OCT | 3 | |
| 0662 | | | | | 40,2501 | 77774 0 | BRNCHCON | OCT | 77774 | |
| 0663 | 2BLANK BLANKS TWO CHAR. PLACE DSP NUMBER OF LEFT CHAR OF THE PAIR INTO | | | | | | | | | |
| 0664 | DSPCOUNT. THIS NUMBER IS LEFT IN DSPCOUNT | | | | | | | | | |
| 0665 | REP | 16 | LAST | 317 | 40,2502 | 3 0777 0 | 2BLANK | CA | DSPCOUNT | |
| 0666 | REP | 4 | LAST | 261 | 40,2503 | 54 021 0 | TS | SR | | |
| 0667 | REP | 1 | | | 40,2504 | 4 2515 0 | CS | BLANKCON | | |
| 0668 | | | | | 40,2505 | 0 0004 0 | | INHINT | | |
| 0669 | REP | 5 | LAST | 317 | 40,2506 | 50 021 1 | INDEX | SR | | |
| 0670 | REP | 25 | LAST | 187 | 40,2507 | 57=023 1 | XCH | DSPTAB | | |
| 0671 | | | | | 40,2510 | 0 0006 1 | | EXTEND | | |
| 0672 | | | | | 40,2511 | 6 2513 1 | RZMF | +2 | IF OLD CONTENTS -, NOLIT OK | |
| 0673 | REP | 6 | LAST | 188 | 40,2512 | 25=016 1 | INCR | NOLIT | IF OLD CONTENTS +, +1 TO NOLIT | |
| 0674 | | | | | 40,2513 | 0 0003 1 | | RELINT | IF -, NOLIT OK | |
| 0675 | REP | 47 | LAST | 316 | 40,2514 | 0 0002 0 | TC | Q | | |
| 0676 | | | | | 40,2515 | 04000 0 | BLANKCON | OCT | 4000 | |



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P0677 ENTER PASS 0 IS THE ESCUTE FUNCTION. HIGHER ORDER ENTERS ACS TO LOAD
 R0678 DATA. THE SIGN OF REQRET DETERMINES THE PASS, + FOR PASS 0, - FOR HIGHER
 R0679 PASSES.
 R0680 MACHINE CADR TO BE SPECIFIED (MCTBS) NOLNS DESIRE AN ECADR TO BE LOADED
 R0681 WHEN USED WITH LOAD VERBS, MONITOR VERBS, OR DISPLAY VERBS (EXCEPT
 R0682 VERB = FIXED MEMORY DISPLAY, WHICH REQUIRES AN FCADR).

0683 41,2000 BANK 41
 068301 REP 1 41,2000 SETLOC PINBALL2
 068302 41,2000 BANK

06835 REP 1 COUNT 41/PIN

0684 REP 1 41,2000 0 3534 0 NVSRB TC NVSR1
 0685 REP 1 41,2001 0 2771 1 LOADLV1 TC LOADLV

STANDARD LEAD INS. DONT MOVE.

END OF STANDARD LEAD INS.

A0686
 0687 REP 40 LAST 316 41,2002 3 4714 1 ENTER CAP ZERO
 0688 REP 8 LAST 318 41,2003 55=015 0 TS CLPASS
 0689 REP 2 LAST 314 41,2004 3 4233 1 CAP ENDINST
 0690 REP 2 LAST 314 41,2005 54 136 1 TS ENTRET
 0691 REP 4 LAST 316 41,2006 11=013 0 CCS REQRET
 0692 REP 1 41,2007 0 2035 0 TC ENTPASO
 0693 REP 2 LAST 318 41,2010 0 2035 0 TC ENTPASO
 0694 41,2011 0 2012 0 TC +1
 0695 REP 1 41,2012 3 2033 0 ENTPASHI CAP M-ADREP
 0696 REP 5 LAST 318 41,2013 6 1013 1 AD REQRET
 0697 41,2014 0 0006 1 EXTEND
 0698 REP 1 41,2015 1 2027 1 BZF ACCEPTWD
 0699 REP 7 LAST 315 41,2016 3 6214 0 CAP INSEE
 0700 REP 10 LAST 317 41,2017 7 1000 1 MASK DECBINCH
 0701 REP 85 LAST 316 41,2020 10 000 0 CCS A
 0702 41,2021 0 2023 1 TC +2
 0703 REP 2 LAST 318 41,2022 0 2027 0 TC ACCEPTWD
 0704 REP 19 LAST 317 41,2023 10 777 1 CCS DSPCOUNT
 0705 REP 1 41,2024 0 2350 0 TC GODSPALM
 0706 REP 2 LAST 318 41,2025 0 2350 0 TC GODSPALM
 0707 41,2026 0 2027 0 TC +1
 0708 REP 6 LAST 318 41,2027 4 1013 0 ACCEPTWD CS REQRET
 0709 REP 7 LAST 318 41,2030 55=013 0 TS REQRET
 0710 REP 2 LAST 238 41,2031 0 4447 1 TC FLASHOFF
 0711 REP 6 LAST 318 41,2032 0 1013 1 TC REQRET

IF +, PASS 0
 IF -, PASS 0
 IF -, NOT PASS 0

IF L/ 2 CHAR IN FOR MM CDR, ALARM
 AND RECYCLE(DECIDE AT MMCHANG+1).

IF DEC, ALARM IF L/ 5 CHAR IN FOR DATA,
 BUT LEAVE REQRET - AND FLASH ON, SO
 OPERATOR CAN SUPPLY MISSING NUMERICAL
 CHARACTERS AND CONTINUE.
 OCTAL. ANY NUMBER OF CHAR OK.

LESS THAN 5 CHAR DEC(DSPCOUNT IS +)
 LESS THAN 5 CHAR DEC(DSPCOUNT IS -)
 5 CHAR IN (DSPCOUNT IS -)
 5 CHAR IN (DSPCOUNT IS -)
 SET REQRET +.

0712 REP 3 LAST 316 0136 ENTEXIT = ENTRT
 0713 REP 1 41,2033 03421 0 M-ADREP ADRES MMCHANG +1

ASSUMES TC REQRET AT MMCHANG.



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| | | | | | | | | | | | |
|------|-----|----|------|---------|---------|-------|----------|---|-----------|-----------|----------|
| 0762 | REP | 1 | | 41,2113 | 02062 | 1 | LODNNLOC | 2 | CADR | LODNNTAB | |
| 0762 | REP | 1 | | 41,2114 | 64101 | 0 | | | | | |
| 0763 | | | | 41,2115 | 77772 | 0 | NEOS | | OCT | 77772 | |
| 0764 | REP | 70 | LAST | 313 | 41,2116 | 3 | 0156 | 0 | INTMCYBS | CA | MPAC +2 |
| 0765 | REP | 2 | LAST | 319 | 41,2117 | 0 | 4317 | 0 | TC | SETNCADR | |
| 0766 | REP | 5 | LAST | 227 | 41,2120 | 4 | 4715 | 1 | CS | FIVE | |
| 0767 | REP | 10 | LAST | 319 | 41,2121 | 6 | 1001 | 1 | AD | VERBREG | |
| 0768 | | | | 41,2122 | 0 | 0006 | 1 | | EXTEND | | |
| 0769 | REP | 4 | LAST | 319 | 41,2123 | 1 | 2133 | 0 | BZF | VERBPAN | |
| 0770 | REP | 2 | LAST | 315 | 41,2124 | 3 | 4335 | 0 | CAP | R3D1 | |
| 0771 | REP | 23 | LAST | 319 | 41,2125 | 54 | 777 | 1 | TS | DSPCOUNT | |
| 0772 | REP | 2 | LAST | 319 | 41,2126 | 3 | 1017 | 0 | CA | NOUNCADR | |
| 0773 | REP | 1 | | 41,2127 | 0 | 3353 | 1 | | TC | DSPOCTWD | |
| 0774 | REP | 5 | LAST | 320 | 41,2130 | 0 | 2133 | 1 | TC | VERBPAN | |
| 0775 | REP | 22 | LAST | 316 | 41,2131 | 6 | 4712 | 1 | AD | ONE | |
| 0776 | REP | 3 | LAST | 320 | 41,2132 | 0 | 4317 | 0 | TC | SETNCADR | |
| 0777 | REP | 1 | | 41,2133 | 4 | 2145 | 1 | | VERBPAN | LST2CON | |
| 0778 | REP | 11 | LAST | 320 | 41,2134 | 6 | 1001 | 1 | AD | VERBREG | |
| 0779 | REP | 86 | LAST | 318 | 41,2135 | 10 | 000 | 0 | CCS | A | |
| 0780 | REP | 23 | LAST | 320 | 41,2136 | 6 | 4712 | 1 | AD | ONE | |
| 0781 | | | | 41,2137 | 0 | 2141 | 1 | | TC | +2 | |
| 0782 | REP | 1 | | 41,2140 | 0 | 2148 | 0 | | TC | VERPANDIR | |
| 0783 | REP | 71 | LAST | 320 | 41,2141 | 54 | 154 | 0 | TS | MPAC | |
| 0784 | REP | 4 | LAST | 198 | 41,2142 | 0 | 4473 | 0 | TC | RELDSP | |
| 0785 | REP | 16 | LAST | 311 | 41,2143 | 0 | 4574 | 0 | TC | POSTJUMP | |
| 0786 | REP | 1 | | 41,2144 | 66000 | 1 | | | CADR | GOEXTVR | |
| 0788 | | | | 41,2145 | 00050 | 1 | | | LST2CON | DEC | 40 |
| 0790 | REP | 12 | LAST | 320 | 41,2146 | 51 | 001 | 1 | VERPANDIR | INDEX | VERBREG |
| 0791 | REP | 1 | | 41,2147 | 3 | 2151 | 0 | | CAP | VERBTAR | |
| 0792 | REP | 1 | | 41,2150 | 0 | 4577 | 0 | | TC | BANKJUMP | |
| 0793 | REP | 4 | LAST | 319 | 41,2151 | 62350 | 0 | | VERBTAR | CADR | GODSPALM |
| 0794 | REP | 1 | | 41,2152 | 62364 | 1 | | | CADR | DSPA | |
| 0795 | REP | 1 | | 41,2153 | 62372 | 0 | | | CADR | DSPB | |
| 0796 | REP | 1 | | 41,2154 | 62377 | 0 | | | CADR | DSPC | |
| 0797 | REP | 1 | | 41,2155 | 62357 | 1 | | | CADR | DSPAB | |
| 0798 | REP | 1 | | 41,2156 | 62352 | 1 | | | CADR | DSPARC | |
| 0799 | REP | 1 | | 41,2157 | 62520 | 1 | | | CADR | DECDSP | |
| 0800 | REP | 1 | | 41,2160 | 60675 | 0 | | | CADR | DSPDPDEC | |
| 0801 | REP | 5 | LAST | 320 | 41,2161 | 62350 | 0 | | CADR | GODSPALM | |
| 0802 | REP | 6 | LAST | 320 | 41,2162 | 62350 | 0 | | CADR | GODSPALM | |
| 0803 | REP | 1 | | 41,2163 | 61323 | 1 | | | CADR | DSPALARM | |
| 0804 | REP | 1 | | 41,2164 | 63220 | 1 | | | CADR | MONITOR | |
| 0805 | REP | 2 | LAST | 320 | 41,2165 | 63220 | 1 | | CADR | MONITOR | |
| 0806 | REP | 3 | LAST | 320 | 41,2166 | 63220 | 1 | | CADR | MONITOR | |
| 0807 | REP | 4 | LAST | 320 | 41,2167 | 63220 | 1 | | CADR | MONITOR | |

INTERNAL MACH CADR TO BE SPECIFIED.
ECADR INTO NOUNCADR. SET EB, NOUNADD.
NVSUB CALL LEFT CADR IN MPAC+2 FOR MACH
CADR TO BE SPECIFIED.

DONT DISPLAY CADR IF VR = 05.
VR NOT = 05. DISPLAY CADR.

ECADR INTO NOUNCADR. SETS EB, NOUNADD.

VERB-LST2CON

VERB G/ LST2CON

VERB L/ LST2CON

RELEASE DISPLAY SYST
GO TO GOEXTVR WITH VR=40 IN MPAC.

FIRST LIST2 VERB (EXTENDED VERB)

- VR00 ILLEGAL
- VR01 DISPLAY OCT COMP 1 (R1)
- VR02 DISPLAY OCT COMP 2 (R1)
- VR03 DISPLAY OCT COMP 3 (R1)
- VR04 DISPLAY OCT COMP 1,2 (R1,R2)
- VR05 DISPLAY OCT COMP 1,2,3 (R1,R2,R3)
- VR06 DECIMAL DISPLAY
- VR07 DP DECIMAL DISPLAY (R1,R2)
- VR08 SPARE
- VR09 SPARE
- VR10 SPARE
- VR11 MONITOR OCT COMP 1 (R1)
- VR12 MONITOR OCT COMP 2 (R1)
- VR13 MONITOR OCT COMP 3 (R1)
- VR14 MONITOR OCT COMP 1,2 (R1,R2)

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| | | | | | | | | | | | |
|-------|-----|----|------|-----|---------|-------|---|---------|-----------|------|---|
| 0608 | REP | 5 | LAST | 320 | 41,2170 | 63220 | 1 | CADR | MONITOR | VB15 | MONITOR OCT COMP 1,2,3 (R1,R2,R3) |
| 0609 | REP | 6 | LAST | 321 | 41,2171 | 63220 | 1 | CADR | MONITOR | VB16 | MONITOR DECIMAL |
| 0610 | REP | 7 | LAST | 321 | 41,2172 | 63220 | 1 | CADR | MONITOR | VB17 | MONITOR DP DEC (R1,R2) |
| 0611 | REP | 7 | LAST | 320 | 41,2173 | 62350 | 0 | CADR | GODSPALM | VB18 | SPARE |
| 0612 | REP | 8 | LAST | 321 | 41,2174 | 62350 | 0 | CADR | GODSPALM | VB19 | SPARE |
| 0613 | REP | 9 | LAST | 321 | 41,2175 | 62350 | 0 | CADR | GODSPALM | VB20 | SPARE |
| 0614 | REP | 1 | | | 41,2176 | 62726 | 0 | CADR | ALOAD | VB21 | LOAD COMP 1 (R1) |
| 0615 | REP | 1 | | | 41,2177 | 62737 | 0 | CADR | BLOAD | VB22 | LOAD COMP 2 (R2) |
| 0616 | REP | 1 | | | 41,2200 | 62754 | 0 | CADR | CLOAD | VB23 | LOAD COMP 3 (R3) |
| 0617 | REP | 1 | | | 41,2201 | 62677 | 0 | CADR | ARLOAD | VB24 | LOAD COMP 1,2 (R1,R2) |
| 0618 | REP | 1 | | | 41,2202 | 62612 | 0 | CADR | ABCLOAD | VB25 | LOAD COMP 1,2,3 (R1,R2,R3) |
| 0619 | REP | 10 | LAST | 321 | 41,2203 | 62350 | 0 | CADR | GODSPALM | VB26 | SPARE |
| 0620 | REP | 1 | | | 41,2204 | 63343 | 0 | CADR | DSPFMEN | VB27 | FIXED MEMORY DISPLAY |
| A0621 | | | | | | | | | | | THE FOLLOWING VERBS MAKE NO NOUN TEST |
| 0622 | REP | 11 | LAST | 321 | 41,2205 | 62350 | 0 | CADR | GODSPALM | VB28 | SPARE |
| 0623 | REP | 12 | LAST | 321 | 41,2206 | 62350 | 0 | CADR | GODSPALM | VB29 | SPARE |
| 0624 | REP | 1 | | | 41,2207 | 63456 | 0 | REQKLOC | VRREQKLOC | VB30 | REQUEST EXECUTIVE |
| 0625 | REP | 1 | | | 41,2210 | 63502 | 0 | CADR | VRQWA IT | VB31 | REQUEST WAITLIST |
| 0626 | REP | 1 | | | 41,2211 | 61360 | 0 | CADR | VRRESQ | VB32 | RESEQUENCE |
| 0627 | REP | 1 | | | 41,2212 | 61343 | 1 | CADR | VRPROC | VB33 | PROCEED WITHOUT DATA |
| 0628 | REP | 1 | | | 41,2213 | 61351 | 1 | CADR | VRTERM | VB34 | TERMINATE CURRENT TEST OR LOAD REQ |
| 0629 | REP | 1 | | | 41,2214 | 63603 | 1 | CADR | VRTSTLTS | VB35 | TEST LIGHTS |
| 0630 | REP | 1 | | | 41,2215 | 12347 | 1 | CADR | SLAP1 | VB36 | FRESH START |
| 0631 | REP | 2 | LAST | 318 | 41,2216 | 63420 | 1 | CADR | MMCHANG | VB37 | CHANGE MAJOR MODE |
| 0632 | REP | 13 | LAST | 321 | 41,2217 | 62350 | 0 | CADR | GODSPALM | VB38 | SPARE |
| 0633 | REP | 14 | LAST | 321 | 41,2220 | 62350 | 0 | CADR | GODSPALM | VB39 | SPARE |
| R0634 | | | | | | | | | | | THE LIST2 VERBANK IS LOCATED IN THE EXTENDED VERB BANK. |

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R0835 NNADTAB CONTAINS A RELATIVE ADDRESS, IDADDR(L IN LOG 10 BITS), REFERRING
 R0836 TO WHERE 3 CONSECUTIVE ADDRESSES ARE STORED (IN IDADDTAB).
 R0837 MIXNOLN GETS DATA AND STORES IN MIXTEMP,+1,+2. IT SETS NOLNADD FOR
 R0838 MIXTEMP.

| | | | | | | | | | | |
|-------|-------|----|------|-----|---------|----------|---------|--------|----------|--|
| 0839 | REP | 4 | LAST | 319 | 41,2221 | 10 146 0 | MIXNOLN | CCS | NNADTEM | |
| 0840 | | | | | 41,2222 | 0 2226 0 | | TC | +4 | |
| 0841 | REP | 15 | LAST | 321 | 41,2223 | 0 2350 0 | | TC | GODSPALM | |
| 0842 | | | | | 41,2224 | 0 2226 0 | | TC | +2 | |
| 0843 | | | | | 41,2225 | 0 2226 0 | | TC | +1 | |
| 0844 | REP | 11 | LAST | 222 | 41,2226 | 4 6211 1 | | CS | SIX | |
| 0845 | REP | 13 | LAST | 320 | 41,2227 | 6 1001 1 | | AD | VERBREQ | |
| 0846 | | | | | 41,2230 | 0 0008 1 | | EXTEND | | |
| 0847 | | | | | 41,2231 | 6 2233 1 | | BZ*P | +2 | |
| 0848 | REP | 6 | LAST | 320 | 41,2232 | 0 2133 1 | | TC | VERBPAN | |
| 0849 | REP | 9 | LAST | 317 | 41,2233 | 3 4711 1 | | CAP | TWO | |
| 0850 | REP | 1 | | | 41,2234 | 54 117 1 | MIXN1 | TS | DECOLT | |
| 0851 | REP | 1 | | | 41,2235 | 6 2260 1 | | AD | MIXAD | |
| 0852 | REP | 1 | | | 41,2236 | 54 145 0 | | TS | NOLNADD | |
| 0853 | REP | 2 | LAST | 322 | 41,2237 | 50 117 0 | | INDEX | DECOLT | |
| 0854 | REP | 2 | LAST | 265 | 41,2240 | 3 0150 0 | | CA | IDAD1TEM | |
| 0855 | REP | 1 | | | 41,2241 | 54 122 1 | | TS | NOLNTEM | |
| A0856 | | | | | | | | | | |
| A0857 | | | | | | | | | | |
| 0858 | REP | 1 | | | 41,2242 | 0 3027 1 | | TC | SPRUMIX | |
| 0859 | REP | 1 | | | 41,2243 | 0 2261 0 | | TC | DPTST | |
| 0860 | REP | 1 | | | 41,2244 | 0 2246 0 | | TC | MIXN2 | |
| 0861 | REP | 2 | LAST | 322 | 41,2245 | 24 122 0 | | INCR | NOLNTEM | |
| 0862 | REP | 3 | LAST | 322 | 41,2246 | 3 0122 0 | MIXN2 | CA | NOLNTEM | |
| 0863 | REP | 3 | LAST | 131 | 41,2247 | 7 4372 1 | | MASK | LOW11 | |
| 0864 | REP | 1 | | | 41,2250 | 0 4327 0 | | TC | SETBRANK | |
| 0865 | REP | 87 | LAST | 320 | 41,2251 | 50 000 1 | | INDEX | A | |
| 0866 | | | | | 41,2252 | 3 0000 1 | | CA | 0 | |
| 0867 | REP | 2 | LAST | 322 | 41,2253 | 50 145 1 | | INDEX | NOLNADD | |
| 0868 | | | | | 41,2254 | 56 000 1 | | XCH | 0 | |
| 0869 | REP | 3 | LAST | 322 | 41,2255 | 10 117 1 | | CCS | DECOLT | |
| 0870 | REP | 1 | | | 41,2256 | 0 2234 0 | | TC | MIXN1 | |
| 0871 | REP | 7 | LAST | 322 | 41,2257 | 0 2133 1 | | TC | VERBPAN | |
| 0872 | REP | 3 | LAST | 316 | 41,2260 | 0 0125 1 | MIXAD | TC | MIXTEMP | |
| R0873 | DPTST | | | | | | | | | |
| R0874 | | | | | | | | | | |
| R0875 | | | | | | | | | | |
| 0876 | REP | 86 | LAST | 322 | 41,2261 | 50 000 1 | DPTST | INDEX | A | |
| 0877 | | | | | 41,2262 | 1 2263 0 | | TCP | +1 | |
| 0878 | REP | 48 | LAST | 317 | 41,2263 | 0 0002 0 | | TC | 0 | |
| 0879 | REP | 49 | LAST | 322 | 41,2264 | 0 0002 0 | | TC | 0 | |

+ IN USE
 +0 NOT IN USE
 - IN USE
 -0 IN USE

VERB L/S 6
 AVOID MIXNOLN SWAP IF VB NOT = DISPLAY

SET NOLNADD TO MIXTEMP + K
 GET IDADDTAB ENTRY FOR COMPONENT K
 OF NOLN.

TEST FOR DP (FOR OCT DISPLAY). IF SO, GET
 MINOR PART ONLY.
 GET SP ROUT NUMBER IN A

NO DP
 DP GET MINOR PART

ESURK (NO DP) OR (ESURK)+1 FOR DP
 SET EBANK, LEAVE EADDRS IN A.
 PICK UP C(ESURK) NOT DP
 OR C((ESURK)+1) FOR DP MINOR PART

STORE IN MIXTEM + K

OCTAL ONLY NO DP
 PRACT NO DP

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| | | | | | | | | | |
|-------|-----|----|------|-----|---------|----------|----------|--------|--------------------------------------|
| 0880 | REP | 50 | LAST | 322 | 41,2265 | 0 0002 0 | TC | 0 | DEG NO DP |
| 0881 | REP | 51 | LAST | 323 | 41,2266 | 0 0002 0 | TC | 0 | ARITH NO DP |
| 0882 | REP | 1 | | | 41,2267 | 1 2300 1 | TCP | DPTST1 | DP1OUT |
| 0883 | REP | 2 | LAST | 323 | 41,2270 | 1 2300 1 | TCP | DPTST1 | DP2OUT |
| 0884 | REP | 52 | LAST | 323 | 41,2271 | 0 0002 0 | TC | 0 | OPDSG NO DP |
| 0885 | REP | 3 | LAST | 323 | 41,2272 | 1 2300 1 | TCP | DPTST1 | DP3OUT |
| 0886 | REP | 53 | LAST | 323 | 41,2273 | 0 0002 0 | TC | 0 | HMS NO DP |
| 0887 | REP | 54 | LAST | 323 | 41,2274 | 0 0002 0 | TC | 0 | M/S NO DP |
| 0888 | REP | 4 | LAST | 323 | 41,2275 | 1 2300 1 | TCP | DPTST1 | DP4OUT |
| 08881 | REP | 55 | LAST | 323 | 41,2276 | 0 0002 0 | TC | 0 | ARITH1 NO DP |
| 08882 | REP | 56 | LAST | 323 | 41,2277 | 0 0002 0 | TC | 0 | 2INTOUT NO DP TO GET HI PART IN MPAC |
| 0889 | REP | 57 | LAST | 323 | 41,2300 | 50 002 0 | DPTST1 | INDEX | 0 |
| 0890 | | | | | 41,2301 | 0 0001 0 | TC | 1 | RETURN TO L+2 |
| 0891 | REP | 4 | LAST | 317 | 41,2302 | 3 4333 0 | RECDATX | CAP | R1D1 |
| 0892 | REP | 1 | | | 41,2303 | 1 2307 0 | TCP | RECCOM | |
| 0893 | REP | 2 | LAST | 315 | 41,2304 | 3 4334 1 | RECDATY | CAP | R2D1 |
| 0894 | REP | 2 | LAST | 323 | 41,2305 | 1 2307 0 | TCP | RECCOM | |
| 0895 | REP | 3 | LAST | 320 | 41,2306 | 3 4335 0 | RECDATZ | CAP | R3D1 |
| 0896 | REP | 24 | LAST | 320 | 41,2307 | 54 777 1 | RECCOM | TS | DSPCOUNT |
| 0897 | REP | 58 | LAST | 323 | 41,2310 | 4 0002 1 | | CS | 0 |
| 0898 | REP | 9 | LAST | 318 | 41,2311 | 55=013 0 | | TS | RECRET |
| 0899 | REP | 39 | LAST | 316 | 41,2312 | 0 4555 0 | | TC | BANKCALL |
| 0900 | REP | 2 | LAST | 316 | 41,2313 | 60437 1 | | CADR | SPLANK |
| 0901 | REP | 2 | LAST | 319 | 41,2314 | 0 4443 0 | | TC | FLASHON |
| 0902 | REP | 2 | LAST | 319 | 41,2315 | 0 0136 0 | ENDRODAT | TC | ENTEXIT |
| 0903 | REP | 8 | LAST | 314 | 41,2316 | 55=002 0 | | TS | NOUNREG |
| 0904 | REP | 59 | LAST | 323 | 41,2317 | 56 002 0 | UPDATNN | XCH | 0 |
| 0905 | REP | 1 | | | 41,2320 | 54 117 1 | | TS | UPDATRET |
| 0906 | | | | | 41,2321 | 0 0006 1 | | EXTEND | |
| 0907 | REP | 3 | LAST | 319 | 41,2322 | 3 2114 1 | | DCA | LDNNLOC |
| 0908 | REP | 5 | LAST | 319 | 41,2323 | 52 008 0 | | DxCH | Z |
| 0909 | REP | 5 | LAST | 322 | 41,2324 | 10 146 0 | | CCS | NNADTEM |
| 0910 | REP | 24 | LAST | 320 | 41,2325 | 6 4712 1 | | AD | ONE |
| 0911 | REP | 1 | | | 41,2326 | 1 2331 0 | | TCP | FUTADD |
| 0912 | REP | 2 | LAST | 323 | 41,2327 | 1 2332 0 | | TCP | FUTADD +1 |
| 0913 | REP | 3 | LAST | 323 | 41,2330 | 1 2332 0 | | TCP | FUTADD +1 |
| 0914 | REP | 4 | LAST | 320 | 41,2331 | 0 4317 0 | FUTADD | TC | SETNCADR |
| 0915 | REP | 2 | LAST | 314 | 41,2332 | 3 4375 1 | | CAP | ND1 |
| 0916 | REP | 25 | LAST | 323 | 41,2333 | 54 777 1 | | TS | DSPCOUNT |
| 0917 | REP | 9 | LAST | 323 | 41,2334 | 3 1002 1 | | CA | NOUNREG |
| 0918 | REP | 1 | | | 41,2335 | 1 2344 1 | | TCP | UPDAT1 |
| 0919 | REP | 14 | LAST | 322 | 41,2336 | 55=001 0 | | TS | VERRREG |
| 0920 | REP | 60 | LAST | 323 | 41,2337 | 56 002 0 | UPDATVR | XCH | 0 |
| 0921 | REP | 2 | LAST | 323 | 41,2340 | 54 117 1 | | TS | UPDATRET |
| 0922 | REP | 5 | LAST | 319 | 41,2341 | 3 4374 0 | | CAP | VD1 |
| 0923 | REP | 26 | LAST | 323 | 41,2342 | 54 777 1 | | TS | DSPCOUNT |

SWITCH BANKS TO NOUN TABLE READING ROUTINE.

NORMAL.

MCTRS DONT CHANGE NOUNADD
MCTBI DONT CHANGE NOUNADD
ECADR INTO NOUNCADR. SETS ER, NOUNADD.



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| | | | | | | | | | | | |
|------|-----|----|------|-----|---------|---|------|---|----------|----------|----------|
| 0924 | REF | 15 | LAST | 323 | 41,2343 | 3 | 1001 | 1 | CA | VERBREG | |
| 0925 | REF | 17 | LAST | 320 | 41,2344 | 0 | 4574 | 0 | UPDAT1 | TC | POSTJUMP |
| 0926 | REF | 1 | | | 41,2345 | 6 | 1222 | 1 | CADR | COVNUPDT | |
| 0927 | REF | 3 | LAST | 323 | 41,2346 | 0 | 0117 | 0 | TC | UPDATRET | |
| 0928 | REF | 2 | LAST | 319 | 41,2347 | 0 | 4161 | 0 | GOALMCYC | TC | ALMCYCLE |
| 0929 | REF | 18 | LAST | 324 | 41,2350 | 0 | 4574 | 0 | GODSPALM | TC | POSTJUMP |
| 0930 | REF | 2 | LAST | 320 | 41,2351 | 6 | 1323 | 1 | CADR | DSPALARM | |

CANT USE SWCALL TO GO TO DSPBCVN, SINCE
UPDATVB CAN ITSELF BE CALLED BY SWCALL.
NEEDED BECAUSE BANKJUMP CANT HANDLE P/P.

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R0931 NOUN TABLES
R0932 NOUN CODE L/40, NORMAL NOUN CASE. NOUN CODE G/8 40, MIXED NOUN CASE.
R0933 FOR NORMAL CASE, NNADTAB CONTAINS ONE BCADR FOR EACH NOUN.
R0934 +0 INDICATES NOUN NOT USED. - ENTRY INDICATES MACHINE CADR(B OR F) TO
R0935 BE SPECIFIED. -1 INDICATES CHANNEL TO BE SPECIFIED. -0 INDICATES AUGMENT
R0936 OF LAST MACHINE CADR SUPPLIED.

R0937 FOR MIXED CASE, NNADTAB CONTAINS ONE INDIRECT ADDRESS (IDADDREL) IN LOW
R0938 10 BITS, AND THE COMPONENT CODE NUMBER IN THE HIGH 5 BITS.

R0939 INTPTAB IS A PACKED TABLE OF THE FORM MMMMMMMNNPPPPP.

R0940 FOR THE NORMAL CASE, M-S ARE THE COMPONENT CODE NUMBER.
R0941 N-S ARE THE SF ROUTINE CODE NUMBER.
R0942 P-S ARE THE SF CONSTANT CODE NUMBER.

R0943 MIXED CASE, M-S ARE THE SF CONSTANT3 CODE NUMBER 3 COMPONENT CASE
R0944 N-S ARE THE SF CONSTANT2 CODE NUMBER
R0945 P-S ARE THE SF CONSTANT1 CODE NUMBER
R0946 N-S ARE THE SF CONSTANT2 CODE NUMBER 2 COMPONENT CASE
R0947 P-S ARE THE SF CONSTANT1 CODE NUMBER
R0948 P-S ARE THE SF CONSTANT1 CODE NUMBER 1 COMPONENT CASE

R0949 THERE IS ALSO AN INDIRECT ADDRESS TABLE (IDADDTAB) FOR MIXED CASE ONLY.
R0950 EACH ENTRY CONTAINS ONE BCADR. IDADDREL IS THE RELATIVE ADDRESS OF
R0951 THE FIRST OF THESE ENTRIES.
R0952 THERE IS ONE ENTRY IN THIS TABLE FOR EACH COMPONENT OF A MIXED NOUN
R0953 THEY ARE LISTED IN ORDER OF ASCENDING K.

R0954 THERE IS ALSO A SCALE FACTOR ROUTINE NUMBER TABLE (RUTMTAB) FOR MIXED
R0955 CASE ONLY. THERE IS ONE ENTRY PER MIXED NOUN. THE FORM IS,
R0956 QQQQRRRRSSSSSS
R0957 Q-S ARE THE SF ROUTINE 3 CODE NUMBER 3 COMPONENT CASE
R0958 R-S ARE THE SF ROUTINE 2 CODE NUMBER
R0959 S-S ARE THE SF ROUTINE 1 CODE NUMBER
R0960 B-S ARE THE SF ROUTINE 2 CODE NUMBER 2 COMPONENT CASE
R0961 S-S ARE THE SF ROUTINE 1 CODE NUMBER

R0962 IN OCTAL DISPLAY AND LOAD (OCT OR DEC) VERBS, EXCLUDE USE OF VERBS WHOSE
R0963 COMPONENT NUMBER IS GREATER THAN THE NUMBER OF COMPONENTS IN NOUN.
R0964 (ALL MACHINE ADDRESS TO BE SPECIFIED NOUNS ARE 3 COMPONENT.)
R0965 IN MULTI-COMPONENT LOAD VERBS, NO MIXING OF OCTAL AND DECIMAL DATA
R0966 COMPONENT WORDS IS ALLOWED. ALARM IF VIOLATION.

R0969 IN DECIMAL LOADS OF DATA, 5 NUMERICAL CHARACTERS MUST BE KEYED IN
R0970 BEFORE EACH ENTER. IF NOT, ALARM.

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| ADDR | RESP | TYPE | ADDR | DATA | DATA | DATA | DATA | DATA | DATA | DATA | |
|-------|--|------|------|---------------|---------|------|------|------|----------|-------|------------|
| P0971 | | | | DISPLAY VERBS | | | | | | | |
| 0972 | REP | 10 | LAST | 322 | 41,2352 | 4 | 4711 | 0 | DSPABC | CS | TWO |
| 0973 | REP | 1 | | | 41,2353 | 0 | 2423 | 0 | | TC | COMPTST |
| 0974 | REP | 3 | LAST | 322 | 41,2354 | 50 | 145 | 1 | | INDEX | NOUNADD |
| 0975 | | | | | 41,2355 | 4 | 0002 | 1 | | CS | 2 |
| 0976 | REP | 36 | LAST | 301 | 41,2356 | 56 | 132 | 1 | | XCH | RUP +2 |
| 0977 | REP | 25 | LAST | 323 | 41,2357 | 4 | 4712 | 0 | DSPAB | CS | ONE |
| 0978 | REP | 2 | LAST | 326 | 41,2360 | 0 | 2423 | 0 | | TC | COMPTST |
| 0979 | REP | 4 | LAST | 326 | 41,2361 | 50 | 145 | 1 | | INDEX | NOUNADD |
| 0980 | | | | | 41,2362 | 4 | 0001 | 1 | | CS | 1 |
| 0981 | REP | 37 | LAST | 326 | 41,2363 | 56 | 131 | 1 | | XCH | RUP +1 |
| 0982 | REP | 1 | | | 41,2364 | 0 | 2442 | 1 | DSPA | TC | DECTEST |
| 0983 | REP | 1 | | | 41,2365 | 0 | 2465 | 1 | | TC | TSIFORDP |
| 0984 | REP | 5 | LAST | 326 | 41,2366 | 50 | 145 | 1 | | INDEX | NOUNADD |
| 0985 | | | | | 41,2367 | 4 | 0000 | 0 | | CS | 0 |
| 0986 | REP | 38 | LAST | 326 | 41,2370 | 56 | 130 | 0 | DSPCOM1 | XCH | RUP |
| 0987 | REP | 1 | | | 41,2371 | 0 | 2404 | 0 | | TC | DSPCOM2 |
| 0988 | REP | 26 | LAST | 326 | 41,2372 | 4 | 4712 | 0 | DSPB | CS | ONE |
| 0989 | REP | 1 | | | 41,2373 | 0 | 2436 | 1 | | TC | DCOMPTST |
| 0990 | REP | 6 | LAST | 326 | 41,2374 | 50 | 145 | 1 | | INDEX | NOUNADD |
| 0991 | | | | | 41,2375 | 4 | 0001 | 1 | | CS | 1 |
| 0992 | REP | 1 | | | 41,2376 | 0 | 2370 | 1 | | TC | DSPCOM1 |
| 0993 | REP | 11 | LAST | 326 | 41,2377 | 4 | 4711 | 0 | DSPC | CS | TWO |
| 0994 | REP | 2 | LAST | 326 | 41,2400 | 0 | 2436 | 1 | | TC | DCOMPTST |
| 0995 | REP | 7 | LAST | 326 | 41,2401 | 50 | 145 | 1 | | INDEX | NOUNADD |
| 0996 | | | | | 41,2402 | 4 | 0002 | 1 | | CS | 2 |
| 0997 | REP | 2 | LAST | 326 | 41,2403 | 0 | 2370 | 1 | | TC | DSPCOM1 |
| 0998 | REP | 12 | LAST | 326 | 41,2404 | 4 | 4711 | 0 | DSPCOM2 | CS | TWO |
| 0999 | REP | 16 | LAST | 324 | 41,2405 | 6 | 1001 | 1 | | AD | VERRREG |
| 1000 | REP | 89 | LAST | 322 | 41,2406 | 10 | 000 | 0 | | CCS | A |
| 1001 | REP | 1 | | | 41,2407 | 0 | 2412 | 1 | | TC | DSPCOM3 |
| 1002 | REP | 3 | LAST | 323 | 41,2410 | 0 | 0136 | 0 | | TC | ENTEXIT |
| 1003 | | | | | 41,2411 | 0 | 2412 | 1 | | TC | +1 |
| 1004 | REP | 1 | | | 41,2412 | 54 | 122 | 1 | DSPCOM3 | TS | DISTEN |
| 1005 | REP | 90 | LAST | 326 | 41,2413 | 50 | 000 | 1 | | INDEX | A |
| 1006 | REP | 5 | LAST | 323 | 41,2414 | 3 | 4333 | 0 | | CAF | R1D1 |
| 1007 | REP | 27 | LAST | 323 | 41,2415 | 54 | 777 | 1 | | TS | DSPCQNT |
| 1008 | REP | 2 | LAST | 326 | 41,2416 | 50 | 122 | 0 | | INDEX | DISTEN |
| 1009 | REP | 39 | LAST | 326 | 41,2417 | 4 | 0130 | 1 | | CS | RUP |
| 1010 | REP | 2 | LAST | 320 | 41,2420 | 0 | 3353 | 1 | | TC | DSPCOTWD |
| 1011 | REP | 3 | LAST | 326 | 41,2421 | 56 | 122 | 0 | | XCH | DISTEN |
| 1012 | REP | 2 | LAST | 326 | 41,2422 | 0 | 2406 | 1 | | TC | DSPCOM2 +2 |
| R1013 | COMPTST ALARMS IF COMPONENT NUMBER OF VERB(LOAD OR OCT DISPLAY) IS | | | | | | | | | | |
| R1014 | GREATER THAN THE HIGHEST COMPONENT NUMBER OF NOUN. | | | | | | | | | | |
| 1016 | REP | 4 | LAST | 266 | 41,2423 | 54 | 123 | 0 | COMPTST | TS | SPTMP1 |
| 1017 | REP | 61 | LAST | 323 | 41,2424 | 22 | 002 | 0 | | XCH | 0 |
| 1022 | REP | 1 | | | 41,2425 | 0 | 2512 | 0 | COMPTST1 | TC | GETCOMP |
| 1023 | REP | 1 | | | 41,2426 | 0 | 4345 | 1 | | TC | LEPTS |
| 1024 | REP | 6 | LAST | 318 | 41,2427 | 7 | 6214 | 1 | | MASK | THREE |

A B C AB ARC
 -1 -0 +1 +2 +3 IN A
 +0 +0 +0 +1 +2 IN A AFTER CCS
 +0,+1,+2 INTO DISTEN

- VERB COMP
 NOUN COMP

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| | | | | | | | | | | | | |
|-------|---|----|------|-----|---------|----|------|---|----------|----------|------------------------|---|
| 1025 | REP | 5 | LAST | 326 | 41,2430 | 6 | 0123 | 1 | AD | SPTMP1 | NOUN COMP - VERB COMP | |
| 1026 | REP | 91 | LAST | 326 | 41,2431 | 10 | 0000 | 0 | CCS | A | | |
| 1027 | REP | 26 | LAST | 317 | 41,2432 | 0 | 0001 | 0 | TC | L | NOUN COMP G/ VERB COMP | |
| 1028 | REP | 3 | LAST | 316 | 41,2433 | 0 | 5640 | 0 | TC | CCSHOLE | | |
| 1029 | REP | 16 | LAST | 322 | 41,2434 | 0 | 2350 | 0 | TC | GODSPALM | NOUN COMP L/ VERB COMP | |
| 1030 | REP | 29 | LAST | 327 | 41,2435 | 0 | 0001 | 0 | NDCMPST | TC | NOUN COMP = VERB COMP | |
| R1031 | DCOMPTST ALARMS IF DECIMAL ONLY BIT (BIT4 OF COMP CODE NUMBER) = 1. | | | | | | | | | | | |
| R1032 | IF NOT, IT PERFORMS REGULAR COMPTST. | | | | | | | | | | | |
| 1033 | REP | 6 | LAST | 327 | 41,2436 | 54 | 123 | 0 | DCOMPTST | TS | SPTMP1 | - VERB COMP |
| 1034 | REP | 62 | LAST | 326 | 41,2437 | 22 | 002 | 0 | LXCH | O | | |
| 1035 | REP | 2 | LAST | 326 | 41,2440 | 0 | 2442 | 1 | TC | DECTEST | | |
| 1036 | REP | 1 | | | 41,2441 | 0 | 2425 | 0 | TC | COMPTST1 | | |
| 1037 | | | | | 41,2442 | 0 | 0006 | 1 | DECTEST | EXTEND | | ALARMS IF DEC ONLY BIT = 1 (BIT4 OF COMP CODE NUMBER). RETURNS IF NOT. |
| 1038 | REP | 72 | LAST | 320 | 41,2443 | 22 | 156 | 0 | QXCH | MPAC | +2 | |
| 1039 | REP | 2 | LAST | 326 | 41,2444 | 0 | 2512 | 0 | TC | GETCOMP | | |
| 1040 | REP | 25 | LAST | 224 | 41,2445 | 7 | 4675 | 0 | MASK | BIT14 | | |
| 1041 | REP | 92 | LAST | 327 | 41,2446 | 10 | 000 | 0 | CCS | A | | |
| 1042 | REP | 17 | LAST | 327 | 41,2447 | 0 | 2350 | 0 | TC | GODSPALM | | |
| 1043 | REP | 73 | LAST | 327 | 41,2450 | 0 | 0156 | 0 | TC | MPAC | +2 | |
| 1044 | REP | 63 | LAST | 327 | 41,2451 | 22 | 002 | 0 | DCTSTCYC | LXCH | O | ALARMS AND RECYCLES IF DEC ONLY BIT = 1 (BIT4 OF COMP CODE NUMBER). RETURNS IF NOT. USED BY LOAD VERRS. |
| 1045 | REP | 3 | LAST | 327 | 41,2452 | 0 | 2512 | 0 | TC | GETCOMP | | |
| 1046 | REP | 26 | LAST | 327 | 41,2453 | 7 | 4675 | 0 | MASK | BIT14 | | |
| 1047 | REP | 93 | LAST | 327 | 41,2454 | 10 | 000 | 0 | CCS | A | | |
| 1048 | REP | 3 | LAST | 324 | 41,2455 | 0 | 4161 | 0 | TC | ALMCYCLE | | |
| 1049 | REP | 30 | LAST | 327 | 41,2456 | 0 | 0001 | 0 | TC | L | | |
| R1050 | NOUNTEST ALARMS IF NO-LOAD BIT (BITS OF COMP CODE NUMBER) = 1. | | | | | | | | | | | |
| R1051 | IF NOT, IT RETURNS. | | | | | | | | | | | |
| 1052 | REP | 64 | LAST | 327 | 41,2457 | 22 | 002 | 0 | NOUNTEST | LXCH | O | |
| 1053 | REP | 4 | LAST | 327 | 41,2460 | 0 | 2512 | 0 | TC | GETCOMP | | |
| 1054 | REP | 94 | LAST | 327 | 41,2461 | 10 | 000 | 0 | CCS | A | | |
| 1055 | REP | 31 | LAST | 327 | 41,2462 | 0 | 0001 | 0 | TC | L | | |
| 1056 | REP | 32 | LAST | 327 | 41,2463 | 0 | 0001 | 0 | TC | L | | |
| 1057 | REP | 18 | LAST | 327 | 41,2464 | 0 | 2350 | 0 | TC | GODSPALM | | |
| 1058 | REP | 65 | LAST | 327 | 41,2465 | 22 | 002 | 0 | TSTFORDP | LXCH | O | TEST FOR DP. IF SO, GET MINOR PART ONLY. |
| 1059 | REP | 6 | LAST | 323 | 41,2466 | 3 | 0146 | 1 | CA | NNADTEM | | IF NNADTEM = -1, CHANNEL TO BE SPECIFIED |
| 1060 | REP | 27 | LAST | 326 | 41,2467 | 6 | 4712 | 1 | AD | ONE | | |
| 1061 | | | | | 41,2470 | 0 | 0006 | 1 | EXTEND | | | |
| 1062 | REP | 1 | | | 41,2471 | 1 | 2503 | 1 | BZF | CHANDSP | | |
| 1063 | REP | 4 | LAST | 319 | 41,2472 | 50 | 140 | 1 | INDEX | MIXRR | | |
| 1064 | | | | | 41,2473 | 0 | 2473 | 0 | TC | +0 | | |
| 1065 | | | | | 41,2474 | 0 | 2476 | 0 | TC | +2 | | NORMAL |

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| | | | | | | | | | |
|------|------|----|------|-----|---------|-----------|----------|---------------|---|
| 1066 | RESP | 33 | LAST | 327 | 41,2475 | 0 0001 0 | TC | L | MIXED CASE ALREADY HANDLED IN MIXNOUN |
| 1067 | RESP | 1 | | | 41,2476 | 0 3021 1 | TC | SPRUTNOR | |
| 1068 | RESP | 2 | LAST | 322 | 41,2477 | 0 2261 0 | TC | DPIEST | |
| 1069 | RESP | 34 | LAST | 328 | 41,2500 | 0 0001 0 | TC | L | NO DP |
| 1070 | RESP | 8 | LAST | 328 | 41,2501 | 24 145 1 | INCR | NOUNADD | DP E+1 INTO NOUNADD FOR MINOR PART. |
| 1071 | RESP | 35 | LAST | 328 | 41,2502 | 0 0001 0 | TC | L | |
| 1072 | | | | | 41,2503 | 0 0006 1 | CHANDSP | EXTEND | |
| 1073 | RESP | 3 | LAST | 320 | 41,2504 | 5 1017 0 | INDEX | NOUNCADR | |
| 1074 | | | | | 41,2505 | 00 000 1 | READ | 0 | |
| 1075 | RESP | 95 | LAST | 327 | 41,2506 | 4 0000 0 | CS | A | |
| 1076 | RESP | 3 | LAST | 326 | 41,2507 | 1 2370 0 | TCF | DSPCOM1 | |
| 1077 | RESP | 2 | LAST | 265 | 41,2510 | 00147 0 | COMPICK | ADRES NNTYPTM | |
| 1078 | RESP | 7 | LAST | 327 | 41,2511 | 00146 1 | ADRES | NNADTEM | |
| 1079 | RESP | 5 | LAST | 327 | 41,2512 | 50 140 1 | GETCOMP | INDEX MIXRR | NORMAL MIXED |
| 1080 | RESP | 1 | | | 41,2513 | 3 2507 1 | CAF | COMPICK -1 | ADRES NNTYPTM ADRES NNADTEM |
| 1081 | RESP | 98 | LAST | 328 | 41,2514 | 50 000 1 | INDEX | A | |
| 1082 | | | | | 41,2515 | 3 0000 1 | CA | 0 | C(NNTYPTM) C(NNADTEM) |
| 1083 | RESP | 4 | LAST | 198 | 41,2516 | 7 4364 0 | MASK | HIS | GET HIS OF NNTYPTM(NORM)OF NNADTEM(MIX) |
| 1084 | RESP | 66 | LAST | 327 | 41,2517 | 0 0002 0 | TC | 0 | |
| 1085 | RESP | 5 | LAST | 327 | 41,2520 | 0 2512 0 | DECDSP | TC GETCOMP | |
| 1086 | RESP | 2 | LAST | 328 | 41,2521 | 0 4345 1 | TC | LEPTS | |
| 1087 | RESP | 9 | LAST | 326 | 41,2522 | 7 6214 1 | MASK | THREE | |
| 1088 | RESP | 4 | LAST | 322 | 41,2523 | 54 117 1 | TS | DECOUNT | COMP NUMBER INTO DECOUNT |
| 1089 | RESP | 1 | | | 41,2524 | 54 122 1 | DSPDCGET | TS DECTEM | PICKS UP DATA |
| 1090 | RESP | 9 | LAST | 328 | 41,2525 | 6 0145 1 | AD | NOUNADD | DECTEM 1COMP +0, 2COMP +1, 3COMP +2 |
| 1091 | RESP | 97 | LAST | 328 | 41,2526 | 50 000 1 | INDEX | A | |
| 1092 | | | | | 41,2527 | 4 0000 0 | CS | 0 | |
| 1093 | RESP | 2 | LAST | 328 | 41,2530 | 50 122 0 | INDEX | DECTEM | CANT USE RUF SINCE DMP USES IT. |
| 1094 | RESP | 2 | LAST | 288 | 41,2531 | 57-0003 0 | XCH | XREG | |
| 1095 | RESP | 3 | LAST | 328 | 41,2532 | 10 122 1 | CCS | DECTEM | |
| 1096 | RESP | 1 | | | 41,2533 | 0 2524 0 | TC | DSPDCGET | MORE TO GET |
| 1097 | RESP | 42 | LAST | 319 | 41,2534 | 3 4714 1 | DSPDCPUT | CAF ZERO | DISPLAYS DATA |
| 1098 | RESP | 74 | LAST | 327 | 41,2535 | 54 155 1 | TS | MPAC +1 | DECOUNT 1COMP +0, 2COMP +1, 3COMP +2 |
| 1099 | RESP | 75 | LAST | 328 | 41,2536 | 54 156 1 | TS | MPAC +2 | |
| 1100 | RESP | 5 | LAST | 328 | 41,2537 | 50 117 0 | INDEX | DECOUNT | |
| 1101 | RESP | 8 | LAST | 328 | 41,2540 | 3 4333 0 | CAF | R1D1 | |
| 1102 | RESP | 28 | LAST | 326 | 41,2541 | 54 777 1 | TS | DSPCOUNT | |
| 1103 | RESP | 6 | LAST | 328 | 41,2542 | 50 117 0 | INDEX | DECOUNT | |
| 1104 | RESP | 3 | LAST | 328 | 41,2543 | 4 1003 1 | CS | XREG | |
| 1105 | RESP | 76 | LAST | 328 | 41,2544 | 54 154 0 | TS | MPAC | |
| 1106 | RESP | 1 | | | 41,2545 | 0 3042 1 | TC | SFCOUM | 2X(SP CON NLMB) IN A |
| 1107 | RESP | 7 | LAST | 327 | 41,2546 | 54 123 0 | TS | SFTMP1 | SWITCH BANKS TO SP CONSTANT TABLE |
| 1108 | | | | | 41,2547 | 0 0006 1 | EXTEND | | |

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1109 RESP 1          41,2550 3 2562 1          DCA  OTSPOUTL
1110 RESP 6 LAST 323 41,2551 52 006 0          DKCH Z
1111 RESP 6 LAST 326 41,2552 60 140 1          INDEX MIXRR
1112 RESP 1          41,2553 0 2553 0          TC   +0
1113 RESP 1          41,2554 0 2557 1          TC  DSPSPNOR
1114 RESP 2 LAST 322 41,2555 0 3027 1          TC  SFRUTMIX
1115 RESP 1          41,2556 0 2572 0          TC  DECDSP3

1116 RESP 2 LAST 326 41,2557 0 3021 1  DSPSPNOR TC  SFRUTNOR
1117 RESP 2 LAST 329 41,2560 0 2572 0          TC  DECDSP3

1118 RESP 29 LAST 328 6777          BRANK DSPCOUT
1119 RESP 1          41,2561 02120 0  OTSPOUTL 2CADR OTSPOUT
1120 RESP 1          41,2562 04101 0          DSDPCEND TC  BANKCALL
1121 RESP 40 LAST 323 41,2563 0 4555 0          CADR  DSPDCWD
1122 RESP 1          41,2564 01131 0          CCS  DECCOUNT
1123 RESP 7 LAST 326 41,2565 10 117 1          TC   +2
1124 RESP 4 LAST 326 41,2567 0 0136 0          TC  ENTRXIT
1125 RESP 6 LAST 329 41,2570 54 117 1          TS  DECCOUNT
1126 RESP 1          41,2571 0 2534 1          TC  DSDPCPUT
1127 RESP 98 LAST 326 41,2572 50 000 1  DECDSP3 INDEX A
1128 RESP 1          41,2573 3 2575 1          CAP  SFCUTARR
1129 RESP 2 LAST 320 41,2574 0 4577 0          TC  BANKJUMP

1130 RESP 1          41,2575 61321 0  SFCUTARR CADR  PRDPSAL
1131 RESP 1          41,2576 62563 0          CADR  DSDPCEND
1132 RESP 1          41,2577 60516 0          CADR  DEGCUTSP
1133 RESP 1          41,2600 60603 1          CADR  ARTCUTSP
1134 RESP 1          41,2601 60614 1          CADR  DP1CUTSP
1135 RESP 1          41,2602 60621 1          CADR  DP2CUTSP
1136 RESP 1          41,2603 60524 1          CADR  OFDECCUT
1137 RESP 1          41,2604 60623 0          CADR  DP3CUTSP
1138 RESP 1          41,2605 65143 1          CADR  HNSCUT
1139 RESP 1          41,2606 65216 1          CADR  M/SCUT
1140 RESP 2 LAST 329 41,2607 60621 1          CADR  DP2CUTSP
11401 RESP 1          41,2610 60610 0          CADR  ARQCUT1SP
11402 RESP 1          41,2611 60636 1          CADR  2INTCUT
1141          41,2612          ENDRQCUT EQUALS
R1142          THE FOLLOWING IS ATYPICAL SF ROUTINE . IT USES MPAC. LEAVES RESU
R1143 LTS IN MPAC, MPAC+1. ENDS WITH TC DSDPCEND
1144 RESP 2 LAST 317 40,2516          SETLOC BLANKCON +1
    
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READING ROUTINE,
LOADS SPTMP1, SPTMP2.

ALL SFCUT ROUTINES END HERE

MORE TO DISPLAY

ALARM IF DEC DISP WITH OCTAL ONLY NOLN

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11445 REP 2 LAST 310 TO 318* 334 334* COUNT 40/PIN

R1145 DECOUPLER SCALES BY .18 THE LOW 14 BITS OF ANGLE, ADDING .18 FOR
R1146 NUMBERS IN THE NEGATIVE (AGC) RANGE.

| | | | | | | | | | | |
|------|-----|----|------|-----|---------|----------|-----------|----------|------|--|
| 1147 | REP | 43 | LAST | 328 | 40,2516 | 3 4714 1 | DECOUPLER | CAP | ZERO | |
| 1148 | REP | 77 | LAST | 328 | 40,2517 | 54 158 1 | TS | MPAC | +2 | SET INDEX FOR FULL SCALE |
| 1149 | REP | 1 | | | 40,2520 | 0 2555 0 | TC | FIXRANGE | | |
| 1150 | | | | | 40,2521 | 0 2523 1 | TC | +2 | | NO AUGMENT NEEDED (SPTMP1 AND 2 ARE 0) |
| 1151 | REP | 1 | | | 40,2522 | 0 2550 0 | TC | SETAUG | | SET AUGMENTER ACCORDING TO C(MPAC +2) |
| 1152 | REP | 1 | | | 40,2523 | 0 2566 0 | TC | DECOM | | |

R1153 OPDECOUPLER SCALES BY .45 (THE RANGE IS 90 DEGREES) AND ADDS A 20 DEG BIAS.

| | | | | | | | | | | |
|------|-----|----|------|-----|---------|----------|-------------|-----------|------|---|
| 1154 | REP | 78 | LAST | 330 | 40,2524 | 10 154 0 | OPDECOUPLER | CCS | MPAC | RANGE IS 90 DEG |
| 1155 | REP | 79 | LAST | 330 | 40,2525 | 56 154 1 | XCH | MPAC | | IF POS OR POS 0 THEN ADD BIAS AND |
| 1156 | | | | | 40,2526 | 0 2531 1 | TC | +3 | | CORRECT FOR POSSIBLE OVERFLOW |
| 1157 | REP | 1 | | | 40,2527 | 0 2540 1 | TC | NEGOPT | | IF NEG NON ZERO |
| 1158 | REP | 4 | LAST | 298 | 40,2530 | 0 7716 0 | AD | NEO1 | | IF NEG ZERO SUBTRACT 1 |
| 1159 | REP | 1 | | | 40,2531 | 6 2602 1 | AD | 20BIAS | | |
| 1160 | REP | 80 | LAST | 330 | 40,2532 | 54 154 0 | BIASCOM | TS | MPAC | TEST FOR OVERFLOW |
| 1161 | | | | | 40,2533 | 0 2538 0 | TC | +3 | | NO OVFLOW |
| 1162 | REP | 22 | LAST | 319 | 40,2534 | 3 4674 0 | CAP | RIT15 | | IF OVFLOW |
| 1163 | REP | 81 | LAST | 330 | 40,2535 | 26 154 0 | ADS | MPAC | | |
| 1164 | REP | 13 | LAST | 326 | 40,2536 | 3 4711 1 | CAP | TWO | | SET MULTIPLIER TO .45 |
| 1165 | REP | 2 | LAST | 329 | 40,2537 | 0 2517 0 | TC | DECOUPLER | +1 | |
| 1166 | REP | 82 | LAST | 330 | 40,2540 | 56 154 1 | NEGOPT | XCH | MPAC | NEGATIVE CASE |
| 1167 | REP | 2 | LAST | 330 | 40,2541 | 6 2602 1 | AD | 20BIAS | | |
| 1168 | REP | 99 | LAST | 329 | 40,2542 | 10 000 0 | CCS | A | | |
| 1169 | REP | 1 | | | 40,2543 | 0 2532 1 | TC | BIASCOM | | IF POS THEN SUBTRACT 1 BECAUSE OF 2SCOM |
| 1170 | REP | 4 | LAST | 327 | 40,2544 | 0 5640 0 | TC | CCSHOLE | | |
| 1171 | REP | 28 | LAST | 327 | 40,2545 | 6 4712 1 | AD | ONE | | IF NEG RESTORE SUM |
| 1172 | | | | | 40,2546 | 4 0000 0 | COM | | | IF NEG 0 LEAVE NEG 0 |
| 1173 | REP | 2 | LAST | 330 | 40,2547 | 0 2532 1 | TC | BIASCOM | | |
| 1174 | | | | | 40,2550 | 0 0006 1 | SETAUG | EXTEND | | LOADS SPTMP1 AND SPTMP2 WITH THE |
| 1175 | REP | 83 | LAST | 330 | 40,2551 | 5 0156 0 | INDEX | MPAC | +2 | DP AUGMENTER CONSTANT |
| 1176 | REP | 1 | | | 40,2552 | 3 2577 0 | DCA | DEGTAB | | |
| 1177 | REP | 8 | LAST | 328 | 40,2553 | 52 124 1 | DxCH | SPTMP1 | | |
| 1178 | REP | 67 | LAST | 328 | 40,2554 | 0 0002 0 | TC | 0 | | |
| 1179 | REP | 84 | LAST | 330 | 40,2555 | 10 154 0 | FIXRANGE | CCS | MPAC | IF MPAC IS + RETURN TO L+1 |
| 1180 | REP | 68 | LAST | 330 | 40,2556 | 0 0002 0 | TC | 0 | | IF MPAC IS - RETURN TO L+2 AFTER |
| 1181 | REP | 69 | LAST | 330 | 40,2557 | 0 0002 0 | TC | 0 | | MASKING OUT THE SIGN BIT |
| 1182 | | | | | 40,2560 | 1 2561 0 | TCP | +1 | | |
| 1183 | REP | 23 | LAST | 330 | 40,2561 | 4 4674 1 | CS | RIT15 | | |
| 1184 | REP | 85 | LAST | 330 | 40,2562 | 7 0154 0 | MASK | MPAC | | |
| 1185 | REP | 86 | LAST | 330 | 40,2563 | 54 154 0 | TS | MPAC | | |
| 1186 | REP | 70 | LAST | 330 | 40,2564 | 50 002 0 | INDEX | 0 | | |

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| | | | | | | | | | |
|-------|-----|----|------|---------|----------|----------|----------|--------|----------|
| 1187 | | | | 40,2565 | 0 0001 0 | | TC | 1 | |
| 1188 | REP | 07 | LAST | 330 | 40,2566 | 0 0006 1 | DEGCOM | EXTEND | |
| 1189 | REP | 2 | LAST | 330 | 40,2567 | 5 0156 0 | | INDEX | MPAC +2 |
| 1190 | REP | 2 | LAST | 330 | 40,2570 | 3 2577 0 | | DCA | DEBTAB |
| 1191 | REP | 88 | LAST | 331 | 40,2571 | 52 155 1 | | DXCH | MPAC |
| 1192 | REP | 4 | LAST | 312 | 40,2572 | 0 7256 1 | | TC | SHORTMP |
| 1193 | REP | 0 | LAST | 330 | 40,2573 | 52 124 1 | | DXCH | SPTMP1 |
| 1194 | REP | 89 | LAST | 331 | 40,2574 | 20 155 1 | | DAS | MPAC |
| 1195 | REP | 1 | | | 40,2575 | 0 2606 0 | | TC | SCOUTEND |
| 1196 | | | | | 40,2576 | 05605 1 | DEBTAB | OCT | 05605 |
| 1197 | | | | | 40,2577 | 03656 1 | | OCT | 03656 |
| 1198 | | | | | 40,2600 | 16314 0 | | OCT | 16314 |
| 1199 | | | | | 40,2601 | 31463 1 | | OCT | 31463 |
| 1200 | | | | | 40,2602 | 16040 1 | 20BIAS | OCT | 16040 |
| 1201 | REP | 10 | LAST | 331 | 40,2603 | 52 124 1 | ARTOUTSP | DXCH | SPTMP1 |
| 1202 | REP | 90 | LAST | 331 | 40,2604 | 52 155 1 | | DXCH | MPAC |
| 1203 | REP | 1 | | | 40,2605 | 0 4431 0 | | TC | PRSHRIMP |
| 1204 | REP | 19 | LAST | 324 | 40,2606 | 0 4574 0 | SCOUTEND | TC | POSTJUMP |
| 1205 | REP | 2 | LAST | 329 | 40,2607 | 62563 0 | | CADR | DSPOCEND |
| 12051 | REP | 11 | LAST | 331 | 40,2610 | 52 124 1 | AROUT1SP | DXCH | SPTMP1 |
| 12052 | REP | 91 | LAST | 331 | 40,2611 | 52 155 1 | | DXCH | MPAC |
| 12053 | REP | 2 | LAST | 331 | 40,2612 | 0 4431 0 | | TC | PRSHRIMP |
| 12054 | REP | 1 | | | 40,2613 | 0 2615 1 | | TC | L14/OUT |
| 1206 | REP | 1 | | | 40,2614 | 0 2627 0 | DP1OUTSP | TC | DPQUT |
| 1207 | REP | 92 | LAST | 331 | 40,2615 | 56 156 0 | L14/OUT | KCH | MPAC +2 |
| 1208 | REP | 93 | LAST | 331 | 40,2616 | 56 155 0 | | XCH | MPAC +1 |
| 1209 | REP | 94 | LAST | 331 | 40,2617 | 54 154 0 | | TS | MPAC |
| 1210 | REP | 2 | LAST | 331 | 40,2620 | 0 2606 0 | | TC | SCOUTEND |
| 1211 | REP | 2 | LAST | 331 | 40,2621 | 0 2627 0 | DP2OUTSP | TC | DPQUT |
| 1212 | REP | 3 | LAST | 331 | 40,2622 | 0 2606 0 | | TC | SCOUTEND |
| 1213 | REP | 3 | LAST | 331 | 40,2623 | 0 2627 0 | DP3OUTSP | TC | DPQUT |
| 1214 | REP | 12 | LAST | 322 | 40,2624 | 3 6211 0 | | CAP | SIX |
| 1215 | REP | 1 | | | 40,2625 | 0 3056 1 | | TC | TUPLEFN |
| 1216 | REP | 4 | LAST | 331 | 40,2626 | 0 2606 0 | | TC | SCOUTEND |
| 12165 | REP | 95 | LAST | 331 | 0162 | | MPAC+8 | = | MPAC +8 |

LOADS MULTIPLIER, DOES SHORTMP, AND ADDS AUGMENTER.

ADJUSTED ANGLE IN A

HI PART OF .18
 LOW PART OF .18
 HI PART OF .45
 LO PART OF .45

20 DEG BIAS FOR OPTICS

ASSUMES POINT AT LEFT OF DP SPCON

IF C(A) = -0, SHORTMP FAILS TO GIVE -0.

ASSUMES POINT BETWEEN HI AND LO PARTS OF DP SPCON. SHIFTS RESULTS LEFT 14, BY TAKING RESULTS FROM MPAC+1, MPAC+2.

SCALES MPAC, MPAC +1 BY DP SCALE FACTOR IN SPTMP1, SPTMP2. THEN SCALE RESULT BY B14.

SCALES MPAC, MPAC +1 BY DP SCALE FACTOR

ASSUMES POINT BETWEEN BITS 7-8 OF HIGH LEFT BY 7, ROUNDS MPAC+2 INTO MPAC+1. SHIFTS LEFT 7.

USE MPAC +8 INSTEAD OF OVPIND



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1217 REP 71 LAST 330 40,2627 56 002 0 DPOUT XCH 0
 1218 REP 1 40,2630 54 162 0 TS MPAC+8
 1219 REP 1 40,2631 0 2653 0 TC READLO
 1220 REP 2 LAST 240 40,2632 0 7226 0 TC TPAGREE
 1221 REP 2 LAST 312 40,2633 0 7052 1 TC DMP
 1222 REP 12 LAST 331 40,2634 00123 1 ADRES SPTEMP1
 1223 REP 2 LAST 332 40,2635 0 0162 1 TC MPAC+8

GET FRESH DATA FOR BOTH HI AND LO.
 MAKE DP DATA AGREE

R12231 THE FOLLOWING ROUTINE DISPLAYS TWO CONTIGUOUS SP POSITIVE INTEGERS
 R12232 AS TWO POSITIVE DECIMAL INTEGERS IN R0D1-R0D2 AND R0D4-R0D5 (R0D3 IS
 R12233 BLANKED). THE INTEGER IN THE LOWER NUMBERED ADDRESS IS DISPLAYED IN
 R12234 R0D1-R0D2.

12235 REP 3 LAST 323 40,2636 0 2437 0 2INTOUT TC 5BLANK
 122355 REP 2 LAST 314 40,2637 0 2314 0 TC +ON
 12236 REP 96 LAST 331 40,2640 3 0154 1 CA MPAC
 12237 REP 1 40,2641 0 3211 0 TC DSPDCVN
 122371 REP 10 LAST 328 40,2642 4 6214 1 CS THREE
 122372 REP 9 LAST 329 40,2643 50 117 0 INDEX DECCOUNT
 122373 REP 7 LAST 328 40,2644 6 4333 0 AD R1D1
 122374 REP 30 LAST 329 40,2645 54 777 1 TS DSPDCOUNT
 122375 REP 2 LAST 332 40,2646 0 2653 0 TC READLO
 122376 REP 97 LAST 332 40,2647 3 0155 0 CA MPAC +1
 122377 REP 2 LAST 332 40,2650 0 3211 0 TC DSPDCVN
 122378 REP 20 LAST 331 40,2651 0 4574 0 TC POSTJUMP
 122379 REP 3 LAST 331 40,2652 62565 0 CADR DSPDCEND +2

TO BLANK R0D3
 TURN ON + SIGN
 DISPLAY 1ST INTEGER (LIKE VERR AND NOUN)
 R0D4
 GET 2ND INTEGER
 DISPLAY 2ND INTEGER (LIKE VERR AND NOUN)

R1224 READLO PICKS UP FRESH DATA FOR BOTH HI AND LO AND LEAVES IT IN
 R1225 MPAC, MPAC+1. THIS IS NEEDED FOR TIME DISPLAY. IT ZEROES MPAC+2, BUT
 R1226 DOES NOT FORCE TPAGREE.

1227 REP 72 LAST 332 40,2653 56 002 0 READLO XCH 0
 1228 REP 8 LAST 69 40,2654 54 144 1 TS TEM4
 1229 REP 7 LAST 329 40,2655 50 140 1 INDEX MIXBR
 1230 40,2656 0 2656 0 TC +0
 1231 REP 1 40,2657 0 2673 1 TC RDLONOR
 1232 REP 10 LAST 332 40,2660 50 117 0 INDEX DECCOUNT
 1233 REP 3 LAST 322 40,2661 3 0150 0 CA IDAD1TEM
 1234 REP 4 LAST 322 40,2662 7 4372 1 MASK LOW11
 1235 REP 2 LAST 322 40,2663 0 4327 0 TC SETERANK
 1236 40,2664 0 0006 1 READLO1 EXTEND
 1237 REP 100 LAST 330 40,2665 5 0000 1 INDEX A
 1238 40,2666 3 0001 0 DCA 0
 1239 REP 98 LAST 332 40,2667 52 155 1 DXCH MPAC
 1240 REP 44 LAST 330 40,2670 3 4714 1 CAP ZERO
 1241 REP 99 LAST 332 40,2671 54 156 1 TS MPAC +2
 1242 REP 9 LAST 332 40,2672 0 0144 0 TC TEM4

GET IDAD1TEM ENTRY FOR COMP K OF NOUN.
 E SURK
 SET ER, LEAVE ADRES IN A.
 MIXED NORMAL
 C(ESURK) C(E)
 C((E SURK)+1) C(E+1)

1243 REP 10 LAST 328 40,2673 3 0145 1 RDLONOR CA NOLNADD
 1244 REP 1 40,2674 0 2664 1 ENDRDLO TC READLO1

F



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| | | | | | | | | |
|--------|-----|-----|------|---------|---------|-------|------|---|
| 1245 | | | | 42,3143 | | | | BANK 42 |
| 124501 | REP | 2 | LAST | 265 | 42,2000 | | | SETLOC PINBALL3 |
| 124502 | | | | | 42,3143 | | | BANK |
| 12455 | REP | 1 | | | | | | COUNT 42/PIN |
| 1246 | REP | 41 | LAST | 329 | 42,3143 | 0 | 4555 | HMSOUT TC |
| 1247 | REP | 3 | LAST | 332 | 42,3144 | 0 | 6053 | CADR READLO |
| 1248 | REP | 3 | LAST | 332 | 42,3145 | 0 | 7226 | TC TPAGREB |
| 1249 | REP | 1 | | | 42,3146 | 0 | 3332 | TC SPSSECR |
| A1250 | | | | | | | | |
| 1251 | REP | 3 | LAST | 332 | 42,3147 | 0 | 7052 | TC DMP |
| 1252 | REP | 1 | | | 42,3150 | 0 | 3204 | ADRES SECON2 |
| 1253 | REP | 4 | LAST | 323 | 42,3151 | 3 | 4335 | CAP R3D1 |
| 1254 | REP | 31 | LAST | 332 | 42,3152 | 54 | 777 | TS DSPCOUNT |
| 1255 | REP | 42 | LAST | 333 | 42,3153 | 0 | 4555 | TC BANKCALL |
| 1256 | REP | 2 | LAST | 329 | 42,3154 | 0 | 1131 | CADR DSPDECD |
| 1257 | REP | 1 | | | 42,3155 | 0 | 3350 | TC SERMIN |
| 1258 | REP | 1 | | | 42,3156 | 3 | 3208 | CAP MINCON2 |
| 1259 | REP | 100 | LAST | 332 | 42,3157 | 56 | 154 | XCH MPAC |
| 1260 | REP | 1 | | | 42,3160 | 55 | 007 | TS HITENOUT |
| 1261 | REP | 2 | LAST | 333 | 42,3161 | 3 | 3207 | CAP MINCON2 +1 |
| 1262 | REP | 101 | LAST | 333 | 42,3162 | 56 | 155 | XCH MPAC +1 |
| 1263 | REP | 3 | LAST | 331 | 42,3163 | 0 | 4431 | TC PRSHRIMP |
| A1264 | | | | | | | | |
| 1265 | REP | 3 | LAST | 323 | 42,3164 | 3 | 4334 | CAP R2D1 |
| 1266 | REP | 32 | LAST | 333 | 42,3165 | 54 | 777 | TS DSPCOUNT |
| 1267 | REP | 43 | LAST | 333 | 42,3166 | 0 | 4555 | TC BANKCALL |
| 1268 | REP | 3 | LAST | 333 | 42,3167 | 0 | 1131 | CADR DSPDECD |
| 1269 | | | | | 42,3170 | 0 | 0006 | EXTEND |
| 1270 | REP | 1 | | | 42,3171 | 3 | 3213 | DCA HRCN1 |
| 1271 | REP | 102 | LAST | 333 | 42,3172 | 52 | 155 | DCH MPAC |
| 1272 | REP | 2 | LAST | 333 | 42,3173 | 3 | 1007 | CA HITENOUT |
| 1273 | REP | 4 | LAST | 333 | 42,3174 | 0 | 4431 | TC PRSHRIMP |
| A1274 | | | | | | | | |
| 1275 | REP | 8 | LAST | 332 | 42,3175 | 3 | 4333 | CAP R1D1 |
| 1276 | REP | 33 | LAST | 333 | 42,3176 | 54 | 777 | TS DSPCOUNT |
| 1277 | REP | 44 | LAST | 333 | 42,3177 | 0 | 4555 | TC BANKCALL |
| 1278 | REP | 4 | LAST | 333 | 42,3200 | 0 | 1131 | CADR DSPDECD |
| 1279 | REP | 5 | LAST | 329 | 42,3201 | 0 | 0136 | TC ENTEXIT |
| 1280 | | | | | 42,3202 | 25660 | 0 | SECON1 2DEC* 1.666666666 E-4 R12* 2EXP12/6000 |
| 1280 | | | | | 42,3203 | 31742 | 1 | |
| 1281 | | | | | 42,3204 | 01727 | 1 | SECON2 OCT 01727 .06 FOR SECONDS DISPLAY |
| 1282 | | | | | 42,3205 | 01217 | 1 | OCT 01217 |
| 1283 | | | | | 42,3206 | 00011 | 1 | MINCON2 OCT 00011 .0006 FOR MINUTES DISPLAY |
| 1284 | | | | | 42,3207 | 32445 | 0 | OCT 32445 |
| 1285 | | | | | 42,3210 | 02104 | 0 | MINCON1 OCT 02104 .066..66 UPPED BY 2EXP-28 |
| 1286 | | | | | 42,3211 | 10422 | 1 | OCT 10422 |
| 1287 | | | | | 42,3212 | 05174 | 0 | HRCN1 2DEC .16384 |
| 1287 | | | | | 42,3213 | 13261 | 0 | |

READ PRESH DATA FOR HI AND LO INTO MPAC, MPAC+1.
 MAKE DP DATA ACRES
 LEAVE FRACT SEC/60 IN MPAC, MPAC+1. LEAVE WHOLE MIN IN BIT13 OF LOTENOUT AND ABOVE
 USE ONLY FRACT SEC/60 MOD 60
 MULT BY .06
 GIVES CENTI-SEC/10EXP5 MOD 60
 DISPLAY SEC MOD 60

REMOVE REST OF SECONDS
 LEAVE FRACT MIN/60 IN MPAC+1. LEAVE WHOLE HOURS IN MPAC.
 SAVE WHOLE HOURS.
 USE ONLY FRACT MIN/60 MOD 60
 IF C(A) = -0, SHORIMP FAILS TO GIVE -0.
 MULT BY .0006
 GIVES MIN/10EXP5 MOD 60
 DISPLAY MIN MOD 60

MINUTES, SECONDS HAVE BEEN REMOVED

USE WHOLE HOURS
 IF C(A) = -0, SHORIMP FAILS TO GIVE -0.
 MULT BY .16384
 GIVES HOURS/10EXP5
 USE REGULAR DSPDECD, WITH ROUND OFF.



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| | | | | | | | |
|-------|-----|-----|------|---------|---------|----------|-------------|
| 1288 | | | | 42,3214 | 00000 1 | OCT | 00000 |
| 1289 | | | | 42,3215 | 00062 0 | RNDCON | OCT |
| 1290 | REP | 45 | LAST | 333 | 42,3216 | 0 4555 0 | TC |
| 1291 | REP | 4 | LAST | 333 | 42,3217 | 60653 1 | M/SCOUT |
| 1292 | REP | 4 | LAST | 333 | 42,3220 | 0 7226 0 | CADR |
| 1293 | REP | 103 | LAST | 333 | 42,3221 | 10 154 0 | TC |
| 1294 | | | | | 42,3222 | 0 3224 0 | CCS |
| 1295 | REP | 1 | | | 42,3223 | 0 3255 0 | TC |
| 1296 | REP | 1 | | | 42,3224 | 8 3312 1 | AD |
| 1297 | REP | 101 | LAST | 332 | 42,3225 | 10 000 0 | M/SCON1 |
| 1298 | REP | 1 | | | 42,3226 | 0 3241 0 | CCS |
| 1299 | REP | 2 | LAST | 334 | 42,3227 | 0 3255 0 | A |
| 1300 | REP | 3 | LAST | 334 | 42,3230 | 0 3255 0 | TC |
| 1301 | REP | 104 | LAST | 334 | 42,3231 | 10 155 1 | M/SLIMIT |
| 1302 | | | | | 42,3232 | 0 3234 1 | CCS |
| 1303 | REP | 4 | LAST | 334 | 42,3233 | 0 3255 0 | MPAC |
| 1304 | REP | 1 | | | 42,3234 | 8 3313 0 | TC |
| 1305 | REP | 102 | LAST | 334 | 42,3235 | 10 000 0 | +2 |
| 1306 | REP | 2 | LAST | 334 | 42,3236 | 0 3241 0 | M/SCON2 |
| 1307 | REP | 5 | LAST | 334 | 42,3237 | 0 3255 0 | CCS |
| 1308 | REP | 6 | LAST | 334 | 42,3240 | 0 3255 0 | A |
| 1309 | REP | 105 | LAST | 334 | 42,3241 | 10 154 0 | TC |
| 1310 | REP | 1 | | | 42,3242 | 3 3315 0 | M/SLIMIT |
| 1311 | REP | 1 | | | 42,3243 | 0 3252 1 | CCS |
| 1312 | REP | 2 | LAST | 334 | 42,3244 | 4 3315 1 | CAP |
| 1313 | REP | 106 | LAST | 334 | 42,3245 | 54 154 0 | M/SCON3 |
| 1314 | REP | 3 | LAST | 334 | 42,3246 | 4 3316 1 | TC |
| 1315 | REP | 107 | LAST | 334 | 42,3247 | 54 155 1 | +LIMIT |
| 1316 | REP | 1 | | | 42,3250 | 3 3314 1 | CS |
| 1317 | REP | 2 | LAST | 333 | 42,3251 | 0 3333 1 | M/SCON3 |
| 1318 | REP | 108 | LAST | 334 | 42,3252 | 54 154 0 | MPAC |
| 1319 | REP | 4 | LAST | 334 | 42,3253 | 3 3316 0 | TS |
| 1320 | REP | 1 | | | 42,3254 | 0 3247 0 | MPAC +1 |
| 1321 | REP | 1 | | | 42,3255 | 0 3317 1 | CAP |
| A1322 | | | | | | | NORMADR |
| 1323 | REP | 1 | | | 42,3256 | 3 3310 0 | TC |
| 1324 | REP | 5 | LAST | 331 | 42,3257 | 0 7256 1 | SEPSECNR +1 |
| 1325 | REP | 11 | LAST | 332 | 42,3260 | 4 6214 1 | MPAC |
| 1326 | REP | 34 | LAST | 333 | 42,3261 | 26 777 1 | TS |
| 1327 | REP | 46 | LAST | 334 | 42,3262 | 0 4555 0 | CS |
| 1328 | REP | 1 | | | 42,3263 | 61171 1 | TWO |
| 1329 | REP | 45 | LAST | 332 | 42,3264 | 3 4714 1 | INDEX |
| 1330 | REP | 5 | LAST | 317 | 42,3265 | 54 124 1 | AD |
| 1331 | REP | 14 | LAST | 330 | 42,3266 | 4 4711 0 | TS |
| 1332 | REP | 11 | LAST | 332 | 42,3267 | 50 117 0 | DECOUNT |
| 1333 | REP | 9 | LAST | 333 | 42,3270 | 6 4333 0 | R1D1 |
| 1334 | REP | 3 | LAST | 317 | 42,3271 | 54 143 0 | TS |
| 1335 | REP | 47 | LAST | 334 | 42,3272 | 0 4555 0 | TC |

.5 SEC
 READ FRESH DATA FOR HI AND LO INTO MPAC,
 MPAC+1.
 MAKE DP DATA AGREE
 IF MAG OP (MPAC, MPAC+1) G/ 59 M 59 S,
 DISPLAY 59B59, WITH PROPER SIGN.
 MPAC = +0. L/ 59M58.55
 - HI PART OF (59M58.55) +1 FOR CCS
 MAG OP MPAC - HI PART OF (59M58.55)
 G/ 59M58.55
 ORIGINAL MPAC = -0. L/ 59M58.55
 L/ 59M58.55
 MAG OP MPAC = HI PART OF 59M58.55
 +2
 M/SCONM
 M/SCON1
 A
 M/SLIMIT
 M/SCONM
 L/ 59M58.55
 MAG OP MPAC = HI PART OF 59M58.55
 M/SCON2
 A
 G/ 59M58.55
 ORIGINAL MPAC+1 = -0. L/ 59M58.55
 L/ 59M58.55
 = 59M58.55 LIMIT
 MPAC CANNOT BE +/- 0 AT THIS POINT.
 FORCE MPAC, MPAC+1 TO +/- 59M59.55
 WILL DISPLAY 59M59S IN DSPDECNR
 SET RETURN TO M/SCONM+1.
 LEAVE FRACT SEC/60 IN MPAC,MPAC+1. LEAVE
 WHOLE MIN IN BIT13 OF LOTEMOUT AND ABOVE
 USE ONLY FRACT SEC/60 MOD 60
 MULT BY .6 + 2EXP-14
 GIVES SEC/100 MOD 60
 DSPCOUNT ALREADY SET TO R0D1
 DISPLAY SEC MOD 60 IN D4D5.
 R0D3
 BLANK MIDDLE CHAR

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| | | | | | | | | | | | | |
|------|-----|-----|------|-----|---------|-------|------|------|-----------|-----------|------------------------|---------------------------------------|
| 1336 | REP | 3 | LAST | 317 | 42,3273 | 61225 | 0 | CADR | DSPIN | | | |
| 1337 | REP | 2 | LAST | 333 | 42,3274 | 0 | 3350 | 1 | TC | SEPMIN | REMOVE REST OF SECONDS | |
| 1338 | REP | 109 | LAST | 334 | 42,3275 | 56 | 155 | 0 | XCH | MPAC | +1 | LEAVE PRACT MIN/60 IN MPAC+1 |
| 1339 | | | | | 42,3276 | 0 | 0006 | 1 | EXTEND | | | USE ONLY PRACT MIN/60 MOD 60 |
| 1340 | REP | 1 | | | 42,3277 | 7 | 3311 | 0 | MP | HIMINCON | | MULT BY .6 + 2EXP-7 |
| 1341 | REP | 110 | LAST | 335 | 42,3300 | 52 | 155 | 1 | DACH | MPAC | | GIVES MIN/100 MOD 60 |
| 1342 | REP | 12 | LAST | 334 | 42,3301 | 50 | 117 | 0 | INDEX | DSCOUNT | | |
| 1343 | REP | 10 | LAST | 334 | 42,3302 | 3 | 4333 | 0 | CAP | R1D1 | | R0D1 |
| 1344 | REP | 35 | LAST | 334 | 42,3303 | 54 | 777 | 1 | TS | DSCOUNT | | |
| 1345 | REP | 48 | LAST | 334 | 42,3304 | 0 | 4555 | 0 | TC | BANKCALL | | DISPLAY MIN MOD 60 IN D1D2. |
| 1346 | REP | 2 | LAST | 334 | 42,3305 | 61171 | 1 | | CADR | DSPDC2NR | | |
| 1347 | REP | 21 | LAST | 332 | 42,3306 | 0 | 4574 | 0 | TC | POSTJUMP | | |
| 1348 | REP | 4 | LAST | 332 | 42,3307 | 62565 | 0 | | CADR | DSPDC2ND | +2 | |
| 1349 | | | | | 42,3310 | 23147 | 1 | | HISECON | OCT | 23147 | .6 + 2EXP-14 |
| 1350 | | | | | 42,3311 | 23346 | 1 | | HIMINCON | OCT | 23346 | .6 + 2EXP-7 |
| 1351 | | | | | 42,3312 | 77753 | 0 | | M/SCON1 | OCT | 77753 | - HI PART OF (59M58.5S) +1 |
| 1352 | | | | | 42,3313 | 41126 | 1 | | M/SCON2 | OCT | 41126 | - LO PART OF (59M58.5S) +1 |
| 1353 | REP | 7 | LAST | 334 | 42,3314 | 03256 | 0 | | NORMADR | ADRES | M/SNORM | +1 |
| 1354 | | | | | 42,3315 | 00025 | 0 | | M/SCON3 | OCT | 00025 | 59M 59.5S |
| 1355 | | | | | 42,3316 | 37016 | 1 | | | OCT | 37016 | |
| 1356 | REP | 111 | LAST | 335 | 42,3317 | 10 | 155 | 1 | SEPSSEC | CCS | MPAC | +1 |
| 1357 | REP | 1 | | | 42,3320 | 1 | 3327 | 0 | TCP | POSEC | | IF +, ROUND BY ADDING .5 SEC |
| 1358 | REP | 2 | LAST | 335 | 42,3321 | 1 | 3327 | 0 | TCP | POSEC | | IF -, ROUND BY SUBTRACTING .5 SEC |
| 1359 | | | | | 42,3322 | 1 | 3323 | 1 | TCP | +1 | | FINDS TIME IN MPAC, MPAC+1 |
| 1360 | | | | | 42,3323 | 0 | 0006 | 1 | EXTEND | | | ROUNDS OFF BY +/- .5 SEC |
| 1361 | REP | 1 | | | 42,3324 | 4 | 3215 | 0 | DCS | RNDCON | -1 | LEAVES WHOLE MIN IN BIT13 OF |
| 1362 | REP | 112 | LAST | 335 | 42,3325 | 20 | 155 | 1 | SEPSSEC1 | DAS | MPAC | |
| 1363 | REP | 3 | LAST | 334 | 42,3326 | 1 | 3332 | 1 | TCP | SEPSSECNR | | LEAVES PRACT SEC/60 IN MPAC, MPAC+1. |
| 1364 | | | | | 42,3327 | 0 | 0006 | 1 | POSEC | EXTEND | | |
| 1365 | REP | 2 | LAST | 335 | 42,3330 | 3 | 3215 | 1 | DCA | RNDCON | -1 | |
| 1366 | REP | 1 | | | 42,3331 | 1 | 3325 | 1 | TCP | SEPSSEC1 | | |
| 1367 | REP | 73 | LAST | 332 | 42,3332 | 56 | 002 | 0 | SEPSSECNR | XCH | 0 | THIS ENTRY AVOIDS ROUNDING BY .5 SEC |
| 1368 | REP | 1 | | | 42,3333 | 54 | 144 | 1 | TS | SEPSCRET | | |
| 1369 | REP | 4 | LAST | 333 | 42,3334 | 0 | 7052 | 1 | TC | DMP | | MULT BY 2EXP12/6000 |
| 1370 | REP | 1 | | | 42,3335 | 03202 | 1 | | ADRES | SECON1 | | GIVES PRACT SEC/60 IN BIT12 OF MPAC+1 |
| 1371 | | | | | 42,3336 | 0 | 0006 | 1 | EXTEND | | | AND BELOW. |
| 1372 | REP | 113 | LAST | 335 | 42,3337 | 3 | 0155 | 0 | DCA | MPAC | | SAVE MINUTES AND HOURS |
| 1373 | REP | 3 | LAST | 333 | 42,3340 | 53 | 010 | 0 | DACH | HITEMOUT | | |
| 1374 | REP | 1 | | | 42,3341 | 0 | 4420 | 0 | TC | TPSL1 | | |
| 1375 | REP | 2 | LAST | 335 | 42,3342 | 0 | 4420 | 0 | TC | TPSL1 | | GIVES PRACT SEC/60 IN MPAC+1, MPAC+2. |
| 1376 | REP | 46 | LAST | 334 | 42,3343 | 3 | 4714 | 1 | CAP | ZERO | | |
| 1377 | REP | 114 | LAST | 335 | 42,3344 | 56 | 156 | 0 | XCH | MPAC | +2 | LEAVE PRACT SEC/60 IN MPAC, MPAC+1. |
| 1378 | REP | 115 | LAST | 335 | 42,3345 | 56 | 155 | 0 | XCH | MPAC | +1 | |
| 1379 | REP | 116 | LAST | 335 | 42,3346 | 56 | 154 | 1 | XCH | MPAC | | |
| 1380 | REP | 2 | LAST | 335 | 42,3347 | 0 | 0144 | 0 | TC | SEPSCRET | | |



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| | | | | | | | | | | |
|-------|---|-----|------|-------------|---------|----------|----------|--------|------------|----------------------------------|
| 1381 | REP | 74 | LAST | 335 | 42,3350 | 56 002 0 | SEPMIN | XCH | Q | FINDS WHOLE MINUTES IN BIT13 |
| 1382 | REP | 1 | | | 42,3351 | 54 144 1 | | TS | SEPMRST | OF LOTEMOUT AND ABOVE. |
| 1383 | REP | 1 | | | 42,3352 | 3 1010 1 | | CA | LOTEMOUT | REMOVES REST OF SECONDS. |
| 1384 | | | | | 42,3353 | 0 0006 1 | | EXTEND | | LEAVES FRACT MIN/60 IN MPAC+1. |
| 1385 | REP | 13 | LAST | 183 | 42,3354 | 7 4710 1 | | MP | BIT3 | LEAVES WHOLE HOURS IN MPAC. |
| 1386 | | | | | 42,3355 | 0 0006 1 | | EXTEND | | SR 12, THROW AWAY LP. |
| 1387 | REP | 17 | LAST | 193 | 42,3356 | 7 4676 0 | | MP | BIT13 | SR 2, TAKE FROM LP. = SL 12. |
| 1388 | REP | 117 | LAST | 335 | 42,3357 | 22 155 0 | | LXCH | MPAC +1 | THIS FORCES BITS 12-1 TO 0 IF +, |
| A1389 | | | | | | | | | | FORCES BITS 12-1 TO 1 IF -. |
| 1390 | REP | 4 | LAST | 335 | 42,3360 | 3 1007 1 | | CA | HITEMOUT | |
| 1391 | REP | 118 | LAST | 336 | 42,3361 | 54 154 0 | | TS | MPAC | |
| 1392 | REP | 5 | LAST | 335 | 42,3362 | 0 7052 1 | | TC | DMP | MULT BY 1/15 |
| 1393 | REP | 1 | | | 42,3363 | 03210 1 | | ADRES | MINCON1 | GIVES FRACT MIN/60 IN MPAC+1. |
| 1394 | REP | 2 | LAST | 336 | 42,3364 | 0 0144 0 | ENDSPMIN | TC | SEPMRST | GIVES WHOLE HOURS IN MPAC. |
| R1395 | THIS IS A SPECIAL PURPOSE VERB FOR DISPLAYING A DOUBLE PRECISION AGC | | | | | | | | | |
| R1396 | WORD AS 10 DECIMAL DIGITS ON THE AGC DISPLAY PANEL. IT CAN BE USED WITH | | | | | | | | | |
| R1397 | ANY NOUN, EXCEPT MIXED NOUNS. IT DISPLAYS THE CONTENTS | | | | | | | | | |
| R1398 | OF THE REGISTER NOUNADD IS POINTING TO. IF USED WITH NOUNS WHICH ARE | | | | | | | | | |
| R1399 | INHERENTLY NOT DP SUCH AS THE CDU COUNTERS THE DISPLAY WILL BE GARRAGE. | | | | | | | | | |
| R1400 | DISPLAY IS IN R1 AND R2 ONLY WITH THE SIGN IN R1. | | | | | | | | | |
| 1401 | REP | 1 | | | 40,2675 | | | SETLOC | ENDROLO +1 | |
| 14015 | REP | 3 | LAST | 330 TO 333' | 111 | 445* | | COUNT | 40/PIN | |
| 1402 | REP | 8 | LAST | 332 | 40,2675 | 50 140 1 | DSPDPDEC | INDEX | MIXBR | |
| 1403 | | | | | 40,2676 | 0 2676 1 | | TC | +0 | |
| 1404 | | | | | 40,2677 | 0 2701 0 | | TC | +2 | NORMAL NOUN |
| 1405 | REP | 3 | LAST | 324 | 40,2700 | 0 3323 0 | | TC | DSPALARM | |
| 1406 | | | | | 40,2701 | 0 0006 1 | | EXTEND | | |
| 1407 | REP | 11 | LAST | 332 | 40,2702 | 5 0145 1 | | INDEX | NOUNADD | |
| 1408 | | | | | 40,2703 | 3 0001 0 | | DCA | 0 | |
| 1409 | REP | 119 | LAST | 336 | 40,2704 | 52 155 1 | | DxCH | MPAC | |
| 1410 | REP | 11 | LAST | 335 | 40,2705 | 3 4333 0 | | CAP | R1D1 | |
| 1411 | REP | 36 | LAST | 335 | 40,2706 | 54 777 1 | | TS | DSPCOUNT | |
| 1412 | REP | 47 | LAST | 335 | 40,2707 | 3 4714 1 | | CAP | ZERO | |
| 1413 | REP | 120 | LAST | 336 | 40,2710 | 54 156 1 | | TS | MPAC +2 | |
| 1414 | REP | 5 | LAST | 334 | 40,2711 | 0 7226 0 | | TC | TPACRER | |
| 1415 | REP | 1 | | | 40,2712 | 0 3176 1 | | TC | DSP2DEC | |
| 1416 | REP | 6 | LAST | 333 | 40,2713 | 0 0136 0 | ENDDPDEC | TC | ENTEXIT | |

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P1417 LOAD VERBS IF ALARM CONDITION IS DETECTED DURING EXECUTE,
R1418 CHECK FAIL LIGHT IS TURNED ON AND ENDOPJOB. IF ALARM CONDITION IS
R1419 DETECTED DURING ENTER OF DATA, CHECK FAIL IS TURNED ON AND IT RECYCLES
R1420 TO EXECUTE OF ORIGINAL LOAD VERB. RECYCLE CAUSED BY 1) DECIMAL MACHINE
R1421 CADR 2) MIXTURE OF OCTAL/DECIMAL DATA 3) OCTAL DATA INTO DECIMAL
R1422 ONLY NOUN 4) DEC DATA INTO OCT ONLY NOUN 5) DATA TOO LARGE FOR SCALE
R1423 6) FEWER THAN 3 DATA WORDS LOADED FOR HRS, MIN, SEC NOUN.5(2)-(6) ALARM
R1424 AND RECYCLE OCCUR AT FINAL ENTER OF SET. (1) ALARM AND RECYCLE OCCUR AT
R1425 ENTER OF CADR.

1426 RESP 1 41,2612 SETLOC SHORTOUT

14265 RESP 2 LAST 318 TO 330' 394 394* COUNT 41/PIN

1427 RESP 15 LAST 334 41,2612 4 4711 0 ARCLD C8 TWO
1428 RESP 3 LAST 326 41,2613 0 2423 0 TC COMPTST
1429 RESP 1 41,2614 0 2457 0 TC NOUNTEST TEST IF NOUN CAN BE LOADED.
1430 RESP 1 41,2615 3 3001 0 CAP VBSPILO
1431 RESP 2 LAST 316 41,2616 0 2336 0 TC UPDATV8 -1
1432 RESP 1 41,2617 0 2302 1 TC REQDATA
1433 RESP 1 41,2620 3 3002 0 CAP VBSPILO
1434 RESP 3 LAST 337 41,2621 0 2336 0 TC UPDATV8 -1
1435 RESP 1 41,2622 0 2304 1 TC REQDATA
1436 RESP 1 41,2623 3 3003 1 CAP VBSPILO
1437 RESP 4 LAST 337 41,2624 0 2336 0 TC UPDATV8 -1
1438 RESP 2 LAST 319 41,2625 0 2306 0 TC REQDATA
1439 RESP 13 LAST 331 41,2626 4 6211 1 PUTXYZ C8 SIX TEST THAT THE 3 DATA WORDS LOADED ARE
1440 RESP 1 41,2627 0 3004 0 TC ALLDC/OC ALL DEC OR ALL OCT.
1441 41,2630 0 0006 1 EXTEND
1442 RESP 4 LAST 323 41,2631 3 2114 1 DCA LODNLOC SWITCH BANKS TO NOUN TABLE READING
1443 RESP 7 LAST 329 41,2632 52 006 0 DXCH Z ROUTINE.
1444 RESP 48 LAST 336 41,2633 3 4714 1 CAP ZERO X COMP
1445 RESP 1 41,2634 0 3070 0 TC PUTCOM
1446 RESP 12 LAST 336 41,2635 50 145 1 INDEX NOUNADD
1447 41,2636 54 000 0 TS 0
1448 RESP 29 LAST 330 41,2637 3 4712 1 CAP ONE Y COMP
1449 RESP 2 LAST 337 41,2640 0 3070 0 TC PUTCOM
1450 RESP 13 LAST 337 41,2641 50 145 1 INDEX NOUNADD
1451 41,2642 54 001 1 TS 1
1452 RESP 16 LAST 337 41,2643 3 4711 1 CAP TWO Z COMP
1453 RESP 3 LAST 337 41,2644 0 3070 0 TC PUTCOM
1454 RESP 14 LAST 337 41,2645 50 145 1 INDEX NOUNADD
1455 41,2646 54 002 1 TS 2
145501 RESP 5 LAST 225 41,2647 4 4716 1 C8 SEVEN IF NOUN 7 HAS JUST BEEN LOADED, SET
145502 RESP 10 LAST 323 41,2650 6 1002 1 AD NOUNREQ FLAG BITS AS SPECIFIED.
145503 41,2651 0 0006 1 EXTEND
145504 41,2652 1 2654 0 BZF +2

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| | | | | | | | | | | | |
|--------|-----|----|------|-----|---------|----|------|---|----------|--------------|---|
| 145505 | REP | 2 | LAST | 318 | 41,2653 | 0 | 2771 | 1 | TC | LOADLV | |
| 145506 | REP | 4 | LAST | 328 | 41,2654 | 3 | 1003 | 0 | CA | XR8G | BCADR OF FLAG WORD. |
| 145507 | REP | 5 | LAST | 323 | 41,2655 | 0 | 4320 | 1 | TC | SETINCADR +1 | SET EBANK, NOLNADD. |
| 145508 | REP | 2 | LAST | 319 | 41,2656 | 3 | 1005 | 0 | CA | ZR8G | ZERO TO RESET BITS, NON-ZERO TO SET BITS |
| 145509 | | | | | 41,2657 | 0 | 0004 | 0 | | INTINT | |
| 14551 | | | | | 41,2660 | 0 | 0006 | 1 | | EXTEND | |
| 145511 | REP | 1 | | | 41,2661 | 1 | 2670 | 0 | BZF | BITSOFF | |
| 145512 | REP | 15 | LAST | 337 | 41,2662 | 50 | 145 | 1 | INDEX | NOLNADD | |
| 145513 | | | | | 41,2663 | 4 | 0000 | 0 | CS | 0 | |
| 145514 | REP | 1 | | | 41,2664 | 7 | 1004 | 0 | MASK | YR8G | BITS TO BE PROCESSED. |
| 145515 | REP | 16 | LAST | 338 | 41,2665 | 50 | 145 | 1 | INDEX | NOLNADD | |
| 145516 | | | | | 41,2666 | 26 | 000 | 0 | ADS | 0 | SET BITS. |
| 145517 | REP | 1 | | | 41,2667 | 0 | 2675 | 1 | TC | BITSOFF1 | |
| 145518 | REP | 2 | LAST | 338 | 41,2670 | 4 | 1004 | 0 | CS | YR8G | BITS TO BE PROCESSED. |
| 145519 | REP | 17 | LAST | 338 | 41,2671 | 50 | 145 | 1 | INDEX | NOLNADD | |
| 14552 | | | | | 41,2672 | 7 | 0000 | 0 | MASK | 0 | |
| 145521 | REP | 18 | LAST | 338 | 41,2673 | 50 | 145 | 1 | INDEX | NOLNADD | |
| 145522 | | | | | 41,2674 | 54 | 000 | 0 | TS | 0 | RESET BITS. |
| 145523 | | | | | 41,2675 | 0 | 0003 | 1 | BITSOFF1 | RELINT | |
| 1456 | REP | 3 | LAST | 338 | 41,2676 | 0 | 2771 | 1 | TC | LOADLV | |
| 1457 | REP | 30 | LAST | 337 | 41,2677 | 4 | 4712 | 0 | ALOAD | CS | ONE |
| 1458 | REP | 4 | LAST | 337 | 41,2700 | 0 | 2423 | 0 | TC | COMPTST | |
| 1459 | REP | 2 | LAST | 337 | 41,2701 | 0 | 2457 | 0 | TC | NOLNTEST | TEST IF NOLN CAN BE LOADED. |
| 1460 | REP | 2 | LAST | 337 | 41,2702 | 3 | 3001 | 0 | CAP | V8SP1LD | |
| 1461 | REP | 5 | LAST | 337 | 41,2703 | 0 | 2336 | 0 | TC | UPDATVR -1 | |
| 1462 | REP | 2 | LAST | 337 | 41,2704 | 0 | 2302 | 1 | TC | RESDATX | |
| 1463 | REP | 2 | LAST | 337 | 41,2705 | 3 | 3002 | 0 | CAP | V8SP2LD | |
| 1464 | REP | 6 | LAST | 338 | 41,2706 | 0 | 2336 | 0 | TC | UPDATVR -1 | |
| 1465 | REP | 2 | LAST | 337 | 41,2707 | 0 | 2304 | 1 | TC | RESDATY | |
| 1466 | REP | 6 | LAST | 320 | 41,2710 | 4 | 4715 | 1 | PUTXY | CS | FIVE |
| 1467 | REP | 2 | LAST | 337 | 41,2711 | 0 | 3004 | 0 | TC | ALLDC/OC | TEST THAT THE 2 DATA WORDS LOADED ARE ALL DEC OR ALL OCT. |
| 1468 | | | | | 41,2712 | 0 | 0006 | 1 | | EXTEND | |
| 1469 | REP | 5 | LAST | 337 | 41,2713 | 3 | 2114 | 1 | DCA | LODNNLOC | SWITCH BANKS TO NOLN TABLE READING ROUTINE. |
| 1470 | REP | 6 | LAST | 337 | 41,2714 | 52 | 006 | 0 | DXCH | Z | X COMP |
| 1471 | REP | 49 | LAST | 337 | 41,2715 | 3 | 4714 | 1 | CAP | ZERO | |
| 1472 | REP | 4 | LAST | 337 | 41,2716 | 0 | 3070 | 0 | TC | PUTCOM | |
| 1473 | REP | 19 | LAST | 338 | 41,2717 | 50 | 145 | 1 | INDEX | NOLNADD | |
| 1474 | | | | | 41,2720 | 54 | 000 | 0 | TS | 0 | |
| 1475 | REP | 31 | LAST | 338 | 41,2721 | 3 | 4712 | 1 | CAP | ONE | Y COMP |
| 1476 | REP | 5 | LAST | 338 | 41,2722 | 0 | 3070 | 0 | TC | PUTCOM | |
| 1477 | REP | 20 | LAST | 338 | 41,2723 | 50 | 145 | 1 | INDEX | NOLNADD | |
| 1478 | | | | | 41,2724 | 54 | 001 | 1 | TS | 1 | |
| 1479 | REP | 4 | LAST | 338 | 41,2725 | 0 | 2771 | 1 | TC | LOADLV | |
| 1481 | REP | 3 | LAST | 338 | 41,2726 | 0 | 2302 | 1 | ALOAD | TC | RESDATX |
| 1482 | | | | | 41,2727 | 0 | 0006 | 1 | | EXTEND | |
| 1483 | REP | 6 | LAST | 338 | 41,2730 | 3 | 2114 | 1 | DCA | LODNNLOC | SWITCH BANKS TO NOLN TABLE READING ROUTINE. |
| 1484 | REP | 9 | LAST | 338 | 41,2731 | 52 | 006 | 0 | DXCH | Z | X COMP |
| 1485 | REP | 50 | LAST | 338 | 41,2732 | 3 | 4714 | 1 | CAP | ZERO | |

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| | | | | | | | | | | |
|------|-----|----|------|-----|---------|----|------|---|--------|----------|
| 1466 | REP | 9 | LAST | 338 | 41,2733 | 0 | 3070 | 0 | TC | RUTCOM |
| 1467 | REP | 21 | LAST | 338 | 41,2734 | 50 | 145 | 1 | INDEX | NQNVADD |
| 1468 | REP | 5 | LAST | 338 | 41,2735 | 54 | 000 | 0 | TS | 0 |
| 1469 | REP | 5 | LAST | 338 | 41,2736 | 0 | 2711 | 1 | TC | LOADLV |
| 1490 | REP | 32 | LAST | 338 | 41,2737 | 4 | 4712 | 0 | CS | ONE |
| 1491 | REP | 5 | LAST | 338 | 41,2740 | 0 | 2423 | 0 | TC | COMPTEST |
| 1492 | REP | 24 | LAST | 338 | 41,2741 | 3 | 4874 | 0 | CAP | BITIS |
| 1493 | REP | 10 | LAST | 319 | 41,2742 | 55 | -015 | 0 | TS | CLPASS |
| 1494 | REP | 3 | LAST | 338 | 41,2743 | 0 | 2304 | 1 | TC | REQUALTY |
| 1495 | REP | 7 | LAST | 338 | 41,2744 | 0 | 0006 | 1 | EXTEND | |
| 1496 | REP | 10 | LAST | 338 | 41,2745 | 3 | 2114 | 1 | DCA | LDNNVLOC |
| 1497 | REP | 33 | LAST | 338 | 41,2746 | 52 | 006 | 0 | DNCH | Z |
| 1498 | REP | 7 | LAST | 339 | 41,2747 | 3 | 4712 | 1 | CAP | ONE |
| 1500 | REP | 22 | LAST | 339 | 41,2750 | 0 | 3070 | 0 | TC | RUTCOM |
| 1501 | REP | 22 | LAST | 339 | 41,2751 | 50 | 145 | 1 | INDEX | NQNVADD |
| 1502 | REP | 6 | LAST | 339 | 41,2752 | 54 | 001 | 1 | TS | 1 |
| 1503 | REP | 6 | LAST | 339 | 41,2753 | 0 | 2771 | 1 | TC | LOADLV |
| 1504 | REP | 17 | LAST | 337 | 41,2754 | 4 | 4711 | 0 | CS | TWO |
| 1505 | REP | 6 | LAST | 339 | 41,2755 | 0 | 2423 | 0 | TC | COMPTEST |
| 1507 | REP | 25 | LAST | 339 | 41,2756 | 3 | 4874 | 0 | CAP | BITIS |
| 1508 | REP | 11 | LAST | 339 | 41,2757 | 55 | -015 | 0 | TS | CLPASS |
| 1509 | REP | 3 | LAST | 337 | 41,2760 | 0 | 2308 | 0 | TC | REQUALTY |
| 1510 | REP | 9 | LAST | 339 | 41,2761 | 0 | 0006 | 1 | EXTEND | |
| 1511 | REP | 11 | LAST | 339 | 41,2762 | 3 | 2114 | 1 | DCA | LDNNVLOC |
| 1512 | REP | 18 | LAST | 339 | 41,2763 | 52 | 006 | 0 | DNCH | Z |
| 1513 | REP | 6 | LAST | 339 | 41,2764 | 3 | 4711 | 1 | CAP | TWO |
| 1514 | REP | 23 | LAST | 339 | 41,2765 | 0 | 3070 | 0 | TC | RUTCOM |
| 1515 | REP | 7 | LAST | 339 | 41,2766 | 50 | 145 | 1 | INDEX | NQNVADD |
| 1516 | REP | 7 | LAST | 339 | 41,2767 | 54 | 002 | 1 | TS | 2 |
| 1517 | REP | 1 | LAST | 339 | 41,2770 | 0 | 2771 | 1 | TC | LOADLV |
| 1518 | REP | 51 | LAST | 336 | 41,2771 | 3 | 4714 | 1 | CAP | ZERO |
| 1519 | REP | 13 | LAST | 319 | 41,2772 | 55 | -000 | 1 | TS | DECRINCH |
| 1520 | REP | 52 | LAST | 339 | 41,2773 | 4 | 4714 | 0 | CS | ZERO |
| 1521 | REP | 1 | LAST | 323 | 41,2774 | 55 | -014 | 1 | TS | LDNSTRT |
| 1522 | REP | 6 | LAST | 323 | 41,2775 | 4 | 4374 | 1 | CS | VD1 |
| 1523 | REP | 37 | LAST | 336 | 41,2776 | 54 | 777 | 1 | TS | DISCOUNT |
| 1524 | REP | 22 | LAST | 335 | 41,2777 | 0 | 4574 | 0 | TC | POSTLUMP |
| 1525 | REP | 1 | LAST | 335 | 41,3000 | 61 | 450 | 1 | CADR | RECALYST |
| 1526 | REP | 13 | LAST | 336 | 41,3001 | 0 | 0025 | 0 | DECC | 21 |
| 1527 | REP | 14 | LAST | 339 | 41,3002 | 0 | 0026 | 0 | DECC | 22 |
| 1528 | REP | 13 | LAST | 336 | 41,3003 | 0 | 0027 | 1 | DECC | 23 |
| 1529 | REP | 14 | LAST | 339 | 41,3004 | 54 | 117 | 1 | TS | DECCINT |
| 1530 | REP | 6 | LAST | 317 | 41,3005 | 4 | 1000 | 1 | CS | DECRINCH |
| 1531 | REP | 6 | LAST | 317 | 41,3006 | 54 | 021 | 0 | TS | SR |

SET CLPASS FOR (*) ONLY

SWITCH BANKS TO NON TABLE READING ROUTINE.

SET CLPASS FOR PASSO ONLY

SWITCH BANKS TO NON TABLE READING ROUTINE.

TO BLOCK NUMERICAL CHARACTERS AND
CLEARS AFTER A COMPLETED LOAD
AFTER COMPLETED LOAD, GO TO RECALYST
TO SEE IF THERE IS RECALL FROM ENDDIAR.

VR21 = ALORD
VR22 = RLOAD
VR23 = CLOAD
TESTS THAT DATA WORDS LOADED ARE EITHER
ALL DEC OR ALL OCT. ALARMS IF NOT.



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| | | | | | | | | | |
|-------|-------|-----------------|-------|--------------------|---------|-------------------|----------|----------|--|
| 1532 | REP | 7 | LAST | 339 | 41,3007 | 4 0021 0 | CS | SR | |
| 1533 | REP | 8 | LAST | 340 | 41,3010 | 4 0021 0 | CS | SR | SHIFTED RIGHT 2 |
| 1534 | REP | 103 | LAST | 334 | 41,3011 | 10 000 0 | CCS | A | DEC COMP BITS IN LOW 3 |
| 1535 | | | | | 41,3012 | 1 3014 0 | TCF | +2 | SOME ONES IN LOW 3 |
| 1536 | REP | 75 | LAST | 336 | 41,3013 | 0 0002 0 | TC | 0 | ALL ZEROS. ALL OCTAL. OK |
| 1537 | REP | 14 | LAST | 339 | 41,3014 | 8 0117 0 | AD | DECOUNT | DEC COMP = 7 FOR 3COMP, =6 FOR 2COMP |
| 1538 | | | | | 41,3015 | 0 0006 1 | EXTEND | | (BUT IT HAS BEEN DECREMENTED BY CCS) |
| 1539 | | | | | 41,3016 | 1 3020 1 | BZF | +2 | MUST MATCH 6 FOR 3COMP, 5 FOR 2COMP. |
| 1540 | REP | 4 | LAST | 327 | 41,3017 | 0 4161 0 | TC | ALMAYCLE | ALARM AND RECYCLE. |
| 1541 | REP | 76 | LAST | 340 | 41,3020 | 0 0002 0 | GOO | TC | 0 |
| 1542 | REP | 77 | LAST | 340 | 41,3021 | 56 002 0 | SPRUTNOR | XCH | 0 |
| 1543 | REP | 1 | | | 41,3022 | 54 114 1 | TS | EXITM | GETS SP ROUTINE NUMBER FOR NORMAL CASE |
| 1544 | REP | 1 | | | 41,3023 | 3 4363 0 | CAP | MID5 | CANT USE L FOR RETURN. TSTPORDP USES L. |
| 1545 | REP | 3 | LAST | 328 | 41,3024 | 7 0147 1 | MASK | NNTYPTM | |
| 1546 | REP | 1 | | | 41,3025 | 0 4336 0 | TC | RIGHTS | |
| 1547 | REP | 2 | LAST | 340 | 41,3026 | 0 0114 0 | TC | EXITM | SP ROUTINE NUMBER IN A |
| 1548 | REP | 76 | LAST | 340 | 41,3027 | 56 002 0 | SPRUTMIX | XCH | 0 |
| 1549 | REP | 3 | LAST | 340 | 41,3030 | 54 114 1 | TS | EXITM | GETS SP ROUTINE NUMBER FOR MIXED CASE |
| 1550 | REP | 15 | LAST | 340 | 41,3031 | 50 117 0 | INDEX | DECOUNT | |
| 1551 | REP | 1 | | | 41,3032 | 3 3061 0 | CAP | DISPLACE | PUT TC GOO, TC RIGHTS, OR TC LEFTS IN L |
| 1552 | REP | 36 | LAST | 328 | 41,3033 | 54 001 1 | TS | L | |
| 1553 | REP | 16 | LAST | 340 | 41,3034 | 50 117 0 | INDEX | DECOUNT | |
| 1554 | REP | 3 | LAST | 311 | 41,3035 | 3 4362 1 | CAP | LOW5 | LOW5, MID5, OR HIS IN A |
| 1555 | REP | 2 | LAST | 265 | 41,3036 | 7 0153 1 | MASK | RUTMXTM | GET HIS, MID5, OR LOW5 OF RUTMXTM ENTRY |
| 1556 | REP | 37 | LAST | 340 | 41,3037 | 50 001 0 | INDEX | L | |
| 1557 | | | | | 41,3040 | 0 0000 1 | TC | 0 | |
| R1558 | DO TC | GOO(DECOUNT=0), | DO TC | RIGHTS(DECOUNT=1), | DO TC | LEFTS(DECOUNT=2). | | | |
| 1559 | REP | 4 | LAST | 340 | 41,3041 | 0 0114 0 | SPRET1 | TC | EXITM |
| 1560 | REP | 79 | LAST | 340 | 41,3042 | 56 002 0 | SPCONUM | XCH | 0 |
| 1561 | REP | 5 | LAST | 340 | 41,3043 | 54 114 1 | TS | EXITM | GETS 2X(SP CONSTANT NUMBER) |
| 1562 | REP | 9 | LAST | 336 | 41,3044 | 50 140 1 | INDEX | MIXRR | |
| 1563 | | | | | 41,3045 | 0 3045 0 | TC | +0 | |
| 1564 | REP | 1 | | | 41,3046 | 0 3064 0 | TC | CONUMOR | NORMAL NOLN |
| 1565 | REP | 17 | LAST | 340 | 41,3047 | 50 117 0 | INDEX | DECOUNT | MIXED NOLN |
| 1566 | REP | 2 | LAST | 340 | 41,3050 | 3 3061 0 | CAP | DISPLACE | |
| 1567 | REP | 38 | LAST | 340 | 41,3051 | 54 001 1 | TS | L | PUT TC GOO, TC RIGHTS, OR TC LEFTS IN L. |
| 1568 | REP | 18 | LAST | 340 | 41,3052 | 50 117 0 | INDEX | DECOUNT | |
| 1569 | REP | 4 | LAST | 340 | 41,3053 | 3 4362 1 | CAP | LOW5 | |
| 1570 | REP | 4 | LAST | 340 | 41,3054 | 7 0147 1 | MASK | NNTYPTM | |
| 1571 | REP | 39 | LAST | 340 | 41,3055 | 50 001 0 | INDEX | L | |
| 1572 | | | | | 41,3056 | 0 0000 1 | TC | 0 | |
| R1573 | DO TC | GOO(DECOUNT=0), | DO TC | RIGHTS(DECOUNT=1), | DO TC | LEFTS(DECOUNT=2). | | | |
| 1574 | | | | | 41,3057 | 8 0000 1 | SPRET | DOUBLE | |
| 1575 | REP | 6 | LAST | 340 | 41,3060 | 0 0114 0 | TC | EXITM | 2X(SP CONSTANT NUMBER) IN A |
| 1576 | REP | 1 | | | 41,3061 | 0 3020 0 | DISPLACE | TC | GOO |

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|-------|---------|-------|-------|-----|---------|----------|----------|----------------|--------|
| 1623 | REP | 2 | LAST | 341 | 41,3134 | 0 3165 0 | TC | FUTDCSP | |
| 1624 | REP | 2 | LAST | 341 | 41,3135 | 0 2451 0 | TC | DOTSTCYC | |
| 1625 | REP | 3 | LAST | 329 | 41,3136 | 0 3021 1 | TC | SPRUTNOR | |
| 1626 | REP | 4 | LAST | 341 | 41,3137 | 0 2261 0 | TC | DPTEST | |
| 1627 | REP | 3 | LAST | 341 | 41,3140 | 0 3144 0 | TC | FUTCOM2 -4 | |
| 1628 | REP | 55 | LAST | 341 | 41,3141 | 3 4714 1 | CAP | ZERO | |
| 1629 | REP | 26 | LAST | 341 | 41,3142 | 54 117 1 | TS | DECOUNT | |
| 1630 | REP | 1 | | | 41,3143 | 0 3123 1 | TC | FUTDCOM | |
| 1631 | REP | 6 | LAST | 328 | 41,3144 | 3 0146 1 | CA | NNADTEM | |
| 1632 | REP | 34 | LAST | 339 | 41,3145 | 6 4712 1 | AD | ONE | |
| 1633 | | | | | 41,3146 | 0 0006 1 | EXTEND | | |
| 1634 | REP | 1 | | | 41,3147 | 1 3154 0 | BZF | CHANLOAD | |
| 1635 | REP | 123 | LAST | 341 | 41,3150 | 56 154 1 | FUTCOM2 | KCH MPAC | |
| 1636 | REP | 2 | LAST | 341 | 41,3151 | 0 0115 1 | TC | DECRET | |
| 1637 | REP | 36 | LAST | 339 | 0777 | | EBANK= | DSPCLNT | |
| 1638 | REP | 1 | | | 41,3152 | 02126 0 | OTSPINLC | ZCADR OTSPIN | |
| 1638 | REP | 1 | | | 41,3153 | 64101 0 | | | |
| 1639 | REP | 6 | LAST | 337 | 41,3154 | 4 4716 1 | CHANLOAD | CS SEVEN | |
| 16391 | REP | 4 | LAST | 328 | 41,3155 | 6 1017 0 | AD | NOUNCADR | |
| 16392 | | | | | 41,3156 | 0 0006 1 | EXTEND | | |
| 16393 | REP | 6 | LAST | 339 | 41,3157 | 1 2771 0 | BZF | LOADLV | |
| 16394 | REP | 124 | LAST | 342 | 41,3160 | 3 0154 1 | CA | MPAC | |
| 1640 | | | | | 41,3161 | 0 0006 1 | EXTEND | | |
| 1641 | REP | 5 | LAST | 342 | 41,3162 | 5 1017 0 | INDEX | NOUNCADR | |
| 1642 | | | | | 41,3163 | 01 000 0 | WRITE | 0 | |
| 1643 | REP | 9 | LAST | 342 | 41,3164 | 0 2771 1 | TC | LOADLV | |
| R1644 | FUTDCSP | PINDS | MIXRR | AND | DECOUNT | STILL | SET | FROM | FUTCOM |
| 1645 | REP | 2 | LAST | 328 | 41,3165 | 0 3042 1 | FUTDCSP | TC SPCONLM | |
| 1646 | REP | 13 | LAST | 332 | 41,3166 | 54 123 0 | TS | SPTMP1 | |
| 1647 | | | | | 41,3167 | 0 0006 1 | EXTEND | | |
| 1648 | REP | 1 | | | 41,3170 | 3 3153 0 | DCA | OTSPINLC | |
| 1649 | REP | 12 | LAST | 339 | 41,3171 | 52 006 0 | DXCH | Z | |
| 1650 | REP | 11 | LAST | 341 | 41,3172 | 50 140 1 | INDEX | MIXRR | |
| 1651 | | | | | 41,3173 | 0 3173 1 | TC | +0 | |
| 1652 | REP | 1 | | | 41,3174 | 0 3177 0 | TC | FUTSPNOR | |
| 1653 | REP | 4 | LAST | 341 | 41,3175 | 0 3027 1 | TC | SPRUTMIX | |
| 1654 | REP | 1 | | | 41,3176 | 0 3200 0 | TC | FUTDCSP2 | |
| 1655 | REP | 4 | LAST | 342 | 41,3177 | 0 3021 1 | FUTSPNOR | TC SPRUTNOR | |
| 1656 | REP | 104 | LAST | 340 | 41,3200 | 50 000 1 | FUTDCSP2 | INDEX A | |
| 1657 | REP | 1 | | | 41,3201 | 3 3203 0 | CAP | SPINTARR | |
| 1658 | REP | 3 | LAST | 329 | 41,3202 | 0 4577 0 | TC | RANKJMP | |
| 1659 | REP | 1 | | | 41,3203 | 62347 0 | SPINTARR | CADR GOALMICYC | |

+ DEC
+0 OCTAL
TEST IF DEC ONLY BIT = 1. IF SO,
ALARM AND RECYCLE. IF NOT, CONTINUE.
NO DP
DP

IF NNADTEM = -1, CHANNEL TO BE SPECIFIED

DONT LOAD CHAN 7. (IT = SUPERRANK).

2X(SF CON NUMB) IN A

SWITCH BANKS TO SF CONSTANT TABLE
READING ROUTINE.
LOADS SPTMP1, SPTMP2.

SWITCH BANKS FOR EXPANSION ROOM
ALARM AND RECYCLE IF DEC LOAD

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A1660
 1661 REP 1 41,3204 60774 0 CADR BINROUND
 1662 REP 1 41,3205 60714 0 CADR DEGINSF
 1663 REP 1 41,3206 60764 1 CADR ARDHINSF
 1664 REP 1 41,3207 61017 0 CADR DPINSF
 1665 REP 1 41,3210 61044 0 CADR DPINSF2
 1666 REP 1 41,3211 61002 1 CADR OPTDSGIN
 1667 REP 2 LAST 343 41,3212 61017 0 CADR DPINSF
 1668 REP 1 41,3213 65365 1 CADR HMSIN
 1669 REP 4 LAST 336 41,3214 61323 1 CADR DSPALARM
 1671 REP 1 41,3215 61051 1 CADR DPINSF4
 16711 REP 1 41,3216 60777 0 CADR ARTINSF
 16712 REP 5 LAST 343 41,3217 61323 1 CADR DSPALARM
 1672 41,3220 ENDRUTIN EQUALS

WITH OCTAL ONLY NOUN.

SAME AS ARITHDP1

MIN/SEC CANT BE LOADED.

2INTOUT CANT BE LOADED.

R1673 SCALE FACTORS FOR THOSE ROUTINES NEEDING THEM ARE AVAILABLE IN SFTEMP1.
 R1674 ALL SPIN ROUTINES USE MPAC MPAC+1. LEAVE RESULT IN A. END WITH TC DECRET
 1675 REP 1 40,2714 SETLOC ENDDPDEC +1

16755 REP 4 LAST 336 TO 337' 15 460* COUNT 40/PIN

R1676 DEGINSF APPLIES 1000/180 = 5.5555(10) = 5.43434(8)

1677 REP 6 LAST 336 40,2714 0 7052 1 DEGINSF TC DMP
 1678 REP 1 40,2715 0 2757 0 ADRES DEGCON1
 1679 REP 125 LAST 342 40,2716 10 155 1 CCS MPAC +1
 1680 REP 15 LAST 315 40,2717 3 4700 1 CAP BIT11
 1681 40,2720 0 2722 1 TC +2
 1682 REP 16 LAST 343 40,2721 4 4700 0 CS BIT11
 1683 REP 126 LAST 343 40,2722 6 0155 0 AD MPAC +1
 1684 REP 1 40,2723 0 3070 0 TC 2ROUND +2
 1685 REP 3 LAST 335 40,2724 0 4420 0 TC TPSP1
 1686 REP 4 LAST 343 40,2725 0 4420 0 DEGINSF2 TC TPSP1
 1687 REP 1 40,2726 0 3077 1 TC TESTOPUP
 1688 REP 5 LAST 343 40,2727 0 4420 0 TC TPSP1
 1689 REP 127 LAST 343 40,2730 10 154 0 CCS MPAC
 1690 REP 1 40,2731 0 2735 1 TC SIGNFIX
 1691 REP 2 LAST 343 40,2732 0 2735 1 TC SIGNFIX
 1692 40,2733 4 0000 0 COM
 1693 REP 128 LAST 343 40,2734 54 154 0 TS MPAC
 1694 REP 4 LAST 341 40,2735 10 162 0 SIGNFIX CCS MPAC+6
 1695 REP 1 40,2736 0 2753 1 TC SENTO1
 1696 REP 1 40,2737 0 2747 1 TC ENDSCALE
 1697 REP 129 LAST 343 40,2740 10 154 0 CCS MPAC
 1698 REP 5 LAST 330 40,2741 0 5640 0 TC CCSHOLE
 1699 REP 1 40,2742 0 2751 0 TC NEG160
 1700 40,2743 0 2744 1 TC +1

SP ROUTINE FOR DEC DEGREES
 MULT BY 5.5 5(10)X2EXP-3
 THIS ROUNDS OFF MPAC+1 BEFORE SHIFT
 LEFT 3, AND CAUSES 360.00 TO OP/UP
 WHEN SHIFTED LEFT AND ALARM.

LEFT 1
 LEFT 2

RETURNS IF NO OP/UP (LEFT3)

IF+, GO TO SIGNFIX
 IF +0, GO TO SIGNFIX
 IF -, USE -MAGNITUDE +1
 IF -0, USE +0

IF OVERFLOW
 NO OVERFLOW/UNDERFLOW
 IF UP FORCE SIGN TO 0 EXCEPT -180

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| | | | | | | | | | | |
|-------|-----|-----|------|-----|---------|----------|----------|----------|-------------|---|
| 1701 | REP | 130 | LAST | 343 | 40,2744 | 56 154 1 | XCH | MPAC | | |
| 1702 | REP | 7 | LAST | 299 | 40,2745 | 7 4672 1 | MASK | POS MAX | | |
| 1703 | REP | 131 | LAST | 344 | 40,2746 | 54 154 0 | TS | MPAC | | |
| 1704 | REP | 23 | LAST | 339 | 40,2747 | 0 4574 0 | ENDSCALE | TC | POSTJUMP | |
| 1705 | REP | 4 | LAST | 342 | 40,2750 | 63150 0 | CADR | FUTCOM2 | | |
| 1706 | REP | 8 | LAST | 344 | 40,2751 | 4 4672 1 | NEG100 | CS | POS MAX | |
| 1707 | REP | 2 | LAST | 343 | 40,2752 | 0 2746 0 | TC | ENDSCALE | -1 | |
| 1708 | REP | 132 | LAST | 344 | 40,2753 | 4 0154 0 | SQNT01 | CS | MPAC | IF OF FORCE SIGN TO 1 |
| 1709 | REP | 9 | LAST | 344 | 40,2754 | 7 4672 1 | MASK | POS MAX | | |
| 1710 | REP | 105 | LAST | 342 | 40,2755 | 4 0000 0 | CS | A | | |
| 1711 | REP | 3 | LAST | 344 | 40,2756 | 0 2746 0 | TC | ENDSCALE | -1 | |
| 1712 | | | | | 40,2757 | 26161 0 | DEGCON1 | 2DRC | 5.555555555 | B-3 |
| 1712 | | | | | 40,2760 | 30707 1 | | | | |
| 1713 | | | | | 40,2761 | 21616 0 | DEGCON2 | 2DEC | 2.222222222 | B-2 |
| 1713 | | | | | 40,2762 | 67071 0 | | | | |
| 1714 | | | | | 40,2763 | 71527 1 | NEG.2 | OCT | -06250 | = .197753906 I.E. THE BIAS SCALED |
| 1715 | REP | 7 | LAST | 343 | 40,2764 | 0 7052 1 | ARTHINSP | TC | DMP | SCALES MPAC, +1 BY SPTMP1, SPTMP2. |
| 1716 | REP | 14 | LAST | 342 | 40,2765 | 00123 1 | ADRES | SPTMP1 | | ASSUMES POINT BETWEEN HI AND LO PARTS |
| 1717 | REP | 133 | LAST | 344 | 40,2766 | 56 156 0 | XCH | MPAC | +2 | OF SPCON. SHIFTS RESULTS LEFT BY 14. |
| 1718 | REP | 134 | LAST | 344 | 40,2767 | 56 155 0 | XCH | MPAC | +1 | (BY TAKING RESULTS FROM MPAC+1, MPAC+2) |
| 1719 | REP | 135 | LAST | 344 | 40,2770 | 56 154 1 | XCH | MPAC | | |
| 1720 | | | | | 40,2771 | 0 0006 1 | EXTEND | | | |
| 1721 | REP | 2 | LAST | 343 | 40,2772 | 1 2774 0 | BZF | BINROUND | | |
| 1722 | REP | 5 | LAST | 340 | 40,2773 | 0 4161 0 | TC | ALMCYCLE | | TOO LARGE A LOAD. ALARM AND RECYCLE. |
| 1723 | REP | 2 | LAST | 343 | 40,2774 | 0 3066 1 | BINROUND | TC | 2ROUND | |
| 1724 | REP | 2 | LAST | 343 | 40,2775 | 0 3077 1 | TC | TESTOPUP | | |
| 1725 | REP | 4 | LAST | 344 | 40,2776 | 0 2747 1 | TC | ENDSCALE | | |
| 17251 | REP | 8 | LAST | 344 | 40,2777 | 0 7052 1 | ARTIN1SP | TC | DMP | RETURNS IF NO OP/UP |
| 17252 | REP | 15 | LAST | 344 | 40,3000 | 00123 1 | ADRES | SPTMP1 | | SCALES MPAC, +1 BY SPTMP1, SPTMP2. |
| 17253 | REP | 3 | LAST | 344 | 40,3001 | 0 2774 1 | TC | BINROUND | | ROUNDS MPAC+1 INTO MPAC. |
| 1726 | REP | 136 | LAST | 344 | 40,3002 | 10 154 0 | OPTDEGIN | CCS | MPAC | OPTICS SCALING ROUTINE |
| 1727 | | | | | 40,3003 | 0 3007 0 | TC | +4 | | |
| 1728 | | | | | 40,3004 | 0 3007 0 | TC | +3 | | |
| 1729 | REP | 6 | LAST | 344 | 40,3005 | 0 4161 0 | TC | ALMCYCLE | | REJECT - INPUT. ALARM AND RECYCLE. |
| 1730 | REP | 7 | LAST | 344 | 40,3006 | 0 4161 0 | TC | ALMCYCLE | | REJECT - INPUT. ALARM AND RECYCLE. |
| 1731 | REP | 1 | | | 40,3007 | 3 2763 1 | OPDEGIN2 | CAP | NEG.2 | RANGE IS 90 DEG |
| 1732 | REP | 137 | LAST | 344 | 40,3010 | 26 154 0 | ADS | MPAC | | SUBTRACT BIAS |
| 1733 | REP | 9 | LAST | 344 | 40,3011 | 0 7052 1 | TC | DMP | | MULT BY 100 / 45 B-2 |
| 1734 | REP | 1 | | | 40,3012 | 02761 0 | ADRES | DEGCON2 | | |
| 1735 | REP | 17 | LAST | 296 | 40,3013 | 3 4677 0 | CAP | BIT12 | | ROUND AS IN DEGINSP |
| 1736 | REP | 138 | LAST | 344 | 40,3014 | 6 0155 0 | AD | MPAC | +1 | |



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| | | | | | | | | | | |
|-------|-----|-----|------|------------|---------|----------|----------|--------|----------|----|
| 1776 | REP | 143 | LAST | 345 | 40,3066 | 56 155 0 | 2ROUND | XCH | MPAC | +1 |
| 1779 | | | | | 40,3067 | 6 0000 1 | | DOUBLE | | |
| 1780 | REP | 144 | LAST | 346 | 40,3070 | 54 155 1 | | TS | MPAC | +1 |
| 1781 | REP | 85 | LAST | 345 | 40,3071 | 0 0002 0 | | TC | O | |
| 1782 | REP | 145 | LAST | 346 | 40,3072 | 6 0154 1 | | AD | MPAC | |
| 1783 | REP | 146 | LAST | 346 | 40,3073 | 54 154 0 | | TS | MPAC | |
| 1784 | REP | 86 | LAST | 346 | 40,3074 | 0 0002 0 | | TC | O | |
| 1785 | REP | 5 | LAST | 343 | 40,3075 | 54 162 0 | | TS | MPAC+6 | |
| 1786 | REP | 87 | LAST | 346 | 40,3076 | 0 0002 0 | 2RNDEND | TC | O | |
| 1787 | REP | 6 | LAST | 346 | 40,3077 | 10 162 0 | TESTOFUP | CCS | MPAC+6 | |
| 1788 | REP | 8 | LAST | 344 | 40,3100 | 0 4161 0 | | TC | ALMCYCLE | |
| 1789 | REP | 88 | LAST | 346 | 40,3101 | 0 0002 0 | | TC | O | |
| 1790 | REP | 9 | LAST | 346 | 40,3102 | 0 4161 0 | | TC | ALMCYCLE | |
| 1791 | REP | 1 | | | 42,3365 | | | SETLOC | ENDSPMIN | +1 |
| 17915 | REP | 2 | LAST | 333 TO 336 | 146 | 146* | | COUNT | 42/PIN | |
| 1792 | REP | 1 | | | 42,3365 | 0 3506 1 | HMSIN | TC | ALL3DEC | |
| 1793 | REP | 13 | LAST | 345 | 42,3366 | 0 7052 1 | | TC | DMP | |
| 1794 | REP | 1 | | | 42,3367 | 0 3447 0 | | ADRES | WHOLECON | |
| 1795 | REP | 1 | | | 42,3370 | 0 3456 0 | | TC | RND/TST | |
| 1796 | REP | 58 | LAST | 345 | 42,3371 | 3 4714 1 | | CAP | ZERO | |
| 1797 | REP | 147 | LAST | 346 | 42,3372 | 54 156 1 | | TS | MPAC | +2 |
| 1798 | REP | 1 | | | 42,3373 | 3 3451 1 | | CAP | HRCON | |
| 1799 | REP | 148 | LAST | 346 | 42,3374 | 54 154 0 | | TS | MPAC | |
| 1800 | REP | 2 | LAST | 346 | 42,3375 | 3 3452 1 | | CAP | HRCON | +1 |
| 1801 | REP | 149 | LAST | 346 | 42,3376 | 56 155 0 | | XCH | MPAC | +1 |
| 1802 | REP | 8 | LAST | 334 | 42,3377 | 0 7256 1 | | TC | SHORTMP | |
| 1803 | REP | 1 | | | 42,3400 | 0 3467 1 | | TC | MPACTST | |
| 1804 | REP | 150 | LAST | 346 | 42,3401 | 52 156 1 | | DXCH | MPAC | +1 |
| 1805 | REP | 1 | | | 42,3402 | 52 124 1 | | DXCH | HITEMIN | |
| 1806 | REP | 3 | LAST | 338 | 42,3403 | 3 1004 1 | | CA | YREG | |
| 1807 | REP | 2 | LAST | 73 | 42,3404 | 23-007 1 | | LXCH | YREGLP | |
| 1808 | REP | 151 | LAST | 346 | 42,3405 | 52 155 1 | | DXCH | MPAC | |
| 1809 | REP | 14 | LAST | 346 | 42,3406 | 0 7052 1 | | TC | DMP | |
| 1810 | REP | 2 | LAST | 346 | 42,3407 | 0 3447 0 | | ADRES | WHOLECON | |
| 1811 | REP | 2 | LAST | 346 | 42,3410 | 0 3456 0 | | TC | RND/TST | |
| 1812 | REP | 1 | | | 42,3411 | 4 3454 0 | | CS | 59MIN | |
| 1813 | REP | 1 | | | 42,3412 | 0 3474 0 | | TC | SIZSTST | |
| 1814 | REP | 152 | LAST | 346 | 42,3413 | 56 155 0 | | XCH | MPAC | +1 |
| 1815 | | | | | 42,3414 | 0 0006 1 | | EXTEND | | |
| 1816 | REP | 1 | | | 42,3415 | 7 3453 1 | | MP | MINCON | |
| 1817 | REP | 2 | LAST | 346 | 42,3416 | 20 124 1 | | DAS | HITEMIN | |
| 1818 | | | | | 42,3417 | 0 0006 1 | | EXTEND | | |
| 1819 | | | | | 42,3420 | 1 3422 1 | | RZF | +2 | |
| 1820 | REP | 10 | LAST | 346 | 42,3421 | 0 4161 0 | | TC | ALMCYCLE | |

IF MPAC+1 DOES NOT OP/UP

IF MPAC DOES NOT OP/UP

RETURNS IF NO OP/UP
OF ALARM AND RECYCLE.

UP ALARM AND RECYCLE.

IF ALL 3 WORDS WERE NOT LOADED, ALARM,
XREG, XREGLP (=HOURS) WERE ALREADY PUT
INTO MPAC, MPAC+1.
ROUND OFF TO WHOLE HRS IN MPAC+1.
ALARM IF MPAC NON ZERO (G/ 16383).

ALARM IF MPAC NON ZERO (G/ 745).
STORE HOURS CONTRIBUTION

PUT YREG, YREGLP INTO MPAC, +1.

ROUND OFF TO WHOLE MIN IN MPAC+1
ALARM IF MPAC NON ZERO (G/16383)
ALARM IF MPAC+1 G/ 59MIN

LEAVES MINUTES CONTRIBUTION IN A,I.
ADD IN MINUTES CONTRIBUTION
IF THIS DAS OVERFLOWS, G/ 745HR, 39MIN

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|------|-----|-----|------|-----|---------|----------|----------|----------|--|
| 1821 | REP | 3 | LAST | 338 | 42,3422 | 3 1005 0 | CA | ZRBO | PUT ZRBO, ZRBO LP INTO MPAC, +1. |
| 1822 | REP | 2 | LAST | 73 | 42,3423 | 23=010 1 | LXCH | ZRBO LP | |
| 1823 | REP | 153 | LAST | 346 | 42,3424 | 52 155 1 | DXCH | MPAC | |
| 1824 | REP | 15 | LAST | 346 | 42,3425 | 0 7052 1 | TC | DMP | |
| 1825 | REP | 3 | LAST | 346 | 42,3426 | 03447 0 | ADRES | WHOLECON | |
| 1826 | REP | 3 | LAST | 346 | 42,3427 | 0 3456 0 | TC | RND/TST | ROUND OFF TO WHOLE CENTI-SEC IN MPAC+1 |
| 1827 | REP | 1 | | | 42,3430 | 4 3455 1 | CS | 59.99SEC | ALARM IF MPAC NON ZERO (G/163.83 SEC) |
| 1828 | REP | 2 | LAST | 346 | 42,3431 | 0 3474 0 | TC | SIZETST | ALARM IF MPAC+1 G/59.99 SEC |
| 1829 | REP | 3 | LAST | 346 | 42,3432 | 52 124 1 | DXCH | HITEMIN | ADD IN SECONDS CONTRIBUTION |
| 1830 | REP | 154 | LAST | 347 | 42,3433 | 20 155 1 | DAS | MPAC | IF THIS DAS OVERFLOWS, |
| 1831 | | | | | 42,3434 | 0 0006 1 | RCTEND | | G/ 746 HR, 39 MIN, 14.55 SEC. |
| 1832 | | | | | 42,3435 | 1 3437 0 | BZF | +2 | |
| 1833 | REP | 11 | LAST | 346 | 42,3436 | 0 4161 0 | TC | ALMCYCLE | ALARM AND RECYCLE |
| 1834 | REP | 59 | LAST | 346 | 42,3437 | 3 4714 1 | CAP | ZERO | |
| 1835 | REP | 155 | LAST | 347 | 42,3440 | 54 156 1 | TS | MPAC +2 | |
| 1836 | REP | 6 | LAST | 338 | 42,3441 | 0 7226 0 | TC | TPAGRES | |
| 1837 | REP | 156 | LAST | 347 | 42,3442 | 52 155 1 | DXCH | MPAC | |
| 1838 | REP | 26 | LAST | 345 | 42,3443 | 50 145 1 | INDEX | NOUNADD | |
| 1839 | | | | | 42,3444 | 52 001 1 | DXCH | 0 | |
| 1840 | REP | 24 | LAST | 344 | 42,3445 | 0 4574 0 | TC | POSTJUMP | |
| 1841 | REP | 10 | LAST | 342 | 42,3446 | 62771 1 | CADR | LOADLV | |
| 1842 | | | | | 42,3447 | 00006 1 | WHOLECON | OCT | 00006 (10EXP5/2EXP14)2EXP14 |
| 1843 | | | | | 42,3450 | 03240 1 | | OCT | 03240 |
| 1844 | | | | | 42,3451 | 00025 0 | HRCN | OCT | 00025 1 HOUR IN CENTI-SEC |
| 1845 | | | | | 42,3452 | 37100 1 | | OCT | 37100 |
| 1846 | | | | | 42,3453 | 13560 0 | MINCON | OCT | 13560 1 MINUTE IN CENTI-SEC |
| 1847 | | | | | 42,3454 | 00073 0 | 59MIN | OCT | 00073 59 AS WHOLE |
| 1848 | | | | | 42,3455 | 13557 1 | 59.99SEC | OCT | 13557 5999 CENTI-SEC |
| 1849 | REP | 157 | LAST | 347 | 42,3456 | 56 156 0 | RND/TST | XCH | MPAC +2 ROUNDS MPAC+2 INTO MPAC+1. |
| 1850 | | | | | 42,3457 | 6 0000 1 | | DOUBLE | ALARMS IF MPAC NOT 0 |
| 1851 | REP | 158 | LAST | 347 | 42,3460 | 54 156 1 | TS | MPAC +2 | |
| 1852 | REP | 60 | LAST | 347 | 42,3461 | 3 4714 1 | CAP | ZERO | |
| 1853 | REP | 159 | LAST | 347 | 42,3462 | 6 0156 0 | AD | MPAC +1 | |
| 1854 | REP | 160 | LAST | 347 | 42,3463 | 54 155 1 | TS | MPAC +1 | |
| 1855 | REP | 61 | LAST | 347 | 42,3464 | 3 4714 1 | CAP | ZERO | |
| 1856 | REP | 161 | LAST | 347 | 42,3465 | 6 0154 1 | AD | MPAC | CANT OVFLOW |
| 1857 | REP | 162 | LAST | 347 | 42,3466 | 56 154 1 | XCH | MPAC | |
| 1858 | REP | 163 | LAST | 347 | 42,3467 | 10 154 0 | MPACTST | CCS | MPAC ALARM IF MPAC NON ZERO |
| 1859 | REP | 12 | LAST | 347 | 42,3470 | 0 4161 0 | TC | ALMCYCLE | ALARM AND RECYCLE. |
| 1860 | REP | 89 | LAST | 346 | 42,3471 | 0 0002 0 | TC | 0 | |
| 1861 | REP | 13 | LAST | 347 | 42,3472 | 0 4161 0 | TC | ALMCYCLE | ALARM AND RECYCLE. |
| 1862 | REP | 90 | LAST | 347 | 42,3473 | 0 0002 0 | TC | 0 | |
| 1863 | REP | 164 | LAST | 347 | 42,3474 | 54 156 1 | SIZETST | TS | MPAC +2 CALLED WITH - CON IN A |
| 1864 | REP | 165 | LAST | 347 | 42,3475 | 10 155 1 | CCS | MPAC +1 | GET MAG OF MPAC+1 |
| 1865 | REP | 35 | LAST | 342 | 42,3476 | 6 4712 1 | AD | ONB | |
| 1866 | | | | | 42,3477 | 1 3501 1 | TCP | +2 | |



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1867 REP 36 LAST 347 42,3500 6 4712 1 AD ONE
1868 REP 166 LAST 347 42,3501 6 0156 0 AD MPAC +2
1869 42,3502 0 0006 1 EXTEND
1870 42,3503 6 3505 1 BZAP +2
1871 REP 14 LAST 347 42,3504 0 4181 0 TC ALMCYCLE
1872 REP 91 LAST 347 42,3505 0 0002 0 TC 0
R1873 ALL3DEC TESTS THAT ALL 3 WORDS ARE LOADED IN DEC (FOR HMSIN).
R1874 ALARM IF NOT. ( TEST THAT BITS 3,4,5 OF DECBRNCH ARE ALL = 1)
1875 REP 1 42,3506 4 3513 1 ALL3DEC CS OCT34BAR
1876 REP 17 LAST 341 42,3507 7 1000 1 MASK DECBRNCH
1877 REP 2 LAST 348 42,3510 6 3513 0 AD OCT34BAR
1878 REP 106 LAST 344 42,3511 10 000 0 CCS A
1879 REP 1 42,3512 0 3516 0 TC FORCEV25
1880 42,3513 77743 1 OCT34BAR OCT T7743
1881 REP 2 LAST 348 42,3514 0 3516 0 TC FORCEV25
1882 REP 92 LAST 348 42,3515 0 0002 0 TC 0
18825 REP 1 42,3516 4 4113 1 FORCEV25 CS OCT31
18826 REP 2 LAST 319 42,3517 55=041 1 TS VERBSAVE
18827 REP 15 LAST 348 42,3520 0 4181 0 TC ALMCYCLE
1883 42,3521 ENDMSS EQUALS
    
```

MAG OF MPAC+1 - CON
MAG OF MPAC+1 G/ CON, ALARM AND RECYCLE.
MAG OF MPAC+1 L/z CON

GET BITS 3,4,5 IN A
GET BITS 3,4,5 OF DECBRNCH IN A
BITS 3,4,5 OF DECBRNCH MUST ALL = 1

FORCE VERB 25 TO BE EXECUTED BY RECYCLE
IN CASE OPERATOR EXECUTED A LOWER LOAD
VERB. ALARM AND RECYCLE.

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R1884 MONITOR ALLOWS OTHER KEYBOARD ACTIVITY. IT IS ENDED BY VERB TERMINATE,
 R1885 VERB PROCEED WITHOUT DATA, VERB RESEQUENCE,
 R1886 ANOTHER MONITOR, OR ANY NVSUB CALL THAT PASSES THE D8PLOCK (PROVIDED
 R18881 THAT THE OPERATOR HAS SOMEHOW ALLOWED THE ENDING OF A MONITOR WHICH
 R18882 HE HAS INITIATED THROUGH THE KEYBOARD).
 R1887 MONITOR ACTION IS SUSPENDED, BUT NOT ENDED, BY ANY KEYBOARD ACTION,
 R1888 EXCEPT ERROR LIGHT RESET. IT BEGINS AGAIN WHEN KEY RELEASE IS PERFORMED.
 R1889 MONITOR SAVES THE NOLN AND APPROPRIATE DISPLAY VERB IN MONSAVE. IT SAVES
 R1890 NOLNCADR IN MONSAVE1, IF NOLN = MACHINE CADR TO BE SPECIFIED. BIT 15 OF
 R1891 MONSAVE1 IS THE KILL MONITOR SIGNAL (KILLER BIT). BIT 14 OF MONSAVE1
 R18911 INDICATES THE CURRENT MONITOR WAS EXTERNALLY INITIATED (EXTERNAL
 R18912 MONITOR BIT). IT IS TURNED OFF BY RELDSP AND KILMONON.

R1892 MONSAVE INDICATES IF MONITOR IS ON(+ON, +0=OFF)
 R1893 IF MONSAVE IS +, MONITOR ENTERS NO REQUEST, BUT TURNS KILLER BIT OFF.
 R1894 IF MONSAVE IS +0, MONITOR ENTERS REQUEST AND TURNS KILLER BIT OFF.

R1895 NVSUB (IF EXTERNAL MONITOR BIT IS OFF), VB=PROCEED WITHOUT DATA,
 R1896 VB=RESEQUENCE, AND VB=TERMINATE TURN KILL MONITOR BIT ON.

R1897 IF KILLER BIT IS ON, MONITOR ENTERS NO FURTHER REQUESTS, ZEROS MONSAVE
 R1898 AND MONSAVE1 (TURNING OFF KILLER BIT AND EXTERNAL MONITOR BIT).

R1899 MONITOR DOESN'T TEST FOR MATBS SINCE NVSUB CAN HANDLE INTERNAL MATBS NOW
 1900 REP 1 41,3220 SETLOC ENDRUTIN

| 19005 | REP | 3 | LAST | 337 | TO | 343* | 262 | 656* | COUNT | 41/PIN | |
|--------|-----|-----|------|-----|----|---------|-------|------|-------|----------|---------------|
| 1901 | REP | 1 | | | | 41,3220 | 4 | 3227 | 1 | MONITOR | CS BIT15/14 |
| 1902 | REP | 6 | LAST | 342 | | 41,3221 | 7 | 1017 | 1 | | MASK NOLNCADR |
| 1903 | REP | 167 | LAST | 348 | | 41,3222 | 54 | 155 | 1 | MONIT1 | TS MPAC +1 |
| 19031 | REP | 7 | LAST | 338 | | 41,3223 | 4 | 0136 | 1 | | CS ENTEXIT |
| 19032 | REP | 4 | LAST | 319 | | 41,3224 | 6 | 4233 | 1 | | AD ENDINST |
| 19033 | REP | 107 | LAST | 348 | | 41,3225 | 10 | 000 | 0 | | CCS A |
| 19034 | REP | 1 | | | | 41,3226 | 0 | 3235 | 0 | | TC MONIT2 |
| 19035 | | | | | | 41,3227 | 60000 | 1 | | BIT15/14 | OCT 60000 |
| 19036 | REP | 2 | LAST | 349 | | 41,3230 | 0 | 3235 | 0 | | TC MONIT2 |
| 19037 | REP | 27 | LAST | 327 | | 41,3231 | 3 | 4675 | 1 | | CAP BIT14 |
| 19038 | REP | 168 | LAST | 349 | | 41,3232 | 26 | 155 | 1 | | ADS MPAC +1 |
| 190381 | REP | 62 | LAST | 347 | | 41,3233 | 3 | 4714 | 1 | | CAP ZERO |
| 190382 | REP | 1 | | | | 41,3234 | 55 | 022 | 1 | | TS MONSAVE2 |
| 1904 | REP | 3 | LAST | 198 | | 41,3235 | 3 | 6043 | 0 | MONIT2 | CAP LOWT |
| 1905 | REP | 17 | LAST | 326 | | 41,3236 | 7 | 1001 | 0 | | MASK VERPREG |
| 1906 | REP | 4 | LAST | 341 | | 41,3237 | 0 | 4345 | 1 | | TC LBPTS |
| 1907 | REP | 5 | LAST | 312 | | 41,3240 | 54 | 022 | 0 | | TS CYL |
| 1908 | REP | 6 | LAST | 349 | | 41,3241 | 4 | 0022 | 0 | | CS CYL |
| 1909 | REP | 7 | LAST | 349 | | 41,3242 | 56 | 022 | 1 | | XCH CYL |
| 1910 | REP | 11 | LAST | 337 | | 41,3243 | 6 | 1002 | 1 | | AD NOLNREQ |
| 1911 | REP | 169 | LAST | 349 | | 41,3244 | 54 | 154 | 0 | | TS MPAC |

TEMP STORAGE

EXTERNALLY INITIATED MONITOR,
 SET BIT 14 FOR MONSAVE1.

ZERO NVMONOPT OPTIONS

TRMP STORAGE

L PINBALL GAME BUTTONS AND LIGHTS

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| | | | | | | | | | | |
|--------|-----|-----|------|------------|---------|-------|------|-------------|------------|--|
| 1954 | REP | 1 | | 41,3317 | 0 | 3341 | 1 | TC | MONBUSY | NVSUB IS BUSY |
| 1955 | REP | 4 | LAST | 349 | 41,3320 | 3 | 8043 | CAP | LOW7 | |
| 1956 | REP | 6 | LAST | 350 | 41,3321 | 7 | 1020 | MASK | MONSAVE | |
| 1958 | REP | 1 | | | 41,3322 | 0 | 2316 | TC | UPDATN -1 | PLACE NOUN INTO NOUNREG AND DISPLAY IT |
| 1960 | REP | 1 | | | 41,3323 | 3 | 4160 | CAP | MID7 | |
| 1961 | REP | 6 | LAST | 351 | 41,3324 | 7 | 1020 | MASK | MONSAVE | CHANGE MONITOR VERR TO DISPLAY VERR |
| 1962 | REP | 1 | | | 41,3325 | 6 | 3337 | AD | MONREP | -DEC10, STARTING IN BITS |
| 1963 | REP | 1 | | | 41,3326 | 54 | 023 | TS | EDOP | RIGHT 7 |
| 1964 | REP | 2 | LAST | 351 | 41,3327 | 3 | 0023 | CA | EDOP | |
| 1965 | REP | 16 | LAST | 349 | 41,3330 | 55 | 001 | TS | VERBREG | |
| 1966 | REP | 1 | | | 41,3331 | 3 | 3340 | CAP | MONBACK | SET RETURN TO PASTEVR AFTER DATA DISPLAY |
| 1967 | REP | 6 | LAST | 350 | 41,3332 | 54 | 136 | TS | ENTRET | |
| 1968 | REP | 2 | LAST | 349 | 41,3333 | 4 | 3227 | CS | BIT15/14 | |
| 1969 | REP | 6 | LAST | 350 | 41,3334 | 7 | 1021 | MASK | MONSAVE1 | FUT BCADR INTO MPAC +2. INTMCTRS WILL |
| 1970 | REP | 171 | LAST | 350 | 41,3335 | 54 | 156 | TS | MPAC +2 | DISPLAY IT AND SET NOUNCADR, NOUNADD, |
| 1971 | REP | 1 | | | 41,3336 | 0 | 2046 | ENDMONDO TC | TESTN | EBANK. |
| 1972 | | | | | 4140 | | | BLOCK | 2 | |
| 197201 | REP | 1 | | | 4000 | | | SETLOC | PFTAG8 | |
| 197202 | | | | | 4140 | | | BANK | | |
| 19725 | REP | 1 | | | | | | COUNT | 02/PIN | |
| 1973 | REP | 2 | LAST | 351 | 4140 | 3 | 4160 | PASTEVR | CAP MID7 | |
| 1974 | REP | 2 | LAST | 349 | 4141 | 7 | 1022 | MASK | MONSAVE2 | NVMOPT PASTR OPTION |
| 1975 | | | | | 4142 | 0 | 0006 | EXTEND | | |
| 1976 | | | | | 4143 | 1 | 4145 | BZF | +2 | |
| 1977 | REP | 1 | | | 4144 | 0 | 4146 | TC | PASTEPT | PASTE PLEASE VERR FOR NVMOPT |
| 1978 | REP | 7 | LAST | 351 | 4145 | 3 | 1020 | CA | MONSAVE | PASTE MONITOR VERR - PASTE OPTION IS 0 |
| 19782 | REP | 3 | LAST | 351 | 4146 | 54 | 023 | PASTEPT | TS EDOP | RIGHT 7 |
| 19783 | REP | 4 | LAST | 351 | 4147 | 3 | 0023 | CA | EDOP | PLACE MONITOR VERR OR PLEASE VERR INTO |
| 197832 | REP | 49 | LAST | 335 | 4150 | 0 | 4555 | TC | BANKCALL | VERBREG AND DISPLAY IT. |
| 197833 | REP | 7 | LAST | 338 | 4151 | 62 | 336 | CADR | UPDATVR -1 | |
| 197835 | REP | 65 | LAST | 350 | 4152 | 3 | 4714 | CAP | ZERO | ZERO REQUEST SO THAT PASTED VERRS CAN |
| 197836 | REP | 10 | LAST | 323 | 4153 | 55 | 013 | TS | REQUEST | BE EXECUTED BY OPERATOR. |
| 19784 | REP | 3 | LAST | 351 | 4154 | 3 | 1022 | CA | MONSAVE2 | |
| 19785 | REP | 1 | | | 4155 | 0 | 4271 | TC | BLANKSUB | PROCESS NVMOPT BLANK OPTION IF ANY |
| 19786 | | | | | 4156 | 0 | 4157 | TC | +1 | |
| 19787 | REP | 34 | LAST | 350 | 4157 | 0 | 5112 | ENDPASTE | TC | ENDOPJOB |
| 1979 | | | | | 4160 | 37600 | 0 | MID7 | OCT | 37600 |
| 1980 | REP | 1 | | | 41,3337 | | | | SETLOC | ENDMONDO +1 |
| 19805 | REP | 4 | LAST | 349 TO 351 | | 79 | 735* | | COUNT | 41/PIN |
| 1981 | | | | | 41,3337 | 75377 | 0 | MONREP | OCT | 75377 |
| 1982 | REP | 1 | | | 41,3340 | 04140 | 0 | MONRACK | ADRES | PASTEVR |



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1983 REP 2 LAST 310 41,3341 0 4410 0 MONBUSY TC RELDSPON
 1984 REP 35 LAST 351 41,3342 0 5112 0 TC ENDOPJOB
 R1985 DSPFMEM IS USED TO DISPLAY (IN OCTAL) ANY FIXED REGISTER.
 R1986 IT IS USED WITH NOLN = MACHINE CADR TO BE SPECIFIED. THE PCADR OF THE
 R1987 DESIRED LOCATION IS THEN PUNCHED IN. IT HANDLES P/P (PCADR 4000-7777)

TURN KEY RELEASE LIGHT

R19871 FOR BANKS L/E 27, THIS IS ENOUGH.

R19872 FOR BANKS G/E 30, THE THIRD COMPONENT OF NOLN 26 (PRIO, ADRES, BRCON)
 R19873 MUST BE PRELOADED WITH THE DESIRED SUPERBANK BITS (BITS 5,6,7).
 R19874 V23N26 SHOULD BE USED.

R19875 SUMMARY

R19876 FOR BANKS L/E 27, V27N01B(PCADR)B
 R19877 FOR BANKS G/E 30, V23N26B(SUPERBITS)B V27N01B(PCADR)B

| REP | LAST | 336 | 41,3343 | 3 4333 0 | DSPFMEM | CAF | RID1 |
|-------|--------|----------|---------|----------|---------|-----|------------|
| 1988 | REP 12 | LAST 336 | 41,3343 | 3 4333 0 | DSPFMEM | CAF | RID1 |
| 1989 | REP 42 | LAST 350 | 41,3344 | 54 777 1 | | TS | DSPCLNT |
| 19891 | REP 15 | LAST 277 | 41,3345 | 3 1047 0 | | CA | DSPTEM1 +2 |
| 19892 | REP 40 | LAST 340 | 41,3346 | 54 001 1 | | TS | L |
| 1990 | REP 7 | LAST 349 | 41,3347 | 3 1017 0 | | CA | NOLNCADR |
| 1991 | REP 1 | | 41,3350 | 0 4610 1 | | TC | SUPDICAL |
| 1992 | REP 3 | LAST 326 | 41,3351 | 0 3353 1 | | TC | DSPCTWD |
| 1993 | REP 38 | LAST 352 | 41,3352 | 0 5112 0 | ENDSPP | TC | ENDOPJOB |

IF P/P, DATACALL USES BANK 02 OR 03.

SUPERBANK BITS WERE PRELOADED INTO
 3RD COMPONENT OF NOLN 26.
 ORIGINAL PCADR LOADED STILL IN NOLNCADR.
 CALL WITH PCADR IN A, SUPERBITS IN L.

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F1994 WORD DISPLAY ROUTINES

| | | | | | | | | | | | |
|-------|--|-----|------|------------|---------|----------|----------|--------|------------|----------|------------------|
| 1995 | REP | 4 | LAST | 345 | 40,3103 | | | | SETLOC | TESTOPUP | +4 |
| 1995B | REP | 5 | LAST | 343 TO 346 | 119 | 579* | | | COUNT | 40/PIN | |
| 1996 | REP | 93 | LAST | 348 | 40,3103 | 56 002 0 | DSPSIGN | XCH | 0 | | |
| 1997 | REP | 1 | | | 40,3104 | 54 144 1 | | TS | DSPDRST | | |
| 1998 | REP | 172 | LAST | 351 | 40,3105 | 10 154 0 | | CCS | MPAC | | |
| 1999 | | | | | 40,3106 | 0 3116 1 | | TC | +6D | | |
| 2000 | | | | | 40,3107 | 0 3116 1 | | TC | +7 | | |
| 2001 | REP | 38 | LAST | 350 | 40,3110 | 6 4712 1 | | AD | ONE | | |
| 2002 | REP | 173 | LAST | 353 | 40,3111 | 54 154 0 | | TS | MPAC | | |
| 2003 | REP | 2 | LAST | 314 | 40,3112 | 0 2334 1 | | TC | -CN | | |
| 2004 | REP | 174 | LAST | 353 | 40,3113 | 4 0155 1 | | CS | MPAC +1 | | |
| 2005 | REP | 175 | LAST | 353 | 40,3114 | 54 155 1 | | TS | MPAC +1 | | |
| 2006 | REP | 2 | LAST | 353 | 40,3115 | 0 0144 0 | | TC | DSPDRST | | |
| 2007 | REP | 3 | LAST | 332 | 40,3116 | 0 2314 0 | | TC | +CN | | |
| 2008 | REP | 3 | LAST | 353 | 40,3117 | 0 0144 0 | | TC | DSPDRST | | |
| 2009 | | | | | 40,3120 | 0 0006 1 | DSPRD | EXTEND | | | ROUND BY 5 EXP-6 |
| 2010 | REP | 1 | | | 40,3121 | 3 3164 1 | | DCA | DECROND -1 | | |
| 2011 | REP | 176 | LAST | 353 | 40,3122 | 20 155 1 | | DAS | MPAC | | |
| 2012 | | | | | 40,3123 | 0 0006 1 | | EXTEND | | | |
| 2013 | | | | | 40,3124 | 1 3130 1 | | BZP | +4 | | |
| 2014 | | | | | 40,3125 | 0 0006 1 | | EXTEND | | | |
| 2015 | REP | 1 | | | 40,3126 | 3 4872 0 | | DCA | DPOS MAX | | |
| 2016 | REP | 177 | LAST | 353 | 40,3127 | 52 155 1 | | DXCH | MPAC | | |
| 2017 | REP | 94 | LAST | 353 | 40,3130 | 0 0002 0 | | TC | 0 | | |
| R2018 | DSPDCWD CONVERTS C(MPAC, MPAC+1) INTO A SIGN AND 5 CHAR DECIMAL | | | | | | | | | | |
| R2019 | STARTING IN LOC SPECIFIED IN DSPCQNT. IT ROUNDS BY 5 EXP-6. | | | | | | | | | | |
| 2020 | REP | 95 | LAST | 353 | 40,3131 | 56 002 0 | DSPDCWD | XCH | 0 | | |
| 2021 | REP | 1 | | | 40,3132 | 54 115 0 | | TS | WDRET | | |
| 2022 | REP | 1 | | | 40,3133 | 0 3103 0 | | TC | DSPSIGN | | |
| 2023 | REP | 1 | | | 40,3134 | 0 3120 1 | | TC | DSPRD | | |
| 2024 | REP | 4 | LAST | 298 | 40,3135 | 3 4710 0 | | CAP | FOUR | | |
| 2025 | REP | 1 | | | 40,3136 | 54 137 0 | DSPDCWD1 | TS | WDONT | | |
| 2026 | REP | 1 | | | 40,3137 | 3 4377 0 | | CAP | BINCON | | |
| 2027 | REP | 7 | LAST | 346 | 40,3140 | 0 7256 1 | | TC | SHORTMP | | |
| 2028 | REP | 178 | LAST | 353 | 40,3141 | 50 154 1 | TRACE1 | INDEX | MPAC | | |
| 2029 | REP | 3 | LAST | 311 | 40,3142 | 3 4072 0 | | CAP | RELTAB | | |
| 2030 | REP | 6 | LAST | 341 | 40,3143 | 7 4362 0 | | MASK | LOWS | | |
| 2031 | REP | 6 | LAST | 334 | 40,3144 | 54 124 1 | | TS | CODE | | |
| 2032 | REP | 66 | LAST | 351 | 40,3145 | 3 4714 1 | | CAP | ZERO | | |
| 2033 | REP | 179 | LAST | 353 | 40,3146 | 56 156 0 | | XCH | MPAC +2 | | |
| 2034 | REP | 180 | LAST | 353 | 40,3147 | 56 155 0 | | XCH | MPAC +1 | | |
| 2035 | REP | 181 | LAST | 353 | 40,3150 | 54 154 0 | | TS | MPAC | | |
| 2036 | REP | 43 | LAST | 352 | 40,3151 | 56 777 0 | | XCH | DSPCQNT | | |
| 2037 | REP | 4 | LAST | 334 | 40,3152 | 54 143 0 | TRACR15 | TS | COUNT | | |

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| | | | | | | | | | |
|------|-----|-----|------|-----|---------|----------|-----|----------|---------------------------------|
| 2038 | REP | 108 | LAST | 349 | 40,3153 | 10 000 0 | CCS | A | DECREMENT DSPCOUNT EXCEPT AT +0 |
| 2039 | REP | 44 | LAST | 353 | 40,3154 | 54 777 1 | TS | DSPCOUNT | |
| 2040 | REP | 4 | LAST | 335 | 40,3155 | 0 3225 1 | TC | DSPIN | |
| 2041 | REP | 2 | LAST | 353 | 40,3156 | 10 137 0 | CCS | WDRST | |
| 2042 | REP | 1 | | | 40,3157 | 0 3136 0 | TC | DSPDCWD1 | |
| 2043 | REP | 7 | LAST | 339 | 40,3160 | 4 4374 1 | CS | VD1 | |
| 2044 | REP | 45 | LAST | 354 | 40,3161 | 54 777 1 | TS | DSPCOUNT | |
| 2045 | REP | 2 | LAST | 353 | 40,3162 | 0 0115 1 | TC | WDRST | |

| | | | | | | | | | |
|------|--|--|--|--|---------|---------|-------------|-------|--|
| 2046 | | | | | 40,3163 | 00000 1 | OCT | 00000 | |
| 2047 | | | | | 40,3164 | 02476 0 | DECROND OCT | 02476 | |

R2048 DSPDCNR CONVERTS C(MPAC,MPAC+1) INTO A SIGN AND 5 CHAR DECIMAL
 R2049 STARTING IN LOC SPECIFIED IN DSPCOUNT. IT DOES NOT ROUND

| | | | | | | | | | |
|------|-----|----|------|-----|---------|----------|-------------|-------------|--|
| 2050 | REP | 96 | LAST | 353 | 40,3165 | 56 002 0 | DSPDCNR XCH | 0 | |
| 2051 | REP | 3 | LAST | 354 | 40,3166 | 54 115 0 | TS | WDRST | |
| 2052 | REP | 2 | LAST | 353 | 40,3167 | 0 3103 0 | TC | DSPSIGN | |
| 2053 | REP | 2 | LAST | 354 | 40,3170 | 0 3135 0 | TC | DSPDCWD1 -1 | |

R2054 DSPDC2NR CONVERTS C(MPAC,MPAC+1) INTO A SIGN AND 2 CHAR DECIMAL
 R2055 STARTING IN LOC SPECIFIED IN DSPCOUNT. IT DOES NOT ROUND

| | | | | | | | | | |
|------|-----|----|------|-----|---------|----------|--------------|----------|--|
| 2056 | REP | 97 | LAST | 354 | 40,3171 | 56 002 0 | DSPDC2NR XCH | 0 | |
| 2057 | REP | 4 | LAST | 354 | 40,3172 | 54 115 0 | TS | WDRST | |
| 2058 | REP | 3 | LAST | 354 | 40,3173 | 0 3103 0 | TC | DSPSIGN | |
| 2059 | REP | 39 | LAST | 353 | 40,3174 | 3 4712 1 | CAP | ONE | |
| 2060 | REP | 3 | LAST | 354 | 40,3175 | 0 3136 0 | TC | DSPDCWD1 | |

R2061 DSP2DEC CONVERTS C(MPAC) AND C(MPAC+1) INTO A SIGN AND 10 CHAR DECIMAL
 R2062 STARTING IN THE LOC SPECIFIED IN DSPCOUNT.

| | | | | | | | | | |
|------|-----|----|------|-----|---------|----------|-------------|----------|---------|
| 2063 | REP | 98 | LAST | 354 | 40,3176 | 56 002 0 | DSP2DEC XCH | 0 | |
| 2064 | REP | 5 | LAST | 354 | 40,3177 | 54 115 0 | TS | WDRST | |
| 2065 | REP | 67 | LAST | 353 | 40,3200 | 3 4714 1 | CAP | ZERO | |
| 2066 | REP | 7 | LAST | 353 | 40,3201 | 54 124 1 | TS | CODE | |
| 2067 | REP | 12 | LAST | 334 | 40,3202 | 3 6214 0 | CAP | THREE | |
| 2068 | REP | 3 | LAST | 315 | 40,3203 | 0 3307 0 | TC | 11DSPIN | -R2 OFF |
| 2069 | REP | 5 | LAST | 353 | 40,3204 | 3 4710 0 | CAP | FOUR | |
| 2070 | REP | 4 | LAST | 354 | 40,3205 | 0 3307 0 | TC | 11DSPIN | +R2 OFF |
| 2071 | REP | 4 | LAST | 354 | 40,3206 | 0 3103 0 | TC | DSPSIGN | |
| 2072 | REP | 4 | LAST | 333 | 40,3207 | 3 4334 1 | CAP | R2D1 | |
| 2073 | REP | 4 | LAST | 354 | 40,3210 | 0 3136 0 | RND2DEC TC | DSPDCWD1 | |

R2074 DSPDCVN DISPLAYS C(A) UPON ENTRY AS A 2 CHAR DECIMAL BEGINNING IN THE

R2075 DSP LOC SPECIFIED IN DSPCOUNT.

R2076 C(A) SHOULD BE IN FORM N X 25XP-14. THIS IS SCALED TO FORM N/100 REPORT

R2077 DISPLAY CONVERSION.



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| | | | | | | | | | | |
|-------|-----|-----|------|------------|---------|--------|----------|-----------|-------------|---------|
| 2078 | | | | 40,3211 | 0 0008 | 1 | DSPDCVN | EXTEND | | |
| 2079 | REP | 1 | | 40,3212 | 7 3221 | 1 | MP | VNDSPCON | | |
| 2080 | REP | 182 | LAST | 353 | 40,3213 | 22 154 | 1 | LXCH | MPAC | |
| 2081 | REP | 88 | LAST | 354 | 40,3214 | 3 4714 | 1 | CAP | ZERO | |
| 2082 | REP | 183 | LAST | 355 | 40,3215 | 54 155 | 1 | TS | MPAC +1 | |
| 2083 | REP | 99 | LAST | 354 | 40,3216 | 56 002 | 0 | XCH | 0 | |
| 2084 | REP | 6 | LAST | 354 | 40,3217 | 54 115 | 0 | TS | WDRET | |
| 2085 | REP | 3 | LAST | 335 | 40,3220 | 0 3174 | 0 | TC | DSPDC2NR +3 | |
| 2086 | | | | 40,3221 | 00244 | 0 | VNDSPCON | OCT | 00244 | |
| 2087 | REP | 3 | LAST | 332 | 40,3222 | 0 3211 | 0 | GOVNUPT | TC | DSPDCVN |
| 2088 | REP | 25 | LAST | 347 | 40,3223 | 0 4574 | 0 | TC | POSTJUMP | |
| 2089 | REP | 2 | LAST | 323 | 40,3224 | 82346 | 1 | CADR | UPDAT1 +2 | |
| 2090 | | | | 40,3225 | | | ENDPCVN | EQUALS | | |
| 2091 | REP | 1 | | 41,3353 | | | SETLOC | ENDSPF +1 | | |
| 20915 | REP | 5 | LAST | 351 TO 353 | 12 | 747* | COUNT | 41/PIN | | |

MULT BY .01
TAKE RESULTS FROM L.(MULT BY 2RXP14).

NO SIGN, NO ROUND, 2 CHAR

.01 ROUNDED UP
THIS IS NOT FOR GENERAL USE. REALLY PART
OF UPDATVB.

R2092 DSPCTWO DISPLAYS C(A) UPON ENTRY AS A 5 CHAR OCT STARTING IN THE DSP
R2093 CHAR SPECIFIED IN DSPCOUNT. IT STOPS AFTER 5 CHAR HAVE BEEN DISPLAYED.

| | | | | | | | | | | |
|------|-----|-----|------|-----|---------|--------|---|---------|----------|-------|
| 2094 | REP | 8 | LAST | 349 | 41,3353 | 54 022 | 0 | DSPCTWO | TS | CYL |
| 2095 | REP | 100 | LAST | 355 | 41,3354 | 56 002 | 0 | XCH | 0 | |
| 2096 | REP | 7 | LAST | 355 | 41,3355 | 54 115 | 0 | TS | WDRET | |
| 2097 | REP | 28 | LAST | 349 | 41,3356 | 3 4675 | 1 | CAP | BIT14 | |
| 2098 | REP | 46 | LAST | 354 | 41,3357 | 26 777 | 1 | ADS | DSPCOUNT | |
| 2099 | REP | 6 | LAST | 354 | 41,3360 | 3 4710 | 0 | CAP | FOUR | |
| 2100 | REP | 3 | LAST | 354 | 41,3361 | 54 137 | 0 | WDAGAIN | TS | WDCNT |
| 2101 | REP | 9 | LAST | 355 | 41,3362 | 4 0022 | 0 | CS | CYL | |
| 2102 | REP | 10 | LAST | 355 | 41,3363 | 4 0022 | 0 | CS | CYL | |
| 2103 | REP | 11 | LAST | 355 | 41,3364 | 4 0022 | 0 | CS | CYL | |
| 2104 | REP | 109 | LAST | 354 | 41,3365 | 4 0000 | 0 | CS | A | |
| 2105 | REP | 1 | | | 41,3366 | 7 4716 | 1 | MARK | DSPMSK | |
| 2106 | REP | 110 | LAST | 355 | 41,3367 | 50 000 | 1 | INDEX | A | |
| 2107 | REP | 4 | LAST | 353 | 41,3370 | 3 4072 | 0 | CAP | RELTAR | |
| 2108 | REP | 7 | LAST | 353 | 41,3371 | 7 4362 | 0 | MARK | LOWS | |
| 2109 | REP | 8 | LAST | 354 | 41,3372 | 54 124 | 1 | TS | CODE | |
| 2110 | REP | 47 | LAST | 355 | 41,3373 | 56 777 | 0 | XCH | DSPCOUNT | |
| 2111 | REP | 5 | LAST | 353 | 41,3374 | 54 143 | 0 | TS | COUNT | |
| 2112 | REP | 111 | LAST | 355 | 41,3375 | 10 000 | 0 | CCS | A | |
| 2113 | REP | 46 | LAST | 355 | 41,3376 | 54 777 | 1 | TS | DSPCOUNT | |
| 2114 | REP | 28 | LAST | 355 | 41,3377 | 0 4574 | 0 | TC | POSTJUMP | |
| 2115 | REP | 1 | | | 41,3400 | 61315 | 1 | CADR | DSPCTIN | |
| 2116 | REP | 4 | LAST | 355 | 41,3401 | 10 137 | 0 | OCTRACK | CCS | WDCNT |
| 2117 | REP | 1 | | | 41,3402 | 0 3361 | 0 | TC | WDAGAIN | |
| 2118 | REP | 8 | LAST | 354 | 41,3403 | 4 4374 | 1 | DSPLV | CS | VD1 |

MUST USE SAME RETURN AS DSP2BIT.
TO BLANK SIGNS

DECREMENT DSPCOUNT EXCEPT AT +0

* TO BLOCK NUMERICAL CHARACTERS, CLEARS,



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2119 RESP 49 LAST 355 41,3404 54 777 1 TS DSPCOUNT AND SIGNS AFTER A COMPLETED DISPLAY.
 2120 RESP 8 LAST 355 41,3405 0 0115 1 TC WDRST

2121 RESP 7 LAST 342 4716 DSPMSK = SEVEN
 R2122 DSP2BIT DISPLAYS C(A) UPON ENTRY AS A 2 CHAR OCT BEGINNING IN THE DSP
 R2123 LOC SPECIFIED IN DSPCOUNT BY PRE CYCLING RIGHT C(A) AND USING THE LOGIC
 R2124 OF THE 5 CHAR OCTAL DISPLAY

2125 RESP 3 LAST 198 41,3406 54 020 1 DSP2BIT TS CYR
 2126 RESP 101 LAST 355 41,3407 56 002 0 XCH 0
 2127 RESP 9 LAST 356 41,3410 54 115 0 TS WDRST
 2128 RESP 40 LAST 354 41,3411 3 4712 1 CAP ONE
 2129 RESP 5 LAST 355 41,3412 54 137 0 TS WDRST
 2130 RESP 4 LAST 356 41,3413 4 0020 1 CS CYR
 2131 RESP 5 LAST 356 41,3414 4 0020 1 CS CYR
 2132 RESP 6 LAST 356 41,3415 56 020 0 XCH CYR
 2133 RESP 12 LAST 355 41,3416 54 022 0 TS CYL
 2134 RESP 2 LAST 355 41,3417 0 3386 1 TC WDAGAIN +5

R2135 FOR DSPIN PLACS 0/25 OCT INTO COUNT, 5 BIT RELAY CODE INTO CODE, BOTH
 ARE DESTROYED. IF BIT14 OF COUNT IS 1, SIGN IS BLANKED WITH LEFT CHAR.
 R2137 FOR DSPIN1 PLACS 0,1 INTO BIT11 OF CODE, 2 INTO COUNT, REL ADDRESS OF
 R2138 DSPDAB ENTRY INTO DSREL.

2139 RESP 1 40,3225 SETLOC ENDBOYN

21395 RESP 8 LAST 353 TO 355 82 661* COUNT 40/PIN

2140 RESP 102 LAST 356 40,3225 56 002 0 DSPIN XCH 0
 2141 RESP 1 40,3226 54 114 1 TS DSEXIT
 2142 RESP 6 LAST 355 40,3227 3 4382 1 CAP LOW5
 2143 RESP 6 LAST 355 40,3230 7 0143 0 MASK COUNT
 2144 RESP 9 LAST 340 40,3231 54 021 0 TS SR
 2145 RESP 10 LAST 356 40,3232 56 021 1 XCH SR
 2146 RESP 1 40,3233 54 141 1 TS DSREL
 2147 RESP 20 LAST 292 40,3234 3 4712 1 CAP BIT1
 2148 RESP 7 LAST 356 40,3235 7 0143 0 MASK COUNT
 2149 RESP 112 LAST 355 40,3236 10 000 0 CCS A
 2150 40,3237 0 3241 0 TC +2
 2151 RESP 1 40,3240 0 3251 1 TC DSPIN1 -1
 2152 RESP 9 LAST 355 40,3241 56 124 0 XCH CODE
 2153 RESP 1 40,3242 0 4354 1 TC SLEFTS
 2154 RESP 10 LAST 356 40,3243 54 124 1 TS CODE
 2155 RESP 20 LAST 355 40,3244 3 4675 1 CAP BIT14
 2156 RESP 6 LAST 356 40,3245 7 0143 0 MASK COUNT
 2157 RESP 113 LAST 356 40,3246 10 000 0 CCS A
 2158 RESP 20 LAST 345 40,3247 3 4711 1 CAP TWO

CANT USE L FOR RETURN, SINCE MANY OF THE
 ROUTINES CALLING DSPIN USE L AS RETURN.

LEFT IF COUNT IS ODD
 RIGHT IF COUNT IS EVEN

DOES NOT USE CYL

BIT14 = 1, BLANK SIGN



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R2203 REP 1 40,3320 63401 1 ENDSPOCT CADR OCTBACK
 R2204 DSPALARM FINDS TC NVSUEEND IN ENTRST FOR NVSUB INITIATED ROUTINES.
 R2205 ABORT WITH 01501.
 R2206 DSPALARM FINDS TC ENDOFJOB IN ENTRST FOR KEYBOARD INITIATED ROUTINES.
 R2207 DO TC ENTRST.

R22075 REP 9 LAST 355 40,3321 4 4374 1 PREDSPAL CS VD1
 R22076 REP 50 LAST 356 40,3322 54 777 1 TS DSPCOUNT
 R2208 REP 1 40,3323 4 3342 0 DSPALARM CS NVSBENDL
 R2209 REP 8 LAST 349 40,3324 6 0136 0 AD ENTEXIT
 R2210 40,3325 0 0006 1 EXTEND
 R2211 REP 16 LAST 311 40,3326 1 3337 1 BZF CHARALRM +2
 R2211 REP 1 40,3327 4 3341 0 CS MONADR
 R2212 REP 9 LAST 358 40,3330 6 0136 0 AD ENTEXIT
 R2213 40,3331 0 0006 1 EXTEND
 R2214 40,3332 1 3334 1 BZF +2
 R2215 40,3333 0 3335 1 TC +2
 R2216 REP 1 40,3334 0 4220 0 TC KILMONON
 R2212 REP 5 LAST 236 40,3335 0 4400 1 CHARALRM TC FALTON
 R2213 REP 37 LAST 352 40,3336 0 5112 0 TC ENDOFJOB
 R2214 REP 1 40,3337 0 5622 1 TC FODODO
 R2217 40,3340 01501 1 OCT 01501
 R2217 REP 2 LAST 351 40,3341 04140 0 MONADR GENADR PASTEVR
 R2218 REP 1 40,3342 0 4216 0 NVSBENDL TC NVSBEND

IF THIS IS A MONITOR, KILL IT

NOT NVSUB INITIATED. TURN ON OPR ERROR

R2219 ALMCYCLE TURNS ON CHECK FAIL LIGHT, REDISPLAYS THE ORIGINAL VERR THAT
 R2220 WAS EXECUTED, AND RECYCLES TO EXECUTE THE ORIGINAL VERR/NQIN COMBINATION
 R2221 THAT WAS LAST EXECUTED. USED FOR BAD DATA DURING LOAD VERBS AND BY
 R2222 MCYRS. ALSO BY MMCHANG IF 2 NUMERICAL CHARACTERS WERE NOT PUNCHED IN
 R2223 FOR MM CODE.

R2224 REP 3 LAST 351 4161 SETLOC MID7 +1
 R22245 REP 2 LAST 351 TO 351' 17 17* COUNT 02/PIN

R2225 REP 6 LAST 358 4161 0 4400 1 ALMCYCLE TC FALTON
 R2226 REP 3 LAST 348 4162 4 1041 1 CS VERBSAVE
 R2229 REP 11 LAST 351 4163 55=013 0 TS HSECRET
 R2230 REP 50 LAST 351 4164 0 4555 0 TC RANKCALL
 R2231 REP 8 LAST 351 4165 62336 0 CADR UPDATVR -1
 R2232 REP 27 LAST 355 4166 0 4574 0 TC POSTJUMP
 R2233 REP 2 LAST 311 4167 62002 1 ENDALM CADR ENTER
 R2234 MMCHANG USES NQIN DISPLAY UNTIL ENTER. THEN IT USES MODE DISP.
 R2235 IT GOES TO MODROUT WITH THE NEW M M CODE IN A, BUT NOT DISPLAYED IN
 R2236 MM LIGHTS.
 R2237 IT DEMANDS 2 NUMERICAL CHARACTERS BE PUNCHED IN FOR NEW MM CODE.

TURN ON CHECK FAIL LIGHT.
 GET ORIGINAL VERR THAT WAS EXECUTED
 SET FOR ENTPAS0
 PUTS ORIGINAL VERR INTO VERRREG AND
 DISPLAYS IT IN VERR LIGHTS.

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R2238 IF NOT, IT RECYCLES.

| | | | | | | | | | |
|-------|-----|-----|------|------------|---------|-------|------|---------------------|----------------|
| 2239 | REP | 1 | | 41,3420 | | | | SETLOC DSP2BIT +10D | |
| 22395 | REP | 6 | LAST | 355 TO 356 | 37 | 784* | | COUNT 41/PIN | |
| 2240 | REP | 1 | | 41,3420 | 0 | 3442 | 0 | MMCHANG TC | REQMM |
| A2241 | | | | | | | | | |
| A2242 | | | | | | | | | |
| 2243 | REP | 16 | LAST | 253 | 41,3421 | 3 | 4708 | 1 | CAP BITS |
| 2244 | REP | 51 | LAST | 356 | 41,3422 | 6 | 0777 | 0 | AD DSPCOUNT |
| 2245 | | | | | 41,3423 | 0 | 0006 | 1 | EXTEND |
| 2246 | | | | | 41,3424 | 1 | 3426 | 0 | BZF +2 |
| 2247 | REP | 16 | LAST | 348 | 41,3425 | 0 | 4161 | 0 | TC ALMCYCLE |
| 2248 | REP | 69 | LAST | 355 | 41,3426 | 3 | 4714 | 1 | CAP ZERO |
| 2249 | REP | 12 | LAST | 349 | 41,3427 | 57 | 002 | 1 | XCH NOUNREQ |
| 2250 | REP | 184 | LAST | 355 | 41,3430 | 54 | 154 | 0 | TS MPAC |
| 2251 | REP | 3 | LAST | 323 | 41,3431 | 3 | 4375 | 1 | CAP ND1 |
| 2252 | REP | 52 | LAST | 359 | 41,3432 | 54 | 777 | 1 | TS DSPCOUNT |
| 2253 | REP | 51 | LAST | 358 | 41,3433 | 0 | 4555 | 0 | TC BANKCALL |
| 2254 | REP | 4 | LAST | 317 | 41,3434 | 60502 | 0 | 0 | CADR 2BLANK |
| 2255 | REP | 10 | LAST | 358 | 41,3435 | 4 | 4374 | 1 | CS VD1 |
| 2256 | REP | 53 | LAST | 359 | 41,3436 | 54 | 777 | 1 | TS DSPCOUNT |
| 2257 | REP | 165 | LAST | 359 | 41,3437 | 3 | 0154 | 1 | CA MPAC |
| 2258 | REP | 28 | LAST | 358 | 41,3440 | 0 | 4574 | 0 | TC POSTJUMP |
| 2259 | REP | 1 | | | 41,3441 | 10010 | 1 | 1 | CADR MODROUTB |
| 2260 | REP | 2 | LAST | 261 | 04,2010 | | | | MODROUTB = V37 |
| 2261 | REP | 104 | LAST | 357 | 41,3442 | 4 | 0002 | 1 | REQMM CS 0 |
| 2262 | REP | 12 | LAST | 358 | 41,3443 | 55 | 013 | 0 | TS REQRET |
| 2263 | REP | 4 | LAST | 359 | 41,3444 | 3 | 4375 | 1 | CAP ND1 |
| 2264 | REP | 54 | LAST | 359 | 41,3445 | 54 | 777 | 1 | TS DSPCOUNT |
| 2265 | REP | 70 | LAST | 359 | 41,3446 | 3 | 4714 | 1 | CAP ZERO |
| 2266 | REP | 13 | LAST | 359 | 41,3447 | 55 | 002 | 0 | TS NOUNREQ |
| 2267 | REP | 52 | LAST | 359 | 41,3450 | 0 | 4555 | 0 | TC BANKCALL |
| 2268 | REP | 5 | LAST | 359 | 41,3451 | 60502 | 0 | 0 | CADR 2BLANK |
| 2269 | REP | 3 | LAST | 323 | 41,3452 | 0 | 4443 | 0 | TC FLASHN |
| 2270 | REP | 43 | LAST | 357 | 41,3453 | 3 | 4712 | 1 | CAP ONE |
| 2271 | REP | 18 | LAST | 348 | 41,3454 | 55 | 000 | 1 | TS DECBRNCH |
| 2272 | REP | 10 | LAST | 358 | 41,3455 | 0 | 0136 | 0 | TC EXIT |

ENTPASHI ASSUMES THE TC REQMM AT MMCHANG IF THIS MOVES AT ALL, MUST CHANGE MMADREF AT ENTPASHI.
OCT20 = ND2.
DSPCOUNT MUST = -ND2.
DEMAND THAT 2 NUM CHAR WERE PUNCHED IN.
DSPCOUNT NOT= -ND2. ALARM AND RECYCLE.
DSPCOUNT = -ND2.

BLOCK NUM CHAR IN

GO THRU STANDARD LOC.

SET FOR DEC

R2273 VBRORBC ENTERS REQUEST TO EXEC FOR ANY ADDRESS WITH ANY PRIORITY.
R2274 IT DOES ENDOFJOB AFTER ENTERING REQUEST, DISPLAY SYST IS RELEASED.
R2275 IT ASSUMES NOUN 26 HAS BEEN PRELOADED WITH
R2276 COMPONENT 1 PRIORITY(BITS 10-14) BIT1=0 FOR NOVAC, BIT1=1 FOR PINDVAC.
R2277 COMPONENT 2 JOB ADRES (12 BIT)
R2278 COMPONENT 3 BRCON

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| | | | | | | | | | |
|-------|--|-----------------|---------|----------|----------|--------|-----------|----|---|
| 2279 | REP 29 | LAST 356 | 41,3456 | 3 4712 1 | VBROKXEC | CAP | BIT1 | | |
| 2280 | REP 16 | LAST 352 | 41,3457 | 7 1045 0 | | MASK | DSPTM1 | | |
| 2281 | REP 115 | LAST 357 | 41,3460 | 10 000 0 | | CCS | A | | |
| 2282 | REP 1 | | 41,3461 | 0 3500 1 | | TC | SETVAC | | IF BIT1 = 1, FINDVAC |
| 2283 | REP 1 | | 41,3462 | 3 4385 0 | | CAP | TCNOVAC | | IF BIT1 = 0, NOVAC |
| 2284 | REP 186 | LAST 359 | 41,3463 | 54 154 0 | REQX1 | TS | MPAC | | TC NOVAC OR TC FINDVAC INTO MPAC |
| 2285 | REP 30 | LAST 360 | 41,3464 | 4 4712 0 | | CS | BIT1 | | |
| 2286 | REP 17 | LAST 360 | 41,3465 | 7 1045 0 | | MASK | DSPTM1 | | |
| 2287 | REP 187 | LAST 360 | 41,3466 | 54 180 1 | | TS | MPAC | +4 | PRI0 INTO MPAC+4 AS A TEMP |
| 2288 | REP 5 | LAST 320 | 41,3467 | 0 4473 0 | REQUESTC | TC | RELDSP | | |
| 2289 | REP 5 | LAST 349 | 41,3470 | 3 4233 1 | | CA | ENDINST | | |
| 2290 | REP 188 | LAST 360 | 41,3471 | 54 157 0 | | TS | MPAC | +3 | TC ENDOFJOB INTO MPAC+3 |
| 2291 | | | 41,3472 | 0 0006 1 | | EXTEND | | | |
| 2292 | REP 18 | LAST 360 | 41,3473 | 3 1047 0 | | DCA | DSPTM1 | +1 | JOB ADRES INTO MPAC+1 |
| 2293 | REP 189 | LAST 360 | 41,3474 | 52 156 1 | | DXCH | MPAC | +1 | BRCN INTO MPAC+2 |
| 2294 | REP 190 | LAST 360 | 41,3475 | 3 0160 0 | | CA | MPAC | +4 | PRI0 IN A |
| 2295 | | | 41,3476 | 0 0004 0 | | INHINT | | | |
| 2296 | REP 191 | LAST 360 | 41,3477 | 0 0154 1 | | TC | MPAC | | |
| 2297 | REP 1 | | 41,3500 | 3 4370 1 | SETVAC | CAP | TCFINDVAC | | |
| 2298 | REP 1 | | 41,3501 | 0 3463 0 | | TC | REQX1 | | |
| R2299 | VBRWAIT ENTERS REQUEST TO WAITLIST FOR ANY ADDRESS WITH ANY DELAY. | | | | | | | | |
| R2300 | IT DOES ENDOFJOB AFTER ENTERING REQUEST.DISPLAY SYST IS RELEASED. | | | | | | | | |
| R2301 | IT ASSUMES NOUN 28 HAS BEEN PRELOADED WITH | | | | | | | | |
| R2302 | COMPONENT 1 DELAY (LOW BITS) | | | | | | | | |
| R2303 | COMPONENT 2 TASK ADRES (12 BIT) | | | | | | | | |
| R2304 | COMPONENT 3 BRCN | | | | | | | | |
| 2305 | REP 1 | | 41,3502 | 3 4366 0 | VBRWAIT | CAP | TWAIT | | |
| 2306 | REP 192 | LAST 360 | 41,3503 | 54 154 0 | | TS | MPAC | | TC WAITLIST INTO MPAC |
| 2307 | REP 19 | LAST 360 | 41,3504 | 3 1045 1 | | CA | DSPTM1 | | TIME DELAY |
| 2308 | REP 1 | | 41,3505 | 0 3466 0 | ENDRONT | TC | REQUESTC | -1 | |
| R2309 | REQUESTC WILL PUT TASK ADRES INTO MPAC+1, BRCN INTO MPAC+2, | | | | | | | | |
| R2310 | TC ENDOFJOB INTO MPAC+3. IT WILL TAKE TIME DELAY OUT OF MPAC+4 AND | | | | | | | | |
| R2311 | LEAVE IT IN A, INHINT AND TC MPAC. | | | | | | | | |
| 2312 | REP 2 | LAST 358 | 40,3343 | | | SETLOC | NVSENDL | +1 | |
| 23125 | REP 7 | LAST 356 TO 358 | | 78 739* | | COUNT | 40/PIN | | |
| 2313 | REP 44 | LAST 359 | 40,3343 | 3 4712 1 | VRPROC | CAP | ONE | | PROCEED WITHOUT DATA |
| 2314 | REP 2 | LAST 339 | 40,3344 | 55-014 1 | | TS | LOADSTAT | | |
| 2315 | REP 2 | LAST 358 | 40,3345 | 0 4220 0 | | TC | KILMONCN | | TURN ON KILL MONITOR BIT |
| 2316 | REP 6 | LAST 360 | 40,3346 | 0 4473 0 | | TC | RELDSP | | |
| 2317 | REP 3 | LAST 318 | 40,3347 | 0 4447 1 | | TC | FLASHOFF | | |
| 2318 | REP 2 | LAST 339 | 40,3350 | 0 3450 0 | | TC | RECALTST | | SEE IF THERE IS ANY RECALL FROM ENDIDLE |

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2319 REP 45 LAST 360 40,3351 4 4712 0 VBTERR CS ONE
2320 REP 2 LAST 321 40,3352 0 3344 1 TC VBPROC +1 TERM VERB SETS LOADSTAT NEG
R23201 PROCKEY PERFORMS THE SAME FUNCTION AS VBPROC. IT MUST BE CALLED UNDER
R23202 EXECUTIVE CONTROL, WITH CHRPRIO.
23205 REP 71 LAST 359 40,3353 3 4714 1 PROCKEY CAP ZERO SET REQST FOR ENTER PASS 0.
23206 REP 13 LAST 359 40,3354 55-013 0 TS REQST
23207 REP 11 LAST 359 40,3355 4 4374 1 CS VD1 BLOCK NUMERICAL CHARACTERS, SIGNS, CLEAR
23208 REP 65 LAST 359 40,3356 54 777 1 TS DSCOUNT
23209 REP 3 LAST 361 40,3357 0 3343 0 TC VBPROC
R2321 VBRSSO WAKES ENDIDLE AT SAME LINE AS FINAL ENTER OF LOAD (L+3).
R2322 (MAIN USE IS INTENDED AS RESPONSE TO INTERNALLY INITIATED FLASHING
R2323 DISPLAYS IN ENDIDLE. SHOULD NOT BE USED WITH LOAD VERBS, PLEASE PERFORM,
R2324 OR PLEASE MARK VERBS BECAUSE THEY ALREADY USE L+3 IN ANOTHER CONTEXT.)
2325 REP 72 LAST 361 40,3360 4 4714 0 VBRSSO CS ZERO MAKE IT LOOK LIKE DATA IN.
2326 REP 4 LAST 361 40,3361 0 3344 1 TC VBPROC +1
R2327 FLASH IS TURNED OFF BY PROCEED WITHOUT DATA, TERMINATE, RESEQUENCE,
R2328 END OF LOAD.

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R2329 KEY RELEASE ROUTINE

R2330 THIS ROUTINE ALWAYS TURNS OFF THE UPACT LIGHT AND ALWAYS CLEARS DSPLOCK.

R2331 THE HIGHEST PRIORITY FUNCTION OF THE KEY RELEASE BUTTON IS THE
 R2332 UNSUSPENDING OF A SUSPENDED MONITOR WHICH WAS EXTERNALLY INITIATED.
 R2333 THIS FUNCTION IS ACCOMPLISHED BY CLEARING DSPLOCK AND TURNING OFF
 R2334 THE KEY RELEASE LIGHT IF BOTH DSPLIST AND CADRSTOR ARE EMPTY.

R2335 IF NO SUCH MONITOR EXISTS, THEN RELDSP IS EXECUTED TO CLEAR DSPLOCK
 R2336 AND THE EXTERNAL MONITOR BIT (PRESSING THE DISPLAY SYSTEM FOR INTERNAL
 R2337 USE), TURN OFF THE KEY RELEASE LIGHT, AND WAKE UP ANY JOB IN DSPLIST.

R2338 IN ADDITION IF THERE IS A JOB IN ENDIDLE, THEN CONTROL IS TRANSFERRED
 R2339 TO PINBRNCH (IN DISPLAY INTERFACE ROUTINE) TO RE-EXECUTE THE SERIES OF
 R23391 NVSLB CALLS ETC. THAT PRECEDED THE ENDIDLE CALL, STILL Awaiting RESPONSE.
 R2340 THIS FEATURE IS INTENDED FOR USE WHEN THE OPERATOR HAS BEEN REQUESTED TO
 R2341 RESPOND TO SOME INTERNAL ACTION THAT USED ENDIDLE, BUT HE HAS WRITTEN
 R2342 OVER THE INFORMATION ON THE DISPLAY PANEL BY SOME DISPLAYS OF HIS OWN
 R2343 INITIATION WHICH DO NOT SERVE AS RESPONSES. HITTING KEY RLSE WILL
 R2344 RE-ESTABLISH THE DISPLAYS TO THE STATE THEY WERE IN BEFORE HE OBSCURED
 R2345 THEM, SO THAT HE CAN SEE THE WAITING REQUEST. THIS WORKS ONLY FOR
 R2346 INTERNAL PROGRAMS THAT USED ENDIDLE THROUGH MARGARETS DISPLAY
 R2347 SUBROUTINES.

| | | | | | | | | | | | |
|-------|-----|-----|------|-----|---------|----|------|---|----------|-----------|--------|
| 2348 | REP | 14 | LAST | 336 | 40,3362 | 4 | 4710 | 1 | VBRDSP | CS | BIT3 |
| 2349 | | | | | 40,3363 | 0 | 0006 | 1 | | EXTEND | |
| 2350 | REP | 10 | LAST | 193 | 40,3364 | 03 | 011 | 1 | WAND | DSALMOUT | |
| 2351 | REP | 2 | LAST | 310 | 40,3365 | 10 | 115 | 0 | CCS | 21/22REQ | |
| 2352 | REP | 30 | LAST | 356 | 40,3366 | 3 | 4675 | 1 | CAP | BIT14 | |
| 2353 | REP | 6 | LAST | 351 | 40,3367 | 7 | 1021 | 1 | MASK | MONSAVE1 | |
| 2354 | REP | 116 | LAST | 360 | 40,3370 | 10 | 000 | 0 | CCS | A | |
| 2355 | REP | 1 | | | 40,3371 | 0 | 3400 | 0 | TC | UNSUSPEN | |
| 2356 | REP | 7 | LAST | 360 | 40,3372 | 0 | 4473 | 0 | TSILTS4 | TC | RELDSP |
| 2357 | REP | 5 | LAST | 350 | 40,3373 | 11 | 042 | 1 | CCS | CADRSTOR | |
| 2358 | | | | | 40,3374 | 0 | 3376 | 0 | TC | +2 | |
| 2359 | REP | 38 | LAST | 358 | 40,3375 | 0 | 5112 | 0 | TC | ENDOFJOB | |
| 2360 | REP | 29 | LAST | 359 | 40,3376 | 0 | 4574 | 0 | TC | POSTLUMP | |
| 2361 | REP | 4 | LAST | 259 | 40,3377 | 2 | 1176 | 1 | CADR | PINBRNCH | |
| 2362 | REP | 73 | LAST | 361 | 40,3400 | 3 | 4714 | 1 | UNSUSPEN | CAP | ZERO |
| 2363 | REP | 5 | LAST | 350 | 40,3401 | 55 | 012 | 1 | TS | DSPLOCK | |
| 2364 | REP | 6 | LAST | 362 | 40,3402 | 11 | 042 | 1 | CCS | CADRSTOR | |
| 2365 | REP | 39 | LAST | 362 | 40,3403 | 0 | 5112 | 0 | TC | ENDOFJOB | |
| 2366 | REP | 2 | LAST | 350 | 40,3404 | 0 | 4516 | 1 | TC | RELDSP1 | |
| 23661 | REP | 40 | LAST | 362 | 40,3405 | 0 | 5112 | 0 | TC | ENDOFJOB | |
| 2367 | | | | | 40,3406 | | | | | ENDRELDSP | EQUALS |

TURN OFF UPACT LITE
 OLD DSPLOCK

EXTERNAL MONITOR BIT (EMR)

OLD DSPLOCK AND EMR BOTH 1, UNSUSPEND.
 NOT UNSUSPENDING EXTERNAL MONITOR,
 RELEASE DISPLAY SYSTEM AND
 DO RE-ESTABLISH IF CADRSTOR IS FULL.

EXTERNAL MONITOR IS SUSPENDED,
 JUST UNSUSPEND IT BY CLEARING DSPLOCK.
 TURN KEY RELEASE LIGHT OFF IF BOTH
 CADRSTOR AND DSPLIST ARE EMPTY.

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- R2366 NVSLB IS USED FOR SUB ROUTINE CALLS FROM WITHIN COMPUTER. IT CAN BE
R2369 USED TO CALL THE COMBINATION OF ANY DISPLAY, LOAD, OR MONITOR VERB
R2370 TOGETHER WITH ANY NOUN AVAILABLE TO THE KEYBOARD.
R23701 PLACE 0VVVVVVVVNNNNN INTO A.
R23702 V-S ARE THE 7 BIT VERB CODE. N-S ARE THE 7 BIT NOUN CODE.
- R23703 IF NVSLB IS CALLED WITH THE FOLLOWING NEGATIVE NUMBERS (RATHER THAN THE
R23704 VERB-NOUN CODE) IN A, THEN THE DISPLAY IS BLANKED AS FOLLOWS-
R23705 -4 FULL BLANK, -3 LEAVE MODE, -2 LEAVE MODE AND VERB, -1 BLANK R-S ONLY
- R2371 NVSLB CAN BE USED WITH MACH CADR TO BE SPEC BY PLACING THE CADR INTO
R2372 MPAC+2 BEFORE THE STANDARD NVSLB CALL.
- R2373 NVSLB RETURNS TO 2+ CALLING LOC AFTER PERFORMING TASK, IF DISPLAY
R2374 SYSTEM IS AVAILABLE. THE NEW NOUN AND VERB CODES ARE DISPLAYED.
R2375 IF V'S =0, THE NEW NOUN CODE IS DISPLAYED ONLY (RETURN WITH NO FURTHER
R2376 ACTION). IF N-S =0, THE NEW VERB CODE IS DISPLAYED ONLY (RETURN WITH NO
R2377 FURTHER ACTION).
- R2378 IT RETURNS TO 1+ CALLING LOC WITHOUT PERFORMING TASK, IF DISPLAY
R2379 SYSTEM IS BLOCKED (NOTHING IS DISPLAYED IN THIS CASE).
R2380 IT DOES TO ABORT (WITH OCT 01501) IF IT ENCOUNTERS A DISPLAY PROGRAM
R2381 ALARM CONDITION BEFORE RETURN TO CALLER.
- R2382 THE DISPLAY SYSTEM IS BLOCKED BY THE DEPRESSION OF ANY
R2383 KEY, EXCEPT ERROR LIGHT RESET
R2384 IT IS RELEASED BY THE KEY RELEASE BUTTON, ALL EXTENDED VERBS,
R2385 PROCEED WITHOUT DATA, TERMINATE, RESEQUENCE, INITIALIZE EXECUTIVE,
R2386 RECALL PART OF RECALTST IF ENDIDLE WAS USED,
R2387 VB = REQUEST EXECUTIVE, VB = REQUEST WAITLIST,
R2388 MONITOR SET UP.
- R2389 THE DISPLAY SYSTEM IS ALSO BLOCKED BY THE EXTERNAL MONITOR BIT, WHICH
R2390 INDICATES AN EXTERNALLY INITIATED MONITOR IS RUNNING (SEE MONITOR)
- R2389 A NVSLB CALL THAT PASSES DSPLOCK AND THE EXTERNAL MONITOR BIT ENDS OLD
R2390 MONITOR.
- R2390 DSPLOCK IS THE INTERLOCK FOR USE OF KEYBOARD AND DISPLAY SYSTEM WHICH
R2391 LOCKS OUT INTERNAL USE WHENEVER THERE IS EXTERNAL KEYBOARD ACTION.
- R23911 NVSLB SHOULD BE USED TWICE IN SUCCESSION FOR 'PLEASE PERFORM' SITUATIONS
R23912 (SIMILARLY FOR PLEASE MARK). FIRST PLACE THE CODED NUMBER FOR WHAT
R23913 ACTION IS DESIRED OF OPERATOR INTO THE REGISTERS REFERRED TO BY THE
R23914 'CHECKLIST' NOUN. GO TO NVSLB WITH A DISPLAY VERB AND THE 'CHECKLIST'
R23915 NOUN. GO TO NVSLB AGAIN WITH THE 'PLEASE PERFORM' VERB AND ZEROS IN THE
R23916 LOW 7 BITS. THIS 'PASTES UP' THE 'PLEASE PERFORM' VERB INTO THE VERB
R23917 LIGHTS.
- R23918 NVMOPT IS AN ENTRY SIMILAR TO NVSLB, BUT REQUIRING AN ADDITIONAL



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R239161 PARAMETER IN L. IT SHOULD BE USED ONLY WITH A MONITOR VERB-NOUN CODE IN
R239162 A. AFTER EACH MONITOR DISPLAY A *PLEASE* VERB WILL BE PASTED IN THE VERB
R239163 LIGHTS OR DATA WILL BE BLANKED (OR BOTH) ACCORDING TO THE OPTIONS
R239164 SPECIFIED IN L. IF BITS 8-14 OF L ARE OTHER THAN ZERO, THEN THEY WILL
R239165 BE INTERPRETED AS A VERB CODE AND PASTED IN THE VERB LIGHTS. (THIS VERB
R239166 CODE SHOULD DESIGNATE ONE OF THE *PLEASE* VERBS.) IF BITS 1-3 OF L ARE
R239167 OTHER THAN ZERO, THEN THEY WILL BE USED TO BLANK DATA BY BEING FED TO
R239168 BLANKSUB. IF NVMONOPT IS USED WITH A VERB OTHER THAN A MONITOR VERB,
R239169 THE PARAMETER IN L HAS NO EFFECT.

R2392 NVSUB IN FIXED-FIXED PLACES 2-CALLING LOC INTO NVQTEM, TO NVSUBEND INTO
R2393 ENTERT. (THIS WILL RESTORE OLD CALLING BANK BITS)

| | | | | | | | | | | | |
|--------|-----|-----|------|------------|------|-------|------|----------|------------|-----------|---|
| 2394 | REP | 1 | | 4170 | | | | SETLOC | ENDALM | +1 | |
| 23945 | REP | 3 | LAST | 358 TO 359 | 7 | 24* | | COUNT | 02/PIN | | |
| 2395 | | | | 4170 | 22 | 007 | 0 | NVSUB | LXCH | 7 | ZERO NVMONOPT OPTIONS |
| 2396 | REP | 1 | | 4171 | 54 | 123 | 0 | NVMONOPT | TS | NVTEM | |
| 2397 | REP | 31 | LAST | 362 | 4172 | 3 | 4875 | 1 | CAP | BIT14 | |
| 23971 | REP | 7 | LAST | 362 | 4173 | 7 | 1021 | 1 | MASK | MONSAVE1 | EXTERNAL MONITOR BIT |
| 23972 | REP | 6 | LAST | 362 | 4174 | 6 | 1012 | 0 | AD | DSPLOCK | |
| 23973 | REP | 117 | LAST | 362 | 4175 | 10 | 000 | 0 | CCS | A | |
| 23974 | REP | 105 | LAST | 359 | 4176 | 0 | 0002 | 0 | TC | Q | DSP SYST RLOCKED. RET TO 1+ CALLING LOC |
| 2398 | REP | 46 | LAST | 361 | 4177 | 3 | 4712 | 1 | CAP | ONE | DSP SYST AVAILABLE |
| 2399 | REP | 106 | LAST | 364 | 4200 | 6 | 0002 | 0 | NVSRCON | AD | 0 |
| 2400 | REP | 1 | | 4201 | 55 | 037 | 0 | | TS | NVQTEM | 2+ CALLING LOC INTO NVQTEM |
| 24001 | REP | 4 | LAST | 351 | 4202 | 23 | 022 | 0 | LXCH | MONSAVE2 | STORE NVMONOPT OPTIONS |
| 2401 | REP | 3 | LAST | 360 | 4203 | 0 | 4220 | 0 | TC | KILMONCN | TURN ON KILL MONITOR BIT |
| 2402 | REP | 1 | | 4204 | 3 | 4215 | 0 | NVSRCON | CAP | NVSRBANK | |
| 2403 | REP | 10 | LAST | 128 | 4205 | 56 | 006 | 1 | XCH | BRANK | |
| 24031 | | | | 4206 | 0 | 0006 | 1 | | EXTEND | | SAVE OLD SUPERBITS |
| 24032 | REP | 3 | LAST | 238 | 4207 | 04 | 007 | 1 | ROR | SUPERBANK | |
| 2404 | REP | 1 | | 4210 | 55 | 040 | 0 | | TS | NVRKTEM | |
| 24041 | REP | 2 | LAST | 238 | 4211 | 3 | 4215 | 0 | CAP | PINSUPRT | |
| 24042 | | | | 4212 | 0 | 0006 | 1 | | EXTEND | | |
| 24043 | REP | 4 | LAST | 364 | 4213 | 01 | 007 | 1 | WRITE | SUPERBANK | GO TO NVSR1 THRU STANDARD LOC |
| 2405 | REP | 1 | | 4214 | 0 | 2000 | 0 | | TC | NVSRB | |
| 2406 | REP | 56 | LAST | 361 | 0777 | | | | BRANK= | DSPCOUNT | |
| 2407 | REP | 2 | LAST | 318 | 4215 | 62101 | 0 | NVSRBANK | BRCON | NVSR1 | |
| 24071 | REP | 2 | LAST | 364 | 4215 | | | | PINSUPRT = | NVSRBANK | CONTAINS THE PINBALL SUPERBITS. |
| 2412 | REP | 2 | LAST | 364 | 4216 | 53 | 040 | 0 | NVSRBEND | D1CH | NVRKTEM MUST = NVQTEM+1 |
| 2413 | REP | 1 | | 4217 | 0 | 5122 | 0 | | TC | SUPD1CHZ | DTOR WITH SUPERBIT SWITCHING |
| 2414 | REP | 1 | | 41,3506 | | | | | SETLOC | ENDRQMT | +1 |
| 241405 | REP | 7 | LAST | 359 TO 360 | 54 | 838* | | | COUNT | 41/PIN | |

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R241412 BLANKDSP BLANKS DISPLAY ACCORDING TO OPTION NUMBER IN NVTEMP AS FOLLOWS
 R241415 -4 FULL BLANK, -3 LEAVE MODE, -2 LEAVE MODE AND VERR, -1 BLANK R-S ONLY

| | | | | | | | | | | | | |
|--------|------|-----|------|-----|---------|----|------|---|----------|--------|-------------|--|
| 241419 | RESP | 8 | LAST | 356 | 41,3508 | 6 | 4716 | 0 | BLANKDSP | AD | SEVEN | 7,8,9,OR 10 (A HAD 0,1,2,OR 3) |
| 241422 | | | | | 41,3507 | 0 | 0004 | 0 | | INHINT | | BLANK SPECIFIED DSPTAB8 |
| 241425 | RESP | 13 | LAST | 357 | 41,3510 | 54 | 124 | 1 | | TS | CODE | |
| 241429 | RESP | 18 | LAST | 344 | 41,3511 | 4 | 4677 | 1 | | CS | BIT12 | |
| 241432 | RESP | 14 | LAST | 365 | 41,3512 | 50 | 124 | 0 | | INDEX | CODE | |
| 241435 | RESP | 28 | LAST | 357 | 41,3513 | 57 | 023 | 1 | | XCH | DSPTAB | |
| 241439 | RESP | 118 | LAST | 364 | 41,3514 | 10 | 000 | 0 | | CCS | A | |
| 241442 | RESP | 6 | LAST | 357 | 41,3515 | 25 | 016 | 1 | | INCR | NOUT | |
| 241445 | | | | | 41,3516 | 0 | 3517 | 1 | | TC | +1 | |
| 241449 | RESP | 15 | LAST | 365 | 41,3517 | 10 | 124 | 1 | | CCS | CODE | |
| 241452 | RESP | 1 | | | 41,3520 | 0 | 3510 | 0 | | TC | BLANKDSP +2 | |
| 241455 | | | | | 41,3521 | 0 | 0003 | 1 | | RELINT | | |
| 241459 | RESP | 2 | LAST | 364 | 41,3522 | 50 | 123 | 1 | | INDEX | NVTEMP | |
| 241462 | | | | | 41,3523 | 0 | 3530 | 1 | | TC | +5 | |
| 241465 | | | | | 41,3524 | 0 | 3525 | 0 | | TC | +1 | NVTEMP HAS -4 (NEVER TOUCH MODREG) |
| 241469 | RESP | 19 | LAST | 351 | 41,3525 | 55 | 001 | 0 | | TS | VERRREG | -3 |
| 241472 | RESP | 14 | LAST | 359 | 41,3526 | 55 | 002 | 0 | | TS | NOLNREG | -2 |
| 241475 | RESP | 12 | LAST | 339 | 41,3527 | 55 | 015 | 0 | | TS | CLPASS | -1 |
| 241479 | RESP | 12 | LAST | 361 | 41,3530 | 4 | 4374 | 1 | | CS | VD1 | |
| 241482 | RESP | 57 | LAST | 364 | 41,3531 | 54 | 777 | 1 | | TS | DSPCOUNT | |
| 241485 | RESP | 4 | LAST | 360 | 41,3532 | 0 | 4447 | 1 | | TC | FLASHOFF | PROTECT AGAINST INVISIBLE FLASH |
| 241489 | RESP | 1 | | | 41,3533 | 0 | 3556 | 1 | | TC | ENTSET -2 | ZEROS RECRET |
| 2415 | RESP | 2 | LAST | 365 | 41,3534 | 3 | 3560 | 1 | NVSUB1 | CAP | ENTSET | IN BANK |
| 2416 | RESP | 6 | LAST | 351 | 41,3535 | 54 | 136 | 1 | | TS | ENTRET | SET RETURN TO NVSUREND |
| 24161 | RESP | 3 | LAST | 365 | 41,3536 | 10 | 123 | 0 | | CCS | NVTEMP | WHAT NOW |
| 24162 | | | | | 41,3537 | 0 | 3543 | 0 | | TC | +4 | NORMAL NVSUB CALL (EXECUTE VN OR PASTE) |
| 24163 | RESP | 19 | LAST | 327 | 41,3540 | 0 | 2350 | 0 | | TC | GDSPALM | |
| 24164 | RESP | 2 | LAST | 365 | 41,3541 | 0 | 3506 | 1 | | TC | BLANKDSP | BLANK DISPLAY AS SPECIFIED |
| 24165 | RESP | 20 | LAST | 365 | 41,3542 | 0 | 2350 | 0 | | TC | GDSPALM | |
| 2417 | RESP | 5 | LAST | 351 | 41,3543 | 3 | 6043 | 0 | | CAP | LOW | |
| 2418 | RESP | 4 | LAST | 365 | 41,3544 | 7 | 0123 | 0 | | MARK | NVTEMP | |
| 2419 | RESP | 193 | LAST | 360 | 41,3545 | 54 | 157 | 0 | | TS | MPAC +3 | TEMP FOR NOLN (CANT USE MPAC, DSPDECVN |
| 2420 | RESP | 5 | LAST | 365 | 41,3546 | 3 | 0123 | 1 | | CA | NVTEMP | USRS MPAC, +1, +2 |
| 2422 | RESP | 5 | LAST | 351 | 41,3547 | 54 | 023 | 1 | | TS | EDOP | RIGHT 7 |
| 2423 | RESP | 6 | LAST | 365 | 41,3550 | 3 | 0023 | 0 | | CA | EDOP | |
| 2424 | RESP | 194 | LAST | 365 | 41,3551 | 54 | 160 | 1 | | TS | MPAC +4 | TEMP FOR VERR (CANT USE MPAC+1, DSPDECVN |
| A2425 | | | | | | | | | | | | USRS MPAC, +1, +2). |
| 2426 | RESP | 195 | LAST | 365 | 41,3552 | 10 | 157 | 0 | | CCS | MPAC +3 | TEST NOLN |
| 2427 | RESP | 1 | | | 41,3553 | 0 | 3561 | 0 | | TC | NVSUR2 | IF NOLN NOT +0, GO ON |
| 2428 | RESP | 196 | LAST | 365 | 41,3554 | 3 | 0160 | 0 | | CA | MPAC +4 | |
| 2429 | RESP | 9 | LAST | 358 | 41,3555 | 0 | 2336 | 0 | | TC | UPDATVR -1 | |
| 24291 | RESP | 74 | LAST | 362 | 41,3556 | 3 | 4714 | 1 | | CAP | ZERO | IF NOLN = +0, DISPLAY VERR. THEN RETURN |
| 24292 | RESP | 14 | LAST | 361 | 41,3557 | 55 | 013 | 0 | | TS | RECRET | ZERO RECRET SO THAT PASTED VERRS CAN |
| 2430 | RESP | 2 | LAST | 358 | 41,3560 | 0 | 4216 | 0 | ENTSET | TC | NVSUREND | BE EXECUTED BY OPERATOR. |
| 2431 | RESP | 197 | LAST | 365 | 41,3561 | 10 | 160 | 1 | NVSUR2 | CCS | MPAC +4 | TEST VERR |
| 2432 | | | | | 41,3562 | 0 | 3566 | 1 | | TC | +4 | IF VERR NOT +0, GO ON |

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2433 REP 198 LAST 365 41,3563 3 0157 1 CA MPAC +3
2434 REP 2 LAST 351 41,3564 0 2318 1 TC UPDATNN -1
2435 REP 3 LAST 365 41,3565 0 4218 0 TC NVSLREND
2436 REP 199 LAST 366 41,3566 3 0156 0 CA MPAC +2
2437 REP 200 LAST 366 41,3567 54 181 0 TS MPAC +5
2438 REP 201 LAST 366 41,3570 3 0160 0 CA MPAC +4
2439 REP 10 LAST 365 41,3571 0 2338 0 TC UPDATVB -1
2440 REP 202 LAST 366 41,3572 3 0157 1 CA MPAC +3
2441 REP 3 LAST 366 41,3573 0 2318 1 TC UPDATNN -1
2442 REP 75 LAST 365 41,3574 3 4714 1 CAP ZERO
2443 REP 3 LAST 360 41,3575 55=014 1 TS LOADSTAT
2444 REP 13 LAST 365 41,3576 55=015 0 TS CLPASS
2445 REP 15 LAST 365 41,3577 55=013 0 TS RREORET
2446 REP 203 LAST 366 41,3600 3 0161 1 CA MPAC +5
2447 REP 204 LAST 366 41,3601 54 156 1 TS MPAC +2
2448 REP 3 LAST 318 41,3602 0 2035 0 ENDVSB1 TC ENTPAS0
R2449 IF INTERNAL MACH CADR TO BE SPECIFIED, MPAC+2 WILL BE PLACED INTO
R2450 NOUNCADR IN ENTPAS0 (INTMCTBS).
2451 REP 4 LAST 366 4220 SETLOC NVSLREND +2
24515 REP 4 LAST 364 TO 364' 24 48* COUNT 02/PIN
    
```

IF VERB = +0, DISPLAY NOUN. THEN RETURN
 TEMP FOR MACH CADR TO BE SPEC. (DSPDECVN
 USES MPAC, +1, +2)

IF BOTH NOUN AND VERB NOT +0, DISPLAY
 BOTH AND GO TO ENTPAS0.

SET FOR WAITING FOR DATA CONDITION

SET RREORET FOR PASS 0.
 RESTORES MACH CADR TO BE SPEC TO MPAC+2
 FOR USE IN INTMCTBS (IN ENTPAS0).

```

A2452
2453 REP 26 LAST 339 4220 3 4674 0 KILMONON CAP BIT15
2454 REP 8 LAST 364 4221 55=021 1 TS MONSAVE1
A2455
2458 REP 107 LAST 364 4222 0 0002 0 TC 0
R2459 LOADSTAT +0 INACTIVE(WAITING FOR DATA). SET BY NVSLR
R2460 +1 PROCEED NO DATA. SET BY SPECIAL VERB
R2461 -1 TERMINATE SET BY SPECIAL VERB
R2462 -0 DATA IN SET BY END OF LOAD ROUTINE
R2463 OR RESEQUENCE SET BY VERB 32
R2464 L TC ENDIDLE (FIXED FIXED)
R2465 ROUTINES THAT REQUEST LOADS THROUGH NVSLR SHOULD USE ENDIDLE WHILE
R2466 WAITING FOR THE DATA TO BE LOADED. ENDIDLE PUTS CURRENT JOB TO SLEEP.
R2467 ENDIDLE CANNOT BE CALLED FROM ERASABLE OR P/P MEMORY,
R2468 SINCE JOBSLEEP AND JOBWAKE CAN HANDLE ONLY FIXED BANKS.
R2469 RECALST TESTS LOADSTAT AND WAKES JOB UP TO,
R2470 L+1 FOR TERMINATE
R2471 L+2 FOR PROCEED WITHOUT DATA
R2472 L+3 FOR DATA IN, OR RESEQUENCE
R2473 IT DOES NOTHING IF LOADSTAT INDICATES WAITING FOR DATA.
    
```

FORCE BIT 15 OF MONSAVE1 TO 1.
 THIS IS THE KILL MONITOR BIT.
 TURN OFF BIT 14, THE EXTERNAL
 MONITOR BIT.

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R2474 ENDIDLE ABORTS (WITH CODE 01206) IF A SECOND JOB ATTEMPTS TO GO TO SLEEP
 R2475 IN PINBALL. IN PARTICULAR, IF AN ATTEMPT IS MADE TO GO TO ENDIDLE WHEN
 R2476 1) CADRSTOR NOT= +0. THIS IS THE CASE WHEN THE CAPACITY OF ENDIDLE IS
 R2477 EXCEEDED. (+NZ INDICATE A JOB IS ALREADY ASLEEP DUE TO ENDIDLE.)
 R2478 2) DSPLIST NOT= +0. THIS INDICATES A JOB IS ALREADY ASLEEP DUE TO
 R2479 WYSLEBUSY.

| | | | | | | | | | | | |
|------|-----|-----|------|-----|------|----|------|---|----------|----------|----------|
| 2480 | REP | 106 | LAST | 366 | 4223 | 22 | 002 | 0 | ENDIDLE | LKCH | 0 |
| 2481 | REP | 1 | | | 4224 | 0 | 4234 | 0 | TC | ISCADR+0 | |
| 2482 | REP | 1 | | | 4225 | 0 | 4240 | 0 | TC | ISLIST+0 | |
| 2483 | REP | 41 | LAST | 352 | 4226 | 3 | 0001 | 0 | CA | L | |
| 2484 | REP | 4 | LAST | 265 | 4227 | 7 | 4747 | 0 | MARK | LOW10 | |
| 2485 | REP | 1 | | | 4230 | 6 | 0004 | 0 | AD | FRANK | |
| 2486 | REP | 7 | LAST | 362 | 4231 | 55 | 042 | 1 | TS | CADRSTOR | |
| 2487 | REP | 1 | | | 4232 | 0 | 5070 | 0 | TC | JOBSLEEP | |
| 2488 | REP | 41 | LAST | 362 | 4233 | 0 | 5112 | 0 | ENDINST | TC | ENDOFJOB |
| 2489 | REP | 8 | LAST | 367 | 4234 | 11 | 042 | 1 | ISCADR+0 | CCS | CADRSTOR |
| 2490 | REP | 1 | | | 4235 | 0 | 4243 | 0 | TC | DSPABORT | |
| 2491 | REP | 109 | LAST | 367 | 4236 | 0 | 0002 | 0 | TC | 0 | |
| 2492 | REP | 2 | LAST | 367 | 4237 | 0 | 4243 | 0 | TC | DSPABORT | |

RETURN ADDRESS INTO L.
 ABORT IF CADRSTOR NOT= +0
 ABORT IF DSPLIST NOT= +0
 DONT SET DSPLCK TO 1 SO CAN USE
 ENDIDLE WITH WYSBUS INITIATED MONITOR.
 SAME STRATEGY FOR CADR AS MAKECADR.

ABORTS (CODE 01206) IF CADRSTOR NOT= +0.
 RETURNS IF CADRSTOR = +0.

| | | | | | | | | | | | |
|------|-----|-----|------|-----|------|----|------|---|----------|----------|---------|
| 2493 | REP | 2 | LAST | 188 | 4240 | 11 | 043 | 0 | ISLIST+0 | CCS | DSPLIST |
| 2494 | REP | 3 | LAST | 367 | 4241 | 0 | 4243 | 0 | TC | DSPABORT | |
| 2495 | REP | 110 | LAST | 367 | 4242 | 0 | 0002 | 0 | TC | 0 | |
| 2496 | REP | 2 | LAST | 358 | 4243 | 0 | 5622 | 1 | DSPABORT | TC | PODDOO |
| 2497 | | | | | 4244 | 0 | 1206 | 1 | OCT | 01206 | |

ABORTS (CODE 01206) IF DSPLIST NOT= +0.
 RETURNS IF DSPLIST = +0.

R2498 JAMTERM ALLOWS PROGRAMS TO PERFORM THE TERMINATE FUNCTION.
 R2499 IT DOES ENDOFJOB.

| | | | | | | | | | | | |
|-------|-----|----|------|-----|------|----|------|---|---------|---------|----------|
| 2500 | REP | 3 | LAST | 364 | 4245 | 3 | 4215 | 0 | JAMTERM | CAP | PINSUPBT |
| 2501 | | | | | 4246 | 0 | 0006 | 1 | | EXTEND | |
| 25011 | REP | 5 | LAST | 364 | 4247 | 01 | 007 | 1 | WRITE | SUPPRBK | |
| 25012 | REP | 1 | | | 4250 | 3 | 4256 | 1 | CAP | 34DEC | |
| 25013 | REP | 16 | LAST | 366 | 4251 | 55 | 013 | 0 | TS | REQRET | |
| 2502 | REP | 13 | LAST | 365 | 4252 | 4 | 4374 | 1 | CS | VD1 | |
| 2503 | REP | 56 | LAST | 365 | 4253 | 54 | 777 | 1 | TS | DSPCLNT | |
| 2504 | REP | 30 | LAST | 362 | 4254 | 0 | 4574 | 0 | TC | POSTLMP | |
| 2505 | REP | 2 | LAST | 321 | 4255 | 61 | 351 | 1 | CADR | VRTERM | |

LEAVE ENTER SET FOR ENTPASSO.

2506 4256 00042 1 34DEC DEC 34
 R2507 JAMPROC ALLOWS PROGRAMS TO PERFORM THE PROCEED/PROCEED WITHOUT DATA
 R2508 FUNCTION. IT DOES ENDOFJOB.



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| | | | | | | | | | | | |
|-------|-----|----|------|-----|------|-------|------|---|---------|--------|-----------|
| 2509 | REP | 4 | LAST | 367 | 4257 | 3 | 4215 | 0 | JAMPROC | CAP | PINSUPBT |
| 2510 | | | | | 4260 | 0 | 0006 | 1 | | EXTEND | |
| 25101 | REP | 8 | LAST | 367 | 4261 | 01 | 007 | 1 | | WRITE | SUPERBANK |
| 25102 | REP | 1 | | | 4262 | 3 | 4270 | 0 | | CAP | 33DEC |
| 25103 | REP | 17 | LAST | 367 | 4263 | 55 | 013 | 0 | | TS | REQEST |
| 2511 | REP | 14 | LAST | 367 | 4264 | 4 | 4374 | 1 | | CS | VD1 |
| 2512 | REP | 59 | LAST | 367 | 4265 | 54 | 777 | 1 | | TS | DSPCOUNT |
| 2513 | REP | 31 | LAST | 367 | 4266 | 0 | 4574 | 0 | | TC | POSTRAMP |
| 2514 | REP | 5 | LAST | 361 | 4267 | 61343 | 1 | | | CADR | VBPROC |

LEAVE ENTER SET FOR ENTPASSO.

2515 4270 00041 1 33DEC DEC 33
R2532 BLANKSUB BLANKS ANY COMBINATION OF R1, R2, R3.
R2533 CALL WITH BLANKING CODE IN A.
R2534 BIT1=1 BLANKS R1, BIT2=1 BLANKS R2, BIT3=1 BLANKS R3.
R2535 ANY COMBINATION OF THESE BITS IS ACCEPTED.

R2536 DSPCOUNT IS RESTORED TO STATE IT WAS IN BEFORE BLANKSUB WAS EXECUTED.

| | | | | | | | | | | | |
|-------|-----|-----|------|-----|------|-------|------|---|-----------|--------|-----------|
| 2538 | REP | 9 | LAST | 365 | 4271 | 7 | 4716 | 1 | BLANKSUB | MASK | SEVEN |
| 25381 | REP | 8 | LAST | 365 | 4272 | 54 | 123 | 0 | | TS | NVTEMP |
| 2539 | REP | 32 | LAST | 364 | 4273 | 3 | 4675 | 1 | | CAP | BIT14 |
| 2540 | REP | 9 | LAST | 366 | 4274 | 7 | 1021 | 1 | | MASK | MONSAVB1 |
| 25401 | REP | 7 | LAST | 364 | 4275 | 6 | 1012 | 0 | | AD | DSPLOCK |
| 25402 | REP | 119 | LAST | 365 | 4276 | 10 | 000 | 0 | | CCS | A |
| 25403 | REP | 111 | LAST | 367 | 4277 | 0 | 0002 | 0 | | TC | 0 |
| 25404 | REP | 112 | LAST | 368 | 4300 | 24 | 002 | 0 | | INCR | 0 |
| A2541 | | | | | | | | | | | |
| 25411 | REP | 7 | LAST | 368 | 4301 | 10 | 123 | 0 | | CCS | NVTEMP |
| 25412 | | | | | 4302 | 1 | 4304 | 0 | | TC | +2 |
| 25413 | REP | 113 | LAST | 368 | 4303 | 0 | 0002 | 0 | | TC | 0 |
| 2542 | REP | 114 | LAST | 368 | 4304 | 22 | 002 | 0 | | LXCH | 0 |
| 2544 | REP | 1 | | | 4305 | 3 | 4316 | 1 | | CAP | BLANKRANK |
| 2545 | REP | 11 | LAST | 364 | 4306 | 56 | 006 | 1 | | XCH | BRANK |
| 25451 | | | | | 4307 | 0 | 0006 | 1 | | EXTEND | |
| 25452 | REP | 7 | LAST | 368 | 4310 | 04 | 007 | 1 | | ROR | SUPERBANK |
| 2546 | REP | 40 | LAST | 326 | 4311 | 52 | 131 | 0 | | DYCH | RUP |
| 25461 | REP | 5 | LAST | 368 | 4312 | 3 | 4215 | 0 | | CAP | PINSUPBT |
| 25462 | | | | | 4313 | 0 | 0006 | 1 | | EXTEND | |
| 25463 | REP | 8 | LAST | 368 | 4314 | 01 | 007 | 1 | | WRITE | SUPERBANK |
| 2547 | REP | 1 | | | 4315 | 0 | 3406 | 0 | | TC | BLANKSUB1 |
| 2548 | REP | 60 | LAST | 368 | 0777 | | | | | BRANK= | DSPCOUNT |
| 25481 | REP | 2 | LAST | 368 | 4316 | 00101 | 1 | | BLANKRANK | BRCON | BLANKSUB1 |
| 2549 | | | | | 4317 | | | | ENDRUFF | EQUALS | |

STORE BLANKING CODE IN NVTEMP.

EXTERNAL MONITOR BIT

DSP SYST BLOCKED. RET TO 1+ CALLING LOC
DSP SYST AVAILABLE
SET RETURN FOR 2+ CALLING LOC

NOTHING TO BLANK. RET TO 2+ CALLING LOC
SET RETURN FOR 2 + CALLING LOC

SAVE OLD SUPERBITS.

| | | | | | | | | | | | |
|-------|-----|---|------|------------|---------|------|--|--|--|--------|----------|
| 2550 | REP | 1 | | | 40,3406 | | | | | SETLOC | ENDRFLDS |
| 25505 | REP | 8 | LAST | 368 TO 364 | 35 | 774* | | | | COUNT | 40/PIN |

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| | | | | | | | | | | |
|-------|-----|-----|------|-----|---------|----------|-----------|-------|-------------|---|
| 2551 | REP | 61 | LAST | 368 | 40,3406 | 3 0777 0 | BLANKSUF1 | CA | DSPCOUNT | SAVE OLD DSPCOUNT FOR LATER RESTORATION |
| 25511 | REP | 41 | LAST | 368 | 40,3407 | 54 132 0 | | TS | RUF +2 | |
| 25512 | REP | 31 | LAST | 360 | 40,3410 | 3 4712 1 | | CAP | BIT1 | TEST BIT1. SEE IF R1 TO BE BLANKED. |
| 2552 | REP | 1 | | | 40,3411 | 0 3430 0 | | TC | TESTBIT | |
| 2553 | REP | 13 | LAST | 352 | 40,3412 | 3 4333 0 | | CAP | R1D1 | |
| 2554 | REP | 4 | LAST | 332 | 40,3413 | 0 2436 1 | | TC | SBLANK -1 | |
| 2555 | REP | 20 | LAST | 218 | 40,3414 | 3 4711 1 | | CAP | BIT2 | TEST BIT 2. SEE IF R2 TO BE BLANKED. |
| 2556 | REP | 2 | LAST | 369 | 40,3415 | 0 3430 0 | | TC | TESTBIT | |
| 2557 | REP | 5 | LAST | 354 | 40,3416 | 3 4334 1 | | CAP | R2D1 | |
| 2558 | REP | 5 | LAST | 369 | 40,3417 | 0 2436 1 | | TC | SBLANK -1 | |
| 2559 | REP | 15 | LAST | 362 | 40,3420 | 3 4710 0 | | CAP | BIT3 | TEST BIT3. SEE IF R3 TO BE BLANKED. |
| 2560 | REP | 3 | LAST | 369 | 40,3421 | 0 3430 0 | | TC | TESTBIT | |
| 2561 | REP | 5 | LAST | 333 | 40,3422 | 3 4335 0 | | CAP | R3D1 | |
| 2562 | REP | 6 | LAST | 369 | 40,3423 | 0 2436 1 | | TC | SBLANK -1 | |
| 2563 | REP | 42 | LAST | 369 | 40,3424 | 3 0132 1 | | CA | RUF +2 | RESTORE DSPCOUNT TO STATE IT HAD BEFORE BLANKSUF. |
| 2564 | REP | 62 | LAST | 369 | 40,3425 | 54 777 1 | | TS | DSPCOUNT | CALL L+2 DIRECTLY. |
| 2565 | REP | 43 | LAST | 369 | 40,3426 | 52 131 0 | | DACH | RUF | DTCB WITH SUPERBIT SWITCHING |
| 2566 | REP | 2 | LAST | 364 | 40,3427 | 0 5123 1 | | TC | SUPDACHZ +1 | |
| 2567 | REP | 8 | LAST | 368 | 40,3430 | 7 0123 0 | TESTBIT | MASK | NVTEMP | NVTEMP CONTAINS BLANKING CODE. |
| 2568 | REP | 120 | LAST | 368 | 40,3431 | 10 000 0 | | CCS | A | |
| 2569 | REP | 115 | LAST | 368 | 40,3432 | 0 0002 0 | | TC | 0 | IF CURRENT BIT = 1, RETURN TO L+1. |
| 2570 | REP | 116 | LAST | 369 | 40,3433 | 50 002 0 | | INDEX | 0 | IF CURRENT BIT = 0, RETURN TO L+3. |
| 2571 | | | | | 40,3434 | 0 0002 0 | | TC | 2 | |

2572 40,3435 ENDRSUF1 EQUALS
R257205 DSPMM DOES NOT DISPLAY MODREG DIRECTLY. IT PUTS IN EXEC REQUEST WITH
R257206 PRIO 30000 FOR DSPMMJR AND RETURNS TO CALLER.

R257207 IF MODREG CONTAINS -0, DSPMMJB BLANKS THE MODE LIGHTS.

R257209 DSPMM MUST BE IN BANK 27 OR LOWER, SO IT CAN BE CALLED VIA BANKCALL.

| | | | | | | | | | | |
|--------|-----|-----|------|-----|---------|----------|-------|---------|----------|--|
| 25721 | | | | | 07,2440 | | | BANK | 7 | |
| 257215 | REP | 1 | | | 04,2000 | | | SETLOC | PINBALL4 | |
| 257217 | | | | | 04,2537 | | | BANK | | |
| 257218 | REP | 1 | | | | | | COUNT | 07/PIN | |
| 25722 | REP | 117 | LAST | 369 | 04,2537 | 58 002 0 | DSPMM | XCH | 0 | |
| 25723 | REP | 205 | LAST | 366 | 04,2540 | 54 154 0 | | TS | MPAC | |
| 25724 | | | | | 04,2541 | 0 0004 0 | | INHINT | | |
| 25725 | REP | 3 | LAST | 350 | 04,2542 | 3 4371 0 | | CAP | CHRPRIO | |
| 25726 | REP | 12 | LAST | 350 | 04,2543 | 0 5027 1 | | TC | NOVAC | |
| 25727 | REP | 63 | LAST | 369 | 0777 | | | BRANK= | DSPCOUNT | |
| 25728 | REP | 1 | | | 04,2544 | 03435 0 | | ZCADR | DSPMMJR | |
| 25728 | REP | 1 | | | 04,2545 | 60101 1 | | | | |
| 257285 | | | | | 04,2546 | 0 0003 1 | | REL.INT | | |



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25729 REP 208 LAST 389 04,2547 0 0154 1 ENDSMM TC MPAC

R2573 DSPMM PLACE MAJOR MODE CODE INTO MODREG

25735 REP 1 40,3435 SETLOC ENDSUB1

25736 REP 9 LAST 368 TO 369 23 797* COUNT 40/PIN

2574 REP 1 40,3435 3 4376 1 DSPMMJB CAP ND1 GETS HERE THRU DSPMM

2575 REP 64 LAST 389 40,3438 56 777 0 XCH DSPCOUNT

2576 REP 1 40,3437 54 140 0 TS DSPMMTEM SAVE DSPCOUNT

2579 REP 6 LAST 255 40,3440 11=011 1 CCS MODREG

2580 REP 47 LAST 384 40,3441 6 4712 1 AD ONE

25801 REP 4 LAST 355 40,3442 0 3211 0 TC DSPDECVN

25802 REP 1 40,3443 0 3445 1 TC +2

25803 REP 6 LAST 359 40,3444 0 2502 1 TC ZBLANK

2581 REP 2 LAST 370 40,3445 56 140 1 XCH DSPMMTEM

2582 REP 65 LAST 370 40,3446 54 777 1 TS DSPCOUNT

2583 REP 42 LAST 387 40,3447 0 5112 0 TC ENDOFJOB

R2584 RECALST IS ENTERED DIRECTLY AFTER DATA IS LOADED (OR RESEQUENCE VERR IS

R2585 EXECUTED), TERMINATE VERR IS EXECUTED, OR PROCEED WITHOUT DATA VERR IS

R2586 EXECUTED. IT WAKES UP JOB THAT DID TC ENDIDLE.

R2587 IF CADRSTOR NOT= +0, IT PUTS +0 INTO DSPLOCK, AND TURNS OFF KEY RLSE

R2588 LIGHT IF DSPLIST IS EMPTY (LEAVES KEY RLSE LIGHT ALONE IF NOT EMPTY).

2589 REP 9 LAST 387 40,3450 11=042 1 RECALST CCS CADRSTOR

2590 REP 1 40,3451 0 3453 0 TC RECAL1

2591 REP 43 LAST 370 40,3452 0 5112 0 TC ENDOFJOB

2592 REP 78 LAST 388 40,3453 3 4714 1 RECAL1 CAP ZERO

2593 REP 10 LAST 370 40,3454 57=042 0 XCH CADRSTOR

2594 REP 1 40,3455 0 0004 0 INHINT

2595 REP 1 40,3456 0 5074 1 TC JORWAKE

2596 REP 4 LAST 368 40,3457 11=014 1 CCS LOADSTAT

2597 REP 1 40,3460 0 3502 0 TC DOPROC

2598 REP 44 LAST 370 40,3461 0 5112 0 TC ENDOFJOB

2599 REP 1 40,3462 0 3500 1 TC DOTERM

2600 REP 22 LAST 357 40,3463 3 4711 1 CAP TWO

2601 REP 1 40,3464 50 064 0 RECAL2 INDEX LOCCTR

2602 REP 1 40,3465 6 0164 1 AD LOC

2603 REP 2 LAST 370 40,3466 50 064 0 INDEX LOCCTR

2604 REP 2 LAST 370 40,3467 54 164 0 TS LOC

26041 REP 15 LAST 365 40,3470 3 1002 1 CA NOUNREG

26042 REP 42 LAST 367 40,3471 54 001 1 TS L

26043 REP 20 LAST 365 40,3472 3 1001 1 CA VERRREG

26044 REP 3 LAST 370 40,3473 50 064 0 INDEX LOCCTR

26045 REP 207 LAST 370 40,3474 52 155 1 XCH MPAC

2605 40,3475 0 0003 1 RELINT

IF MODREG IS + OR +0, DISPLAY MODREG
IF MODREG IS -NZ, DO NOTHING
IF MODREG IS -0, BLANK MM
RESTORE DSPCOUNT

NORMAL EXIT IF KEYBOARD INITIATED

+ PROCEED WITHOUT DATA
- TERMINATE
-0 DATA IN OR RESEQUENCE

LOC IS + FOR BASIC JOBS

SAVE VERR IN MPAC, NOUN IN MPAC+1 AT
TIME OF RESPONSE TO ENDIDLE FOR
POSSIBLE LATER TESTING BY JOB THAT HAS
BEEN WAKED UP.



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| | | | | | | | | | | | |
|------|-----|----|------|-----|---------|---|------|---|--------|-----|----------|
| 2806 | REP | 6 | LAST | 382 | 40,3476 | 0 | 4473 | 0 | RSCAL3 | TC | RELDSP |
| 2807 | REP | 45 | LAST | 370 | 40,3477 | 0 | 5112 | 0 | | TC | ENDOPJOB |
| 2808 | REP | 77 | LAST | 370 | 40,3500 | 3 | 4714 | 1 | DOTERM | CAP | ZERO |
| 2809 | REP | 1 | | | 40,3501 | 0 | 3464 | 1 | | TC | RSCAL2 |
| 2810 | REP | 48 | LAST | 370 | 40,3502 | 3 | 4712 | 1 | DOPROC | CAP | ONE |
| 2811 | REP | 2 | LAST | 371 | 40,3503 | 0 | 3464 | 1 | | TC | RSCAL2 |



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R2612 MISCELLANEOUS SERVICE ROUTINES IN FIXED/FIXED

R2613 REP 1 4317 SETLOC ENDRUPP

R26135 REP 5 LAST 366 TO 368 63 111* COUNT 02/PIN

R2614 SETNCADR B CADR ARRIVES IN A. IT IS STORED IN NOLNCADR. ERANK BITS
R2615 ARE SET. B ADRES IS DERIVED AND PUT INTO NOLNADD.

R2616 REP 8 LAST 352 4317 55-017 1 SETNCADR TS NOLNCADR STORE ECADR

R2617 REP 18 LAST 296 4320 54 003 0 TS ERANK SET ERANK BITS

R2618 REP 1 4321 7 4373 0 MASK LOW8

R2619 REP 1 4322 8 4744 1 AD OCT1400

R2620 REP 29 LAST 347 4323 54 145 0 TS NOLNADD PUT B ADRES INTO NOLNADD

R2621 REP 118 LAST 369 4324 0 0002 0 TC 0

R2622 SETNADD GETS B CADR FROM NOLNCADR, SETS ERANK BITS, DERIVES

R2623 B ADRES AND PUTS IT INTO NOLNADD.

R2624 REP 9 LAST 372 4325 3 1017 0 SETNADD CA NOLNCADR

R2625 REP 7 LAST 341 4326 1 4320 0 TCP SETNCADR +1

R2626 SETERANK B CADR ARRIVES IN A. ERANK BITS ARE SET. B ADRES IS

R2627 DERIVED AND LEFT IN A.

R2628 REP 17 LAST 372 4327 54 003 0 SETERANK TS ERANK SET ERANK BITS

R2629 REP 2 LAST 372 4330 7 4373 0 MASK LOW8

R2630 REP 2 LAST 372 4331 6 4744 1 AD OCT1400 B ADRES LEFT IN A

R2631 REP 119 LAST 372 4332 0 0002 0 TC 0

R2632 4333 00016 0 R1D1 OCT 16 THESE 3 CONSTANTS FORM A PACKED TABLE.

R2633 4334 00011 1 R2D1 OCT 11 DONT SEPARATE.

R2634 4335 00004 0 R3D1 OCT 4

R2635 REP 7 LAST 356 4336 54 020 1 RIGHTS TS CYR

R2636 REP 8 LAST 372 4337 4 0020 1 CS CYR

R2637 REP 9 LAST 372 4340 4 0020 1 CS CYR

R2638 REP 10 LAST 372 4341 4 0020 1 CS CYR

R2639 REP 11 LAST 372 4342 4 0020 1 CS CYR

R2640 REP 12 LAST 372 4343 56 020 0 XCH CYR

R2641 REP 120 LAST 372 4344 0 0002 0 TC 0

R2642 REP 13 LAST 356 4345 54 022 0 LEPTS TS CYL

R2643 REP 14 LAST 372 4346 4 0022 0 CS CYL

R2644 REP 15 LAST 372 4347 4 0022 0 CS CYL

R2645 REP 16 LAST 372 4350 4 0022 0 CS CYL

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| | | | | | | |
|------|---------|----------|------|----------|----------|--------------|
| 2646 | REP 17 | LAST 372 | 4351 | 4 0022 0 | CS | CYL |
| 2647 | REP 18 | LAST 373 | 4352 | 56 022 1 | XCH | CYL |
| 2648 | REP 121 | LAST 372 | 4353 | 0 0002 0 | TC | 0 |
| 2649 | | | 4354 | 6 0000 1 | SLEPTS | DOUBLE |
| 2650 | | | 4355 | 6 0000 1 | | DOUBLE |
| 2651 | | | 4356 | 6 0000 1 | | DOUBLE |
| 2652 | | | 4357 | 6 0000 1 | | DOUBLE |
| 2653 | | | 4360 | 6 0000 1 | | DOUBLE |
| 2654 | REP 122 | LAST 373 | 4361 | 0 0002 0 | TC | 0 |
| 2655 | | | 4362 | 00037 0 | LOWS | OCT 37 |
| 2656 | | | 4363 | 01740 0 | MIDS | OCT 1740 |
| 2657 | | | 4364 | 76000 0 | HIS | OCT 76000 |
| 2658 | REP 13 | LAST 369 | 4365 | 0 5027 1 | TCNOVAC | TC NOVAC |
| 2659 | REP 13 | LAST 350 | 4366 | 0 5140 1 | TCWAIT | TC WAITLIST |
| 2660 | REP 14 | LAST 350 | 4367 | 0 5213 1 | TCSTKOV | TC TASKOVER |
| 2661 | REP 13 | LAST 261 | 4370 | 0 5042 1 | TCFINDVC | TC FINDVAC |
| 2662 | | | 4371 | 30000 1 | CHRPRI | OCT 30000 |
| 2663 | | | 4372 | 03777 0 | LOW11 | OCT 3777 |
| 2664 | REP 6 | LAST 341 | 4372 | | B12-1 | EQUALS LOW11 |
| 2665 | | | 4373 | 00377 1 | LOWS | OCT 377 |
| 2667 | | | 4374 | 00023 0 | VD1 | OCT 23 |
| 2668 | | | 4375 | 00021 1 | ND1 | OCT 21 |
| 2669 | | | 4376 | 00025 0 | MD1 | OCT 25 |
| 2670 | | | 4377 | 00012 1 | BINCON | DEC 10 |
| 2671 | REP 28 | LAST 317 | 4400 | 3 4704 0 | FALTON | CA BIT7 |
| 2672 | | | 4401 | 0 0006 1 | EXTEND | |
| 2673 | REP 11 | LAST 362 | 4402 | 05 011 1 | WOR | DSALMOUT |
| 2674 | REP 123 | LAST 373 | 4403 | 0 0002 0 | TC | 0 |
| 2675 | REP 29 | LAST 373 | 4404 | 4 4704 1 | FALTOP | CS BIT7 |
| 2676 | | | 4405 | 0 0006 1 | EXTEND | |
| 2677 | REP 12 | LAST 373 | 4406 | 03 011 1 | WAND | DSALMOUT |
| 2678 | REP 124 | LAST 373 | 4407 | 0 0002 0 | TC | 0 |
| 2679 | REP 17 | LAST 359 | 4410 | 3 4706 1 | RELDSPN | CAP BIT5 |
| 2680 | | | 4411 | 0 0006 1 | EXTEND | |
| 2681 | REP 13 | LAST 373 | 4412 | 05 011 1 | WOR | DSALMOUT |
| 2682 | REP 125 | LAST 373 | 4413 | 0 0002 0 | TC | 0 |

THESE 3 CONSTANTS FORM A PACKED TABLE, DONT SEPARATE, MUST STAY HERE

EXEC PRIORITY OF CHARIN

THESE 3 CONSTANTS FORM A PACKED TABLE, DONT SEPARATE.

TURN ON OPERATOR ERROR LIGHT

BIT 7 OF CHANNEL 11

TURN OFF OPERATOR ERROR LIGHT

BIT 7 OF CHANNEL 11

TURN ON KEY RELEASE LIGHT

BIT 5 OF CHANNEL 11

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| | | | | | | | | | |
|-------|--|----------|--|------|----------|----------|------------|--------|---|
| 2683 | | | | 4414 | 0 0006 1 | LODSAMPT | EXTEND | | |
| 2684 | REP 10 | LAST 267 | | 4415 | 3 0025 0 | DCA | TIME2 | | |
| 2685 | REP 5 | LAST 276 | | 4416 | 52 014 0 | D/CH | SAMPTIME | | |
| 2686 | REP 126 | LAST 373 | | 4417 | 0 0002 0 | TC | 0 | | |
| 2687 | | | | 4420 | 0 0006 1 | TPSL1 | EXTEND | | |
| 2688 | REP 208 | LAST 370 | | 4421 | 3 0156 0 | DCA | MPAC +1 | | SHIFTS MPAC, +1, +2 LEFT 1 |
| 2689 | REP 209 | LAST 374 | | 4422 | 20 156 1 | DAS | MPAC +1 | | LEAVES O/PIND SET TO +/- 1 FOR O/P/UP |
| 2690 | REP 210 | LAST 374 | | 4423 | 6 0154 1 | AD | MPAC | | |
| 2691 | REP 211 | LAST 374 | | 4424 | 26 154 0 | ADS | MPAC | | |
| 2692 | | | | 4425 | 54 007 1 | TS | 7 | | TS A DOES NOT CHANGE A ON O/P/UP. |
| 2693 | REP 127 | LAST 374 | | 4426 | 0 0002 0 | TC | 0 | | NO NET O/P/UP |
| 2694 | REP 7 | LAST 346 | | 4427 | 54 162 0 | TS | MPAC+8 | | MPAC +8 SET TO +/-1 FOR O/P/UP |
| 2695 | REP 128 | LAST 374 | | 4430 | 0 0002 0 | TC | 0 | | |
| R2696 | IF MPAC, +1 ARE EACH +NZ OR +0 AND C(A)=-0, SHORTMP WRONGLY GIVES +0. | | | | | | | | |
| R2697 | IF MPAC, +1 ARE EACH -NZ OR -0 AND C(A)=+0, SHORTMP WRONGLY GIVES +0. | | | | | | | | |
| R2698 | PRSHRIMP FIXES FIRST CASE ONLY, BY MERELY TESTING C(A) AND IF IT = -0, | | | | | | | | |
| R2699 | SETTING RESULT TO -0. | | | | | | | | |
| R2700 | (DO NOT USE PRSHRIMP UNLESS MPAC, +1 ARE EACH +NZ OR +0, AS THEY ARE | | | | | | | | |
| R2701 | WHEN THEY CONTAIN THE SP CONSTANTS.) | | | | | | | | |
| 2702 | REP 2 | LAST 68 | | 4431 | 54 135 1 | PRSHRIMP | TS | MPTEMP | |
| 2703 | REP 121 | LAST 369 | | 4432 | 10 000 0 | CCS | A | | |
| 2704 | REP 3 | LAST 374 | | 4433 | 3 0135 0 | CA | MPTEMP | | C(A) +, DO REGULAR SHORTMP |
| 2705 | REP 8 | LAST 353 | | 4434 | 1 7257 1 | TCF | SHORTMP +1 | | C(A) +0, DO REGULAR SHORTMP |
| 2706 | | | | 4435 | 1 4433 0 | TCF | -2 | | C(A) -, DO REGULAR SHORTMP |
| 2707 | REP 78 | LAST 371 | | 4436 | 4 4714 0 | CS | ZERO | | C(A) -0, FORCE RESULT TO -0 AND RETURN. |
| 2708 | REP 212 | LAST 374 | | 4437 | 54 154 0 | TS | MPAC | | |
| 2709 | REP 213 | LAST 374 | | 4440 | 54 155 1 | TS | MPAC +1 | | |
| 2710 | REP 214 | LAST 374 | | 4441 | 54 156 1 | TS | MPAC +2 | | |
| 2711 | REP 129 | LAST 374 | | 4442 | 0 0002 0 | TC | 0 | | |
| 2712 | REP 26 | LAST 292 | | 4443 | 3 4705 1 | FLASHON | CAF | BIT6 | TURN ON V/N FLASH |
| 2713 | | | | 4444 | 0 0006 1 | EXTEND | | | BIT 6 OF CHANNEL 11 |
| 2714 | REP 14 | LAST 373 | | 4445 | 05 011 1 | WOR | DSALMOUT | | |
| 2715 | REP 130 | LAST 374 | | 4446 | 0 0002 0 | TC | 0 | | |
| 2716 | REP 27 | LAST 374 | | 4447 | 4 4705 0 | FLASHOFF | CS | BIT6 | TURN OFF V/N FLASH |
| 2717 | | | | 4450 | 0 0006 1 | EXTEND | | | |
| 2718 | REP 15 | LAST 374 | | 4451 | 03 011 1 | WAND | DSALMOUT | | BIT 6 OF CHANNEL 11 |
| 2719 | REP 131 | LAST 374 | | 4452 | 0 0002 0 | TC | 0 | | |



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P2720 INTERNAL USE OF KEYBOARD AND DISPLAY PROGRAM

R2721 USER MUST SCHEDULE CALLS TO NVSUB SO THAT THERE IS NO CONFLICT OF USE OR
 R2722 CONFUSION TO OPERATOR. THE OLD QDABLOCK (INTERNAL/INTERNAL INTERLOCK)
 R2723 HAS BEEN REMOVED AND THE INTERNAL USER NO LONGER HAS THE PROTECTION THIS
 R2724 OFFERED.

R2725 THERE ARE TWO WAYS A JOB CAN BE PUT TO SLEEP BY THE KEYBOARD + DISPLAY
 R2726 PROGRAM. 1) BY ENDIDLE

R2727 2) BY NVSUBRUSY

R2728 THE BASIC CONVENTION IS THAT ONLY ONE JOB WILL BE PERMITTED ASLEEP VIA
 R2729 THE KEYBOARD + DISPLAY PROGRAM AT A TIME. IF A JOB ATTEMPTS TO GO TO
 R2730 SLEEP BY MEANS OF (1) OR (2) AND THERE IS ALREADY A JOB ASLEEP THAT WAS
 R2731 PUT TO SLEEP BY (1) OR (2), THEN AN ABORT IS CAUSED.

R2732 THE CALLING SEQUENCE FOR NVSUB IS

R2733 CAP V/N

R2734 L TC NVSUB

R2735 L+1 RETURN HERE IF OPERATOR HAS INTERVENED

R2736 L+2 RETURN HERE AFTER EXECUTION

R2737 A ROUTINE CALLED NVSUBRUSY IS PROVIDED (USE IS OPTIONAL) TO PUT
 R2738 YOUR JOB TO SLEEP UNTIL THE OPERATOR RELEASES THE KEYBOARD + DISPLAY
 R2739 SYSTEM. NVSUBRUSY ALSO TURNS ON THE KEY RELEASE LIGHT.

R2740 NVSUBRUSY CANNOT BE CALLED FROM ERASABLE OR P/P MEMORY,
 R2741 SINCE JOBSLEEP AND JOBSAGE CAN HANDLE ONLY FIXED BANKS.

R2742 THE CALLING SEQUENCE IS

R2743 CAP WAKECADR

R2744 TC NVSUBRUSY

R2745

R2746 NVSUBRUSY IS INTENDED FOR USE WHEN AN INTERNAL PROGRAM FINDS THE OPERATOR
 R2747 IS USING THE KEYBOARD + DISPLAY PROGRAM (BY HIS OWN INITIATION). IT IS

R2748 NOT INTENDED FOR USE WHEN ONE INTERNAL PROGRAM FINDS ANOTHER INTERNAL

R2749 PROGRAM USING THE KEYBOARD + DISPLAY PROGRAM.

R2750 NVSUBRUSY ABORTS (WITH CODE 01208) IF A SECOND JOB ATTEMPTS TO GO TO

R2751 SLEEP IN PINBALL. IN PARTICULAR, IF AN ATTEMPT IS MADE TO GO TO NVSUBRUSY

R2752 WHEN

R2753 1) DSPLIST NOT= +0. THIS IS THE CASE WHERE THE CAPACITY OF THE DSPLIST
 R2754 IS EXCEEDED.

R2755 2) CADRSTOR NOT= +0. THIS INDICATES THAT A JOB IS ALREADY USING



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R2756 ENDDLE. (-NZ INDICATE A JOB IS ALREADY ASLEEP DUE TO ENDDLE.)

| | | | | | | | | | | |
|------|-----|-----|----------|------|-------|------|---|----------|-----------|----------|
| 2757 | REP | 1 | | 4453 | 4 | 4460 | 0 | PRENVBSY | CS | 2K+3 |
| 2758 | REP | 132 | LAST 374 | 4454 | 6 | 0002 | 0 | AD | Q | |
| 2759 | REP | 2 | LAST 367 | 4455 | 6 | 0004 | 0 | AD | FRANK | |
| 2760 | REP | 32 | LAST 368 | 4456 | 6 | 4574 | 0 | NVLSUBSY | TC | POSTJUMP |
| 2761 | REP | 1 | | 4457 | 10550 | 0 | | CADR | NVLSUBSY1 | |
| 2762 | | | | 4460 | 02003 | 0 | | 2K+3 | OCT | 2003 |

SPECIAL ENTRANCE FOR ROUTINES IN FIXED BANKS ONLY DESIRING THE PCADR OF (LOC FROM WHICH THE TC PRENVBSY WAS DONE) -2 TO BE ENTERED.

R27625 NVLSUBSY1 MUST BE IN BANK 27 OR LOWER, SO IT WILL PUT CALLER TO SLEEP WITH HIS PROPER SUPERBITS.

| | | | | | | | | | | |
|-------|-----|---|------------------|---------|---|--|----|--------|--------|----|
| 2763 | REP | 1 | | 04,2550 | | | | SETLOC | ENDSPM | +1 |
| 27635 | REP | 2 | LAST 369 TO 370' | | 9 | | 9* | COUNT | 07/PIN | |

| | | | | | | | | | | |
|------|-----|----|----------|---------|----|------|---|-----------|----------|----------|
| 2764 | REP | 43 | LAST 370 | 04,2550 | 54 | 001 | 1 | NVLSUBSY1 | TS | L |
| 2769 | REP | 2 | LAST 367 | 04,2551 | 0 | 4234 | 0 | TC | ISCADR+0 | |
| 2770 | REP | 2 | LAST 367 | 04,2552 | 0 | 4240 | 0 | TC | ISLIST+0 | |
| 2771 | REP | 3 | LAST 352 | 04,2553 | 0 | 4410 | 0 | TC | RELDSPON | |
| 2772 | REP | 44 | LAST 376 | 04,2554 | 3 | 0001 | 0 | CA | L | |
| 2773 | REP | 3 | LAST 367 | 04,2555 | 55 | 043 | 0 | TS | DSPLIST | |
| 2774 | REP | 2 | LAST 367 | 04,2556 | 0 | 5070 | 0 | ENDNVBSY | TC | JOBSLEEP |

ABORT IF CADRSTOR NOT= +0.
ABORT IF DSPLIST NOT= +0.

R2775 NVSWAIT IS A SPECIAL ENTRANCE FOR ROUTINES IN FIXED BANKS ONLY. IF SYSTEM IS NOT BUSY, IT EXECUTES V/N AND RETURNS TO L+1 (L= LOC FROM WHICH THE TC NVSWAIT WAS DONE). IF SYSTEM IS BUSY, IT PUTS CALLING JOB TO SLEEP WITH L-1 GOING INTO LIST FOR EVENTUAL WAKING UP WHEN SYSTEM IS NOT BUSY.

| | | | | | | | | | | |
|-------|-----|---|------------------|------|----|--|------|--------|----------|----|
| 2780 | REP | 1 | | 4461 | | | | SETLOC | NVLSUBSY | +3 |
| 27805 | REP | 6 | LAST 372 TO 376' | | 98 | | 209* | COUNT | 02/PIN | |

| | | | | | | | | | | |
|-------|-----|-----|----------|------|----|------|---|---------|----------|---|
| 2781 | REP | 1 | | 4461 | 22 | 007 | 0 | NVSWAIT | LXCH | 7 |
| 2782 | REP | 9 | LAST 369 | 4462 | 54 | 123 | 0 | TS | NVTEMP | |
| 2783 | REP | 33 | LAST 368 | 4463 | 3 | 4675 | 1 | CAF | BIT14 | |
| 27831 | REP | 10 | LAST 368 | 4464 | 7 | 1021 | 1 | MASK | MONSAVE1 | |
| 27832 | REP | 8 | LAST 368 | 4465 | 6 | 1012 | 0 | AD | DSBLOCK | |
| 27833 | REP | 122 | LAST 374 | 4466 | 10 | 000 | 0 | CCS | A | |
| 27834 | REP | 1 | | 4467 | 1 | 4471 | 0 | TCF | NVSWT1 | |
| 2784 | REP | 1 | | 4470 | 1 | 4200 | 0 | TCF | NVSRCON | |

ZERO NVMONOPT OPTIONS

EXTERNAL MONITOR BIT

BUSY
FREE. NVSWR WILL SAVE L+1 FOR RETURN AFTER EXECUTION.
L+2. PRENVBSY WILL PUT L-1 INTO LIST AND GO TO SLEEP.

R2785
2786 REP 133 LAST 376 4471 24 002 0 NVSWT1 INCR 0
2787 REP 1 4472 1 4453 0 TCF PRENVBSY
R2788 RELDSP IS USED BY VPROG, VBTM, VPROEXEC, VPROWAIT, VPRELDSP, EXTENDED
R2789 VERB DISPATCHER, VRESEQ, RECALST.
R2790 RELDSP1 IS USED BY MONITOR SET UP, VPRELDSP.
2791 REP 134 LAST 376 4473 56 002 0 RELDSP XCH 0

SET DSBLOCK TO +0, TURN RELDSP LIGHT

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| | | | | | | | | | | |
|-------|-----|-----|------|------|------|-----|------|----|----------|----------|
| 2792 | REP | 1 | | 4474 | 54 | 144 | 1 | TS | RELST | |
| 27921 | REP | 34 | LAST | 376 | 4475 | 4 | 4675 | 0 | CS | BIT14 |
| 27922 | | | | | 4476 | 0 | 0004 | 0 | INHINT | |
| 27923 | REP | 11 | LAST | 376 | 4477 | 7 | 1021 | 1 | MASK | MNSAVB1 |
| 27924 | REP | 12 | LAST | 377 | 4500 | 55 | 021 | 1 | TS | MNSAVB1 |
| 2793 | REP | 4 | LAST | 376 | 4501 | 11 | 043 | 0 | CCS | DSPLIST |
| 2794 | | | | | 4502 | 0 | 4504 | 1 | TC | +2 |
| 2795 | REP | 1 | | | 4503 | 0 | 4507 | 1 | TC | RELDSP2 |
| 2796 | REP | 70 | LAST | 374 | 4504 | 3 | 4714 | 1 | CAP | ZERO |
| 2797 | REP | 5 | LAST | 377 | 4505 | 57 | 043 | 1 | XCH | DSPLIST |
| 2799 | REP | 2 | LAST | 370 | 4506 | 0 | 5074 | 1 | TC | JOBWAKB |
| 2800 | | | | | 4507 | 0 | 0003 | 1 | RELDSP2 | RELINT |
| 2801 | REP | 16 | LAST | 373 | 4510 | 4 | 4766 | 0 | CS | BITS |
| 2802 | | | | | 4511 | 0 | 0006 | 1 | EXTEND | |
| 2803 | REP | 16 | LAST | 374 | 4512 | 03 | 011 | 1 | WAND | DSALMOUT |
| 2804 | REP | 80 | LAST | 377 | 4513 | 3 | 4714 | 1 | CAP | ZERO |
| 2805 | REP | 9 | LAST | 376 | 4514 | 55 | 012 | 1 | TS | DSPLCK |
| 2807 | REP | 2 | LAST | 377 | 4515 | 0 | 0144 | 0 | TC | RELST |
| 2808 | REP | 135 | LAST | 376 | 4516 | 56 | 002 | 0 | RELDSP1 | XCH |
| 2809 | REP | 3 | LAST | 377 | 4517 | 54 | 144 | 1 | TS | RELST |
| A2810 | | | | | | | | | | |
| A2811 | | | | | | | | | | |
| 2812 | REP | 6 | LAST | 377 | 4520 | 11 | 043 | 0 | CCS | DSPLIST |
| 2813 | | | | | 4521 | 0 | 4523 | 1 | TC | +2 |
| 2814 | REP | 2 | LAST | 377 | 4522 | 0 | 4507 | 1 | TC | RELDSP2 |
| 2815 | REP | 81 | LAST | 377 | 4523 | 3 | 4714 | 1 | CAP | ZERO |
| 2816 | REP | 10 | LAST | 377 | 4524 | 55 | 012 | 1 | TS | DSPLCK |
| 2817 | REP | 4 | LAST | 377 | 4525 | 0 | 0144 | 0 | TC | RELST |
| 2818 | | | | | 4526 | | | | ENDPINRP | EQUALS |

OFF, SEARCH DSPLIST

TURN OFF EXTERNAL MONITOR BIT

LIST EMPTY

TURN OFF KEY RELEASE LIGHT
(BIT 5 OF CHANNEL 11)

SET DSPLCK TO +0. NO DSPLIST SEARCH.
TURN KEY RLSE LIGHT OFF IF DSPLIST IS
EMPTY. LEAVE KEY RLSE LIGHT ALONE IF
DSPLIST IS NOT EMPTY.

+ NOT EMPTY. LEAVE KEY RLSE LIGHT ALONE
+0 EMPTY. TURN OFF KEY RLSE LIGHT
- NOT EMPTY. LEAVE KEY RLSE LIGHT ALONE



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L PINBALL GAME BUTTONS AND LIGHTS

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P28181 PINTEST IS NEEDED FOR AUTO CHECK OF PINBALL.

28182 REF 2 LAST 230 43,2002 PINTEST EQUALS LST2PAN

L PINBALL GAME BUTTONS AND LIGHTS

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P2819 VBTSTLTS TURNS ON ALL DISPLAY PANEL LIGHTS. AFTER 5 SEC, IT TURNS
 P2820 OFF THE CAUTION AND STATUS LIGHTS.

| | | | | | | | | | |
|-------|-----|----|------|------------|---------|--------|--------------------|-------------------|--|
| 2821 | REP | 1 | | 41,3603 | | | | SETLOC ENDVSB1 +1 | |
| 28215 | REP | 8 | LAST | 364 TO 386 | 61 | 899* | | COUNT 41/PIN | |
| 2822 | | | | 41,3603 | 0 | 0004 | 0 | VBTSTLTS INHINT | |
| 2823 | REP | 32 | LAST | 369 | 41,3604 | 4 | 4712 | CS BIT1 | SET BIT 1 OF IMODES33 SO IMMCON WONT |
| 2824 | REP | 20 | LAST | 183 | 41,3605 | 7 | 1321 | MARK IMODES33 | TURN OUT ANY LAMPS. |
| 2825 | REP | 33 | LAST | 379 | 41,3606 | 6 | 4712 | AD BIT1 | |
| 2826 | REP | 21 | LAST | 379 | 41,3607 | 55=321 | 1 | TS IMODES33 | |
| 2827 | REP | 1 | | 41,3610 | 3 | 3644 | 1 | CAP TSTCON1 | TURN ON UPLINK ACTIVITY, TEMP, KEY RLSB, |
| 2828 | | | | 41,3611 | 0 | 0006 | 1 | EXTEND | V/N FLASH, OPERATOR ERROR. |
| 2829 | REP | 17 | LAST | 377 | 41,3612 | 05 | 011 | WOR DSALMOUT | |
| 2830 | REP | 1 | | 41,3613 | 3 | 3645 | 0 | CAP TSTCON2 | TURN ON NO ATT, GIMRAL LOCK, TRACKER, |
| 2831 | REP | 29 | LAST | 365 | 41,3614 | 55=036 | 1 | TS DSPTAB +11D | PROG ALM. |
| 2832 | REP | 20 | LAST | 299 | 41,3615 | 3 | 4701 | CAP BIT10 | TURN ON TEST ALARM OUTBIT . |
| 2833 | | | | 41,3616 | 0 | 0006 | 1 | EXTEND | |
| 2834 | REP | 3 | LAST | 186 | 41,3617 | 05 | 013 | WOR CHAN13 | |
| 2835 | REP | 3 | LAST | 312 | 41,3620 | 3 | 4377 | CAP TEN | |
| 2836 | REP | 1 | | 41,3621 | 54 | 117 | 1 | TS ERONT | |
| 2837 | REP | 1 | | 41,3622 | 4 | 3642 | 0 | CS FULLDSP | |
| 2838 | REP | 2 | LAST | 379 | 41,3623 | 50 | 117 | INDEX ERONT | |
| 2839 | REP | 30 | LAST | 379 | 41,3624 | 55=023 | 0 | TS DSPTAB | |
| 2840 | REP | 3 | LAST | 379 | 41,3625 | 10 | 117 | CCS ERONT | |
| 2841 | REP | 1 | | 41,3626 | 0 | 3621 | 1 | TC TSTLTS1 | |
| 2842 | REP | 1 | | 41,3627 | 4 | 3643 | 1 | CS FULLDSP1 | |
| 2843 | REP | 31 | LAST | 379 | 41,3630 | 55=024 | 1 | TS DSPTAB +1 | TURN ON 3-PLUS SIGNS |
| 2844 | REP | 32 | LAST | 379 | 41,3631 | 55=027 | 1 | TS DSPTAB +4 | |
| 2845 | REP | 33 | LAST | 379 | 41,3632 | 55=031 | 0 | TS DSPTAB +6 | |
| 2846 | REP | 3 | LAST | 199 | 41,3633 | 3 | 4717 | CAP ELEVEN | |
| 2847 | REP | 9 | LAST | 365 | 41,3634 | 55=016 | 0 | TS NOUT | |
| 2848 | REP | 1 | | 41,3635 | 3 | 3647 | 1 | CAP SHOLTS | |
| 2851 | REP | 14 | LAST | 373 | 41,3636 | 0 | 5140 | TC WAITLIST | |
| 2852 | REP | 34 | LAST | 379 | | 1023 | | BRANK= DSPTAB | |
| 2853 | REP | 1 | | 41,3637 | | 03650 | 1 | ZCADR TSTLTS2 | |
| 2853 | REP | 1 | | 41,3640 | | 82102 | 0 | | |
| 2854 | REP | 46 | LAST | 371 | 41,3641 | 0 | 5112 | TC ENDOFJCH | DSBLOCK IS LEFT BUSY (FROM KEYBOARD |
| A2855 | | | | | | | | | ACTION) UNTIL TSTLTS3 TO INSURE THAT |
| A2856 | | | | | | | | | LIGHTS TEST WILL BE SEEN. |
| 2857 | | | | 41,3642 | 05675 | 0 | FULLDSP OCT 05675 | | DISPLAY ALL 8'S |
| 2858 | | | | 41,3643 | 07675 | 1 | FULLDSP1 OCT 07675 | | DISPLAY ALL 8'S AND * |
| 2859 | | | | 41,3644 | 00175 | 1 | TSTCON1 OCT 00175 | | |
| A2860 | | | | | | | | | UPLINK ACTIVITY, TEMP, KEY RLSB, |
| A2861 | | | | | | | | | V/N FLASH, OPERATOR ERROR. |
| 2862 | | | | 41,3645 | 40650 | 0 | TSTCON2 OCT 40650 | | DSPTAB+11D BITS 4,6,8,9. |



L PINBALL GAME BUTTONS AND LIGHTS

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| | | | | | | | | | | |
|-------|-----|----|------|-----|---------|--------|---|---------|----------|-------------|
| A2863 | | | | | 41,3646 | 00115 | 1 | TSTCON3 | OCT | 00115 |
| 2864 | | | | | | | | | | |
| A2865 | | | | | | | | | | |
| 2866 | | | | | 41,3647 | 00764 | 1 | SHLTS | OCT | 764 |
| 2867 | REP | 4 | LAST | 369 | 41,3650 | 3 4371 | 0 | TSTLTS2 | CAP | CHRPRIO |
| 2868 | REP | 14 | LAST | 373 | 41,3651 | 0 5027 | 1 | | TC | NOVAC |
| 2869 | REP | 35 | LAST | 379 | | 1023 | | | BRANK | DSPTAB |
| 2870 | REP | 1 | | | 41,3652 | 03655 | 1 | | 2CADR | TSTLTS3 |
| 2870 | REP | 1 | | | 41,3653 | 62102 | 0 | | | |
| 2871 | REP | 15 | LAST | 373 | 41,3654 | 0 5213 | 1 | | TC | TAKOVER |
| 2872 | REP | 1 | | | 41,3655 | 4 3646 | 1 | TSTLTS3 | CS | TSTCON3 |
| 2873 | | | | | 41,3656 | 0 0004 | 0 | | | |
| 2874 | | | | | 41,3657 | 0 0006 | 1 | | | |
| 2875 | REP | 18 | LAST | 379 | 41,3660 | 03 011 | 1 | | EXTEND | |
| 2876 | REP | 21 | LAST | 379 | 41,3661 | 4 4701 | 1 | | WAND | DSALMOUT |
| 2877 | | | | | 41,3662 | 0 0006 | 1 | | CS | BIT10 |
| 2878 | REP | 4 | LAST | 379 | 41,3663 | 03 013 | 0 | | EXTEND | |
| 28781 | REP | 22 | LAST | 297 | 41,3664 | 3 4707 | 0 | | WAND | CHAN13 |
| 28782 | | | | | 41,3665 | 0 0006 | 1 | | CAP | BIT4 |
| 28783 | REP | 23 | LAST | 243 | 41,3666 | 02 012 | 0 | | EXTEND | |
| 2879 | REP | 27 | LAST | 366 | 41,3667 | 6 4674 | 0 | | RAND | CHAN12 |
| 2880 | REP | 36 | LAST | 380 | 41,3670 | 55=036 | 1 | | AD | BIT15 |
| 2881 | REP | 1 | | | 41,3671 | 4 3713 | 0 | | TS | DSPTAB +11D |
| 2882 | REP | 22 | LAST | 379 | 41,3672 | 7 1321 | 1 | | CS | 13-11,1 |
| 2883 | REP | 7 | LAST | 251 | 41,3673 | 6 4763 | 1 | | MASK | IMODES33 |
| 2884 | REP | 23 | LAST | 380 | 41,3674 | 55=321 | 1 | | AD | PRIO16 |
| | | | | | | | | | TS | IMODES33 |
| 2885 | REP | 1 | | | 41,3675 | 4 3714 | 1 | | CS | OCTS5000 |
| 2888 | REP | 38 | LAST | 193 | 41,3676 | 7 1320 | 0 | | MASK | IMODES30 |
| 2887 | REP | 2 | LAST | 155 | 41,3677 | 6 4762 | 0 | | AD | PRIO15 |
| 2888 | REP | 39 | LAST | 380 | 41,3700 | 55=320 | 0 | | TS | IMODES30 |
| 2889 | REP | 33 | LAST | 218 | 41,3701 | 4 1331 | 0 | | CS | OPTMODES |
| 2890 | REP | 30 | LAST | 373 | 41,3702 | 7 4704 | 1 | | MASK | BIT7 |
| 2891 | REP | 34 | LAST | 380 | 41,3703 | 27=331 | 0 | | ADS | OPTMODES |
| am3 | | | | | 41,3704 | 0 0003 | 1 | | RELINT | |
| v94 | REP | 53 | LAST | 359 | 41,3705 | 0 4555 | 0 | | TC | RANKCALL |
| 2895 | REP | 1 | | | 41,3706 | 10537 | 1 | | CADR | DSPM |
| 2896 | REP | 4 | LAST | 384 | 41,3707 | 0 4220 | 0 | | TC | KILMONON |
| 2897 | REP | 5 | LAST | 365 | 41,3710 | 0 4447 | 1 | | TC | FLASHOFF |
| 2898 | REP | 33 | LAST | 376 | 41,3711 | 0 4574 | 0 | | TC | POSTJUMP |
| 2899 | REP | 1 | | | 41,3712 | 61372 | 0 | | CADR | TSTLTS4 |
| 1901 | | | | | 41,3713 | 16001 | 1 | | 13-11,1 | OCT |
| 2903 | | | | | 41,3714 | 55000 | 1 | | OCTS5000 | OCT |
| 1904 | | | | | 41,3715 | | | | ENDPINS2 | EQUALS |

NO ATT, GIMBAL LOCK, TRACKER, PROG ALM.
CHAN 11 BITS 1, 3, 4, 7.
UPLINK ACTIVITY, TEMP, OPERATOR ERROR.
5 SEC
CALLED BY WAITLIST

CALLED BY EXECUTIVE

TURN OFF UPLINK ACTIVITY, TEMP,
OPERATOR ERROR.
TURN OFF TEST ALARM QUITBIT

MAKE NO ATT FOLLOW BIT 4 OF CHANNEL 12
(NO ATT LIGHT ON IP IN COARSE ALIGN)

TURN OFF AUTO, HOLD, FREE, SPARE,
GIMBAL LOCK, SPARE, TRACKER, PROG ALM
SET BITS TO INDICATE ALL LAMPS OUT. TEST
LIGHTS COMPLETE.

15000.

REDISPLAY C(MODREG)

TURN ON KILL MONITOR BIT.
TURN OFF V/N FLASH.
DOES RELDSP AND GOES TO PINRNCH IF
ENDIDLE IS AWAITING OPERATOR RESPONSE.



L PINEBALL GAME BUTTONS AND LIGHTS

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| | | | | | | | | | |
|-------|-----|-----|------|-----|---------|----------|----------|---------|------------|
| 2952 | REP | 124 | LAST | 381 | 40,3552 | 4 0000 0 | ERPLUS | CS | A |
| 2953 | REP | 2 | LAST | 381 | 40,3553 | 7 3573 1 | | MASK | NOTBIT12 |
| 2954 | REP | 125 | LAST | 382 | 40,3554 | 4 0000 0 | | CS | A |
| 2955 | REP | 8 | LAST | 381 | 40,3555 | 50 117 0 | ERCOM | INDEX | ERCNT |
| 2956 | REP | 40 | LAST | 381 | 40,3556 | 55=023 0 | | TS | DSPDAB |
| 2957 | | | | | 40,3557 | 0 0003 1 | | REL.INT | |
| 2958 | REP | 7 | LAST | 382 | 40,3560 | 10 117 1 | | CCS | ERCNT |
| 2959 | REP | 1 | | | 40,3561 | 0 3540 0 | | TC | TSTAB +1 |
| 2960 | REP | 82 | LAST | 377 | 40,3562 | 3 4714 1 | | CAP | ZERO |
| 2961 | REP | 5 | LAST | 288 | 40,3563 | 54 375 1 | | TS | FAILREG |
| 29611 | REP | 8 | LAST | 382 | 40,3564 | 54 376 1 | | TS | FAILREG +1 |
| 29612 | REP | 7 | LAST | 382 | 40,3565 | 54 377 0 | | TS | FAILREG +2 |
| 2962 | REP | 2 | LAST | 80 | 40,3566 | 55=357 0 | | TS | SFAIL |
| 2963 | REP | 47 | LAST | 379 | 40,3567 | 0 5112 0 | | TC | ENDOPJOB |
| 2964 | | | | | 40,3570 | 00104 1 | ERCON | OCT | 104 |
| 2966 | | | | | 40,3571 | 00240 1 | BITS6,8 | OCT | 240 |
| 29665 | | | | | 40,3572 | 00050 1 | GL.NOATT | OCT | 00050 |
| 2967 | | | | | 40,3573 | 73777 1 | NOTBIT12 | OCT | 73777 |
| 2968 | | | | | 40,3574 | | ENDPINS1 | EQUALS | |

MIGHT WANT TO RESET CLASS, DECBRNCH, ETC.

CHAN 11 BITS 3,7.
UPLINK ACTIVITY, AND OPERATOR ERROR.

NO ATT AND GIMBAL LOCK LAMPS



L R60,R62

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1500 34,2002 BANK 34
 1501 REP 1 27,2000 SETLOC MANUVER
 1502 27,2000 BANK
 1503 REP 1 1146 EBANK= TEMPR60
 1504 REP 1 COUNT 27/R60
 R15041

R150411 R60CM
 R150413 REV 13 CONFORMS TO GSOP CHAPTER FOUR REVISION LOGIC 09 JAN 18, 1968
 R150415

1505 REP 1 27,2000 0 4604 1 R60CM TC MAKECADR
 1506 REP 2 LAST 383 27,2001 55=146 1 TS TEMPR60

R1507 INSERT PRIDSP CHECK WITH R22 (V06N49) WITH JERNINGS BRODEUR

| | | | | | | | | | | |
|------|-----|-----|------|-----|---------|----------|----------|-------|-----------|---|
| 1510 | REP | 26 | LAST | 374 | 27,2002 | 3 4705 1 | REDMANN | CAP | BIT6 | |
| 1511 | REP | 6 | LAST | 257 | 27,2003 | 7 0101 0 | | MASK | FLAGWRD5 | IS 3-AXIS FLAG SET |
| 1512 | REP | 126 | LAST | 382 | 27,2004 | 10 000 0 | | CCS | A | |
| 1513 | REP | 1 | | | 27,2005 | 1 2013 0 | | TOP | TORALL | YES |
| 1514 | REP | 9 | LAST | 286 | 27,2006 | 0 6006 1 | | TC | INTPRST | |
| 1515 | | | | | 27,2007 | 77624 1 | | CALL | | |
| 1516 | REP | 1 | | | 27,2010 | 56126 1 | | | VECPPOINT | TO COMPUTE FINAL ANGLES |
| 1517 | REP | 2 | LAST | 246 | 27,2011 | 01156 1 | | STORE | CPHI | STORE FINAL ANGLES - CPHI, CTHETA, CPSI |
| 1518 | | | | | 27,2012 | 77776 1 | | EXIT | | |
| 1519 | REP | 1 | | | 27,2013 | 3 2125 0 | TORALL | CAP | V06N18 | |
| 1520 | REP | 54 | LAST | 380 | 27,2014 | 0 4555 0 | | TC | RANKCALL | |
| 1521 | REP | 1 | | | 27,2015 | 21036 1 | | CADR | OCPEP2R | DISPLAY PLEASE PERFORM AUTO MANUVER |
| 1522 | REP | 1 | | | 27,2016 | 0 2114 1 | | TC | R61TEST | PROCEED |
| 1523 | REP | 1 | | | 27,2017 | 0 2023 1 | | TC | REDQMANC | ENTER I.E. FINISHED WITH R60 |
| 1524 | REP | 1 | | | 27,2020 | 1 2052 0 | | TOP | ENDMANU1 | |
| 1525 | REP | 1 | | | 27,2021 | 0 2056 0 | | TC | OKLINUS | TO CHECK FOR PRIORITY DISPLAYS |
| 1526 | REP | 48 | LAST | 382 | 27,2022 | 0 5112 0 | | TC | ENDOFJOB | |
| 1529 | REP | 29 | LAST | 383 | 27,2023 | 3 4705 1 | REDQMANC | CAP | BIT6 | |
| 1530 | REP | 7 | LAST | 383 | 27,2024 | 7 0101 0 | | MASK | FLAGWRD5 | IS 3-AXIS FLAG SET |
| 1531 | REP | 127 | LAST | 383 | 27,2025 | 10 000 0 | | CCS | A | |
| 1532 | REP | 1 | | | 27,2026 | 1 2034 0 | | TOP | TORALLC | YES |
| 1533 | REP | 10 | LAST | 383 | 27,2027 | 0 6006 1 | | TC | INTPRST | |
| 1534 | | | | | 27,2030 | 77624 1 | | CALL | | |
| 1535 | REP | 2 | LAST | 383 | 27,2031 | 56126 1 | | | VECPPOINT | TO COMPUTE FINAL ANGLES |
| 1536 | REP | 3 | LAST | 383 | 27,2032 | 01156 1 | | STORE | CPHI | STORE ANGLES |
| 1537 | | | | | 27,2033 | 77776 1 | | EXIT | | |
| 1538 | REP | 7 | LAST | 246 | 27,2034 | 3 4371 0 | TORALLC | CAP | PRIO30 | IS MODE AUTO AND CTL. GNC |



L 060,862

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| | | | | | | | | | |
|--------|-----|-----|------|---------|---------|--------|--------|----------|---------------------|
| 1539 | | | | 27,2035 | 0 0006 | 1 | EXTEND | | |
| 1540 | REP | 1 | | 27,2036 | 06 031 | 0 | ROR | CHAN31 | |
| 1541 | REP | 2 | LAST | 162 | 27,2037 | 7 7707 | 1 | MASK | 13,14,15 |
| 1542 | | | | 27,2040 | 0 0006 | 1 | EXTEND | | |
| 1543 | | | | 27,2041 | 1 2043 | 0 | BZF | +2 | AUTO, NON-FLASH N18 |
| 154301 | REP | 2 | LAST | 383 | 27,2042 | 1 2013 | 0 | TCP | TORALL |
| 1546 | REP | 2 | LAST | 383 | 27,2043 | 3 2125 | 0 | CAP | V08N18 |
| 1549 | REP | 65 | LAST | 383 | 27,2044 | 0 4555 | 0 | TC | BANKCALL |
| 1550 | REP | 1 | | | 27,2045 | 20602 | 1 | CADR | GODSPR |
| 1551 | REP | 2 | LAST | 383 | 27,2046 | 0 2056 | 0 | TC | CRCLINUS |
| 1552 | REP | 56 | LAST | 384 | 27,2047 | 0 4555 | 0 | STARTINV | TC |
| 1553 | REP | 1 | | | 27,2050 | 17547 | 1 | CADR | GOMANUR |
| 1555 | REP | 3 | LAST | 384 | 27,2051 | 1 2013 | 0 | ENDMANUV | TCP |
| 1566 | REP | 10 | LAST | 261 | 27,2052 | 0 5447 | 0 | ENDMANU1 | TC |
| 1567 | REP | 1 | | | 27,2053 | 00124 | 0 | ADRES | DOWNFLAG |
| 1568 | REP | 3 | LAST | 383 | 27,2054 | 31=146 | 0 | CAB | 3AXISFLAG |
| 1569 | REP | 5 | LAST | 357 | 27,2055 | 0 4577 | 0 | TC | TEMPR60 |
| 1570 | REP | 3 | LAST | 231 | 27,2056 | 4 0100 | 1 | CRCLINUS | CS |
| 1571 | REP | 19 | LAST | 365 | 27,2057 | 7 4677 | 1 | MASK | FLAGWRD4 |
| 1572 | REP | 128 | LAST | 383 | 27,2060 | 10 000 | 0 | CCS | BIT12 |
| 157201 | REP | 136 | LAST | 377 | 27,2061 | 0 0002 | 0 | TC | A |
| 157202 | REP | 137 | LAST | 384 | 27,2062 | 3 0002 | 0 | CA | O |
| 157204 | REP | 215 | LAST | 374 | 27,2063 | 54 156 | 1 | TS | MPAC +2 |
| 15721 | REP | 13 | LAST | 354 | 27,2064 | 4 6214 | 1 | CS | THREE |
| 157212 | REP | 2 | LAST | 69 | 27,2065 | 6 0133 | 0 | AD | BLF2 |
| 1573 | REP | 2 | LAST | 215 | 27,2066 | 55=053 | 1 | TS | TRASE1 |
| 1580 | REP | 5 | LAST | 260 | 27,2067 | 0 5301 | 0 | TC | FLASHING |
| 1581 | | | | | 27,2070 | 00071 | 1 | OCT | T1 |
| 1586 | REP | 32 | LAST | 381 | 27,2071 | 3 4704 | 0 | CAP | BIT7 |
| 1587 | REP | 1 | | | 27,2072 | 0 5415 | 1 | TC | LINUS |
| 1588 | REP | 216 | LAST | 384 | 27,2073 | 0 0156 | 0 | TC | MPAC +2 |
| 15881 | REP | 19 | LAST | 377 | 27,2074 | 3 4706 | 1 | RELINUS | CAP |
| 158812 | REP | 10 | LAST | 253 | 27,2075 | 7 0075 | 1 | MASK | BIT5 |
| 158813 | | | | | 27,2076 | 0 0006 | 1 | EXTEND | FLAGWRD1 |
| 158814 | REP | 1 | | | 27,2077 | 1 2111 | 0 | BZF | GOREDO20 |
| 158815 | REP | 13 | LAST | 261 | 27,2100 | 0 5435 | 0 | TC | UPFLAG |
| 158816 | REP | 1 | | | 27,2101 | 00077 | 1 | ADRES | PDSPPFLAG |
| 15882 | REP | 14 | LAST | 384 | 27,2102 | 0 5435 | 0 | TC | UPFLAG |
| 158821 | REP | 1 | | | 27,2103 | 00024 | 1 | ADRES | TARG1FLAG |
| 158822 | REP | 63 | LAST | 382 | 27,2104 | 3 4714 | 1 | CAP | ZPRO |

AUTO, NON-FLASH N18
NOT AUTO

SET UP NON-FLASHING V08 N18

FINISHED MANUEVER

RESET 3-AXIS FLAG
BIT 6 FLAG 5

IS PRIORITY DISPLAY FLAG SET

NO - EXIT

SAVE RETURN
OBTAIN LOCATION FOR RESTART.
HOLDS 0 OF LAST DISPLAY

1.7SPOT FOR RELINUS

GO SET BITS FOR PRIORITY DISPLAY

IS TRACK FLAG ON

NO

R60 PRICDSP FLAG

FOR R52

RESET TO ZERO, SINCE

L R60,R62

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| | | | | | | | | | |
|--------|-----|----|------|-----|---------|--------|---|----------|-------------|
| 158823 | REP | 21 | LAST | 253 | 27,2105 | 55-303 | 1 | TS | OPTIND |
| 15883 | REP | 1 | | | 27,2106 | 3 4761 | 0 | CAP | PRI014 |
| 15884 | REP | 3 | LAST | 240 | 27,2107 | 0 5103 | 0 | TC | PRICORNG |
| 15885 | REP | 3 | LAST | 384 | 27,2110 | 0 1053 | 0 | TC | TRASS1 |
| 15886 | REP | 6 | LAST | 384 | 27,2111 | 0 5301 | 0 | GOREDO20 | TC PHASCHNG |
| 15887 | | | | | 27,2112 | 00111 | 0 | OCT | 111 |
| 15888 | REP | 49 | LAST | 383 | 27,2113 | 0 5112 | 0 | TC | ENDOFJOB |
| 15889 | REP | 7 | LAST | 370 | 27,2114 | 3 1011 | 0 | R61TEST | CA MDREG |
| 15891 | | | | | 27,2115 | 0 0006 | 1 | EXTEND | |
| 15892 | REP | 2 | LAST | 383 | 27,2116 | 1 2052 | 0 | BZP | ENDMANU1 |
| 15893 | REP | 4 | LAST | 384 | 27,2117 | 3 0100 | 0 | CA | FLAGRD4 |
| 1590 | REP | 20 | LAST | 384 | 27,2120 | 7 4677 | 1 | MARK | BIT12 |
| 1591 | | | | | 27,2121 | 0 0006 | 1 | EXTEND | |
| 1592 | REP | 2 | LAST | 185 | 27,2122 | 1 4106 | 0 | BZP | GOTOPOOH |
| 1593 | REP | 1 | | | 27,2123 | 0 4550 | 0 | TC | GOTOV56 |
| 1594 | | | | | 27,2124 | 20100 | 1 | BIT14+7 | OCT 20100 |
| 1595 | | | | | 27,2125 | 01422 | 1 | V06N18 | VN 0618 |

OPTIND WAS SET TO -1 BY V379

RESTORE ORIGINAL PRIORITY

1.11 FOR PIKUP20

ARE WE IN P00. IF YES THIS MUST BE
VERB49 OR VERB89 SO DO ENDEXT.
RESET 3-AXIS d RETURN. USER DOES ENDEXT
ARE WE IN R61 (P20)

NO
YES



L R80,R82

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P1597 PROGRAM DESCRIPTION - VECPOINT

R1598 THIS INTERPRETIVE SUBROUTINE MAY BE USED TO POINT A SPACECRAFT AXIS IN A DESIRED DIRECTION. THE AXIS
 R1600 TO BE POINTED MUST APPEAR AS A HALF UNIT DOUBLE PRECISION VECTOR IN SUCCESSIVE LOCATIONS OF ERASABLE MEMORY
 R1602 BEGINNING WITH THE LOCATION CALLED SCAXIS. THE COMPONENTS OF THIS VECTOR ARE GIVEN IN SPACECRAFT COORDINATES.
 R1604 THE DIRECTION IN WHICH THIS AXIS IS TO BE POINTED MUST APPEAR AS A HALF UNIT DOUBLE PRECISION VECTOR IN
 R1606 SUCCESSIVE LOCATIONS OF ERASABLE MEMORY BEGINNING WITH THE ADDRESS CALLED POINTVSM. THE COMPONENTS OF THIS
 R1608 VECTOR ARE GIVEN IN STABLE MEMORY COORDINATES. WITH THIS INFORMATION VECPOINT COMPUTES A SET OF THREE GIMBAL
 R1610 ANGLES (25 COMPLIMENT) CORRESPONDING TO THE CROSS-PRODUCT ROTATION BETWEEN SCAXIS AND POINTVSM AND STORES THEM
 R1612 IN TMPAC) BEFORE RETURNING TO THE CALLER.

R1613 THIS ROTATION, HOWEVER, MAY BRING THE S/C INTO GIMBAL LOCK. WHEN POINTING A VECTOR IN THE Y-Z PLANE,
 R1615 THE TRANSDUCER AXIS, OR THE AOT FOR THE LEM, THE PROGRAM WILL CORRECT THIS PROBLEM BY ROTATING THE CROSS-
 R1617 PRODUCT ATTITUDE ABOUT POINTVSM BY A FIXED AMOUNT SUFFICIENT TO ROTATE THE DESIRED S/C ATTITUDE OUT OF GIMBAL
 R1619 LOCK. IF THE AXIS TO BE POINTED IS MORE THAN 40.6 DEGREES BUT LESS THAN 60.5 DEG FROM THE +X (OR -X) AXIS,
 R1621 THE ADDITIONAL ROTATION TO AVOID GIMBAL LOCK IS 35 DEGREES. IF THE AXIS IS MORE THAN 60.5 DEGREES FROM +X (OR -X)
 R1623 THE ADDITIONAL ROTATION IS 35 DEGREES. THE GIMBAL ANGLES CORRESPONDING TO THIS ATTITUDE ARE THEN COMPUTED AND
 R1625 STORED AS 25 COMPLIMENT ANGLES IN TMPAC) BEFORE RETURNING TO THE CALLER.

R1627 WHEN POINTING THE X-AXIS, OR THE THRUST VECTOR, OR ANY VECTOR WITHIN 40.6 DEG OF THE X-AXIS, VECPOINT
 R1629 CANNOT CORRECT FOR A CROSS-PRODUCT ROTATION INTO GIMBAL LOCK. IN THIS CASE A PLATFORM REALIGNMENT WOULD BE
 R1631 REQUIRED TO POINT THE VECTOR IN THE DESIRED DIRECTION. AT PRESENT NO INDICATION IS GIVEN FOR THIS SITUATION
 R1633 EXCEPT THAT THE FINAL MIDDLE GIMBAL ANGLE IN MPAC +2 IS GREATER THAN 59 DEGREES.

R1635 CALLING SEQUENCE -
 R1636 1) LOAD SCAXIS, POINTVSM
 R1637 2) CALL
 R1638 VECPOINT

R1639 RETURNS WITH

R1640 1) DESIRED OUTER GIMBAL ANGLE IN MPAC
 R1641 2) DESIRED INNER GIMBAL ANGLE IN MPAC +1
 R1642 3) DESIRED MIDDLE GIMBAL ANGLE IN MPAC +2
 R1643 ERASABLES USED -

R1644 1) SCAXIS 6
 R1645 2) POINTVSM 6
 R1646 3) HIS 18
 R1647 4) DEL 18
 R1648 5) COP 6
 R1649 6) VECOTEMP 1
 R1650 7) ALL OF VAC AREA 43

| | | | | |
|-------|-------|---------|----|--------------|
| R1651 | | TOTAL | 99 | |
| 1652 | REF 1 | 27,2000 | | SETLOC VECPT |
| 1653 | | 27,2128 | | RANK |

L R60,R62

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| Line | Op | Count | Label | Address | Value | Op | Label | Address | Value | Comments |
|-------|-----|-------|-------|---------|---------|----------|----------|----------|-------|--|
| 1854 | REP | 4 | LAST | 112 | R6,1661 | BRANK= | BCDU | | | |
| 1855 | REP | 1 | | | | COUNT | 27/VBCPT | | | |
| 1856 | | | | | 27,2126 | VBCPOINT | STO | BOV | | SAVE RETURN ADDRESS |
| 1857 | REP | 1 | | | 27,2127 | | | VBCQTEMP | | |
| 1858 | REP | 1 | | | 27,2130 | | | VBCLEAR | | AND CLEAR OV/PIND |
| 1859 | | | | | 27,2131 | VBCLEAR | AXC,2 | RTB | | |
| 1860 | REP | 2 | LAST | 112 | 27,2132 | | | MIS | | READ THE PRESENT CDU ANGLES AND |
| 1861 | REP | 1 | | | 27,2133 | | | HEADCDUK | | STORE THEM IN PD25, 26, 27 |
| 1862 | | | | | 27,2134 | STCALL | 2SD | | | |
| 1863 | REP | 1 | | | 27,2135 | | | CDUTDCM | | S/C AXES TO STABLE MEMBER AXES (MIS) |
| 1864 | | | | | 27,2136 | VLOAD | VXM | | | |
| 1865 | REP | 2 | LAST | 112 | 27,2137 | | | POINTVSM | | RESOLVE THE POINTING DIRECTION VP INTO |
| 1866 | REP | 3 | LAST | 387 | 27,2140 | | | MIS | | INITIAL S/C AXES (VP = POINTVSM) |
| 1867 | | | | | 27,2141 | UNIT | | | | |
| 1868 | | | | | 27,2142 | STORE | 2SD | | | |
| A1869 | | | | | | | | | | |
| 1870 | | | | | 27,2143 | VXV | UNIT | | | PD 28 29 30 31 32 33 |
| 1871 | REP | 2 | LAST | 112 | 27,2144 | | SCAXIS | | | TAKE THE CROSS PRODUCT VP X VI |
| 1872 | | | | | 27,2145 | BOV | VCOMP | | | WHERE VI = SCAXIS |
| 1873 | REP | 1 | | | 27,2146 | | PICKAXIS | | | |
| 1874 | REP | 2 | LAST | 112 | 27,2147 | STODL | CCP | | | CHECK MAGNITUDE |
| 1875 | | | | | 27,2150 | | 3SD | | | OF CROSS PRODUCT |
| 1876 | | | | | 27,2151 | DSU | RNN | | | VECTOR, IF LESS |
| 1877 | REP | 1 | | | 27,2152 | | DPS-14 | | | THAN R-14 ASSUME |
| 1878 | REP | 2 | LAST | 387 | 27,2153 | | PICKAXIS | | | UNIT OPERATION |
| 1879 | | | | | 27,2154 | VLOAD | DOT | | | INVALID. |
| 1880 | REP | 3 | LAST | 387 | 27,2155 | | SCAXIS | | | |
| 1881 | | | | | 27,2156 | | 2SD | | | |
| 1882 | | | | | 27,2157 | SL1 | ARCCOS | | | |
| 1883 | | | | | 27,2160 | COMMATX | CALL | | | NOW COMPUTE THE TRANSFORMATION FROM |
| 1884 | REP | 1 | | | 27,2161 | | DELCOMP | | | FINAL S/C AXES TO INITIAL S/C AXES MPI |
| 1885 | | | | | 27,2162 | AXC,1 | AXC,2 | | | |
| 1886 | REP | 4 | LAST | 387 | 27,2163 | | MIS | | | COMPUTE THE TRANSFORMATION FROM FINAL |
| 1887 | REP | 1 | | | 27,2164 | | DEL | | | S/C AXES TO STABLE MEMBER AXES |
| 1888 | | | | | 27,2165 | CALL | | | | MPS = MIS MPI |
| 1889 | REP | 1 | | | 27,2166 | | MCM3 | | | (IN PD LIST) |
| 1890 | | | | | 27,2167 | DLOAD | ABS | | | |
| 1891 | | | | | 27,2170 | | S | | | MPS8 = SIN(CPS1) 32 |
| 1892 | | | | | 27,2171 | DSU | RNN | | | |
| 1893 | REP | 1 | | | 27,2172 | | SINGIMC | | | = SIN(59 DEGS) 32 |
| 1894 | REP | 1 | | | 27,2173 | | PINDGIMR | | | /CPS1/ LESS THAN 59 DEGS |
| A1895 | | | | | | | | | | I.E. DESIRED ATTITUDE NOT IN GIMBAL LOCK |
| 1896 | | | | | 27,2174 | DLOAD | ABS | | | CHECK TO SEE IF WE ARE POINTING |
| 1897 | REP | 4 | LAST | 387 | 27,2175 | | SCAXIS | | | THE THRUST AXIS |
| 1898 | | | | | 27,2176 | DSU | RPL | | | |
| 1899 | REP | 1 | | | 27,2177 | | SINVR1 | | | SIN 49.4 DEGS 32 |

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| | | | | | | | | |
|-------|-----|---|------|-----|---------|---------|----------|----------------|
| 1700 | REP | 2 | LAST | 387 | 27,2200 | 56246 1 | | FINDGIMB |
| 1701 | | | | | 27,2201 | 77775 1 | | VLOAD |
| 1702 | | | | | 27,2202 | 77028 0 | | STADR |
| 1703 | REP | 5 | LAST | 387 | 27,2203 | 50442 0 | | STOVL MIS +12D |
| 1704 | | | | | 27,2204 | 77626 0 | | STADR |
| 1705 | REP | 6 | LAST | 388 | 27,2205 | 50450 0 | | STOVL MIS +6 |
| 1706 | | | | | 27,2206 | 77626 0 | | STADR |
| 1707 | REP | 7 | LAST | 388 | 27,2207 | 50456 0 | | STOVL MIS |
| 1708 | REP | 8 | LAST | 388 | 27,2210 | 03327 1 | | MIS +6 |
| 1709 | | | | | 27,2211 | 57444 1 | | BPL VCOMP |
| 1710 | REP | 1 | | | 27,2212 | 56213 1 | | IGSAXEX |
| 1711 | | | | | 27,2213 | 50035 1 | IGSAXEX | VXV BFN |
| 1712 | REP | 5 | LAST | 387 | 27,2214 | 03351 0 | | SCAXIS |
| 1713 | REP | 1 | | | 27,2215 | 56222 0 | | U=SCAXIS |
| A1714 | | | | | | | | |
| A1715 | | | | | | | | |
| 1716 | | | | | 27,2216 | 57575 1 | | VLOAD VCOMP |
| 1717 | REP | 6 | LAST | 388 | 27,2217 | 03351 0 | | SCAXIS |
| 1718 | REP | 3 | LAST | 387 | 27,2220 | 37343 1 | | STCALL COP |
| 1719 | REP | 1 | | | 27,2221 | 56225 1 | | CHEKAXIS |
| 1720 | | | | | 27,2222 | 77775 1 | U=SCAXIS | VLOAD |
| 1721 | REP | 7 | LAST | 388 | 27,2223 | 03351 0 | | SCAXIS |
| 1722 | REP | 4 | LAST | 388 | 27,2224 | 03343 0 | | STORE COP |
| 1723 | | | | | 27,2225 | 51545 1 | CHEKAXIS | DLOAD ABS |
| 1724 | REP | 8 | LAST | 388 | 27,2226 | 03351 0 | | SCAXIS |
| 1725 | | | | | 27,2227 | 51025 1 | | DSU BPL |
| 1726 | REP | 1 | | | 27,2230 | 16320 1 | | SINVEC2 |
| 1727 | REP | 1 | | | 27,2231 | 56235 0 | | PICKANG1 |
| 1728 | | | | | 27,2232 | 52145 0 | | DLOAD GOTO |
| 1729 | REP | 1 | | | 27,2233 | 16324 0 | | VECAN2 |
| 1730 | REP | 1 | | | 27,2234 | 56237 1 | | COMPMPN |
| A1731 | | | | | | | | |
| 1732 | | | | | 27,2235 | 77745 1 | PICKANG1 | DLOAD |
| 1733 | REP | 1 | | | 27,2236 | 16322 0 | | VECAN1 |
| 1734 | | | | | 27,2237 | 77624 1 | COMPMPN | CALL |
| 1735 | REP | 2 | LAST | 387 | 27,2240 | 44530 1 | | DELCOMP |
| 1736 | | | | | 27,2241 | 75160 1 | AXC,1 | AXC,2 |
| 1737 | REP | 9 | LAST | 388 | 27,2242 | 03320 0 | | MIS |
| 1738 | REP | 2 | LAST | 387 | 27,2243 | 03425 1 | | DEL |
| 1739 | | | | | 27,2244 | 77624 1 | | CALL |
| 1740 | REP | 2 | LAST | 387 | 27,2245 | 44304 0 | | NOM3 |
| A1741 | | | | | | | | |
| A1742 | | | | | | | | |
| 1743 | | | | | 27,2246 | 45160 1 | FINDGIMB | AXC,1 CALL |
| 1744 | | | | | 27,2247 | 00000 1 | | 0 |
| 1745 | REP | 1 | | | 27,2250 | 44655 1 | | DCMTCOU |
| 1746 | | | | | 27,2251 | 40234 0 | | RTR SETD |
| 1747 | REP | 1 | | | 27,2252 | 45547 0 | | VISTO2S |

IF SO, WE ARE TRYING TO POINT IT INTO GIMBAL LOCK, ABORT COULD GO HERE

STORE MFS (IN PD LIST) IN MIS

INNER GIMBAL AXIS IN FINAL S/C AXES LOCATE THE IG AXIS DIRECTION CLOSEST TO FINAL X S/C AXIS

FIND THE SHORTEST WAY OF ROTATING THE S/C OUT OF GIMBAL LOCK BY A ROTATION ABOUT +- SCAXIS, I.E. IF (IG (SGN MFS3) X SCAXIS . XP) LESS THAN 0, U = SCAXIS OTHERWISE U = -SCAXIS

ROTATE ABOUT -SCAXIS

ROTATE ABOUT + SCAXIS

SEE IF WE ARE POINTING THE AOT

SIN 29.5 DEGS \$2
IF SO, ROTATE 50 DEGS ABOUT +- SCAXIS
IF NOT, MUST BE POINTING THE TRANSPONDER OR SOME VECTOR IN THE Y, OR Z PLANE
IN THIS CASE ROTATE 35 DEGS TO GET OUT OF GIMBAL LOCK (VECAN2 \$360)

= 50 DEGS \$ 360

COMPUTE THE ROTATION ABOUT SCAXIS TO BRING MFS OUT OF GIMBAL LOCK

COMPUTE THE NEW TRANSFORMATION FROM DESIRED S/C AXES TO STABLE MEMBER AXES WHICH WILL ALIGN VI WITH VP AND AVOID GIMBAL LOCK

EXTRACT THE COMMANDED CDU ANGLES FROM THIS MATRIX

CONVERT TO 2'S COMPLEMENT



L R60,R62

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| | | | | | | | | | | | |
|------|-----|----|---------|---------|----------|---------|-------------|----------|-----|--|-------|
| 1748 | | | 27,2253 | 00001 0 | | | | | | | |
| 1749 | | | 27,2254 | 77650 1 | GOTO | 0 | | | | | |
| 1750 | REP | 2 | LAST | 387 | 27,2255 | 03310 0 | VBCOTEMP | | | RETURN TO CALLER | |
| 1751 | | | 27,2256 | 50375 0 | PICKAXIS | VLOAD | DOT | | | IF VP X VI = 0, FIND VP . VI | |
| 1752 | | | 27,2257 | 00035 1 | | | 26D | | | | |
| 1753 | REP | 9 | LAST | 388 | 27,2260 | 03351 0 | SCAXIS | | | | |
| 1754 | | | 27,2261 | 72240 1 | BNN | TLOAD | | | | | |
| 1755 | REP | 1 | | | 27,2262 | 56266 0 | ROT180 | | | | |
| 1756 | | | 27,2263 | 00032 0 | | | 26D | | | | |
| 1757 | | | 27,2264 | 77650 1 | GOTO | | | | | IF VP = VI, CDU DESIRED = PRESENT CDU | |
| 1758 | REP | 3 | LAST | 389 | 27,2265 | 03310 0 | VBCOTEMP | | | PRESENT CDU ANGLES | |
| 1759 | | | 27,2266 | 47375 0 | ROT180 | VLOAD | VXV | | | IF VP, VI ANTIPARALLEL, 180 DEG ROTATION | |
| 1760 | REP | 10 | LAST | 388 | 27,2267 | 03327 1 | MIS +6 | | | IS REQUIRED. Y STABLE MEMBER AXIS IN | |
| 1761 | REP | 2 | LAST | 281 | 27,2270 | 15330 0 | HIUNITX | | | INITIAL S/C AXIS. | |
| 1762 | | | 27,2271 | 47256 0 | | | VXV | | | FIND Y(SM) X X(I) | |
| 1763 | REP | 10 | LAST | 389 | 27,2272 | 03351 0 | SCAXIS | | | FIND UNITVI X UNITY(SM) X X(I)) | |
| 1764 | | | 27,2273 | 40056 0 | | | BOV | | | I.E. PICK A VECTOR IN THE PLANE OF X(I), | |
| 1765 | REP | 1 | | | 27,2274 | 56310 0 | PICKX | | | Y(SM) PERPENDICULAR TO VI | |
| 1766 | REP | 5 | LAST | 388 | 27,2275 | 17343 0 | STOXL | COF | | | |
| 1767 | | | 27,2276 | 00045 0 | | | 36D | | | CHECK MAGNITUDE | |
| 1768 | | | 27,2277 | 50025 0 | | | BNN | | | OF THIS VECTOR. | |
| 1769 | REP | 2 | LAST | 387 | 27,2300 | 16327 0 | DPR-14 | | | IF LESS THAN B-14, | |
| 1770 | REP | 2 | LAST | 389 | 27,2301 | 56310 0 | PICKX | | | PICK X-AXIS. | |
| 1771 | | | 27,2302 | 77775 1 | | | VLOAD | | | | |
| 1772 | REP | 6 | LAST | 389 | 27,2303 | 03343 0 | COF | | | | |
| 1773 | REP | 7 | LAST | 389 | 27,2304 | 17343 0 | XROT | STOXL | COF | | |
| 1774 | REP | 2 | LAST | 289 | 27,2305 | 15330 0 | HIDPHALF | | | | |
| 1775 | | | 27,2306 | 77650 1 | | | GOTO | | | | |
| 1776 | REP | 1 | | | 27,2307 | 56160 0 | CONRMATX | | | | |
| 1777 | | | 27,2310 | 52175 0 | PICKX | VLOAD | GOTO | | | PICK THE XAXIS IN THIS CASE | |
| 1778 | REP | 3 | LAST | 389 | 27,2311 | 15330 0 | HIUNITX | | | | |
| 1779 | REP | 1 | | | 27,2312 | 56304 0 | XROT | | | | |
| 1780 | | | 27,2000 | | | | BANK | 35 | | | |
| 1781 | REP | 1 | | | 27,2000 | | SETLOC | MANUVER1 | | | |
| 1782 | | | 27,2313 | | | | BANK | | | | |
| 1783 | | | 27,2313 | 15555 0 | SINGIMLC | 2DEC | .4285836003 | | | =SIN(59) | 52 |
| 1783 | | | 27,2314 | 35172 0 | | | | | | | |
| 1784 | | | 27,2315 | 14113 1 | SINVEC1 | 2DEC | .3796356537 | | | =SIN(49.4) | 52 |
| 1784 | | | 27,2316 | 36326 0 | | | | | | | |
| 1785 | | | 27,2317 | 07701 0 | SINVEC2 | 2DEC | .2462117800 | | | =SIN(29.5) | 52 |
| 1785 | | | 27,2320 | 35703 0 | | | | | | | |
| 1786 | | | 27,2321 | 04343 1 | VECANG1 | 2DEC | .1368866889 | | | = 50 DEGREES | 5360 |
| 1786 | | | 27,2322 | 21616 0 | | | | | | | |
| 1787 | | | 27,2323 | 03070 0 | VECANG2 | 2DEC | .0972222222 | | | = 35 DEGREES | 5360 |
| 1787 | | | 27,2324 | 34344 0 | | | | | | | |
| 1788 | | | 27,2325 | 00000 1 | 18ITDP | OCT | 0 | | | KEEP THIS BEFORE DPR(-14) | ***** |
| 1789 | | | 27,2326 | 00001 0 | DPR-14 | OCT | 00001 | | | | |



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| | | | | | |
|------|----------------|---------|---------|----------------|-------|
| 1790 | | 27,2327 | 00000 1 | OCT | 00000 |
| 1791 | | 34,2002 | | BANK | 34 |
| 1792 | REP 2 LAST 383 | 27,2000 | | SETLOC MANUVER | |
| 1793 | | 27,2330 | | BANK | |

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P1794 ROUTINE FOR INITIATING AUTOMATIC MANEUVER VIA KEYBOARD (V49)
 1795 REP 4 LAST 383 1155 BRANK: CPHI

1796 REP 1 COLNT 27/R62

| | | | | | | | | |
|------|-----|----|----------|---------|----------|---------|------|----------|
| 1797 | REP | 1 | | 27,2330 | 3 4745 0 | R62DISP | CAP | V08N22 |
| 1798 | REP | 57 | LAST 384 | 27,2331 | 0 4555 0 | | TC | BANKCALL |
| 1799 | REP | 2 | LAST 190 | 27,2332 | 20824 0 | | CADR | GOFLASH |
| 1800 | REP | 16 | LAST 257 | 27,2333 | 1 5423 0 | | TCP | ENDXCT |
| 1801 | REP | 1 | | 27,2334 | 1 2336 1 | | TCP | GOMOVE |
| 1802 | REP | 2 | LAST 246 | 27,2335 | 1 2330 1 | | TCP | R62DISP |

DISPLAY COMMAND ICDS CPHI, CNETA, CPHI

A1803

| | | | | | | | | |
|-------|-----|----|----------|---------|----------|--------|------|----------|
| A1804 | | | | | | | | |
| 1805 | REP | 15 | LAST 384 | 27,2336 | 0 5435 0 | GOMOVE | TC | UPFLAG |
| 1806 | REP | 2 | LAST 384 | 27,2337 | 00124 0 | | ADRS | 3AXISFLG |
| 1807 | REP | 56 | LAST 391 | 27,2340 | 0 4555 0 | | TC | BANKCALL |
| 1808 | REP | 1 | | 27,2341 | 56000 1 | | CADR | R60CSM |
| 1809 | REP | 17 | LAST 391 | 27,2342 | 1 5423 0 | | TCP | ENDXCT |

PROCEED
 ENTER
 ASTRONAUT MAY LOAD NEW ICDS AT THIS
 POINT
 SST 3-AXIS FLAG
 BIT 6 FLAG 5



L ANGLPIND

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| | | | | | | | | |
|--------|-----|----|----------|---------|----------|----------|-------|-----------------|
| 0500 | | | | 15,2000 | | | | BANK 15 |
| 050001 | REP | 1 | | 22,2000 | | | | SETLOC KALOMAN1 |
| 050002 | | | | 22,2000 | | | | BANK |
| 0501 | REP | 5 | LAST 387 | E0,1661 | | | | EBANK= BCDU |
| 05015 | REP | 1 | | | | | | COUNT 22/KALC |
| 0502 | REP | 11 | LAST 383 | 22,2000 | 0 6008 1 | KALOMAN3 | TC | INTPRST |
| 0503 | | | | 22,2001 | 77634 0 | | RTB | |
| 0504 | REP | 2 | LAST 387 | 22,2002 | 44376 0 | | | READCDUK |
| 0505 | REP | 6 | LAST 392 | 22,2003 | 03262 1 | | | STORE BCDU |
| 0516 | | | | 22,2004 | 72364 0 | | AXC,2 | TLOAD |
| 0517 | REP | 11 | LAST 389 | 22,2005 | 03320 0 | | | MIS |
| 0518 | REP | 7 | LAST 392 | 22,2006 | 03262 1 | | | BCDU |
| 0519 | | | | 22,2007 | 77624 1 | | CALL | |
| 0520 | REP | 2 | LAST 387 | 22,2010 | 44405 0 | | | CDUTODCM |
| 0521 | | | | 22,2011 | 72364 0 | | AXC,2 | TLOAD |
| 0522 | REP | 4 | LAST 119 | 22,2012 | 03425 1 | | | MPS |
| 0523 | REP | 5 | LAST 391 | 22,2013 | 01156 1 | | | CPHI |
| 0524 | | | | 22,2014 | 77624 1 | | CALL | |
| 0525 | REP | 3 | LAST 392 | 22,2015 | 44405 0 | | | CDUTODCM |
| 0526 | | | | 22,2016 | 45160 1 | SECAD | AXC,1 | CALL |
| 0527 | REP | 12 | LAST 392 | 22,2017 | 03320 0 | | | MIS |
| 0528 | REP | 1 | | 22,2020 | 44334 0 | | | TRANSPOS |
| 0529 | | | | 22,2021 | 77775 1 | | VLOAD | |
| 0530 | | | | 22,2022 | 77626 0 | | STADR | |
| 0531 | REP | 12 | LAST 112 | 22,2023 | 50474 0 | | STOVL | TMIS +12D |
| 0532 | | | | 22,2024 | 77626 0 | | STADR | |
| 0533 | REP | 13 | LAST 392 | 22,2025 | 50502 0 | | STOVL | TMIS +6 |
| 0534 | | | | 22,2026 | 77626 0 | | STADR | |
| 0535 | REP | 14 | LAST 392 | 22,2027 | 74510 0 | | STORE | TMIS |
| 0536 | | | | 22,2030 | 75160 1 | | AXC,1 | AXC,2 |
| 0537 | REP | 15 | LAST 392 | 22,2031 | 03266 0 | | | TMIS |
| 0538 | REP | 5 | LAST 392 | 22,2032 | 03425 1 | | | MPS |
| 0539 | | | | 22,2033 | 77624 1 | | CALL | |
| 0540 | REP | 3 | LAST 388 | 22,2034 | 44304 0 | | | MOV3 |
| 0541 | | | | 22,2035 | 45575 1 | | VLOAD | STADR |
| 0542 | REP | 1 | | 22,2036 | 50335 1 | | STOVL | MPI +12D |
| 0543 | | | | 22,2037 | 77626 0 | | STADR | |
| 0544 | REP | 2 | LAST 392 | 22,2040 | 50343 0 | | STOVL | MPI +6 |
| 0545 | | | | 22,2041 | 77626 0 | | STADR | |
| 0546 | REP | 3 | LAST 392 | 22,2042 | 74351 0 | | STORE | MPI |
| 0547 | | | | 22,2043 | 45001 1 | | SETPD | CALL |
| 0548 | | | | 22,2044 | 00023 0 | | | 18D |
| 0549 | REP | 1 | | 22,2045 | 44343 0 | | | TRNSPSPD |
| 0550 | | | | 22,2046 | 45575 1 | | VLOAD | STADR |
| 0551 | REP | 1 | | 22,2047 | 50474 0 | | STOVL | TMPI +12D |
| 0552 | | | | 22,2050 | 77626 0 | | STADR | |
| 0553 | REP | 2 | LAST 392 | 22,2051 | 50502 0 | | STOVL | TMPI +6 |

PICK UP CURRENT CDU ANGLES
STORE THE INITIAL S/C ANGLES
COMPUTE THE TRANSFORMATION FROM
INITIAL S/C AXES TO STARLE MEMBER AXES
(MIS)

COMPUTE THE TRANSFORMATION FROM
FINAL S/C AXES TO STARLE MEMBER AXES
(MPS)

MIS AND MPS ARRAYS CALCULATED 52

TMIS = TRANSPOSE(MIS) SCALED BY 2

MPI = TMIS MPS (SCALED BY 4)
TRANSPOSE MPI IN PD LIST

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0554 22,2052 77626 0
 0555 REP 3 LAST 392 22,2053 74510 0

STADR
 STOR8 TMPI

TMPI = TRANSPOSE (MPI) SCALED BY 4

R0556
 R0557 CALCULATE COPSKEW AND MPTISYM
 R0558

0559 22,2054 45345 1
 0560 REP 4 LAST 393 22,2055 03271 0
 0561 REP 4 LAST 392 22,2056 03430 0
 0562 22,2057 45325 1
 0563 REP 5 LAST 393 22,2060 03432 1
 0564 REP 5 LAST 393 22,2061 03273 1
 0565 22,2062 45325 1
 0566 REP 6 LAST 393 22,2063 03301 0
 0567 REP 6 LAST 393 22,2064 03440 1
 0568 22,2065 77666 1
 0569 REP 4 LAST 112 22,2066 03311 1

DLOAD DSU
 TMPI +2
 MPI +2
 PDDL DSU
 MPI +4
 TMPI +4
 PDDL DSU
 TMPI +10D
 MPI +10D
 VDEF
 STOR8 COPSKEW

CALCULATE COP SCALED BY 2/SIN(AM)

EQUALS MPISKEW

R0570
 R0571 CALCULATE AM AND PROCEED ACCORDING TO ITS MAGNITUDE
 R0572

0573 22,2067 43345 1
 0574 REP 7 LAST 393 22,2070 03426 1
 0575 REP 8 LAST 393 22,2071 03446 1
 0576 22,2072 43225 0
 0577 REP 2 LAST 31 22,2073 15322 0
 0578 REP 9 LAST 393 22,2074 03436 0
 0579 REP 3 LAST 112 22,2075 03317 1
 0580 22,2076 77726 1
 0581 REP 2 LAST 112 22,2077 03365 1
 0582 22,2100 51025 1
 0583 REP 1 22,2101 04367 1
 0584 REP 1 22,2102 44111 0
 0585 22,2103 77776 1
 0586 22,2104 0 0004 0
 0587 REP 51 LAST 381 22,2105 4 4712 0
 0588 REP 1 22,2106 55=332 0
 0589 REP 1 22,2107 0 3301 0
 0590 REP 1 22,2110 1 2727 0

DLOAD DAD
 MPI
 MPI +16D
 DSU DAD
 DP1/4TH
 MPI +8D
 STOR8 CAM
 ARCCOS
 STOR8 AM
 DSU RPL
 MINANG
 CHECKMAX
 EXIT
 INHINT
 CS ONE
 TS HOLDFLAG
 TC LOADCDLD
 TCP NOGO

CAM = (MPI0+MPI4+MPI8-1)/2 HALF SCALE

AM=ARCCOS(CAM) (AM SCALED BY 2)

MANEUVER LESS THAN 0.25 DEG
 GO DIRECTLY INTO ATTITUDE HOLD
 ABOUT COMMANDED ANGLES
 NOGO WILL STOP ANY RATE AND SET UP FOR A
 GOOD RETURN

0597 22,2111 45345 1
 0598 REP 3 LAST 393 22,2112 03365 1
 0599 REP 1 22,2113 04370 1
 0600 22,2114 77244 0
 0601 REP 1 22,2115 44123 1
 0602 REP 5 LAST 393 22,2116 03311 1
 0603 22,2117 77656 1
 0604 REP 8 LAST 389 22,2120 03343 0
 0605 22,2121 77650 1
 0606 REP 1 22,2122 44738 0
 0607 22,2123 53375 0
 0608 REP 10 LAST 393 22,2124 03426 1

CHECKMAX DLOAD DSU
 AM
 MAXANG
 RPL VLOAD
 ALTCALC
 COPSKEW
 UNIT
 STOR8 COP
 GOTO
 ALTCALC VLOAD
 VAD
 MPI

UNIT
 COPSKEW

COP IS THE MANEUVER AXIS
 SEE IF MANEUVER GOES THRU GIMBAL LOCK
 IF AM GREATER THAN 170 DEGREES



L ANOLPIND

0609 REP 7 LAST 393 22,2125 03267 1
 0610 22,2126 77762 1
 0611 REP 1 22,2127 27267 1
 0612 REP 11 LAST 393 22,2130 03434 1
 0613 22,2131 74455 0
 0614 REP 8 LAST 394 22,2132 03275 1
 0615 REP 2 LAST 394 22,2133 27275 1
 0616 REP 12 LAST 394 22,2134 03442 0
 0617 22,2135 74455 0
 0618 REP 9 LAST 394 22,2136 03303 1
 0619 REP 3 LAST 394 22,2137 03303 1

TMPI
 VSR1
 STOVL MPISYM
 MPI +6
 VAD VSR1
 TMPI +6
 STOVL MPISYM +6
 MPI +12D
 VAD VSR1
 TMPI +12D
 STORE MPISYM +12D MPISYM=(MPI+TMPI)/2 SCALED BY 4

R0620
 R0621
 R0622 CALCULATE COP
 R0623

0624 22,2140 70545 1
 0625 REP 4 LAST 393 22,2141 03317 1
 0626 22,2142 45325 1
 0627 REP 1 22,2143 15330 0
 0628 REP 5 LAST 394 22,2144 03317 1
 0629 22,2145 65204 1
 0630 REP 1 22,2146 45707 0
 0631 REP 4 LAST 394 22,2147 03307 0
 0632 22,2150 56225 1
 0633 22,2151 00001 0
 0634 22,2152 00003 1
 0635 22,2153 65366 1
 0636 REP 5 LAST 394 22,2154 03277 0
 0637 22,2155 56225 1
 0638 22,2156 00001 0
 0639 22,2157 00003 1
 0640 22,2160 65366 1
 0641 REP 6 LAST 394 22,2161 03267 1
 0642 22,2162 56225 1
 0643 22,2163 00001 0
 0644 22,2164 00003 1
 0645 22,2165 55566 1
 0646 22,2166 77656 1
 0647 REP 9 LAST 393 22,2167 03343 0

DLOAD SR1
 CAM
 PDDL DSU PD0 CAM \$4
 DPHALP
 CAM
 ROVB PDDL PD2 1 - CAM \$2
 SIGNMPAC
 MPISYM +16D
 DSU DDV
 0
 2
 SORT PDDL COPZ = SORT(MPISYM6-CAM)/(1-CAM) \$ ROOT 2
 MPISYM +8D
 DSU DDV
 0
 2
 SORT PDDL COPY = SORT(MPISYM4-CAM)/(1-CAM) \$ROOT2
 MPISYM
 DSU DDV
 0
 2
 SORT VDRP COPX = SORT(MPISYM-CAM)/(1-CAM) \$ROOT 2
 UNIT
 STORE COP

R0648
 R0649 DETERMINE LARGEST COP AND ADJUST ACCORDINGLY
 R0650

0651 22,2170 45345 1
 0652 REP 10 LAST 394 22,2171 03343 0
 0653 REP 11 LAST 394 22,2172 03345 0
 0654 22,2173 71240 1
 0655 REP 1 22,2174 44203 0
 0656 REP 12 LAST 394 22,2175 03343 0
 0657 22,2176 50025 0
 0658 REP 13 LAST 394 22,2177 03347 1

COPMAXGO DLOAD DSU
 COP
 COP +2
 RMN DLOAD COPY G COPX
 COMP12
 COP
 DSU RMN
 COP +4



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| | | | | | | | | | |
|------|-----|----|------|---------|---------|---------|---------|-------------|---------------------------|
| 0659 | REP | 1 | | 22,2200 | 44260 0 | | METHOD3 | | COPZ G COPX OR COPY |
| 0660 | | | | 22,2201 | 77650 1 | | GOTO | | |
| 0661 | REP | 1 | | 22,2202 | 44234 1 | | METHOD1 | | COPX G COPY OR COPZ |
| 0662 | | | | 22,2203 | 45345 1 | COMP12 | DLOAD | DSU | |
| 0663 | REP | 14 | LAST | 394 | 22,2204 | 03345 0 | | COP +2 | |
| 0664 | REP | 15 | LAST | 395 | 22,2205 | 03347 1 | | COP +4 | |
| 0665 | | | | 22,2206 | 77640 0 | | BMN | | |
| 0666 | REP | 2 | LAST | 395 | 22,2207 | 44260 0 | | METHOD3 | COPZ G COPY OR COPX |
| 0667 | | | | 22,2210 | 51145 0 | METHOD2 | DLOAD | BPL | COPY MAX |
| 0668 | REP | 6 | LAST | 393 | 22,2211 | 03313 0 | | COPSKW +2 | UY |
| 0669 | REP | 1 | | 22,2212 | 44216 1 | | | U2POS | |
| 0670 | | | | 22,2213 | 57575 1 | | VLOAD | VCOMP | |
| 0671 | REP | 16 | LAST | 395 | 22,2214 | 03343 0 | | COP | |
| 0672 | REP | 17 | LAST | 395 | 22,2215 | 03343 0 | | STORE | COP |
| 0673 | | | | 22,2216 | 51145 0 | U2POS | DLOAD | RPL | |
| 0674 | REP | 7 | LAST | 394 | 22,2217 | 03271 0 | | MFISYM +2 | UX UY |
| 0675 | REP | 1 | | 22,2220 | 44224 0 | | | OKU21 | |
| 0676 | | | | 22,2221 | 57545 1 | | DLOAD | DCOMP | SIGN OF UX OPPOSITE TO UY |
| 0677 | REP | 18 | LAST | 395 | 22,2222 | 03343 0 | | COP | |
| 0678 | REP | 19 | LAST | 395 | 22,2223 | 03343 0 | | STORE | COP |
| 0679 | | | | 22,2224 | 51145 0 | OKU21 | DLOAD | BPL | |
| 0680 | REP | 8 | LAST | 395 | 22,2225 | 03301 0 | | MFISYM +10D | UY UZ |
| 0681 | REP | 2 | LAST | 393 | 22,2226 | 44736 0 | | LOCKIRT | |
| 0682 | | | | 22,2227 | 57545 1 | | DLOAD | DCOMP | SIGN OF UZ OPPOSITE TO UY |
| 0683 | REP | 20 | LAST | 395 | 22,2230 | 03347 1 | | COP +4 | |
| 0684 | REP | 21 | LAST | 395 | 22,2231 | 03347 1 | | STORE | COP +4 |
| 0685 | | | | 22,2232 | 77650 1 | | GOTO | | |
| 0686 | REP | 3 | LAST | 395 | 22,2233 | 44736 0 | | LOCKIRT | |
| 0687 | | | | 22,2234 | 51145 0 | METHOD1 | DLOAD | RPL | COPX MAX |
| 0688 | REP | 7 | LAST | 395 | 22,2235 | 03311 1 | | COPSKW | UX |
| 0689 | REP | 1 | | 22,2236 | 44242 0 | | | U1POS | |
| 0690 | | | | 22,2237 | 57575 1 | | VLOAD | VCOMP | |
| 0691 | REP | 22 | LAST | 395 | 22,2240 | 03343 0 | | COP | |
| 0692 | REP | 23 | LAST | 395 | 22,2241 | 03343 0 | | STORE | COP |
| 0693 | | | | 22,2242 | 51145 0 | U1POS | DLOAD | RPL | |
| 0694 | REP | 9 | LAST | 395 | 22,2243 | 03271 0 | | MFISYM +2 | UX UY |
| 0695 | REP | 1 | | 22,2244 | 44250 0 | | | OKU12 | |
| 0696 | | | | 22,2245 | 57545 1 | | DLOAD | DCOMP | |
| 0697 | REP | 24 | LAST | 395 | 22,2246 | 03345 0 | | COP +2 | SIGN OF UY OPPOSITE TO UX |
| 0698 | REP | 25 | LAST | 395 | 22,2247 | 03345 0 | | STORE | COP +2 |
| 0699 | | | | 22,2250 | 51145 0 | OKU12 | DLOAD | RPL | |
| 0700 | REP | 10 | LAST | 395 | 22,2251 | 03273 1 | | MFISYM +4 | UX UZ |
| 0701 | REP | 4 | LAST | 395 | 22,2252 | 44736 0 | | LOCKIRT | |
| 0702 | | | | 22,2253 | 57545 1 | | DLOAD | DCOMP | SIGN OF UZ OPPOSITE TO UY |
| 0703 | REP | 26 | LAST | 395 | 22,2254 | 03347 1 | | COP +4 | |
| 0704 | REP | 27 | LAST | 395 | 22,2255 | 03347 1 | | STORE | COP +4 |
| 0705 | | | | 22,2256 | 77650 1 | | GOTO | | |
| 0706 | REP | 5 | LAST | 395 | 22,2257 | 44736 0 | | LOCKIRT | |
| 0707 | | | | 22,2260 | 51145 0 | METHOD3 | DLOAD | RPL | COPZ MAX |

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R0727
R0728 MATRIX OPERATIONS
R0729

| | | | | | | |
|-------|----------------|---------|----------|--------|-------------------|----------------------------------|
| R0730 | 22,2304 | 77601 0 | M043 | SETPD | | M043 MULTIPLIES 2 3X3 MATRICES |
| R0731 | 22,2305 | 00001 0 | | | 0 | AND LEAVES RESULT IN PD LIST |
| R0732 | 22,2306 | 84743 0 | | DLOAD* | PDDL* | ADDRESS OF 1ST MATRIX IN XR1 |
| R0733 | 22,2307 | 77762 1 | | | 12D,2 | ADDRESS OF 2ND MATRIX IN XR2 |
| R0734 | 22,2310 | 77770 1 | | | 0,2 | |
| R0735 | 22,2311 | 55523 0 | | PDDL* | VDEF | DEFINE VECTOR M2(COL 1) |
| R0736 | 22,2312 | 77776 1 | | | 0,2 | |
| R0737 | 22,2313 | 84717 1 | | MKV* | PDDL* | M1XM2(COL 1) IN PD |
| R0738 | 22,2314 | 00001 0 | | | 0,1 | |
| R0739 | 22,2315 | 77760 0 | | | 14D,2 | |
| R0740 | 22,2316 | 84723 0 | | PDDL* | PDDL* | |
| R0741 | 22,2317 | 77766 0 | | | 8D,2 | |
| R0742 | 22,2320 | 77774 0 | | | 2,2 | |
| R0743 | 22,2321 | 63666 1 | | VDEF | MKV* | DEFINE VECTOR M2(COL 2) |
| R0744 | 22,2322 | 00001 0 | | | 0,1 | |
| R0745 | 22,2323 | 84723 0 | | PDDL* | PDDL* | M1XM2(COL 2) IN PD |
| R0746 | 22,2324 | 77756 0 | | | 16D,2 | |
| R0747 | 22,2325 | 77764 1 | | | 10D,2 | |
| R0748 | 22,2326 | 55523 0 | | PDDL* | VDEF | DEFINE VECTOR M2(COL 3) |
| R0749 | 22,2327 | 77772 0 | | | 4,2 | |
| R0750 | 22,2330 | 41517 1 | | MKV* | PUSH | M1XM2(COL 3) IN PD |
| R0751 | 22,2331 | 00001 0 | | | 0,1 | |
| R0752 | 22,2332 | 77650 1 | | GOTO | | |
| R0753 | REP 2 LAST 392 | 22,2333 | 44343 0 | | TRNSPSPD | REVERSE ROWS AND COLS IN PD AND |
| R0754 | | | | | RETURN WITH M1XM2 | IN PD LIST |
| R0755 | | | | | | |
| R0756 | 22,2334 | 76801 1 | TRANSPOS | SETPD | VLOAD* | TRANSPOS TRANSPOSES A 3X3 MATRIX |
| R0757 | 22,2335 | 00001 0 | | | 0 | AND LEAVES RESULT IN PD LIST |
| R0758 | 22,2336 | 00001 0 | | | 0,1 | MATRIX ADDRESS IN XR1 |
| R0759 | 22,2337 | 82713 0 | | FDVL* | FDVL* | |
| R0760 | 22,2340 | 00007 0 | | | 6,1 | |
| R0761 | 22,2341 | 00015 0 | | | 12D,1 | |
| R0762 | 22,2342 | 77606 1 | | PUSH | | MATRIX IN PD |
| R0763 | 22,2343 | 85345 0 | TRNSPSPD | DLOAD | PDDL | ENTER WITH MATRIX IN PD LIST |
| R0764 | 22,2344 | 00003 1 | | | 2 | |
| R0765 | 22,2345 | 00007 0 | | | 6 | |
| R0766 | 22,2346 | 14003 1 | | STODL | 2 | |
| R0767 | 22,2347 | 77626 0 | | STADR | | |
| R0768 | 22,2350 | 63770 1 | | STODL | 6 | |
| R0769 | 22,2351 | 00005 1 | | | 4 | |
| R0770 | 22,2352 | 77725 1 | | PDDL | | |
| R0771 | 22,2353 | 00015 0 | | | 12D | |
| R0772 | 22,2354 | 14005 1 | | STODL | 4 | |
| R0773 | 22,2355 | 77626 0 | | STADR | | |
| R0774 | 22,2356 | 83762 1 | | STODL | 12D | |
| R0775 | 22,2357 | 00013 0 | | | 10D | |
| R0776 | 22,2360 | 77725 1 | | PDDL | | |

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```

0777      22,2361 00017 1      14D
0778      22,2362 14013 0      STODL 10D
0779      22,2363 77626 0      STADR
0780      22,2364 77760 0      STORE 14D
0781      22,2365 77616 0      RVD
0782      22,2366 00013 0 MINANG DEC .00069375
0783      22,2367 17071 1 MAXANG DEC .472222
R0784      GIMBAL LOCK CONSTANTS
    
```

RETURN WITH TRANSPOSED MATRIX IN PD LIST

```

R0785      D = NGA CORRESPONDING TO GIMBAL LOCK = 60 DEGREES
R0786      NCL = RUPPER ANGLE (TO AVOID DIVISIONS BY ZERO) = 2 DEGREES
    
```

```

0787      22,2370 15667 1 SD      DEC .433015
0788      22,2371 33555 1 K3S1   DEC .86603
0789      22,2372 67777 1 K4     DEC -.25
0790      22,2373 04000 0 K4SQ   DEC .125
0791      22,2374 00217 0 SNGLCD DEC .008725
0792      22,2375 17773 1 CNCL   DEC .499695
0794      22,2376 0 0004 0 READCDLX INHINT
0795 REP 5 LAST 238 22,2377 3 0034 0 CA CDUZ
0796 REP 217 LAST 384 22,2400 54 156 1 TS MPAC +2
0797      22,2401 0 0006 1 EXTEND
0798 REP 6 LAST 266 22,2402 3 0033 1 DCA CDUX
0799      22,2403 0 0003 1 RELINT
0800 REP 1 22,2404 1 6445 0 TCP TLOAD +8
0801      16,2000 BANK 16
080101 REP 1 22,2000 SETLOC KALOMON2
080102      22,2405 BANK
    
```

```

= SIN(D)          $2
= SIN(D)          $1
= - COS(D)        $2
= COS(D)COS(D)   $2
= SIN(NCL)COS(D) $2
= COS(NCL)        $2
LOAD T(MPAC) WITH THE CURRENT CDU ANGLES
    
```

```

080105 REP 2 LAST 392 TO 398 261 261* COUNT* SS/KALC
    
```

```

0802      22,2405 66370 0 CDUTDCM AXT,1 SSP
0803      22,2406 00003 1 OCT 3
0804 REP 1 22,2407 00051 0 S1
0805      22,2410 00001 0 OCT 1
0806      22,2411 00010 0 STORE 7
0807      22,2412 77601 0 SETPD
0808      22,2413 00001 0
0809      22,2414 47133 0 LOOPSIN SLOAD* RTR
0810      22,2415 00013 0 10D,1
0811 REP 3 LAST 280 22,2416 45510 1 CDULOGIC
0812      22,2417 00013 0 STORE 10D
0813      22,2420 65356 1 SIN PDDL
0814      22,2421 00013 0 10D
0815      22,2422 41546 0 COS PUSH
0816      22,2423 71300 1 TIX,1 DLOAD
0817 REP 1 22,2424 44414 0 LOOPSIN
0818      22,2425 00007 0 6
0819      22,2426 72405 0 DMP SL,1
0820      22,2427 00013 0 10D
    
```

SUBROUTINE TO COMPUTE DIRECTION COSINE MATRIX RELATING S/C AXES TO STABLE MEMBER AXES FROM 3 CDU ANGLES IN T(MPAC) SET XR1, S1 AND PD FOR LOOP

```

LOAD PD WITH 0 SIN(PHI)
              2 COS(PHI)
              4 SIN(THETA)
              6 COS(THETA)
              8 SIN(PST)
              10 COS(PST)
    
```



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| | | | | | |
|------|---------|---------|-------|-------|---|
| 0821 | 22,2430 | 10001 1 | STORE | 0,2 | |
| 0822 | 22,2431 | 77745 1 | DLOAD | | |
| 0823 | 22,2432 | 00005 1 | | 4 | |
| 0824 | 22,2433 | 65205 0 | DMP | PDDL | |
| 0825 | 22,2434 | 00001 0 | | 0 | (PD6 SIN(THETA)SIN(PHI)) |
| 0826 | 22,2435 | 00007 0 | | 6 | |
| 0827 | 22,2436 | 41205 0 | DMP | DMP | |
| 0828 | 22,2437 | 00011 1 | | 8D | |
| 0829 | 22,2440 | 00003 1 | | 2 | |
| 0830 | 22,2441 | 44352 0 | SL1 | SDSU | |
| 0831 | 22,2442 | 00015 0 | | 12D | |
| 0832 | 22,2443 | 77752 1 | SL1 | | |
| 0833 | 22,2444 | 10003 0 | STORE | 2,2 | |
| 0834 | 22,2445 | 77745 1 | DLOAD | | |
| 0835 | 22,2446 | 00003 1 | | 2 | |
| 0836 | 22,2447 | 65205 0 | DMP | PDDL | (PD7 COS(PHI)SIN(THETA)) SCALED 4 |
| 0837 | 22,2450 | 00005 1 | | 4 | |
| 0838 | 22,2451 | 00007 0 | | 6 | |
| 0839 | 22,2452 | 41205 0 | DMP | DMP | |
| 0840 | 22,2453 | 00011 1 | | 8D | |
| 0841 | 22,2454 | 00001 0 | | 0 | |
| 0842 | 22,2455 | 77752 1 | SL1 | | |
| 0843 | 22,2456 | 72415 1 | DAD | SL1 | |
| 0844 | 22,2457 | 00017 1 | | 14D | |
| 0845 | 22,2460 | 10005 0 | STORE | 4,2 | |
| 0846 | 22,2461 | 77745 1 | DLOAD | | |
| 0847 | 22,2462 | 00011 1 | | 8D | |
| 0848 | 22,2463 | 10007 1 | STORE | 6,2 | |
| 0849 | 22,2464 | 77745 1 | DLOAD | | |
| 0850 | 22,2465 | 00013 0 | | 10D | |
| 0851 | 22,2466 | 72405 0 | DMP | SL1 | |
| 0852 | 22,2467 | 00003 1 | | 2 | |
| 0853 | 22,2470 | 10011 0 | STORE | 8D,2 | |
| 0854 | 22,2471 | 77745 1 | DLOAD | | |
| 0855 | 22,2472 | 00013 0 | | 10D | |
| 0856 | 22,2473 | 57405 1 | DMP | DCOMP | |
| 0857 | 22,2474 | 00001 0 | | 0 | |
| 0858 | 22,2475 | 77752 1 | SL1 | | |
| 0859 | 22,2476 | 10013 1 | STORE | 10D,2 | |
| 0860 | 22,2477 | 77745 1 | DLOAD | | |
| 0861 | 22,2500 | 00005 1 | | 4 | |
| 0862 | 22,2501 | 57405 1 | DMP | DCOMP | |
| 0863 | 22,2502 | 00013 0 | | 10D | |
| 0864 | 22,2503 | 77752 1 | SL1 | | |
| 0865 | 22,2504 | 10015 1 | STORE | 12D,2 | |
| 0866 | 22,2505 | 77745 1 | DLOAD | | |
| 0867 | 22,2506 | 72405 0 | DMP | SL1 | (PUSH UP 7) |
| 0868 | 22,2507 | 00011 1 | | 8D | |
| 0869 | 22,2510 | 41325 0 | PDDL | DMP | (PD7 COS(PHI)SIN(THETA)SIN(PHI)) SCALRA |
| 0870 | 22,2511 | 00007 0 | | 6 | |



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| | | | | | |
|--------|----------------|---------|--------|---------|---|
| 0871 | 22,2512 | 00001 0 | | | |
| 0872 | 22,2513 | 72415 1 | DAD | SL1 | (PUSH UP 7) |
| 0873 | 22,2514 | 77626 0 | STADR | | $C7 = \cos(\phi) \sin(\theta) \sin(\psi)$ |
| 0874 | 22,2515 | 67760 1 | STORE | 14D,2 | |
| 0875 | 22,2516 | 77745 1 | DLOAD | | |
| 0876 | 22,2517 | 72405 0 | DMP | SL1 | (PUSH UP 6) |
| 0877 | 22,2520 | 00011 1 | | SD | |
| 0878 | 22,2521 | 41325 0 | PDDL | DMP | $(PD6 \sin(\theta) \sin(\phi) \sin(\psi)) \text{ SCALE4}$ |
| 0879 | 22,2522 | 00007 0 | | 6 | |
| 0880 | 22,2523 | 00003 1 | | 2 | |
| 0881 | 22,2524 | 72425 1 | DSU | SL1 | (PUSH UP 6) |
| 0882 | 22,2525 | 77626 0 | STADR | | |
| 0883 | 22,2526 | 67756 1 | STORE | 16D,2 | $C8 = -\sin(\theta) \sin(\phi) \sin(\psi)$ |
| 0884 | 22,2527 | 77616 0 | RVD | | $+\cos(\theta) \cos(\phi)$ |
| 0885 | 22,2530 | | ENDDCM | EQUALS | |
| 0886 | 15,2000 | | BANK | 15 | |
| 088601 | REP 2 LAST 392 | 22,2000 | SETLOC | KALMON1 | |
| 088602 | 22,2530 | | BANK | | |

R0887 CALCULATION OF THE MATRIX DEL.....

R0888 * * --T *
R0889 DEL = (IDMATRIX)COS(A) + U(1-COS(A)) + X SIN(A) SCALED 1

R0890
R0891 WHERE U IS A UNIT VECTOR (DP SCALED 2) ALONG THE AXIS OF ROTATION.
R0893 A IS THE ANGLE OF ROTATION (DP SCALED 2)

R0894
R0895 UPON ENTRY THE STARTING ADDRESS OF U IS COP, AND A IS IN MPAC

| | | | | | |
|-------|------------------------|---------|---------|----------|--------------------------------|
| 08955 | REP 3 LAST 398 TO 400' | 83 344* | COUNT | 22/KALC | |
| 0896 | 22,2530 | 41401 1 | DELCOMP | SETPD | PUSH MPAC CONTAINS THE ANGLE A |
| 0897 | 22,2531 | 00001 0 | | 0 | |
| 0898 | 22,2532 | 65356 1 | SIN | PDDL | PD0 = SIN(A) |
| 0899 | 22,2533 | 41546 0 | COS | PUSH | PD2 = COS(A) |
| 08995 | 22,2534 | 65302 0 | SR2 | PDDL | PD2 = COS(A) |
| 0900 | 22,2535 | 41021 1 | RDSU | BOVR | PD4 = 1-COS(A) |
| 0901 | REP 2 LAST 394 | 22,2536 | | DPHALP | \$8 |
| 09014 | REP 2 LAST 394 | 22,2537 | | SIGNMPAC | \$2 |

R0902 COMPUTE THE DIAGONAL COMPONENTS OF DEL

| | | | | | |
|-------|-----------------|---------|------|-----|--|
| 09024 | 22,2540 | 77725 1 | PDDL | | |
| 0903 | REP 34 LAST 396 | 22,2541 | | COP | |
| 0904 | 22,2542 | 41316 0 | DSO | DMP | |
| 0905 | 22,2543 | 00005 1 | | 4 | |
| 0906 | 22,2544 | 52415 0 | DAD | SL3 | |



L ANCLPIND

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0907 22,2545 00003 1
 0908 22,2546 77604 0
 0909 REP 3 LAST 400 22,2547 45707 0
 0910 REP 3 LAST 388 22,2550 17426 1
 0911 REP 35 LAST 400 22,2551 03345 0
 0912 22,2552 41316 0
 0913 22,2553 00005 1
 0914 22,2554 52415 0
 0915 22,2555 00003 1
 0916 22,2556 77604 0
 0917 REP 4 LAST 401 22,2557 45707 0
 0918 REP 4 LAST 401 22,2560 17436 0
 0919 REP 36 LAST 401 22,2561 03347 1
 0920 22,2562 41316 0
 0921 22,2563 00005 1
 0922 22,2564 52415 0
 0923 22,2565 00003 1
 0924 22,2566 77604 0
 0925 REP 5 LAST 401 22,2567 45707 0
 0926 REP 5 LAST 401 22,2570 03446 1

BOVR 2
 SIGNMPAC
 STODL DEL UX UZ(U-COS(A)) +COS(A) 31
 COP +2
 DSO DMP
 4
 DAD SL3
 2
 BOVR
 SIGNMPAC
 STODL DEL +8D UY UZ(1-COS(A)) .COS(A) 31
 COP +4
 DSO DMP
 4
 DAD SL3
 2
 BOVR
 SIGNMPAC
 STORE DEL +16D UZ UZ(1-COS(A)) +COS(A) 31

R0927 COMPUTE THE OFF DIAGONAL TERMS OF DEL

0928 22,2571 41345 0
 0929 REP 37 LAST 401 22,2572 03343 0
 0930 REP 38 LAST 401 22,2573 03345 0
 0931 22,2574 72405 0
 0932 22,2575 00005 1
 0933 22,2576 41325 0
 0934 REP 39 LAST 401 22,2577 03347 1
 0935 22,2600 00001 0
 0936 22,2601 43206 1
 0937 22,2602 00007 0
 0938 22,2603 41112 0
 0939 REP 6 LAST 401 22,2604 45707 0
 0940 REP 6 LAST 401 22,2605 17434 1
 0941 22,2606 62421 1
 0942 22,2607 77604 0
 0943 REP 7 LAST 401 22,2610 45707 0
 0944 REP 7 LAST 401 22,2611 17430 0
 0945 REP 40 LAST 401 22,2612 03343 0
 0946 22,2613 41205 0
 0947 REP 41 LAST 401 22,2614 03347 1
 0948 22,2615 00005 1
 0949 22,2616 65352 0
 0950 REP 42 LAST 401 22,2617 03345 0
 0951 22,2620 41405 0
 0952 22,2621 00001 0
 0953 22,2622 62415 0
 0954 22,2623 00007 0

DLOAD DMP
 COP
 COP +2
 DMP SL1
 4
 PDDL DMP D6 UX UY (1-COS A) 3 4
 COP +4
 0
 PUSH DAD D6 UZ SIN A 3 4
 6
 SL2 BOVR
 SIGNMPAC
 STODL DEL +8
 BOSJ SL2
 BOVR
 SIGNMPAC
 STODL DEL +2
 COP
 DMP DMP COP +4
 4
 SL1 PDDL D6 UX UZ (1-COS A) 3 4
 COP +2
 DMP PUSH D6 UY SIN(A)
 0
 DAD SL2
 6



L ANGLPIND

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| | | | | | | | | |
|------|-----|----|------|---------|---------|----------|----------------|-----------------------------|
| 0955 | | | | 22,2624 | 77604 0 | BOVB | | |
| 0956 | REP | 8 | LAST | 401 | 22,2625 | 45707 0 | SIGNMPAC | |
| 0957 | REP | 8 | LAST | 401 | 22,2626 | 17432 1 | STOCL DEL +4 | UX UZ (1-COS(A))+UY SIN(A) |
| 0958 | | | | 22,2627 | 82421 1 | BDSJ SL2 | | |
| 0959 | | | | 22,2630 | 77604 0 | BOVB | | |
| 0960 | REP | 9 | LAST | 402 | 22,2631 | 45707 0 | SIGNMPAC | |
| 0961 | REP | 9 | LAST | 402 | 22,2632 | 17442 0 | STOCL DEL +12D | UX UZ (U-COS(A))-UY SIN(A) |
| 0962 | REP | 43 | LAST | 401 | 22,2633 | 03345 0 | COP +2 | |
| 0963 | | | | 22,2634 | 41205 0 | DMP | | |
| 0964 | REP | 44 | LAST | 402 | 22,2635 | 03347 1 | COP +4 | |
| 0965 | | | | 22,2636 | 00005 1 | | | |
| 0966 | | | | 22,2637 | 85352 0 | SL1 PDDL | | D8 UY UZ (1-COS(A)) 8 4 |
| 0967 | REP | 45 | LAST | 402 | 22,2640 | 03343 0 | COP | |
| 0968 | | | | 22,2641 | 41405 0 | DMP PUSH | | D8 UX SIN(A) |
| 0969 | | | | 22,2642 | 00001 0 | | | |
| 0970 | | | | 22,2643 | 82415 0 | DAD SL2 | | |
| 0971 | | | | 22,2644 | 00007 0 | | | |
| 0972 | | | | 22,2645 | 77604 0 | BOVB | | |
| 0973 | REP | 10 | LAST | 402 | 22,2646 | 45707 0 | SIGNMPAC | |
| 0974 | REP | 10 | LAST | 402 | 22,2647 | 17444 0 | STOCL DEL +14D | UY UZ(1-COS(A)) +UX SIN(A) |
| 0975 | | | | 22,2650 | 82421 1 | BDSJ SL2 | | |
| 0976 | | | | 22,2651 | 77604 0 | BOVB | | |
| 0977 | REP | 11 | LAST | 402 | 22,2652 | 45707 0 | SIGNMPAC | |
| 0978 | REP | 11 | LAST | 402 | 22,2653 | 03440 1 | STORE DEL +10D | UY UZ (1-COS(A)) -UX SIN(A) |
| 0979 | | | | 22,2654 | 77616 0 | RVC | | |

R0980 DIRECTION COSINE MATRIX TO CDU ANGLE ROUTINE
R0981 X1 CONTAINS THE COMPLEMENT OF THE STARTING ADDRESS FOR MATRIX (SCALED 2)
R0982 LEAVES CDU ANGLES SCALED 2PI IN V(MPAC)
R0983 COS(MGA) WILL BE LEFT IN S1 (SCALED 1)

R0984 THE DIRECTION COSINE MATRIX RELATING S/C AXES TO STABLE MEMBER AXES CAN BE WRITTEN AS***

| | |
|-------|--|
| R0986 | C =COS(THETA)COS(PHI) |
| R0987 | 0 |
| R0988 | C =-COS(THETA)SIN(PHI)COS(PHI)+SI (THETA)SIN(PHI) |
| R0989 | 1 |
| R0990 | C =COS(THETA)SIN(PHI)SIN(PHI) + S N(THETA)COS(PHI) |
| R0991 | 2 |
| R0992 | C =SIN(PHI) |
| R0993 | 3 |
| R0994 | C =COS(PHI)COS(PHI) |
| R0995 | 4 |
| R0996 | C =-COS(PHI)SIN(PHI) |
| R0997 | 5 |
| R0998 | C =-SIN(THETA)COS(PHI) |
| R0999 | 6 |
| R1000 | C =SIN(THETA)SIN(PHI)COS(PHI)+COS THETA)SIN(PHI) |
| R1001 | 7 |

L ANGLFIND

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R1002 C = -SIN(THETA)SIN(PHI)SIN(PHI)+CO (THETA)COS(PHI)
 R1003 8

R1004 WHERE PHI = OGA
 R1005 THETA = IGA
 R1006 PSI = MGA

| | | | | | | |
|------|-----|----|---------|---------|----------------|----------|
| 1007 | | | 22,2655 | 67543 1 | DOYTCOU DLOAD* | ARCSIN |
| 1008 | | | 22,2656 | 00007 0 | | 8,1 |
| 1009 | | | 22,2657 | 71406 0 | PUSH | COS |
| 1010 | | | 22,2660 | 41152 1 | SL1 | BOVB |
| 1011 | REP | 12 | 22,2661 | 45707 0 | | SIGNMPAC |
| 1012 | REP | 2 | 22,2662 | 00051 0 | STORE | S1 |
| 1013 | | | 22,2663 | 57543 1 | DLOAD* | DCOMP |
| 1014 | | | 22,2664 | 00015 0 | | 12D,1 |
| 1015 | | | 22,2665 | 67471 1 | DDV | ARCSIN |
| 1016 | REP | 3 | 22,2666 | 00051 0 | | S1 |
| 1017 | | | 22,2667 | 51123 0 | PODL* | BPL |
| 1018 | | | 22,2670 | 00001 0 | | 0,1 |
| 1019 | REP | 1 | 22,2671 | 44703 0 | | QKTHETA |
| 1020 | | | 22,2672 | 57545 1 | DLOAD | DCOMP |
| 1021 | | | 22,2673 | 43244 1 | BPL | DAD |
| 1022 | REP | 1 | 22,2674 | 44700 0 | | SUHALPA |
| 1023 | REP | 3 | 22,2675 | 15330 0 | | DPHALP |
| 1024 | | | 22,2676 | 77650 1 | GOTO | |
| 1025 | REP | 1 | 22,2677 | 44702 1 | | CALCPHI |
| 1026 | | | 22,2700 | 77625 0 | SUHALPA | DSU |
| 1027 | REP | 4 | 22,2701 | 15330 0 | | DPHALP |
| 1028 | | | 22,2702 | 77606 1 | CALCPHI | PUSH |
| 1029 | | | 22,2703 | 57543 1 | QKTHETA | DLOAD* |
| 1030 | | | 22,2704 | 00013 0 | | 10D,1 |
| 1031 | | | 22,2705 | 67471 1 | DDV | ARCSIN |
| 1032 | REP | 4 | 22,2706 | 00051 0 | | S1 |
| 1033 | | | 22,2707 | 51123 0 | PODL* | BPL |
| 1034 | | | 22,2710 | 00011 1 | | 8D,1 |
| 1035 | REP | 1 | 22,2711 | 44723 1 | | QKPHI |
| 1036 | | | 22,2712 | 57545 1 | DLOAD | DCOMP |
| 1037 | | | 22,2713 | 43244 1 | BPL | DAD |
| 1038 | REP | 1 | 22,2714 | 44720 1 | | SUHALPAP |
| 1039 | REP | 5 | 22,2715 | 15330 0 | | DPHALP |
| 1040 | | | 22,2716 | 77650 1 | GOTO | |
| 1041 | REP | 1 | 22,2717 | 44724 0 | | VBCOPANG |
| 1042 | | | 22,2720 | 52025 1 | SUHALPAP | DSU |
| 1043 | REP | 6 | 22,2721 | 15330 0 | | GOTO |
| 1044 | REP | 2 | 22,2722 | 44724 0 | | DPHALP |
| 1045 | | | 22,2723 | 77745 1 | QKPHI | DLOAD |
| 1046 | | | 22,2724 | 43466 1 | VBCOPANG | VDRP RVQ |

PD +0 PSI

PD +2 THETA
 MUST CHECK THE SIGN OF COS(THETA)
 TO DETERMINE THE PROPER QUADRANT

PUSH DOWN PHI

PUSH UP PHI

PUSH UP PHI



L ANGLPIND

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P1047 ROUTINE FOR TERMINATING AUTOMATIC MANEUVERS

| | | | | | | | | | |
|-------|-----|----|----------|---------|---|------|---|--------|---------------|
| 10512 | | | | 22,2725 | 0 | 0004 | 0 | NOO0M2 | INHINT |
| 10513 | REP | 1 | | 22,2726 | 0 | 3272 | 0 | | TC ZSROBROR |
| 10514 | | | | 22,2727 | 0 | 0004 | 0 | NOO0 | INHINT |
| 10515 | REP | 4 | LAST 253 | 22,2730 | 0 | 3245 | 1 | | TC STOPRATE |
| A1052 | | | | | | | | | |
| 1053 | REP | 23 | LAST 370 | 22,2731 | 3 | 4711 | 1 | | CAP TWO |
| 1054 | REP | 15 | LAST 379 | 22,2732 | 0 | 5140 | 1 | | TC WAITLIST |
| 1055 | REP | 8 | LAST 392 | E6,1661 | | | | | BRANK= BCDU |
| 1056 | REP | 1 | | 22,2733 | 0 | 3237 | 1 | | 2CADR ENDMANU |
| 1056 | REP | 1 | | 22,2734 | 4 | 4106 | 0 | | |
| 1058 | REP | 50 | LAST 385 | 22,2735 | 1 | 5112 | 1 | | TCP ENDOPJOB |

THIS LOCATION ACCESSED BY A BZMP NOGO -2

TERMINATE MANEUVER
NOTE - ALL RETURNS ARE NOW MADE VIA
GOODEND

L GIMBAL LOCK AVOIDANCE

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```

0001          15,2000          BANK 15
0002 REP 3 LAST 400 22,2000 SETLOC KALCMON1
0003          22,2736          BANK
                                BRANK= BCDU
0004 REP 9 LAST 404 22,1661
R0005 DETECTING GIMBAL LOCK
0006 REP 1          22,2736 LOC&KIRT EQUALS NOGIMLOC
                                NOGIMLOC SET
0007          22,2736 77614 1 NOGIMLOC SET
0008 REP 1          22,2737 01074 0
0009          22,2740 70740 0 W&CALC LXC,1
0010 REP 2 LAST 180 22,2741 01130 1
0011 REP 1          22,2742 04772 1
0012          22,2743 45002 1
0013 REP 3 LAST 388 22,2744 44530 1
                                SR4
                                DELCOMP
A0014
0015          22,2745 74343 0
0016 REP 2 LAST 405 22,2746 04772 1
0017 REP 46 LAST 402 22,2747 03343 0
                                DLOAD* VXSC
                                ARATE,1
                                COP
0018          22,2750 77721 0
                                MKV
                                QUADROT
0019 REP 1          22,2751 05004 0
                                STODL BRATE
0020 REP 1          22,2752 17311 1
                                AM
0021 REP 4 LAST 393 22,2753 03385 1
                                DMP DDV*
                                ANCLTIME
                                ARATE,1
0022          22,2754 55605 1
0023 REP 1          22,2755 05002 0
                                SR
0024 REP 3 LAST 405 22,2756 04772 1
                                5
0025          22,2757 77661 0
                                STODL TM
0026          22,2760 20606 0
                                BRATE
0027 REP 1          22,2761 27317 1
                                VXSC
0028 REP 2 LAST 405 22,2762 03311 1
                                BIASCALE
0029          22,2763 77761 1
                                STORE BIASTEMP
0030 REP 1          22,2764 05026 0
                                SETOO
0031 REP 1          22,2765 03275 1
                                CALCMAN2
                                NEWANCL +1
                                ARATE 2DEC .0022222222
                                = .05 DEG/SEC
                                2DEC .00888888889
                                = .2 DEG/SEC
                                2DEC .02222222222
                                = .5 DEG/SEC
                                2DEC .17777777777
                                = 4 DEG/SEC
                                $ 22.5 DEG/SEC
                                ANCLTIME 2DEC .000190735
                                = 100R - 19
                                MANUVER ANGLE TO MANUVER TIME
A0032
0033          22,2766 77614 1
0034 REP 1          22,2767 01035 0
0035 REP 1          22,2770 45033 0
0036          22,2771 00044 1
0036          22,2772 15053 0
0037          22,2773 00221 0
0037          22,2774 24255 0
0038          22,2775 00564 0
0038          22,2776 02660 0
0039          22,2777 05540 0
0039          22,3000 26603 0
0040          22,3001 00003 1
0040          22,3002 04000 0
A0041

```

COMPUTE THE INCREMENTAL ROTATION MATRIX DEL CORRESPONDING TO A 1 SEC ROTATION ABOUT COP

ATTITUDE ERROR BIAS TO PREVENT OVERSHOOT IN SYSTEM
 STATE SWITCH CALCMAN2 (43D)
 0(OFF) = BYPASS STARTING PROCEDURE
 1(ON) = START MANUVER
 = .05 DEG/SEC
 = .2 DEG/SEC
 = .5 DEG/SEC
 = 4 DEG/SEC \$ 22.5 DEG/SEC
 = 100R - 19
 MANUVER ANGLE TO MANUVER TIME



L GIMBAL LOCK AVOIDANCE

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| | | | | | | |
|------|---------|---------|----------|------|-------------|--|
| 0042 | 22,3003 | 03148 1 | QUADROT | 2DEC | .1 | ROTATION MATRIX FROM S/C AXES TO CONTROL |
| 0042 | 22,3004 | 14632 0 | | | | AXES (X ROT = -7.25 DEG) |
| 0043 | 22,3005 | 00000 1 | | 2DEC | 0 | |
| 0043 | 22,3006 | 00000 1 | | | | |
| 0044 | 22,3007 | 00000 1 | | 2DEC | 0 | |
| 0044 | 22,3010 | 00000 1 | | | | |
| 0045 | 22,3011 | 00000 1 | | 2DEC | 0 | |
| 0045 | 22,3012 | 00000 1 | | | | |
| 0046 | 22,3013 | 03131 1 | | 2DEC | .099200 | = (.1)COS7.25 |
| 0046 | 22,3014 | 11275 1 | | | | |
| 0047 | 22,3015 | 77461 1 | | 2DEC | -.012620 | = -(.1)SIN7.25 |
| 0047 | 22,3016 | 47370 0 | | | | |
| 0048 | 22,3017 | 00000 1 | | 2DEC | 0 | |
| 0048 | 22,3020 | 00000 1 | | | | |
| 0049 | 22,3021 | 00316 0 | | 2DEC | .012620 | (.1)SIN7.25 |
| 0049 | 22,3022 | 30407 1 | | | | |
| 0050 | 22,3023 | 03131 1 | | 2DEC | .099200 | (.1)COS7.25 |
| 0050 | 22,3024 | 11275 1 | | | | |
| 0051 | 22,3025 | 00004 0 | BIASCALR | 2DEC | .0002543132 | = (450/180)(1/0.6)(1/16384) |
| 0051 | 22,3026 | 05253 0 | | | | |

L KALOMANU STEERING

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R0001 GENERATION OF STEERING COMMANDS FOR DIGITAL AUTOPILOT FREE FALL MANEUVERS

R0003 NEW COMMANDS WILL BE GENERATED EVERY ONE SECOND DURING THE MANEUVER

| | | | | | | | | | |
|------|-----|----|---------|-------------|----------|----------|-------------|----------|--|
| 0004 | | | 15,2000 | | | BANK | 15 | | |
| 0005 | REP | 4 | LAST | 405 | 22,2000 | SETLOC | KALOMAN1 | | |
| 0006 | | | | | 22,3027 | BANK | | | |
| 0007 | REP | 10 | LAST | 405 | 56,1661 | BRANK | BCDU | | |
| 0008 | REP | 4 | LAST | 400 TO 407' | 191 535* | COUNT | 22/KALC | | |
| 0009 | REP | 2 | LAST | 393 | 22,3027 | 4 1332 0 | NEWDELHI CS | HOLDFLAG | SEE IF MANEUVER HAS BEEN INTERRUPTED |
| 0010 | | | | | 22,3030 | 0 0008 1 | EXTEND | | BY ASTRONAUT |
| 0011 | REP | 2 | LAST | 393 | 22,3031 | 6 2725 0 | BZMF | NCOO -2 | IF SO, TERMINATE KALOMANU |
| 0012 | REP | 12 | LAST | 392 | 22,3032 | 0 6006 1 | NEWANGL | TC | INTERPRET |
| 0013 | | | | | 22,3033 | 75160 1 | AXC,1 | AXC,2 | |
| 0014 | REP | 13 | LAST | 392 | 22,3034 | 03320 0 | MIS | | COMPUTE THE NEW MATRIX FROM S/C TO |
| 0015 | REP | 12 | LAST | 402 | 22,3035 | 03425 1 | DEL | | STABLE MEMBER AXES |
| 0016 | | | | | 22,3036 | 77624 1 | CALL | | |
| 0017 | REP | 4 | LAST | 392 | 22,3037 | 44304 0 | MCM3 | | |
| 0018 | | | | | 22,3040 | 45575 1 | VLOAD | STADR | |
| 0019 | REP | 14 | LAST | 407 | 22,3041 | 50442 0 | STOVL | MIS +12D | CALCULATE NEW DESIRED CDU ANGLES |
| 0020 | | | | | 22,3042 | 77628 0 | STADR | | |
| 0021 | REP | 15 | LAST | 407 | 22,3043 | 50450 0 | STOVL | MIS +6D | |
| 0022 | | | | | 22,3044 | 77628 0 | STADR | | |
| 0023 | REP | 10 | LAST | 407 | 22,3045 | 74456 0 | STORE | MIS | |
| 0024 | | | | | 22,3046 | 45160 1 | AXC,1 | CALL | |
| 0025 | REP | 17 | LAST | 407 | 22,3047 | 03320 0 | MIS | | |
| 0026 | REP | 2 | LAST | 388 | 22,3050 | 44655 1 | DOMTODU | | PICK UP THE NEW CDU ANGLES FROM MATRIX |
| 0027 | | | | | 22,3051 | 77634 0 | RTB | | |
| 0028 | REP | 2 | LAST | 388 | 22,3052 | 45547 0 | VISTO2S | | |
| 0029 | REP | 1 | | | 22,3053 | 03267 1 | STORE | NCDU | NEW CDU ANGLES |
| 0030 | | | | | 22,3054 | 77414 0 | BONCLR | EXIT | |
| 0031 | REP | 2 | LAST | 405 | 22,3055 | 01215 0 | CALOMAN2 | | |
| 0032 | REP | 1 | | | 22,3056 | 45142 1 | MANUSTAT | | TO START MANEUVER |
| 0033 | REP | 24 | LAST | 404 | 22,3057 | 3 4711 1 | CAP | TWO | +0 OTHERWISE |
| 0034 | REP | 2 | LAST | 112 | 22,3060 | 55=664 0 | INCRCDU | TS | KSPNDX |
| 0035 | | | | | 22,3061 | 6 0000 1 | DOUBLE | | |
| 0036 | REP | 2 | LAST | 112 | 22,3062 | 55=665 1 | TS | KDPNDX | |
| 0037 | REP | 3 | LAST | 407 | 22,3063 | 51=664 1 | INDEX | KSPNDX | |
| 0038 | REP | 2 | LAST | 407 | 22,3064 | 3 1666 0 | CA | NCDU | NEW DESIRED CDU ANGLES |
| 0039 | | | | | 22,3065 | 0 0006 1 | EXTEND | | |
| 0040 | REP | 4 | LAST | 407 | 22,3066 | 5 1664 1 | INDEX | KSPNDX | |
| 0041 | REP | 11 | LAST | 407 | 22,3067 | 21=661 0 | MSU | BCDU | INITIAL S/C ANGLE OR PREVIOUS DESIRED |
| 0042 | | | | | 22,3070 | 0 0006 1 | EXTEND | | CDU ANGLES |
| 0043 | REP | 1 | | | 22,3071 | 7 3141 1 | MP | DT/TAU | |
| 0044 | REP | 3 | LAST | 407 | 22,3072 | 51=665 0 | INDEX | KDPNDX | |
| 0045 | REP | 2 | LAST | 107 | 22,3073 | 53=578 0 | DXCH | DELCDU | ANGLE INCREMENTS TO BE ADDED TO |



L KALCHMANU STEERING

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| | | | | | | | | | |
|------|-----|----|------|-----|---------|--------|---|-------|----------|
| 0046 | REP | 5 | LAST | 407 | 22,3074 | 51=664 | 1 | INDEX | KSPNDX |
| 0047 | REP | 3 | LAST | 407 | 22,3075 | 3 1666 | 0 | CA | NCDU |
| 0048 | REP | 6 | LAST | 408 | 22,3076 | 51=664 | 1 | INDEX | KSPNDX |
| 0049 | REP | 12 | LAST | 407 | 22,3077 | 57=661 | 1 | XCH | BCDU |
| 0050 | REP | 4 | LAST | 407 | 22,3100 | 51=665 | 0 | INDEX | KSPNDX |
| 0051 | REP | 2 | LAST | 108 | 22,3101 | 55=646 | 0 | TS | COLND |
| 0052 | REP | 7 | LAST | 408 | 22,3102 | 11=664 | 0 | CCS | KSPNDX |
| 0053 | REP | 1 | | | 22,3103 | 1 3060 | 0 | TCF | INCRDCDU |

DCDU EVERY TENTH SEC
BY LEM DAP

LOOP FOR THREE AXES

0054 22,3104 0 0003 1 RELINT
 0055 COMPARE PRESENT TIME WITH TIME TO TERMINATE MANEUVER

| | | | | | | | | | | |
|------|-----|-----|------|-----|---------|--------|----|----------|----------|-----------|
| 0056 | REP | 1 | | | 22,3105 | 0 3115 | 1 | MANUCHK | TC | TIMECHK |
| 0057 | REP | 1 | | | 22,3106 | 1 3206 | -1 | TCF | CONTMANU | |
| 0058 | REP | 52 | LAST | 393 | 22,3107 | 3 4712 | 1 | CAP | ONE | |
| 0060 | REP | 16 | LAST | 404 | 22,3110 | 0 5140 | 1 | MANUSTAL | TC | WAITLIST |
| 0061 | REP | 13 | LAST | 408 | 22,1661 | | | BRANK | BCDU | |
| 0062 | REP | 1 | | | 22,3111 | 03232 | 1 | ZCADR | MANUSTOP | |
| 0062 | REP | 1 | | | 22,3112 | 44106 | 0 | | | |
| 0063 | REP | 1 | | | 22,3113 | 0 0003 | 1 | RELINT | | |
| 0064 | REP | 51 | LAST | 404 | 22,3114 | 1 5112 | 1 | TCF | ENDOFJOB | |
| 0065 | REP | 1 | | | 22,3115 | 0 0006 | 1 | TIMECHK | EXTEND | |
| 0066 | REP | 11 | LAST | 374 | 22,3116 | 4 0025 | 1 | DCS | TIME2 | |
| 0067 | REP | 1 | | | 22,3117 | 53=673 | 0 | DACH | TTEMP | |
| 0068 | REP | 1 | | | 22,3120 | 0 0006 | 1 | EXTEND | | |
| 0069 | REP | 2 | LAST | 405 | 22,3121 | 3 1717 | 1 | DCA | TM | |
| 0070 | REP | 2 | LAST | 408 | 22,3122 | 21=673 | 0 | DAS | TTEMP | |
| 0071 | REP | 3 | LAST | 408 | 22,3123 | 11=672 | 1 | CCS | TTEMP | |
| 0072 | REP | 138 | LAST | 384 | 22,3124 | 0 0002 | 0 | TC | O | |
| 0073 | REP | 1 | | | 22,3125 | 1 3127 | 1 | TCF | +2 | |
| 0074 | REP | 1 | | | 22,3126 | 1 3137 | 0 | TCF | 2NDRETRN | |
| 0075 | REP | 4 | LAST | 408 | 22,3127 | 11=673 | 0 | CCS | TTEMP +1 | |
| 0076 | REP | 139 | LAST | 408 | 22,3130 | 0 0002 | 0 | TC | O | |
| 0077 | REP | 1 | | | 22,3131 | 1 3133 | 1 | TCF | MANUOFF | |
| 0078 | REP | 1 | | | 22,3132 | 4 0000 | 0 | CCM | | |
| 0079 | REP | 1 | | | 22,3133 | 6 3205 | 0 | MANUOFF | AD | ONESEC +1 |
| 0080 | REP | 1 | | | 22,3134 | 0 0006 | 1 | EXTEND | | |
| 0081 | REP | 2 | LAST | 408 | 22,3135 | 6 3137 | 1 | BZMP | 2NDRETRN | |
| 0082 | REP | 140 | LAST | 408 | 22,3136 | 24 002 | 0 | INCR | O | |
| 0083 | REP | 141 | LAST | 408 | 22,3137 | 24 002 | 0 | 2NDRETRN | INCR | O |
| 0084 | REP | 142 | LAST | 408 | 22,3140 | 0 0002 | 0 | TC | O | |
| 0085 | REP | 1 | | | 22,3141 | 03146 | 1 | DT/TAU | DEC | .1 |
| 0086 | REP | 1 | | | 22,3142 | 77776 | 1 | MANUSTAT | EXIT | |
| 0087 | REP | 1 | | | 22,3143 | 0 0006 | 1 | EXTEND | | |
| 0088 | REP | 12 | LAST | 408 | 22,3144 | 3 0025 | 0 | DCA | TIME2 | |
| 0089 | REP | 3 | LAST | 408 | 22,3145 | 21=717 | 0 | DAS | TM | |
| 0090 | REP | 1 | | | 22,3146 | 0 0006 | 1 | EXTEND | | |

INITIALIZATION ROUTINE
FOR AUTOMATIC MANEUVERS

TM+TO MANEUVER COMPLETION TIME

L KALOMNU STEERING

USER=8 PAGE NO. 3 Pg 24

| | | | | | | | | | | |
|------|-----|-----|------|-----|---------|--------|---|-----------|-------------|--------------------------------------|
| 0091 | REP | 2 | LAST | 408 | 22,3147 | 4 3205 | 1 | DCS | ONESEC | |
| 0092 | REP | 4 | LAST | 408 | 22,3150 | 21-717 | 0 | DAS | TM | (TM+T0)-1 |
| 0093 | | | | | 22,3151 | 0 0004 | 0 | INHINT | | |
| 0094 | REP | 53 | LAST | 408 | 22,3152 | 4 4712 | 0 | CS | ONE | ENABLE AUTOPILOT TO PERFORM |
| 0095 | REP | 3 | LAST | 407 | 22,3153 | 55-332 | 0 | TS | HOLDFLAG | AUTOMATIC MANEUVERS |
| 0096 | REP | 3 | LAST | 405 | 22,3154 | 4 1130 | 0 | CS | RATEINDX | SEE IP MANEUVERING AT HIGH RATE |
| 0097 | REP | 15 | LAST | 345 | 22,3155 | 6 6211 | 0 | AD | SIX | |
| 0098 | | | | | 22,3156 | 0 0006 | 1 | EXTEND | | |
| 0099 | REP | 1 | | | 22,3157 | 6 3161 | 1 | BZMP | HIGHGAIN | |
| 0100 | | | | | 22,3160 | 1 3164 | 0 | TCP | +4 | |
| 0101 | REP | 1 | | | 22,3161 | 4 1501 | 0 | HIGHGAIN | CS | IF SO, SET HIGH RATE FLAG (BIT 15 OF |
| 0102 | REP | 29 | LAST | 381 | 22,3162 | 7 4674 | 1 | MARK | BIT15 | RCSPLAGS) |
| 0103 | REP | 2 | LAST | 409 | 22,3163 | 27-501 | 0 | ADS | RCSPLAGS | |
| 0104 | REP | 3 | LAST | 405 | 22,3164 | 53-711 | 0 | DXCH | BRATE | X-AXIS MANEUVER RATE |
| 0105 | REP | 6 | LAST | 173 | 22,3165 | 53-528 | 0 | DXCH | WBODY | |
| 0106 | REP | 4 | LAST | 409 | 22,3166 | 53-713 | 1 | DXCH | BRATE +2 | Y-AXIS MANEUVER RATE |
| 0107 | REP | 1 | | | 22,3167 | 53-530 | 1 | DXCH | WBODY1 | |
| 0108 | REP | 5 | LAST | 409 | 22,3170 | 53-715 | 1 | DXCH | BRATE +4 | Z-AXIS MANEUVER RATE |
| 0109 | REP | 2 | LAST | 106 | 22,3171 | 53-532 | 0 | DXCH | WBODY2 | |
| 0110 | REP | 2 | LAST | 405 | 22,3172 | 3 1675 | 1 | CA | BIASTEMP +1 | INSERT ATTITUDE ERROR BIASES |
| 0111 | REP | 2 | LAST | 107 | 22,3173 | 55-564 | 0 | TS | BIAS | INTO AUTOPILOT |
| 0112 | REP | 3 | LAST | 409 | 22,3174 | 3 1677 | 0 | CA | BIASTEMP +3 | |
| 0113 | REP | 2 | LAST | 107 | 22,3175 | 55-565 | 1 | TS | BIAS1 | |
| 0114 | REP | 4 | LAST | 409 | 22,3176 | 3 1701 | 0 | CA | BIASTEMP +5 | |
| 0115 | REP | 2 | LAST | 107 | 22,3177 | 55-566 | 1 | TS | BIAS2 | |
| 0116 | REP | 5 | LAST | 299 | 22,3200 | 3 0025 | 0 | CA | TIME1 | |
| 0117 | REP | 3 | LAST | 409 | 22,3201 | 6 3205 | 0 | AD | ONESEC +1 | |
| 0118 | REP | 1 | | | 22,3202 | 57-671 | 0 | XCH | NEXTIME | |
| 0119 | REP | 2 | LAST | 408 | 22,3203 | 1 3057 | 1 | TCP | INCRDCDU -1 | |
| 0120 | | | | | 22,3204 | 00000 | 1 | ONESEC | DEC | 0 |
| 0121 | | | | | 22,3205 | 60144 | 0 | DEC | DEC | 100 |
| 0122 | | | | | 22,3206 | 0 0004 | 0 | CONTIMANU | INHINT | CONTINUE WITH UPDATE PROCESS |
| 0123 | REP | 6 | LAST | 409 | 22,3207 | 4 0025 | 1 | CS | TIME1 | |
| 0124 | REP | 2 | LAST | 409 | 22,3210 | 6 1671 | 0 | AD | NEXTIME | |
| 0125 | REP | 129 | LAST | 384 | 22,3211 | 10 000 | 0 | CCS | A | |
| 0126 | REP | 54 | LAST | 409 | 22,3212 | 6 4712 | 1 | AD | ONE | |
| 0127 | REP | 1 | | | 22,3213 | 1 3216 | 0 | TCP | MANUCALL | |
| 0128 | REP | 1 | | | 22,3214 | 6 4674 | 0 | AD | NEXMAX | |
| 0129 | | | | | 22,3215 | 4 0000 | 0 | COM | | |
| 0130 | REP | 17 | LAST | 408 | 22,3216 | 0 5140 | 1 | MANUCALL | TC | WAITLIST |
| 0131 | REP | 14 | LAST | 408 | 22,3216 | 1661 | | BRANK= | RDUJ | |
| 0132 | REP | 1 | | | 22,3217 | 03225 | 1 | 2CADR | UPDTCALL | |
| 0132 | REP | 1 | | | 22,3220 | 44106 | 0 | | | |
| 0133 | | | | | 22,3221 | 0 0003 | 1 | RELINT | | |
| 0134 | REP | 4 | LAST | 409 | 22,3222 | 3 3205 | 0 | CAP | ONESEC +1 | INCREMENT TIME FOR NEXT UPDATE |
| 0135 | REP | 3 | LAST | 409 | 22,3223 | 27-671 | 1 | ADS | NEXTIME | |
| 0136 | REP | 52 | LAST | 408 | 22,3224 | 1 5112 | 1 | TCP | ENDOFJOB | |



L KALOMANU STEERING

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| | | | | | | | | |
|------|-----|----|------|---------|---------|--------|-------------|---------------|
| 0137 | REP | 1 | | 22,3225 | 3 7663 | 0 | UPDCALL CAP | PRI026 |
| 0138 | REP | 14 | LAST | 373 | 22,3226 | 0 5042 | 1 | TC FINDVAC |
| 0139 | REP | 15 | LAST | 409 | E6,1661 | | | BRANK= BCDU |
| 0140 | REP | 1 | | | 22,3227 | 03027 | 1 | 2CDR NEWDELHI |
| 0140 | REP | 1 | | | 22,3230 | 44106 | 0 | |
| 0141 | REP | 16 | LAST | 380 | 22,3231 | 0 5213 | 1 | TC TASKOVER |

CALL FOR UPDATE
OF STEERING COMMANDS

L KALOMANU STEERING

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P0142 ROUTINE FOR TERMINATING AUTOMATIC MANEUVERS

| | | | | | | | | | | | | |
|-------|-----|-----|------|---------|---------|--------|------|----------|----------|------------|---|----------------------------------|
| 0143 | REP | 1 | | 22,3232 | 0 | 3256 | 0 | MANUSTOP | TC | STOPYZ | | |
| 0144 | REP | 1 | | 22,3233 | 0 | 3303 | 1 | | TC | LOADYZ | | |
| 0145 | REP | 0 | LAST | 392 | 22,3234 | 3 | 1155 | 1 | ENDROLL | CA | CPHI | |
| 0146 | REP | 3 | LAST | 408 | 22,3235 | 55=646 | 0 | | TS | CDUXD | SET CDUXD TO THE COMMANDED OUTER GIMBAL | |
| 0149 | REP | 5 | LAST | 404 | 22,3236 | 0 | 3245 | 1 | | TC | STOPRATE | |
| 0150 | REP | 1 | | | 22,3237 | 3 | 1327 | 0 | ENDMANU | CA | ATTIPRIO | RESTORE USERS PRIORITY |
| 0151 | REP | 2 | LAST | 198 | 22,3240 | 54 | 063 | 0 | | TS | NEWPRIO | |
| 0152 | REP | 84 | LAST | 384 | 22,3241 | 3 | 4714 | 1 | | CA | ZERO | ZERO ATTICADR |
| 0153 | REP | 3 | LAST | 188 | 22,3242 | 53=326 | 0 | | DXCH | ATTICADR | | |
| 0154 | REP | 2 | LAST | 198 | 22,3243 | 0 | 5053 | 1 | | TC | SPVAC | RETURN TO USER OF GOMANUR |
| 0155 | REP | 17 | LAST | 410 | 22,3244 | 0 | 5213 | 1 | | TC | TASKOVER | |
| 0156 | REP | 85 | LAST | 411 | 22,3245 | 3 | 4714 | 1 | STOPRATE | CAP | ZERO | |
| 0157 | REP | 3 | LAST | 407 | 22,3246 | 55=575 | 0 | | TS | DELCDUX | | |
| 0158 | REP | 4 | LAST | 411 | 22,3247 | 55=576 | 0 | | TS | DELCDUX +1 | ZERO ROLL INCREMENTAL ANGLES | |
| 0159 | REP | 7 | LAST | 409 | 22,3250 | 55=525 | 0 | | TS | WRDXY | RATE | |
| 0160 | REP | 8 | LAST | 411 | 22,3251 | 55=526 | 0 | | TS | WRDXY +1 | | |
| 0161 | REP | 3 | LAST | 409 | 22,3252 | 55=564 | 0 | | TS | BIAS | BIAS | |
| 01611 | REP | 30 | LAST | 409 | 22,3253 | 4 | 4874 | 1 | CS | BIT15 | MAKE SURE HIGH RATE FLAG (BIT 15 OF | |
| 01612 | REP | 3 | LAST | 409 | 22,3254 | 7 | 1501 | 0 | MASK | RC8FLAGS | RC8FLAGS) IS RESET. | |
| 01613 | REP | 4 | LAST | 411 | 22,3255 | 55=501 | 0 | | TS | RC8FLAGS | | |
| 0162 | REP | 86 | LAST | 411 | 22,3256 | 3 | 4714 | 1 | STOPYZ | CAP | ZERO | |
| 0163 | REP | 2 | LAST | 107 | 22,3257 | 55=577 | 1 | | TS | DELCDUY | ZERO PITCH, YAW | |
| 0164 | REP | 3 | LAST | 411 | 22,3260 | 55=600 | 1 | | TS | DELCDUY +1 | INCREMENTAL ANGLES | |
| 0165 | REP | 2 | LAST | 107 | 22,3261 | 55=601 | 0 | | TS | DELCDUZ | | |
| 0166 | REP | 3 | LAST | 411 | 22,3262 | 55=602 | 0 | | TS | DELCDUZ +1 | | |
| 0167 | REP | 2 | LAST | 409 | 22,3263 | 55=527 | 1 | | TS | WRDXY1 | RATES | |
| 0168 | REP | 3 | LAST | 411 | 22,3264 | 55=530 | 1 | | TS | WRDXY1 +1 | | |
| 0169 | REP | 3 | LAST | 409 | 22,3265 | 55=531 | 0 | | TS | WRDXY2 | | |
| 0170 | REP | 4 | LAST | 411 | 22,3266 | 55=532 | 0 | | TS | WRDXY2 +1 | | |
| 0171 | REP | 3 | LAST | 409 | 22,3267 | 55=565 | 1 | | TS | BIAS1 | BIASES | |
| 0172 | REP | 3 | LAST | 409 | 22,3270 | 55=566 | 1 | | TS | BIAS2 | | |
| 0173 | REP | 143 | LAST | 408 | 22,3271 | 0 | 0002 | 0 | TC | 0 | | |
| 0174 | REP | 7 | LAST | 398 | 22,3272 | 3 | 0032 | 0 | ZEROEROR | CA | CDUX | PICK UP CDUX ANGLES AND STORE IN |
| 0175 | REP | 4 | LAST | 411 | 22,3273 | 55=646 | 0 | | TS | CDUXD | CDUX DESIRED | |
| 0176 | REP | 2 | LAST | 219 | 22,3274 | 3 | 0033 | 1 | | CA | CDUY | |
| 0177 | REP | 2 | LAST | 108 | 22,3275 | 55=650 | 1 | | TS | CDUYD | | |
| 0178 | REP | 8 | LAST | 398 | 22,3276 | 3 | 0034 | 0 | | CA | CDUZ | |
| 0179 | REP | 2 | LAST | 108 | 22,3277 | 55=652 | 0 | | TS | CDUZD | | |
| 0180 | REP | 144 | LAST | 411 | 22,3300 | 0 | 0002 | 0 | | TC | 0 | |



L KALOMANU STEERING

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| | | | | | | | | | |
|------|-----|-----|------|-----|---------|----------|----------|----|-------|
| 0181 | REP | 7 | LAST | 411 | 22,3301 | 3 1155 1 | LOADCDUD | CA | CPHI |
| 0182 | REP | 5 | LAST | 411 | 22,3302 | 55=646 0 | | TS | CDUD |
| 0183 | REP | 1 | | | 22,3303 | 3 1156 1 | LOADYZ | CA | CRSTA |
| 0184 | REP | 3 | LAST | 411 | 22,3304 | 55=650 1 | | TS | CDUD |
| 0185 | REP | 1 | | | 22,3305 | 3 1157 0 | | CA | CPST |
| 0186 | REP | 3 | LAST | 411 | 22,3306 | 55=652 0 | | TS | CDUD |
| 0187 | REP | 145 | LAST | 411 | 22,3307 | 0 0002 0 | | TC | 0 |

STORE TERMINAL ANGLES INTO
COMMAND ANGLES



L SYSTEM TEST STANDARD LEAD INS

USR=8 PAGE NO. 2 E5 54

P0038 E/CALL FOR CALLING A FIXED MEMORY INTERPRETIVE SUBROUTINE FROM ERASABLE AND RETURNING TO ERASABLE.

R0040 THE CALLING SEQUENCE IS...

A0041
A0042
A0043
A0044

| | | | | | | | |
|------|-----|----|------|-----|---------|----------|--------|
| 0045 | REP | 3 | LAST | 370 | 04,2576 | 22 164 1 | E/CALL |
| 0046 | REP | 45 | LAST | 376 | 04,2577 | 50 001 0 | |
| 0047 | REP | 46 | LAST | 414 | 04,2600 | 3 0001 0 | |
| 0048 | REP | 47 | LAST | 414 | 04,2601 | 24 001 0 | |
| 0049 | REP | 48 | LAST | 414 | 04,2602 | 24 001 0 | |
| 0050 | REP | 8 | LAST | 413 | 04,2603 | 52 385 0 | |
| 0051 | REP | 13 | LAST | 407 | 04,2604 | 0 6006 1 | |
| 0052 | | | | | 04,2605 | 77624 1 | |
| 0053 | REP | 9 | LAST | 414 | 04,2606 | 00364 0 | |
| 0054 | | | | | 04,2607 | 77776 1 | |
| 0055 | REP | 10 | LAST | 414 | 04,2610 | 22 385 1 | |
| 0056 | REP | 14 | LAST | 414 | 04,2611 | 1 6010 1 | |

RTS

CADR E/CALL
ROUTINE

THE INTERPRETIVE SUBROUTINE YOU WANT.
RETURNS HERE IN INTERPRETIVE.

LXCH LOC

ADRES -1 OF CADR.

INDEX L

CADR IN A.

CA L

INCR L

INCR L

RETURN ADRES IN L.

DXCH ERUP2

STORE CADR AND RETURN.

TC INTPRET

CALL

INDIRECTLY EXECUTE ROUTINE. IT MUST
LEAVE VIA RVO OR EQUIVALENT.

EXIT

PICK UP RETURN.

LXCH ERUP2 +1

SET LOC AND RETURN TO CALLER

TCP INTPRET +2

L IMU CALIBRATION AND ALIGNMENT

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R0010 NAME- IMU PERFORMANCE TESTS 2

R0011 DATE- MARCH 20, 1967

R0012 BY- SYSTEM TEST GROUP 864-8900 EXT. 1274

R0013 MODNO.- ZERO

R0014 FUNCTIONAL DESCRIPTION

R0015 POSITIONING ROUTINES FOR THE IMU PERFORMANCE TESTS AS WELL AS SOME OF
 R0016 THE TESTS THEMSELVES. FOR A DESCRIPTION OF THESE SUBROUTINES AND THE
 R0017 OPERATING PROCEDURES (TYPICALLY) SEE STG MEMO 685.THEORETICAL REF.6-1973

| | | | | | | | | | | |
|--------|-----|----|------|---------|--------|------|--------|----------|------------|--|
| 0018 | | | | 33,2004 | | | BANK | 33 | | |
| 0019 | REF | 1 | | 33,2000 | | | SETLOC | IMCAL | | |
| 0020 | | | | 33,2004 | | | BANK | | | |
| 0021 | REF | 1 | | 55,1423 | | | BRANK= | POSITON | | |
| 0022 | REF | 87 | LAST | 33,2004 | 3 | 4714 | 1 | IMUTEST | CA | ZERO |
| 0023 | REF | 1 | | 33,2005 | 55=452 | 1 | | TS | DRIFTT | |
| 0024 | REF | 1 | | 33,2006 | 55=843 | 0 | | TS | GROCOMP1 | |
| 00241 | REF | 1 | | 33,2007 | 3 | 2443 | 0 | CAP | TESTTIME | |
| 00242 | REF | 1 | | 33,2010 | 55=412 | 0 | | TS | LENGTHOT | |
| 00243 | REF | 1 | | 33,2011 | 0 | 2302 | 1 | TC | COALIGN | TAKE CARE OF DRIFT FLAG |
| 0025 | REF | 1 | | 33,2012 | 3 | 4734 | 0 | CAP | 1SECK | |
| 0026 | REF | 1 | | 33,2013 | 55=644 | 1 | | TS | 1SECKT1 | |
| 00261 | REF | 1 | | 33,2014 | 3 | 2441 | 1 | CA | OC14400 | |
| 00262 | REF | 7 | LAST | 33,2015 | 55=074 | 1 | | TS | 1/PIPADT | |
| 0027 | REF | 15 | LAST | 33,2016 | 0 | 6006 | 1 | GUESS | TC | CALCULATE -COS LATITUDE AND SIN LATITUDE |
| 002701 | | | | 33,2017 | 77624 | 1 | | CALL | | |
| 0028 | REF | 1 | | 33,2020 | 10617 | 0 | | | LATAZCK | |
| 0029 | | | | 33,2021 | 57546 | 1 | | COS | DCOMP | |
| 0030 | | | | 33,2022 | 77752 | 1 | | SL1 | | |
| 0031 | REF | 1 | | 33,2023 | 16447 | 1 | | STODL | WANGI | |
| 0032 | REF | 1 | | 33,2024 | 02403 | 1 | | | LATITUDE | |
| 0033 | | | | 33,2025 | 72556 | 1 | | SIN | SL1 | |
| 0034 | REF | 1 | | 33,2026 | 02445 | 0 | | STORE | WANGO | |
| 0035 | | | | 33,2027 | 77776 | 1 | | EXIT | | |
| 0036 | REF | 59 | LAST | 33,2030 | 0 | 4555 | 0 | GEOIMUTT | TC | GYROCOMPASS COMRS IN HERE |
| 0037 | REF | 2 | LAST | 33,2031 | 16516 | 1 | | CADR | IMIZERO | |
| 0038 | REF | 1 | | 33,2032 | 0 | 2316 | 1 | TC | IMUSTLIG | |
| 0039 | REF | 88 | LAST | 33,2033 | 3 | 4714 | 1 | IMURACK | CA | ZERO |
| 0040 | REF | 1 | | 33,2034 | 55=421 | 0 | | TS | NDXCTR | |
| 0041 | REF | 1 | | 33,2035 | 55=450 | 0 | | TS | TORONDX | |
| 0042 | REF | 2 | LAST | 33,2036 | 55=451 | 1 | | TS | TORONDX +1 | |
| 0043 | REF | 1 | | 33,2037 | 3 | 4375 | 1 | NRPOSPI | CA | DEC17 |
| 0044 | REF | 1 | | 33,2040 | 55=655 | 1 | | TS | ZERONDX1 | |
| 0045 | REF | 1 | | 33,2041 | 3 | 2445 | 0 | CA | XNRADR | |



L IMJ CALIBRATION AND ALIGNMENT

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| | | | | | | | | |
|--------|-----|----|----------|---------|----------|---------------|------------|--------------------------------------|
| 0046 | REP | 1 | | 33,2042 | 0 2356 0 | TC | ZEROING | |
| 0047 | REP | 1 | | 33,2043 | 3 4675 1 | CA | HALF | |
| 0048 | REP | 2 | LAST 282 | 33,2044 | 55-713 1 | TS | XNB | |
| 0049 | REP | 16 | LAST 416 | 33,2045 | 0 6006 1 | TC | INTPRET | |
| 0050 | | | | 33,2046 | 73545 1 | DLOAD | SIN | |
| 0051 | REP | 1 | | 33,2047 | 02401 0 | | AZIMJH | |
| 0052 | REP | 2 | LAST 282 | 33,2050 | 02724 1 | STORE | YNB +2 | |
| 0053 | REP | 2 | LAST 282 | 33,2051 | 16734 0 | STOCL | ZNB +4 | |
| 0054 | REP | 2 | LAST 417 | 33,2052 | 02401 0 | | AZIMJH | |
| 0055 | | | | 33,2053 | 77746 1 | COS | | |
| 0056 | REP | 3 | LAST 417 | 33,2054 | 02726 0 | STORE | YNB +4 | |
| 0057 | | | | 33,2055 | 77676 0 | DCOMP | | |
| 0058 | REP | 3 | LAST 417 | 33,2056 | 02732 0 | STORE | ZNB +2 | |
| 00581 | | | | 33,2057 | 77776 1 | EXIT | | |
| 00582 | REP | 8 | LAST 261 | 33,2060 | 0 5253 0 | TC | CHEQOM | |
| 00583 | | | | 33,2061 | 00003 1 | MM | 03 | SEE IF IN OPTICAL VERIFICATION |
| 00584 | | | | 33,2062 | 1 2064 0 | TCF | +2 | NO |
| 00585 | REP | 1 | | 33,2063 | 1 3432 0 | TCF | SETNPOS +1 | YES |
| 00586 | REP | 17 | LAST 417 | 33,2064 | 0 6006 1 | TC | INTPRET | |
| 00587 | | | | 33,2065 | 77624 1 | CALL | | |
| 0059 | REP | 1 | | 33,2066 | 47244 0 | | CALCOA | |
| 0060 | | | | 33,2067 | 77776 1 | EXIT | | |
| 0061 | REP | 60 | LAST 416 | 33,2070 | 0 4555 0 | TC | BANKCALL | |
| 0062 | REP | 2 | LAST 235 | 33,2071 | 16602 1 | CADR | IMJCOARS | |
| 0063 | REP | 35 | LAST 377 | 33,2072 | 3 4675 1 | CAP | BIT14 | IF BIT14 SET, GIMRAL LOCK |
| 0064 | REP | 1 | | 33,2073 | 7 0077 0 | MAK | FLAGWD3 | |
| 0065 | | | | 33,2074 | 0 0006 1 | EXTEND | | |
| 0066 | | | | 33,2075 | 1 2077 1 | BZF | +2 | |
| 0067 | REP | 2 | LAST 416 | 33,2076 | 25-421 1 | INCR | NDXCTR | +1 IF IN GIMRAL LOCK, OTHERWISE 0 |
| 0068 | REP | 20 | LAST 384 | 33,2077 | 0 5447 0 | TC | DOWNFLAG | RESET GIMRAL LOCK FLAG |
| 0069 | REP | 1 | | 33,2100 | 00056 1 | ADRES | GLOKPAI | BIT 14 FLAG 3 |
| 0070 | REP | 2 | LAST 416 | 33,2101 | 0 2316 1 | TC | IMUSTLLG | |
| 0071 | REP | 3 | LAST 417 | 33,2102 | 11-421 0 | CCS | NDXCTR | IF ONE GO AND DO A PIPA TEST ONLY |
| 0072 | REP | 1 | | 33,2103 | 0 2131 0 | TC | PIPACK | ALIGN AND MEASURE VERTICAL PIPA RATE |
| 0074 | REP | 61 | LAST 417 | 33,2104 | 0 4555 0 | TC | BANKCALL | |
| 0075 | REP | 2 | LAST 237 | 33,2105 | 17012 1 | CADR | IMUFINE | |
| 0076 | REP | 3 | LAST 417 | 33,2106 | 0 2316 1 | TC | IMUSTLLG | |
| 0077 | | | | 33,2107 | 0 0006 1 | EXTEND | | |
| 00771 | REP | 1 | | 33,2110 | 3 1657 1 | DCA | PERFDLAY | |
| 00772 | REP | 1 | | 33,2111 | 0 5231 1 | TC | LONGCALL | |
| 00773 | REP | 2 | LAST 416 | ES,1423 | | ERANK= | POSITON | |
| 00774 | REP | 1 | | 33,2112 | 02116 0 | 2CADR | GORSTIMS | |
| 00774 | REP | 1 | | 33,2113 | 66065 1 | | | |
| 00775 | REP | 1 | | 33,2114 | 3 2121 1 | CA | ESTICADR | |
| 00776 | REP | 3 | LAST 376 | 33,2115 | 0 5070 0 | TC | JORSLEPP | |
| 00777 | REP | 2 | LAST 417 | 33,2116 | 3 2121 1 | GORSTIMS CA | ESTICADR | |
| 00778 | REP | 4 | LAST 415 | 33,2117 | 0 5074 1 | TC | JORWAKE | |
| 00779 | REP | 16 | LAST 411 | 33,2120 | 0 5213 1 | TC | TASKOVER | |
| 007791 | REP | 1 | | 33,2121 | 66453 0 | ESTICADR CADR | ESTIMS | |



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| | | | | | | | | | | |
|-------|-----|----|------|-----|---------|--------|---|----------|--------|------------|
| 0078 | REP | 89 | LAST | 416 | 33,2122 | 3 4714 | 1 | TORQUE | CA | ZERO |
| 0079 | REP | 7 | LAST | 278 | 33,2123 | 55=050 | 1 | | TS | DSPTEN2 |
| 0080 | REP | 1 | | | 33,2124 | 3 1514 | 0 | | CA | DRIFT1 |
| 0081 | REP | 8 | LAST | 418 | 33,2125 | 55=051 | 0 | | TS | DSPTEN2 +1 |
| 0082 | REP | 3 | LAST | 417 | 33,2128 | 51=423 | 0 | | INDEX | POSITON |
| 0083 | REP | 2 | LAST | 96 | 33,2127 | 55=430 | 0 | | TS | SOUTHER -1 |
| 0084 | REP | 1 | | | 33,2130 | 0 2427 | 1 | | TC | SHOW |
| 0085 | REP | 4 | LAST | 417 | 33,2131 | 51=421 | 1 | PIPACR | INDEX | NDXCTR |
| 0086 | | | | | 33,2132 | 0 2133 | 1 | | TC | +1 |
| 0087 | REP | 1 | | | 33,2133 | 0 2417 | 1 | | TC | EARTH* |
| 0090 | REP | 1 | | | 33,2134 | 3 4374 | 0 | | CA | DECS7 |
| 0091 | REP | 2 | LAST | 416 | 33,2135 | 55=412 | 0 | | TS | LENGHOT |
| 0092 | REP | 55 | LAST | 409 | 33,2136 | 3 4712 | 1 | | CA | ONE |
| 0093 | REP | 1 | | | 33,2137 | 55=547 | 1 | | TS | RESULTCT |
| 0094 | REP | 90 | LAST | 418 | 33,2140 | 3 4714 | 1 | | CA | ZERO |
| 0095 | REP | 1 | | | 33,2141 | 51=422 | 1 | | INDEX | PIPINDEX |
| 0096 | REP | 2 | LAST | 266 | 33,2142 | 54 037 | 1 | | TS | PIPAK |
| 0097 | REP | 1 | | | 33,2143 | 55=502 | 0 | | TS | DATAPL |
| 00971 | REP | 2 | LAST | 418 | 33,2144 | 55=506 | 1 | | TS | DATAPL +4 |
| 0098 | REP | 1 | | | 33,2145 | 0 2321 | 0 | | TC | CHECKO |
| 0099 | | | | | 33,2146 | 0 0004 | 0 | | | |
| 0100 | REP | 25 | LAST | 407 | 33,2147 | 3 4711 | 1 | | IMHINT | |
| 0101 | REP | 1 | | | 33,2150 | 0 5130 | 0 | | CAP | TWO |
| 0102 | REP | 16 | LAST | 413 | ES,1671 | | | | TC | TWIDDLE |
| 0103 | REP | 1 | | | 33,2151 | 02153 | 1 | | BRANK= | XSM |
| 0105 | REP | 53 | LAST | 409 | 33,2152 | 0 5112 | 0 | | ADRES | PIPATASK |
| 0106 | | | | | 33,2153 | 0 0006 | 1 | PIPATASK | TC | ENDOPJOR |
| 0107 | REP | 3 | LAST | 418 | 33,2154 | 27=412 | 0 | | EXTEND | |
| 01071 | REP | 4 | LAST | 418 | 33,2155 | 3 1412 | 1 | | DIM | LENGHOT |
| 0108 | | | | | 33,2156 | 0 0006 | 1 | | CA | LENGHOT |
| 0109 | REP | 1 | | | 33,2157 | 6 2163 | 1 | | EXTEND | |
| 0110 | REP | 26 | LAST | 381 | 33,2160 | 3 4701 | 0 | | RZMP | STARTPIP |
| 0111 | REP | 2 | LAST | 418 | 33,2161 | 0 5130 | 0 | | CAP | RIT10 |
| 0112 | REP | 17 | LAST | 418 | ES,1671 | | | | TC | TWIDDLE |
| 0113 | REP | 2 | LAST | 418 | 33,2162 | 02153 | 1 | | BRANK= | XSM |
| 0114 | REP | 2 | LAST | 241 | 33,2163 | 3 4675 | 1 | STARTPIP | ADRES | PIPATASK |
| 0115 | REP | 15 | LAST | 410 | 33,2164 | 0 5042 | 1 | | CAP | PRIO20 |
| 0116 | REP | 18 | LAST | 418 | ES,1671 | | | | TC | FINDVAC |
| 0117 | REP | 1 | | | 33,2165 | 02170 | 0 | | BRANK= | XSM |
| 0117 | REP | 1 | | | 33,2166 | 66065 | 1 | | 2CADR | PIPJORB |
| 0118 | REP | 19 | LAST | 417 | 33,2167 | 0 5213 | 1 | | TC | TASKOVER |
| 0119 | REP | 5 | LAST | 418 | 33,2170 | 51=421 | 1 | PIPJORB | INDEX | NDXCTR |
| 0120 | | | | | 33,2171 | 0 2172 | 1 | | TC | +1 |
| 0121 | REP | 2 | LAST | 418 | 33,2172 | 0 2417 | 1 | | TC | EARTH* |
| 0122 | REP | 5 | LAST | 418 | 33,2173 | 3 1412 | 1 | | CA | LENGHOT |
| 0123 | | | | | 33,2174 | 0 0006 | 1 | | EXTEND | |
| 0124 | | | | | 33,2175 | 6 2177 | 1 | | RZMP | +2 |
| 0125 | REP | 54 | LAST | 418 | 33,2176 | 0 5112 | 0 | | TC | ENDOPJOR |
| 0126 | REP | 7 | LAST | 338 | 33,2177 | 3 4715 | 0 | | CA | FIVE |

PIPA TEST

PIP PULSE CATCHING ROUTINE

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| | | | | | | | | | | |
|------|-----|----|------|-----|---------|--------|---|----------|------------|--|
| 0127 | REP | 2 | LAST | 418 | 33,2200 | 55=547 | 1 | TS | RESULTOT | |
| 0128 | REP | 2 | LAST | 418 | 33,2201 | 0 2321 | 0 | TC | CHECKG | |
| 0134 | | | | | 33,2202 | 0 0006 | 1 | EXTEND | | |
| 0135 | REP | 3 | LAST | 418 | 33,2203 | 4 1503 | 1 | DCS | DATAPL | |
| 0136 | REP | 4 | LAST | 419 | 33,2204 | 21=507 | 0 | DAS | DATAPL +4 | |
| 0137 | REP | 18 | LAST | 417 | 33,2205 | 0 6008 | 1 | TC | INTPRST | |
| 0139 | | | | | 33,2206 | 45345 | 1 | DLOAD | DSU | |
| 0139 | REP | 5 | LAST | 419 | 33,2207 | 02511 | 0 | | DATAPL +6 | |
| 0140 | REP | 6 | LAST | 419 | 33,2210 | 02505 | 0 | | DATAPL +2 | |
| 0141 | | | | | 33,2211 | 45044 | 0 | RPL | CALL | |
| 0142 | REP | 1 | | | 33,2212 | 66214 | 0 | | AINOON | |
| 0143 | REP | 1 | | | 33,2213 | 66276 | 1 | | OVERFIX | |
| 0144 | | | | | 33,2214 | 56325 | 0 | AINOON | PODL | DDV |
| 0145 | REP | 7 | LAST | 419 | 33,2215 | 02507 | 1 | | DATAPL +4 | |
| 0146 | | | | | 33,2216 | 57212 | 1 | SL4 | DMPR | |
| 0147 | REP | 1 | | | 33,2217 | 27111 | 0 | | DEC585 | DEC585 HAS BEEN REDEFINED FOR IEM |
| 0148 | | | | | 33,2220 | 77634 | 0 | RTB | | |
| 0149 | REP | 1 | | | 33,2221 | 45541 | 0 | | SONAGREE | |
| 0150 | REP | 9 | LAST | 418 | 33,2222 | 01051 | 1 | STORE | DSPTM2 | |
| 0151 | | | | | 33,2223 | 77776 | 1 | EXIT | | |
| 0152 | REP | 6 | LAST | 418 | 33,2224 | 11=421 | 0 | CCS | NDXCTR | |
| 0153 | REP | 2 | LAST | 418 | 33,2225 | 0 2302 | 1 | TC | COALIGN | TAKE PLATFORM OUT OF GIMBAL LOCK |
| 0154 | REP | 2 | LAST | 418 | 33,2226 | 0 2427 | 1 | TC | SHOW | |
| 0155 | REP | 1 | | | 33,2227 | 3 2447 | 1 | VERTDRPT | CA | ABOUT 1 HOUR VERTICAL DRIFT TEST |
| 0156 | REP | 6 | LAST | 418 | 33,2230 | 55=412 | 0 | TS | 3990DRC | |
| 0157 | REP | 4 | LAST | 418 | 33,2231 | 51=423 | 0 | INDEX | LENGTH | |
| 0158 | REP | 3 | LAST | 418 | 33,2232 | 4 1427 | 0 | CS | POSITION | |
| 0159 | REP | 2 | LAST | 418 | 33,2233 | 55=452 | 1 | CS | SOUTHDR -2 | |
| 0160 | REP | 19 | LAST | 418 | 33,2234 | 3 1875 | 1 | TS | DRIFTT | |
| 0161 | | | | | 33,2235 | 0 0006 | 1 | CA | XSM +4 | O IF POSN 4 |
| 0162 | REP | 1 | | | 33,2236 | 1 2244 | 0 | EXTEND | | |
| 0163 | REP | 20 | LAST | 384 | 33,2237 | 4 4706 | 0 | BZF | PN2 | OFFSET PLATFORM |
| 0164 | REP | 1 | | | 33,2240 | 27=651 | 0 | PN4 | CS | BITS |
| 0165 | REP | 21 | LAST | 419 | 33,2241 | 3 4706 | 1 | ADS | ERCOMP1 +2 | |
| 0166 | REP | 2 | LAST | 419 | 33,2242 | 27=647 | 1 | CA | BITS | |
| 0167 | REP | 1 | | | 33,2243 | 1 2250 | 0 | ADS | ERCOMP1 | |
| 0168 | REP | 22 | LAST | 419 | 33,2244 | 4 4706 | 0 | TCP | PONG | |
| 0169 | REP | 3 | LAST | 419 | 33,2245 | 27=651 | 0 | PN2 | CS | BITS |
| 0170 | REP | 23 | LAST | 419 | 33,2246 | 3 4706 | 1 | ADS | ERCOMP1 +2 | |
| 0171 | REP | 4 | LAST | 419 | 33,2247 | 27=653 | 1 | CA | BITS | |
| 0172 | REP | 3 | LAST | 418 | 33,2250 | 0 2411 | 1 | ADS | ERCOMP1 +4 | |
| 0173 | REP | 91 | LAST | 418 | 33,2251 | 3 4114 | 1 | PN3 | TC | EARTH* |
| 0174 | REP | 1 | | | 33,2252 | 55=404 | 1 | CA | ZERO | ALLOW ONLY SOUTH GYRO EARTH RATE COMPENS |
| 0175 | REP | 2 | LAST | 419 | 33,2253 | 55=405 | 0 | TS | ERECTOR | |
| 0176 | REP | 10 | LAST | 344 | 33,2254 | 3 4672 | 0 | TS | ERECTOR +1 | |
| 0177 | REP | 3 | LAST | 418 | 33,2255 | 55=450 | 0 | QUSS1 | CAP | POS4X |
| 0178 | REP | 4 | LAST | 419 | 33,2256 | 55=451 | 1 | TS | TOROND | |
| 0179 | REP | 6 | LAST | 411 | 33,2251 | 3 0032 | 0 | TS | TOROND +1 | |
| 0180 | REP | 2 | LAST | 96 | 33,2280 | 55=413 | 1 | CA | COLX | |
| | | | | | | | | TS | LOSVEC | |



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| | | | | | | | | | | | | |
|-------|-----|----|------|-----|---------|----|------|---|----------|-------|-------------|----------------|
| 0181 | REP | 2 | LAST | 417 | 33,2261 | 0 | 2453 | 1 | | TC | ESTIMS | |
| 0184 | REP | 1 | | | 33,2262 | 3 | 1512 | 0 | VALMIS | CA | DRIFTO | |
| 0185 | REP | 10 | LAST | 419 | 33,2263 | 55 | 051 | 0 | | TS | DSPTM2 +1 | |
| 0186 | REP | 92 | LAST | 419 | 33,2264 | 3 | 4714 | 1 | | CA | ZERO | |
| 0187 | REP | 11 | LAST | 420 | 33,2265 | 55 | 050 | 1 | | TS | DSPTM2 | |
| 0188 | REP | 3 | LAST | 419 | 33,2266 | 0 | 2427 | 1 | | TC | SHOW | |
| 01894 | REP | 21 | LAST | 417 | 33,2267 | 0 | 5447 | 0 | ENDTEST1 | TC | DOWNFLAG | IMU NOT IN USE |
| 0190 | REP | 3 | LAST | 253 | 33,2270 | 0 | 0007 | 0 | | ADRES | IMUSE | BIT 5 FLAG 0 |
| 0191 | REP | 93 | LAST | 420 | 33,2271 | 4 | 4714 | 0 | | CS | ZERO | |
| 0192 | REP | 2 | LAST | 415 | 33,2272 | 0 | 5246 | 1 | | TC | NEWMODFX +3 | |
| 0193 | REP | 62 | LAST | 417 | 33,2273 | 0 | 4555 | 0 | | TC | BANKCALL | |
| 0194 | REP | 1 | | | 33,2274 | 16 | 083 | 0 | | CADR | NRRELEAS | |
| 0195 | REP | 16 | LAST | 391 | 33,2275 | 0 | 5423 | 1 | | TC | ENDEXT | |

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| | | | | | | | | | |
|-------|-----|----|------|---------|---------|--------|----------|-------------|----------------------------|
| 0196 | | | | 33,2276 | 43215 | 0 | OVERFFIX | DAD | DAD |
| 0197 | REP | 1 | | 33,2277 | 15340 | 1 | | | DPPOS MAX |
| 0198 | REP | 1 | | 33,2300 | 27117 | 0 | | | ONEDPP |
| 0199 | | | | 33,2301 | 77616 | 0 | | | |
| 0200 | | | | 33,2302 | 0 | 0006 | COALIGN | RVO | |
| 0201 | REP | 6 | LAST | 415 | 33,2303 | 23=425 | EXTEND | QPLACE | COARSE ALIGN SUBROUTINE |
| 0202 | REP | 94 | LAST | 420 | 33,2304 | 3 4714 | CA | ZERO | |
| 0203 | REP | 10 | LAST | 266 | 33,2305 | 55=155 | TS | THEAD | |
| 0204 | REP | 11 | LAST | 421 | 33,2306 | 55=156 | TS | THEAD +1 | |
| 0205 | REP | 12 | LAST | 421 | 33,2307 | 55=157 | TS | THEAD +2 | |
| 0206 | REP | 63 | LAST | 420 | 33,2310 | 0 4555 | TC | BANKCALL | |
| 0207 | REP | 3 | LAST | 417 | 33,2311 | 16602 | CADR | IMUCOARS | |
| 0208 | REP | 64 | LAST | 421 | 33,2312 | 0 4555 | TC | BANKCALL | |
| 0209 | REP | 6 | LAST | 298 | 33,2313 | 17516 | CADR | IMUSTALL | |
| 0210 | REP | 1 | | | 33,2314 | 0 3103 | TC | SOMERR2 | |
| 0211 | REP | 7 | LAST | 421 | 33,2315 | 0 1425 | TC | QPLACE | |
| 0212 | | | | | 33,2316 | 0 0006 | IMUSTLLG | EXTEND | |
| 0213 | REP | 8 | LAST | 421 | 33,2317 | 23=425 | CA | QPLACE | |
| 0214 | REP | 3 | LAST | 419 | 33,2320 | 0 2312 | TC | COALIGN +10 | |
| 0215 | | | | | 33,2321 | 0 0006 | CHECKG | EXTEND | PIP PULSE CATCHING ROUTINE |
| 0216 | REP | 9 | LAST | 421 | 33,2322 | 23=425 | CA | QPLACE | |
| 0217 | | | | | 33,2323 | 0 2331 | TC | +6 | |
| 0218 | | | | | 33,2324 | 0 0003 | CHECKG1 | RELINT | |
| 0219 | REP | 2 | LAST | 187 | 33,2325 | 3 0067 | CA | NRWJOB | |
| 0220 | | | | | 33,2326 | 0 0006 | EXTEND | | |
| 02201 | | | | | 33,2327 | 6 2335 | RZMP | +6 | |
| 02202 | REP | 1 | | | 33,2330 | 0 5057 | TC | CHANG1 | |
| 02203 | | | | | 33,2331 | 0 0004 | INHINT | | |
| 02204 | REP | 2 | LAST | 418 | 33,2332 | 51=422 | INDEX | PIPINDEX | |
| 02205 | REP | 3 | LAST | 418 | 33,2333 | 4 0037 | CS | PIPAK | |
| 02206 | REP | 2 | LAST | 98 | 33,2334 | 55=655 | TS | ZERONDX | |
| 0224 | | | | | 33,2335 | 0 0004 | INHINT | | |
| 0225 | REP | 3 | LAST | 421 | 33,2336 | 51=422 | INDEX | PIPINDEX | |
| 0226 | REP | 4 | LAST | 421 | 33,2337 | 3 0037 | CA | PIPAK | |
| 0227 | REP | 3 | LAST | 421 | 33,2340 | 6 1655 | AD | ZERONDX | |
| 0228 | | | | | 33,2341 | 0 0006 | EXTEND | | |
| 0229 | REP | 1 | | | 33,2342 | 1 2324 | RZF | CHECKG1 | |
| 0230 | REP | 4 | LAST | 421 | 33,2343 | 51=422 | INDEX | PIPINDEX | |
| 0231 | REP | 5 | LAST | 421 | 33,2344 | 3 0037 | CA | PIPAK | |
| 0232 | REP | 3 | LAST | 419 | 33,2345 | 51=547 | INDEX | RESULTCT | |
| 0233 | REP | 6 | LAST | 419 | 33,2346 | 55=502 | TS | DATAFL | |
| 0234 | REP | 1 | | | 33,2347 | 0 4626 | TC | FINE TIME | |
| 0235 | REP | 4 | LAST | 421 | 33,2350 | 51=547 | INDEX | RESULTCT | |
| 0236 | REP | 9 | LAST | 421 | 33,2351 | 55=503 | TS | DATAFL +1 | |



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| | | | | | | | | |
|------|-----|-----|------|-----|---------|----------|----------------------|----------------------|
| 0237 | REP | 5 | LAST | 421 | 33,2352 | 51=547 0 | INDEX | RESULTCT |
| 0238 | REP | 10 | LAST | 421 | 33,2353 | 23=504 1 | LXCH | DATAPL +2 |
| 0239 | | | | | 33,2354 | 0 0003 1 | RELINT | |
| 0240 | REP | 10 | LAST | 421 | 33,2355 | 0 1425 0 | ENDXNG | TC |
| 0241 | REP | 49 | LAST | 414 | 33,2356 | 54 001 1 | ZEROING | TS |
| 0242 | | | | | 33,2357 | 1 2361 0 | TCP | +2 |
| 0243 | REP | 2 | LAST | 416 | 33,2360 | 55=655 1 | ZEROING ₁ | TS |
| 0244 | REP | 95 | LAST | 421 | 33,2361 | 3 4714 1 | CAP | ZEROND ₁ |
| 0245 | REP | 50 | LAST | 422 | 33,2362 | 50 001 0 | INDEX | ZERO |
| 0246 | | | | | 33,2363 | 54 000 0 | TS | L |
| 0247 | REP | 51 | LAST | 422 | 33,2364 | 24 001 0 | INCR | 0 |
| 0248 | REP | 3 | LAST | 422 | 33,2365 | 11=655 1 | CCS | ZEROND ₁ |
| 0249 | REP | 1 | | | 33,2366 | 1 2360 1 | TCP | ZEROING ₁ |
| 0250 | REP | 146 | LAST | 412 | 33,2367 | 0 0002 0 | TC | 0 |



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| | | | | | | | | | | | | |
|-------|-----|----|------|---------|--------|---|----------|--------|----------|-----------|--|---------------------------------------|
| 0251 | REP | 1 | | 32,2000 | | | | SETLOC | IMJCAL3 | | | |
| 0252 | | | | 32,2000 | | | | BANK | | | | |
| 0254 | | | | 32,2000 | 65345 | 0 | ERTHRVSS | DLOAD | FDL | | | |
| 0255 | REP | 1 | | 32,2001 | 27112 | 0 | | | SCHZERS | | | FD24 = (SIN |
| 0256 | REP | 2 | LAST | 32,2002 | 02403 | 1 | | | LATITUDE | | | -COS |
| 0257 | | | | 32,2003 | 57546 | 1 | | | DCOMP | | | 0)(OMEG/MS) |
| 0258 | | | | 32,2004 | 73525 | 1 | | | COS | | | |
| 0259 | REP | 3 | LAST | 32,2005 | 02403 | 1 | | | FDL | | | |
| 0260 | | | | 32,2006 | 74266 | 0 | | | SIN | | | |
| 0261 | REP | 1 | | 32,2007 | 26450 | 1 | | | LATITUDE | | | |
| 0262 | REP | 3 | LAST | 32,2010 | 02405 | 1 | | | VXSC | | | |
| 0263 | | | | 32,2011 | 77634 | 0 | | | OMEG/MS | | | |
| 0264 | REP | 1 | | 32,2012 | 45505 | 0 | | | STORE | ERECTOR | | |
| 0265 | REP | 1 | | 32,2013 | 26443 | 0 | | | RTB | | | |
| 0266 | REP | 2 | LAST | 32,2014 | 27112 | 0 | | | LOADTIME | | | |
| 0267 | REP | 5 | LAST | 32,2015 | 02650 | 0 | | | TMRK | SCHZERS | | |
| 0268 | | | | 32,2016 | 77616 | 0 | | | ERCOMP1 | | | |
| 0269 | REP | 2 | LAST | 33,2000 | | | | | RVO | | | |
| 0270 | | | | 33,2370 | | | | | SETLOC | IMJCAL | | |
| 0272 | | | | 33,2370 | 47020 | 0 | EARTH | ITA | RTB | | | CALCULATES AND COMPENSATES EARTH RATE |
| 0273 | REP | 1 | | 33,2371 | 00051 | 0 | | | S2 | | | |
| 0274 | REP | 2 | LAST | 33,2372 | 45505 | 0 | | | LOADTIME | | | |
| 0275 | REP | 1 | | 33,2373 | 02441 | 1 | | | STORE | TEMPTIME | | |
| 0276 | | | | 33,2374 | 51025 | 1 | | | DSU | BPL | | |
| 0277 | REP | 2 | LAST | 33,2375 | 02443 | 0 | | | | TMRK | | |
| 0278 | REP | 1 | | 33,2376 | 66401 | 1 | | | CALL | ERTHR | | |
| 0279 | | | | 33,2377 | 77624 | 1 | | | | | | |
| 0280 | REP | 2 | LAST | 33,2400 | 66276 | 1 | | | | OVERFIX | | |
| 0281 | | | | 33,2401 | 74261 | 1 | ERTHR | SL | VXSC | | | |
| 0282 | | | | 33,2402 | 20212 | 1 | | | 9D | | | |
| 0283 | REP | 4 | LAST | 33,2403 | 02405 | 1 | | | ERECTOR | | | |
| 0284 | | | | 33,2404 | 53321 | 1 | | | MKV | VAD | | |
| 0285 | REP | 20 | LAST | 33,2405 | 02672 | 0 | | | | XSM | | |
| 0286 | REP | 6 | LAST | 33,2406 | 02650 | 0 | | | | ERCOMP1 | | |
| 0287 | REP | 7 | LAST | 33,2407 | 16650 | 0 | | | STOCL | ERCOMP1 | | |
| 0288 | REP | 2 | LAST | 33,2410 | 02441 | 1 | | | | TEMPTIME | | |
| 0289 | REP | 3 | LAST | 33,2411 | 02443 | 0 | | | STORE | TMRK | | |
| 0290 | | | | 33,2412 | 47170 | 1 | | | AKT,1 | RTB | | |
| 0291 | REP | 6 | LAST | 33,2413 | 02647 | 0 | | | RCADR | ERCOMP1 | | |
| 0292 | REP | 1 | | 33,2414 | 45650 | 0 | | | | PULSEIMJ | | |
| 0293 | | | | 33,2415 | 77650 | 1 | | | GOTO | | | |
| 0294 | REP | 2 | LAST | 33,2416 | 00051 | 0 | | | | S2 | | |
| 0295 | | | | 33,2417 | 0 0006 | 1 | EARTH* | EXTEND | | | | |
| 02951 | REP | 3 | LAST | 33,2420 | 23=428 | 0 | | | QCH | OPLACES | | |
| 02952 | REP | 19 | LAST | 33,2421 | 0 6006 | 1 | | | TC | INTPRFT | | |
| 02953 | | | | 33,2422 | 77624 | 1 | | | CALL | | | |
| 02954 | REP | 1 | | 33,2423 | 66370 | 0 | | | | EARTH | | |
| 02955 | | | | 33,2424 | 77778 | 1 | PROUT | EXIT | | | | |
| 02956 | REP | 4 | LAST | 33,2425 | 0 2318 | 1 | | | TC | IMUST.I.G | | |
| 02957 | REP | 4 | LAST | 33,2426 | 0 1428 | 0 | | | TC | OPLACES | | |



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| | | | | | | | | | |
|-------|-----|-----|------|---------|----------|----------|----------|--------|-------------|
| 0296 | | | | 33,2427 | 0 0006 1 | SHOW | EXTEND | | |
| 0297 | REP | 11 | LAST | 422 | 33,2430 | 23=425 0 | OKCH | QPLACB | |
| 0298 | REP | 5 | LAST | 419 | 33,2431 | 3 1423 0 | SHOW1 | CA | POSITION |
| 0299 | REP | 12 | LAST | 420 | 33,2432 | 55=052 0 | | TS | DSPTM2 +2 |
| 0300 | REP | 1 | | | 33,2433 | 3 2442 1 | | CA | VR01N98 |
| 0301 | REP | 66 | LAST | 424 | 33,2434 | 0 4888 0 | | TC | BANKCALL |
| 0302 | REP | 3 | LAST | 391 | 33,2435 | 20024 0 | | CADR | OCPLASH |
| 0304 | REP | 1 | | | 33,2436 | 0 2267 0 | | TC | ENDTEST1 |
| 0305 | REP | 12 | LAST | 424 | 33,2437 | 0 1425 0 | | TC | QPLACB |
| 0306 | REP | 1 | | | 33,2440 | 1 2431 1 | | TCF | SHOW1 |
| 03061 | | | | | 33,2441 | 14400 0 | OC14400 | OCT | 14400 |
| 0307 | REP | 2 | LAST | 423 | 33,2447 | | 3990DEC | = | Q23G/MS |
| 0308 | | | | | 33,2442 | 01542 0 | VR06N98 | VN | 0898 |
| 0309 | | | | | 33,2443 | 01602 1 | TESTTIME | OCT | 01602 |
| 0310 | REP | 5 | LAST | 359 | 4375 | | DEC17 | = | ND1 |
| 0311 | REP | 9 | LAST | 277 | 33,2444 | 02757 0 | OCPL | RCADR | OC |
| 0312 | REP | 1 | | | 4734 | | 1SECX | = | 1SEC |
| 0313 | REP | 15 | LAST | 368 | 4374 | | DEC57 | = | VD1 |
| 0314 | REP | 3 | LAST | 417 | 33,2445 | 01713 0 | XNRADR | GENADR | XNB |
| 0315 | REP | 21 | LAST | 423 | 33,2446 | 01871 0 | XSMADR | GENADR | XSN |
| 0316 | | | | | 33,2447 | 07823 1 | QMG/MS | ZDEC | .24339048 |
| 0316 | | | | | 33,2450 | 26552 1 | | | |
| 03161 | REP | 66 | LAST | 424 | 33,2451 | 0 4555 0 | P11OUT | TC | BANKCALL |
| 03162 | REP | 2 | LAST | 207 | 33,2452 | 70127 1 | | CADR | MATRXJOB |
| 03165 | REP | 1 | | | | | | COLNT | 02/CONST |
| 0317 | | | | | 4526 | | | BLOCK | 2 |
| 0318 | | | | | 4526 | 0 0004 0 | PINETIME | INHINT | |
| 0319 | | | | | 4527 | 0 0006 1 | | EXTEND | |
| 0320 | REP | 1 | | | 4530 | 00 004 0 | | READ | LOSCALAR |
| 0321 | REP | 52 | LAST | 422 | 4531 | 54 001 1 | | TS | L |
| 0322 | | | | | 4532 | 0 0006 1 | | EXTEND | |
| 0323 | REP | 2 | LAST | 424 | 4533 | 06 004 0 | | RKOR | LOSCALAR |
| 0324 | | | | | 4534 | 0 0006 1 | | EXTEND | |
| 0325 | | | | | 4535 | 1 4541 1 | | RZP | +4 |
| 0326 | | | | | 4536 | 0 0006 1 | | EXTEND | |
| 0327 | REP | 3 | LAST | 424 | 4537 | 00 004 0 | | READ | LOSCALAR |
| 0328 | REP | 53 | LAST | 424 | 4540 | 54 001 1 | | TS | L |
| 0329 | REP | 11 | LAST | 419 | 4541 | 4 4872 1 | +4 | CS | POS MAX |
| 0330 | REP | 54 | LAST | 424 | 4542 | 0 0001 0 | | AD | L |
| 0331 | | | | | 4543 | 0 0006 1 | | EXTEND | |
| 0332 | REP | 2 | LAST | 421 | 4544 | 1 4527 1 | | RZP | PINETIME +1 |
| 0333 | | | | | 4545 | 0 0006 1 | | EXTEND | |
| 0334 | REP | 1 | | | 4546 | 00 003 1 | | READ | HIS CALAR |
| 0335 | REP | 147 | LAST | 422 | 4547 | 0 0002 0 | | TC | 0 |

V 34
V33

RETURN TO P11

RETURNS WITH INTERRUPT INHIBITED



L IMU CALIBRATION AND ALIGNMENT

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R0336 PROGRAM NAME-OPTIMUM PRELAUNCH ALIGNMENT CALIBRATION
R0337 DATE- NOVEMBER 2 1966
R0338 BY- GEORGE SCHMIDT IL 7-146 EXT. 126
R0339 MOD NO 3
R0340 FUNCTIONAL DESCRIPTION

R0341 THIS SECTION CONSISTS OF PRELAUNCH ALIGNMENT AND GYRO DRIFT TESTS
R0342 INTEGRATED TOGETHER TO SAVE WORDS. COMPASS IS COMPLETELY RESTART
R0343 PROOFED EXCEPT FOR THE FIRST 30 SECONDS OR SO. PERFORMANCE TESTS OF
R0344 THE IRIGS IS RESTART PROOFED ENOUGH TO GIVE 75 PERCENT CONFIDENCE THAT
R0345 IF A RESTART OCCURS THE DATA WILL STILL BE GOOD. GOOD PRACTICE TO RECYCLE
R0346 WHEN A RESTART OCCURS UNLESS IT HAPPENS NEAR THE END OF A TEST-THEN WAIT
R0347 FOR THE DATA TO FLASH.
R03471 A RESTART IN GYROCOMPASS DURING GYRO TORQUING CAUSES PULSES TO BE LOST
R0348 THE PRELAUNCH ALIGNMENT TECHNIQUE IS BASICALLY THE SAME AS IN BLOCK 1
R0349 EXCEPT THAT IT HAS BEEN SIMPLIFIED IN THE SENSE THAT SMALL ANGLE APPROX.
R0350 HAVE BEEN USED. THE DRIFT TESTS USE A UNIQUE IMPLEMENTATION OF THE
R0351 OPTIMUM STATISTICAL FILTER. FOR A DESCRIPTION SEE E-1973. BOTH OF THESE
R0352 ROUTINES USE STANDARD SYSTEM TEST LEADIN PROCEDURES. THE INITIALIZATION
R0353 PROCEDURE FOR THE DRIFT TESTS IS IN THE JDC 5. THE INITIALIZATION METHOD
R0354 FOR GYROCOMPASS IS AN ERAS LOAD THEN A MISSION PHASE CALL.
R0355 THE COMPASS ALIGNS TO Z DOWN, X DOWNRANGE, HAS THE CAPABILITY
R0356 CHANGE AZIMUTH WHILE RUNNING, IS COMPENSATED FOR
R0357 COMPONENT ERRORS, IS CAPABLE OF OPTICAL VERIFICATION(CSM ONLY).

R0358 COMPASS ERASABLE LOAD REQUIRED

R0359 1-LAUNCHAZ -DP AZIMUTH IN REV FROM NORTH OF XSM DESIRED (NOM=.2)
R0360 2- LATITUDE -DP-OF LAUNCH PAD
R0361 3- AZIMUTH-DP-OF ZNB OF VEHICLE
R03611 4- IMU COMPENSATION PARAMETERS
R0362 5-AZ AND ELEVATION OF TARGETS 1,2 ****OPTIONAL****

R0363 TO PERFORM AS PART OF COMPASS

R0364 1-OPTICAL VERIFICATION- V 65 E
R0365 2-AZIMUTH CHANGE-V 78 E

R0366 SUBROUTINES CALLED

R0367 DURING OPTICAL VERIFICATION (CSM ONLY) ESSENTIALLY ALL OF INFLIGHT ALIGN
R0368 IS CALLED IN ONE WAY OR ANOTHER. SEE THE LISTING.

R0369 NORMAL EXIT

R0370 DRIFT TESTS- LENGTH GOES TO ZERO-RETURN TO IMU PERF TEST2 CONTROL.
R0371 GYROCOMPASS-MANY, SEE THE LISTING
R0372 ALARMS

R0373 1600 OVERFLOW IN DRIFT TEST



L IMU CALIBRATION AND ALIGNMENT

- R0374 1601 BAD IMU TORQUE ABORT
- R0375 1602 BAD OPTICS DURING VERIFICATION-RETURN TO COMPASS CSM ONLY

- R0376 OUTPUT

- R0377 DRIFT TESTS- FLASHING DISPLAYS OF RESULTS-CONTROLLED IN IMU PERP TESTS 2
- R0378 COMPASS-PROGRAM MODE LIGHTS TELL YOU WHAT PHASE OF PROGRAM YOU ARE IN
- R0379 01 INITIALIZING THE PLATFORM POSITION AND ERASABLE
- R0380 02 GYROCOMPASSING
- R0381 03 DOING OPTICAL VERIFICATION (CSM)
- R0382
- R0383
- R0384 DEBRIS

- R0385 ALL CENTRALS,ALL OF BRANK XSM

L IMU CALIBRATION AND ALIGNMENT

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R0386 MOST OF THE ROUTINES COMMON TO ALIGNMENT AND CALIBRATION APPEAR
R0387 ON THE NEXT FEW PAGES.

| LINE | REP | TYPE | START | END | ADDRESS | DATA | OPERATION | COMMENT |
|-------|-----|------|-------|-----|---------|----------|-------------------|---------------------------------------|
| 03875 | REP | 1 | | | | | COUNT 33/P02 | |
| 0388 | REP | 22 | LAST | 424 | E5,1671 | | BRANK= XSM | |
| 0389 | | | | | 33,2453 | | BANK 33 | |
| 0390 | REP | 3 | LAST | 423 | 33,2000 | | SETLOC IMUCAL | |
| 0391 | | | | | 33,2453 | | BANK | |
| 0392 | REP | 2 | LAST | 254 | 33,2453 | 0 5281 1 | ESTIMS TC 2PHSCNO | COMES HERE FROM IMU2 |
| 0393 | | | | | 33,2454 | 00075 0 | OCT 00075 | |
| 03931 | | | | | 33,2455 | 00004 0 | OCT 00004 | TURN OFF GROUP 4 IF ON |
| 0394 | REP | 1 | | | 33,2456 | 0 0004 0 | RSTOTS1 INHINT | COMES HERE PHASE1 RESTART |
| 0395 | REP | 1 | | | 33,2460 | 55=645 0 | TS OTSWLT1 | |
| 0396 | REP | 96 | LAST | 422 | 33,2461 | 3 4714 1 | CAP ZERO | ZERO THE PIPAS |
| 0398 | REP | 6 | LAST | 421 | 33,2462 | 54 037 1 | TS PIPAX | |
| 0399 | REP | 1 | | | 33,2463 | 54 040 1 | TS PIPAY | |
| 0400 | REP | 1 | | | 33,2464 | 54 041 0 | TS PIPAZ | |
| 0402 | | | | | 33,2465 | 0 0003 1 | RES.INT | |
| 0403 | REP | 1 | | | 33,2466 | 3 3130 0 | CA 77DECM | ZERO ALL NECESSARY LOCATIONS |
| 0404 | REP | 4 | LAST | 422 | 33,2467 | 55=655 1 | TS ZEROND1 | |
| 0405 | REP | 1 | | | 33,2470 | 5 5151 1 | CA AAXXZ | |
| 0406 | REP | 2 | LAST | 417 | 33,2471 | 0 2356 0 | TC ZEROING | |
| 0407 | REP | 20 | LAST | 423 | 33,2472 | 0 8006 1 | TC INTPRET | |
| 04084 | | | | | 33,2473 | 77735 0 | SLOAD | |
| 04085 | REP | 3 | LAST | 423 | 33,2474 | 27112 0 | SCHZEROS | |
| 04086 | REP | 9 | LAST | 301 | 33,2475 | 25477 1 | STOVL GCOMP5W -1 | LOAD SOME INITIAL DRIFT GAINS |
| 0409 | REP | 1 | | | 33,2476 | 27123 1 | INTVAL +2 | |
| 0410 | REP | 1 | | | 33,2477 | 26455 1 | STOVL AIX1S | |
| 0411 | REP | 4 | LAST | 427 | 33,2500 | 27112 0 | SCHZEROS | |
| 0412 | REP | 17 | LAST | 301 | 33,2501 | 01472 1 | STORE GCOMP | GCOMPZER SUBROUTINE NO LONGER NEEDED |
| 0413 | REP | 6 | LAST | 294 | 33,2502 | 01163 1 | STORE DELAX | |
| 0414 | | | | | 33,2503 | 77776 1 | EXIT | |
| 0415 | REP | 2 | LAST | 416 | 33,2504 | 11=643 0 | CCS GECOMP1 | NON ZERO IF COMPASS. |
| 0416 | | | | | 33,2505 | 0 2507 1 | TC +2 | |
| 0417 | REP | 1 | | | 33,2506 | 0 2523 1 | TC SLEEP1R +1 | |
| 0422 | REP | 21 | LAST | 427 | 33,2507 | 0 8006 1 | TC INTPRET | |
| 04221 | | | | | 33,2510 | 77624 1 | CALL | |
| 04222 | REP | 1 | | | 33,2511 | 84000 0 | ERTHRVSE | |
| 04223 | | | | | 33,2512 | 77776 1 | EXIT | |
| 0423 | REP | 7 | LAST | 419 | 33,2513 | 3 1412 1 | CA LENGTHOT | TIMES FIVE IS THE MM OF SEC ERRECTING |
| 0424 | REP | 1 | | | 33,2514 | 55=646 0 | TS ERRECTIME | |
| 0425 | REP | 3 | LAST | 420 | 33,2515 | 0 5243 1 | TC NEWMDPX | |
| 0426 | | | | | 33,2516 | 00002 0 | MM 02 | |
| 0427 | REP | 67 | LAST | 424 | 33,2517 | 0 4555 0 | TC RANCALL | SET UP PIPA PATI. TO CAUSE ISS ALARM |



L INU CALIBRATION AND ALIGNMENT

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0428 REP 2 LAST 301 33,2520 17075 0
0429 REP 1 33,2521 0 3376 0

CADR PIPUSE
TC ANNNNN

COMPASS NEVER TURNS THIS OFF
END OF FIRST TIME THROUGH

L IMU CALIBRATION AND ALIGNMENT

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R0430 COMES HERE AT THE END OF EVERY ITERATION THROUGH DRIFT TEST OR COMPASS

R0431 SET UP WAITLIST SECTION
0432 REP 8 LAST 427 33,2522 55=412 0 SLEEPS TS LENGTHOT TEST NOT OVER-DECREMENT LENGTHOT
0433 REP 7 LAST 385 33,2523 0 5301 0 TC PHASCHG CHANGE PHASE
0434 REP 5 LAST 419 33,2524 00135 0 OCT 00135
0435 REP 4 LAST 419 33,2525 11=450 0 CCS TORCNDX ARE WE DOING VERTDRIFT
0436 REP 1 33,2526 0 2417 1 TC BARDHM TRUE TORQUE SOUTH GYRO
0437 REP 1 33,2527 0 3401 1 WLSTINT TC CHKCSGD SEE IF COMPASS OVER
04371 REP 1 33,2530 0 2532 1 TC SETGWLST
04372 REP 55 LAST 418 33,2531 0 5112 0 TC ENDJOB

04373 SETGWLST EXTEND
04374 REP 218 LAST 398 33,2533 22 154 1 CRCH MPAC CALLED EVERY WAITLIST OR AZIMUTH CHANGE
0438 REP 218 LAST 398 33,2534 0 0004 0 INHINT
0439 REP 8 LAST 427 33,2535 4 0025 1 CS TIME1
0440 REP 2 LAST 427 33,2536 6 1645 1 AD OTSMPLT1
0441 REP 2 LAST 427 33,2537 0 0008 1 EXTEND
0442 REP 2 LAST 409 33,2540 6 2542 0 BZMF +2
0443 REP 2 LAST 416 33,2541 6 4874 0 AD NEGMAX 10 MS ERROR OK
0444 REP 2 LAST 416 33,2542 6 1644 0 AD 1SEXT1 1 SEC FOR CALIBRATION, .5 SEC IN COMPASS
0445 REP 1 33,2543 0 0008 1 EXTEND
0446 REP 1 33,2544 6 2550 0 BZMF RIGHTTS
0447 REP 3 LAST 418 33,2545 0 5130 0 WTOTSMPL TC TWIDDLE
0448 REP 1 ES,1540 BRANK= ALTIM
0449 REP 1 33,2546 02575 1 ADRES ALLOP
0451 REP 219 LAST 429 33,2547 0 0154 1 TC MPAC
0452 REP 7 LAST 355 33,2550 3 4710 0 RIGHTTS CAP FOUR SET UP NEXT WAITLIST-ALLOW SOME TIME
0453 REP 1 33,2551 0 2545 1 TC WTOTSMPL END OF WAITLIST SECTION

R0454 STORE AND LOAD DATA SECTIONS FOR RESTART PROOFING

0455 33,2552 00031 0 25DECM. DEC 25

0456 REP 1 33,2553 3 2552 1 STOREDTA CAP 25DECM.
0457 REP 220 LAST 429 33,2554 54 154 0 TS MPAC
0458 REP 221 LAST 429 33,2555 50 154 1 INDEX MPAC
0459 REP 2 LAST 98 33,2556 31=460 1 CAE THETA1
0460 REP 222 LAST 429 33,2557 50 154 1 INDEX MPAC
0461 REP 1 33,2560 55=577 1 TS RESTARTPT
0462 REP 223 LAST 429 33,2561 10 154 0 CCS MPAC
0463 REP 1 33,2562 1 2554 0 TCP STOREDTA +1
0464 REP 148 LAST 424 33,2563 0 0002 0 TC 0
0465 REP 2 LAST 429 33,2564 3 2552 1 LOADSDT CAP 25DECM.
0466 REP 224 LAST 429 33,2565 54 154 1 TS MPAC
0467 REP 225 LAST 429 33,2566 50 154 1 INDRX MPAC
0468 REP 2 LAST 429 33,2567 3 1577 0 CA RESTARTPT
    
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L IMU CALIBRATION AND ALIGNMENT

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0469 REP 226 LAST 429 33,2570 50 154 1 INDRX MPAC
 0470 REP 3 LAST 429 33,2571 55=460 0 TS TESTAK1
 0471 REP 227 LAST 430 33,2572 10 154 0 CCS MPAC
 0472 REP 1 33,2573 1 2565 1 TCF LOADSTDT +1
 0473 REP 149 LAST 429 33,2574 0 0002 0 TC 0
 R0474 COMES HERE EVERY ITERATION BY A WAITLIST CALL SET IN SLEEPIS

0475 REP 9 LAST 429 33,2575 3 0025 0 ALLOOP CA TIME1
 0476 REP 3 LAST 429 33,2576 55=645 0 TS GTSWLT1
 0477 REP 2 LAST 429 33,2577 3 1540 1 ALLOOP3 CA ALTIM
 0478 REP 1 33,2600 55=631 0 TS G3OSAVR1
 0479 REP 8 LAST 429 33,2601 0 5301 0 TC PHASCHG
 0480 33,2602 00115 1 OCT 00115
 0481 REP 2 LAST 430 33,2603 31=631 1 ALLOOP1 CAE G3OSAVR1
 0482 REP 3 LAST 430 33,2604 55=540 0 TS ALTIM
 0483 REP 130 LAST 409 33,2605 10 000 0 CCS A
 0484 REP 131 LAST 430 33,2606 3 0000 1 CA A
 0485 REP 1 33,2607 55=541 1 TS ALTIMS
 0486 REP 132 LAST 430 33,2610 4 0000 0 CS A
 0487 REP 4 LAST 430 33,2611 55=540 0 TS ALTIM
 0488 REP 97 LAST 427 33,2612 3 4714 1 CAP ZPRO
 04881 REP 7 LAST 427 33,2613 56 037 0 XCH PIPAX
 0489 REP 7 LAST 427 33,2614 55=162 1 TS DELVX
 0490 REP 98 LAST 430 33,2615 3 4714 1 CAP ZPRO
 04901 REP 2 LAST 427 33,2616 56 040 0 XCH PIPAY
 0491 REP 4 LAST 294 33,2617 55=164 1 TS DELVY
 0492 REP 99 LAST 430 33,2620 3 4714 1 CAP ZPRO
 04921 REP 2 LAST 427 33,2621 56 041 1 XCH PIPAZ
 0493 REP 3 LAST 295 33,2622 55=166 0 TS DELVZ
 0494 REP 1 33,2623 3 4374 0 CAP 19DECM.
 0495 REP 1 33,2624 0 4114 1 TC NEWPHASE
 0496 33,2625 00005 1 OCT 00005
 0501 REP 3 LAST 418 33,2626 3 4675 1 SPECSTS CAP PRIO20
 0502 REP 16 LAST 418 33,2627 0 5042 1 TC FINDVAC
 0503 REP 3 LAST 430 33,1631 ERANK= G3OSAVR1
 0504 REP 1 33,2630 02633 0 ZCADR ALFLT
 0504 REP 1 33,2631 66065 1
 0505 REP 20 LAST 418 33,2632 0 5213 1 TC TASKOVER

STORE TIME TO SET UP NEXT WAITLIST.

SHOULD NEVER HIT THIS LOCATION

23 OCT

START THE JOB

L IMU CALIBRATION AND ALIGNMENT

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00506 THIS IS PART OF THE JOB DONE EVERY ITERATION

| | | | | | | | | | |
|------|-----|-----|------|-----|---------|----------|--------|-------|----------|
| 0507 | REP | 2 | LAST | 429 | 33,2633 | 0 2553 0 | ALFLT | TC | STOREDTA |
| 0508 | REP | 9 | LAST | 430 | 33,2634 | 0 5301 0 | | TC | FLASHING |
| 0509 | | | | | 33,2635 | 00215 1 | | OCT | 00215 |
| 0510 | | | | | 33,2636 | 1 2640 0 | | TCF | +2 |
| 0511 | REP | 2 | LAST | 430 | 33,2637 | 0 2564 1 | ALFLT1 | TC | LOADSTDT |
| 0512 | REP | 3 | LAST | 427 | 33,2640 | 11-843 0 | | CC8 | GEOCOMP1 |
| 0513 | | | | | 33,2641 | 0 2643 1 | | TC | +2 |
| 0514 | REP | 1 | | | 33,2642 | 0 2646 1 | | TC | NORMLP |
| 0515 | REP | 2 | LAST | 429 | 33,2643 | 0 3401 1 | | TC | CRKCOMED |
| 0516 | REP | 68 | LAST | 427 | 33,2644 | 0 4555 0 | | TC | BANKCALL |
| 0517 | REP | 1 | | | 33,2645 | 15262 0 | | CADR | 1/PIPA |
| 0518 | REP | 22 | LAST | 427 | 33,2646 | 0 6006 1 | NORMLP | TC | INTPRET |
| 0519 | | | | | 33,2647 | 77745 1 | | DLOAD | |
| 0520 | REP | 2 | LAST | 427 | 33,2650 | 27121 0 | | | INTVAL |
| 0521 | REP | 5 | LAST | 403 | 33,2651 | 24051 0 | | STOVL | S1 |
| 0522 | REP | 8 | LAST | 430 | 33,2652 | 01163 1 | | | DELVX |
| 0523 | | | | | 33,2653 | 76505 0 | | VGM | VSL1 |
| 0524 | REP | 23 | LAST | 427 | 33,2654 | 02672 0 | | | XSM |
| 0525 | | | | | 33,2655 | 57545 1 | | DLOAD | DCOMP |
| 0526 | REP | 228 | LAST | 430 | 33,2656 | 00160 0 | | | MPAC +3 |
| 0527 | REP | 1 | | | 33,2657 | 16533 0 | | STOVL | DPIPAY |
| 0528 | REP | 229 | LAST | 431 | 33,2660 | 00162 1 | | | MPAC +5 |
| 0529 | REP | 1 | | | 33,2661 | 02537 1 | | STORE | DPIPAZ |
| 0530 | | | | | 33,2662 | 76001 1 | | STPD | AXT,1 |
| 0531 | | | | | 33,2663 | 00001 0 | | | 0 |
| 0532 | | | | | 33,2664 | 00010 0 | | | 8D |
| 0533 | | | | | 33,2665 | 57535 0 | | SLOAD | DCOMP |
| 0534 | REP | 4 | LAST | 431 | 33,2666 | 02644 0 | | | GEOCOMP1 |
| 0535 | | | | | 33,2667 | 77640 0 | | RNN | |
| 0536 | REP | 1 | | | 33,2670 | 67203 1 | | | ALWAYS |

STORE DATA IN CASE OF RESTART IN JOB
THIS IS THE JOB DONE EVERY ITERATION

COMES HERE ON RESTART

SEE IF PRELAUNCH OVER
COMPENSATION IF IN COMPASS

DO A QUICK COMPASS

L INU CALIBRATION AND ALIGNMENT

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| | | | | | | | | |
|------|-----|-----|------|---------|---------|---------|---------|-------------|
| 0583 | | | | 33,2746 | 77613 0 | DAD* | | |
| 0584 | REP | 3 | LAST | 432 | 33,2747 | 75266 1 | INTY | +8D,2 |
| 0585 | REP | 4 | LAST | 433 | 33,2750 | 12511 1 | STORE | INTY +8D,2 |
| 0586 | | | | 33,2751 | 42743 1 | DLOAD* | DAD* | |
| 0587 | REP | 6 | LAST | 432 | 33,2752 | 75304 1 | ALK | +12D,2 |
| 0588 | REP | 3 | LAST | 432 | 33,2753 | 75220 0 | ALDK | +12D,2 |
| 0589 | REP | 7 | LAST | 433 | 33,2754 | 12473 1 | STORE | ALK +12D,2 |
| 0590 | | | | 33,2755 | 42673 0 | DMPR* | DAD* | |
| 0591 | REP | 4 | LAST | 432 | 33,2756 | 75206 1 | DELM | +8D,2 |
| 0592 | REP | 5 | LAST | 433 | 33,2757 | 75256 1 | INTY | +16D,2 |
| 0593 | REP | 6 | LAST | 433 | 33,2760 | 12521 1 | STORE | INTY +16D,2 |
| 0594 | | | | 33,2761 | 40743 0 | DLOAD* | DMP* | |
| 0595 | REP | 1 | | | 33,2762 | 27702 1 | ALSK | +1,1 |
| 0596 | REP | 5 | LAST | 433 | 33,2763 | 75206 1 | DELM | +8D,2 |
| 0597 | | | | 33,2764 | 42772 0 | SL1R | DAD* | |
| 0598 | REP | 2 | LAST | 432 | 33,2765 | 75246 0 | VLA1N | +8D,2 |
| 0599 | REP | 3 | LAST | 433 | 33,2766 | 12531 0 | STORE | VLA1N +8D,2 |
| 0600 | | | | 33,2767 | 76104 0 | TIX,2 | AXT,1 | |
| 0601 | REP | 1 | | | 33,2770 | 66740 1 | ALKLP | |
| 0602 | | | | 33,2771 | 00010 0 | 8D | | |
| 0603 | | | | 33,2772 | 64743 0 | LOOSE | DLOAD* | PCDL* |
| 0604 | REP | 1 | | | 33,2773 | 02533 0 | ACCWD | +8D,1 |
| 0605 | REP | 4 | LAST | 433 | 33,2774 | 02531 1 | VLA1N | +8D,1 |
| 0606 | | | | 33,2775 | 55523 0 | PCDL* | VDEF | |
| 0607 | REP | 1 | | | 33,2776 | 02541 0 | POSV | +8D,1 |
| 0608 | | | | 33,2777 | 76521 0 | M&V | V8.1 | |
| 0609 | REP | 2 | LAST | 90 | 33,3000 | 02001 1 | TRANSM1 | |
| 0610 | | | | 33,3001 | 77745 1 | DLOAD | | |
| 0611 | REP | 230 | LAST | 431 | 33,3002 | 00155 0 | MPAC | |
| 0612 | REP | 2 | LAST | 433 | 33,3003 | 06541 1 | STORE | POSV +8D,1 |
| 0613 | | | | 33,3004 | 77745 1 | DLOAD | | |
| 0614 | REP | 231 | LAST | 433 | 33,3005 | 00160 0 | MPAC | +3 |
| 0615 | REP | 5 | LAST | 433 | 33,3006 | 06531 0 | STORE | VLA1N +8D,1 |
| 0616 | | | | 33,3007 | 77745 1 | DLOAD | | |
| 0617 | REP | 232 | LAST | 433 | 33,3010 | 00162 1 | MPAC | +5 |
| 0618 | REP | 2 | LAST | 433 | 33,3011 | 06533 1 | STORE | ACCWD +8D,1 |
| 0619 | | | | 33,3012 | 77700 0 | TIX,1 | | |
| 0620 | REP | 1 | | | 33,3013 | 66772 0 | LOOSE | |
| 0621 | | | | 33,3014 | 76174 1 | AXT,2 | AXT,1 | |
| 0622 | | | | 33,3015 | 00006 1 | 6 | | |
| 0623 | | | | 33,3016 | 00002 0 | 2 | | |
| 0624 | | | | 33,3017 | 67343 1 | HOOP | DLOAD* | DMPR |
| 0625 | REP | 1 | | | 33,3020 | 02513 1 | ANOK | +2,1 |
| 0626 | REP | 1 | | | 33,3021 | 27705 0 | GEORGEJ | |
| 0627 | | | | 33,3022 | 77722 0 | SR2R | | |
| 0628 | | | | 33,3023 | 73400 1 | PUSH | 511 | |

EXTRAPOLATE SWAY VARIABLES

EVALIATE SINES AND COSINES



L IMU CALIBRATION AND ALIGNMENT

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| | | | | | | | |
|-------|------|----|----------|---------|----------|----------|----------|
| 0629 | | | | 33,3024 | 56072 1 | SL3R | XAD,1 |
| 0630 | RESP | 1 | | 33,3025 | 00046 0 | | X1 |
| 0631 | | | | 33,3026 | 10021 0 | STORE | 18D,2 |
| 0632 | | | | 33,3027 | 77745 1 | DLOAD | |
| 0633 | | | | 33,3030 | 77746 1 | COS | |
| 0634 | | | | 33,3031 | 10027 0 | STORE | 22D,2 |
| 0635 | | | | 33,3032 | 77704 1 | TIX,2 | |
| 0636 | RESP | 1 | | 33,3033 | 67017 0 | | BOOP |
| 0637 | | | | 33,3034 | 77776 1 | PERFERAS | EXIT |
| 0638 | RESP | 2 | LAST 252 | 33,3035 | 3 4753 1 | CA | ERANK7 |
| 0639 | RESP | 5 | LAST 275 | E7,1400 | | ERANK= | LAT(SPL) |
| 0639S | RESP | 16 | LAST 372 | 33,3036 | 54 003 0 | TS | ERANK |
| 0640 | RESP | 6 | LAST 434 | 33,3037 | 0 1400 1 | TC | LAT(SPL) |

COSINES

GO TO ERASABLE ONLY TO RETURN

R0641 CAUTION

R0642 THE ERASABLE PROGRAM THAT DOES THE CALCULATIONS MUST BE LOADED
R0643 BEFORE ANY ATTEMPT IS MADE TO RUN THE IMU PERFORMANCE TEST

| | | | | | | | |
|-------|------|----|----------|---------|----------|----------|-----------|
| 0134 | RESP | 9 | LAST 429 | E5,1412 | | ERANK= | LENGTH |
| 0735 | RESP | 10 | LAST 434 | 33,3040 | 11=412 0 | ONCEMORE | CCS |
| 0736 | RESP | 2 | LAST 427 | 33,3041 | 0 2522 0 | TC | SLEEP1E |
| 07361 | RESP | 6 | LAST 429 | 33,3042 | 11=450 0 | CCS | TORQNDX |
| 07362 | | | | 33,3043 | 1 3045 1 | TOP | +2 |
| 07363 | RESP | 1 | | 33,3044 | 0 3047 1 | TC | SETUPR1 |
| 07384 | RESP | 9 | LAST 419 | 33,3045 | 3 0032 0 | CA | CDLX |
| 07385 | RESP | 3 | LAST 419 | 33,3046 | 55=414 0 | TS | LOSVEC +1 |
| 0737 | RESP | 23 | LAST 431 | 33,3047 | 0 6006 1 | SETUPR1 | TC |
| 0738 | | | | 33,3050 | 65345 0 | DLOAD | PDDL |
| 0739 | RESP | 1 | | 33,3051 | 02503 0 | | ANGZ |
| 0740 | RESP | 1 | | 33,3052 | 02507 1 | | ANGY |
| 0741 | | | | 33,3053 | 55525 0 | PDDL | VDRP |
| 0742 | RESP | 2 | LAST 433 | 33,3054 | 02511 0 | | ANGX |
| 0743 | | | | 33,3055 | 74276 1 | VCOMP | VXSC |
| 0744 | RESP | 2 | LAST 433 | 33,3056 | 27705 0 | | GEORGEJ |
| 0745 | | | | 33,3057 | 74521 1 | MXV | VSR1 |
| 0746 | RESP | 24 | LAST 431 | 33,3060 | 02872 0 | | XSM |
| 0747 | RESP | 10 | LAST 424 | 33,3061 | 02760 1 | STORE | CCC |
| 0748 | | | | 33,3062 | 77776 1 | EXIT | |
| 0749 | RESP | 10 | LAST 431 | 33,3063 | 0 5301 0 | TORQINCH | TC |
| 0750 | | | | 33,3064 | 00005 1 | OCT | PHASCHG |
| 0751 | RESP | 1 | | 33,3065 | 3 2444 1 | CA | 00005 |
| 0752 | RESP | 69 | LAST 431 | 33,3066 | 0 4555 0 | TC | 00CPL |
| 0753 | RESP | 3 | LAST 298 | 33,3067 | 17125 1 | CADR | BANKCALL |
| 0754 | RESP | 5 | LAST 423 | 33,3070 | 0 2316 1 | TC | IMPULSE |
| 0755 | RESP | 7 | LAST 434 | 33,3071 | 11=450 0 | CCS | IMUSTLIG |
| 0756 | RESP | 1 | | 33,3072 | 0 2282 0 | TC | TORQNDX |
| 0757 | RESP | 24 | LAST 434 | 33,3073 | 0 6006 1 | TC | VALMIS |
| | | | | | | | INTPRET |

TEST NOT OVER SET UP NEXT WAITLIST

FOR TROUBLESHOOTING POSNS 254 VD
DRIFT TEST OVER
ANGLES FROM DRIFT TEST ONLY

* IP IN VERTICAL DRIFT TEST
VERT DRIFT TEST OVER

L IMU CALIBRATION AND ALIGNMENT

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| | | | | | | | |
|-------|---|--|---------|-----------|---------------|-----------|--|
| 07571 | | | 33,3074 | 77624 1 | CALL | | |
| 07572 | REP 2 LAST 427 | | 33,3075 | 64000 0 | | ERTHRVSE | SET UP RATE FOR PIP TEST OR COMPASS |
| 07573 | | | 33,3076 | 77776 1 | EXIT | | |
| 0758 | REP 1 | | 33,3077 | 0 2122 1 | TC | TORQUE | |
| 0759 | REP 21 LAST 251 | | 33,3100 | 0 5537 0 | SOMERRR TC | ALARM | GO TO IMU2 FOR A PIPA TEST AND DISPLAY |
| 0760 | | | 33,3101 | 01600 0 | OCT | 1600 | |
| 0761 | | | 33,3102 | 0 3105 0 | TC | +3 | |
| 0762 | REP 22 LAST 435 | | 33,3103 | 0 5537 0 | SOMERR2 TC | ALARM | |
| 0763 | | | 33,3104 | 01601 1 | OCT | 1601 | |
| 0764 | REP 11 LAST 434 | | 33,3105 | 0 5301 0 | TC | FLASHING | |
| 0765 | | | 33,3106 | 00005 1 | OCT | 00005 | |
| 0766 | REP 2 LAST 424 | | 33,3107 | 0 2267 0 | TC | ENDTEST1 | |
| R0767 | THE FAMOUS MAGIC NUMBERS OF SCHMIDT ARE NOW PART OF AN ERASABLE LOAD. | | | | | | |
| 0768 | | | 33,3110 | 02222 1 | DEC685 OCT | 02222 | 1170 B+14 ORDER IS NOW IMPORTANT |
| 0769 | | | 33,3111 | 00000 1 | SCHZEROS 2DEC | .00000000 | |
| 0770 | | | 33,3112 | 00000 1 | | | |
| 0770 | | | 33,3113 | 00000 1 | 2DEC | .00000000 | |
| 0770 | | | 33,3114 | 00000 1 | | | |
| 0771 | | | 33,3115 | 00000 1 | OCT | 00000 | |
| 0772 | | | 33,3116 | 00000 1 | QMEDPP OCT | 00000 | |
| 0773 | | | 33,3117 | 00001 0 | OCT | 00001 | ABOVE ORDER IS IMPORTANT |
| 0774 | | | 33,3120 | 00004 0 | INTVAL OCT | 4 | |
| 0775 | | | 33,3121 | 00002 0 | OCT | 2 | |
| 0776 | | | 33,3122 | 00220 1 | DEC | 144 | |
| 0777 | | | 33,3123 | 77776 1 | DEC | -1 | |
| 0778 | | | 33,3124 | 35730 0 | SOUPLY 2DEC | .93505670 | INITIAL GAINS FOR PIP OUTPUTS |
| 0778 | | | 33,3125 | 00035 1 | | | |
| 0779 | | | 33,3126 | 10317 0 | 2DEC | .26266423 | INITIAL GAINS/4 FOR ERECTION ANGLES |
| 0779 | | | 33,3127 | 17550 1 | | | |
| 0780 | | | 33,3130 | 00115 1 | 77DECM. DEC | 77 | |
| 0781 | REP 4 LAST 432 | | 33,3131 | 01453 1 | ALJOKZ GENADR | ALX1S -1 | |
| R0789 | GYROCOMPASS PORTIONS FINISH THIS LOG SECTION | | | | | | |
| 07895 | REP 1 | | | | COUNT | 33/P01 | |
| R0790 | INITIALIZATION SECTION | | | | | | |
| 0791 | REP 56 LAST 418 | | 33,3132 | -3 4712 1 | GTSCPSS CAP | ONE | CALLED BY V37. |
| 0792 | REP 5 LAST 431 | | 33,3133 | 55=643 0 | TS | GEOSCOMP1 | THIS IS THE LEAD IN FOR COMPASS. |



L IMU CALIBRATION AND ALIGNMENT

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| | | | | | | | | | |
|-------|---|-----|------|------------|----------|----------|--------|----------------|--|
| 0793 | REP | 1 | | 33,3134 | 3 3424 0 | | CA | 1/PIPAOT | |
| 0794 | REP | 8 | LAST | 410 | 33,3135 | 55=074 1 | TS | 1/PIPADT | |
| 0795 | REP | 21 | LAST | 298 | 33,3136 | 3 4703 1 | CA | BITs | |
| 0796 | REP | 11 | LAST | 434 | 33,3137 | 55=412 0 | TS | LENGTHOT | |
| 0797 | REP | 1 | | | 33,3140 | 3 4731 0 | CAP | 1/2SECK | |
| 0798 | REP | 3 | LAST | 429 | 33,3141 | 55=644 1 | TS | 1SECKT1 | |
| 0799 | REP | 57 | LAST | 435 | 33,3142 | 3 4712 1 | CAP | ONE | |
| 0800 | REP | 1 | | | 33,3143 | 55=632 0 | TS | PERMTRK1 | |
| 08005 | REP | 2 | LAST | 417 | 33,3144 | 55=657 0 | TS | PERFDLAY +1 | |
| 08006 | REP | 100 | LAST | 430 | 33,3145 | 3 4714 1 | CAP | ZERO | |
| 08007 | REP | 3 | LAST | 436 | 33,3146 | 55=656 1 | TS | PERFDLAY | |
| 0801 | REP | 1 | | | 33,3147 | 0 0006 1 | EXTEND | | |
| 0802 | REP | 4 | LAST | 98 | 33,3150 | 3 1634 1 | DCA | LINHAZ1 | |
| 0803 | REP | 1 | | | 33,3151 | 53=636 1 | DCH | NEWAZ1 | |
| 08031 | REP | 1 | | | 33,3152 | 0 0006 1 | EXTEND | | |
| 08032 | REP | 5 | LAST | 436 | 33,3153 | 3 1634 1 | DCA | LINHAZ1 | |
| 08033 | REP | 1 | | | 33,3154 | 53=640 0 | DCH | OLDAZMTH | |
| 0804 | REP | 2 | LAST | 416 | 33,3155 | 3 4375 1 | CA | DEC17 | |
| 0805 | REP | 5 | LAST | 427 | 33,3156 | 55=655 1 | TS | ZERONDY1 | |
| 0806 | REP | 1 | | | 33,3157 | 3 2446 0 | CA | XSMADR | |
| 0807 | REP | 3 | LAST | 427 | 33,3160 | 0 2356 0 | TC | ZERONDY | |
| 0808 | REP | 1 | | | 33,3161 | 0 3163 0 | TC | POSN17C | |
| 0809 | REP | 1 | | | 33,3162 | 0 2030 0 | TC | GROIMUTT | |
| 0810 | REP | 1 | | | 33,3163 | 0 0006 1 | EXTEND | | |
| 0811 | REP | 13 | LAST | 424 | 33,3164 | 23=425 0 | QXCH | QPLACE | |
| 0812 | REP | 2 | LAST | 417 | 33,3165 | 4 4675 0 | CS | HALF | |
| 0813 | REP | 2 | LAST | 93 | 33,3166 | 55=705 0 | TS | ZSM | |
| 0814 | REP | 25 | LAST | 434 | 33,3167 | 0 6006 1 | TC | INTPRRT | |
| 0815 | REP | 1 | | | 33,3170 | 41545 0 | DLOAD | PUSH | |
| 0816 | REP | 2 | LAST | 436 | 33,3171 | 02636 0 | | NEWAZ1 | |
| 0817 | REP | 1 | | | 33,3172 | 77756 0 | SIN | | |
| 0818 | REP | 25 | LAST | 434 | 33,3173 | 02676 1 | STORE | XSM +4 | |
| 0819 | REP | 2 | LAST | 93 | 33,3174 | 16702 0 | STODL | YSM +2 | |
| 0820 | REP | 1 | | | 33,3175 | 77746 1 | COS | | |
| 0821 | REP | 3 | LAST | 436 | 33,3176 | 02704 0 | STORE | YSM +4 | |
| 0822 | REP | 1 | | | 33,3177 | 77676 0 | DCOMP | | |
| 0823 | REP | 26 | LAST | 436 | 33,3200 | 62674 0 | STORE | XSM +3 | |
| 0824 | REP | 1 | | | 33,3201 | 77776 1 | EXIT | | |
| 0825 | REP | 14 | LAST | 436 | 33,3202 | 0 1425 0 | TC | QPLACE | |
| 0826 | JOB DONE EVERY ITERATION THROUGH COMPASS PROGRAM, SET BY TASK ALLOP | | | | | | | | |
| 0828 | REP | 2 | LAST | 427 TO 432 | 142 | 142* | COUNT | 33/P02 | |
| 0827 | REP | 1 | | | 33,3203 | 44743 1 | ALWAYS | DLOAD* DLM* | |
| 0828 | REP | 3 | LAST | 432 | 33,3204 | 02543 1 | | DPIPAY +8D,1 | |
| 0829 | REP | 2 | LAST | 98 | 33,3205 | 02505 0 | | FILDRLW1 +8D,1 | |

COMPASS IS A .5 SEC LOOP

GO TO IMU2 FOR FURTHER INITIALIZATION
COMPASS POSITION Z DOWN, X DOWNRANGE
FROM NORTH IN REVOLUTIONS + CLOCKWISE
ALL THIS TO INITIALIZE MATRIX

COMPASS AND ERECT

L IMU CALIBRATION AND ALIGNMENT

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| | | | | | | | | | |
|------|------|----|------|---------|---------|-----------|-----------|----------------|---------------|
| 0830 | | | | 33,3206 | 42675 0 | DMPR | DAD+ | | |
| 0831 | RESP | 1 | | 33,3207 | 27713 1 | | GEOCONS1 | | |
| 0832 | RESP | 3 | LAST | 436 | 33,3210 | 02505 0 | FILDELV1 | +8D,1 | |
| 0833 | RESP | 4 | LAST | 437 | 33,3211 | 06505 1 | STORE | FILDELV1 +8D,1 | |
| 0834 | | | | 33,3212 | 77613 0 | DAD+ | | | |
| 0835 | RESP | 1 | | 33,3213 | 02507 1 | | INTVEC1 | +8D,1 | |
| 0836 | RESP | 2 | LAST | 437 | 33,3214 | 06507 0 | STORE | INTVEC1 +8D,1 | |
| 0837 | | | | 33,3215 | 42675 0 | DMPR | DAD+ | | |
| 0838 | RESP | 1 | | 33,3216 | 27715 1 | | GEOCONS2 | | |
| 0839 | RESP | 5 | LAST | 437 | 33,3217 | 02505 0 | STORE | FILDELV1 +8D,1 | |
| 0840 | | | | 33,3220 | 41475 1 | DMPR | PUSH | | |
| 0841 | RESP | 1 | | 33,3221 | 15330 0 | | GEOCONS6 | | |
| 0842 | | | | 33,3222 | 67300 0 | TIX,1 | SLOAD | | |
| 0843 | RESP | 2 | LAST | 431 | 33,3223 | 67203 1 | | ALWAYS0 | |
| 0844 | RESP | 1 | | 33,3224 | 02647 0 | | ERECTIM1 | | |
| 0845 | | | | 33,3225 | 71254 1 | BZE | DLOAD | | |
| 0846 | RESP | 1 | | 33,3226 | 67237 0 | | COMPOS | | |
| 0847 | RESP | 2 | LAST | 98 | 33,3227 | 02471 1 | | THETAN1 +2 | |
| 0848 | | | | 33,3230 | 45425 0 | DSU | STADR | | |
| 0849 | RESP | 3 | LAST | 437 | 33,3231 | 61306 0 | STODL | THETAN1 +2 | ERECTOR ONLY. |
| 0850 | | | | 33,3232 | 77621 1 | RDSU | | | |
| 0851 | RESP | 4 | LAST | 437 | 33,3233 | 02473 0 | | THETAN1 +4 | |
| 0852 | RESP | 5 | LAST | 437 | 33,3234 | 02473 0 | STORE | THETAN1 +4 | |
| 0853 | | | | 33,3235 | 77650 1 | GOTO | | | |
| 0854 | RESP | 1 | | 33,3236 | 67261 0 | | ADD INDRP | | |
| 0855 | | | | 33,3237 | 43345 1 | COMPOS | DLOAD | | COMPASS |
| 0856 | RESP | 6 | LAST | 437 | 33,3240 | 02467 0 | | THETAN1 | |
| 0857 | RESP | 6 | LAST | 437 | 33,3241 | 02475 0 | | FILDELV1 | |
| 0858 | RESP | 7 | LAST | 437 | 33,3242 | 16467 0 | STODL | THETAN1 | |
| 0859 | RESP | 7 | LAST | 437 | 33,3243 | 02475 0 | | FILDELV1 | |
| 0860 | | | | 33,3244 | 44275 1 | DMPR | RDSU | | |
| 0861 | RESP | 1 | | 33,3245 | 27717 0 | | GEOCONS3 | | |
| 0862 | RESP | 8 | LAST | 437 | 33,3246 | 02473 0 | | THETAN1 +4 | |
| 0863 | RESP | 9 | LAST | 437 | 33,3247 | 16473 0 | STODL | THETAN1 +4 | |
| 0864 | RESP | 8 | LAST | 437 | 33,3250 | 02501 1 | | FILDELV1 +4 | |
| 0865 | | | | 33,3251 | 44275 1 | DMPR | RDSU | | |
| 0866 | RESP | 2 | LAST | 437 | 33,3252 | 27717 0 | | GEOCONS3 | |
| 0867 | RESP | 10 | LAST | 437 | 33,3253 | 02471 1 | | THETAN1 +2 | |
| 0868 | | | | 33,3254 | 57325 1 | PDDL | DMPR | | |
| 0869 | RESP | 3 | LAST | 437 | 33,3255 | 02503 0 | | INTVEC1 +4 | |
| 0870 | RESP | 1 | | 33,3256 | 27721 0 | | GEOCONS4 | | |
| 0871 | | | | 33,3257 | 45421 1 | RDSU | STADR | | |
| 0872 | RESP | 11 | LAST | 437 | 33,3260 | 75306 0 | STORE | THETAN1 +2 | |
| 0873 | | | | 33,3261 | 77776 1 | ADD INDRP | EXIT | | |
| 0874 | RESP | 12 | LAST | 436 | 33,3262 | 11412 0 | ENDGTSAL | CCS | LENGTHOT |
| 0875 | RESP | 3 | LAST | 434 | 33,3263 | 0 2522 0 | | TC | SLEEP1E |
| 0876 | RESP | 3 | LAST | 431 | 33,3264 | 0 3401 1 | | TC | CHKCOND |
| 0877 | RESP | 2 | LAST | 188 | 33,3265 | 114304 0 | | CCS | LOYRO |

IS 5 SEC OVER-THE TIME TO TORO PLATFORM
NO-SET UP NEXT WAITLIST CALL FOR .5 SEC
YES BUT ARE GYROS BUSY



L IMU CALIBRATION AND ALIGNMENT

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| | | | | | | | | |
|-------|-----|----|------|-----|---------|----------|-----------|------------|
| 0878 | REP | 4 | LAST | 437 | 33,3266 | 1 2523 0 | TCP | SLEEPIE +1 |
| 0879 | REP | 26 | LAST | 438 | 33,3267 | 0 6006 1 | LASTOTS | TC |
| 0880 | | | | | 33,3270 | 77775 1 | VLOAD | INTPRET |
| 0881 | REP | 9 | LAST | 423 | 33,3271 | 02850 0 | | ERCOMP1 |
| 0882 | REP | 4 | LAST | 430 | 33,3272 | 16461 0 | STODL | THETAX1 |
| 0883 | REP | 4 | LAST | 423 | 33,3273 | 02443 0 | | TMARK |
| 0884 | REP | 8 | LAST | 433 | 33,3274 | 02457 0 | STORE | ALK |
| 0885 | | | | | 33,3275 | 77776 1 | EXIT | |
| 0886 | REP | 12 | LAST | 435 | 33,3276 | 0 5301 0 | RESTARTER | TC |
| 0887 | | | | | 33,3277 | 00275 1 | OCT | PHASCHNG |
| 0888 | REP | 27 | LAST | 438 | 33,3300 | 0 6006 1 | TC | 00275 |
| 0889 | | | | | 33,3301 | 64375 1 | VLOAD | INTPRET |
| 0890 | REP | 12 | LAST | 437 | 33,3302 | 02467 0 | | MOV |
| 0891 | REP | 27 | LAST | 436 | 33,3303 | 02672 0 | | THETAN1 |
| 0892 | | | | | 33,3304 | 63372 1 | VSL1 | XSM |
| 0893 | REP | 5 | LAST | 438 | 33,3305 | 02461 0 | | VAD |
| 0894 | REP | 10 | LAST | 438 | 33,3306 | 16650 0 | STODL | THETAX1 |
| 0895 | REP | 9 | LAST | 438 | 33,3307 | 02457 0 | | ERCOMP1 |
| 0896 | REP | 5 | LAST | 438 | 33,3310 | 02443 0 | STORE | ALK |
| 0897 | | | | | 33,3311 | 77776 1 | EXIT | TMARK |
| 0898 | REP | 5 | LAST | 429 | 33,3312 | 0 2417 1 | TC | EARTHRC |
| 0899 | REP | 2 | LAST | 437 | 33,3313 | 316646 1 | CAB | ERECTIM1 |
| 0900 | REP | 4 | LAST | 430 | 33,3314 | 556631 0 | TS | GEOSAVE1 |
| 0901 | REP | 13 | LAST | 438 | 33,3315 | 0 5301 0 | TC | PHASCHNG |
| 0902 | | | | | 33,3316 | 00155 0 | OCT | 00155 |
| 0903 | REP | 28 | LAST | 438 | 33,3317 | 0 6006 1 | RETEST1 | TC |
| 0904 | | | | | 33,3320 | 77775 1 | VLOAD | INTPRET |
| 0905 | REP | 5 | LAST | 427 | 33,3321 | 27112 0 | | SCHZEROS |
| 0906 | REP | 13 | LAST | 438 | 33,3322 | 02467 0 | STORE | THETAN1 |
| 0907 | | | | | 33,3323 | 77776 1 | EXIT | |
| 0912 | REP | 1 | | | 33,3324 | 116632 0 | CCS | PREMTRXC |
| 09121 | REP | 1 | | | 33,3325 | 0 3374 1 | TC | NOCHORD |
| 09122 | REP | 14 | LAST | 438 | 33,3326 | 0 5301 0 | TC | PHASCHNG |
| 0913 | | | | | 33,3327 | 00255 0 | OCT | 00255 |
| 09131 | REP | 29 | LAST | 438 | 33,3330 | 0 6006 1 | RETEST3 | TC |
| 0914 | | | | | 33,3331 | 77745 1 | DLOAD | INTPRET |
| 09142 | REP | 2 | LAST | 169 | 33,3332 | 02834 1 | | LAUNCHAZ |
| 0915 | | | | | 33,3333 | 53025 0 | DSJ | RZF |
| 09151 | REP | 2 | LAST | 436 | 33,3334 | 02640 1 | | OLDAZMTH |
| 09152 | REP | 1 | | | 33,3335 | 67371 0 | | NOAZCHKE |
| 09153 | | | | | 33,3336 | 00001 0 | STORE | OD |
| 09154 | | | | | 33,3337 | 43335 0 | SLOAD | DAD |
| 09155 | REP | 2 | LAST | 421 | 33,3340 | 27120 1 | | QNEOPP +1 |
| 0918 | REP | 2 | LAST | 438 | 33,3341 | 02833 0 | | PREMTRXC |
| 0919 | REP | 3 | LAST | 438 | 33,3342 | 16633 0 | STODL | PREMTRXC |
| 0920 | REP | 3 | LAST | 438 | 33,3343 | 02634 1 | | LAUNCHAZ |
| 09201 | REP | 1 | | | 33,3344 | 16636 0 | STODL | NEWAZMTH |
| 09202 | | | | | 33,3345 | 00001 0 | | OD |

BUSY-GET THEM .5 SECONDS FROM NOW

PREVIOUS SECTION WAS FOR RESTARTS

ADD COMPASS COMMANDS INTO ERATE

TORQUE IT ALL IN

DOES NOT CHANGE LAUNCHAZ



L IMU CALIBRATION AND ALIGNMENT

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| | | | | | | | | | | |
|-------|-----|-----|------|---------|---------|--------|---------|-------|-----------|------------|
| 00203 | REP | 1 | | 33,3346 | 02654 | 1 | ADRCOMP | STORE | ERCOMP +4 | |
| 00204 | | | | 33,3347 | 77776 | 1 | | EXIT | | |
| 00205 | REP | 2 | LAST | 438 | 33,3350 | 0 | 3163 | 0 | TC | POSN17C |
| 00206 | REP | 15 | LAST | 438 | 33,3351 | 0 | 5301 | 0 | TC | PHASCHNG |
| 00207 | | | | | 33,3352 | 00335 | 1 | | OCT | 00335 |
| 0021 | | | | | 33,3353 | 0 | 0006 | 1 | RESCHNG | EXTEND |
| 0022 | REP | 2 | LAST | 438 | 33,3354 | 3 | 1638 | 0 | DCA | NEWAZMTH |
| 0023 | REP | 3 | LAST | 438 | 33,3355 | 53=640 | 0 | | DXCH | OLDAZMTH |
| 00231 | REP | 33 | LAST | 384 | 33,3356 | 3 | 4704 | 0 | CA | BIT7 |
| 00232 | REP | 13 | LAST | 437 | 33,3357 | 55=412 | 0 | | TS | LENGTHOT |
| 0024 | REP | 16 | LAST | 439 | 33,3360 | 0 | 5301 | 0 | TC | PHASCHNG |
| 0025 | | | | | 33,3361 | 00075 | 0 | | OCT | 00075 |
| 0026 | REP | 1 | | | 33,3362 | 3 | 3423 | 1 | SPITGYRO | CA |
| 0027 | REP | 70 | LAST | 434 | 33,3363 | 0 | 4555 | 0 | TC | ERCOMPPL |
| 0028 | REP | 4 | LAST | 434 | 33,3364 | 17125 | 1 | | CADR | RANKCALL |
| 0029 | REP | 71 | LAST | 439 | 33,3365 | 0 | 4555 | 0 | TC | IMPLUSE |
| 0030 | REP | 7 | LAST | 421 | 33,3366 | 17516 | 0 | | CADR | RANKCALL |
| 0031 | REP | 2 | LAST | 421 | 33,3367 | 0 | 3103 | 0 | TC | SCMERR2 |
| 00311 | REP | 3 | LAST | 420 | 33,3370 | 0 | 2453 | 1 | TC | ESTIMS |
| 0032 | | | | | 33,3371 | 77776 | 1 | | NOAZCHGR | EXIT |
| 0033 | REP | 58 | LAST | 438 | 33,3372 | 3 | 4712 | 1 | CA | ONE |
| 0034 | REP | 4 | LAST | 438 | 33,3373 | 55=632 | 0 | | TS | PREMTRNC |
| 0041 | REP | 5 | LAST | 438 | 33,3374 | 11=631 | 0 | | NOCHORLD | CCS |
| 0042 | REP | 3 | LAST | 438 | 33,3375 | 55=646 | 0 | | TS | ERECTIM1 |
| 0043 | REP | 1 | | | 33,3376 | 3 | 433 | 1 | ANNNNN | CAP |
| 0044 | REP | 14 | LAST | 439 | 33,3377 | 55=412 | 0 | | TS | LENGTHOT |
| 0045 | REP | 5 | LAST | 438 | 33,3400 | 0 | 2523 | 1 | TC | SLEEP1E +1 |
| 0046 | | | | | 33,3401 | 0 | 0004 | 0 | CHKCOMED | INHINT |
| 0047 | REP | 101 | LAST | 436 | 33,3402 | 4 | 4714 | 0 | CS | ZERO |
| 0048 | | | | | 33,3403 | 0 | 0006 | 1 | | EXTEND |
| 0049 | REP | 5 | LAST | 244 | 33,3404 | 06 | 030 | 1 | ROR | CHAN30 |
| 0050 | REP | 24 | LAST | 419 | 33,3405 | 7 | 4706 | 0 | MASK | RITS |
| 0051 | REP | 133 | LAST | 430 | 33,3406 | 10 | 000 | 0 | CCS | A |
| 0052 | REP | 1 | | | 33,3407 | 1 | 3416 | 0 | TCF | PRELTERM |
| 0053 | REP | 25 | LAST | 439 | 33,3410 | 3 | 4706 | 1 | CA | RITS |
| 0054 | REP | 8 | LAST | 383 | 33,3411 | 7 | 0101 | 0 | MASK | FLAGWRD5 |
| 0055 | REP | 134 | LAST | 439 | 33,3412 | 10 | 000 | 0 | CCS | A |
| 0056 | REP | 2 | LAST | 439 | 33,3413 | 1 | 3416 | 0 | TCF | PRELTERM |
| 0057 | | | | | 33,3414 | 0 | 0003 | 1 | | RELINT |
| 0058 | REP | 150 | LAST | 430 | 33,3415 | 0 | 0002 | 0 | TC | O |
| 0059 | REP | 1 | | | 33,3416 | 3 | 7657 | 1 | PRELTERM | CA |
| | | | | | | | | | | PRI022 |

SPEND 320 SEC ERECTING

RE-INITIALIZE

COUNTS DOWN FOR ERECTION.

READ AND INVERT BITS IN CHANNEL 30 LIPTOFF BIT

LIPTOFF HAS OCCURRED

CHECK FOR BACKUP LIPTOFF BITS FLAGWRD5

BACKUP RECEIVED

CONTINUE PRELAUNCH PRELAUNCH DONE - SET UP P11



L IMU CALIBRATION AND ALIGNMENT

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| | | | | | | | | | |
|------|-----|----|------|-----|---------|----------|----------|----------|--|
| 0960 | REP | 4 | LAST | 385 | 33,3417 | 0 5103 0 | TC | PRIORNG | INCREASE PRIORITY HIGHER THAN SERVICER |
| 0961 | | | | | 33,3420 | 0 0004 0 | INHINT | | |
| 0962 | REP | 34 | LAST | 380 | 33,3421 | 0 4574 0 | TC | POSTJUMP | |
| 0963 | REP | 1 | | | 33,3422 | 70002 1 | CADR | P11 | |
| 0965 | REP | 2 | LAST | 439 | 33,3423 | 02647 0 | ERCOMPPL | ECADR | ERCOMP |
| 0968 | REP | 3 | LAST | 389 | 26,3327 | | GEOCONS | EQUALS | HIDPHALP |
| 0969 | | | | | 33,3424 | 06200 0 | 1/PIPACT | OCT | 06200 |
| 0970 | REP | 6 | LAST | 424 | 4375 | | 17DECM | = | ND1 |
| 0971 | REP | 16 | LAST | 424 | 4374 | | 19DECM | = | VD1 |
| 0972 | REP | 3 | LAST | 164 | 4731 | | 1/2SPOK | = | .5SEC |

OCT 21
OCT 23



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L IMJ CALIBRATION AND ALIGNMENT

USER=5 PAGE NO. 26 RS 53

09720 RSP 56 LAST 429 5112

GEOSTRT4 EQUALS ENDOPJOB



L IMU CALIBRATION AND ALIGNMENT

USER=8 PAGE NO. 27 E5 53

P0873 OPTICAL VERIFICATION ROUTINES FOR GYROCOMPASS

| | | | | | | | | | | |
|--------|-----|----|------|-----|---------|----------|----------|--------|------------|--|
| 09735 | REP | 1 | | | | | COUNT | 33/P03 | | |
| 0974 | REP | 17 | LAST | 439 | 33,3425 | 0 5301 0 | GCOMPVER | TC | PHASCHNG | OPTICAL VERIFICATION ROUTINE |
| 0975 | | | | | 33,3428 | 00154 1 | | OCT | 00154 | |
| 0976 | REP | 4 | LAST | 427 | 33,3427 | 0 5243 1 | | TC | NEWMODEX | ENTERED BY VERB 85 ENTER |
| 0977 | | | | | 33,3430 | 00003 1 | | MM | 03 | |
| 09771 | REP | 1 | | | 33,3431 | 0 2037 1 | SETNBPOS | TC | NBPOSPL | |
| 0978 | REP | 72 | LAST | 439 | 33,3432 | 0 4555 0 | | TC | BANKCALL | |
| 0979 | REP | 2 | LAST | 420 | 33,3433 | 16063 0 | | CADR | MCRELEAS | |
| 0980 | REP | 34 | LAST | 379 | 33,3434 | 3 4712 1 | OPTDATA | CAP | BIT1 | CALLS FOR AZIMUTH AND ELEVATION OF TARGET 1, THEN TARGET 2 |
| 0981 | | | | | 33,3435 | 22 007 0 | | ZL | | AZIMUTH CLOCKWISE FROM NORTH TO TARGET |
| 0982 | REP | 1 | | | 33,3438 | 23=427 1 | | LXCH | RUN | ELEVATION MEASURED FROM HORIZONTAL |
| 0983 | REP | 20 | LAST | 360 | 33,3437 | 55=047 1 | | TS | DSPTM1 +2 | |
| 0984 | | | | | 33,3440 | 0 0006 1 | | EXTEND | | |
| 0985 | REP | 2 | LAST | 442 | 33,3441 | 5 1427 1 | | INDEX | RUN | |
| 0986 | REP | 1 | | | 33,3442 | 3 1433 1 | | DCA | TAZEL1 | |
| 0987 | REP | 21 | LAST | 442 | 33,3443 | 53=046 0 | | DXCH | DSPTM1 | TAZEL1 TARGET 1 AZIMUTH |
| 0988 | REP | 1 | | | 33,3444 | 3 3467 1 | | CAP | V05N30E | TAZEL1 +2 TARGET 2 AZIMUTH |
| 0989 | REP | 73 | LAST | 442 | 33,3445 | 0 4555 0 | | TC | BANKCALL | |
| 0990 | REP | 1 | | | 33,3446 | 20577 0 | | CADR | GODSPRET | |
| 0991 | REP | 1 | | | 33,3447 | 3 3455 0 | | CAP | VN0641 | |
| 09911 | REP | 74 | LAST | 442 | 33,3450 | 0 4555 0 | | TC | BANKCALL | |
| 09912 | REP | 4 | LAST | 424 | 33,3451 | 20624 0 | | CADR | GOPLASH | |
| 09913 | REP | 1 | | | 33,3452 | 0 3810 0 | | TC | GCOMP5 | |
| 09914 | | | | | 33,3453 | 0 3456 0 | | TC | +3 | |
| 09915 | | | | | 33,3454 | 0 3444 0 | | TC | -8D | |
| 09916 | | | | | 33,3455 | 01451 0 | VN0641 | VN | 0641 | |
| 0992 | REP | 22 | LAST | 442 | 33,3456 | 53=046 0 | | DXCH | DSPTM1 | |
| 0993 | REP | 3 | LAST | 442 | 33,3457 | 51=427 1 | | INDEX | RUN | |
| 0994 | REP | 2 | LAST | 442 | 33,3460 | 53=433 0 | | DXCH | TAZEL1 | |
| 0995 | REP | 4 | LAST | 442 | 33,3461 | 11=427 0 | | CCS | RUN | |
| 0996 | | | | | 33,3462 | 1 3466 1 | | TCF | +4 | |
| 0997 | REP | 26 | LAST | 418 | 33,3463 | 3 4711 1 | | CAP | TWO | |
| 0998 | REP | 55 | LAST | 424 | 33,3464 | 54 001 1 | | TS | L | |
| 0999 | REP | 1 | | | 33,3465 | 1 3436 1 | | TCF | OPTDATA +2 | MPAC 1ST PASS=0 2ND PASS=2 |
| 09991 | REP | 1 | | | 33,3466 | 0 3530 1 | | TC | CONTIN33 | |
| 099921 | | | | | 33,3467 | 01236 1 | V05N30E | VN | 0530 | |
| 10136 | REP | 30 | LAST | 438 | 33,3470 | 0 6006 1 | | TC | INTPRET | UNDYNAMIC ASSEMBLER |
| 1014 | | | | | 33,3471 | 77170 1 | TAR/EREF | AXT,1 | AXT,2 | TARGET VECTOR |
| 1015 | | | | | 33,3472 | 00002 0 | | | 2 | SIN(EL) -COS(AZ)COS(EL) SIN(AZ)COS(EL) |
| 1016 | | | | | 33,3473 | 00014 1 | | | 12D | |
| 1017 | | | | | 33,3474 | 40331 1 | | SSP | SETPD | |
| 1018 | REP | 3 | LAST | 423 | 33,3475 | 00052 0 | | | S2 | |
| 1019 | | | | | 33,3476 | 00006 1 | | | 6 | |



L IMU CALIBRATION AND ALIGNMENT

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| 11003 | | | 04,2617 | | BANK | | | |
|--------|-----|-----|-----------------|---------|--------|----------|----------|-----------------|
| 110035 | REP | 1 | | | | COUNT | 34/CONST | |
| 1119 | | | 04,2617 | 62545 | 1 | LATAZCHK | DLOAD | SL2 |
| 1120 | REP | 4 | LAST 423 | 04,2620 | 02403 | 1 | | LATITUDE |
| 1121 | REP | 23 | LAST 442 | 04,2621 | 15047 | 0 | | STOCL DSPTM1 +1 |
| 1122 | REP | 3 | LAST 417 | 04,2622 | 02401 | 0 | | AZIMUTH |
| 1123 | | | | 04,2623 | 77434 | 1 | | RTB EXIT |
| 1124 | REP | 3 | LAST 283 | 04,2624 | 45543 | 1 | | 1STO25 |
| 1125 | REP | 233 | LAST 433 | 04,2625 | 56 154 | 1 | | XCH MPAC |
| 1126 | REP | 24 | LAST 445 | 04,2626 | 55=045 | 0 | | TS DSPTM1 |
| 1127 | REP | 78 | LAST 444 | 04,2627 | 0 4555 | 0 | | TC BANKCALL |
| 1128 | REP | 1 | | 04,2630 | 20607 | 1 | | CADR CLEANDSP |
| 1129 | REP | 1 | | 04,2631 | 3 2650 | 0 | | CAP VNG0641 |
| 11291 | REP | 79 | LAST 445 | 04,2632 | 0 4555 | 0 | | TC BANKCALL |
| 11292 | REP | 8 | LAST 444 | 04,2633 | 20624 | 0 | | CADR GOPLASH |
| 11293 | | | | 04,2634 | 0 2636 | 0 | | TC +2 |
| 11294 | | | | 04,2635 | 0 2637 | 1 | | TC +2 |
| 11295 | | | | 04,2636 | 0 2631 | 1 | | TC -5 |
| 1130 | REP | 34 | LAST 444 | 04,2637 | 0 6006 | 1 | | TC INTPRET |
| 1131 | | | | 04,2640 | 47135 | 0 | | SLOAD RTB |
| 1132 | REP | 25 | LAST 445 | 04,2641 | 01046 | 1 | | DSPTM1 |
| 1133 | REP | 5 | LAST 443 | 04,2642 | 45510 | 1 | | CDXLOGIC |
| 1134 | REP | 4 | LAST 445 | 04,2643 | 02401 | 0 | | STORE AZIMUTH |
| 11341 | | | | 04,2644 | 60535 | 1 | | SLOAD SR2 |
| 11342 | REP | 26 | LAST 445 | 04,2645 | 01047 | 0 | | DSPTM1 +1 |
| 11343 | REP | 5 | LAST 445 | 04,2646 | 02403 | 1 | | STORE LATITUDE |
| 1135 | | | | 04,2647 | 77616 | 0 | | RVO |
| 11351 | | | | 04,2650 | 01451 | 0 | VNG0641 | VN 0641 |
| 1136 | | | | 33,3625 | | | | RANK 33 |
| 1137 | REP | 5 | LAST 443 | 33,3000 | | | | SETLOC IMCAL |
| 1138 | | | | 33,3625 | | | | RANK |
| 1139 | REP | 2 | LAST 442 TO 443 | 67 67* | | | | COUNT* 33/P03 |
| 1140 | | | | 33,3625 | 0 0006 | 1 | TARCDRVE | EXTEND |
| 1141 | REP | 1 | | 33,3626 | 23=424 | 1 | | QXCH OPLAC |
| 1142 | REP | 1 | | 33,3627 | 55=431 | 1 | | TS TARG1/2 |
| 11421 | REP | 35 | LAST 445 | 33,3630 | 0 6006 | 1 | | TC INTPRET |
| 1143 | | | | 33,3631 | 77624 | 1 | | CALL |
| 1144 | REP | 2 | LAST 443 | 33,3632 | 67471 | 1 | | TAR/REP |
| 1145 | | | | 33,3633 | 76740 | 0 | | LXC,1 |
| 1146 | REP | 2 | LAST 445 | 33,3634 | 02431 | 0 | | VLOAD* |
| 1147 | | | | 33,3635 | 00007 | 0 | | TARG1/2 |
| 1148 | REP | 10 | LAST 283 | 33,3636 | 36766 | 0 | | 6D,1 |
| 1149 | REP | 1 | | 33,3637 | 46053 | 0 | | STCALI STAR |
| 1150 | | | | 33,3640 | 77776 | 1 | | EXIT SKTANG |

CALLS FOR AZIMUTH AND LATITUDE

NOT ALLOWED



L IMU CALIBRATION AND ALIGNMENT

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| | | | | | | | | |
|--------|-----|-----|------|--------|---------|----------|---------|-----------------|
| 1151 | REP | 6 | LAST | 283 | 33,3641 | 3 1773 0 | CA | SAC |
| 1152 | REP | 4 | LAST | 236 | 33,3642 | 55=161 1 | TS | DESOPTS |
| 1153 | REP | 6 | LAST | 283 | 33,3643 | 3 1775 0 | CA | PAC |
| 1154 | REP | 5 | LAST | 236 | 33,3644 | 55=160 0 | TS | DESOPTT |
| 1155 | REP | 103 | LAST | 443 | 33,3645 | 3 4714 1 | CAP | ZERO |
| 1156 | REP | 22 | LAST | 385 | 33,3646 | 55=303 1 | TS | OPTIND |
| 1157 | REP | 60 | LAST | 443 | 33,3647 | 3 4712 1 | CAP | ONE |
| 1158 | REP | 60 | LAST | 445 | 33,3650 | 0 4555 0 | TC | BANKCALL |
| 1159 | REP | 1 | | | 33,3651 | 16002 1 | CADR | SXTMARK |
| 1160 | REP | 61 | LAST | 446 | 33,3652 | 0 4555 0 | TC | BANKCALL |
| 1161 | REP | 1 | | | 33,3653 | 17512 1 | CADR | OPTSTALL |
| 1162 | REP | 1 | | | 33,3654 | 0 3622 1 | TC | OPTSOPTS |
| 116201 | REP | 11 | LAST | 384 | 33,3655 | 30 075 0 | CAB | FLAGRD1 |
| 116202 | REP | 1 | | | 33,3656 | 7 4707 1 | MARK | TRM03BIT |
| 116203 | REP | 135 | LAST | 439 | 33,3657 | 10 000 0 | CCS | A |
| 116204 | REP | 4 | LAST | 444 | 33,3660 | 0 3610 0 | TC | CCOMPS |
| 11621 | REP | 26 | LAST | 261 | 33,3661 | 51=330 0 | INDEX | MARKSTAT |
| 11622 | REP | 8 | LAST | 259 | 33,3662 | 3 0052 0 | CA | OPRST |
| 11623 | | | | | 33,3663 | 0 0006 1 | EXTEND | |
| 11624 | REP | 1 | | | 33,3664 | 1 3666 0 | BZP | RETARG1 |
| 1163 | REP | 2 | LAST | 445 | 33,3665 | 0 1424 1 | TC | QPLAC |
| 1164 | REP | 104 | LAST | 446 | 33,3666 | 3 4714 1 | CA | ZERO |
| 1165 | REP | 27 | LAST | 446 | 33,3667 | 57=330 0 | XCR | MARKSTAT |
| 1166 | REP | 136 | LAST | 446 | 33,3670 | 10 000 0 | CCS | A |
| 1167 | REP | 137 | LAST | 446 | 33,3671 | 50 000 1 | INDEX | A |
| 1168 | REP | 138 | LAST | 446 | 33,3672 | 54 000 0 | TS | A |
| 1169 | REP | 1 | | | 33,3673 | 1 3645 1 | TCP | RETARG |
| 1170 | | | | | 33,3674 | | BANK | 33 |
| 1171 | REP | 6 | LAST | 445 | 33,2000 | | SPTLOC | IMUCAL |
| 1172 | | | | | 33,3674 | | RANK | |
| 1173 | REP | 3 | LAST | 445 TO | 446 | 39 106* | COUNT* | SS/P03 |
| 1200 | | | | | 33,3674 | 30341 1 | PIPASC | 2DEC .76376833 |
| 1200 | | | | | 33,3675 | 22444 0 | | |
| 1201 | | | | | 33,3676 | 57223 0 | VEL.SC | 2DEC -.52223476 |
| 1201 | | | | | 33,3677 | 66451 1 | | |
| 1202 | | | | | 33,3700 | 05427 0 | ALSK | 2DEC .17329931 |
| 1202 | | | | | 33,3701 | 12577 1 | | |
| 1203 | | | | | 33,3702 | 77567 0 | | 2DEC -.00835370 |
| 1203 | | | | | 33,3703 | 44202 1 | | |
| 1204 | | | | | 33,3704 | 24276 1 | GEORGEJ | 2DEC .63661977 |
| 1204 | | | | | 33,3705 | 14066 1 | | |
| 1205 | | | | | 33,3706 | 23073 1 | GEORGEK | 2DEC .59737013 |
| 1205 | | | | | 33,3707 | 11773 1 | | |
| 1206 | | | | | 33,3710 | 00055 1 | 2GEORGS | 2DEC .00277778 |
| 1206 | | | | | 33,3711 | 20267 0 | | |
| 1207 | | | | | 33,3712 | 03146 1 | GEOCNS1 | 2DEC .1 |
| 1207 | | | | | 33,3713 | 14632 0 | | |

RELEASE PREVIOUSLY GRABBED VAC AREA

GO DO SXTMARK AGAIN



ASSEMBLE REVISION 249 OF AOC PROGRAM COLOSSUS BY NASA 2021111-041

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L IMJ CALIBRATION AND ALIGNMENT

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*** END OF KOOLADE .069 ***

L GROUND TRACKING DETERMINATION PROGRAM - P21

USER'S PAGE NO. 1 E0 83

P0001 GROUND TRACKING DETERMINATION PROGRAM P21
R0002 PROGRAM DESCRIPTION
R0003 MCD NO - 1
R0004 MCD BY - N.M. NEVILLE
R0005 FUNCTIONAL DESCRIPTION-
R0006
R0007 TO PROVIDE THE ASTRONAUT DETAILS OF THE LM OR CSM GROUND TRACK WITHOUT
R0008 THE NEED FOR GROUND COMMUNICATION (REQUESTED BY DSKY).
R0009 CALLING SEQUENCE -
R0010
R0011 ASTRONAUT REQUEST THROUGH DSKY V37E21E
R0012 SUBROUTINES CALLED-
R0013
R0014 GOPERF4
R0015 GOFASH
R0016 THISPREC
R0017 OTHPREC
R0018 LAT-LONG
R0019 NORMAL EXIT MODES-
R0020
R0021 ASTRONAUT REQUEST THROUGH DSKY TO TERMINATE PROGRAM V34E
R0022 ALARM OR ABORT EXIT MODES-
R0023
R0024 NONE
R0025 OUTPUT -
R0026
R0027 OCTAL DISPLAY OF OPTION CODE AND VEHICLE WHOSE GROUND TRACK IS TO BE
R0028 COMPUTED
R0029 OPTION CODE 00002
R0030 THIS 00001
R0031 OTHER 00002
R0032 DECIMAL DISPLAY OF TIME TO BE INTEGRATED TO HOURS , MINUTES , SECONDS
R0033 DECIMAL DISPLAY OF LAT, LONG, ALT
R0034 ERASABLE INITIALIZATION REQUIRED
R0035
R0036 AXO 2DEC 4.652459653 E-5 RADIANS Σ68-69 CONSTANTS₆
R0037
R0038 -AYO 2DEC 2.147535898 E-5 RADIANS
R0039
R0040 AZO 2DEC .7753206184 REVOLUTIONS
R0041 FOR LUNAR ORBITS 504LM VECTOR IS NEEDED
R0042
R0043 504LM 2DEC -2.700340600 E-5 RADIANS
R0044
R0045 504LM 2 2DEC -7.514128400 E-4 RADIANS
R0046
R0047 504LM 4 2DEC 2.553198641 E-4 RADIANS
R0048
R0049 NONE
R0050 DERRIS



L GROUND TRACKING DETERMINATION PROGRAM - P21

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R0051 CENTRALS-A,Q,L
R0052 OTHER-THOSE USED BY THE ABOVE LISTED SUBROUTINES
R0053 SEE LEMPREC,LAT-LONG
R0054
0055 REP 3 LAST 279 30,2000 SBANK= LOWSUPER
0056 REP 1 33,3772 BANK 33
0057 REP 1 37,2000 SETLOC P20S
0058 37,2001 BANK
0059 REP 3 LAST 256 E4,1715 EBANK= P21TIME
0060 REP 1 COUNT 24/P21
0061 REP 61 LAST 446 37,2001 3 4712 1 PROG21 CAP ONE
0062 REP 2 LAST 276 37,2002 55-132 1 TS OPTION2
0063 REP 21 LAST 369 37,2003 3 4711 1 CAP RIT2
0064 REP 64 LAST 447 37,2004 0 4555 0 TC BANKCALL
0065 REP 1 37,2005 20761 0 CADR GOPERP4
0066 REP 3 LAST 385 37,2006 0 4106 1 TC GOTOPOOH
0067 37,2007 0 2011 0 TC +2
0068 37,2010 0 2003 0 TC -5
0069 REP 1 37,2011 3 2102 0 P21PROG1 CAP V6N34
0070 REP 85 LAST 450 37,2012 0 4555 0 TC BANKCALL
0071 REP 8 LAST 447 37,2013 20624 0 CADR GOFASH
0072 REP 4 LAST 450 37,2014 0 4106 1 TC GOTOPOOH
0073 37,2015 0 2017 0 TC +2
0074 37,2016 0 2011 0 TC -5
0075 REP 38 LAST 447 37,2017 0 6006 1 TC INTRPT
0076 37,2020 77745 1 DLOAD
0077 REP 29 LAST 447 37,2021 01046 1 DSPTM1
0078 REP 4 LAST 450 37,2022 02316 1 STORE P21TIME
0079 37,2023 45335 0 SLOAD DSJ
0080 REP 3 LAST 450 37,2024 01133 1 OPTION2
0081 REP 1 37,2025 36100 0 P21ONEN
0082 37,2026 71230 0 RHIZ DLOAD
0083 REP 1 37,2027 76042 0 P21PROG2
0084 REP 5 LAST 450 37,2030 02316 1 P21TIME
0085 REP 2 LAST 204 37,2031 34041 0 STCALL TDEC1
0086 REP 1 37,2032 27036 1 OTHPRC
0087 37,2033 46135 1 P21PROG3 SLOAD RHIZ
0088 REP 1 37,2034 00050 1 X2
0089 REP 1 37,2035 76050 0 P21PROG3
0090 37,2036 43175 0 VLOAD SETGO
0091 REP 1 37,2037 00001 0 RATT
0092 REP 1 37,2040 01423 0 LINAPLAG
0093 REP 1 37,2041 76053 0 P21PROG4
0094 37,2042 77745 1 P21PROG2 DLOAD
0095 REP 6 LAST 450 37,2043 02316 1 P21TIME
0096 REP 3 LAST 450 37,2044 34041 0 STCALL TDEC1
0097 REP 1 37,2045 27022 1 THISPRC

FOR LOW gCADR=S.

ASSUMED VEHICLE IS LM, R2 = 00001
OPTION 2

TERMINATE
PROCEED VALUE OF ASSUMED VEHICLE OK
R2 LOADED THROUGH DSKY
LOAD DESIRED TIME OF LAT-LONG.

TERM
PROCEED VALUES OK
TIME LOADED THROUGH DSKY

VEHICLE TO BE INTEGRATED IS LEM
VEHICLE TO BE INTEGRATED IS CSM
INTEGRATE TO TIME SPECIFIED IN TDEC
ADJUST UNITS FOR LAT-LONG ROUTINE

L GROUND TRACKING DETERMINATION PROGRAM - P21

USER'S PAGE NO. 3 E4 53

| | | | | | | | | |
|------|-----|----|----------|---------|----------|----------|----------|-----------------------------|
| 0098 | | | 37,2046 | 77650 1 | | GOTO | | |
| 0099 | REP | 1 | 37,2047 | 76033 0 | | | P21PROG4 | DISPLAY LAT, LONG, ALT |
| 0100 | | | 37,2050 | 43175 0 | P21PROG3 | VLOAD | CLEAR | LAT, LONG = 1/2 REVS B0 |
| 0101 | REP | 2 | LAST 450 | 37,2051 | 00001 0 | | RATT | ALT = KM B14 |
| 0102 | REP | 2 | LAST 450 | 37,2052 | 01663 0 | | LINAPLAG | TERM |
| 0103 | REP | 2 | LAST 67 | 37,2053 | 16152 0 | P21PROG4 | STOOL | |
| 0104 | REP | 1 | | 37,2054 | 00015 0 | | ALPHAV | |
| 0105 | | | | 37,2055 | 45014 0 | | TAT | |
| 0106 | REP | 1 | | 37,2056 | 00662 0 | | CALL | |
| 0107 | REP | 1 | | 37,2057 | 26322 0 | | ERADFLAG | |
| 0108 | | | | 37,2060 | 77776 1 | | LAT-LONG | |
| 0109 | REP | 1 | | 37,2061 | 3 2101 0 | | EXIT | |
| 0110 | REP | 86 | LAST 450 | 37,2062 | 0 4555 0 | | CAP | V06N43 |
| 0111 | REP | 9 | LAST 450 | 37,2063 | 20624 0 | | TC | BANKCALL |
| 0112 | REP | 5 | LAST 450 | 37,2064 | 0 4106 1 | | CADR | GOPLASH |
| 0113 | REP | 6 | LAST 451 | 37,2065 | 0 4106 1 | | TC | GOTOPOCH |
| 0114 | REP | 39 | LAST 450 | 37,2066 | 0 6006 1 | | TC | GOTOPOCH |
| 0115 | | | | 37,2067 | 43345 1 | | TC | INTPRET |
| 0116 | REP | 7 | LAST 450 | 37,2070 | 02316 1 | | DLOAD | DAD |
| 0117 | REP | 1 | | 37,2071 | 36076 0 | | | P21TIME |
| 0118 | REP | 30 | LAST 450 | 37,2072 | 01046 1 | | | 600SEC |
| 0119 | | | | 37,2073 | 77834 0 | | STORE | DSP1EM1 |
| 0120 | REP | 1 | | 37,2074 | 76011 0 | | RTR | |
| 0121 | | | | 37,2075 | 00003 1 | 600SEC | ZUBC | P21PROG1 |
| 0122 | | | | 37,2076 | 25140 0 | | | 60000 |
| 0123 | | | | 37,2077 | 00001 0 | P21QENM | OCT | 10 MIN |
| 0124 | | | | 37,2100 | 00000 1 | | OCT | NEEDED TO DETERMINE VEHICLE |
| 0125 | | | | 37,2101 | 01453 1 | V06N43 | VN | TO BE INTEGRATED |
| | | | | 37,2102 | 01442 1 | V6N34 | VN | |



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P0010 TRANSFER PHASE INITIATION (TPI) PROGRAMS (P34 AND P74)

R0011 MOD NO -1 LOG SECTION - P32-P35, P72-P75
R0012 MOD BY WHITE,P DATE 1JUNE67

R0013 PURPOSE

R0014 (1) TO CALCULATE THE REQUIRED DELTA V AND OTHER INITIAL CONDITIONS
R0015 REQUIRED BY THE ACTIVE VEHICLE FOR EXECUTION OF THE TRANSFER
R0016 PHASE INITIATION (TPI) MANEUVER, GIVEN -R0017 (A) TIME OF IGNITION TIG (TPI) OR THE ELEVATION ANGLE (E) OF
R0018 THE ACTIVE/PASSIVE VEHICLE LOS AT TIG (TPI).R0019 (B) CENTRAL ANGLE OF TRANSFER (CENTANG) FROM TIG (TPI) TO
R0020 INTERCEPT TIME (TIG (TPI)).

R0021 (2) TO CALCULATE TIG (TPI) GIVEN E OR E GIVEN TIG (TPI).

R0022 (3) TO CALCULATE THESE PARAMETERS BASED UPON MANEUVER DATA
R0023 APPROVED AND KEYED INTO THE DSKY BY THE ASTRONAUT.R0024 (4) TO DISPLAY TO THE ASTRONAUT AND THE GROUND CERTAIN DEPENDENT
R0025 VARIABLES ASSOCIATED WITH THE MANEUVER FOR APPROVAL BY THE
R0026 ASTRONAUT/GROUND.R0027 (5) TO STORE THE TPI TARGET PARAMETERS FOR USE BY THE DESIRED
R0028 THRUSTING PROGRAM.

R0029 ASSUMPTIONS

R0030 (1) LM ONLY - THIS PROGRAM IS BASED UPON PREVIOUS COMPLETION OF
R0031 THE CONSTANT DELTA ALTITUDE (CDH) PROGRAM (P33/P73).
R0032 THEREFORE -R0033 (A) AT A SELECTED TPI TIME (NOW IN STORAGE) THE LINE OF SIGHT
R0034 BETWEEN THE ACTIVE AND PASSIVE VEHICLES WAS SELECTED TO BE
R0035 A PRESCRIBED ANGLE (E) (NOW IN STORAGE) FROM THE
R0036 HORIZONTAL PLANE DEFINED BY THE ACTIVE VEHICLE POSITION.R0037 (B) THE TIME BETWEEN CDH IGNITION AND TPI IGNITION WAS
R0038 COMPUTED TO BE GREATER THAN 10 MINUTES.R0039 (C) THE VARIATION OF THE ALTITUDE DIFFERENCE BETWEEN THE
R0040 ORBITS WAS MINIMIZED.

R0041 (D) THE PERICENTER ALTITUDES OF ORBITS FOLLOWING CSI AND

R0042 CDH WERE COMPUTED TO BE GREATER THAN 35,000 FT FOR LUNAR

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R0043 ORBIT OR 85 NM FOR EARTH ORBIT.

R0044 (B) THE CSI AND CON MANEUVERS WERE ASSUMED TO BE PARALLEL TO
R0045 THE PLANE OF THE PASSIVE VEHICLE ORBIT. HOWEVER, CREW
R0046 MODIFICATION OF DELTA V (LV) COMPONENTS MAY HAVE RESULTED
R0047 IN AN OUT-OF-PLANE MANEUVER.

R0048 (2) STATE VECTOR UPDATED BY P27 ARE DISALLOWED DURING AUTOMATIC
R0049 STATE VECTOR UPDATING INITIATED BY P20 (SEE ASSUMPTION (4)).

R0050 (3) THIS PROGRAM MUST BE DONE OVER A TRACKING STATION FOR REAL
R0051 TIME GROUND PARTICIPATION IN DATA INPUT AND OUTPUT. COMPUTED
R0052 VARIABLES MAY BE STORED FOR LATER VERIFICATION BY THE GROUND.
R0053 THESE STORAGE CAPABILITIES ARE LIMITED ONLY TO THE PARAMETERS
R0054 FOR ONE THRUSTING MANEUVER AT A TIME EXCEPT FOR CONCENTRIC
R0055 FLIGHT PLAN MANEUVER SEQUENCES.

R0056 (4) THE RENDEZVOUS RADAR MAY OR MAY NOT BE USED TO UPDATE THE LM
R0057 OR CSM STATE VECTORS FOR THIS PROGRAM. IF RADAR USE IS
R0058 DESIRED THE RADAR WAS TURNED ON AND LOCKED ON THE CSM BY
R0059 PREVIOUS SELECTION OF P20. RADAR SIGHTING MARKS WILL BE MADE
R0060 AUTOMATICALLY APPROXIMATELY ONCE A MINUTE WHEN ENABLED BY THE
R0061 TRACK AND UPDATE FLAGS (SEE P20). THE RENDEZVOUS TRACKING
R0062 MARK COUNTER IS ZEROED BY THE SELECTION OF P20 AND AFTER EACH
R0063 THRUSTING MANEUVER.

R0064 (5) THE ISS NEED NOT BE ON TO COMPLETE THIS PROGRAM.

R0065 (6) THE OPERATION OF THE PROGRAM UTILIZES THE FOLLOWING FLAGS -

R0066 ACTIVE VEHICLE FLAG - DESIGNATES THE VEHICLE WHICH IS
R0067 DOING RENDEZVOUS THRUSTING MANEUVERS TO THE PROGRAM WHICH
R0068 CALCULATES THE MANEUVER PARAMETERS. SET AT THE START OF
R0069 EACH RENDEZVOUS PRE-THRUSTING PROGRAM.

R0070 FINAL FLAG - SELECTS FINAL PROGRAM DISPLAYS AFTER CREW HAS
R0071 SELECTED THE FINAL MANEUVER COMPUTATION CYCLE.

R0072 EXTERNAL DELTA V FLAG - DESIGNATES THE TYPE OF STEERING
R0073 REQUIRED FOR EXECUTION OF THIS MANEUVER BY THE THRUSTING
R0074 PROGRAM SELECTED AFTER COMPLETION OF THIS PROGRAM.

R0075 (7) ONCE THE PARAMETERS REQUIRED FOR COMPUTATION OF THE MANEUVER
R0076 HAVE BEEN COMPLETELY SPECIFIED, THE VALUE OF THE ACTIVE
R0077 VEHICLE CENTRAL ANGLE OF TRANSFER IS COMPUTED AND STORED.
R0078 THIS NUMBER WILL BE AVAILABLE FOR DISPLAY TO THE ASTRONAUT
R0079 THROUGH THE USE OF V06NS2.

R0080 THE ASTRONAUT WILL CALL THIS DISPLAY TO VERIFY THAT THE
R0081 CENTRAL ANGLE OF TRANSFER OF THE ACTIVE VEHICLE IS NOT WITHIN



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R0082 170 TO 190 DEGREES. IF THE ANGLE IS WITHIN THIS ZONE THE
R0083 ASTRONAUT SHOULD REASSESS THE INPUT TARGETING PARAMETERS BASED
R0084 UPON DELTA V AND EXPECTED MANEUVER TIME.

R0085 (6) THIS PROGRAM IS SELECTED BY THE ASTRONAUT BY DSKY ENTRY -

R0086 P34 IF THIS VEHICLE IS ACTIVE VEHICLE.

R0087 P74 IF THIS VEHICLE IS PASSIVE VEHICLE.

R0088 INPUT

R0089 (1) TTPI TIME OF THE TPI MANEUVER
R0090 (2) ELEV DESIRED LOS ANGLE AT TPI
R0091 (3) CENTANG ORBITAL CENTRAL ANGLE OF THE PASSIVE VEHICLE DURING
R0092 TRANSFER FROM TPI TO TIME OF INTERCEPT

R0093 OUTPUT

R0094 (1) TRMKCNT NUMBER OF MARKS
R0095 (2) TTGO TIME TO GO
R0096 (3) MGA MIDDLE GIMBAL ANGLE
R0097 (4) TTPI COMPUTED TIME OF TPI MANEUVER
R0098 OR
R0099 ELEV COMPUTED LOS ANGLE AT TPI
R0100 (5) POSTTPI PERIGEE ALTITUDE AFTER THE TPI MANEUVER
R0101 (6) DELVTPI MAGNITUDE OF DELTA V AT TPI
R0102 (7) DELVTPP MAGNITUDE OF DELTA V AT INTERCEPT
R0103 (8) DVLOS DELTA VELOCITY AT TPI - LINE OF SIGHT
R0104 (9) DELVLVC DELTA VELOCITY AT TPI - LOCAL VERTICAL COORDINATES

R0105 DOWNLINK

R0114 (1) TTPI TIME OF THE TPI MANEUVER
R0115 (2) TIG TIME OF THE TPI MANEUVER
R0116 (3) ELEV DESIRED LOS ANGLE AT TPI
R0117 (4) CENTANG ORBITAL CENTRAL ANGLE OF THE PASSIVE VEHICLE DURING
R0118 TRANSFER FROM TPI TO TIME OF INTERCEPT
R0119 (5) DELVET3 DELTA VELOCITY AT TPI - REFERENCE COORDINATES
R0120 (6) TPASS4 TIME OF INTERCEPT
R0121 COMMUNICATION TO THRUSTING PROGRAMS
R0122 (1) TIG TIME OF THE TPI MANEUVER
R0123 (2) RTARG OFFSET TARGET POSITION
R0124 (3) TPASS4 TIME OF INTERCEPT
R0125 (4) XDELVPLG RESET TO INDICATE LAMBERT (AIMPOINT) VG COMPUTATION

R0126 SUBROUTINES USED

R0127 AVPLACA

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R0128 AVFLAG
R0129 VNPOCH
R0130 DISPLAYE
R0131 SELECTM1
R0132 PRECSST
R0133 S33/34.1
R0134 ALARM
R0135 BANKCALL
R0136 GOFLASH
R0137 GOTOPOCH
R0138 TIMESTRT
R0139 S34/35.2
R0140 PERIAP01
R0141 SHIFTR1
R0142 S34/35.5
R0143 VN1645

| | | | | | | | | | |
|-------|-----|----|------|---------|---|-------|---|----------|-------------------|
| 0144 | REP | 1 | | 35,2000 | | | | | SETLOC C81/CDH |
| 0145 | | | | 35,2000 | | | | | BANK |
| 0146 | REP | 5 | LAST | 249 | | | | | BRANK= SUREKIT |
| 0147 | REP | 1 | | | | | | | COUNT 35/P3474 |
| | | | | | | | | | |
| 0148 | REP | 1 | | 35,2000 | 0 | 3728 | 1 | P34 | TC AVFLAGA |
| 0149 | REP | 1 | | 35,2001 | 0 | 2003 | 0 | | TC P34/P74A |
| 0150 | REP | 1 | | 35,2002 | 0 | 3741 | 0 | P74 | TC AVFLAGP |
| 0151 | REP | 1 | | 35,2003 | 0 | 3746 | 1 | P34/P74A | TC P20PLCON |
| 01515 | REP | 1 | | 35,2004 | 3 | 3125 | 1 | | CAP V06N37 |
| 0152 | REP | 1 | | 35,2005 | 0 | 3114 | 0 | | TC VNPOCH |
| 0153 | REP | 1 | | 35,2006 | 0 | 3073 | 0 | | TC DISPLAYE |
| 0154 | REP | 40 | LAST | 451 | | | | | TC INTPRET |
| 0155 | | | | 35,2010 | | 71214 | 0 | | CLEAR DLOAD |
| 0156 | REP | 3 | LAST | 48 | | 01270 | 0 | | ETPIFLAG |
| 0157 | REP | 4 | LAST | 267 | | 03863 | 1 | | TPI |
| 0158 | REP | 16 | LAST | 267 | | 17413 | 1 | | STODL TIG |
| 0159 | REP | 5 | LAST | 275 | | 03744 | 0 | | ELEV |
| 0160 | | | | 35,2015 | | 43054 | 1 | | BZE SET |
| 0161 | REP | 1 | | 35,2016 | | 72020 | 0 | | P34/P74B |
| 0162 | REP | 4 | LAST | 455 | | 01070 | 1 | | ETPIFLAG |
| 0163 | | | | 35,2020 | | 77624 | 1 | P34/P74B | CALL |
| 0164 | REP | 1 | | 35,2021 | | 10716 | 0 | | SELECTM1 |
| 0165 | | | | 0032 | | | | | DELELO EQUALS 26D |
| 0166 | | | | 35,2022 | | 43145 | 0 | P34/P74C | DLOAD SET |
| 0167 | REP | 2 | LAST | 31 | | 15332 | 1 | | ZEROVCS |
| 0168 | REP | 1 | | 35,2024 | | 03461 | 1 | | ITSWICH |
| 0169 | | | | 35,2025 | | 43014 | 0 | | RON CLEAR |
| 0170 | REP | 5 | LAST | 455 | | 01310 | 1 | | ETPIFLAG |
| 0171 | REP | 1 | | 35,2027 | | 72031 | 0 | | SWCHSET |
| 0172 | REP | 2 | LAST | 455 | | 03861 | 0 | | ITSWICH |
| 0173 | REP | 1 | | 35,2031 | | 02364 | 1 | SWCHSET | STORE NONTPI |
| 0174 | | | | 35,2032 | | 43345 | 1 | INTLOP | DLOAD DAD |

SET UPDATPLG, TRACKPLG
TPI
ELEV AND CENTANG

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| | | | | | | | |
|------|-----|----|------|-----|---------|--------|---|
| 0224 | REP | 2 | LAST | 121 | 35,2114 | 03503 | 1 |
| 0225 | | | | | 35,2115 | 77615 | 0 |
| 0226 | REP | 1 | | | 35,2116 | 00037 | 0 |
| 0227 | REP | 4 | LAST | 171 | 35,2117 | 37656 | 0 |
| 0228 | REP | 1 | | | 35,2120 | 72534 | 0 |
| 0229 | | | | | 35,2121 | 51675 | 1 |
| 0230 | REP | 4 | LAST | 171 | 35,2122 | 03646 | 0 |
| 0231 | REP | 4 | LAST | 275 | 35,2123 | 26635 | 0 |
| 0232 | REP | 2 | LAST | 121 | 35,2124 | 03640 | 0 |
| 0233 | | | | | 35,2125 | 51451 | 0 |
| 0234 | REP | 3 | LAST | 121 | 35,2126 | 03620 | 0 |
| 0235 | REP | 4 | LAST | 275 | 35,2127 | 26637 | 1 |
| 0236 | REP | 3 | LAST | 120 | 35,2130 | 03540 | 0 |
| 0237 | | | | | 35,2131 | 45115 | 0 |
| 0238 | REP | 3 | LAST | 121 | 35,2132 | 03612 | 1 |
| 0239 | REP | 1 | | | 35,2133 | 45312 | 0 |
| 0240 | | | | | 35,2134 | 77624 | 1 |
| 0241 | REP | 1 | | | 35,2135 | 45422 | 1 |
| 0242 | REP | 2 | LAST | 275 | 35,2136 | 16641 | 0 |
| 0243 | REP | 7 | LAST | 455 | 35,2137 | 03663 | 1 |
| 0244 | REP | 17 | LAST | 455 | 35,2140 | 03413 | 1 |
| 0245 | | | | | 35,2141 | 77776 | 1 |
| 0246 | REP | 1 | | | 35,2142 | 3 3127 | 0 |
| 0247 | REP | 3 | LAST | 455 | 35,2143 | 0 3114 | 0 |
| 0248 | REP | 42 | LAST | 455 | 35,2144 | 0 6006 | 1 |
| 0249 | | | | | 35,2145 | 77624 | 1 |
| 0250 | REP | 1 | | | 35,2146 | 72742 | 0 |
| 0251 | | | | | 35,2147 | 77624 | 1 |
| 0252 | REP | 1 | | | 35,2150 | 73005 | 0 |
| 0253 | | | | | 35,2151 | 77650 | 1 |
| 0254 | REP | 1 | | | 35,2152 | 72022 | 1 |

| | | |
|--------|----------|-----------------|
| STORE | INTIME | FOR INITVEL |
| DAD | | |
| T | | RENDEZVOUS TIME |
| STCALL | TPASS4 | FOR INITVEL |
| | S34/35.2 | |
| VLOAD | ABVAL | |
| | DELVEST3 | |
| STOVL | DELVTPI | |
| | VPASS4 | |
| VBU | ABVAL | |
| | VIPRIME | |
| STOVL | DELVTIPF | |
| | RACT3 | |
| PDVL | CALL | |
| | VIPRIME | |
| | PERIAPO1 | |
| CALL | | |
| | SHIFTR1 | |
| STOVL | POSTTPI | |
| | TTP1 | |
| STORE | TIG | |
| EXIT | | |
| CAP | V06N58 | |
| TC | VNPOCH | |
| TC | INTRST | |
| CALL | | |
| | S34/35.5 | |
| CALL | | |
| | VN1645 | |
| GOTO | | |
| | P34/P74C | |



L P34-P35, P74-P75

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R0255 RENDEZVOUS MID-COURSE MANEUVER PROGRAMS (P35 AND P75)

R0256 MOD NO -1 LOG SECTION - P32-P35, P72-P75
R0257 MOD BY WHITE,P DATE 1JUN67

R0258 PURPOSE

- R0259 (1) TO CALCULATE THE REQUIRED DELTA V AND OTHER INITIAL CONDITIONS
R0260 REQUIRED BY THE ACTIVE VEHICLE FOR EXECUTION OF THE NEXT
R0261 MIDCOURSE CORRECTION OF THE TRANSFER PHASE OF AN ACTIVE
R0262 VEHICLE RENDEZVOUS.
- R0263 (2) TO DISPLAY TO THE ASTRONAUT AND THE GROUND CERTAIN DEPENDENT
R0264 VARIABLES ASSOCIATED WITH THE MANEUVER FOR APPROVAL BY THE
R0265 ASTRONAUT/GROUND.
- R0266 (3) TO STORE THE TFM TARGET PARAMETERS FOR USE BY THE DESIRED
R0267 THRUSTING PROGRAM.

R0268 ASSUMPTIONS

- R0269 (1) THE ISS NEED NOT BE ON TO COMPLETE THIS PROGRAM.
- R0270 (2) STATE VECTOR UPDATES BY P27 ARE DISALLOWED DURING AUTOMATIC
R0271 STATE VECTOR UPDATING INITIATED BY P20 (SEE ASSUMPTION (3)).
- R0272 (3) THE RENDEZVOUS RADAR IS ON AND IS LOCKED ON THE CSM. THIS WAS
R0273 DONE DURING PREVIOUS SELECTION OF P20. RADAR DIGITING MARKS
R0274 WILL BE MADE AUTOMATICALLY APPROXIMATELY ONCE A MINUTE WHEN
R0275 ENABLED BY THE TRACK AND UPDATE FLAGS (SEE P20). THE
R0276 RENDEZVOUS TRACKING MARK COUNTER IS ZEROED BY THE SELECTION OF
R0277 P20 AND AFTER EACH THRUSTING MANEUVER.
- R0278 (4) THE OPERATION OF THE PROGRAM UTILIZES THE FOLLOWING FLAGS -
- R0279 ACTIVE VEHICLE FLAG - DESIGNATES THE VEHICLE WHICH IS
R0280 DOING RENDEZVOUS THRUSTING MANEUVERS TO THE PROGRAM WHICH
R0281 CALCULATES THE MANEUVER PARAMETERS. SET AT THE START OF
R0282 EACH RENDEZVOUS PRE-THRUSTING PROGRAM.
- R0283 FINAL FLAG - SELECTS FINAL PROGRAM DISPLAYS AFTER CREW HAS
R0284 SELECTED THE FINAL MANEUVER COMPUTATION CYCLE.
- R0285 EXTERNAL DELTA V FLAG - DESIGNATES THE TYPE OF STEERING
R0286 REQUIRED FOR EXECUTION OF THIS MANEUVER BY THE THRUSTING
R0287 PROGRAM SELECTED AFTER COMPLETION OF THIS PROGRAM.
- R0288 (5) THE TIME OF INTERCEPT (TINT) WAS DEFINED BY PREVIOUS
R0289 COMPLETION OF THE TRANSFER PHASE INITIATION (TPI) PROGRAM
R0290 (P34/P74) AND IS PRESENTLY AVAILABLE IN STORAGE.

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R0291 (6) ONCE THE PARAMETERS REQUIRED FOR COMPUTATION OF THE MANEUVER
R0292 HAVE BEEN COMPLETELY SPECIFIED, THE VALUE OF THE ACTIVE
R0293 VEHICLE CENTRAL ANGLE OF TRANSFER IS COMPUTED AND STORED.
R0294 THIS NUMBER WILL BE AVAILABLE FOR DISPLAY TO THE ASTRONAUT
R0295 THROUGH THE USE OF V00N52.

R0296 THE ASTRONAUT WILL CALL THIS DISPLAY TO VERIFY THAT THE
R0297 CENTRAL ANGLE OF TRANSFER OF THE ACTIVE VEHICLE IS NOT WITHIN
R0298 170 TO 190 DEGREES. IF THE ANGLE IS WITHIN THIS ZONE THE
R0299 ASTRONAUT SHOULD REASSESS THE INPUT TARGETING PARAMETERS BASED
R0300 UPON DELTA V AND EXPECTED MANEUVER TIME.

R0301 (7) THIS PROGRAM IS SELECTED BY THE ASTRONAUT BY DSKY ENTRY -
R0302 P35 IF THIS VEHICLE IS ACTIVE VEHICLE.
R0303 P75 IF THIS VEHICLE IS PASSIVE VEHICLE.

R0304 INPUT

R0305 (1) TPASS4 TIME OF INTERCEPT - SAVED FROM P34/P14
R0306 OUTPUT

R0307 (1) TRONCNT NUMBER OF MARKS
R0308 (2) TTOO TIME TO GO
R0309 (3) MGA MIDDLE GIMBAL ANGLE
R0310 (4) DVLOS DELTA VELOCITY AT MID - LINE OF SIGHT
R0311 (5) DELVLVC DELTA VELOCITY AT MID - LOCAL VERTICAL COORDINATES

R0312 DOWNLINK

R0325 (1) TIG TIME OF THE TFM MANEUVER
R0326 (2) DELVST3 DELTA VELOCITY AT TFM - REFERENCE COORDINATES
R0327 (3) TPASS4 TIME OF INTERCEPT
R0328 COMMUNICATION TO THRUSTING PROGRAMS

R0329 (1) TIG TIME OF THE TFM MANEUVER
R0330 (2) RTARG OFFSET TARGET POSITION
R0331 (3) TPASS4 TIME OF INTERCEPT
R0332 (4) XDELVFLG RESET TO INDICATE LAMBERT (AIMPOINT) VO COMPUTATION

R0333 SUBROUTINES USED

R0334 AVPLACB
R0335 AVFLAGP
R0336 LOADTIME
R0337 SELECTMU
R0338 PRECSET
R0339 S34/35.1
R0340 S34/35.2



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R0341 S34/35.5
R0342 VN1645

| | | | | | | | | | | |
|-------|-----|----|------|-----|---------|--------|------|---|----------|--------------|
| 0343 | REP | 1 | | | | | | | COUNT | 35/P3575 |
| 0344 | REP | 6 | LAST | 202 | E4,1763 | | | | BRANK= | KT |
| 0345 | REP | 2 | LAST | 455 | 35,2153 | 0 | 3728 | 1 | P35 | TC AVPLAGA |
| 0346 | | | | | 35,2154 | 0 | 0008 | 1 | | EXTEND |
| 0347 | REP | 1 | | | 35,2155 | 3 | 1422 | 1 | | DCA ATIGINC |
| 0348 | REP | 1 | | | 35,2156 | 0 | 2162 | 0 | | TC P35/P75A |
| 0349 | REP | 2 | LAST | 455 | 35,2157 | 0 | 3741 | 0 | P75 | TC AVPLAGP |
| 0350 | | | | | 35,2160 | 0 | 0008 | 1 | | EXTEND |
| 0351 | REP | 1 | | | 35,2161 | 3 | 1424 | 1 | | DCA FTIGINC |
| 0352 | REP | 7 | LAST | 460 | 35,2162 | 53=764 | 1 | | P35/P75A | DCH KT |
| 03525 | REP | 2 | LAST | 455 | 35,2163 | 0 | 3746 | 1 | | TC P20PLOCN |
| 0353 | REP | 43 | LAST | 457 | 35,2164 | 0 | 6008 | 1 | | TC INTPRET |
| 0359 | | | | | 35,2165 | 77624 | 1 | | | CALL |
| 0360 | REP | 2 | LAST | 455 | 35,2166 | 10716 | 0 | | | SELECTMU |
| 0361 | | | | | 35,2167 | 77634 | 0 | | P35/P75B | RTR |
| 0362 | REP | 3 | LAST | 423 | 35,2170 | 45505 | 0 | | | LOADTIME |
| 03621 | REP | 3 | LAST | 123 | 35,2171 | 03665 | 1 | | | STORE TSTRT |
| 03622 | | | | | 35,2172 | 77615 | 0 | | | DAD |
| 03623 | REP | 8 | LAST | 460 | 35,2173 | 02364 | 1 | | | KT |
| 03624 | REP | 18 | LAST | 457 | 35,2174 | 03413 | 1 | | | STORE TIG |
| 0363 | REP | 3 | LAST | 457 | 35,2175 | 03503 | 1 | | | STORE INTIME |
| 0364 | REP | 5 | LAST | 456 | 35,2176 | 34041 | 0 | | | STCALL TDEC1 |
| 0365 | REP | 2 | LAST | 456 | 35,2177 | 45354 | 1 | | | PRECSPT |
| 0366 | | | | | 35,2200 | 77624 | 1 | | | CALL |
| 0367 | REP | 1 | | | 35,2201 | 72522 | 1 | | | S34/35.1 |
| 0368 | | | | | 35,2202 | 77624 | 1 | | | CALL |
| 0369 | REP | 2 | LAST | 457 | 35,2203 | 72534 | 0 | | | S34/35.2 |
| 0370 | | | | | 35,2204 | 77624 | 1 | | | CALL |
| 0371 | REP | 2 | LAST | 457 | 35,2205 | 72742 | 0 | | | S34/35.5 |
| 0372 | | | | | 35,2206 | 77624 | 1 | | | CALL |
| 0373 | REP | 2 | LAST | 457 | 35,2207 | 73005 | 0 | | | VN1645 |
| 0379 | | | | | 35,2210 | 77650 | 1 | | | GOTO |
| 0380 | REP | 1 | | | 35,2211 | 72167 | 1 | | | P35/P75B |

SET UPDATPLG, TRACKPLG

FOR INITVEL

ADVANCE BOTH VEHICLES

GET NORM AND LOS FOR TRANSFORM

GET DELTA V(LV)

L P34-P35, P74-P75

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P0381 833/34.1

| | | | | | | | | |
|------|-----|---|----------|---------|---------|--------------|--------------|----------------|
| 0382 | | | | 35,2212 | 00220 1 | 833/34.1 STO | SSP | |
| 0383 | REP | 1 | | 35,2213 | 01340 1 | | NORMEX | |
| 0384 | REP | 2 | LAST 123 | 35,2214 | 03665 1 | | TITER | |
| 0385 | | | | 35,2215 | 40000 0 | | OCT 40000 | |
| 0386 | | | | 35,2216 | 40345 1 | | DLOAD SETPD | |
| 0387 | REP | 1 | | 35,2217 | 33136 0 | | MAX250 | |
| 0388 | | | | 35,2220 | 00001 0 | | GD | |
| 0389 | REP | 2 | LAST 120 | 35,2221 | 27454 1 | | STOVL SECMAK | |
| 0390 | REP | 4 | LAST 457 | 35,2222 | 03540 0 | | RACT3 | |
| 0391 | REP | 1 | | 35,2223 | 27576 0 | | STOVL RPPREC | |
| 0392 | REP | 2 | LAST 120 | 35,2224 | 03546 0 | | VACT3 | |
| 0393 | REP | 1 | | 35,2225 | 27570 0 | | STOVL VAPREC | |
| 0394 | REP | 3 | LAST 456 | 35,2226 | 03554 0 | | RPPAS3 | |
| 0395 | REP | 1 | | 35,2227 | 27620 0 | | STOVL RPPREC | |
| 0396 | REP | 3 | LAST 456 | 35,2230 | 03562 0 | | VPPAS3 | |
| 0397 | REP | 1 | | 35,2231 | 03612 1 | | STORE VPPREC | |
| 0398 | | | | 35,2232 | 77624 1 | ELCALC | CALL | |
| 0399 | REP | 2 | LAST 460 | 35,2233 | 72522 1 | | S34/35.1 | NORMAL AND LOS |
| 0400 | | | | 35,2234 | 63235 0 | | VXV | |
| 0401 | REP | 5 | LAST 461 | 35,2235 | 03540 0 | | FDVL | |
| 0402 | | | | 35,2236 | 53515 0 | | FDVL | (RAWA)*RA GD |
| 0403 | REP | 6 | LAST 431 | 35,2237 | 03540 0 | | FDVL | ULOS AT GD |
| 0404 | | | | 35,2240 | 46315 1 | | FDVL | |
| 0405 | | | | 35,2241 | 51352 1 | | VSL2 | XORNJ AND UP |
| 0406 | REP | 2 | LAST 91 | 35,2242 | 02625 1 | | | |
| 0407 | | | | 35,2243 | 63256 0 | | UNIT | UP AT GD |
| 0408 | | | | 35,2244 | 63241 0 | | DOT | UP UNWRA AT GD |
| 0409 | | | | 35,2245 | 00001 0 | | | UP IN MPAC |
| 0410 | | | | 35,2246 | 75241 1 | | DOT | |
| 0411 | REP | 3 | LAST 461 | 35,2247 | 02625 1 | | | |
| 0412 | | | | 35,2250 | 65552 0 | | EL1 | |
| 0413 | | | | 35,2251 | 50315 0 | | FDVL | EA AT GD |
| 0414 | REP | 4 | LAST 461 | 35,2252 | 02625 1 | | | |
| 0415 | REP | 7 | LAST 461 | 35,2253 | 03540 0 | | | |
| 0416 | | | | 35,2254 | 71244 0 | | BPL | |
| 0417 | REP | 1 | | 35,2255 | 72260 0 | | | |
| 0418 | REP | 2 | LAST 421 | 35,2256 | 15340 1 | | | |
| 0419 | | | | 35,2257 | 41425 1 | | DSJ | DPPOS MAX |
| 0420 | | | | 35,2260 | 71214 0 | TESTY | BOFF | |
| 0421 | REP | 4 | LAST 456 | 35,2261 | 03741 0 | | | |
| 0422 | REP | 1 | | 35,2262 | 72507 0 | | | |
| 0423 | REP | 2 | LAST 120 | 35,2263 | 03452 1 | | | |
| 0424 | REP | 1 | | 35,2264 | 14033 1 | | STOVL | DELELO |
| 0425 | | | | 35,2265 | 77625 0 | | DSU | |
| 0426 | REP | 6 | LAST 455 | 35,2266 | 03744 0 | | | |
| 0427 | REP | 3 | LAST 461 | 35,2267 | 03452 1 | | STORE | DELEL |
| 0428 | | | | 35,2270 | 45246 0 | | ARS | DSJ |
| 0429 | REP | 1 | | 35,2271 | 33142 0 | | | ELFPS |

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| | | | | | | | |
|------|-----|----|---------|---------|---------|---------|------------------------|
| 0480 | | | 35,2354 | 77621 1 | BDSU | | |
| 0481 | | | 35,2355 | 63301 0 | NORM | FDVL | NORMALIZED WA - WP 12D |
| 0482 | REP | 3 | LAST | 456 | 35,2356 | 00047 1 | X1 |
| 0483 | | | | | 35,2357 | 00007 0 | GD |
| 0484 | | | | | 35,2360 | 50235 0 | VXV |
| 0485 | | | | | 35,2361 | 00001 0 | GD |
| 0486 | REP | 3 | LAST | 462 | 35,2362 | 02617 0 | UNRM |
| 0487 | | | | | 35,2363 | 50315 0 | FDVL |
| 0488 | | | | | 35,2364 | 00001 0 | GD |
| 0489 | | | | | 35,2365 | 00007 0 | GD |
| 0490 | | | | | 35,2366 | 65552 0 | SL1 |
| 0491 | | | | | 35,2367 | 77765 0 | SIGN |
| 0492 | | | | | 35,2370 | 43225 0 | DSU |
| 0493 | REP | 9 | LAST | 462 | 35,2371 | 15330 0 | DAD |
| 0494 | REP | 8 | LAST | 462 | 35,2372 | 03744 0 | DPHALP |
| 0495 | | | | | 35,2373 | 65525 0 | ELBY |
| 0496 | | | | | 35,2374 | 00035 1 | FDL |
| 0497 | | | | | 35,2375 | 75221 1 | ACOS |
| 0498 | REP | 10 | LAST | 463 | 35,2376 | 15330 0 | BDSU |
| 0499 | | | | | 35,2377 | 00037 0 | SIGN |
| 0500 | | | | | 35,2400 | 77615 0 | DPHALP |
| 0501 | | | | | 35,2401 | 56205 0 | 30D |
| 0502 | REP | 1 | | | 35,2402 | 33134 1 | DAD |
| 0503 | | | | | 35,2403 | 77605 1 | DMP |
| 0504 | | | | | 35,2404 | 41257 1 | DDV |
| 0505 | | | | | 35,2405 | 20176 0 | TWOPI |
| 0506 | | | | | 35,2406 | 51406 1 | DMP |
| 0507 | | | | | 35,2407 | 50025 0 | SL* |
| 0508 | REP | 3 | LAST | 461 | 35,2410 | 03454 1 | DMP |
| 0509 | REP | 1 | | | 35,2411 | 72415 1 | 0 -3,1 |
| 0510 | | | | | 35,2412 | 75345 1 | PUSH |
| 0511 | REP | 4 | LAST | 463 | 35,2413 | 03454 1 | ARS |
| 0512 | | | | | 35,2414 | 77606 1 | DSU |
| 0513 | | | | | 35,2415 | 51135 1 | RMN |
| 0514 | REP | 5 | LAST | 462 | 35,2416 | 03665 1 | SECMAK |
| 0515 | REP | 1 | | | 35,2417 | 72425 1 | QOMAX |
| 0516 | | | | | 35,2420 | 71331 0 | SIGN |
| 0517 | REP | 6 | LAST | 463 | 35,2421 | 03665 1 | SECMAK |
| 0518 | | | | | 35,2422 | 37777 1 | DLOAD |
| 0519 | | | | | 35,2423 | 77650 1 | SIGN |
| 0520 | REP | 1 | | | 35,2424 | 72463 0 | SECMAK |
| 0521 | | | | | 35,2425 | 41345 0 | PUSH |
| 0522 | REP | 4 | LAST | 461 | 35,2426 | 03452 1 | SLOAD |
| 0523 | REP | 2 | LAST | 461 | 35,2427 | 00033 1 | RPL |
| 0524 | | | | | 35,2430 | 71244 0 | RPL |
| 0525 | REP | 1 | | | 35,2431 | 72441 0 | TITER |
| 0526 | REP | 5 | LAST | 463 | 35,2432 | 03454 1 | REPETE |
| 0527 | | | | | 35,2433 | 77605 1 | DLOAD |
| 0528 | REP | 1 | | | 35,2434 | 33140 1 | TITER |
| 0529 | REP | 6 | LAST | 463 | 35,2435 | 17454 1 | OCT |
| | | | | | | | GOTO |
| | | | | | | | STORDEL.T |
| | | | | | | | DMP |
| | | | | | | | DELEL |
| | | | | | | | DELEO |
| | | | | | | | DLOAD |
| | | | | | | | NEXTES |
| | | | | | | | SECMAK |
| | | | | | | | DMP |
| | | | | | | | THIRD |
| | | | | | | | STODL |
| | | | | | | | SECMAK |

CONTAINS RP-RA

REPLACE TIME WITH MAX TIME SIGNED

TEST FIRST ITERATION



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| | | | | | | | |
|------|-----|--------|---------|---------|---------|---------|---------|
| 0530 | | | 35,2438 | 10446 0 | ABS | SR1 | |
| 0531 | | | 35,2437 | 52076 1 | DCOMP | GOTO | |
| 0532 | REP | 1 | 35,2440 | 12451 1 | | RESIGN | |
| 0533 | | | 35,2441 | 51545 1 | NEXTES | DLOAD | ABS |
| 0534 | REP | 5 LAST | 35,2442 | 03452 1 | | DELEL | |
| 0535 | | | 35,2443 | 51525 1 | | ABS | |
| 0536 | REP | 3 UNH | 35,2444 | 00033 1 | | DELELO | |
| 0531 | | | 35,2445 | 77625 0 | DSU | | |
| 0538 | | | 35,2440 | 71240 1 | BN | DLOAD | |
| 0539 | REP | 1 | 35,2447 | 12454 1 | | REVERS | |
| 0540 | | | 35,2450 | 11646 0 | ABS | | |
| 0541 | | | 35,2451 | 52185 1 | RESIGN | SIGN | GOTO |
| 0542 | REP | 2 LAST | 35,2452 | 03450 0 | | DELTEBO | |
| 0543 | REP | 2 LAST | 35,2453 | 12463 0 | | STORDEL | |
| 0544 | | | 35,2454 | 57545 1 | REVERS | DLOAD | DCOMP |
| 0545 | REP | 3 LAST | 35,2455 | 03450 0 | | DELTEBO | |
| 0546 | | | 35,2456 | 10406 1 | | PUSH | SR1 |
| 0541 | REP | 4 UNH | 35,2451 | 03450 0 | | STORE | DELTEBO |
| 0548 | | | 35,2460 | 77615 0 | | DAD | |
| 0549 | | | 35,2461 | 77650 1 | | GOTO | |
| 0550 | REP | 1 | 35,2462 | 12464 1 | | ADTIME | |
| 0551 | REP | 5 LAST | 35,2463 | 03450 0 | STORDEL | STORE | DELTEBO |
| 0552 | | | 35,2464 | 77615 0 | ADTIME | DAD | |
| 0553 | REP | 3 LAST | 35,2465 | 02364 1 | | NOMTI | |
| 0554 | REP | 4 LAST | 35,2466 | 02364 1 | | STORE | NOMTI |
| 0555 | | | 35,2467 | 63375 0 | | VLOAD | PDVL |
| 0556 | REP | 2 LAST | 35,2410 | 03570 0 | | VAPREC | |
| 0557 | REP | 2 LAST | 35,2411 | 03570 0 | | RAPREC | |
| 0558 | | | 35,2472 | 77624 1 | | CALL | |
| 0559 | REP | 1 | 35,2473 | 72702 1 | | GOINT | |
| 0560 | | | 35,2474 | 17624 1 | | CALL | |
| 0561 | REP | 1 | 35,2475 | 45316 1 | | ACTIVE | |
| 0562 | | | 35,2476 | 63375 0 | | VLOAD | PDVL |
| 0563 | REP | 2 LAST | 35,2477 | 03612 1 | | VPPREC | |
| 0564 | REP | 2 LAST | 35,2500 | 03620 0 | | RPPREC | |
| 0565 | | | 35,2501 | 17824 1 | | CALL | |
| 0566 | REP | 2 LAST | 35,2502 | 72702 1 | | GOINT | |
| 0567 | | | 35,2503 | 17624 1 | | CALL | |
| 0568 | REP | 1 | 35,2504 | 45406 1 | | PASSIVE | |
| 0569 | | | 35,2805 | 77650 1 | | GOTO | |
| 0570 | REP | 1 | 35,2506 | 12232 1 | | ELCALC | |
| 0571 | | | 35,2507 | 43345 1 | EL EX | DLOAD | DAD |
| 0572 | REP | 8 LAST | 35,2510 | 03863 1 | | TTP1 | |
| 0573 | REP | 5 LAST | 35,2511 | 02364 1 | | NOMTI | |
| 0574 | REP | 9 LAST | 35,2512 | 17663 1 | | STOCL | TTP1 |
| 0575 | | | 35,2513 | 17614 1 | | BN | |
| 0576 | REP | 7 LAST | 35,2514 | 01310 1 | | ETP1LAG | |
| 0577 | REP | 2 LAST | 35,2515 | 72517 1 | | TINEX | |
| 0578 | REP | 9 LAST | 35,2516 | 03144 0 | | STORE | EL EX |
| 0579 | | | 35,2517 | 52145 0 | TINEX | DLOAD | GOTO |

CROSSED OVER SOLUTION
DT = (-SIGN(DTO))/DT//1/2

WRONG DIRECTION

SUM OF DELTA T'S

STORE NEW RACT3 VACT3

STORE NEW RPASS3 VPASS3



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0580 RSP 3 LAST 455 35,2520 15332 1
0581 RSP 5 LAST 462 35,2521 01340 1

ZERO/EC8
NORMEX



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P0582 834/35.1

R0583 COMPUTE UNIT NORMAL AND LINE OF SIGHT VECTORS GIVEN THE ACTIVE AND
R0584 PASSIVE POS AND VEL AT TIME T3

| | | | | | | | | |
|------|-----|----|------|---------|---------|----------|-------|--------|
| 0585 | | | | 35,2522 | 52375 1 | 834/35.1 | VLOAD | VSU |
| 0586 | REP | 6 | LAST | 462 | 35,2523 | 03554 0 | | RPASS3 |
| 0587 | REP | 9 | LAST | 462 | 35,2524 | 03540 0 | | RACT3 |
| 0588 | | | | 35,2525 | 41456 0 | | UNIT | PUSH |
| 0589 | REP | 5 | LAST | 461 | 35,2526 | 26625 1 | STOVL | ULOS |
| 0590 | REP | 10 | LAST | 466 | 35,2527 | 03540 0 | | RACT3 |
| 0591 | | | | 35,2530 | 53435 0 | | VXV | UNIT |
| 0592 | REP | 4 | LAST | 462 | 35,2531 | 03546 0 | | VACT3 |
| 0593 | REP | 4 | LAST | 463 | 35,2532 | 02617 0 | STORE | LNRM |
| 0594 | | | | 35,2533 | 77616 0 | | RVO | |

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P0595 S34/35.2

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R0596 ADVANCE PASSIVE VEH TO rendezvous TIME AND GET REQ VEL FROM LAMBERT
0597          35,2534  77220 1  S34/35.2 STO  VLOAD
0598 REP 6 LAST 455 35,2535  02370 1  SUBEXIT
0599 REP 6 LAST 462 35,2536  03562 0  VPASS3
0600          35,2537  65315 0  PDVL
0601 REP 6 LAST 466 35,2540  03554 0  RPASS3
0602 REP 4 LAST 460 35,2541  03503 1  INTIME
0603          35,2542  65325 0  PDVL
0604 REP 5 LAST 457 35,2543  03556 1  TPASS4
0605 REP 4 LAST 465 35,2544  15332 1  ZEROVECS
0606          35,2545  45006 0  PUSH  CALL
0607 REP 1          35,2546  72708 0  INTINT
0608 REP 4 LAST 171 35,2547  27415 1  S3435.25 STOVL RTARG GET TARGET VECTOR
0609 REP 1          35,2550  00007 0  VATT
0610 REP 3 LAST 457 35,2551  27640 0  STOVL VPASS4
0611 REP 5 LAST 467 35,2552  03415 1  RTARG
R0612 COMPUTE PHI = PI * (ACOS(UNIT RA,UNIT RP) - PI) SIGN(RA*RP,U)
0613          35,2553  63256 0  UNIT PDVL UNIT RP
0614 REP 11 LAST 466 35,2554  03540 0  RACT3
0615          35,2555  41456 0  UNIT PUSH UNIT RA
0616          35,2556  50235 0  VXV DOT
0617          35,2557  00001 0  OD
0618 REP 5 LAST 466 35,2560  02617 0  UNRM RA*RP,U
0619          35,2561  77715 1  PDVL
0620          35,2562  72441 0  DOT SL1 UNIT RA,UNIT RP
0621          35,2563  00001 0  OD
0622          35,2564  75326 1  ACOS SIGN
0623          35,2565  43244 1  RPL DAD
0624 REP 1          35,2566  72570 0  NOPIE
0625 REP 3 LAST 461 35,2567  15340 1  DPPOS MAX REASONABLE TWO PI
0626 REP 3 LAST 275 35,2570  16633 0  NOPIE STOVL ACTCENT
0627 REP 6 LAST 467 35,2571  03656 1  TPASS4
0628          35,2572  77625 0  DSU
0629 REP 5 LAST 467 35,2573  03503 1  INTIME
0630 REP 4 LAST 171 35,2574  03423 1  STORE DELTA
0631          35,2575  40335 0  SLOAD SETPD
0632 REP 1          35,2576  33144 0  DECTWO
0633          35,2577  00001 0  OD
06331          35,2600  63325 0  PDVL PDVL
06332 REP 1          35,2601  33147 0  EPSFOUR
06333 REP 12 LAST 467 35,2602  03540 0  RACT3
06334 REP 3 LAST 121 35,2603  27570 0  STOVL RINIT
06335 REP 5 LAST 466 35,2604  03546 0  VACT3
06336 REP 3 LAST 121 35,2605  37576 1  STCALL VINIT
06337 REP 1          35,2606  22000 1  INITVEL
0634          35,2607  77624 1  CALL
0635 REP 1          35,2610  72667 0  LQMAT
0636          35,2611  64375 1  VLOAD MVV
    
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| | | | | | | | | |
|------|------|---|------|-----|---------|-------|---|----------------|
| 0637 | RESP | 5 | LAST | 457 | 35,2612 | 03646 | 0 | DELVEET3 |
| 0638 | | | | | 35,2613 | 00001 | 0 | 0D |
| 0639 | | | | | 35,2614 | 77772 | 0 | VSL1 |
| 0640 | RESP | 7 | LAST | 277 | 35,2615 | 37405 | 1 | STCALL DELALVC |
| 0641 | RESP | 7 | LAST | 467 | 35,2616 | 02370 | 1 | SUREKIT |



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P0642 S34/35.3

| | | | | | | | | | |
|------|-----|----|------|---------|---------|--------------|----------|-----------|---------------------------|
| 0643 | | | | 35,2617 | 45020 1 | S34/35.3 STO | CALL | | |
| 0644 | REP | 6 | LAST | 465 | 35,2620 | 01340 1 | NORMEX | | |
| 0645 | REP | 2 | LAST | 467 | 35,2621 | 72667 0 | LOMAT | | GET MATRIX IN PUSH LIST |
| 0646 | | | | 35,2622 | 61375 1 | | VLOAD | VOM | |
| 0647 | REP | 8 | LAST | 468 | 35,2623 | 03405 0 | DELAVALC | | NEW DEL V TPI |
| 0648 | | | | 35,2624 | 00001 0 | | OD | | |
| 0649 | | | | 35,2625 | 77772 0 | | VSL1 | | |
| 0650 | REP | 6 | LAST | 468 | 35,2626 | 03646 0 | STORE | DELVEST3 | SAVE FOR INWARDFLW |
| 0651 | | | | 35,2627 | 63255 0 | | VAD | FDVL | |
| 0652 | REP | 6 | LAST | 467 | 35,2630 | 03046 0 | | VW013 | NEW V NEW |
| 0653 | REP | 13 | LAST | 467 | 35,2631 | 03540 0 | | FACT3 | |
| 0654 | | | | 35,2632 | 65325 0 | | PDDL | PDDL | |
| 0655 | REP | 19 | LAST | 460 | 35,2633 | 03413 1 | | TIG | |
| 0656 | REP | 7 | LAST | 467 | 35,2634 | 03656 1 | | TPASS4 | |
| 0657 | | | | 35,2635 | 41525 0 | | PDDL | PUSH | |
| 0658 | REP | 4 | LAST | 467 | 35,2636 | 15340 1 | | DPPOS MAX | |
| 0659 | | | | 35,2637 | 77624 1 | | CALL | | INTEG. FOR NEW TARGET VEC |
| 0660 | REP | 2 | LAST | 467 | 35,2640 | 72706 0 | | INTINT | |
| 0661 | | | | 35,2641 | 77775 1 | | VLOAD | | |
| 0662 | REP | 3 | LAST | 451 | 35,2642 | 00001 0 | | RATT | |
| 0663 | REP | 4 | LAST | 467 | 35,2643 | 02414 1 | STORE | RTARG | |
| 0664 | | | | 35,2644 | 41575 0 | NOL/WRRT | VLOAD | PUSH | |
| 0665 | REP | 6 | LAST | 466 | 35,2645 | 02625 1 | | ULOS | |
| 0666 | | | | 35,2646 | 01330 1 | | VW | VW | |
| 0667 | REP | 6 | LAST | 467 | 35,2647 | 02617 0 | | UNRM | |
| 0668 | | | | 35,2650 | 41456 0 | | UNIT | PUSH | |
| 0669 | | | | 35,2651 | 75100 1 | | | ULOS | |
| 0670 | REP | 7 | LAST | 469 | 35,2652 | 02625 1 | | ULOS | |
| 0671 | | | | 35,2653 | 77715 1 | | PDVL | | |
| 0672 | | | | 35,2654 | 54315 1 | | PDVL | PDVL | |
| 0673 | REP | 7 | LAST | 469 | 35,2655 | 03646 0 | | DELVEST3 | |
| 0674 | | | | 35,2656 | 00001 0 | | OD | | |
| 0675 | | | | 35,2657 | 77772 0 | | VSL1 | | |
| 0676 | REP | 10 | LAST | 275 | 35,2660 | 36611 1 | STCALL | DVLOS | |
| 0677 | REP | 7 | LAST | 469 | 35,2661 | 01340 1 | | NORMEX | |



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P0678 S34/35.4

| | | | | | | | | |
|------|-----|---|------|---------|---------|--------------|--------|------------------------|
| 0679 | | | | 35,2662 | 40220 0 | S34/35.4 STO | STPD | NO ASTRONAUT OVERWRITE |
| 0680 | REP | 8 | LAST | 469 | 35,2663 | 01340 1 | NORMEX | |
| 0681 | | | | | 35,2664 | 00001 0 | GD | |
| 0682 | | | | | 35,2665 | 77650 1 | GOTO | |
| 0683 | REP | 1 | | | 35,2666 | 72644 1 | NOVRWT | |

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P0684 LQMAT

| | | | | | | | | | |
|------|-----|----|------|---------|---------|--------|--------|----------|-------------------------------|
| 0685 | | | | 35,2687 | 57575 1 | LQMAT | VLOAD | VCOMP | |
| 0686 | REP | 7 | LAST | 469 | 35,2670 | | | UNRM | |
| 0687 | | | | 35,2671 | 24007 0 | | STOVL | GD | Y |
| 0688 | REP | 14 | LAST | 469 | 35,2672 | | | FACT3 | |
| 0689 | | | | 35,2673 | 57456 1 | | UNIT | VCOMP | |
| 0690 | | | | 35,2674 | 00015 0 | | STORE | 12D | |
| 0691 | | | | 35,2675 | 76435 1 | | VXV | VSL1 | |
| 0692 | REP | 8 | LAST | 471 | 35,2676 | | | UNRM | 2*-Y |
| 0693 | | | | 35,2677 | 00001 0 | | STORE | GD | |
| 0694 | | | | 35,2700 | 43401 0 | | SETPD | RVO | |
| 0695 | | | | 35,2701 | 00023 0 | | | 18D | |
| 0696 | | | | 35,2702 | 65325 0 | GOINT | FDL | FDL | DO |
| 0697 | REP | 5 | LAST | 467 | 35,2703 | | | ZEROVECS | NOT |
| 0698 | REP | 6 | LAST | 464 | 35,2704 | | | NOVPI | |
| 0699 | | | | 35,2705 | 41406 0 | | PUSH | PUSH | ORDER OR INSERT BEFORE INTINT |
| 0700 | | | | 35,2706 | 45020 1 | INTINT | STO | CALL | |
| 0701 | REP | 2 | LAST | 90 | 35,2707 | | | RTRN | |
| 0702 | REP | 6 | LAST | 259 | 35,2710 | | | INTSTALL | |
| 0703 | | | | 35,2711 | 71214 0 | | CLEAR | DLOAD | |
| 0704 | REP | 1 | | | 35,2712 | | | INTYPFLO | |
| 0705 | | | | 35,2713 | 43054 1 | | BZE | SET | |
| 0706 | | | | 35,2714 | 72716 1 | | | +2 | |
| 0707 | REP | 2 | LAST | 471 | 35,2715 | | | INTYPFLO | |
| 0708 | | | | 35,2716 | 45545 1 | | DLOAD | STADR | |
| 0709 | REP | 6 | LAST | 460 | 35,2717 | | STOVL | TOEC1 | |
| 0710 | | | | 35,2720 | 73014 0 | | SET | LXA, 2 | |
| 0711 | REP | 1 | | | 35,2721 | | | MOONFLAG | |
| 0712 | REP | 2 | LAST | 124 | 35,2722 | | | RDX2 | |
| 0713 | | | | 35,2723 | 43014 0 | | RON | CLEAR | |
| 0714 | REP | 2 | LAST | 32 | 35,2724 | | | CMOONFLO | |
| 0715 | REP | 1 | | | 35,2725 | | | ALLSET | |
| 0716 | REP | 2 | LAST | 471 | 35,2726 | | | MOONFLAG | |
| 0717 | REP | 4 | LAST | 284 | 35,2727 | | ALLSET | STOVL | TST |
| 0718 | | | | 35,2730 | 77657 0 | | VSR* | | |
| 0719 | | | | 35,2731 | 57176 0 | | | 0, 2 | |
| 0720 | REP | 4 | LAST | 284 | 35,2732 | | STOVL | RCV | |
| 0721 | | | | 35,2733 | 77657 0 | | VSR* | | |
| 0722 | | | | 35,2734 | 57176 0 | | | 0, 2 | |
| 0723 | REP | 4 | LAST | 285 | 35,2735 | | STCALL | VOV | |
| 0724 | REP | 1 | | | 35,2736 | | | INTEGRVS | |
| 0725 | | | | 35,2737 | 52175 0 | | VLOAD | GOTO | |
| 0726 | REP | 4 | LAST | 469 | 35,2740 | | | RATT | |
| 0727 | REP | 3 | LAST | 471 | 35,2741 | | | RTRN | |



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P0726 S34/35.5
R0729 SUBROUTINES USED

R0730 BANKCALL
R0731 GOPLASH
R0732 GOTOPOCH
R0733 S34/35.3
R0734 S34/35.4
R0735 VNPOCH

| | | | | | | | | | |
|------|-----|----|------|---------|---------|-------|----------|--------|----------|
| 0736 | | | | 35,2742 | 43020 | 1 | S34/35.5 | STO | BON |
| 0737 | REP | 8 | LAST | 468 | 35,2743 | 02370 | 1 | | SURXIT |
| 0738 | REP | 1 | | | 35,2744 | 01311 | 0 | | FINLPLG |
| 0739 | REP | 1 | | | 35,2745 | 72751 | 1 | | FLAGON |
| 0740 | | | | | 35,2746 | 52014 | 0 | SET | GOTO |
| 0741 | REP | 2 | LAST | 253 | 35,2747 | 00470 | 1 | | UPDATPLG |
| 0742 | REP | 1 | | | 35,2750 | 72775 | 1 | | FLAGOFF |
| 0743 | | | | | 35,2751 | 77414 | 0 | FLAGON | CLEAR |
| 0744 | REP | 1 | | | 35,2752 | 03274 | 0 | | EXIT |
| 0745 | REP | 1 | | | 35,2753 | 3 | 3131 | 1 | NTARGPLG |
| 0746 | REP | 88 | LAST | 456 | 35,2754 | 0 | 4555 | 0 | CAP |
| 0747 | REP | 11 | LAST | 456 | 35,2755 | 20624 | 0 | 0 | TC |
| 0748 | REP | 8 | LAST | 456 | 35,2756 | 0 | 4100 | 1 | CADR |
| 0749 | | | | | 35,2757 | 0 | 2764 | 0 | TC |
| 0750 | REP | 44 | LAST | 460 | 35,2760 | 0 | 6006 | 1 | TC |
| 0751 | | | | | 35,2761 | 77414 | 0 | 0 | SET |
| 0752 | REP | 2 | LAST | 472 | 35,2762 | 03074 | 1 | 1 | NTARGPLG |
| 0753 | REP | 2 | LAST | 472 | 35,2763 | 0 | 2753 | 1 | TC |
| 0754 | REP | 45 | LAST | 472 | 35,2764 | 0 | 6006 | 1 | TC |
| 0755 | | | | | 35,2765 | 45014 | 0 | 0 | BOFF |
| 0756 | REP | 3 | LAST | 472 | 35,2766 | 03354 | 0 | 0 | CALL |
| 0757 | REP | 1 | | | 35,2767 | 72771 | 0 | 0 | NTARGPLG |
| 0758 | REP | 1 | | | 35,2770 | 72617 | 1 | 1 | NOCHG |
| 0759 | | | | | 35,2771 | 77214 | 0 | 0 | CLEAR |
| 0760 | REP | 1 | | | 35,2772 | 01267 | 0 | 0 | VLOAD |
| 0761 | REP | 8 | LAST | 469 | 35,2773 | 03646 | 0 | 0 | XDELVPLG |
| 0762 | REP | 3 | LAST | 121 | 35,2774 | 03646 | 0 | 0 | DELVRTJ |
| 0763 | | | | | 35,2775 | 77624 | 1 | 1 | STORE |
| 0764 | REP | 1 | | | 35,2776 | 72662 | 0 | 0 | FLAGOFF |
| 0765 | | | | | 35,2777 | 77776 | 1 | 1 | CALL |
| 0766 | REP | 1 | | | 35,3000 | 3 | 3130 | 0 | S34/35.4 |
| 0767 | REP | 4 | LAST | 457 | 35,3001 | 0 | 3114 | 0 | EXIT |
| 0768 | REP | 46 | LAST | 472 | 35,3002 | 0 | 6006 | 1 | CAP |
| 0769 | | | | | 35,3003 | 77650 | 1 | 1 | TC |
| 0770 | REP | 9 | LAST | 472 | 35,3004 | 02370 | 1 | 1 | GOTO |



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P0771 VN1645

R0772 SUBROUTINES USED

R0773 P3XORPTX
R0774 GET-MCA
R0775 BANKCALL
R0776 DELAYJOB
R0777 COMPTGO
R0778 GOFLASH
R0779 GOTOPCH
R0780 FLAGUP

| | | | | | | | | | | |
|------|-----|----|------|---------|---------|--------|--------|----------|----------|--|
| 0781 | | | | 35,3005 | 71220 | 1 | VN1645 | STO | DLOAD | |
| 0782 | REP | 10 | LAST | 472 | 35,3008 | 02370 | 1 | | SUREXIT | |
| 0783 | REP | 1 | | | 35,3007 | 33145 | 1 | | DP-.01 | |
| 0784 | REP | 4 | LAST | 274 | 35,3010 | 03828 | 0 | STORE | +MCA | MCA = -.01 |
| 0785 | | | | | 35,3011 | 71214 | 0 | ROFF | DLOAD | |
| 0786 | REP | 2 | LAST | 472 | 35,3012 | 01351 | 1 | | FINALPLD | |
| 0787 | REP | 1 | | | 35,3013 | 73033 | 0 | | GET45 | |
| 0788 | REP | 2 | LAST | 473 | 35,3014 | 33145 | 1 | | DP-.01 | |
| 0789 | | | | | 35,3015 | 77815 | 0 | DAD | | |
| 0790 | REP | 3 | LAST | 473 | 35,3016 | 33145 | 1 | | DP-.01 | |
| 0791 | REP | 5 | LAST | 473 | 35,3017 | 03828 | 0 | STORE | +MCA | MCA = -.02 |
| 0792 | | | | | 35,3020 | 77414 | 0 | ROFF | EXIT | |
| 0793 | REP | 1 | | | 35,3021 | 01742 | 1 | | REP5MPLD | |
| 0794 | REP | 2 | LAST | 473 | 35,3022 | 73033 | 0 | | GET45 | |
| 0795 | REP | 1 | | | 35,3023 | 0 3106 | 0 | TC | P3XORPTX | |
| 0796 | | | | | 35,3024 | 0 3026 | 0 | TC | +2 | P3X |
| 0797 | REP | 3 | LAST | 473 | 35,3025 | 0 3034 | 0 | TC | GET45 +1 | P7X |
| 0798 | REP | 47 | LAST | 472 | 35,3026 | 0 6008 | 1 | TC | INTPRET | |
| 0799 | | | | | 35,3027 | 41575 | 0 | VLOAD | PUSH | |
| 0800 | REP | 4 | LAST | 472 | 35,3030 | 03846 | 0 | | DELSIN | |
| 0801 | | | | | 35,3031 | 77824 | 1 | CALL | | COMPUTE MCA |
| 0802 | REP | 1 | | | 35,3032 | 10660 | 0 | | GET-MCA | |
| 0803 | | | | | 35,3033 | 77778 | 1 | GET45 | EXIT | |
| 0804 | REP | 1 | | | 35,3034 | 0 3584 | 0 | TC | COMPTGO | INITIATE TASK TO UPDATE TCOO |
| 0805 | REP | 11 | LAST | 473 | 35,3035 | 3 1770 | 0 | CA | SUREXIT | |
| 0806 | REP | 2 | LAST | 90 | 35,3036 | 55-768 | 0 | TS | OSAVED | |
| 0807 | REP | 2 | LAST | 424 | 35,3037 | 3 4734 | 0 | CAP | 1SEC | |
| 0808 | REP | 89 | LAST | 472 | 35,3040 | 0 4555 | 0 | TC | BANKCALL | |
| 0809 | REP | 2 | LAST | 194 | 35,3041 | 01732 | 0 | CADR | DELAYJOB | |
| 0810 | REP | 1 | | | 35,3042 | 3 3132 | 1 | CAP | V16N45 | TROCKNT, TCOO, +MCA |
| 0811 | REP | 90 | LAST | 473 | 35,3043 | 0 4555 | 0 | TC | BANKCALL | |
| 0812 | REP | 12 | LAST | 472 | 35,3044 | 20824 | 0 | CADR | GOFLASH | |
| 0813 | REP | 1 | | | 35,3045 | 0 3050 | 1 | TC | KILCLOCK | TERMINATE |
| 0814 | REP | 1 | | | 35,3046 | 0 3053 | 1 | TC | N45PROC | PROCEED |
| 0815 | REP | 1 | | | 35,3047 | 0 3063 | 1 | TC | CLUPDATE | RECYCLE - RETURN FOR INITIAL COMPUTATION |
| 0816 | REP | 13 | LAST | 342 | 35,3050 | 3 0005 | 1 | KILCLOCK | CA | Z |
| 0817 | REP | 1 | | | 35,3051 | 54 000 | 0 | TS | DISPOEX | |



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| | | | | | | | | | | |
|------|-----|----|------|-----|---------|--------|---|----------|--------|----------|
| 0818 | REP | 9 | LAST | 472 | 35,3052 | 0 4106 | 1 | | TC | GOTOPOCH |
| 0819 | REP | 7 | LAST | 299 | 35,3053 | 4 0076 | 1 | N45PROC | CS | FLAGRD2 |
| 0820 | REP | 30 | LAST | 383 | 35,3054 | 7 4705 | 0 | | MASK | BITS |
| 0821 | | | | | 35,3055 | 0 0006 | 1 | | EXTEND | |
| 0822 | REP | 2 | LAST | 473 | 35,3056 | 1 3050 | 0 | | BZF | KILCLOCK |
| 0823 | REP | 20 | LAST | 447 | 35,3057 | 0 5301 | 0 | | TC | PHASCHG |
| 0824 | | | | | 35,3060 | 04024 | 0 | | OCT | 04024 |
| 0825 | REP | 16 | LAST | 391 | 35,3061 | 0 5435 | 0 | | TC | UPPLAG |
| 0826 | REP | 3 | LAST | 473 | 35,3062 | 00047 | 1 | | ADRES | FINALPLG |
| 0827 | REP | 14 | LAST | 473 | 35,3063 | 3 0005 | 1 | CLUPDATE | CA | Z |
| 0828 | REP | 2 | LAST | 473 | 35,3064 | 54 000 | 0 | | TS | DISPDX |
| 0829 | REP | 21 | LAST | 474 | 35,3065 | 0 5301 | 0 | | TC | PHASCHG |
| 0830 | | | | | 35,3066 | 04024 | 0 | | OCT | 04024 |
| 0831 | REP | 48 | LAST | 473 | 35,3067 | 0 6006 | 1 | | TC | INTPRST |
| 0832 | | | | | 35,3070 | 52014 | 0 | | CLEAR | GOTO |
| 0833 | REP | 3 | LAST | 472 | 35,3071 | 00670 | 0 | | | UPDATPLG |
| 0834 | REP | 3 | LAST | 473 | 35,3072 | 02366 | 0 | | | QSAVED |

FINALPLG IS SET-FLASH V37-AWAIT NEW PCM

SET
FINALPLG

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P0035 DISPLAYE

R0036 SUBROUTINES USED

R0037 BANKCALL
 R0038 GOFLASHR
 R0039 GOTOPOOH
 R0040 BLANKET
 R0041 ENDOPJOB

| | | | | | | | | | | |
|------|-----|----|------|---------|---------|--------|------|----------|----------|----------|
| 0042 | | | | 35,3073 | 0 | 0008 | 1 | DISPLAYE | EXTEND | |
| 0043 | REP | 9 | LAST | 470 | 35,3074 | 23-340 | 1 | GRCH | NORMEX | |
| 0044 | REP | 1 | | | 35,3075 | 3 | 3126 | CAP | V06N55 | |
| 0045 | REP | 91 | LAST | 473 | 35,3076 | 0 | 4555 | TCR | BANKCALL | |
| 0046 | REP | 1 | | | 35,3077 | 20763 | 1 | CADR | GOFLASHR | |
| 0047 | REP | 10 | LAST | 474 | 35,3100 | 1 | 4108 | TCF | GOTOPOOH | |
| 0048 | REP | 10 | LAST | 475 | 35,3101 | 0 | 1340 | TC | NORMEX | |
| 0049 | | | | | 35,3102 | 1 | 3075 | TCF | -5 | |
| 0050 | REP | 35 | LAST | 442 | 35,3103 | 3 | 4712 | CAP | BIT1 | BLANK R1 |
| 0051 | REP | 1 | | | 35,3104 | 0 | 5415 | TCR | BLANKET | |
| 0052 | REP | 58 | LAST | 444 | 35,3105 | 1 | 5112 | TCF | ENDOPJOB | |



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P0853 P3XORPTX

| | | | | | | | | |
|------|-----|-----|------|---------|----------|----------|--------|--------|
| 0854 | REP | 1 | | 35,3106 | 3 7713 0 | P3XORPTX | CAP | HIGH9 |
| 0855 | REP | 6 | LAST | 385 | 35,3107 | 7 1011 1 | MASK | MODR20 |
| 0856 | | | | | 35,3110 | 0 0006 1 | EXTEND | |
| 0857 | | | | | 35,3111 | 1 3113 0 | BZF | +2 |
| 0858 | REP | 151 | LAST | 439 | 35,3112 | 24 002 0 | INCR | 0 |
| 0859 | | | | | 35,3113 | 0 0002 0 | RETURN | |

me60 VNPOCH

P0861 SUBROUTINES USED

P0862 BANKCALL
P0863 GOFLASH
P0864 GOTOPOCH

| | | | | | | | | |
|------|-----|----|------|-----|---------|----------|--------|----------|
| 0865 | | | | | 35,3114 | 0 0006 1 | VNPOCH | EXTEND |
| 0866 | REP | 4 | LAST | 471 | 35,3115 | 23*787 0 | ORCH | RTRN |
| 0867 | REP | 2 | LAST | 89 | 35,3116 | 55=765 0 | TS | VERBNLN |
| 0868 | REP | 3 | LAST | 476 | 35,3111 | 3 1765 1 | CA | VERBNLN |
| 0869 | REP | 92 | LAST | 475 | 35,3120 | 0 4555 0 | TCR | BANKCALL |
| 0870 | REP | 13 | LAST | 473 | 35,3121 | 20824 0 | CADR | GOFLASH |
| 0811 | REP | 11 | LAST | 475 | 35,3122 | 1 4108 0 | TCF | GOTOPOCH |
| 0812 | REP | 5 | LAST | 476 | 35,3123 | 0 1787 0 | TC | RTRN |
| 0813 | | | | | 35,3124 | 1 3111 1 | TCF | -5 |

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P0674 CONSTANTS

| | | | | | | |
|-------|---------|---------|---------|------|-------------|------------------|
| 0675 | 35,3125 | 01445 0 | V06N37 | VN | 0637 | |
| 0676 | 35,3126 | 01467 0 | V06N55 | VN | 0655 | |
| 0677 | 35,3127 | 01472 1 | V06N58 | VN | 0658 | |
| 0678 | 35,3130 | 01473 0 | V06N59 | VN | 0659 | |
| 0679 | 35,3131 | 01521 0 | V06N61 | VN | 0661 | |
| 0680 | 35,3132 | 04055 0 | V16N45 | VN | 1645 | |
| 0681 | 35,3133 | 14441 0 | TWOPI | 2DEC | 6.283185307 | B-4 |
| 0681 | 35,3134 | 37325 1 | | | | |
| 0682 | 35,3135 | 00001 0 | MAX250 | 2DEC | 25 E3 | |
| 0682 | 35,3136 | 20850 0 | | | | |
| 0683 | 35,3137 | 12525 0 | THIRD | 2DEC | .333333333 | |
| 0683 | 35,3140 | 12525 0 | | | | |
| 0684 | 35,3141 | 00004 0 | ELEPS | 2DEC | .277777777 | E-3 |
| 0684 | 35,3142 | 21505 1 | | | | |
| 0685 | 35,3143 | 00002 0 | DECTWO | OCT | 2 | |
| 0686 | 35,3144 | 77777 0 | DP-.01 | OCT | 77777 | CONSTANTS |
| 0687 | 35,3145 | 61337 1 | | OCT | 61337 | ADJACENT |
| 06871 | 35,3146 | 01252 0 | EPSFOUR | 2DEC | .0416666666 | -.01 FOR MCA DSP |
| 06871 | 35,3147 | 25253 1 | | | | |



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P0888 INITVEL

R0889 MOD NO -1 LOC SECTION - P34-P35, P74-P75
R0890 MOD BY WHITE,P DATE 21NOV67

R0891 FUNCTIONAL DESCRIPTION

R0892 THIS SUBROUTINE COMPUTES THE REQUIRED INITIAL VELOCITY VECTOR FOR
R0893 A TRAJECTORY OF SPECIFIED TRANSFER TIME BETWEEN SPECIFIED INITIAL
R0894 AND TARGET POSITIONS. THE TRAJECTORY MAY BE EITHER CONIC OR
R0895 PRECISION DEPENDING ON AN INPUT PARAMETER (NAMELY, NUMBER OF
R0896 OFFSETS). IN ADDITION, IN THE PRECISION TRAJECTORY CASE, THE
R0897 SUBROUTINE ALSO COMPUTES AN OFFSET TARGET VECTOR, TO BE USED
R0898 DURING PURE-CONIC CROSS-PRODUCT STEERING. THE OFFSET TARGET
R0899 VECTOR IS THE TERMINAL POSITION VECTOR OF A CONIC TRAJECTORY WHICH
R0900 HAS THE SAME INITIAL STATE AS A PRECISION TRAJECTORY WHOSE
R0901 TERMINAL POSITION VECTOR IS THE SPECIFIED TARGET VECTOR.

R0902 IN ORDER TO AVOID THE INHERENT SINGULARITIES IN THE 180 DEGREE
R0903 TRANSFER CASE WHEN THE (TRUE OR OFFSET) TARGET VECTOR MAY BE
R0904 SLIGHTLY OUT OF THE ORBITAL PLANE, THIS SUBROUTINE ROTATES THIS
R0905 VECTOR INTO A PLANE DEFINED BY THE INPUT INITIAL POSITION VECTOR
R0906 AND ANOTHER INPUT VECTOR (USUALLY THE INITIAL VELOCITY VECTOR),
R0907 WHENEVER THE INPUT TARGET VECTOR LIES INSIDE A CONE WHOSE VERTIX
R0908 IS THE ORIGIN OF COORDINATES, WHOSE AXIS IS THE 180 DEGREE
R0909 TRANSFER DIRECTION, AND WHOSE CONE ANGLE IS SPECIFIED BY THE USER.

R0910 THE LAMBERT SUBROUTINE IS UTILIZED FOR THE CONIC COMPUTATIONS AND
R0911 THE COASTING INTEGRATION SUBROUTINE IS UTILIZED FOR THE PRECISION
R0912 TRAJECTORY COMPUTATIONS.

R0913 CALLING SEQUENCE

R0914 L CALL
R0915 L+1 INITVEL
R0916 L+2 (RETURN - ALWAYS)

R0917 INPUT

R0918 (1) RINIT INITIAL POSITION RADIUS VECTOR
R0919 (2) VINIT INITIAL POSITION VELOCITY VECTOR
R0920 (3) RTARG TARGET POSITION RADIUS VECTOR
R0921 (4) DELT4 DESIRED TIME OF FLIGHT FROM RINIT TO RTARG
R0922 (5) INTIME TIME OF RINIT
R0923 (6) OD NUMBER OF ITERATIONS OF LAMBERT/INTEGRVS
R0924 (7) 2D ANGLE TO 180 DEGREES WHEN ROTATION STARTS
R0925 (8) RTX1 -2 FOR EARTH, -10D FOR LUNAR
R09251 (9) RTX2 COORDINATE SYSTEM ORIGIN - 0 FOR EARTH, 2 FOR LUNAR
R0926 PUSHLOC SET AT 4D

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R0027 OUTPUT

- R0028 (1) RTARG OFFSET TARGET POSITION VECTOR
- R0029 (2) VTRIMEP MANEUVER VELOCITY REQUIRED
- R0030 (3) VTRIMEK VELOCITY AT TARGET AFTER MANEUVER
- R0031 (4) DELVETS3 DELTA VELOCITY REQUIRED FOR MANEUVER

R0032 SUBROUTINES USED

R0033 LAMBERT
R0034 INSTALL
R0035 INITORWS

| Address | Operation | Count | Time | Value | Label | Comments |
|---------|------------------|-------|---------|---------|--------------------|--|
| 0036 | REP 1 | | 11,2000 | | SETLOC INTVEL | |
| 0037 | | | 11,2000 | | BANK | |
| 0038 | REP 1 | | | | COUNT 11/INITV | |
| 0058 | | | 11,2000 | 77814 1 | INITVEL SET | COGA GUESS NOT AVAILABLE |
| 0059 | REP 1 | | 11,2001 | 00475 1 | GUESSW | |
| 0060 | | | 11,2002 | 44175 1 | HAVEQUES VLOAD | STO |
| 0061 | REP 7 LAST 469 | | 11,2003 | 03415 1 | RTARG | |
| 0062 | REP 11 LAST 475 | | 11,2004 | 01340 1 | NORMEX | |
| 0063 | REP 2 LAST 120 | | 11,2005 | 03604 0 | STORE RTARG1 | |
| 0064 | | | 11,2006 | 46135 1 | SLOAD RHIZ | |
| 0065 | REP 3 LAST 471 | | 11,2007 | 03747 0 | RTX2 | |
| 0067 | REP 1 | | 11,2010 | 22022 1 | INITVEL1 | |
| 0069 | REP 4 LAST 467 | | 11,2012 | 03570 0 | RINIT | R29 |
| 0070 | REP 5 LAST 479 | | 11,2013 | 27570 0 | STOVL RINIT | R27 |
| 0071 | REP 4 LAST 467 | | 11,2014 | 03576 0 | VINIT | R7 |
| 0072 | | | 11,2015 | 77752 1 | VSL2 | |
| 0073 | REP 5 LAST 479 | | 11,2016 | 27576 0 | STOVL VINIT | R6 |
| 0074 | REP 3 LAST 479 | | 11,2017 | 03604 0 | RTARG1 | |
| 0075 | | | 11,2020 | 77752 1 | VSL2 | |
| 0076 | REP 4 LAST 479 | | 11,2021 | 03604 0 | STORE RTARG1 | |
| R0077 | INITIALIZATION | | | | | |
| 0078 | | | 11,2022 | 71331 0 | INITVEL1 REP DLOAD | SET ITCTR TO 1 (LOAD MPAC WITH R4 (PL 00)) |
| 0079 | REP 1 | | 11,2023 | 03505 1 | ITCTR | |
| 0080 | | | 11,2024 | 77776 1 | 0 -1 | |
| 0081 | | | 11,2025 | 70546 1 | COSINE SR1 | CALCULATE COSINE (R4) (+2) |
| 0082 | REP 2 LAST 121 | | 11,2026 | 17630 1 | STOVL COZY4 | SET COZY4 TO COSINE(R4) (PL 00) |
| 0083 | | | 11,2027 | 87154 0 | LXA,2 SKA,2 | |
| 0084 | REP 236 LAST 462 | | 11,2030 | 00154 1 | MPAC | |
| 0085 | REP 2 LAST 94 | | 11,2031 | 02703 1 | VTAROTAG | SET VTAROTAG TO 0D (SP) |
| 0086 | | | 11,2032 | 77775 1 | VLOAD | |
| 0087 | REP 6 LAST 479 | | 11,2033 | 03570 0 | RINIT | |
| 0088 | REP 3 LAST 94 | | 11,2034 | 26657 1 | STOVL R1VEC | R1VEC RO RINIT |
| 0089 | REP 5 LAST 479 | | 11,2035 | 03604 0 | RTARG1 | |



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| | | | | | | | | | |
|--------|-----|---|------|-----|---------|---------|----------|----------|---|
| 0990 | REP | 2 | LAST | 94 | 11,2036 | 18665 0 | STOVL | R2VEC | R2VEC EQ RTARG |
| 0991 | REP | 5 | LAST | 467 | 11,2037 | 03423 1 | | DELLT4 | |
| 0992 | REP | 2 | LAST | 94 | 11,2040 | 02673 1 | STORE | TDSSIRD | TDSSIRD EQ DELLT4 |
| 0993 | | | | | 11,2041 | 77201 1 | SETPD | VLOAD | |
| 0994 | | | | | 11,2042 | 00001 0 | | GD | INITIALIZE PL TO GD |
| 0995 | REP | 7 | LAST | 479 | 11,2043 | 03570 0 | | RINIT | MPAC EQ RINIT (+29) |
| 0996 | | | | | 11,2044 | 41456 0 | UNIT | PUSH | UNIT(RI) (+1) (PL 6D) |
| 0997 | | | | | 11,2045 | 53435 0 | VXV | UNIT | |
| 0998 | REP | 6 | LAST | 479 | 11,2046 | 03576 0 | | VINIT | MPAC EQ UNIT(RI) X VI (+8) |
| 0999 | REP | 2 | LAST | 94 | 11,2047 | 28676 1 | STOVL | LN | |
| 1000 | REP | 6 | LAST | 479 | 11,2050 | 03604 0 | | RTARG1 | |
| 1001 | | | | | 11,2051 | 50256 0 | UNIT | DOT | TEMP=URT.UR1 (+2) (PL 0D) |
| 1002 | | | | | 11,2052 | 43015 1 | DAD | CLEAR | |
| 1003 | REP | 3 | LAST | 479 | 11,2053 | 03630 1 | | COZY4 | |
| 1004 | REP | 1 | | | 11,2054 | 03665 1 | | NORMSW | |
| 1005 | REP | 4 | LAST | 480 | 11,2055 | 03630 1 | STORE | COZY4 | |
| 1006 | | | | | 11,2056 | 43044 0 | INITVEL2 | RPL | SET |
| 1007 | REP | 1 | | | 11,2057 | 22101 1 | | INITVEL3 | LN CALCULATED IN LAMBERT |
| 1008 | REP | 2 | LAST | 480 | 11,2060 | 03465 0 | | NORMSW | |
| R1009 | | | | | | | | | ROTATE RC INTO YC PLANE - SET UNIT NORMAL TO YC |
| 1010 | | | | | 11,2061 | 41575 0 | VLOAD | PUSH | (PL 6D) |
| 1011 | REP | 3 | LAST | 480 | 11,2062 | 02665 0 | | R2VEC | RC TO 6D (+29) |
| 1012 | | | | | 11,2063 | 63246 1 | ARVAL | PDVL | RC TO MPAC, ARVAL(RC) (+29) TO 6D(PL 2D) |
| 1013 | | | | | 11,2064 | 46206 1 | PUSH | VPROJ | (PL 8D) |
| 1014 | REP | 3 | LAST | 480 | 11,2065 | 02676 1 | | LN | |
| 1015 | | | | | 11,2066 | 51352 1 | VSL2 | BVSJ | |
| 1016 | | | | | 11,2067 | 74256 0 | UNIT | VXSC | (PL 6D) |
| 1017 | | | | | 11,2070 | 77772 0 | VSL1 | | |
| 1018 | REP | 4 | LAST | 480 | 11,2071 | 02665 0 | STORE | R2VEC | |
| 1019 | | | | | 11,2072 | 67351 1 | TLOAD | SLOAD | |
| 1020 | REP | 2 | LAST | 31 | 11,2073 | 11456 0 | | ZEROVEC | |
| 1021 | REP | 2 | LAST | 479 | 11,2074 | 03505 1 | | ITCTR | |
| 1022 | | | | | 11,2075 | 77244 0 | RPL | VLOAD | |
| 1023 | REP | 2 | LAST | 480 | 11,2076 | 22101 1 | | INITVEL3 | |
| 1024 | REP | 5 | LAST | 480 | 11,2077 | 02665 0 | | R2VEC | |
| 1025 | REP | 7 | LAST | 480 | 11,2100 | 03604 0 | STORE | RTARG1 | |
| 1026 | | | | | 11,2101 | 63345 0 | INITVEL3 | DLOAD | PDVL (PL 2D) |
| 1027 | REP | 1 | | | 11,2102 | 27736 0 | | MLEARTH | POSITIVE VALUE |
| 1028 | REP | 6 | LAST | 480 | 11,2103 | 02665 0 | | R2VEC | |
| 102802 | | | | | 11,2104 | 63256 0 | UNIT | PDVL | 2D = UNIT(R2VEC) (PL 8D) |
| 102804 | REP | 4 | LAST | 479 | 11,2105 | 02657 1 | | R1VEC | |
| 102806 | | | | | 11,2106 | 41456 0 | UNIT | PUSH | 6D = UNIT(R1VEC) (PL 14D) |
| 102808 | | | | | 11,2107 | 57435 1 | VXV | VCOMP | -N = UNIT(R2VEC) X UNIT(R1VEC) |
| 10281 | | | | | 11,2110 | 00003 1 | | 2D | |
| 10282 | | | | | 11,2111 | 77606 1 | PUSH | | (PL 20D) |
| 10283 | | | | | 11,2112 | 71350 1 | LXA,1 | DLOAD | |
| 10284 | REP | 3 | LAST | 456 | 11,2113 | 03745 1 | | RTX1 | |
| 10285 | | | | | 11,2114 | 00023 0 | | 18D | |
| 10286 | | | | | 11,2115 | 62040 1 | RNN | INCR,1 | |

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| | | | | | | | |
|-------|--|---------|---------|----------|----------|--------------------------------|---------|
| 10287 | | 11,2116 | 22120 1 | | +2 | | |
| 10288 | | 11,2117 | 77767 1 | DBC | -8 | | |
| 10289 | | 11,2120 | 67310 1 | INCR,1 | SLOAD | | |
| 1029 | | 11,2121 | 00012 1 | | 10D | | |
| 10291 | REP 4 LAST 463 | 11,2122 | 00047 1 | | X1 | | |
| 10292 | | 11,2123 | 77230 0 | RHIZ | VLOAD | (PL14D) | |
| 10293 | | 11,2124 | 22120 1 | | +2 | | |
| 10294 | | 11,2125 | 41476 1 | VCOMP | PUSH | (PL20D) | |
| 10295 | | 11,2126 | 77775 1 | VLOAD | | (PL14D) | |
| 10296 | | 11,2127 | 50235 0 | VXV | DOT | (PL 2D) | |
| 1032 | | 11,2130 | 71244 0 | BPL | DLOAD | (PL 0D) | |
| 1033 | REP 1 | 11,2131 | 22133 0 | | INITVEL4 | | |
| 1034 | | 11,2132 | 41476 1 | DCOMP | PUSH | (PL 2D) | |
| 1035 | | 11,2133 | 87154 0 | INITVEL4 | LXA.2 | | |
| 1036 | | 11,2134 | 00000 1 | | SKA.2 | | |
| 1037 | REP 2 LAST 94 | 11,2135 | 02674 0 | | GD | | |
| R1038 | SET INPUTS UP FOR LAMBERT | | | | | | GEOMSON |
| 1039 | | 11,2136 | 45150 1 | LXA,1 | CALL | | |
| 1040 | REP 4 LAST 480 | 11,2137 | 03745 1 | | RTX1 | | |
| R1041 | OPERATE THE LAMBERT CONIC ROUTINE (COASTPLT SUBROUTINE) | | | | | | |
| 1042 | REP 1 | 11,2140 | 25215 0 | | LAMBERT | | |
| R1043 | DELETE THRU 4521 | | | | | | |
| R1044 | ARRIVED AT SOLUTION IS GOOD ENOUGH ACCORDING TO SLIGHTLY WIDER BOUNDS. | | | | | | |
| 1045 | | 11,2141 | 77214 0 | CLEAR | VLOAD | | |
| 1046 | REP 2 LAST 479 | 11,2142 | 00675 0 | | CLUSSW | | |
| 1047 | REP 3 LAST 456 | 11,2143 | 02746 0 | | VVEC | | |
| R1048 | STORE CALCULATED INITIAL VELOCITY REQUIRED IN VIPRIME | | | | | | |
| R1049 | | | | | | | |
| 1050 | REP 4 LAST 457 | 11,2144 | 17612 1 | STOOL | VIPRIME | INITIAL VELOCITY REQUIRED (-7) | |
| R1051 | | | | | | | |
| R1052 | IF NLIMIT IS ZERO, CONTINUE AT INITVEL6, OTHERWISE | | | | | | |
| R1053 | SET UP INPUTS FOR ENCKE INTEGRATION (INTEGRVS). | | | | | | |
| 1054 | REP 3 LAST 479 | 11,2145 | 02704 0 | | VTAROTAG | | |
| 1055 | | 11,2146 | 45030 0 | RHIZ | CALL | | |
| 1056 | REP 1 | 11,2147 | 22224 0 | | INITVEL7 | | |
| 1057 | REP 7 LAST 471 | 11,2150 | 27371 1 | | INTSTALL | | |
| 1061 | | 11,2151 | 43135 1 | SLOAD | CLEAR | | |
| 1062 | REP 4 LAST 479 | 11,2152 | 03747 0 | | RTX2 | | |
| 1063 | REP 3 LAST 471 | 11,2153 | 00263 0 | | MOONFLAG | | |
| 1064 | | 11,2154 | 43030 0 | RHIZ | SET | | |
| 1065 | REP 1 | 11,2155 | 22157 1 | | INITVEL6 | | |
| 1066 | REP 4 LAST 481 | 11,2156 | 00063 1 | | MOONFLAG | | |
| 1067 | | 11,2157 | 77775 1 | INITVEL6 | VLOAD | | |
| 1068 | REP 8 LAST 480 | 11,2160 | 03570 0 | | RINIT | | |
| 1069 | REP 5 LAST 480 | 11,2161 | 02657 1 | STORE | R1VEC | | |



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| | | | | | | | | | | |
|-------|---|---|------|-----|---------|-------|---|----------|----------|--|
| 1070 | REP | 5 | LAST | 471 | 11,2162 | 25535 | 0 | STOVL | RCV | |
| 1071 | REP | 5 | LAST | 461 | 11,2163 | 03612 | 1 | | VIPRIME | |
| 1072 | REP | 5 | LAST | 471 | 11,2164 | 15543 | 1 | STOVL | VCV | |
| 1073 | REP | 6 | LAST | 467 | 11,2165 | 03503 | 1 | | INTIME | |
| 1074 | REP | 5 | LAST | 471 | 11,2166 | 01517 | 0 | STORE | TST | |
| 1075 | | | | | 11,2167 | 43015 | 1 | DAD | CLEAR | |
| 1076 | REP | 6 | LAST | 480 | 11,2170 | 03423 | 1 | | DELLT4 | |
| 1077 | REP | 3 | LAST | 471 | 11,2171 | 01673 | 1 | | INTYPLD | |
| 1078 | REP | 7 | LAST | 471 | 11,2172 | 34041 | 0 | STCALL | TDEC1 | |
| 1079 | REP | 2 | LAST | 471 | 11,2173 | 27066 | 1 | | INTEGRVS | |
| 1080 | | | | | 11,2174 | 77775 | 1 | VLOAD | | |
| 1081 | REP | 1 | | | 11,2175 | 00025 | 0 | | VATT1 | |
| 1082 | REP | 2 | LAST | 94 | 11,2176 | 02705 | 1 | STORE | VTARGET | |
| R1083 | IF ITERATION COUNTER (ITCTR) EQ NO. ITERATIONS (NUNIT), CONTINUE AT | | | | | | | | | |
| R1084 | INITVELC, OTHERWISE REITERATE LAMBERT AND ENCKE | | | | | | | | | |
| 1085 | | | | | 11,2177 | 63154 | 1 | LXA,2 | INCR,2 | |
| 1086 | REP | 3 | LAST | 480 | 11,2200 | 03504 | 0 | | ITCTR | |
| 1087 | | | | | 11,2201 | 00001 | 0 | | ID | INCREMENT ITCTR |
| 1088 | | | | | 11,2202 | 55134 | 1 | SKA,2 | XSU,2 | |
| 1089 | REP | 4 | LAST | 482 | 11,2203 | 03504 | 0 | | ITCTR | |
| 1090 | REP | 4 | LAST | 481 | 11,2204 | 02703 | 1 | | VTARGET | |
| 1091 | | | | | 11,2205 | 46135 | 1 | SLOAD | RHIZ | IF SP(MPAC) EQ 0, CONTINUE AT INITVELC |
| 1092 | REP | 2 | LAST | 450 | 11,2206 | 00050 | 1 | | X2 | |
| 1093 | REP | 1 | | | 11,2207 | 22221 | 0 | | INITVEL6 | |
| R1094 | | | | | | | | | | |
| R1095 | OFFSET CONIC TARGET VECTOR | | | | | | | | | |
| 1096 | | | | | 11,2210 | 52375 | 1 | VLOAD | VSU | |
| 1097 | REP | 6 | LAST | 480 | 11,2211 | 03604 | 0 | | RTARG1 | |
| 1098 | REP | 1 | | | 11,2212 | 00017 | 1 | | RATT1 | |
| 1099 | | | | | 11,2213 | 77655 | 1 | VAD | | |
| 1100 | REP | 7 | LAST | 480 | 11,2214 | 02665 | 0 | | R2VEC | |
| 1101 | REP | 8 | LAST | 482 | 11,2215 | 16665 | 0 | STOVL | R2VEC | |
| 1102 | REP | 5 | LAST | 480 | 11,2216 | 03630 | 1 | | COZY4 | |
| 1103 | | | | | 11,2217 | 77650 | 1 | GOTO | | |
| 1104 | REP | 1 | | | 11,2220 | 22056 | 1 | | INITVEL2 | CONTINUE ITERATING AT INITVEL2 |
| R1105 | COMPUTE THE DELTA VELOCITY | | | | | | | | | |
| 1106 | | | | | 11,2221 | 77775 | 1 | INITVEL6 | VLOAD | |
| 1107 | REP | 9 | LAST | 482 | 11,2222 | 02665 | 0 | | R2VEC | |
| 1108 | REP | 9 | LAST | 482 | 11,2223 | 03604 | 0 | STORE | RTARG1 | |
| 1109 | | | | | 11,2224 | 52375 | 1 | INITVEL7 | VLOAD | |
| 1110 | REP | 8 | LAST | 482 | 11,2225 | 03612 | 1 | | VIPRIME | |
| 1111 | REP | 7 | LAST | 480 | 11,2226 | 03576 | 0 | | VINIT | |
| 1112 | REP | 9 | LAST | 472 | 11,2227 | 27646 | 0 | STOVL | DELVEET3 | DELVEET3 = VIPRIME-VINIT (*7) |
| 1113 | REP | 3 | LAST | 482 | 11,2230 | 02705 | 1 | | VTARGET | |
| 1114 | REP | 4 | LAST | 457 | 11,2231 | 03620 | 0 | STORE | VTPRIME | |
| 1115 | | | | | 11,2232 | 46135 | 1 | SLOAD | RHIZ | |
| 1116 | REP | 5 | LAST | 481 | 11,2233 | 03747 | 0 | | RTX2 | |

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| | | | | | | | | | |
|-------|-----|----|----------|---------|---------|----------|----------|--------|--|
| 1117 | REP | 1 | | 11,2234 | 22251 1 | | | | |
| 11171 | | | | 11,2235 | 70575 1 | VLOAD | VSR2 | | |
| 11172 | REP | 5 | LAST 482 | 11,2236 | 03620 0 | | VTPRIME | | |
| 1118 | REP | 6 | LAST 483 | 11,2237 | 27620 0 | STOVL | VTPRIME | | |
| 1119 | REP | 7 | LAST 482 | 11,2240 | 03612 1 | | VIPRIME | | |
| 1120 | | | | 11,2241 | 77742 0 | VSR2 | | | |
| 1121 | REP | 8 | LAST 483 | 11,2242 | 27612 1 | STOVL | VIPRIME | | |
| 1122 | REP | 10 | LAST 482 | 11,2243 | 03604 0 | | RTARG1 | | |
| 1123 | | | | 11,2244 | 77742 0 | VSR2 | | | |
| 1124 | REP | 11 | LAST 483 | 11,2245 | 27604 0 | STOVL | RTARG1 | | |
| 1125 | REP | 10 | LAST 482 | 11,2246 | 03646 0 | | DELVEST3 | | |
| 1126 | | | | 11,2247 | 77742 0 | VSR2 | | | |
| 1127 | REP | 11 | LAST 483 | 11,2250 | 03646 0 | STORE | DELVEST3 | | |
| 1128 | | | | 11,2251 | 77201 1 | INITVELX | SETPD | VLOAD | |
| 1129 | | | | 11,2252 | 00001 0 | | | QD | |
| 1130 | REP | 12 | LAST 483 | 11,2253 | 03604 0 | | | RTARG1 | |
| 1131 | REP | 8 | LAST 479 | 11,2254 | 37415 0 | STCALL | RTARG | | |
| 1134 | REP | 12 | LAST 479 | 11,2255 | 01340 1 | | | NORMEX | |
| R1135 | | | | | | | | | |
| R1136 | | | | | | | | | |

..... END OF INITVEL ROUTINE



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R1137 MIDDIM

R1138 MOD NO. 0, BY WILLMAN, SUBROUTINE RENDQUID, LOG P34-P35, P74-P75
 R1139 REVISION 03, 17 FEB 67

R1140 IF THE ACTIVE VEHICLE IS DOING THE COMPUTATION, MIDDIM COMPUTES
 R1141 THE POSITIVE MIDDLE GIMBAL ANGLE OF THE ACTIVE VEHICLE TO THE INPUT
 R1142 DELTA VELOCITY VECTOR (QD IN PUSH LIST), OTHERWISE
 R1143 MIDDIM CONVERTS THE INPUT DELTA VELOCITY VECTOR FROM INERTIAL COORDIN-
 R1144 ATES TO LOCAL VERTICAL COORDINATES OF THE ACTIVE VEHICLE.

R1145 .. INPUTS ..

| R1146 | NAME | MEANING | UNITS/SCALING/MODE |
|-------|----------|---|---------------------|
| R1147 | AVFLAG | INT FLAG - 0 IS CS4 ACTIVE, 1 IS LEM ACTIVE | BIT |
| R1148 | COMPUTER | INT FLAG - 0 IS LEM COMPUTER, 1 IS CS4 COMPUTER | BIT |
| R1149 | RINIT | ACTIVE VEHICLE RADIUS VECTOR | METERS/CSEC (+7) VT |
| R1150 | VINIT | ACTIVE VEHICLE VELOCITY VECTOR | METERS/CSEC (+7) VT |
| R1151 | QD (PL) | ACTIVE VEHICLE DELTA VELOCITY VECTOR | METERS/CSEC (+7) VT |

R1152 .. OUTPUTS ..

| R1153 | NAME | MEANING | UNITS/SCALING/MODE |
|-------|----------|---|---------------------|
| R1154 | +MGA | + MIDDLE GIMBAL ANGLE | REVOLUTIONS (+0) DP |
| R1155 | DELVLVC | DELTA VELOCITY VECTOR IN LV COORD. | METERS/CSEC (+7) VT |
| R1156 | MGLVFLAG | INT FLAG - 0 IS +MGA COMPUTED, 1 IS DELVLVC COMP. | BIT |

R1157 .. CALLING SEQUENCE ..

R1158 L CALL
 R1159 L+1 MIDDIM
 R1160 L+2 (RETURN - ALWAYS)

R1161 .. NO SUBROUTINES CALLED ..

R1162 .. DERRIS - ERASABLE TEMPORARY USAGE

R1163 A,O,L, PUSH LIST, MPAC.

R1164 .. ALARMS - NONE ..



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P1165 MIDDLE GIMBAL ANGLE COMPUTATION.

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1166 REP 1 04,2000 SETLOC MIDGIM
1167 04,2651 BANK

1168 REP 1 COUNT# 88/MIDG

1169 04,2651 20000 0 HALPREV 2DEC 1 B-1
1170 04,2652 00000 1
1171 REP 1 04,2654 01312 0
1172 REP 1 04,2655 10872 1
1173 REP 1 04,2656 02747 1
1174 REP 1 04,2657 10876 1

R1175 COMPUTE MGA IF AVFLAG AND COMPUTER HAVE OPPOSITE VALUES.
1176 04,2660 53575 0 GET.MGA VLOAD UNIT
1177 04,2661 72441 0 DOT SL1
1178 REP 3 LAST 169 04,2662 01744 1 REFSMAT +6
1179 04,2663 51138 1 ARCSIN BPL
1180 REP 1 04,2664 10870 1 SETMGA
1181 04,2665 10870 0
1182 REP 1 04,2666 10852 1 HALPREV
1183 REP 2 LAST 485 04,2667 10852 1 HALPREV
1184 REP 6 LAST 473 04,2670 03828 0 SETMGA STORE MGA
1185 04,2671 43414 1 CLR RVO
1186 REP 1 04,2672 02675 1 MCLVFLAG
1187 04,2673 77814 1 MIDGIM1 ROPP
1188 04,2674 02747 1 COMPUTER
1189 REP 2 LAST 473 04,2675 10860 0 GET.MGA

R1190 COMPUTE DELVLVC IF AVFLAG AND COMPUTER HAVE SAME VALUES.
1191 04,2676 53575 0 GET.LVC VLOAD UNIT
1192 REP 9 LAST 481 04,2677 03570 0 RINIT
1193 04,2700 77876 0 VCOMP
1194 04,2701 00023 0 STORE 18D
1195 04,2702 53435 0 VXV UNIT
1196 REP 8 LAST 482 04,2703 03576 0 VINIT
1197 04,2704 00015 0 STORE 12D
1198 04,2705 53435 0 VXV UNIT
1199 04,2706 00023 0 18D
1200 04,2707 24007 0 STOVL 6D
1201 04,2710 00001 0 6D
1202 04,2711 78521 0 MVV VSL1
1203 04,2712 00007 0 6D
1204 REP 9 LAST 469 04,2713 03405 0 STORE DELVLVC
1205 04,2714 43414 1 SET RVO
1206 REP 2 LAST 485 04,2715 02475 0 MCLVFLAG
R1207 ..... END OF MIDGIM ROUTINE .....

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(PL 6D) V (+7) TO MPAC, UNITIZE UV (+1)
 DOT UV WITH Y(STABLE MEMBER) AND RESCALE
 FROM +2 TO +1 FOR ASIN ROUTINE

CONVERT MGA TO MGA BY
 ADDING ONE REVOLUTION

CLEAR MCLVFLAG TO INDICATE MGA CALC
 AND EXIT

(PL 6D) R (+29) IN MPAC, UNITIZE UR

U(-R)
 U(-R) TO 18D
 U(-R)*V EQ VMU(R), U(V*R)

U(V*R) TO 12D
 U(V*R)*U(-R), U(V*R)*(-R)

TRANSFORMATION MATRIX IS IN 6D (+1)
 DELTA V (+7) IN 6D
 CONVERT FROM INER COOR TO I/V COOR (+8)
 AND SCALE +7 IN MPAC
 STORE IN DELVLVC (+7)
 SET MCLVFLAG TO INDICATE LVC CALC
 AND EXIT



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| | | | | | |
|-------|-----|------------|---------|---------|----------------------|
| P1208 | | | | | |
| 1209 | | | 04,2716 | 77100 0 | SELECTMU AXC,1 AXT,2 |
| 1210 | | | 04,2717 | 00002 0 | 2D |
| 1211 | | | 04,2720 | 00000 1 | 6D |
| 1212 | | | 04,2721 | 77614 1 | BOFF |
| 1213 | REP | 3 LAST 471 | 04,2722 | 04343 1 | CMOONPLG |
| 1214 | REP | 1 | 04,2723 | 10727 1 | SETMUR |
| 1215 | | | 04,2724 | 77160 0 | AXC,1 AXT,2 |
| 1216 | | | 04,2725 | 00012 1 | 10D |
| 1217 | | | 04,2726 | 00002 0 | 2D |
| 1218 | | | 04,2727 | 66143 1 | SETMUR DLOAD* SKA,1 |
| 1219 | REP | 1 | 04,2730 | 11635 1 | MUTABLE +4,1 |
| 1220 | REP | 5 LAST 481 | 04,2731 | 03745 1 | RTX1 |
| 1221 | REP | 2 LAST 124 | 04,2732 | 23752 0 | STOCL* RTSR1/MU |
| 1222 | REP | 2 LAST 486 | 04,2733 | 11627 1 | MUTABLE -2,1 |
| 1223 | | | 04,2734 | 54214 1 | BOFF |
| 1224 | REP | 4 LAST 486 | 04,2735 | 04343 1 | CMOONPLG |
| 1225 | REP | 1 | 04,2736 | 10740 0 | RTRRMU |
| 1226 | | | 04,2737 | 20807 1 | 6D |
| 1227 | REP | 2 LAST 124 | 04,2740 | 03750 0 | RTRRMU STORE RTMU |
| 1228 | | | 04,2741 | 43134 0 | SKA,2 CLEAR |
| 1229 | REP | 6 LAST 482 | 04,2742 | 03746 1 | RTX2 |
| 1230 | REP | 4 LAST 474 | 04,2743 | 01271 1 | FINALPLG |
| 1234 | | | 04,2744 | 77650 1 | GOTO |
| 1235 | REP | 3 LAST 480 | 04,2745 | 73005 0 | VN1645 |

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P1238 PERIAPO

R1237 MOD NO -1 LOG SECTION - P34-P35, P74-P75
 R1238 MOD BY WHITE,P DATE 18JAN68

R1239 FUNCTIONAL DESCRIPTION

R1240 THIS SUBROUTINE COMPUTES THE TWO BODY APOCENTER AND PERICENTER
 R1241 ALTITUDES GIVEN THE POSITION AND VELOCITY VECTORS FOR A POINT ON
 R1242 THE TRAJECTORY AND THE PRIMARY BODY.

R1243 SETRAD IS CALLED TO DETERMINE THE RADIUS OF THE PRIMARY BODY.

R1244 APSIDES IS CALLED TO SOLVE FOR THE TWO BODY RADII OF APOCENTER AND
 R1245 PERICENTER AND THE ECCENTRICITY OF THE TRAJECTORY.

R1246 CALLING SEQUENCE

R1247 L CALL
 R1248 L+1 PERIAPO
 R1249 L+2 (RETURN - ALWAYS)

R1250 INPUT

R1251 (1) RVBC POSITION VECTOR IN METERS
 R1252 SCALE FACTOR - EARTH +29, MOON +27
 R1253 (2) WVBC VELOCITY VECTOR IN METERS/CENTISECOND
 R1254 SCALE FACTOR - EARTH +7, MOON +5
 R1255 (3) X1 PRIMARY BODY INDICATOR
 R1256 EARTH -2, MOON -10

R1257 OUTPUT

R1258 (1) 2D APOCENTER RADIUS IN METERS
 R1259 SCALE FACTOR - EARTH +29, MOON +27
 R1260 (2) 4D APOCENTER ALTITUDE IN METERS
 R1261 SCALE FACTOR - EARTH +29, MOON P27
 R1262 (3) 6D PERICENTER RADIUS IN METERS
 R1263 SCALE FACTOR - EARTH +29, MOON +27
 R1264 (4) 8D PERICENTER ALTITUDE IN METERS
 R1265 SCALE FACTOR - EARTH +29, MOON +27
 R1266 (5) ECC ECCENTRICITY OF CONIC TRAJECTORY
 R1267 SCALE FACTOR - +3
 R1268 (6) XXXALT RADIUS OF THE PRIMARY BODY IN METERS
 R1269 SCALE FACTOR - EARTH +29, MOON +27
 R1270 (7) PUSHLOC EQUALS 10D

R1271 SUBROUTINES USED

R1272 SETRAD



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| | | | | | | | |
|-------|----------------|---------|---------|---------|-------|---------|--|
| P1301 | SETRAD | | | | | | |
| 1302 | | 22,3340 | 41545 0 | SETRAD | DLOAD | PUSH | |
| 1303 | REP 1 | 22,3341 | 05311 1 | | | RPAD | |
| 1304 | | 22,3342 | 63130 0 | | SWA,1 | INCR,2 | |
| 1305 | REP 3 LAST 482 | 22,3343 | 00047 1 | | | X2 | |
| 1306 | | 22,3344 | 00002 0 | | | 2D | |
| 1307 | | 22,3345 | 46135 1 | | SLOAD | RHIZ | |
| 1308 | REP 4 LAST 489 | 22,3346 | 00050 1 | | | X2 | |
| 1309 | REP 1 | 22,3347 | 45353 0 | | | SETRADX | |
| 1310 | | 22,3350 | 51575 1 | | VLOAD | ABVAL | |
| 1311 | REP 2 LAST 175 | 22,3351 | 02026 1 | | | NLS | |
| 1312 | | 22,3352 | 77725 1 | | PODL | | |
| 1313 | | 22,3353 | 43545 1 | SETRADX | DLOAD | RVO | |



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| | | | | | | | | | |
|-------|---------|----------|--|---------|---------|----------|--------|----------|--|
| P1314 | PRECSET | | | | | | | | |
| 1315 | | | | 22,3354 | 77620 0 | PRECSET | STQ | | |
| 1316 | REP 15 | LAST 488 | | 22,3355 | 01340 1 | | | NORMEX | |
| 1317 | REP 1 | | | 22,3356 | 30635 1 | | STCALL | TDEC2 | |
| 1318 | REP 2 | LAST 32 | | 22,3357 | 27036 1 | | | LEMPREC | |
| 1319 | | | | 22,3360 | 77624 1 | | CALL | | |
| 1320 | REP 1 | | | 22,3361 | 45372 0 | | | LEMSTORE | |
| 1321 | | | | 22,3362 | 77745 1 | | DLOAD | | |
| 1322 | REP 2 | LAST 490 | | 22,3363 | 02635 0 | | | TDEC2 | |
| 1323 | REP 8 | LAST 482 | | 22,3364 | 34041 0 | | STCALL | TDEC1 | |
| 1324 | REP 2 | LAST 32 | | 22,3365 | 27022 1 | | | CMPREC | |
| 1325 | | | | 22,3366 | 77624 1 | | CALL | | |
| 1326 | REP 1 | | | 22,3367 | 45402 0 | | | CMSTORE | |
| 1327 | | | | 22,3370 | 77650 1 | | GOTO | | |
| 1328 | REP 16 | LAST 490 | | 22,3371 | 01340 1 | | | NORMEX | |
| 1329 | | | | 22,3372 | 43175 0 | LEMSTORE | VLOAD | ROFF | |
| 1330 | REP 5 | LAST 471 | | 22,3373 | 00001 0 | | | RATT | |
| 1331 | REP 2 | LAST 485 | | 22,3374 | 01352 1 | | | AVFLAG | |
| 1332 | REP 2 | LAST 464 | | 22,3375 | 45406 1 | | | PASSIVE | |
| 1333 | REP 15 | LAST 471 | | 22,3376 | 27540 0 | ACTIVE | STOVL | RACT3 | |
| 1334 | REP 2 | LAST 467 | | 22,3377 | 00007 0 | | | VATT | |
| 1335 | REP 7 | LAST 469 | | 22,3400 | 03546 0 | | STORE | VACT3 | |
| 1336 | | | | 22,3401 | 77616 0 | | RVO | | |
| 1337 | | | | 22,3402 | 43175 0 | CMSTORE | VLOAD | BOFF | |
| 1338 | REP 6 | LAST 490 | | 22,3403 | 00001 0 | | | RATT | |
| 1339 | REP 3 | LAST 490 | | 22,3404 | 01352 1 | | | AVFLAG | |
| 1340 | REP 2 | LAST 464 | | 22,3405 | 45378 1 | | | ACTIVE | |
| 1341 | REP 7 | LAST 467 | | 22,3406 | 27554 0 | PASSIVE | STOVL | RPASS3 | |
| 1342 | REP 3 | LAST 490 | | 22,3407 | 00007 0 | | | VATT | |
| 1343 | REP 7 | LAST 467 | | 22,3410 | 03562 0 | | STORE | VPASS3 | |
| 1344 | | | | 22,3411 | 77616 0 | | RVO | | |



L P34-P35, P74-P75

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| P1345 | VECSHIFT | | | | | | |
|-------|----------------|--|---------|-------|---|----------------|------|
| 1346 | | | 22,3412 | 53754 | 1 | VECSHIFT LXA,2 | VSR* |
| 1347 | REP 0 LAST 488 | | 22,3413 | 03746 | 1 | | RTX2 |
| 1348 | | | 22,3414 | 57176 | 0 | | 0,2 |
| 1349 | | | 22,3415 | 63350 | 1 | LXA,1 | FDVL |
| 1350 | REP 7 LAST 488 | | 22,3416 | 03745 | 1 | | RTX1 |
| 1351 | | | 22,3417 | 63257 | 1 | VSR* | FDVL |
| 1352 | | | 22,3420 | 57176 | 0 | | 0,2 |
| 1353 | | | 22,3421 | 77616 | 0 | RVO | |



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| | | | | | | | |
|-------|----------------|---------|---------|---------|-------|------|--|
| P1354 | SHIPTR1 | | | | | | |
| 1355 | | 22,3422 | 53754 1 | SHIPTR1 | LXA,2 | SL* | |
| 1356 | REP 9 LAST 491 | 22,3423 | 03746 1 | | | RTX2 | |
| 1357 | | 22,3424 | 57576 1 | | | 0,2 | |
| 1358 | | 22,3425 | 77616 0 | | RVO | | |

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P1359 PROGRAM DESCRIPTION

R1360 SUBROUTINE NAME R36 OUT-OF-PLANE RENDEZVOUS ROUTINE
 R1361 MOD NO. 0 DATE 22 DECEMBER 67
 R1362 MOD BY N.M.NEVILLE LOG SECTION EXTENDED VERBS
 R1363 FUNCTIONAL DESCRIPTION

R1364 TO DISPLAY AT ASTRONAUT REQUEST LOC CALCULATED RENDEZVOUS
 R1365 OUT-OF-PLANE PARAMETERS (Y, YDOT, PSI). (REQUESTED BY DSKY).

R1366 CALLING SEQUENCE

R1367 ASTRONAUT REQUEST THROUGH DSKY V 90 B

R1368 SUBROUTINES CALLED

R1369 BDCSPRT
 R1370 COMAROP
 R1371 COMPREC
 R1372 LEMPREC
 R1373 SCNACRES
 R1374 LOADTIME

R1375 NORMAL EXIT MODES

R1376 ASTRONAUT REQUEST THROUGH DSKY TO TERMINATE PROGRAM V 34 B

R1377 ALARM OR ABORT EXIT MODES

R1378 NONE

R1379 OUTPUT

R1380 DECIMAL DISPLAY OF TIME, Y, YDOT AND PSI

R1381 DISPLAYED VALUES Y, YDOT, AND PSI, ARE STORED IN ERASABLE
 R1382 REGISTERS RANGE, RRATE AND RTHETA RESPECTIVELY.

R1383 ERASABLE INITIALIZATION REQUIRED

R1384 CSM AND LEM STATE VECTORS

R1385 DERRIS

R1386 CENTRALS A,O,L

R1387 OTHER THOSE USED BY THE ABOVE LISTED SUBROUTINES

| | | | |
|------|-------|---------|--------------|
| 1388 | | 20,2000 | BANK 20 |
| 1389 | NSP 1 | 04,2000 | SETLOC R361M |
| 1390 | | 04,2746 | BANK |



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1391 REP 3 LAST 200 E4,1728 BRANK= RPASS36
1392 REP 1 COUNT# 88/R36
1393 04,2748 22 007 0 R36 ZL
1394 REP 106 LAST 447 04,2747 3 4714 1 CAP ZERO
1395 REP 3 LAST 266 04,2750 53=052 0 DXCH DSPTMX
1396 REP 1 04,2751 3 3101 1 CAP VO6N16N
1397 REP 93 LAST 476 04,2752 0 4555 0 TC BANKCALL
1398 REP 2 LAST 240 04,2753 20465 1 GADR GOMARCP
1399 REP 19 LAST 420 04,2754 1 5423 0 TCP ENDXCT
1400 04,2755 1 2757 1 TCP +2
1401 04,2756 1 2751 1 TCP -5
1402 REP 4 LAST 494 04,2757 53=052 0 DXCH DSPTMX
1403 04,2760 0 0006 1 EXTEND
1404 REP 1 04,2761 1 3070 1 BZF LRECHK
1405 REP 237 LAST 479 04,2762 52 155 1 ASTROTIM DXCH MPAC
1406 REP 49 LAST 474 04,2763 0 6006 1 TC INTPRST
1407 04,2764 77634 0 RTB
1408 REP 1 04,2765 45713 0
1409 REP 9 LAST 490 04,2766 34041 0 R36 INT STCALL DRMODE
1410 REP 2 LAST 450 04,2767 27036 1 TDEC1
1411 04,2770 63375 0 VLOAD OINPREC
1412 REP 4 LAST 490 04,2771 00007 0 VLOAD PDVL
1413 REP 7 LAST 490 04,2772 00001 0 VATT
1414 REP 4 LAST 494 04,2773 02327 0 RATT
1415 04,2774 63256 0 STORE RPASS36
1416 04,2775 53435 0 UNIT PDVL
1417 04,2776 77626 0 VXV UNIT
1418 REP 1 04,2777 61442 1 STADR
1419 REP 2 LAST 451 04,3000 00015 0 STODL UNP36
1420 REP 10 LAST 494 04,3001 34041 0 TAT
1421 REP 2 LAST 450 04,3002 27022 1 STCALL TDEC1
1422 04,3003 63375 0 VLOAD THISPREC
1423 REP 5 LAST 494 04,3004 00007 0 VLOAD PDVL
1424 REP 8 LAST 494 04,3005 00001 0 VATT
1425 04,3006 77725 1 RATT
1426 REP 3 LAST 494 04,3007 00015 0 FDDL
1427 04,3010 24037 0 TAT
1428 04,3011 41406 0 STODL 30D
1429 04,3012 63245 1 PUSH PUSH
1430 REP 5 LAST 494 04,3013 02327 0 BVSU PDVL
1431 04,3014 72441 0 DOT RPASS36
1432 REP 2 LAST 494 04,3015 02335 0 SL1
1433 REP 9 LAST 277 04,3016 26321 0 UNP36
1434 04,3017 00001 0 STODL RANGE
1435 04,3020 72441 0 DOT SL1
1436 REP 3 LAST 494 04,3021 02335 0 UNP36
1437 REP 5 LAST 277 04,3022 26323 1 STODL RRATE
1438 04,3023 00007 0 06D

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SET TIME OF EVENT TO ZERO FOR FIRST DISPLAY

TERMINATE
PROCEED
RECYCLE FOR ASTRONAUT INPUT TIME

A-REG ZERO GOTO CHECK L-REG FOR ZERO
A-REG NON-ZERO, TIME = ASTRO INPUT TIME

-
R
P
-
U

VELOCITY VECTOR V A 00D

SAVE TIME IN LOCATION 30D FOR REDISPLAY

POSITION VECTOR R IN 06D AND 12D

LINE OF SIGHT VECTOR R - R 12D
P A

Y = U .R
A

Y = U .V
A



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| | | | | | | | |
|--------|------|---------|----------|----------|----------|---------------------------------|----------|
| 1439 | | 04,3024 | 41456 0 | UNIT | PUSH | U = UNIT(R) | 18D |
| 1440 | | 04,3025 | 47235 0 | VXV | VXV | RA A | |
| 1441 | | 04,3026 | 00001 0 | | 00D | | |
| 1442 | | 04,3027 | 00023 0 | | 18D | (U XV)XU =U | |
| 1443 | | 04,3030 | 53552 0 | VSL2 | UNIT | RA A RA A | |
| 144305 | | 04,3031 | 77656 1 | UNIT | | | |
| 1444 | | 04,3032 | 24001 0 | STOVL | 00D | UNIT HORIZONTAL IN FORWARD DIR. | 00D |
| 1445 | | 04,3033 | 00023 0 | | 18D | | |
| 1446 | | 04,3034 | 74241 0 | DOT | VXSC | | |
| 1447 | | 04,3035 | 00015 0 | | 12D | | |
| 1448 | | 04,3036 | 77752 1 | VSL2 | | | |
| 1449 | | 04,3037 | 53445 1 | BVSU | UNIT | | |
| 144905 | | 04,3040 | 77656 1 | UNIT | | | |
| 1450 | | 04,3041 | 50208 0 | PUSH | DOT | LOS PROJECTED INTO HORIZONTAL | 12D |
| 1451 | | 04,3042 | 00001 0 | | 00D | PLANE | |
| 1452 | | 04,3043 | 65552 0 | SL1 | ARCCOS | | |
| 1453 | RESP | 6 LAST | 277 | 04,3044 | 28325 1 | PSI= ARCCOS(U .U) | |
| 1454 | | 04,3045 | 50235 0 | STOVL | RHETA | A L | |
| 1455 | | 04,3046 | 00001 0 | VXV | DOT | | |
| 1456 | | 04,3047 | 71244 0 | | 00D | | |
| 1457 | RESP | 1 | 04,3050 | 11055 1 | R38TAG2 | | |
| 1458 | RESP | 1 | 04,3051 | 11467 1 | LOADMAX | | |
| 1459 | | 04,3052 | 77625 0 | DSU | | | |
| 1460 | RESP | 7 LAST | 495 | 04,3053 | 02325 1 | RHETA | |
| 1461 | RESP | 8 LAST | 495 | 04,3054 | 02325 1 | RHETA | |
| 1462 | | 04,3055 | 47145 1 | R38TAG2 | DLOAD | RTB | |
| 1463 | | 04,3056 | 00037 0 | | 30D | | |
| 1464 | RESP | 2 LAST | 419 | 04,3057 | 45541 0 | SCNAGREE | |
| 1465 | RESP | 5 LAST | 494 | 04,3060 | 01052 1 | DSPTMX | |
| 1466 | | 04,3061 | 77776 1 | STORE | | | |
| 1467 | RESP | 1 | 04,3062 | 3 3102 1 | EXIT | | |
| 1468 | RESP | 94 LAST | 494 | 04,3063 | 0 4555 0 | CAP | V06N90N |
| 1469 | RESP | 3 LAST | 494 | 04,3064 | 20465 1 | TC | BANKCALL |
| 1470 | RESP | 20 LAST | 494 | 04,3065 | 1 5423 0 | CADR | GMARKP |
| 1471 | RESP | 21 LAST | 495 | 04,3066 | 1 5423 0 | TCP | ENDEXT |
| 1472 | RESP | 2 LAST | 260 | 04,3067 | 1 2751 1 | TCP | ENDEXT |
| 1473 | RESP | 56 LAST | 442 | 04,3070 | 56 001 0 | TCP | R36 +3 |
| 1474 | | 04,3071 | 0 0006 1 | LRECHK | XCH | L | |
| 1475 | RESP | 1 | 04,3072 | 1 3075 1 | EXTEND | | |
| 1476 | RESP | 67 LAST | 495 | 04,3073 | 56 001 0 | RZP | ENTTIM2 |
| 1477 | RESP | 1 | 04,3074 | 1 2762 1 | XCH | L | |
| 1478 | RESP | 50 LAST | 494 | 04,3075 | 0 6006 1 | TCP | ASTROTIM |
| 1479 | | 04,3076 | 52034 1 | ENTTIM2 | TC | INTPRET | |
| 1480 | RESP | 4 LAST | 460 | 04,3077 | 45505 0 | RTB | GOTO |
| 1481 | RESP | 1 | 04,3100 | 10766 1 | | LOADTIME | |
| 1482 | | 04,3101 | 01420 0 | V06N16N | VN | R36 INT | |
| 1483 | | 04,3102 | 01532 1 | V06N90N | VN | 00616 | |
| | | | | | | 00690 | |

DISPLAY Y , YDOT , AND PSI

TERMINATE
PROCEED , END OF PROGRAM
RFDISPLAY OUTPUT

L-REG ZERO , SET TIME = PRESENT TIME
L-REG NON ZERO , TIME = ASTRO INPUT TIME

| L | R31 | | | | | | | | |
|-------|-----|----|------|---------|---------|----------|---------|--------------------------|--|
| 3033 | | | | 35,3220 | 20201 0 | | | | |
| 3034 | | | | 35,3221 | 82315 1 | FDVL | 0,1 | | |
| 3035 | REP | 8 | LAST | 494 | 35,3222 | 00007 0 | VSU | UNIT(LOS) TO QD | PD= 6 |
| 3036 | REP | 2 | LAST | 89 | 35,3223 | 02335 0 | VATT | | |
| 3037 | | | | 35,3224 | 77641 1 | VONE | | | |
| 3039 | | | | 35,3225 | 77752 1 | DOT | | (VATT-VONE).UNIT(LOS) | PD= 0 |
| 3040 | REP | 6 | LAST | 494 | 35,3226 | 36323 0 | SL1 | | |
| 3041 | REP | 1 | | | 35,3227 | 47432 1 | STCALL | RRATE | RANGE RATE M/C5 B-7 |
| 30411 | | | | | 35,3230 | 77624 1 | CDUTRIG | TO INITIALIZE FOR *NBSM* | |
| 30412 | REP | 1 | | | 35,3231 | 62000 0 | CALL | | NOTE. PDL MUST = 0. |
| 3042 | | | | | 35,3232 | 53575 0 | R34ANG | R34LOS | |
| 3043 | REP | 4 | LAST | 495 | 35,3233 | 02327 0 | VLOAD | UNIT | |
| 3044 | | | | | 35,3234 | 77715 1 | RONE | | |
| 3045 | REP | 1 | | | 35,3235 | 15330 0 | FDVL | | UR TO QD PD= 6 |
| 30452 | | | | | 35,3236 | 77214 0 | BN | THETA | UNITX FOR CM, UNITZ FOR LM |
| 30454 | REP | 1 | | | 35,3237 | 04713 0 | VLOAD | R31FLAG | CHK R31FLAG. ON=R31 THETA, OFF=R34 PHI |
| 30455 | | | | | 35,3240 | 73242 1 | R31FLAG | +2 | |
| 30456 | | | | | 35,3241 | 00015 0 | | 12D | R31-THETA |
| 30458 | | | | | 35,3242 | 77624 1 | CALL | | |
| 3046 | REP | 1 | | | 35,3243 | 47601 0 | | *NBSM* | |
| 3047 | | | | | 35,3244 | 41505 1 | VXM | PUSH | UXORZ TO QD PD=12D |
| 3048 | REP | 4 | LAST | 485 | 35,3245 | 01736 1 | REFSMAT | | |
| 3049 | | | | | 35,3246 | 72431 1 | VPROJ | VSL2 | |
| 3050 | | | | | 35,3247 | 00001 0 | QD | | |
| 3051 | | | | | 35,3250 | 53445 1 | BVSU | UNIT | |
| 3052 | | | | | 35,3251 | 00007 0 | QD | | |
| 3053 | | | | | 35,3252 | 47315 0 | FDVL | VXV | UP/2 TO 12D PD=18D |
| 3054 | REP | 5 | LAST | 497 | 35,3253 | 02327 0 | RONE | | |
| 3055 | REP | 3 | LAST | 497 | 35,3254 | 02335 0 | VONE | | |
| 3056 | | | | | 35,3255 | 47256 0 | UNIT | VXV | |
| 3057 | REP | 6 | LAST | 497 | 35,3256 | 02327 0 | RONE | | |
| 3058 | | | | | 35,3257 | 63241 0 | DOT | FDVL | SIGN TO 12D, UP/2 TO MPAC PD=18D |
| 3059 | | | | | 35,3260 | 00015 0 | 12D | | |
| 3060 | | | | | 35,3261 | 50372 1 | VSL1 | DOT | UP,UXORZ |
| 3061 | | | | | 35,3262 | 00007 0 | QD | | |
| 3062 | | | | | 35,3263 | 72565 1 | SIGN | SL1 | |
| 3063 | | | | | 35,3264 | 00015 0 | 12D | | |
| 3064 | | | | | 35,3265 | 77726 1 | ACOS | | |
| 3065 | REP | 9 | LAST | 495 | 35,3266 | 26325 1 | STOVL | RTHETA | |
| 3066 | REP | 7 | LAST | 497 | 35,3267 | 02327 0 | RONE | | |
| 3067 | | | | | 35,3270 | 51041 0 | DOT | BPL | |
| 3068 | | | | | 35,3271 | 00007 0 | QD | | |
| 3069 | | | | | 35,3272 | 73277 1 | +5 | | |
| 3070 | | | | | 35,3273 | 44345 0 | DLOAD | RDSU | IF UXORZ.R NEG, RTHETA = 1 - RTHETA |
| 3071 | REP | 10 | LAST | 497 | 35,3274 | 02325 1 | RTHETA | | |
| 3072 | REP | 5 | LAST | 489 | 35,3275 | 15340 1 | DPOSMAX | | |
| 3073 | REP | 11 | LAST | 497 | 35,3276 | 02325 1 | RTHETA | | RTHETA BETWEEN 0 AND 1 REV. |
| 3074 | | | | | 35,3277 | 77776 1 | EXIT | | |
| 3075 | REP | 26 | LAST | 439 | 35,3300 | 3 4706 1 | CAP | RITS | HAVE WE BEEN ANSWERED |
| 30751 | REP | 10 | LAST | 496 | 35,3301 | 7 1044 1 | MASK | EXTRACT | |



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| | | | | | | | | | | |
|-------|-----|----|------|---------|---------|--------|--------|--------|---------|----------|
| 3076 | | | | 35,3302 | 0 0006 | 1 | EXTEND | | | |
| 3077 | REP | 22 | LAST | 495 | 35,3303 | 1 5423 | 0 | BZF | ENEXT | YES, DIS |
| 3078 | REP | 11 | LAST | 497 | 35,3304 | 4 1044 | 1 | CS | EXTVACT | |
| 3079 | REP | 22 | LAST | 496 | 35,3305 | 7 4677 | 1 | MASK | BIT12 | |
| 3080 | REP | 12 | LAST | 498 | 35,3306 | 27=044 | 1 | ADS | EXTVACT | |
| 30805 | REP | 1 | | | 35,3307 | 1 3177 | 1 | TCF | V83 | |
| 3081 | | | | | 35,3310 | 04088 | 0 | V16N54 | VN | 1654 |
| 3082 | | | | | 35,3311 | 04085 | 0 | V16N53 | VN | 1653 |

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P3083 THE STATEXP SUBROUTINE DOES A PRECISION EXTRAPOLATION OF BOTH VEHICLES
R3084 STATE VECTORS TO PRESENT TIME AND SAVES THEM AS BASE VECTORS.
R3085 IF SERVICES IS OFF ---
R3086 THIS VEHICLES BASE VECTOR IS CONIC EXTRAPOLATED TO
R3087 PRESENT TIME AND SAVED AS RONE, VONE.
R3088 THE OTHER VEHICLES BASE VECTOR IS CONIC EXTRAPOLATED
R3089 TO THE SAME TIME, THE OUTPUT BEING LEFT IN RATT, VATT.
R3090 IF SERVICES IS ON ---
R3091 RONE, VONE ARE SET EQUAL TO RN, VN AND THE OTHER
R3092 VEHICLES STATE VECTOR IS PREC. EXTRAPOLATED TO PIPTIME.
3093 35,3312 47020 0 STATEXP STO RTB
3094 REP 1 35,3313 00112 0 STATEXP IT
3095 REP 5 LAST 495 35,3314 45505 0 LOADTIME
3096 REP 11 LAST 494 35,3315 34041 0 STCALL TDEC1
3097 REP 3 LAST 494 35,3316 27036 1 OTHPRC GET BASE VECTORS
3098 35,3317 77775 1 VLOAD
3099 REP 2 LAST 482 35,3320 00017 1 RATT1
3100 REP 1 35,3321 26225 0 STOVL BASEOTP OTHER POS.
3101 REP 2 LAST 482 35,3322 00025 0 VATT1
3102 REP 1 35,3323 16241 1 STODL BASEOTV OTHER VEL.
3103 REP 4 LAST 494 35,3324 00015 0 TAT
3104 REP 1 35,3325 02272 1 STORE BASETIME
3105 REP 12 LAST 499 35,3326 34041 0 STCALL TDEC1
3106 REP 3 LAST 494 35,3327 27022 1 THISPRC
3107 35,3330 77775 1 VLOAD
3108 REP 3 LAST 499 35,3331 00017 1 RATT1
3109 REP 1 35,3332 26255 1 STOVL BASETHP THIS POS.
3110 REP 3 LAST 499 35,3333 00025 0 VATT1
3111 REP 1 35,3334 02263 1 STORE BASETHV THIS VEL.
3112 35,3335 47014 1 HAVERASE RON RTB
3113 REP 1 35,3336 03711 0 V37FLAG
3114 REP 1 35,3337 73413 0 GETRVN
3115 REP 6 LAST 499 35,3340 45505 0 LOADTIME
3116 REP 13 LAST 499 35,3341 34041 0 STCALL TDEC1
3117 REP 8 LAST 481 35,3342 27371 1 INTSTALL BEGIN SET UP FOR CONIC EXTRAP. FOR THIS.
3118 35,3343 43175 0 VLOAD CLEAR
3119 REP 2 LAST 499 35,3344 02255 1 BASETHP
3120 REP 5 LAST 481 35,3345 00263 0 MOONFLAG
3121 REP 6 LAST 482 35,3346 25535 0 STOVL RCV
3122 REP 2 LAST 499 35,3347 02263 1 BASETHV
3123 REP 6 LAST 482 35,3350 15543 1 STODL VCV
3124 REP 2 LAST 499 35,3351 02272 1 BASETIME
3125 35,3352 43014 0 ROP SET GET APPROPRIATE MOONFLAG SETTING
3126 REP 4 LAST 260 35,3353 04343 1 MOONTHIS
3127 35,3354 73356 0 +2
3128 REP 6 LAST 499 35,3355 00063 1 MOONFLAG
3129 35,3356 77614 1 SET
3130 REP 4 LAST 482 35,3357 01473 0 INTYPLD CONIC EXTRAP.
3131 REP 6 LAST 482 35,3360 35517 1 STCALL TET
3132 REP 3 LAST 482 35,3361 27066 1 INTEGRVS INTEGRATION --- AT LAST---
    
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| | | | | | | | | |
|------|-----|----|------|---------|------------------|----------|----------|--------------------------------------|
| 3133 | | | | 35,3362 | 77775 1 | VLOAD | | |
| 3134 | REP | 10 | LAST | 496 | 35,3363 00001 0 | | RATT | |
| 3135 | REP | 8 | LAST | 497 | 35,3364 28327 0 | STOVL | RONE | |
| 3136 | REP | 7 | LAST | 497 | 35,3365 00007 0 | | VATT | |
| 3137 | REP | 4 | LAST | 497 | 35,3366 38335 1 | STCALL | VONE | GET SET FOR CONIC EXTRAP., OTHER. |
| 3138 | REP | 9 | LAST | 499 | 35,3367 27371 1 | | INTSTALL | |
| 3139 | | | | 35,3370 | 71214 0 | SET | DLOAD | |
| 3140 | REP | 5 | LAST | 499 | 35,3371 01473 0 | | INTYPFLO | |
| 3141 | REP | 5 | LAST | 499 | 35,3372 00015 0 | | TAT | |
| 3142 | REP | 14 | LAST | 499 | 35,3373 00041 1 | OHINT | STORE | TDEC1 |
| 3143 | | | | 35,3374 | 43175 0 | VLOAD | CLEAR | |
| 3144 | REP | 2 | LAST | 499 | 35,3375 02225 0 | | RASBOTP | |
| 3145 | REP | 7 | LAST | 499 | 35,3376 00263 0 | | MOONFLAG | |
| 3146 | REP | 7 | LAST | 499 | 35,3377 25535 0 | STOVL | RCV | |
| 3147 | REP | 2 | LAST | 499 | 35,3400 02241 1 | | RASEOTV | |
| 3148 | REP | 7 | LAST | 499 | 35,3401 15543 1 | STODL | VCV | |
| 3149 | REP | 3 | LAST | 499 | 35,3402 02272 1 | | BASETIME | |
| 3150 | | | | 35,3403 | 43014 0 | ROP | SET | |
| 3151 | REP | 5 | LAST | 499 | 35,3404 04343 1 | | MOONTHIS | |
| 3152 | | | | 35,3405 | 73407 0 | | +2 | |
| 3153 | REP | 8 | LAST | 500 | 35,3406 00063 1 | | MOONFLAG | |
| 3154 | REP | 7 | LAST | 499 | 35,3407 35517 1 | STCALL | TET | |
| 3155 | REP | 4 | LAST | 499 | 35,3410 27068 1 | | INTERVRS | |
| 3156 | | | | 35,3411 | 77650 1 | GOTO | | |
| 3157 | REP | 2 | LAST | 499 | 35,3412 00112 0 | | STATEXIT | THIS VEHICLES POS.,VEL. IN PUSHLIST. |
| 3158 | | | | 35,3413 | 77775 1 | OETRWN | VLOAD | |
| 3159 | REP | 5 | LAST | 284 | 35,3414 01171 1 | | RN | |
| 3160 | REP | 9 | LAST | 500 | 35,3415 28327 0 | STOVL | RONE | |
| 3161 | REP | 5 | LAST | 284 | 35,3416 01177 1 | | VN | |
| 3162 | REP | 5 | LAST | 500 | 35,3417 16335 0 | STODL | VONE | |
| 3163 | REP | 4 | LAST | 284 | 35,3420 01205 1 | | PIPTIME | |
| 3164 | | | | 35,3421 | 77624 1 | CALL | | |
| 3165 | REP | 10 | LAST | 500 | 35,3422 27371 1 | | INTSTALL | |
| 3166 | | | | 35,3423 | 52014 0 | CLEAR | GOTO | |
| 3167 | REP | 6 | LAST | 500 | 35,3424 01673 1 | | INTYPFLO | PREC EXTRAP FOR OTHER |
| 3168 | REP | 1 | | | 35,3425 73373 1 | | OHINT | |
| 3169 | | | | 35,3426 | 52020 1 | REDOEXTP | STO | GOTO |
| 3170 | REP | 3 | LAST | 500 | 35,3427 00112 0 | | STATEXIT | |
| 3171 | REP | 1 | | | 35,3430 73335 0 | | HAVERAGE | |
| 3172 | REP | 1 | | | 31,2000 | SETLOC | R34 | |
| 3173 | | | | 31,2000 | | BANK | | |
| 3174 | | | | 31,2000 | 77776 1 | R34LOS | EXIT | |
| 3175 | REP | 8 | LAST | 277 | 31,2001 3 0036 1 | | CA | CDUS |
| 3176 | REP | 2 | LAST | 259 | 31,2002 50 120 1 | | INDEX | FIXLOC |
| 3177 | | | | 31,2003 | 54 011 0 | | TS | 9D |
| 3178 | REP | 7 | LAST | 277 | 31,2004 3 0035 1 | | CA | CDAT |
| 3179 | REP | 3 | LAST | 500 | 31,2005 50 120 1 | | INDEX | FIXLOC |
| 3180 | | | | 31,2006 | 54 013 1 | | TS | 11D |



L R31

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| | | | | | | | | |
|------|-----|----|------|-----|---------|----------|--------|---------|
| 3181 | REP | 4 | LAST | 500 | 31,2007 | 3 0120 1 | CA | FIXLOC |
| 3182 | REP | 17 | LAST | 444 | 31,2010 | 6 6211 0 | AD | SIX |
| 3183 | | | | | 31,2011 | 4 0000 0 | COM | |
| 3184 | REP | 5 | LAST | 501 | 31,2012 | 50 120 1 | INDEX | FIXLOC |
| 3185 | REP | 6 | LAST | 496 | 31,2013 | 54 046 1 | TS | X1 |
| 3186 | REP | 53 | LAST | 496 | 31,2014 | 0 6006 1 | TC | INTPRST |
| 3187 | | | | | 31,2015 | 77624 1 | CALL | |
| 3188 | REP | 2 | LAST | 447 | 31,2016 | 46000 0 | BTNS | |
| 3189 | | | | | 31,2017 | 34015 1 | STCALL | 12P |
| 3190 | REP | 1 | | | 31,2020 | 73232 0 | R34AND | |



L P76

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P5000 1) PROGRAM NAME - TARGET DELTA V PROGRAM (P76).
R5001 2) FUNCTIONAL DESCRIPTION - UPON ENTRY BY ASTRONAUT ACTION, P76 FLASHES DSKY REQUESTS TO THE ASTRONAUT
R5003 TO PROVIDE VIA DSKY (1) THE DELTA V TO BE APPLIED TO THE OTHER VEHICLE STATE VECTOR AND (2) THE
R5005 TIME (TIG) AT WHICH THE OTHER VEHICLE VELOCITY WAS CHANGED BY EXECUTION OF A THRUSTING MANEUVER. THE
R5007 OTHER VEHICLE STATE VECTOR IS INTEGRATED TO TIG AND UPDATED BY THE ADDITION OF DELTA V (DELTA V HAVING
R5009 BEEN TRANSFORMED FROM LV TO REP COSYS). USING INTEGVS, THE PROGRAM THEN INTEGRATES THE OTHER
R5011 VEHICLE STATE VECTOR TO THE STATE VECTOR OF THIS VEHICLE, THUS INSURING THAT THE W-MATRIX AND BOTH VEHICLE
R5013 STATES CORRESPOND TO THE SAME TIME.
R5014 3) ERASABLE INITIALIZATION REQUIRED - NONE.
R5015 4) CALLING SEQUENCES AND EXIT MODES - CALLED BY ASTRONAUT REQUEST THRU DSKY V 37 E 76 E.
R5017 EXITS BY TCP ENDP76.
R5018 5) OUTPUT - OTHER VEHICLE STATE VECTOR INTEGRATED TO TIG AND INCREMENTED BY DELTA V IN REP COSYS.
R5020 THE PUSHLIST CONTAINS THE MATRIX BY WHICH THE INPUT DELTA V MUST BE POST-MULTIPLIED TO CONVERT FROM LV
R5022 TO REP COSYS.
R5023 6) DEBRIS - OTHER VEHICLE STATE VECTOR.
R5024 7) SUBROUTINES CALLED - BANKCALL, GOXDSPP, CMPREC (OR LEMPREC), ATOPCSM (OR ATOPLEM), INTSTALL, INTWAKE, PHASCHNG
R5026 INTPRET, INTEGVS, AND MINIRECT.

R5027 8) FLAG USE - MOONFLAG, CMOONFLAG, INTYPFLO, BASFLAG, AND MARKCTR.

| | | | | | | | | | | |
|------|--------|----------|---------|----------|---------|--|--|----------------|--|--|
| 5028 | | | | | | | | | BANK 30 | |
| 5029 | REP 1 | | 30,2000 | | | | | | SETLOC P76LOC | |
| 5030 | | | 13,2000 | | | | | | BANK | |
| | | | 13,2036 | | | | | | | |
| 5031 | REP 1 | | | | | | | | COUNT* 88/P76 | |
| 5032 | REP 20 | LAST 469 | 87,1412 | | | | | | BRANK= TIG | |
| 5033 | REP 17 | LAST 474 | 13,2036 | 0 5435 0 | P76 | | | TC UPFLAG | | |
| 5034 | REP 2 | LAST 253 | 13,2037 | 00031 0 | | | | ADRES TRACKFLO | | |
| 5035 | REP 1 | | 13,2040 | 3 2163 1 | | | | CAP V08N84 | FLASH LAST DELTA V, | |
| 5040 | REP 97 | LAST 498 | 13,2041 | 0 4555 0 | | | | TC BANKCALL | AND WAIT FOR KEYBOARD ACTION. | |
| 5041 | REP 14 | LAST 476 | 13,2042 | 20824 0 | | | | CADR GOFFLASH | | |
| 5042 | REP 1 | | 13,2043 | 1 2155 0 | | | | TCP ENDP76 | | |
| 5043 | | | 13,2044 | 0 2046 1 | | | | TC +2 | PROCEED | |
| 5044 | | | 13,2045 | 0 2040 1 | | | | TC -5 | STORE DATA AND REPEAT FLASHING | |
| 5045 | REP 2 | LAST 502 | 13,2046 | 3 2164 0 | | | | CAP V08N84 +1 | FLASH VERR 08 NQUN 33, DISPLAY LAST TIG, | |
| 5046 | REP 98 | LAST 502 | 13,2047 | 0 4555 0 | | | | TC BANKCALL | AND WAIT FOR KEYBOARD ACTION. | |
| 5047 | REP 15 | LAST 502 | 13,2050 | 20824 0 | | | | CADR GOFFLASH | | |
| 5048 | REP 2 | LAST 502 | 13,2051 | 1 2155 0 | | | | TCP ENDP76 | | |
| 5049 | | | 13,2052 | 0 2054 1 | | | | TC +2 | | |
| 5050 | | | 13,2053 | 0 2046 1 | | | | TC -5 | | |
| 5051 | REP 54 | LAST 501 | 13,2054 | 0 6006 1 | | | | TC INTPRET | RETURN TO INTERPRETIVE CODE | |
| 5052 | | | 13,2055 | 77745 1 | | | | DLOAD | SET D(MPAC)=TIG IN CSEC R28 | |
| 5053 | REP 21 | LAST 502 | 13,2056 | 03413 1 | | | | TIG | | |
| 5054 | REP 15 | LAST 500 | 13,2057 | 34041 0 | | | | STCALL TDPC1 | SET TDPC1=TIG FOR ORBITAL INTEGRATION | |
| 5055 | REP 4 | LAST 499 | 13,2060 | 27038 1 | | | | OTNPREC | | |
| 5056 | | | 13,2061 | 53575 0 | COMPMAT | | | VLOAD | UNIT | |
| 5057 | REP 11 | LAST 500 | 13,2062 | 00001 0 | | | | RATT | | |

| L | P76 | | | | | | | | |
|------|-----|-------------|---------|----------|-----------------|-----------|--|--------------------------------------|--|
| 5058 | | | 13,2053 | 77676 0 | VCOMP | | | U(-R) | |
| 5059 | | | 13,2064 | 00031 0 | STORE | 24D | | U(-R) TO 24D | |
| 5060 | | | 13,2065 | 53435 0 | VXV | UNIT | | U(-R)XV = U(VXR) | |
| 5061 | REP | 8 LAST 500 | 13,2066 | 00007 0 | VATT | | | | |
| 5062 | | | 13,2067 | 00023 0 | STORE | 18D | | | |
| 5063 | | | 13,2070 | 53435 0 | VXV | UNIT | | U(VXR)XU(-R) = U((RV)XR) | |
| 5064 | | | 13,2071 | 00031 0 | | 24D | | | |
| 5065 | | | 13,2072 | 24015 0 | STOVL | 12D | | | |
| 5066 | REP | 4 LAST 277 | 13,2073 | 03540 0 | | DELAVOV | | | |
| 5067 | | | 13,2074 | 76505 0 | VXV | VEL1 | | V(MPAC)=DELTA V IN REPCOSYS | |
| 5068 | | | 13,2075 | 00015 0 | VAD | 12D | | | |
| 5069 | | | 13,2076 | 77655 1 | | | | | |
| 5070 | REP | 9 LAST 503 | 13,2077 | 00007 0 | VATT | | | | |
| 5071 | | | 13,2100 | 00007 0 | STORE | 6 | | V(PD6)=VATT + DELTA V | |
| 5072 | | | 13,2101 | 77624 1 | CALL | | | PREVENT WOULD-BE USER OF ORBITAL | |
| 5073 | REP | 11 LAST 500 | 13,2102 | 27371 1 | | INTSTALL. | | INTEG FROM INTERFERING WITH UPDATING | |
| 5074 | | | 13,2103 | 77624 1 | CALL | | | | |
| 5075 | REP | 1 | 13,2104 | 28165 1 | | P76SUB1 | | | |
| 5076 | | | 13,2105 | 53775 1 | VLOAD | VSR* | | | |
| 5077 | | | 13,2106 | 00007 0 | | 6 | | | |
| 5078 | | | 13,2107 | 57176 0 | | 0,2 | | | |
| 5079 | REP | 8 LAST 500 | 13,2110 | 25543 1 | STOVL | VCV | | | |
| 5080 | REP | 12 LAST 502 | 13,2111 | 00001 0 | | RATT | | | |
| 5081 | | | 13,2112 | 77657 0 | VSR* | | | | |
| 5082 | | | 13,2113 | 57176 0 | | 0,2 | | | |
| 5083 | REP | 8 LAST 500 | 13,2114 | 15535 0 | STOVL | RCV | | | |
| 5084 | REP | 22 LAST 502 | 13,2115 | 03413 1 | | TIG | | | |
| 5085 | REP | 8 LAST 500 | 13,2116 | 01517 0 | STORE | TET | | | |
| 5086 | | | 13,2117 | 71214 0 | CLEAR | DLOAD | | | |
| 5087 | REP | 7 LAST 500 | 13,2120 | 01673 1 | | INTYPLG | | | |
| 5088 | REP | 1 | 13,2121 | 01571 0 | | TETHIS | | | |
| 5089 | REP | 16 LAST 502 | 13,2122 | 34041 0 | INTOIHIS STCALL | TDEC1 | | | |
| 5090 | REP | 5 LAST 500 | 13,2123 | 27066 1 | | INTEGRWS | | | |
| 5091 | | | 13,2124 | 77624 1 | CALL | | | | |
| 5093 | REP | 12 LAST 503 | 13,2125 | 27371 1 | | INTSTALL. | | | |
| 5094 | | | 13,2126 | 77775 1 | VLOAD | | | | |
| 5095 | REP | 4 LAST 499 | 13,2127 | 00017 1 | | RATT1 | | | |
| 5096 | REP | 2 LAST 83 | 13,2130 | 01503 0 | STORE | RRECT | | | |
| 5097 | REP | 9 LAST 503 | 13,2131 | 15535 0 | STOVL | RCV | | | |
| 5098 | REP | 6 LAST 500 | 13,2132 | 00015 0 | | TAT | | | |
| 5099 | REP | 9 LAST 503 | 13,2133 | 25517 0 | STOVL | TET | | | |
| 5100 | REP | 4 LAST 499 | 13,2134 | 00025 0 | | VATT1 | | | |
| 5101 | | | 13,2135 | 77624 1 | CALL | | | | |
| 5102 | REP | 1 | 13,2136 | 23360 0 | | MINIRECT | | | |
| 5103 | | | 13,2137 | 77776 1 | EXIT | | | | |
| 5104 | REP | 22 LAST 474 | 13,2140 | 0 5301 0 | TC | PHASCHG | | | |
| 5105 | | | 13,2141 | 04024 0 | OCT | 04024 | | | |
| 5106 | REP | 18 LAST 502 | 13,2142 | 0 5435 0 | TC | UPFLAG | | | |
| 5107 | REP | 1 | 13,2143 | 00236 0 | ADRES | REINTPLG | | | |



| L | PT6 | | | | | | | | | |
|-------|-----|-----|------|-----|---------|--------|---|---------|----------|--|
| 5109 | REP | 55 | LAST | 502 | 13,2144 | 0 6006 | 1 | TC | INTPRET | |
| 5110 | | | | | 13,2145 | 77624 | 1 | CALL | | |
| 5111 | REP | 1 | | | 13,2146 | 26711 | 1 | | ATOPOTH | |
| 5116 | | | | | 13,2147 | 77531 | 0 | SSP | EXIT | |
| 5117 | REP | 9 | LAST | 446 | 13,2150 | 00053 | 1 | | OPRET | |
| 5118 | REP | 1 | | | 13,2151 | 26154 | 0 | | OUT | |
| 5119 | REP | 99 | LAST | 502 | 13,2152 | 0 4555 | 0 | TC | BANKCALL | PERMIT USE OF ORBITAL INTEGRATION |
| 5120 | REP | 1 | | | 13,2153 | 27428 | 1 | CADR | INTWAKE1 | |
| 5121 | | | | | 13,2154 | 77776 | 1 | OUT | EXIT | |
| 5125 | REP | 107 | LAST | 494 | 13,2155 | 3 4714 | 1 | ENDPT6 | CAP | ZERO |
| 5126 | REP | 1 | | | 13,2156 | 55=126 | 1 | TS | MARKCTR | CLEAR RR TRACKING MARK COUNTER |
| 51285 | REP | 4 | LAST | 274 | 13,2157 | 55=125 | 1 | TS | VHPCNT | |
| 5127 | REP | 11 | LAST | 297 | 13,2160 | 3 7716 | 0 | CAP | NEGONE | |
| 5128 | REP | 6 | LAST | 222 | 13,2161 | 55=734 | 1 | TS | MRGRUP2 | INVALIDATE MARK BUFFER |
| 5129 | REP | 12 | LAST | 476 | 13,2162 | 1 4106 | 0 | TCF | GOTOPOOH | |
| 5130 | | | | | 13,2163 | 01524 | 0 | V06N84 | NV | 0684 |
| 5131 | | | | | 13,2164 | 01441 | 1 | | NV | 0633 |
| 5132 | | | | | 13,2165 | 43174 | 1 | P76SLR1 | AXT,2 | SET |
| 5133 | | | | | 13,2166 | 00002 | 0 | | | 2 |
| 5134 | REP | 9 | LAST | 500 | 13,2167 | 00063 | 1 | | MOONFLAG | SET MEANS MOON IS SPHERE OF INFLUENCE. |
| 5135 | | | | | 13,2170 | 77014 | 1 | RCN | AXT,2 | |
| 5136 | REP | 5 | LAST | 486 | 13,2171 | 04303 | 0 | | MOONFLO | SET MEANS PERM CM STATE IN LUNAR SPHERE. |
| 5137 | REP | 10 | LAST | 504 | 13,2172 | 00052 | 0 | | OPRET | |
| 5138 | | | | | 13,2173 | 00000 | 1 | | 0 | |
| 5139 | | | | | 13,2174 | 43414 | 1 | CLEAR | RVO | |
| 5140 | REP | 10 | LAST | 504 | 13,2175 | 00263 | 0 | | MOONFLAG | |

L R30

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R5200 SUBROUTINE NAME' V82CALL
R5201 MOD NO' 0
R5203 MOD BY' RR BAINSPATHER
R5205 MOD NO' 1 MOD BY' RR BAINSPATHER DATE' 11 APR 67
R5208 MOD NO' 2 MOD BY ALONSO DATE' 11 DEC 67
R52095 MOD NO' 3 MOD BY ALONSO DATE' 28 MAR 68
R5210 NEW FUNCTIONAL DESCRIPTION' CALLED BY VERB 82 ENTER. PRIORITY 10
R5211 USED THROUGHOUT. CALCULATE AND DISPLAY ORBITAL PARAMETERS

R5212 1. IF AVERAGE G IS OFF'
R5213 FLASH DISPLAY V04N06. R2 INDICATES WHICH SHIP-S STATE VECTOR IS
R5214 TO BE UPDATED. INITIAL CHOICE IS THIS SHIP (R2=1). ASTRONAUT
R5215 CAN CHANGE TO OTHER SHIP BY V225X, WHERE X NOT EQ 1.
R5216 SELECTED STATE VECTOR UPDATED BY THISPREC (OTHPREC).
R5217 CALLS SR30.1 (WHICH CALLS TFFCONU + TFFRP/RA) TO CALCULATE
R5218 RPER (PERIGEE RADIUS), RAPO (APOGEE RADIUS), HPER (PERIGEE
R5219 HEIGHT ABOVE LAUNCH PAD OR LUNAR LANDING SITE), HAPO (APOGEE
R5220 HEIGHT AS ABOVE), TPER (TIME TO PERIGEE), TPF (TIME TO
R5221 INTERSECT 300 KFT ABOVE PAD OR 35KFT ABOVE LANDING SITE).
R5222 FLASH MONITOR V16N44 (HAPO, HPER, TPF). TPF IS -59M59S IF IT WAS
R5223 NOT COMPUTABLE, OTHERWISE IT INCREMENTS ONCE PER SECOND.
R5224 ASTRONAUT HAS OPTION TO MONITOR TPER BY KEYING IN N 32 E.
R5225 DISPLAY IS IN HMS, IS NEGATIVE (AS WAS TPF), AND INCREMENTS
R5226 ONCE PER SECOND ONLY IF TPF DISPLAY WAS -59M59S.

R5227 2. IF AVERAGE G IS ON'
R5228 CALLS SR30.1 APPROX EVERY TWO SECS. STATE VECTOR IS ALWAYS
R5229 FOR THIS VEHICLE. V82 DOES NOT DISTURB STATE VECTOR. RESULTS
R5230 OF SR30.1 ARE RAPO, RPER, HAPO, HPER, TPER, TPF.
R5231 FLASH MONITOR V16N44 (HAPO, HPER, TPF).
R5232 IF MODE IS P11, THEN CALL DELRSPL SO ASTRONAUT CAN MONITOR
R5233 RESULTS BY N50E. SPLASH COMPUTATION DONE ONCE PER TWO SECS.
R52331 ADDENDUM' HAPO AND HPER SHOULD BE CHANGED TO READ HAPOK AND HPERK IN THE
R52332 ABOVE REMARKS.

R5234 CALLING SEQUENCE' VERB 82 ENTER.
R5235 SUBROUTINES CALLED' SR30.1, GOKDSPP
R5236 MAYBE - THISPREC, OTHPREC, LOADTIME, DELRSPL.
R5237 NORMAL EXIT MODES' TC ENDEXT

R5238 ALARMS' NONE

R5239 OUTPUT' HAPOK (-29) M
R5240 HPERK (-29) M
R5241 RAPO (-29) M EARTH
R5241 (-27) M MOON

L R30

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RS242 RPER (-29) M EARTH
 RS2421 (-27) M MOON
 RS243 TFF (-28) CS CONTAINS NEGATIVE QUANTITY
 RS244 -TPER (-28) CS CONTAINS NEGATIVE QUANTITY
 RS245 RSP-RREC (-29) M IF DELRSPL CALLED

RS246 ERASABLE INITIALIZATION REQUIRED STATE VECTOR.

RS247 DEBRIS' OPRST, RONE, VONS, TFF/RIMU, HPERMIN, RPADTEM, V82EMFLO,
 RS248 MAYBE' TSTART82, V82FLAGS, TDEC1.

| | | | | | | | | | | |
|-------|-----|-----|------|-----|---------|--------|---|-----------|-------|---------------|
| 5249 | REP | 3 | LAST | 274 | E4,1751 | | | | | EBANK= HAPOX |
| 5250 | | | | | 31,2021 | | | | | BANK 31 |
| 5251 | REP | 1 | | | 23,2000 | | | | | SETLOC R30LOC |
| 5252 | | | | | 23,2332 | | | | | BANK |
| 5253 | REP | 1 | | | | | | | | COUNT* 88/R30 |
| 5254 | REP | 56 | LAST | 504 | 23,2332 | 0 6006 | 1 | V82CALL | TC | INTPRST |
| 5255 | | | | | 23,2333 | 52014 | 0 | | BCN | GOTO |
| 5256 | REP | 1 | | | 23,2334 | 00716 | 1 | | | AVEGFLAG |
| 5257 | REP | 1 | | | 23,2335 | 46566 | 0 | | | V82GON |
| 5258 | REP | 1 | | | 23,2336 | 46337 | 1 | | | V82GOFF |
| 5259 | | | | | 23,2337 | 77776 | 1 | V82GOFF | EXIT | |
| 5260 | REP | 28 | LAST | 444 | 23,2340 | 3 4711 | 1 | | CAP | TWO |
| 5261 | REP | 2 | LAST | 266 | 23,2341 | 55=051 | 0 | | TS | OPTIONX |
| 5262 | REP | 62 | LAST | 450 | 23,2342 | 3 4712 | 1 | | CAP | ONE |
| 5263 | REP | 3 | LAST | 506 | 23,2343 | 55=052 | 0 | | TS | OPTIONX +1 |
| 5264 | REP | 1 | | | 23,2344 | 3 2406 | 1 | | CAP | OPTIONVN |
| 5265 | REP | 100 | LAST | 504 | 23,2345 | 0 4555 | 0 | | TC | BANKCALL |
| 5266 | REP | 9 | LAST | 257 | 23,2346 | 20465 | 1 | | CADR | GOKSPP |
| 5267 | REP | 23 | LAST | 498 | 23,2347 | 0 5423 | 1 | | TC | ENDEXT |
| 5268 | | | | | 23,2350 | 0 2352 | 1 | | TC | +2 |
| 5269 | | | | | 23,2351 | 0 2344 | 0 | | TC | -5 |
| AS270 | | | | | | | | | | |
| 5271 | REP | 24 | LAST | 496 | 23,2352 | 3 4707 | 0 | | CAP | RITA |
| 5272 | REP | 18 | LAST | 409 | 23,2353 | 0 5140 | 1 | | TC | WAITLIST |
| 5273 | REP | 4 | LAST | 275 | E4,1743 | | | | | EBANK= TFF |
| 5274 | REP | 1 | | | 23,2354 | 02531 | 1 | | 2CADR | TICKTEST |
| 5274 | REP | 1 | | | 23,2355 | 46064 | 1 | | | |
| 5275 | | | | | 23,2356 | 0 0003 | 1 | | | RELINT |
| 5276 | REP | 1 | | | 23,2357 | 3 2410 | 0 | V82GOFF.P | CAP | TFFRANK |
| 5277 | REP | 19 | LAST | 434 | 23,2360 | 54 003 | 0 | | TS | EBANK |
| 5278 | REP | 108 | LAST | 504 | 23,2361 | 3 4714 | 1 | | CAP | ZERO |
| 5279 | REP | 3 | LAST | 89 | 23,2362 | 55=742 | 0 | | TS | V82FLAGS |
| AS280 | | | | | | | | | | |
| 5281 | REP | 5 | LAST | 261 | 23,2363 | 3 4756 | 1 | | CAP | PRIOT |
| 5282 | REP | 18 | LAST | 496 | 23,2364 | 0 5042 | 1 | | TC | FINDVAC |

IF AVERAGE G ON
 IF AVERAGE G OFF
 ALLOW ASTRONAUT TO SELECT VEHICLE
 DESIRED FOR ORBITAL PARAMETERS

V 04 N 06

TERMINATE
 PROCEED
 DATA IN. OPTIONX +1 = 1 FOR THIS VEHIC.
 UNSO 1 FOR OTHER VEHICLE.

60 MS

MAJOR RECYCLE LOOP ENTRY

ZERO FLAGS FOR TICKTEST. INHIBITS
 DECREMENTING OF TFF AND -TPER.

V82GOFF1 WILL EXECUTE STATE VECTOR



J. R30

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| | | | | | | | | | | | |
|------|-----|----|------|-----|---------|--------|---|---------|------|----------|---|
| 5330 | REP | 5 | LAST | 489 | 23,2442 | 00050 | 1 | | | | |
| 5331 | REP | 1 | | | 23,2443 | 46483 | 1 | | | X2 | EARTH PAD |
| 5332 | | | | | 23,2444 | 77650 | 1 | | GOTO | | |
| 5333 | REP | 1 | | | 23,2445 | 46487 | 0 | | | | MOON PAD |
| 5334 | REP | 59 | LAST | 507 | 23,2446 | 0 6006 | 1 | THISHIP | TC | INTPRET | |
| 5335 | | | | | 23,2447 | 77624 | 1 | | CALL | | CALL STATE VECTOR UPDATE FOR THIS SHIP. |
| 5336 | REP | 4 | LAST | 499 | 23,2450 | 27022 | 1 | | | THISPREC | |
| 5337 | | | | | 23,2451 | 77650 | 1 | | GOTO | | |
| 5338 | REP | 1 | | | 23,2452 | 46428 | 0 | | | | BOTHSHIP |

R5339 THE FOLLOWING CONSTANTS ARE PAIRWISE INDEXED. DO NOT SEPARATE PAIRS.

| | | | | | | | | | | | |
|------|-----|----|------|-----|---------|--------|---|-----------|--------|-----------|---|
| 5340 | | | | | 23,2453 | 27533 | 1 | 1/RIMM | ZDEC* | .45162595 | E-4 B14* |
| 5340 | | | | | 23,2454 | 07571 | 0 | | | | |
| 5341 | | | | | 23,2455 | 25004 | 1 | 1/RIML | ZDEC* | .50087529 | E-5 B17* |
| 5341 | | | | | 23,2456 | 06702 | 1 | | | | |
| 5342 | | | | | 23,2457 | 00001 | 0 | MINPERM | ZDEC | 10668 | B-27 |
| 5342 | | | | | 23,2460 | 11530 | 1 | | | | 35 KFT MIN PERIGEE HEIGHT FOR MOON (-27)M |
| 5343 | | | | | 23,2461 | 00002 | 0 | MINPERE | ZDEC | 91440 | B-29 |
| 5343 | | | | | 23,2462 | 31230 | 1 | | | | 300 KFT (-29)M FOR EARTH |
| 5344 | | | | | 23,2463 | 43145 | 0 | EARTH PAD | DLOAD | CLRGO | PAD 37-B RADIUS. SCALED AT (-29)M. |
| 5345 | REP | 2 | LAST | 489 | 23,2464 | 05311 | 1 | | | RPAD | |
| 5345 | REP | 1 | | | 23,2465 | 04622 | 0 | | | V82EMFLG | INDICATE EARTH SCALING FOR SR30.1 |
| 5346 | REP | 1 | | | 23,2466 | 46473 | 0 | | | BOTHPAD | |
| 5347 | | | | | 23,2467 | 51575 | 1 | MOON PAD | VLOAD | ARVAL | COMPUTE MOON PAD RADIUS FROM RLS VECTOR. |
| 5348 | REP | 3 | LAST | 489 | 23,2470 | 02026 | 1 | | | RLS | SCALED AT (-27)M. |
| 5349 | | | | | 23,2471 | 77614 | 1 | | | SET | |
| 5349 | | | | | 23,2472 | 04462 | 0 | | | | INDICATE MOON SCALING FOR SR30.1 |
| 5349 | REP | 2 | LAST | 508 | 23,2473 | 36323 | 0 | | | V82EMFLG | |
| 5350 | REP | 2 | LAST | 89 | 23,2473 | 36323 | 0 | BOTHPAD | STCALL | RPADTEM | |
| 5352 | REP | 1 | | | 23,2474 | 46667 | 1 | | | SR30.1 | CALCULATE ORBITAL PARAMETERS |
| 5352 | REP | 1 | | | 23,2475 | 77776 | 1 | | | EXIT | |
| 5352 | REP | 9 | LAST | 476 | 23,2476 | 3 1011 | 0 | | | CA | ARE WE IN POO |
| 5352 | REP | 1 | | | 23,2477 | 0 0006 | 1 | | | EXTEND | |
| 5352 | REP | 1 | | | 23,2500 | 1 2645 | 0 | | | BZP | YES, DO DELRSPL. |
| 5352 | REP | 60 | LAST | 508 | 23,2501 | 0 6006 | 1 | SPLRET1 | TC | INTPRET | |
| 5353 | | | | | 23,2502 | 46234 | 0 | | | RTB | DSJ |
| 5354 | REP | 8 | LAST | 507 | 23,2503 | 45505 | 0 | | | LOADTIME | |
| 5356 | REP | 2 | LAST | 507 | 23,2504 | 02325 | 1 | | | TSTARTB2 | PRESENT TIME - TIME V82G0FF1 BEGAN |
| 5357 | REP | 3 | LAST | 508 | 23,2505 | 02325 | 1 | | | TSTARTB2 | SAVE IT |
| 5358 | | | | | 23,2506 | 53145 | 1 | STORE | RZE | | SR30.1 SETS -TPER=0 IF HPER 1./ |
| 5359 | REP | 3 | LAST | 267 | 23,2507 | 02346 | 1 | DLOAD | -TPER | | HPERMIN (300 OR 35) KFT. |
| 5360 | REP | 1 | | | 23,2510 | 46521 | 0 | | | TICKTPP | (-TPER = 0) |
| 5361 | | | | | 23,2511 | 43345 | 1 | TICKTPER | DLOAD | DAD | (-TPER NON ZERO) TPP WAS NOT COMPUTED, |
| 5362 | REP | 4 | LAST | 508 | 23,2512 | 02346 | 1 | | | -TPER | BUT WAS SET TO 59*595.DONT TICK TPP, DO |
| 5363 | REP | 4 | LAST | 508 | 23,2513 | 02325 | 1 | | | TSTARTB2 | TICK -TPER: DISPLAY BOTH. |
| 5364 | REP | 5 | LAST | 508 | 23,2514 | 02346 | 1 | | | -TPER | -TPER CORRECTED FOR TIME SINCE V82G0FF1 |
| 5365 | | | | | 23,2515 | 77776 | 1 | STORE | EXIT | | BEGAN. |



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| | | | | | | | | |
|------|-----|-----|------|-----|---------|----------|----------|----------|
| 5366 | REP | 36 | LAST | 475 | 23,2516 | 3 4712 1 | CAP | BIT1 |
| 5367 | REP | 5 | LAST | 507 | 23,2517 | 55-742 0 | TS | V82FLAGS |
| 5368 | REP | 59 | LAST | 475 | 23,2520 | 0 5112 0 | TC | ENDOFJOB |
| 5369 | | | | | 23,2521 | 43345 1 | TICKTFF | DLOAD |
| 5370 | REP | 7 | LAST | 507 | 23,2522 | 02344 0 | | DAD |
| 5371 | REP | 5 | LAST | 508 | 23,2523 | 02325 1 | | TFF |
| 5372 | REP | 8 | LAST | 509 | 23,2524 | 02344 0 | | TSTART92 |
| 5373 | | | | | 23,2525 | 77776 1 | STORE | TFF |
| 5374 | REP | 22 | LAST | 450 | 23,2526 | 3 4711 1 | EXIT | BIT2 |
| 5375 | REP | 8 | LAST | 509 | 23,2527 | 55-742 0 | CAP | V82FLAGS |
| 5376 | REP | 60 | LAST | 509 | 23,2530 | 0 5112 0 | TC | ENDOFJOB |
| 5377 | REP | 27 | LAST | 497 | 23,2531 | 3 4706 1 | TICKTEST | CAP |
| 5378 | REP | 13 | LAST | 498 | 23,2532 | 7 1044 1 | TS | EXTVACT |
| 5379 | REP | 140 | LAST | 507 | 23,2533 | 10 000 0 | CCS | A |
| 5380 | REP | 1 | | | 23,2534 | 0 2542 0 | TC | DOTICK |
| 5381 | REP | 1 | | | 23,2535 | 3 7662 1 | CAP | PRIO25 |
| 5382 | REP | 15 | LAST | 380 | 23,2536 | 0 5027 1 | TC | NOVAC |
| 5383 | REP | 14 | LAST | 509 | 1044 | | EBANK= | EXTVACT |
| 5384 | REP | 24 | LAST | 506 | 23,2537 | 05423 1 | 2CADR | ENDEXT |
| 5385 | REP | 21 | LAST | 430 | 23,2541 | 0 5213 1 | TC | TASKOVER |
| 5386 | REP | 5 | LAST | 507 | 23,2542 | 3 4734 0 | CAP | 1SEC |
| 5387 | REP | 19 | LAST | 506 | 23,2543 | 0 5140 1 | TC | WAITLIST |
| 5388 | REP | 9 | LAST | 509 | 24,1743 | | EBANK= | TFF |
| 5389 | REP | 2 | LAST | 506 | 23,2544 | 02531 1 | 2CADR | TICKTEST |
| 5389 | | | | | 23,2545 | 46064 1 | | |
| 5390 | REP | 15 | LAST | 507 | 23,2546 | 3 6214 0 | CAP | THREE |
| 5391 | REP | 7 | LAST | 509 | 23,2547 | 7 1742 0 | MASK | V82FLAGS |
| 5392 | REP | 141 | LAST | 509 | 23,2550 | 50 000 1 | INDEX | A |
| 5393 | | | | | 23,2551 | 0 2552 1 | TC | +1 |
| 5394 | REP | 22 | LAST | 509 | 23,2552 | 0 5213 1 | TC | TASKOVER |
| 5395 | | | | | 23,2553 | 0 2561 1 | | |
| 5396 | REP | 1 | | | 23,2554 | 3 4734 0 | TPFTICK | TC |
| 5397 | REP | 8 | LAST | 509 | 23,2555 | 54 001 1 | CAP | 1SEC |
| 5398 | REP | 58 | LAST | 495 | 23,2556 | 3 4714 1 | TS | L |
| 5399 | REP | 109 | LAST | 506 | 23,2557 | 21-744 0 | CAP | ZERO |
| 5400 | REP | 10 | LAST | 509 | 23,2557 | 21-744 0 | DAS | TFF |
| 5401 | REP | 23 | LAST | 509 | 23,2560 | 0 5213 1 | TC | TASKOVER |
| 5402 | REP | 7 | LAST | 509 | 23,2561 | 3 4734 0 | TPERTICK | CAP |
| 5403 | REP | 59 | LAST | 509 | 23,2562 | 54 001 1 | TS | L |
| 5404 | REP | 110 | LAST | 509 | 23,2563 | 3 4714 1 | CAP | ZERO |
| 5405 | REP | 6 | LAST | 508 | 23,2564 | 21-746 1 | DAS | -TPER |
| 5406 | REP | 24 | LAST | 509 | 23,2565 | 0 5213 1 | TC | TASKOVER |

INFORMS TICKTEST TO INCREMENT ONLY -TPER

(-TPER=0) TFF WAS COMPUTED, TICK TFF. DO NOT TICK -TPER, DISPLAY TFF, BUT NOT -TPER. TFF CORRECTED FOR TIME SINCE V82OFF1 BEGAN.

INFORMS TICKTEST TO INCREMENT ONLY TFF.

THIS WAITLIST PROGRAM PERPETUATES ITSELF ONCE A SEC UNTIL BIT 5 OF EXTVACT =0.

TERMINATE V 82.CANT CALL ENDEXT IN RUPT.

RE-REQUEST TICKTEST.

IF NO FLAGBITS SET DONT CHANGE TFF OR -TPER, BUT CONTINUE LOOP. ONLY BIT 1 SET. INCR -TPER BY 1 SEC. ONLY BIT 2 SET. INCR TFF BY 1 SEC.



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5407          23,2566 77776 1 V82GON EXIT
A5408
5409 RESP 6 LAST 506 23,2567 3 4758 1 CAP PRIOT
5410 RESP 19 LAST 506 23,2570 0 5042 1 TC FINDVAC
5411 RESP 11 LAST 509 E4,1743 EBANK= TFF
5412 RESP 1 23,2571 02804 1 2CADR V82GON1
5412 RESP 1 23,2572 48064 1
5413 23,2573 0 0003 1 RELINT
5414 RESP 3 LAST 421 23,2574 10 067 1 CCS NEWJOB
5415 RESP 2 LAST 421 23,2575 0 5057 0 TC CHANG1
A5418
A54161
5417 RESP 2 LAST 507 23,2576 3 2407 0 V82REDSP CAP V16N44
5418 RESP 103 LAST 507 23,2577 0 4555 0 TC BANKCALL
5419 RESP 11 LAST 507 23,2600 20485 1 CADR QCDSPF
5420 RESP 5 LAST 507 23,2601 0 5514 1 TC B5OFF
5421 RESP 6 LAST 510 23,2602 0 5514 1 TC B5OFF
5422 RESP 1 23,2603 0 2576 1 TC V82REDSP

5423 RESP 61 LAST 508 23,2604 0 6006 1 V82GON1 TC INTERP
A5424
5425 23,2605 52175 0 VLOAD GOTO
5426 RESP 6 LAST 500 23,2606 01171 1 IN
5427 RESP 1 23,2607 46610 1 NEXTLINE
5428 RESP 11 LAST 507 23,2610 26327 0 STOVL RONE
5429 RESP 6 LAST 500 23,2611 01177 1 VN
5430 RESP 7 LAST 507 23,2612 02335 0 STORE VONE
5431 23,2613 52014 0 BQN GOTO
5432 RESP 6 LAST 500 23,2614 04303 0 MOONTHIS
5433 RESP 1 23,2615 46617 0 MOONGON
5434 RESP 1 23,2616 46630 0 EARTHGON

5435 23,2617 71214 0 MOONGON SET DLOAD
5436 RESP 3 LAST 508 23,2620 04462 0 V82EMPLG
54361 RESP 1 23,2621 06454 1 1/RIMLM
5437 RESP 2 LAST 507 23,2622 14037 0 STOVL TFF/RIMU
5438 RESP 1 23,2623 06460 0 MINPERM
5439 RESP 3 LAST 507 23,2624 26321 0 STOVL HPERMIN
5441 RESP 4 LAST 508 23,2625 02026 1 RLS
5443 23,2626 52046 1 ARVAL GOTO
5444 RESP 1 23,2627 46637 1 V82GON2
5445 23,2630 71214 0 EARTHGON CLEAR DLOAD
5446 RESP 4 LAST 510 23,2631 04662 1 V82EMPLG
54461 RESP 2 LAST 507 23,2632 06456 0 1/RIMLE
5447 RESP 3 LAST 510 23,2633 14037 0 STOVL TFF/RIMU
5448 RESP 2 LAST 507 23,2634 06462 1 MINPERE
5449 RESP 4 LAST 510 23,2635 16321 0 STOVL HPERMIN
5450 RESP 3 LAST 508 23,2636 05311 1 RPAD
5451 RESP 3 LAST 508 23,2637 36323 0 V82GON2 STCALL RPADTRM
5453 RESP 2 LAST 508 23,2640 46667 1 SR30.1
    
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AVERAGE G ON, USE CURRENT STATE VECTOR FOR ORBITAL PARAMETER CALCULATIONS. LESS THAN LAMBERT V82GON1 WILL PERFORM ORBIT CALCULATIONS ABOUT PROPER BODY APPROX ONCE PER SEC.

WITHOLD V16 N44 UNTIL FIRST ORBIT CALC IS DONE. NOTE V82GON1 (PRIOT, FINDVAC JOB) IS COMPLETED BEFORE V82GON (PRIOT, NOVAC JOB). MONITOR HAPO, HPER, TFF

TERM THIS TELLS V82GON1 TO KILL ITSELF. PROC DITTO. RECYCLE

THIS EXEC PROGRAM PERPETUATES ITSELF ONCE A SEC UNTIL BIT 5 OF EXTVBACT =0. HOLDS OFF CCS NEWJOB BETWEEN RN AND VN FETCH SO RN, VN ARE FROM SAME STATE VECTOR UPDATE. RN AT (-29)M FOR EARTH OR MOON

VN AT (-7)M/CS FOR EARTH OR MOON

FLAG INDICATES BODY ABOUT WHICH ORBITAL CALCULATIONS ARE TO BE PERFORMED. IF SET - MOON, IF RESET - EARTH.

INDICATE MOON SCALING FOR SR30.1 LUNAR PARAMETERS LOADED HERE FOR SR30.1

SCALED AT (-27)M.

INDICATE EARTH SCALING FOR SR30.1 EARTH PARAMETERS LOADED HERE FOR SR30.1

COMMON CODE FOR EARTH d MOON.

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| | | | | | | | | | |
|-------|-----|-----|------|---------|---------|--------|---|---------|----------|
| 5454 | | | | 23,2641 | 77776 | 1 | | EXIT | |
| 5455 | REP | 9 | LAST | 417 | 23,2642 | 0 5253 | 0 | TC | CHECOM |
| 5456 | | | | | 23,2643 | 00013 | 0 | DEC | 11 |
| 5457 | REP | 1 | | | 23,2644 | 0 2657 | 1 | TC | V82GON3 |
| 5458 | REP | 62 | LAST | 510 | 23,2645 | 0 6006 | 1 | CANDEL | TC |
| 54581 | | | | | 23,2646 | 77624 | 1 | CALL | INTPRST |
| 54582 | REP | 13 | LAST | 503 | 23,2647 | 27371 | 1 | | CALL |
| 5459 | | | | | 23,2650 | 45145 | 0 | DLOAD | INTSTALL |
| 5460 | REP | 12 | LAST | 510 | 23,2651 | 02344 | 0 | | CALL |
| 5461 | REP | 1 | | | 23,2652 | 64017 | 0 | | TFF |
| 5462 | | | | | 23,2653 | 77776 | 1 | SPLRST | DELRSP |
| 54621 | REP | 10 | LAST | 508 | 23,2654 | 3 1011 | 0 | | EXIT |
| 54622 | | | | | 23,2655 | 0 0006 | 1 | CA | MDRSG |
| 54623 | REP | 1 | | | 23,2656 | 1 2501 | 0 | EXTEND | |
| 5463 | REP | 26 | LAST | 509 | 23,2657 | 3 4706 | 1 | BZF | SPLRST1 |
| 5464 | REP | 15 | LAST | 509 | 23,2660 | 7 1044 | 1 | V82GON3 | CAP |
| 5465 | | | | | 23,2661 | 0 0006 | 1 | | BITS |
| 5466 | REP | 25 | LAST | 509 | 23,2662 | 1 5423 | 0 | MASK | EXTTRACT |
| 5468 | REP | 8 | LAST | 509 | 23,2663 | 3 4734 | 0 | EXTEND | |
| 5469 | REP | 104 | LAST | 510 | 23,2664 | 0 4555 | 0 | BZF | ENDEXT |
| 5470 | REP | 5 | LAST | 507 | 23,2665 | 01732 | 0 | CAP | 1SEC |
| 5471 | REP | 2 | LAST | 510 | 23,2666 | 0 2604 | 1 | TC | BANKCALL |
| | | | | | | | | CADR | DELAYJOB |
| | | | | | | | | TC | V82GON1 |

NOT IN MODE 11.
IN MODE 11 OR 00

DELRSP DOES INTWAKE

RETURN IS TO NEXT LINE (SPLRST).

SEE IF ASTRONAUT HAS SIGNALED TERMINATE

YES, TERMINATE VB 82 LOOP

WAIT ONE SECOND BEFORE REPEATING
ORBITAL PARAMETER COMPUTATION.



L R30

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R5548 SUBROUTINE NAME' SR30.1
R5549 MOD NO' 0
R5551 MOD BY' RR BAINSPATHER
R5553 MOD NO' 1 MOD BY' RR BAINSPATHER DATE' 11 APR 67
R5555 MOD NO' 2 MOD BY' RR BAINSPATHER DATE' 14 APR 67
R5557 MOD NO' 3 MOD BY' ALONSO DATE' 11 DEC 67
R5558 MOD NO' 4 MOD BY' ALONSO DATE' 28 MAR 68
R5559 MOD NO' 5 MOD BY' RR BAINSPATHER DATE' 6 AUG 68

DATE' 16 FEB 67
LOG SECTION' R32
SR30.1 CHANGED TO ALLOW MONITOR OPERN
ADD O/PL CK FOR RAPO
SUBROUTINE REWRITTEN
PROC MOD TO HANDLE DIP EARTH/MOON SCALE
O/PL CK FOR HAPO & HPER. VOIDS MOD J2.

R5562 NEW FUNCTIONAL DESCRIPTION' ORBITAL PARAMETERS DISPLAY FOR NOUNS 32 AND 44.
R5564 SR30.1 CALLS TFFCONMU AND TFFRP/RA TO CALCULATE RPER (PERIGEE RADIUS),
R5565 RAPO (APOGEE RADIUS), HPER (PERIGEE HEIGHT ABOVE LAUNCH PAD OR LUNAR
R5566 LANDING SITE), HAPO (APOGEE HEIGHT AS ABOVE), TPER (TIME TO PERIGEE),
R5567 TFF (TIME TO INTERSECT 300 KFT ABOVE PAD OR 35KFT ABOVE LANDING SITE).
R5568 IF HPER IS GREATER THAN OR EQUAL TO HPERMIN, CALCULATES TPER AND STORES
R5569 NEGATIVE IN -TPER. OTHERWISE STORES +0 IN -TPER. WHENEVER TPER IS
R5570 CALCULATED, TFF IS NOT COMPUTABLE AND DEFAULTS TO -59MIN 59SEC. IF HAPO
R5571 WOULD EXCEED 9999.9 NM, IT IS LIMITED TO THAT VALUE FOR DISPLAY.

R5572 ADDENDUM' HAPO AND HPER SHOULD BE CHANGED TO READ HAPOX AND HPERX IN THE
R5573 ABOVE REMARKS.

R5574 CALLING SEQUENCE' CALL
R5575 SR30.1
R5576 SUBROUTINES CALLED' TFFCONMU, TFFRP/RA, CALCTPER, CALCTFF
R5577 NORMAL EXIT MODE' CALLING LINE +1 (STILL IN INTERPRETIVE MODE)
R5578 ALARMS' NONE

R5579 OUTPUT' RAPO (-29) M EARTH APOGEE RADIUS EARTH CENTERED COORD.
R5580 (-27) M MOON MOON CENTERED COORD.
R5581 RPER (-29) M EARTH PERIGEE RADIUS EARTH CENTERED COORD.
R5582 (-27) M MOON MOON CENTERED COORD.
R5583 HAPOX (-29) M APOGEE ALTITUDE ABOVE PAD OR LAND. SITE MAX VALUE LIMITED TO 9999.9 NM.
R5585 HPERX (-29) M PERIGEE ALT. ABOVE PAD OR LAND. SITE MAX VALUE LIMITED TO 9999.9 NM.
R5587 TFF (-28) CS TIME TO 300KFT OR 35KFT ALTITUDE
R5588 -TPER (-28) CS TIME TO PERIGEE

R5589 ERASABLE INITIALIZATION REQUIRED.
R5590 TFF/RIMU (+17) EARTH RECIPROCAL OF PROPER GRAV CONSTANT FOR
R5591 (+14) MOON EARTH OR MOON = 1/SQRT(MU).
R5592 RONE (-29) M STATE VECTOR
R5593 VONE (-7) M/CS STATE VECTOR
R5594 RPADTEM (-29) M EARTH RADIUS OF LAUNCH PAD OR LUNAR LANDING
R5595 (-27) M MOON SITE.
R5596 HPERMIN (-29) M EARTH (300 OR 35)KFT MINIMUM PERIGEE ALTITUDE
R5597 (-27) M MOON ABOVE LAUNCH PAD OR LUNAR LANDING SITE.
R5598 V82EMPLG (INT SW BIT) RESET FOR EARTH, SET FOR MOON.

R5599 DERRIS' OPRET, PDL, S2



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| Address | Operation | Count | Label | Address | Address | Address | Address | Address | Address | Address |
|---------|-----------|-------|----------|---------|---------|---------|---------|----------|----------|---------|
| 5600 | REP | 1 | | | | | | | | |
| 5601 | | | | 23,2667 | 44001 0 | SR30.1 | SETPD | STO | | |
| 5602 | | | | 23,2670 | 00001 0 | | | | | |
| 5603 | REP | 4 | LAST 442 | 23,2671 | 00051 0 | | | | | |
| A5604 | | | | | | | | | | |
| A5605 | | | | | | | | | | |
| A5606 | | | | | | | | | | |
| A5607 | | | | | | | | | | |
| A5608 | | | | | | | | | | |
| A5609 | | | | | | | | | | |
| A5610 | | | | | | | | | | |
| A5611 | | | | | | | | | | |
| A5612 | | | | | | | | | | |
| A5613 | | | | | | | | | | |
| 5614 | | | | 23,2672 | 77214 0 | | BOFF | VLOAD | | |
| 5615 | REP | 5 | LAST 510 | 23,2673 | 04742 1 | | | V82R=FLG | | |
| 5616 | REP | 1 | | 23,2674 | 46703 1 | | | TFFCALLS | | |
| 5617 | REP | 12 | LAST 510 | 23,2675 | 02327 0 | | | RONE | | |
| 5618 | | | | 23,2676 | 77752 1 | | | VSL2 | | |
| 5619 | REP | 13 | LAST 513 | 23,2677 | 26327 0 | | | STOVL | RONE | |
| 5620 | REP | 8 | LAST 510 | 23,2700 | 02335 0 | | | | VONE | |
| 5621 | | | | 23,2701 | 77752 1 | | | VSL2 | | |
| 5622 | REP | 9 | LAST 513 | 23,2702 | 02335 0 | | | STORE | VONE | |
| 5623 | | | | 23,2703 | 77624 1 | | | TFFCALLS | CALL | |
| 5624 | REP | 1 | | 23,2704 | 56751 1 | | | | TFFCONMU | |
| 5625 | | | | 23,2705 | 77624 1 | | | CALL | | |
| 5626 | REP | 1 | | 23,2706 | 57017 0 | | | | TFFRP/RA | |
| A5627 | | | | | | | | | | |
| 5628 | | | | 23,2707 | 77625 0 | | | DSU | | |
| 5629 | REP | 4 | LAST 510 | 23,2710 | 02323 1 | | | | RPADTEM | |
| 5630 | | | | 23,2711 | 64414 1 | | | BOFF | SR2R | |
| A5631 | | | | | | | | | | |
| A5632 | | | | | | | | | | |
| 5633 | REP | 6 | LAST 513 | 23,2712 | 04742 1 | | | | V82R=FLG | |
| 5634 | | | | 23,2713 | 46714 1 | | | | +1 | |
| 5635 | | | | 23,2714 | 77624 1 | | | CALL | | |
| 5636 | REP | 1 | | 23,2715 | 46754 0 | | | | MAXCHK | |
| 5637 | REP | 4 | LAST 506 | 23,2716 | 16352 1 | | | STORHAPO | STOVL | HAPOK |
| 5638 | REP | 1 | | 23,2717 | 00017 1 | | | | | RPER |
| 5639 | | | | 23,2720 | 77625 0 | | | DSU | | |
| 5640 | REP | 5 | LAST 513 | 23,2721 | 02323 1 | | | | RPADTEM | |
| 5641 | REP | 238 | LAST 494 | 23,2722 | 00161 1 | | | STORE | MPAC +4 | |
| 5642 | | | | 23,2723 | 64414 1 | | | BOFF | SR2R | |
| A5643 | | | | | | | | | | |
| A5644 | | | | | | | | | | |
| 5645 | REP | 7 | LAST 513 | 23,2724 | 04742 1 | | | | V82R=FLG | |
| 5646 | | | | 23,2725 | 46726 0 | | | | +1 | |
| 5647 | | | | 23,2726 | 77624 1 | | | CALL | | |
| 5648 | REP | 2 | LAST 513 | 23,2727 | 46754 0 | | | | MAXCHK | |

INITIALIZE PUSHDOWN LIST.

SR30.1 INPUT: RONE AT (-29)M EARTH/MOON
 VONE AT (-7)M/CS
 TFFCONMU, TFFRP/RA, CALCTPER AND CALCTFF
 CALLS REQUIRE:
 EARTH CENTERED (NO RESCALING REQUIRED)
 RONE SCALED TO B-29 M
 VONE SCALED TO B-7 M/CS
 MOON CENTERED (RESCALING REQUIRED)
 RONE SCALED TO B-27 M
 VONE SCALED TO B-5 M/CS

OFF FOR EARTH, ON FOR MOON.

TFFRP/RA COMPUTES RAPO, RPER.

RETURNS WITH RAPO IN D(MPAC).

NEED HAPO AT (-29)M FOR DISPLAY.
 IF MOON CENTERED, RESCALE FROM (-27)M.
 IF EARTH CENTERED ALREADY AT (-29)M.
 OFF FOR EARTH, ON FOR MOON.

IF HAPO > MAXNM, SET HAPO = 9999.9 NM.
 OTHERWISE STORE (RAPO-RPADTEM) IN HAPO.

GIVES HPER AT (-29)M EARTH, (-27)M MOON.
 SAVE THIS FOR COMPARISON TO HPERMIN.
 NEED HPER AT (-29)M FOR DISPLAY.
 IF MOON CENTERED, RESCALE FROM (-27)M.
 IF EARTH CENTERED ALREADY AT (-29)M.
 OFF FOR EARTH, ON FOR MOON.

IF HPER > MAXNM, SET HPER = 9999.9 NM.



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| | | | | | | | | | | |
|------|-----|-----|------|-----|---------|-------|---|----------|--------|-------------|
| 5649 | REP | 4 | LAST | 275 | 23,2730 | 16354 | 1 | STORHPR | STOCL | HPRK |
| 5650 | REP | 239 | LAST | 513 | 23,2731 | 00161 | 1 | | | MPAC +4 |
| 5651 | | | | | 23,2732 | 51025 | 1 | | DSU | RPL |
| 5652 | REP | 5 | LAST | 510 | 23,2733 | 02321 | 0 | | | HPRMIN |
| 5653 | REP | 1 | | | 23,2734 | 46740 | 0 | | | DOTPER |
| 5654 | | | | | 23,2735 | 52145 | 0 | | DLOAD | GOTO |
| 5655 | REP | 1 | | | 23,2736 | 15332 | 1 | | | HI&ZEROS |
| 5656 | REP | 1 | | | 23,2737 | 46744 | 1 | | | SKIPTPER |
| 5657 | | | | | 23,2740 | 45145 | 0 | DOTPER | DLOAD | CALL |
| 5658 | REP | 2 | LAST | 513 | 23,2741 | 00017 | 1 | | | RPER |
| 5659 | REP | 1 | | | 23,2742 | 57055 | 0 | | | CALCTPER |
| 5660 | | | | | 23,2743 | 77676 | 0 | | DCOMP | |
| 5661 | REP | 7 | LAST | 509 | 23,2744 | 16346 | 1 | SKIPTPER | STOCL | -TPER |
| 5662 | REP | 6 | LAST | 514 | 23,2745 | 02321 | 0 | | | HPRMIN |
| 5663 | | | | | 23,2746 | 45015 | 1 | | DAD | CALL |
| 5664 | REP | 6 | LAST | 513 | 23,2747 | 02323 | 1 | | | RPADTEM |
| 5665 | REP | 1 | | | 23,2750 | 57060 | 0 | | | CALCTPP |
| 5666 | | | | | 23,2751 | 77676 | 0 | | DCOMP | |
| 5637 | REP | 13 | LAST | 511 | 23,2752 | 36344 | 1 | | STCALL | TFP |
| 5668 | REP | 5 | LAST | 513 | 23,2753 | 00051 | 0 | | | S2 |
| 5669 | | | | | 23,2754 | 51025 | 1 | MAXCHK | DSU | RPL |
| 5670 | REP | 1 | | | 23,2755 | 06764 | 1 | | | MAXNM |
| 5671 | | | | | 23,2756 | 46761 | 0 | | | +3 |
| 5672 | | | | | 23,2757 | 43415 | 0 | | DAD | RVO |
| 5673 | REP | 2 | LAST | 514 | 23,2760 | 06764 | 1 | | | MAXNM |
| 5674 | | | | | 23,2761 | 43545 | 1 | +3 | DLOAD | RVO |
| 5675 | REP | 3 | LAST | 514 | 23,2762 | 06764 | 1 | | | MAXNM |
| 5676 | | | | | 23,2763 | 01065 | 0 | MAXNM | 2OCT | 01065 05603 |
| 5676 | | | | | 23,2764 | 05603 | 1 | | | |

STORE (RPER - RPADTEM) INTO HPRK.

HPRMIN AT (-29)M FOR EARTH, (-27)M MOON
IF HPR L/ HPRMIN (300 OR 35)KPT,
THEN ZERO INTO -TPER.
OTHERWISE CALCULATE TPER.

TPER IS PUT NEG INTO -TPER.

HPRMIN AT (-29)M FOR EARTH, (-27)M MOON

RPADTEM AT (-29)M FOR EARTH, (-27)M MOON
GIVES 59M69S FOR TFP IF RPER G/
HPRMIN + RPADTEM. (TPER WAS NON ZERO)
OTHERWISE COMPUTES TFP. (GOTO)

IF C(MPAC) > 9999.9 NM, MPAC = 9999.9 NM

OTHERWISE C(MPAC) = R(MPAC).

(USED BY P30 - P37 ALSO)



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L R30

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L STABLE ORBIT - P38-P39

USER'S PAGE NO. 1 EQ 53

R0001 STABLE ORBIT RENDEZVOUS PROGRAMS (P38 AND P78)

R0002 MOD NO -1 LOG SECTION - STABLE ORBIT - P38-P39
R0003 MOD BY RUDNICKI,S DATE 25JAN68

R0004 FUNCTIONAL DESCRIPTION

R0005 P38 AND P78 CALCULATE THE REQUIRED DELTA V AND OTHER INITIAL
R0006 CONDITIONS REQUIRED BY THE AOC TO (1) PUT THE ACTIVE VEHICLE
R0007 ON A TRANSFER TRAJECTORY THAT INTERCEPTS THE PASSIVE VEHICLE
R0008 ORBIT A GIVEN DISTANCE, DELTA R, EITHER AHEAD OF OR BEHIND THE
R0009 PASSIVE VEHICLE AND (2) ACTUALLY PLACE THE ACTIVE VEHICLE IN THE
R0010 PASSIVE VEHICLE ORBIT WITH A DELTA R SEPARATION BETWEEN THE TWO
R0011 VEHICLES

R0012 CALLING SEQUENCE

R0013 ASTRONAUT REQUEST THRU DSKY

R0014 V37838E IF THIS VEHICLE IS ACTIVE VEHICLE
R0015 V37878E IF OTHER VEHICLE IS ACTIVE VEHICLE

R0016 INPUT

R0017 (1) SOI MANEUVER

R0018 (A) TIG TIME OF SOI MANEUVER
R0019 (B) CENTANG ORBITAL CENTRAL ANGLE OF THE PASSIVE VEHICLE
R0020 DURING TRANSFER FROM TIG TO TIME OF INTERCEPT
R0021 (C) DELTAR THE DESIRED SEPARATION OF THE TWO VEHICLES
R0022 SPECIFIED AS A DISTANCE ALONG THE PASSIVE VEHICLE
R0023 ORBIT
R0024 (D) OPTION EQUALS 1 FOR SOI

R0025 (2) SOR MANEUVER

R0026 (A) TIG TIME OF SOR MANEUVER
R0027 (B) CENTANG AN OPTIONAL RESPECIFICATION OF 1 (B) ABOVE
R0028 (C) OPTION EQUALS-2 FOR SOR
R0029 (D) DELTTIME THE TIME REQUIRED TO TRAVERSE DELTA R WHEN
R0030 TRAVELING AT A VELOCITY EQUAL TO THE HORIZONTAL
R0031 VELOCITY OF THE PASSIVE VEHICLE - SAVED FROM
R0032 SOI PHASE
R0033 (E) TINT TIME OF INTERCEPT (SOI) - SAVED FROM SOI PHASE

R0034 OUTPUT

R0035 (1) TRACKCNT NUMBER OF MARKS
R0036 (2) TTOGO TIME TO GO
R0037 (3) ANGA MIDDLE GIMBAL ANGLE



L STABLE ORBIT - P38-P39

USER'S PAGE NO. 2 B0 83

R0038 (4) DSPTM1 TIME OF INTERCEPT OF PASSIVE VEHICLE ORBIT
 R0039 (FOR SOI ONLY)
 R0040 (5) POSTTPI PERIGEE ALTITUDE OF ACTIVE VEHICLE ORBIT AFTER
 R0041 THE SOI (SOR) MANEUVER
 R0042 (6) DELVTP1 MAGNITUDE OF DELTA V AT SOI (SOR) TIME
 R0043 (7) DELVTP2 MAGNITUDE OF DELTA V AT INTERCEPT TIME
 R0044 (8) DELVLVC DELTA VELOCITY AT SOI (AND SOR) - LOCAL VERTICAL
 R0045 COORDINATES

R0046 SUBROUTINES USED

R0047 AVFLAGA
 R0048 AVFLAGP
 R0049 VNSPLY
 R0050 BANKCALL
 R00502 GOFASR
 R00504 GOTOPOCH
 R00506 BLANKET
 R00508 ENDOPJOB
 R0051 PRESUIT
 R0052 SELECTMU
 R0053 INTRPVP
 R0054 MAINRTNE

| | | | | | | | | |
|--------|-----|-----|------|---------|---------|----------|-----|-----------------|
| R0055 | | | | 04,3103 | | | | RANK 04 |
| R0056 | REP | 1 | | 04,2000 | | | | SETLOC STBLEORB |
| R0057 | | | | 04,3103 | | | | RANK |
| R0058 | REP | 13 | LAST | 496 | E4,1770 | | | ERANK= SURXIT |
| R0059 | REP | 1 | | | | | | COUNT# 88/P3879 |
| R0060 | REP | 105 | LAST | 511 | 04,3103 | 0 4555 0 | P38 | TC BANKCALL |
| R0061 | REP | 3 | LAST | 460 | 04,3104 | 73728 0 | | CADR AVFLAGA |
| R0062 | | | | | 04,3105 | 0 3110 1 | | TC +3 |
| R0063 | REP | 106 | LAST | 517 | 04,3106 | 0 4555 0 | PT8 | TC BANKCALL |
| R0064 | REP | 3 | LAST | 460 | 04,3107 | 73741 1 | | CADR AVFLAGP |
| R00645 | REP | 107 | LAST | 517 | 04,3110 | 0 4555 0 | | TC BANKCALL |
| R00646 | REP | 3 | LAST | 460 | 04,3111 | 73746 0 | | CADR P20PLOCN |
| R0065 | REP | 1 | | | 04,3112 | 3 3440 1 | | CAP V06N33SR |
| R0066 | REP | 1 | | | 04,3113 | 0 3427 0 | | TC VNSPLY |
| R0067 | REP | 1 | | | 04,3114 | 3 3441 0 | | CAP V06N66SR |
| R0068 | REP | 108 | LAST | 517 | 04,3115 | 0 4555 0 | | TCR BANKCALL |
| R0069 | REP | 2 | LAST | 475 | 04,3116 | 20763 1 | | CADR GOFASR |
| R00694 | REP | 13 | LAST | 504 | 04,3117 | 1 4106 0 | | TCR GOTOPOCH |
| R00696 | | | | | 04,3120 | 1 3125 0 | | TCR +5 |
| R00698 | | | | | 04,3121 | 1 3114 1 | | TCR -5 |
| R0070 | REP | 16 | LAST | 509 | 04,3122 | 3 6214 0 | | CAP THREE |
| R00702 | REP | 2 | LAST | 475 | 04,3123 | 0 5415 1 | | TCR BLANKET |
| R00704 | REP | 61 | LAST | 509 | 04,3124 | 1 5112 1 | | TCR ENDOPJOB |
| R0071 | REP | 8 | LAST | 418 | 04,3125 | 3 4715 0 | | CAP FIVE |

THIS VEHICLE ACTIVE

OTHER VEHICLE ACTIVE

SET UPDATFLO, TRACKFLO
 DISPLAY TIG

DISPLAY CENTANG

TERMINATE
 PROCFD
 RRCYCLE
 IMMEDIATE RETURN - BLANK R1, R2

L STABLE ORBIT - P38-P39

USER=5 PAGE NO. 3 E4 53

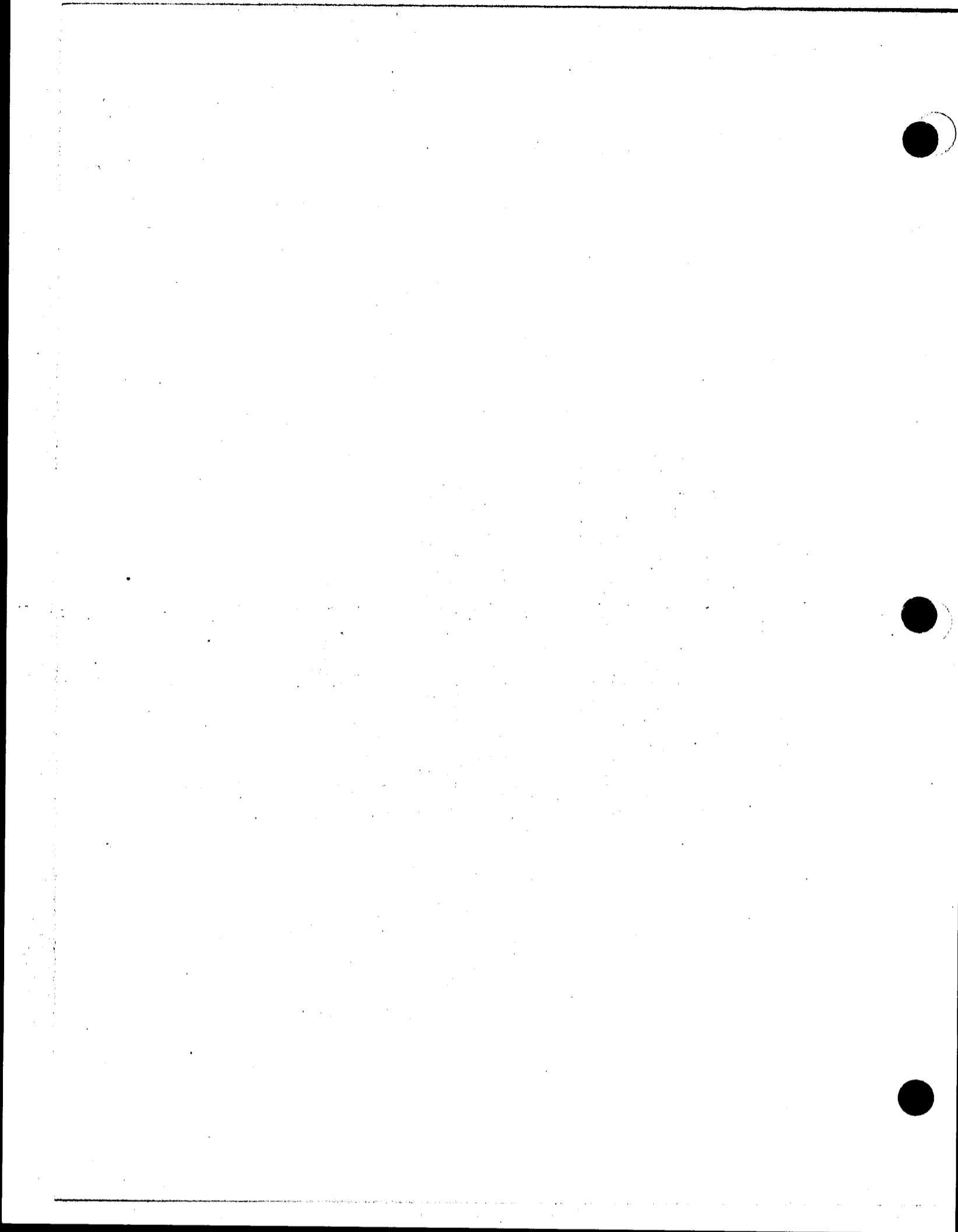
| | | | | | | | |
|-------|-----|-----|------|-----|---------|--------|---|
| 0072 | REP | 2 | LAST | 268 | 04,3126 | 55=131 | 1 |
| 0073 | REP | 64 | LAST | 507 | 04,3127 | 3 4712 | 1 |
| 0074 | REP | 4 | LAST | 450 | 04,3130 | 55=132 | 1 |
| 00742 | REP | 1 | | | 04,3131 | 3 3442 | 0 |
| 00744 | REP | 109 | LAST | 517 | 04,3132 | 0 4555 | 0 |
| 00746 | REP | 3 | LAST | 517 | 04,3133 | 20763 | 1 |
| 00748 | REP | 14 | LAST | 517 | 04,3134 | 1 4108 | 0 |
| 0075 | | | | | 04,3135 | 1 3142 | 1 |
| 00752 | | | | | 04,3136 | 1 3131 | 0 |
| 0076 | REP | 16 | LAST | 369 | 04,3137 | 3 4710 | 0 |
| 0077 | REP | 3 | LAST | 517 | 04,3140 | 0 5415 | 1 |
| 0078 | REP | 62 | LAST | 517 | 04,3141 | 1 5112 | 1 |
| 0079 | REP | 63 | LAST | 511 | 04,3142 | 0 6006 | 1 |
| 0080 | | | | | 04,3143 | 70535 | 0 |
| 0081 | REP | 5 | LAST | 518 | 04,3144 | 01133 | 1 |
| 0082 | | | | | 04,3145 | 71230 | 0 |
| 0083 | REP | 1 | | | 04,3146 | 11104 | 1 |
| 0084 | REP | 1 | | | 04,3147 | 03856 | 1 |
| 0085 | REP | 1 | | | 04,3150 | 02811 | 0 |
| 0086 | | | | | 04,3151 | 77614 | 1 |
| 0087 | REP | 1 | | | 04,3152 | 01230 | 1 |

| | |
|-------|----------|
| TS | OPTION1 |
| CAP | ONE |
| TS | OPTION2 |
| CAP | V04N06SR |
| TCR | BANKCALL |
| CADR | GOPFLASH |
| TCP | GOTOPOCH |
| TCP | +5 |
| TCP | -5 |
| CAP | BIT3 |
| TCR | BLANKET |
| TCP | ENDOFJOB |
| TC | INTPRST |
| SLOAD | SR1 |
| | OPTION2 |
| BHIZ | DLOAD |
| | OPIN1 |
| | TINT |
| STORE | TINTSOI |
| CLROO | |
| | OPTNSW |

OPTION CODE IS SET TO 1
 DISPLAY OPTION CODE - 1 = SOI, 2 = SOR

TERMINATE
 PROCEED
 RECYCLE
 IMMEDIATE RETURN - BLANK R3

STORE FOR SOR PHASE
 OPTNSW



L STABLE ORBIT - P30-P39

USER#5 PAGE NO. 4 E4 S3

| | | | | | | | | |
|------|----------------------|----------|---------|---------|----------|-----------|--|---|
| 0100 | | | 04,3210 | 71214 0 | BOFF | DLOAD | | |
| 0110 | REP 3 | LAST 510 | 04,3211 | 01350 0 | | OPTNSW | | |
| 0111 | REP 1 | | 04,3212 | 11232 1 | | OPTN2 | | |
| 0112 | REP 3 | LAST 510 | 04,3213 | 03656 1 | | TINT | | |
| 0113 | REP 18 | LAST 507 | 04,3214 | 34041 0 | STCALL | TDEC1 | PRECISION UPDATE PASSIVE VEHICLE TO INTERCEPT TIME | |
| 0114 | REP 1 | | 04,3215 | 11413 1 | | INTRPVP | | |
| 0115 | | | 04,3216 | 53575 0 | VLOAD | UNIT | RP/(RP) | |
| 0116 | REP 14 | LAST 507 | 04,3217 | 00001 0 | | RATT | | |
| 0117 | | | 04,3220 | 47315 0 | FDVL | VXV | | |
| 0118 | REP 11 | LAST 507 | 04,3221 | 00007 0 | | VATT | (VP X RP/(RP)) | |
| 0119 | | | 04,3222 | 80246 1 | ARVAL | NORM | | |
| 0120 | REP 7 | LAST 501 | 04,3223 | 00047 1 | | X1 | | |
| 0121 | | | 04,3224 | 56325 0 | FDL | DDV | | |
| 0122 | REP 8 | LAST 275 | 04,3225 | 02611 0 | | DELTAR | | |
| 0123 | | | 04,3226 | 77057 0 | SL* | | DELTA R / (VP X RP/RP) | |
| 0124 | | | 04,3227 | 20172 1 | | 0 -7,1 | | |
| 0125 | REP 1 | | 04,3230 | 36613 0 | STCALL | DELTTIME | DELTA T = (RP) DELTA R / (VP X RP) | |
| 0126 | REP 1 | | 04,3231 | 11236 0 | | JUNCTN2 | | |
| 0127 | | | 04,3232 | 43345 1 | OPTN2 | DAD | | |
| 0128 | REP 2 | LAST 510 | 04,3233 | 02611 0 | | TINTSOI | | |
| 0129 | REP 2 | LAST 457 | 04,3234 | 00037 0 | | T | | |
| 0130 | REP 4 | LAST 519 | 04,3235 | 03656 1 | STORE | TINT | TI = TI + TP | |
| 0131 | | | 04,3236 | 45345 1 | JUNCTN2 | DSJ | | |
| 0132 | REP 5 | LAST 519 | 04,3237 | 03656 1 | | TINT | | |
| 0133 | REP 2 | LAST 519 | 04,3240 | 02613 1 | | DELTTIME | | |
| 0134 | REP 1 | | 04,3241 | 02615 1 | STORE | TARGETIME | TT = TI - DELTA T | |
| 0135 | MAINRINE | | | | | | | |
| 0136 | SUBROUTINES USED | | | | | | | |
| 0137 | S3435.25 | | | | | | | |
| 0138 | PERIAP01 | | | | | | | |
| 0139 | SHIFTR1 | | | | | | | |
| 0140 | VNDSPLY | | | | | | | |
| 0141 | RANKCALL | | | | | | | |
| 0142 | OOFLASH | | | | | | | |
| 0143 | GOTOPOCH | | | | | | | |
| 0144 | VN1645 | | | | | | | |
| 0146 | REP 19 | LAST 519 | 04,3242 | 34041 0 | MAINRINE | STCALL | TDEC1 | PRECISION UPDATE PASSIVE VEHICLE TO TARGET TIME |
| 0147 | REP 2 | LAST 519 | 04,3243 | 11413 1 | | INTRPVP | | |
| 0148 | | | 04,3244 | 77745 1 | | DLOAD | | |
| 0149 | REP 24 | LAST 518 | 04,3245 | 03413 1 | | TIG | | |
| 0150 | REP 7 | LAST 482 | 04,3246 | 03503 1 | STORE | INTIME | | |
| 0151 | | | 04,3247 | 77331 0 | SSP | VLOAD | | |
| 0152 | REP 14 | LAST 517 | 04,3250 | 02371 0 | | SUBEXIT | | |
| 0153 | REP 1 | | 04,3251 | 11255 0 | | TEST3979 | | |
| 0154 | REP 15 | LAST 519 | 04,3252 | 00001 0 | | RATT | | |
| 0155 | | | 04,3253 | 77624 1 | CALL | | | |
| 0156 | REP 1 | | 04,3254 | 72547 1 | | S3435.25 | | |
| 0157 | | | 04,3255 | 43014 0 | TEST3979 | ROFF | RON | |



L STABLE ORBIT - P39-P39

USER'S PAGE NO. 5 E4 53

| | | | | | | | | | | |
|-------|-----|----|------|-----|---------|--------|---|----------|----------|----------|
| 0158 | REP | 2 | LAST | 518 | 04,3256 | 04346 | 1 | | P39/T9SW | |
| 0159 | REP | 1 | | | 04,3257 | 11286 | 0 | | MAINRTN1 | |
| 0160 | REP | 5 | LAST | 486 | 04,3260 | 01311 | 0 | | FINALFLG | |
| 0161 | REP | 1 | | | 04,3261 | 11284 | 1 | | P39P79 | |
| 0162 | | | | | 04,3262 | 77614 | 1 | | SET | |
| 0163 | REP | 6 | LAST | 518 | 04,3263 | 00470 | 1 | | UPDATFLG | |
| 0164 | | | | | 04,3264 | 77778 | 1 | P39P79 | EXIT | |
| 01645 | REP | 1 | | | 04,3265 | 0 3313 | 0 | | TC | DSPLY81 |
| 0165 | | | | | 04,3266 | 51575 | 1 | MAINRTN1 | VLOAD | ABVAL |
| 0166 | REP | 12 | LAST | 483 | 04,3267 | 03646 | 0 | | | DELVEBT3 |
| 0167 | REP | 5 | LAST | 457 | 04,3270 | 26635 | 0 | | STOVL | DELVTPI |
| 0168 | REP | 4 | LAST | 467 | 04,3271 | 03640 | 0 | | | VPASS4 |
| 0169 | | | | | 04,3272 | 51451 | 0 | | VSI | ABVAL |
| 0170 | REP | 7 | LAST | 483 | 04,3273 | 03620 | 0 | | | VTPRIME |
| 0171 | REP | 5 | LAST | 457 | 04,3274 | 26637 | 1 | | STOVL | DELVTTP |
| 0172 | REP | 16 | LAST | 490 | 04,3275 | 03540 | 0 | | | FACT3 |
| 0173 | | | | | 04,3276 | 45115 | 0 | | FDVL | CALL |
| 0174 | REP | 9 | LAST | 483 | 04,3277 | 03612 | 1 | | | VIPRIME |
| 0175 | REP | 2 | LAST | 457 | 04,3300 | 45312 | 0 | | | PERIAP01 |
| 0176 | | | | | 04,3301 | 77624 | 1 | | CALL | |
| 0177 | REP | 2 | LAST | 457 | 04,3302 | 45422 | 1 | | | SHIPTR1 |
| 0178 | REP | 3 | LAST | 457 | 04,3303 | 02641 | 0 | | STORE | POSTTPI |
| 0179 | | | | | 04,3304 | 43014 | 0 | | BCN | SET |
| 0180 | REP | 6 | LAST | 520 | 04,3305 | 01311 | 0 | | | FINALFLG |
| 0181 | REP | 1 | | | 04,3306 | 11310 | 0 | | | DSPLY58 |
| 0182 | REP | 7 | LAST | 520 | 04,3307 | 00470 | 1 | | | UPDATFLG |
| 0183 | | | | | 04,3310 | 77778 | 1 | DSPLY58 | EXIT | |
| 0184 | REP | 1 | | | 04,3311 | 3 3445 | 1 | | CAP | V06N58SR |
| 0185 | REP | 3 | LAST | 518 | 04,3312 | 0 3427 | 0 | | TC | VNDSPLY |
| 0186 | REP | 1 | | | 04,3313 | 3 3446 | 1 | DSPLY81 | CAP | V06N61SR |
| 0187 | REP | 4 | LAST | 520 | 04,3314 | 0 3427 | 0 | | TC | VNDSPLY |
| 0188 | REP | 65 | LAST | 518 | 04,3315 | 0 8008 | 1 | | TC | INTPRET |
| 0189 | | | | | 04,3316 | 77214 | 0 | | CLEAR | VLOAD |
| 0204 | REP | 2 | LAST | 472 | 04,3317 | 01287 | 0 | | | XDELVFLG |
| 0205 | REP | 13 | LAST | 520 | 04,3320 | 03646 | 0 | | | DELVEBT3 |
| 0206 | REP | 5 | LAST | 473 | 04,3321 | 37646 | 1 | | STCALL | DELVSIN |
| 0207 | REP | 4 | LAST | 486 | 04,3322 | 73005 | 0 | | | VN1645 |
| 0208 | | | | | 04,3323 | 52014 | 0 | | BCN | GOTO |
| 0209 | REP | 3 | LAST | 520 | 04,3324 | 04306 | 0 | | | P39/T9SW |
| 0210 | REP | 1 | | | 04,3325 | 11347 | 1 | | | P39/P79B |
| 0211 | REP | 1 | | | 04,3326 | 11208 | 0 | | | RECYCLE |

R0212 STABLE ORBIT MIDCOURSE PROGRAM (P39 AND P79)

R0213 MOD NO -1 LOG SECTION - STABLE ORBIT - P38-P39

R0214 MOD BY RUDNICKI,S DATE 25JAN68

R0215 FUNCTIONAL DESCRIPTION

R0216 P39 AND P79 CALCULATE THE REQUIRED DELTA V AND OTHER INITIAL

R0217 CONDITIONS REQUIRED BY THE AGC TO MAKE A MIDCOURSE CORRECTION

FOR P39 AND P79

DELTA V

DELTA V (FINAL) = V_T - V_T

GET PERIGEE ALTITUDE

DISPLAY HP, DELTA V, DELTA V (FINAL)

DISPLAY DELTA V (LV)

DISPLAY TRACKONT, T000, ANGA

L STABLE ORBIT - P38-P39

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R0218 MANEUVER AFTER COMPLETING THE SOI MANEUVER BUT BEFORE MAKING
R0219 THE SCR MANEUVER

R0220 CALLING SEQUENCE

R0221 ASTRONAUT REQUEST THRU DSKY

R0222 V37E39E IF THIS VEHICLE IS ACTIVE VEHICLE
R0223 V37E79E IF OTHER VEHICLE IS ACTIVE VEHICLE

R0224 INPUT

R0225 (1) TPASS4 TIME OF INTERCEPT - SAVED FROM P38/P78
R0226 (2) TARTIME TIME THAT PASSIVE VEHICLE IS AT INTERCEPT POINT -
R0227 SAVED FROM P38/P78

R0228 OUTPUT

R0229 (1) TR04CNT NUMBER OF MARKS
R0230 (2) TTOGO TIME TO GO
R0231 (3) MCA MIDDLE GIMBAL ANGLE
R0232 (4) DELTA VC DELTA VELOCITY AT MID - LOCAL VERTICAL COORDINATES

R0233 SUBROUTINES USED

R0234 AVFLAGA
R0235 AVFLAGP
R0236 LOADTIME
R0237 SELECTMU
R0238 PRECSET
R0239 S34/35.1
R0240 MAINRTNE

| | | | | | | | | | | |
|-------|-----|-----|------|-----|---------|----------|----------|--------|----------|---|
| 0241 | REP | 111 | LAST | 518 | 04,3327 | 0 4555 0 | P39 | TC | BANKCALL | |
| 0242 | REP | 4 | LAST | 517 | 04,3330 | 73728 0 | | CADR | AVFLAGA | THIS VEHICLE ACTIVE |
| 0243 | | | | | 04,3331 | 0 0008 1 | | EXTEND | | |
| 0244 | REP | 2 | LAST | 480 | 04,3332 | 3 1422 1 | | DCA | ATIGINC | |
| 0245 | REP | 1 | | | 04,3333 | 0 3340 0 | | TC | P39/P79A | |
| 0246 | REP | 112 | LAST | 521 | 04,3334 | 0 4555 0 | P79 | TC | BANKCALL | OTHER VEHICLE ACTIVE |
| 0247 | REP | 4 | LAST | 517 | 04,3335 | 73741 1 | | CADR | AVFLAGP | |
| 0248 | | | | | 04,3336 | 0 0008 1 | | EXTEND | | |
| 0249 | REP | 2 | LAST | 480 | 04,3337 | 3 1424 1 | | DCA | PTIGINC | |
| 0250 | REP | 9 | LAST | 480 | 04,3340 | 53-764 1 | P39/P79A | DYCH | KT | TIME TO PREPARE FOR BURN |
| 02505 | REP | 113 | LAST | 521 | 04,3341 | 0 4555 0 | | TC | BANKCALL | |
| 02506 | REP | 4 | LAST | 517 | 04,3342 | 73748 0 | | CADR | P20PLCON | SET UPDATPLG, TRACKPLG |
| 0251 | REP | 66 | LAST | 520 | 04,3343 | 0 6008 1 | | TC | INTPRET | |
| 0255 | | | | | 04,3344 | 45014 0 | | SET | CALL | |
| 02555 | REP | 4 | LAST | 520 | 04,3345 | 04088 0 | | | P39/79SW | |
| 0256 | REP | 4 | LAST | 518 | 04,3346 | 10716 0 | | | SELECTMU | SELECT MU, CLEAR FINALPLG, GO TO VN1645 |
| 0257 | | | | | 04,3347 | 43234 0 | P39/P79R | RTR | DAD | |



L STABLE ORBIT - P30-P39

0258 RESP 9 LAST 508 04,3350 45505 0
 0259 RESP 10 LAST 521 04,3351 02364 1
 0259S RESP 25 LAST 519 04,3352 03413 1
 0260 RESP 20 LAST 519 04,3353 34041 0
 0261 RESP 3 LAST 460 04,3354 45354 1
 0262 RESP 3 LAST 461 04,3355 77624 1
 0263 RESP 3 LAST 461 04,3356 72522 1
 0264 RESP 2 LAST 519 04,3357 52145 0
 0265 RESP 1 LAST 519 04,3360 02615 1
 0266 RESP 1 04,3361 11242 0

LOADTIME
 KT
 STORE TIG
 STCALL TDEC1
 PRECSBT
 CALL
 S34/35.1
 DLOAD GOTO
 TARDTIME
 MAINRINE

TIG = T (PRESENT) + PREPARATION TIME
 PRECISION UPDATE ACTIVE AND PASSIVE
 VEHICLES TO TIG
 GET UNIT NORMAL
 CALCULATE DELTA V AND DELTA V (LV)

R0272 PREC/TT
 R0273 SUBROUTINES USED

R0274 PRECSBT
 R0275 TIMETHET
 R0276 S34/35.1

0277 04,3362 71220 1
 0278 RESP 8 LAST 476 04,3363 02367 1
 0279 RESP 26 LAST 522 04,3364 03413 1
 0280 RESP 21 LAST 522 04,3365 34041 0
 0281 RESP 4 LAST 522 04,3366 45354 1
 0282 04,3367 53775 1
 0283 RESP 8 LAST 490 04,3370 03554 0
 0284 04,3371 57176 0
 0285 RESP 3 LAST 488 04,3372 16657 1
 0286 RESP 5 LAST 456 04,3373 03754 1
 0287 04,3374 71406 0
 0288 RESP 3 LAST 456 04,3375 16734 0
 0289 04,3376 43156 1
 0290 RESP 2 LAST 456 04,3377 03466 0
 0291 RESP 3 LAST 456 04,3400 26732 0
 0292 RESP 8 LAST 490 04,3401 03562 0
 0293 04,3402 77657 0
 0294 04,3403 57176 0
 0295 RESP 5 LAST 488 04,3404 36746 1
 0296 RESP 2 LAST 456 04,3405 24737 1
 0297 04,3406 77624 1
 0298 RESP 4 LAST 522 04,3407 72522 1
 0299 04,3410 52145 0
 0300 RESP 3 LAST 519 04,3411 00037 0
 0301 RESP 7 LAST 522 04,3412 02367 1

PREC/TT STO DLOAD
 RTRN
 TIG
 STCALL TDEC1
 PRECSBT
 VLOAD VSR*
 RPASS3
 0,2
 STODL WVEC
 CENTANG
 PUSH COS
 STODL CSTM
 SET
 RVSW
 STODL SMTH
 VPASS3
 VSR*
 0,2
 STCALL WVEC
 TIMETHET
 CALL
 S34/35.1
 DLOAD GOTO
 T
 RTRN

PRECISION UPDATE ACTIVE AND PASSIVE
 VEHICLES TO TIG
 GET TRANSFER TIME BASED ON CENTANG OF
 PASSIVE VEHICLE
 GET UNIT NORMAL

R0302 INTRPVP
 R0303 SUBROUTINES USED

R0304 CMPPREC
 R0305 LEMPREC

0306 04,3413 43020 1
 0307 RESP 8 LAST 522 04,3414 02367 1

INTRPVP STO ROPF
 RTRN

PRECISION UPDATE PASSIVE VEHICLE TO
 TDEC1



L P11

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R0001 EARTH ORBIT INSERTION MONITOR PROGRAM
 R0002 *****

R0003 PROGRAM DESCRIPTION -P11-

R0004 MOD NO. 1
 R0005 MOD BY ELIASSEN

R0006 FUNCTIONAL DESCRIPTION

R0007 P11 IS INITIATED BY

R0008 A) GYROCOMPASS PRO P02 WHEN LIPTOFF DISCRETE IS RECEIVED OR
 R0009 B) BACKUP THRU VERB 75 ENTER

R0010 PROGRAM WILL

R0011 1. ZERO CMC CLOCK AT LIPTOFF (OR UPON RECEIPT OF BACKUP)
 R0012 2. UPDATE TEPHEM TO TIME CMC CLOCK WAS ZEROED
 R0013 3. INITIATE SERVICER AT PREREAD1
 R0014 4. CHANGE MAJOR MODE TO 11
 R0015 5. CLEAR DSKY IN CASE OF V 75
 R0016 6. STORE LIPTOFF IMU-CDU ANGLES FOR ATT. ERROR DISPLAY
 R0017 7. TERMINATE GYROCOMPASSING - -
 R0018 8. COMPUTE INITIAL VECTORS RN, VN - - -
 R0019 9. COMPUTE REFSMAT FOR PRELAUNCH ALIGNMENT WHERE U, U, U ARE
 R0020 - - - X Y Z
 R0021 U =UNIT -R) LOCAL VERTICAL AT TIME OF LIPTOFF
 R0022 Z
 R0023 - - -
 R0024 U =UNIT (A), A=HOR VECTOR AT LAUNCH AZIMUTH
 R0025 X
 R0026 - - -
 R0027 U =U * U
 R0028 U Z X

R0029 10. SET REFSMAT KNOWN FLAG

R0030 11. SET AVGRXIT IN SERVICER TO VHDOT TO
 R0031 COMPUTE AND DISPLAY NOUN 62 EVERY 2 SECONDS

R0032 R1 V1 - INERTIAL VELOCITY MAGNITUDE IN FPS
 R0033 R2 HDOT - RATE OF CHANGE OF VEHICLE VEL IN FPS
 R0034 R3 H - VEHICLE ALTITUDE ABOVE PAD IN NM

R0035 12. DISPLAY BODY AXES ATT. ERRORS ON F0A1 NEEDLES

R0036 A) FROM L.O. TO RPSTART (APPROX. 0 TO +10SECS AFTER L.O.)
 R0037 DESIRED ATTITUDE IS AS STORED AT L.O.
 R0038 B) FROM RPSTART TO POLYSTOP (APPROX. +10 TO +133SECS AFTER L.O.)
 R0039 DESIRED ATTITUDE IS SPECIFIED BY CMC PITCH AND ROLL
 R0040 POLYNOMIALS DURING SATURN ROLLOUT AND PITCHOVER



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R0041 THE DISPLAY IS RUN AS LOW PRIORITY JOB APPROX.
R0042 EVERY 1/2 SEC OR LESS AND IS DISABLED UPON OVFL0 OF TIME1

R0057 SUBROUTINES CALLED

| | | | | | | |
|-------|----------|----------|----------|----------|----------|--------|
| R0058 | 2PHSCHNG | BANKCALL | CALCORA | CDUTRIG | CLEANDSP | DANZIG |
| R0059 | DELAYJOB | BARTH | ENDOPJOB | FINDVAC | IBKCALL | |
| R0060 | INTPRET | LALOTRW | NEEDLER | NEWMODEX | PHASCHNG | |
| R0061 | POSTJUMP | POWRSERS | PREEAD1 | REGDSPR | S11.1 | |
| R0062 | SEREXIT | TASKOVER | TODANZIG | V1ST025 | WAITLIST | |

R0060 ASTRONAUT REQUESTS (IF ALTITUDE ABOVE 300,000 FT)

R0061 DSKY -
R0062 MONITOR DISPLAY OF TIME TO PERIGEE R1 HOURS
R0063 R2 MINUTES

R0064 DSKY -
R0065 MONITOR DISPLAY OF R1 APOGEE ALTITUDE IN NAUTICAL MILES
R0066 R2 PERIGEE ALTITUDE IN NAUTICAL MILES
R0067 R3 TFP IN MINUTES/SECS

R0068 IF ASTRONAUT HAS REQUESTED ANY OF THESE DISPLAYS HE MUST
R0069 HIT KEY RELEASE BUTTON TO RETURN TO NORMAL NOLN 82 DISPLAY

R0070 NORMAL EXIT MODE

R0071 ASTRONAUT VERB 37 ENTER 00 ENTER

R0072 ALARM MODES - NONE

R00721 ABORT EXIT MODES -

R00722 EARLY BOOST ABORT FOLLOWED BY REENTRY V 37 E 62 E
R00723 LATE BOOST ABORT FOLLOWED BY REENTRY V 37 E 61 E

R0073 OUTPUT

R0074 TLIFTOFF (DP) TEPHEM (TP)
R0075 REFSMAT
R0076 DSKY DISPLAY
R0077 FDAI DISPLAY

R0078 ERASABLE INITIALIZATION

R0079 AZO, AXO, -AYO
R0080 LATITUDE
R0081 PADLNG
R0082 TEPHEM
R0083 PNCSTLT



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R0084 POLYNM THRU POLYNM +14D)
R00841 RPSTART
R00842 POLYSTOP
R0085 FLAGS SET OR RESET

R0086 SET REFS=PLG
R0087 SET DVMON IDLE FLAG
R0088 CLEAR BRADFLAG

R0089 DEBRIS

R0090 LIFTTEMP
R0091 POLYNM THRU POLYNM +7
R0092 SPOLYARG
R0093 BODY1, BODY2, BODY3
R0094 VMAG2, ALTI, HDOT
R0095 CENTRALS, CORE SET AND VAC AREAS

| | | | | | | | | | | |
|-------|-----|-----|------|---------|---------|--------|---|----------|---------|------------|
| 0096 | REP | 1 | | | | | | | COUNT | 34/P11 |
| 0097 | REP | 1 | | 4730 | | | | | BITSS-6 | = SUPER011 |
| 0098 | | | | 42,3521 | | | | | BANK | 42 |
| 0099 | REP | 1 | | 34,2000 | | | | | SETLOC | P11ONE |
| 0100 | | | | 34,2002 | | | | | BANK | |
| 0101 | REP | 6 | LAST | 213 | E3,1706 | | | | BRANK= | TSPHEM |
| 0102 | REP | 2 | LAST | 164 | 34,2002 | 3 4744 | 1 | P11 | CA | BRANK3 |
| 0103 | REP | 20 | LAST | 506 | 34,2003 | 54 003 | 0 | | TS | BRANK |
| 0104 | | | | | 34,2004 | 0 0006 | 1 | | EXTEND | |
| 0105 | REP | 1 | | | 34,2005 | 3 2273 | 0 | | DCA | REP11S |
| 0106 | REP | 2 | LAST | 161 | 34,2006 | 52 757 | 0 | | DXCH | -PHASE3 |
| 01061 | REP | 111 | LAST | 509 | 34,2007 | 4 4714 | 0 | | CS | ZERO |
| 01062 | | | | | 34,2010 | 22 007 | 0 | | ZL | |
| 0107 | REP | 2 | LAST | 76 | 34,2011 | 55=265 | 0 | | TS | LIFTTEMP |
| 0108 | REP | 2 | LAST | 161 | 34,2012 | 52 763 | 1 | | DXCH | -PHASE5 |
| 0111 | | | | | 34,2013 | 0 0006 | 1 | P11+7 | EXTEND | |
| 0112 | REP | 1 | | | 34,2014 | 3 2275 | 0 | | DCA | REP11SA |
| 0113 | REP | 1 | | | 34,2015 | 53=337 | 0 | | DXCH | TLIPTOPP |
| 0114 | | | | | 34,2016 | 0 0006 | 1 | | EXTEND | |
| 0115 | REP | 13 | LAST | 408 | 34,2017 | 3 0025 | 0 | | DCA | TIME2 |
| 0116 | REP | 3 | LAST | 526 | 34,2020 | 53=266 | 0 | | DXCH | LIFTTEMP |
| 0117 | REP | 112 | LAST | 526 | 34,2021 | 3 4714 | 1 | | CA | ZERO |
| 0118 | | | | | 34,2022 | 22 007 | 0 | | ZL | |
| 0119 | REP | 14 | LAST | 526 | 34,2023 | 52 025 | 1 | | DXCH | TIME2 |
| 0120 | REP | 2 | LAST | 526 | 34,2024 | 53=337 | 0 | REP11A-2 | DXCH | TLIPTOPP |
| 0121 | REP | 3 | LAST | 526 | 34,2025 | 52 757 | 0 | REP11A-1 | DXCH | -PHASE3 |

DIRECT RESTARTS TO REP11

INACTIVE GROUP 5, PRELAUNCH PROTECTION

FOR RESTARTS

RESRT PHASE



L P11

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| | | | | | | | |
|-------|-----|-----|------|---------|----------|----------|----------------|
| 0122 | | | | 34,2026 | 0 0004 0 | REP11A | INHINT |
| 0123 | | | | 34,2027 | 0 0006 1 | | EXTEND |
| 0124 | REP | 7 | LAST | 526 | 34,2030 | 3 1710 0 | DCA TSPHM +1 |
| 0125 | REP | 2 | LAST | 78 | 34,2031 | 53=271 0 | DACH TSPHM +1 |
| 0126 | REP | 8 | LAST | 527 | 34,2032 | 3 1706 1 | CA TSPHM |
| 0127 | REP | 3 | LAST | 527 | 34,2033 | 57=267 0 | XCH TSPHM |
| 0128 | | | | 34,2034 | 0 0006 1 | | EXTEND |
| 0129 | REP | 3 | LAST | 526 | 34,2035 | 3 1337 1 | DCA TLIFTOFF |
| 0130 | REP | 4 | LAST | 527 | 34,2036 | 21=271 0 | DAS TSPHM +1 |
| 0131 | REP | 5 | LAST | 527 | 34,2037 | 27=267 1 | DAS TSPHM |
| 0132 | REP | 23 | LAST | 503 | 34,2040 | 0 5301 0 | TC PHASONG |
| 0133 | | | | 34,2041 | 05023 0 | | OCT 05023 |
| 0134 | | | | 34,2042 | 22000 1 | | OCT 22000 |
| 0135 | | | | 34,2043 | 0 0004 0 | | INHINT |
| 0136 | | | | 34,2044 | 0 0006 1 | | EXTEND |
| 0137 | REP | 6 | LAST | 527 | 34,2045 | 3 1270 0 | DCA TSPHM |
| 0138 | REP | 9 | LAST | 527 | 34,2046 | 53=707 1 | DACH TSPHM |
| 0139 | REP | 7 | LAST | 527 | 34,2047 | 3 1271 1 | CA TSPHM +2 |
| 0140 | REP | 10 | LAST | 527 | 34,2050 | 57=710 0 | XCH TSPHM +2 |
| 0141 | REP | 1 | | | 34,2051 | 3 2000 0 | CAP ERVCNT |
| 0142 | REP | 21 | LAST | 526 | 34,2052 | 54 003 0 | TS BRANK |
| 01421 | REP | 10 | LAST | 212 | 57,1431 | | BRANK= DVNTR |
| 0143 | REP | 19 | LAST | 248 | 34,2053 | 0 4633 0 | TC IRKCALL |
| 0144 | REP | 1 | | | 34,2054 | 76625 1 | CADR PRERAD1 |
| 0145 | REP | 24 | LAST | 527 | 34,2055 | 0 5301 0 | TC PHASONG |
| 0146 | | | | 34,2056 | 05023 0 | | OCT 05023 |
| 0147 | | | | 34,2057 | 22000 1 | | OCT 22000 |
| 0148 | REP | 4 | LAST | 440 | 34,2060 | 3 4731 0 | CAP .5SEC |
| 0150 | REP | 20 | LAST | 509 | 34,2061 | 0 5140 1 | TC WAITLIST |
| 0151 | REP | 3 | LAST | 210 | 56,1704 | | BRANK= BODY3 |
| 0152 | REP | 2 | LAST | 210 | 34,2062 | 02314 0 | 2CADR ATERTASK |
| 0152 | | | | 34,2063 | 70066 0 | | |
| 0153 | REP | 6 | LAST | 444 | 34,2064 | 0 5243 1 | TC MBRNDRX |
| 0154 | | | | 34,2065 | 00013 0 | | MM 11 |
| 0155 | REP | 115 | LAST | 523 | 34,2066 | 0 4555 0 | TC BRANKCALL |
| 0156 | REP | 3 | LAST | 447 | 34,2067 | 20607 1 | CADR CLEANDSP |
| 0157 | REP | 3 | LAST | 427 | 34,2070 | 0 5261 1 | TC 2PHASONG |
| 0158 | | | | 34,2071 | 40514 0 | | OCT 40514 |
| 0159 | | | | 34,2072 | 00073 0 | | OCT 00073 |
| 0160 | REP | 1 | | | 34,2073 | 3 2001 1 | CAP ERPLACE |
| 0161 | REP | 22 | LAST | 527 | 34,2074 | 54 003 0 | TS BRANK |

CORRECTOR OVERFLOW

ZERO PIPS AND INITIALIZE AVERAGE

CONTINUE HERE ON RESTART

START ATT ERROR DISPLAY
IN .5 SEC

DISPLAY MM 11

CLEAR DSKY IN CASE OF V75

PROTECT ATERTASK



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01611 REP 5 LAST 423 55,1426
016111 REP 1 34,2075 3 2276 0
016112 REP 6 LAST 528 34,2076 55=426 1
0162 34,2077 22 007 0
01621 REP 10 LAST 434 34,2100 3 0032 0
016211 REP 12 LAST 444 34,2101 53=760 0
016212 34,2102 22 007 0
016213 REP 3 LAST 411 34,2103 3 0033 1
016214 REP 2 LAST 93 34,2104 53=762 1
01622 34,2105 22 007 0
016221 REP 7 LAST 411 34,2106 3 0034 0
016222 REP 2 LAST 93 34,2107 53=764 1
016223 REP 67 LAST 521 34,2110 0 6006 1
016224 34,2111 74575 0
016225 REP 13 LAST 528 34,2112 02760 1
016226 REP 14 LAST 528 34,2113 02760 1
0163 34,2114 64375 1
0164 REP 2 LAST 97 34,2115 02467 0
0165 REP 30 LAST 443 34,2116 02672 0
0166 34,2117 53372 1
0167 REP 3 LAST 440 34,2120 02850 0
0168 REP 4 LAST 528 34,2121 16650 0
0169 REP 4 LAST 527 34,2122 01337 1
0170 34,2123 52131 0
0171 REP 6 LAST 514 34,2124 00052 0
0172 REP 1 34,2125 68424 0
0173 REP 2 LAST 423 34,2126 66373 0
0174 REP 68 LAST 528 34,2127 0 6006 1
01741 34,2130 77731 1
01742 REP 10 LAST 492 34,2131 03747 0
01743 34,2132 00000 1
0175 34,2133 65345 0
0176 REP 1 34,2134 01273 0
0177 REP 2 LAST 78 34,2135 01264 0
0178 34,2136 55525 0
0179 REP 6 LAST 445 34,2137 02403 1
0180 REP 6 LAST 276 34,2140 15104 0
0181 REP 2 LAST 514 34,2141 15332 1
0182 34,2142 45014 0
0183 REP 2 LAST 451 34,2143 00662 0
0184 REP 1 34,2144 26373 1

0185 REP 4 LAST 77 34,2145 35232 1
01851 REP 1 34,2146 77256 0
01852 34,2147 77656 1
01853 REP 5 LAST 497 34,2150 25752 0
01854 REP 5 LAST 528 34,2151 01232 0
0186 34,2152 74235 0
0187 REP 5 LAST 289 34,2153 01714 1
0188 REP 1 34,2154 30300 1
    
```

```

BRANK= OPLACES
CA P11XIT
TS OPLACES
ZL
CA CDUX
DXCH OGC
ZL
CA CDUY
DXCH OGC
ZL
CA CDUZ
DXCH MOC
TC INTPRET
VLOAD VSR1
OC
STORE OGC
VLOAD MVV
THETAN
XSM
VSL1 VAD
ERCOMP
STOVL ERCOMP
TLIPTOPF
SSP GOTO
S2
CADR PROUT
EARTH +3
MATRJOR TC INTPRET
SSP
RTX2
0
DLOAD PDDL
PGNCSALT
PADLONG
PDDL VDEF
LATITUDE
STOVL LAT
HIGZEROS
CLEAR CALL
BRADFLAG
LALOTORV

STCALL RN1
CALCGRAV
UNIT
STOVL REFSMAT +12D
RN1
VKV VKSC
UNITW
-ERTHRAT
    
```

```

SET EXIT FROM PROUT IN EARTH
STORE DP GIMBAL
ANGLES FOR ATTITUDE
ERROR DISPLAY
AFTER L.O.
    
```

SCALE OGC B-1

RETURN FROM EARTH

ZERO RTX2
FOR
EARTH

ALTITUDE OF PGNC'S
LONGITUDE

GEODETIC LATITUDE
LAT, LONG, ALT ARE CONSECUTIVE
TIME = 0

CONVERT TO POSITION VECTOR IN REF. COORDS

RETURN WITH GRAVITY
IN MPAC
UNITZ = (UNIT*GRAV)

SCALED AT 1
V = EARTHRAE X R



| L | P11 | | | | | | |
|-------|---------|----------|---------|----------|--------|--------------|---|
| 0189 | | | 34,2155 | 77712 0 | VSL4 | | SCALE TO 2(7) M/CS |
| 0190 | REP 2 | LAST 77 | 34,2156 | 25240 0 | STOVL | VN1 | |
| 0191 | REP 6 | LAST 528 | 34,2157 | 01752 0 | | REFSMAT +12D | |
| 0209 | | | 34,2160 | 53435 0 | VXV | UNIT | |
| 0210 | REP 6 | LAST 528 | 34,2161 | 01714 1 | | UNITW | (REP3 X UNITW) = EAST |
| 0211 | | | 34,2162 | 47208 0 | PUSH | VXV | |
| 0212 | REP 7 | LAST 529 | 34,2163 | 01752 0 | | REFSMAT +12D | (EAST X REP3) = -SOUTH |
| 0213 | | | 34,2164 | 65256 0 | UNIT | PDDL | |
| 0214 | REP 5 | LAST 447 | 34,2165 | 02834 1 | | LAUNCHAZ | COS(AZ)*SOUTH |
| 0215 | | | 34,2166 | 74346 0 | COS | VXSC | |
| 0216 | | | 34,2167 | 77626 0 | STADR | | |
| 0217 | REP 8 | LAST 529 | 34,2170 | 62041 0 | STOVL | REFSMAT | TEMPORARY STORAGE |
| 0218 | REP 6 | LAST 529 | 34,2171 | 02634 1 | | LAUNCHAZ | |
| 0219 | | | 34,2172 | 74356 1 | SIN | VXSC | SIN(AZ)*EAST |
| 0220 | | | 34,2173 | 53455 0 | VAD | UNIT | SIN(AZ)*EAST - COS(AZ)*SOUTH = REP1 |
| 0221 | REP 9 | LAST 529 | 34,2174 | 01736 1 | | REFSMAT | |
| 0222 | REP 10 | LAST 529 | 34,2175 | 01736 1 | STORE | REFSMAT | |
| 0223 | | | 34,2176 | 53435 0 | VXV | UNIT | (REP1 X REP3) = -REP3 |
| 0224 | REP 11 | LAST 529 | 34,2177 | 01752 0 | | REFSMAT +12D | |
| 0225 | | | 34,2200 | 77676 0 | VCOMP | | |
| 0226 | REP 12 | LAST 529 | 34,2201 | 01744 1 | STORE | REFSMAT +6 | |
| 02261 | | | 34,2202 | 45345 1 | DLOAD | DSU | |
| 02262 | REP 11 | LAST 463 | 34,2203 | 15330 0 | | DPHALF | 1/2 REV |
| 02263 | REP 7 | LAST 529 | 34,2204 | 02634 1 | | LAUNCHAZ | |
| 02264 | | | 34,2205 | 65215 1 | DAD | PDDL | |
| 02265 | REP 5 | LAST 445 | 34,2206 | 02401 0 | | AZIMUTH | |
| 02266 | REP 2 | LAST 113 | 34,2207 | 03301 0 | | SATRLRT | SET SATRLRT = -SATRLRT IF |
| 02267 | | | 34,2210 | 45565 0 | SIGN | STADR | (1/2REV -LAUNCHAZ +AZIMUTH) IS NEGATIVE |
| 02268 | REP 3 | LAST 529 | 34,2211 | 74476 1 | STORE | SATRLRT | FOR ROLL CALC IN FDATA ATT. ERROR DISPLAY |
| 0227 | | | 34,2212 | 77414 0 | SET | EXIT | |
| 0228 | REP 2 | LAST 473 | 34,2213 | 01462 0 | | REFSMPLD | SET REFSMAT KNOWN FLAG |
| 0229 | REP 25 | LAST 527 | 34,2214 | 0 5301 0 | TC | PHASCHG | |
| 0230 | | | 34,2215 | 04023 1 | OCT | 04023 | |
| 0231 | | | 34,2216 | 0 0006 1 | EXTEND | | |
| 0232 | REP 1 | | 34,2217 | 3 2302 1 | DCA | P11SCADR | |
| 0233 | REP 1 | | 34,2220 | 53=223 1 | DICH | AVOEXIT | SET AVOEXIT |
| 0234 | REP 2 | LAST 301 | 34,2221 | 3 7665 0 | CA | PRIO31 | 2 SECONDS AT 2(+8) |
| 0235 | REP 9 | LAST 436 | 34,2222 | 55=074 1 | TS | 1/PIPADT | |
| 0236 | REP 5 | LAST 411 | Es,1501 | | BRANK= | RCSPLAS | |
| 0237 | REP 8 | LAST 253 | 34,2223 | 3 4752 0 | CA | BRANK6 | |
| 0238 | REP 23 | LAST 527 | 34,2224 | 54 003 0 | TS | BRANK | |
| 0239 | | | 34,2225 | 0 0004 0 | INHINT | | |
| 0246 | REP 113 | LAST 526 | 34,2226 | 4 4714 0 | CS | ZERO | |
| 0247 | REP 1 | | 34,2227 | 55=063 1 | TS | TRASE5 | RESTART READACCS 2 SRCONDS AFTER LIPTOPP |



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L      P11
0246 REP 10 LAST 430 34,2230 4 0025 1      CS  TIME1
0249 REP 1          34,2231 6 4735 1      AD  2SECS
0250 REP 142 LAST 509 34,2232 10 000 0      CCS  A
0251          34,2233 1 2236 0      TCP  +3
0252          34,2234 1 2236 0      TCP  +2
0253 REP 114 LAST 529 34,2235 3 4714 1      CA  ZERO
0254 REP 65 LAST 518 34,2236 6 4712 1      AD  ONE
0255 REP 21 LAST 527 34,2237 0 5140 1      TC  WAITLIST
0256 REP 14 LAST 212 E6,1661          EBANK= AOC
0257 REP 1          34,2240 02647 0      ZCADR READACCS
0257 REP 1          34,2241 78066 0
0258 REP 4 LAST 527 34,2242 0 5261 1      TC  2PHSCING
0259          34,2243 00003 1      OCT  00003
0260          34,2244 00025 0      OCT  00025
0261 REP 36 LAST 447 34,2245 0 4574 0      TC  POSTJUMP
0262 REP 2 LAST 211 34,2246 77141 0      CADR  NORMLIZE
0263 REP 11 LAST 527 E3,1708          EBANK= TEPHEM
0264          34,2247 0 0004 0      INHINT
0265 REP 1          34,2250 10 763 1      CCS  PHASE5
0266 REP 64 LAST 518 34,2251 0 5112 0      TC  ENDOFJOB
0267 REP 4 LAST 526 34,2252 11=265 0      CCS  LIPTTEMP
0268          34,2253 1 2257 1      TCP  +4
0269          34,2254 1 2257 1      TCP  +3
0270          34,2255 1 2257 1      TCP  +2
0271 REP 1          34,2256 1 2013 0      TCP  P11+7
0272 REP 5 LAST 528 34,2257 4 1336 1      CS  TLIFTOFF
0273          34,2260 0 0006 1      EXTEND
0274 REP 1          34,2261 6 2267 0      BZMP  ENDREP11
0275 REP 15 LAST 526 34,2262 10 024 0      CCS  TIME2
0276 REP 2 LAST 207 34,2263 1 2021 1      TCP  REP11A -5
0277          34,2264 0 0006 1      EXTEND
0279 REP 5 LAST 530 34,2265 3 1266 1      DCA  LIPTTEMP
0280 REP 1          34,2266 1 2024 1      TCP  REP11A-2
0281          34,2267 0 0006 1      ENDREP11 EXTEND
0282 REP 2 LAST 526 34,2270 3 2275 0      DCA  REP11BA
0283 REP 1          34,2271 1 2025 0      TCP  REP11A-1
0284          34,2272 77766 0      REP11S 2OCT 77766 00011
0284          34,2273 00011 1

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DO READACCS 2 SECONDS AFTER LIPTOFF

CHECK TO INSURE DT IS POSITIVE
TIME POSITIVE
CANNOT GET HERE
TIME NEGATIVE - SET TO 1
RESTORE TIME - OR MAKE POSITIVE

TURN OFF GROUP 3
PROTECT NORMLIZE AND READACCS

DO NORMLIZE AND ENDOFJOB

TIME2 MUST BE NON-ZERO AT LIPTOFF
T2,T1 NOT YET ZEROED, GO AND DO IT

T2,T1 ZEROED, SET TLIFTOFF

L P11

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0285 34,2274 77764 1 RSP11SA 2OCT 77764 00013
 0285 34,2275 00013 0
 02851 REF 1 34,2276 02451 0 P11KIT GENADR P11OUT
 0286 34,2277 71704 1 -ERRHRT 2DEC* -7.292115138 E-7 B18* - BARTH RATE AT 2(18)
 0286 34,2300 41735 0
 0288 REF 4 LAST 527 E6,1704 BRANK= BODY3
 0289 REF 1 34,2301 02303 0 P11SCADR 2CADR VHHDOT
 0289 REF 1 34,2302 70066 0
 0290 REF 5 LAST 531 E6,1704 BRANK= BODY3
 R0295 VHHDOT IS EXECUTED EVERY 2 SECONDS TO DISPLAY ON DSKY
 R0296 VI INERTIAL VELOCITY MAGNITUDE
 R0297 HDOT RATE OF CHANGES OF ALT ABOVE L PAD RADIUS
 R0298 H ALTITUDE ABOVE L PAD RADIUS

0299 REF 69 LAST 528 34,2303 0 8006 1 VHHDOT TC INTPRET
 0300 34,2304 77624 1 CALL LOAD VMAGI, ALTI,
 0301 REF 1 34,2305 70436 1 S11.1 HDOT FOR DISPLAY
 0302 34,2306 77776 1 EXIT
 0303 REF 1 34,2307 3 2511 0 CAP V06N62 DISPLAY IN R1 R2 R3
 0304 REF 116 LAST 527 34,2310 0 4555 0 TC BANKCALL VI HDOT H
 0305 REF 1 34,2311 20621 0 CADR RECDSPR DISPLAY INTERPACE - IMMEDIATE RETURN
 0306 REF 117 LAST 531 34,2312 0 4555 0 TC BANKCALL
 0307 REF 1 34,2313 77132 1 CADR SERVEKIT END OF P11SERVE CYCLE
 0308 REF 1 34,2314 3 4701 0 ATERTASK CAP PRIO1 ESTABLISH JOB TO DISPLAY ATT ERRORS
 0309 REF 20 LAST 510 34,2315 0 5042 1 TC FINDVAC COMES HERE AT L.O. + .33 SEC
 0310 REF 6 LAST 531 E6,1704 BRANK= BODY3
 0311 REF 1 34,2316 02326 1 2CADR ATERJOB
 0311 REF 1 34,2317 70066 0
 03111 REF 6 LAST 529 34,2320 4 1501 0 CS RCSPLAGS SET BIT3 FOR
 03112 REF 17 LAST 518 34,2321 7 4710 1 MASK BIT3 NEEDLER
 03113 REF 7 LAST 531 34,2322 27*501 0 ADS RCSPLAGS INITIALIZATION PASS
 03114 REF 20 LAST 527 34,2323 0 4633 0 TC IRNKCALL AND GO
 03115 REF 1 34,2324 42404 1 CADR NEEDLER DO IT
 0312 REF 25 LAST 509 34,2325 0 5213 1 TC TASKOVER

R0313 THIS SECTION PROVIDES ATTITUDE ERROR DISPLAYS TO THE FDAI DURING SOME BOOST

A0315
 A0316
 A0317
 A0318
 A0319
 A0320

COMPUTE DESIRED PITCH W.R.T. LAUNCH SITE LOCAL VERTICAL.
 $PITCH = -.0000469184028 + .00137571556 * T + .0231502280 * T^2 - .0205929365 * T^3$
 SCALED TO 32 REVOLUTIONS
 IF TL = TIME FROM LAUNCH IN SECONDS, THEN $T = 100(TL - 10SEC) / (2**14)$
 WHERE TL GE 10 SEC
 TL LE 133 SEC

A0321
 A0322
 A0323
 A0324
 A0325

COMPUTE DESIRED ROLL WHERE ROLL EQUALS COUNTER-CLOCKWISE ANGLE FROM
 LAUNCHAZ TO -Z(S/C) AS SEEN FROM X(S/C).
 $ROLL = LAUNCHAZ - AZIMUTH - .5 * SATRLRT * T$ IN REV
 SATRLRT = RATE OF ROLL IN REV/CENTI-SEC
 T, IN CENTI-SEC, IS DEFINED AS ABOVE, INCLUSIVE OF TIME RESTRICTIONS



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A0326
A0327

FOR SIMPLICITY, LET $P = 2\pi * \text{PITCH}$
 $R = 2\pi * \text{ROLL}$

A0328
A0329
A0330

CONSTRUCT THE TRANSFORMATION MATRIX, TSW, GIVING DESIRED S/C AXES IN TERMS OF SM COORDINATES. LET THE RESULTING ROWS EQUAL THE VECTORS XDC, YDC, AND ZDC.

A0331
A0332
A0333

$$* \begin{pmatrix} \sin(P) & 0 & -\cos(P) \\ -\sin(R)\cos(P) & -\cos(R) & -\sin(R)\sin(P) \\ -\cos(R)\cos(P) & \sin(R) & -\cos(R)\sin(P) \end{pmatrix} \begin{pmatrix} (XDC) \\ (YDC) \\ (ZDC) \end{pmatrix}$$

A0334
A0335
A0336
A0337

XDC, YDC, ZDC ARE USED AS INPUT TO CALCOTA FOR THE EXTRACTION OF THE EULER SET OF ANGLES WHICH WILL BRING THE SM INTO THE DESIRED ORIENTATION. THIS EULER SET, OGC, IGC, AND MGC, MAY BE IDENTIFIED AS THE DESIRED CDU ANGLES.

A0338
A0339
A0340

(XDC) (OGC)
(YDC) ---) CALCOTA ---) (IGC)
(ZDC) (MGC)

A0341
A0342

DEFINE THE VECTOR DELTACDU.

A0343
A0344
A0345

$$\text{DELTACDU} = \begin{pmatrix} (OGC) & (CDUX) \\ (IGC) & - (CDUY) \\ (MGC) & (CDUZ) \end{pmatrix}$$

A0346
A0347

COMPUTE ATTITUDE ERRORS, A, WHERE $A = \text{TGSC} * \text{DELTACDU}$

A0348
A0349
A0350

$$* \begin{pmatrix} 1 & \sin(CDUZ) & 0 \\ 0 & \cos(CDUX) + \cos(CDUZ) & \sin(CDUX) \\ 0 & -\sin(CDUX) + \cos(CDUZ) & \cos(CDUX) \end{pmatrix} \begin{pmatrix} \text{THE GIMBAL ANGLES} \\ \text{TO SPACECRAFT AXES} \\ \text{CONVERSION MATRIX} \end{pmatrix}$$

A0351
A0352
A0353
A0354

THE ATTITUDE ERRORS, A, ARE STORED ONE HALF SINGLE PRECISION IN THE REGISTERS AK, AK1, AK2 AS INPUT TO NEEDLER, THE PDA1 ATTITUDE ERROR DISPLAY ROUTINE.

| | | | | | | | | | | |
|------|-----|----|------|-----|---------|----------|---------|----------|---------|----------------------------------|
| 0355 | REP | 16 | LAST | 530 | 34,2328 | 30 024 1 | ATERJOB | CAB | TIME2 | CHECK IF MORE THAN |
| 0356 | | | | | 34,2327 | 0 0008 1 | EXTEND | | | 164 SECONDS FROM L.O. |
| 0357 | | | | | 34,2330 | 6 2332 1 | BZP | +2 | | |
| 0358 | REP | 1 | | | 34,2331 | 1 2424 0 | TOP | SATCLEAR | | YES - CLEAR ERROR COUNTER + EXIT |
| 0359 | REP | 10 | LAST | 255 | 34,2332 | 30 102 1 | CAB | FLAGWRD6 | | CHECK FLAGWRD6 |
| 0360 | REP | 8 | LAST | 255 | 34,2333 | 7 4105 0 | MASK | OCT60000 | | BITS 14 + 15 |
| 0361 | | | | | 34,2334 | 0 0008 1 | EXTEND | | | |
| 0362 | REP | 1 | | | 34,2335 | 1 2337 0 | BZP | ATTDISP | | NO SATURN STICK ON |
| 0363 | REP | 1 | | | 34,2336 | 0 2420 0 | TC | ATRSRT | | EXIT - SATURN STICK IN USE |
| 0364 | REP | 2 | LAST | 113 | 34,2337 | 4 1702 1 | ATTDISP | CS | RPSTART | PITCH/ROLL START TIME |
| 0365 | REP | 11 | LAST | 530 | 34,2340 | 6 0025 0 | AD | TIME1 | | |



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03651 34,2341 0 0006 1
 03652 REP 1 34,2342 6 2504 1
 0366 REP 240 LAST 514 34,2343 54 154 0
 0367 REP 2 LAST 113 34,2344 55-707 1
 0368 REP 2 LAST 113 34,2345 6 1703 1
 0369 34,2346 0 0006 1
 0370 34,2347 6 2351 1
 0371 REP 1 34,2350 1 2416 1
 0372 REP 3 LAST 112 34,2351 31-661 1
 0373 REP 60 LAST 509 34,2352 54 001 1
 0374 REP 1 34,2353 3 2510 1
 0375 REP 1 34,2354 0 7164 0

EXTEND
 BZ*P NOPOLY IF MINUS THEN ATTITUDE HOLD
 TS MPAC MPAC = TIME1 - RPSTART
 TS SPOLYANG SAVE FOR USE IN ROLL CALCULATION
 AD POLYSTOP NEG PITCHOVER TIME IN CSECS
 EXTEND
 BZ*P +2
 TCP SATOUT EXIT IF TIME1 OR THAN (RPSTART-POLYSTOP)
 CAS POLYNM
 TS L
 CAS COEPPOLY EVALUATE PITCH POLYNOMIAL
 TC POWRSERS SCALED TO 32 REVOLUTIONS

A0376
 A0377

THE FOLLOWING PAD LOADED COEFFICIENTS ARE
 USED TO COMPUTE THE PITCH POLYNOMIAL

A03771
 A0378
 A0379
 A0380
 A0381
 A0382
 A0383
 A0384
 A0385
 A0386

----- SUNDISK SI COEFS -----
 POLYNM FIVE POLYNOMIAL DEGREE -1
 +1 2DEC -.469184028 E-4 A0
 +3 2DEC .137571556 E-2 A1
 +5 2DEC .231502280 E-1 A2
 +7 2DEC -.205929365 E-1 A3
 +9D 2DEC 0 A4
 +11D 2DEC 0 A5
 +13D 2DEC 0 A6
 POLYLOC = POLYNM +10D

0387 REP 115 LAST 530 34,2355 3 4714 1
 0388 REP 3 LAST 296 34,2356 54 163 1
 0389 REP 70 LAST 531 34,2357 0 6006 1
 0390 34,2360 54201 0
 0391 34,2361 00001 0
 0392 34,2362 20206 1
 0393 34,2363 77606 1

CA ZERO RETURN WITH PITCH(32REV)
 TS MODE STORED IN MPAC, MPAC +1
 TC INTERP
 SETPD SL 32(PITCH(32REV)) = PITCH(REV)
 0
 5
 PUSH LET P(RAD) = 2*PI*PITCH(REV)

0394
 0395 REP 1
 A0396
 A0397

34,2364 77650 1
 34,2365 78103 1

GOTO ATTDISP1 AROUND SETLOC
 *

CONSTRUCT S4 TO S/C MATRIX, TSW

0398 REP 1 37,2000
 0399 37,2103

SETLOC P11TWO
 BANK 36 IN COL., 34 IN DISK

0400 REP 1

COUNT 36/P11

0401 37,2103 57546 1 ATTDISP1
 0402 37,2104 14017 1
 0403 37,2105 77756 0
 0404 37,2106 14013 0
 0405 REP 6 LAST 471 37,2107 15332 1

COS DCQMP
 STODL 14D -.5*COS(P)
 SIN
 STODL 10D .5*SIN(P)
 ZEROVECS



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0408          37,2110  00015 0          STORE 12D          0
A0407
0409          37,2111  41335 1          EVALUATE ROLL = LAUNCHAZ-AZIMUTH-.5*SATRLRT*P
0410 RESP 3 LAST 533 37,2112  03310 0          SLOAD DMP
0411 RESP 4 LAST 529 37,2113  03301 0          SPOLYARG          TIME1 - RPSTART ,CSECS B-14.
0412          37,2114  45231 0          SATRLRT
0413          37,2115  20217 1          SL          DSU
0414 RESP 12 LAST 529 37,2116  15330 0          14D
0415          37,2117  45215 0          DAD          DPHALP
0416 RESP 8 LAST 529 37,2120  02634 1          DSU          ASSUMING X(SM) ALONG LAUNCH AZIMUTH,
0417 RESP 6 LAST 529 37,2121  02401 0          LAUNCHAZ          LAUNCHAZ = ANGLE FROM NORTH TO X(SM).
0418          37,2122  77634 0          AZIMUTH          AZIMUTH = -ANGLE FROM NORTH TO Z(S/C).
0419 RESP 1          37,2123  70473 0          RTB          DETERMINE IF ROLLOUT
0421          37,2124  71406 0          ATDISPR PUSH  RLTST          IS COMPLETED
0422          37,2125  77606 1          PUSH          COS          CONTINUE COMPUTING TSW
0423          37,2126  72405 0          DMP          SL1          LET R(RAD) = 2*PI*ROLL(REV)
0424          37,2127  00017 1          14D
0425          37,2130  14027 1          STOVL 22D          -.5*COS(R)*COS(P)
0426          37,2131  77676 0          DCOMP
0427          37,2132  00023 0          STORE 16D          -.5*COS(R)
0428          37,2133  72405 0          DMP          SL1
0429          37,2134  00013 0          10D
0430          37,2135  14033 1          STOVL 26D          -.5*COS(R)*SIN(P)
0431          37,2136  41556 1          SIN          PUSH
0432          37,2137  00031 0          STORE 24D          .5*SIN(R)
0433          37,2140  72405 0          DMP          SL1
0434          37,2141  00017 1          14D
0435          37,2142  14021 1          STOVL 16D          -.5*SIN(R)*COS(P)
0436          37,2143  77676 0          DCOMP
0437          37,2144  72405 0          DMP          SL1
0438          37,2145  00013 0          10D
0439          37,2146  24025 0          STOVL 20D          -.5*SIN(R)*SIN(P)
0440          37,2147  00013 0          10D

A0441          FROM TSW FIND THE HALF UNIT VECTORS XDC,YDC,ZDC = INPUT TO CALCGTA
0442          37,2150  77656 1          UNIT
0443 RESP 3 LAST 93 37,2151  26714 1          STOVL XDC          XDC = .5*UNITX SIN(P),0,-COS(P)
0444          37,2152  00021 1          16D
0445          37,2153  77656 1          UNIT
0446 RESP 3 LAST 93 37,2154  26722 1          STOVL YDC          YDC = .5*UNITX -SIN(R)*COS(P),-COS(R),
0447          37,2155  00027 1          22D          -SIN(R)*SIN(P))
0448          37,2156  77656 1          UNIT
0449 RESP 3 LAST 93 37,2157  36730 0          STCALL ZDC          ZDC = .5*UNITX -COS(R)*COS(P),SIN(R),
0450 RESP 2 LAST 444 37,2160  47140 1          CALCGTA          -COS(R)*SIN(P))

A0451          CALL CALCGTA TO COMPUTE DESIRED SM ORIENTATION OCC,ICC,AND MCC
A0452          FIND DIFFERENCE VECTOR DELTACTA = OCC-CDAX
A0453

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A04531

ENTER HERE IF ATTITUDE HOLD

| | | | | | | | | | | |
|------|-----|----|-----------------|---------|----------|----------|--------|-------------------------------------|-------------------------------------|------------------|
| 0454 | | | 37,2161 | 41575 0 | NONPOLYM | VLOAD | PUSH | OCC | IOC | |
| 0455 | REP | 15 | LAST 528 | 37,2162 | 02760 1 | | OCC | CHANGE IOC TO MCC FOR COMPATIBILITY | | |
| 0456 | | | | 37,2163 | 45006 0 | | PUSH | CALL | MCC | OCC |
| 0457 | REP | 2 | LAST 497 | 37,2164 | 47432 1 | | | CDUTRIG | WITH Y,Z,X | ORDER OF CDUSPOT |
| 0458 | | | | 37,2165 | 47175 1 | | VLOAD | RTB | DPHI | OCC-CDUX , PD4 |
| 0459 | | | | 37,2166 | 00003 1 | | | 2 | DELTA CDU = DTHETA = IOC-CDUY , 0 | |
| 0460 | REP | 3 | LAST 407 | 37,2167 | 45547 0 | | | V1STO2S | DPSI | MCC-CDUZ , 2 |
| 0461 | REP | 1 | | 37,2170 | 27317 1 | | STOVL | BOOSTEMP | | |
| 0462 | REP | 7 | LAST 533 | 37,2171 | 15332 1 | | | ZEROVCS | | |
| 0463 | | | | 37,2172 | 24001 0 | | STOVL | 0 | | |
| 0464 | REP | 5 | LAST 447 | 37,2173 | 00767 1 | | | CDUSPOT | | |
| 0465 | | | | 37,2174 | 47034 0 | | RTB | RTB | | |
| 0466 | REP | 4 | LAST 535 | 37,2175 | 45547 0 | | | V1STO2S | | |
| 0467 | REP | 1 | | 37,2176 | 70453 1 | | | DELSTOR | | |
| 0468 | | | | 37,2177 | 14013 0 | | STOVL | 10D | | |
| 0469 | REP | 1 | | 37,2200 | 00741 0 | | | SINCDUZ | | |
| 0470 | | | | 37,2201 | 72405 0 | | DMP | SL1 | | |
| 0471 | | | | 37,2202 | 00001 0 | | | 0 | | |
| 0472 | | | | 37,2203 | 60415 1 | | DAD | SR2 | CHANGE SCALE OF AK TO 2REVS | |
| 0473 | | | | 37,2204 | 00005 1 | | | 4 | | |
| 0474 | | | | 37,2205 | 77650 1 | | GOTO | | | |
| 0475 | REP | 1 | | 37,2206 | 70386 0 | | | ATTDISP2 | | |
| 0476 | REP | 2 | LAST 526 | 34,2000 | | | SETLOC | P11ONE | | |
| 0477 | | | | 34,2366 | | | RANK | | | |
| 0478 | REP | 2 | LAST 526 TO 533 | 244 | 244* | | COUNT | 34/P11 | | |
| 0479 | | | | 34,2366 | 14021 1 | ATTDISP2 | STOVL | 16D | 16D, .5(DPHI + DTHETA*SIN(CDUZ)) | |
| 0480 | REP | 1 | | 34,2367 | 00747 0 | | | COSCDUZ | | |
| 0481 | | | | 34,2370 | 41405 0 | | DMP | PUSH | | |
| 0482 | | | | 34,2371 | 00001 0 | | | 0 | | |
| 0483 | | | | 34,2372 | 72405 0 | | DMP | SL1 | | |
| 0484 | REP | 1 | | 34,2373 | 00751 1 | | | COSCDUX | | |
| 0485 | | | | 34,2374 | 41325 0 | | FDDL | DMP | | |
| 0486 | REP | 1 | | 34,2375 | 00743 1 | | | SINCDUX | | |
| 0487 | | | | 34,2376 | 00003 1 | | | 2 | | |
| 0488 | | | | 34,2377 | 72415 1 | | DAD | SL1 | | |
| 0489 | | | | 34,2400 | 77626 0 | | STADR | | | |
| 0490 | | | | 34,2401 | 63756 0 | | STOVL | 17D | 17D, .5(DTHETA*COS(CDUX)*COS(CDUZ) | |
| 0491 | | | | 34,2402 | 72405 0 | | DMP | SL1 | .DPSI*SIN(CDUX)) | |
| 0492 | REP | 2 | LAST 535 | 34,2403 | 00743 1 | | | SINCDUX | | |
| 0493 | | | | 34,2404 | 41325 0 | | FDDL | DMP | | |
| 0494 | REP | 2 | LAST 535 | 34,2405 | 00751 1 | | | COSCDUX | | |
| 0495 | | | | 34,2406 | 00003 1 | | | 2 | | |
| 0496 | | | | 34,2407 | 72425 1 | | DSU | SL1 | | |
| 0497 | | | | 34,2410 | 77626 0 | | STADR | | | |
| 0498 | | | | 34,2411 | 77754 1 | | STORE | 18D | 18D, .5(-DTHETA*SIN(CDUX)*COS(CDUZ) | |
| 0499 | | | | 34,2412 | 77751 1 | | TLOAD | | .DPSI*COS(CDUX)) | |



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| | | | | | | | | | | |
|------|-----|---|------|---------|---------|-------|---|-------|----|-------------------------------------|
| 0500 | | | | 34,2413 | 00021 | 1 | | 16D | | |
| 0501 | REP | 0 | LAST | 244 | 34,2414 | 03077 | 1 | STORE | AK | STORE ATTITUDE ERRORS IN AK,AK1,AK2 |
| 0502 | | | | 34,2415 | 77776 | 1 | | EXIT | | |

A0503

DISPLAY ATTITUDE ERRORS ON FDAI VIA NEEDLER

| | | | | | | | | | | | |
|------|-----|-----|------|-----|---------|--------|---|---------|------|----------|-----------------------------------|
| 0504 | REP | 118 | LAST | 531 | 34,2416 | 0 4555 | 0 | SATOUT | TC | BANKCALL | |
| 0505 | REP | 2 | LAST | 531 | 34,2417 | 42404 | 1 | | CADR | NEEDLER | |
| 0506 | REP | 2 | LAST | 348 | 34,2420 | 3 4113 | 0 | ATERSET | CAP | OCT31 | DELAY .25 SEC |
| 0507 | REP | 119 | LAST | 536 | 34,2421 | 0 4555 | 0 | | TC | BANKCALL | EXECUTION + DELAY = .56SEC APPROX |
| 0508 | REP | 6 | LAST | 511 | 34,2422 | 01732 | 0 | | CADR | DELAYJOB | |
| 0509 | REP | 2 | LAST | 531 | 34,2423 | 0 2326 | 1 | | TC | ATERJOB | END OF ATT ERROR DISPLAY CYCLE |

| | | | | | | | | | | | |
|-------|-----|-----|------|-----|---------|--------|---|----------|--------|----------|----------------------------|
| 0510 | REP | 31 | LAST | 474 | 34,2424 | 4 4705 | 0 | SATCLEAR | CS | BIT6 | |
| 0511 | | | | | 34,2425 | 0 0006 | 1 | | EXTEND | | |
| 0512 | REP | 24 | LAST | 380 | 34,2426 | 03 012 | 1 | | WAND | CHAN12 | CLEAR IMU ERROR COUNTER |
| 0513 | REP | 26 | LAST | 529 | 34,2427 | 0 5301 | 0 | | TC | PHASCHNG | TURN OFF PROTECTION |
| 0514 | | | | | 34,2430 | 00004 | 0 | | OCT | 00004 | FOR ATTITUDE ERROR DISPLAY |
| 05141 | REP | 116 | LAST | 533 | 34,2431 | 3 4714 | 1 | | CAP | ZERO | |
| 05142 | REP | 10 | LAST | 536 | 34,2432 | 55=476 | 1 | | TS | AK | ZERO OUT |
| 05143 | REP | 1 | | | 34,2433 | 55=477 | 0 | | TS | AK1 | AKS FOR |
| 05144 | REP | 1 | | | 34,2434 | 55=500 | 1 | | TS | AK2 | DOWNLINK |
| 0515 | REP | 65 | LAST | 530 | 34,2435 | 0 5112 | 0 | | TC | ENDOFJOB | |

| | | | | | | | | | | | |
|------|-----|-----|------|-----|---------|--------|---|---------|--------|-------------|---------------------------------|
| 0516 | | | | | 34,2436 | 51575 | 1 | S11.1 | VLOAD | ARVAL | |
| 0517 | REP | 7 | LAST | 510 | 34,2437 | 01177 | 1 | | | VN | |
| 0518 | REP | 5 | LAST | 276 | 34,2440 | 27723 | 1 | | STOVL | VMAGI | VI SCALED 2(7) IN METERS/CSEC |
| 0519 | REP | 7 | LAST | 510 | 34,2441 | 01171 | 1 | | | RN | |
| 0520 | | | | | 34,2442 | 45246 | 0 | | ARVAL | DSU | |
| 0521 | REP | 4 | LAST | 510 | 34,2443 | 05311 | 1 | | | RPAD | |
| 0522 | REP | 3 | LAST | 275 | 34,2444 | 27735 | 0 | | STOVL | ALTI | H SCALED 2(29) IN METERS |
| 0523 | REP | 8 | LAST | 536 | 34,2445 | 01171 | 1 | | | RN | |
| 0524 | | | | | 34,2446 | 50256 | 0 | | UNIT | DOT | |
| 0525 | REP | 8 | LAST | 536 | 34,2447 | 01177 | 1 | | | VN | |
| 0526 | | | | | 34,2450 | 77752 | 1 | | SL1 | | |
| 0527 | REP | 2 | LAST | 275 | 34,2451 | 03737 | 1 | | STORE | HDOT | HDOT SCALED 2(7) IN METERS/CSEC |
| 0528 | | | | | 34,2452 | 77616 | 0 | | RVO | | |
| 0529 | REP | 2 | LAST | 535 | 34,2453 | 3 1716 | 0 | DELSTOR | CA | ROOSTEMP | |
| 0530 | | | | | 34,2454 | 0 0006 | 1 | | EXTEND | | STORE DELTACDU INTO PDL 0,2,4 |
| 0531 | REP | 241 | LAST | 533 | 34,2455 | 20 154 | 0 | | MSU | MPAC | |
| 0532 | REP | 6 | LAST | 501 | 34,2456 | 50 120 | 1 | | INDEX | FIXLOC | |
| 0533 | | | | | 34,2457 | 54 000 | 0 | | TS | 0 | |
| 0534 | REP | 3 | LAST | 536 | 34,2460 | 3 1717 | 1 | | CA | ROOSTEMP +1 | |
| 0535 | | | | | 34,2461 | 0 0006 | 1 | | EXTEND | | |
| 0536 | REP | 242 | LAST | 536 | 34,2462 | 20 155 | 1 | | MSU | MPAC +1 | |
| 0537 | REP | 7 | LAST | 536 | 34,2463 | 50 120 | 1 | | INDEX | FIXLOC | |
| 0538 | | | | | 34,2464 | 54 002 | 1 | | TS | 2 | |
| 0539 | REP | 4 | LAST | 536 | 34,2465 | 3 1720 | 0 | | CA | ROOSTEMP +2 | |
| 0540 | | | | | 34,2466 | 0 0006 | 1 | | EXTEND | | |
| 0541 | REP | 243 | LAST | 536 | 34,2467 | 20 156 | 1 | | MSU | MPAC +2 | |

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| | | | | | | | | | | |
|-------|-----|-----|------|-----|---------|----------|----------|--------|------------|--|
| 0542 | REP | 8 | LAST | 538 | 34,2470 | 50 120 1 | | INDEX | FIXLOC | |
| 0543 | | | | | 34,2471 | 54 004 1 | | TS | 4 | |
| 0544 | REP | 2 | LAST | 280 | 34,2472 | 1 6030 0 | | TCF | DANZIG | |
| 0545 | REP | 244 | LAST | 538 | 34,2473 | 3 0154 1 | RLTST | CA | MPAC | DETERMINES IF ROLLOUT IS COMPLETED |
| 05451 | | | | | 34,2474 | 0 0008 1 | | EXTEND | | |
| 05452 | REP | 5 | LAST | 534 | 34,2475 | 7 1701 1 | | MP | SATRLAT +1 | |
| 05453 | | | | | 34,2476 | 0 0008 1 | | EXTEND | | |
| 05454 | REP | 3 | LAST | 537 | 34,2477 | 6 6030 1 | | BZMP | DANZIG | UNLIKE SIGNS STILL ROLLING ROLLOUT COMPLETED |
| 0546 | | | | | 34,2500 | 0 0008 1 | | EXTEND | | ZERO OUT ROLL CONTRIBUTION |
| 05461 | REP | 1 | | | 34,2501 | 3 3561 0 | | DCA | MEDYCTL +2 | |
| 05462 | REP | 245 | LAST | 537 | 34,2502 | 52 155 1 | | DXCH | MPAC | |
| 05463 | REP | 4 | LAST | 537 | 34,2503 | 0 6030 1 | | TC | DANZIG | |
| 05464 | REP | 71 | LAST | 533 | 34,2504 | 0 6008 1 | NOPLY | TC | INTPRET | COMES HERE IF ATTITUDE HOLD |
| 05465 | | | | | 34,2505 | 52001 1 | | SETPD | OOTO | |
| 05466 | | | | | 34,2506 | 00001 0 | | | 0 | |
| 05467 | REP | 1 | | | 34,2507 | 76161 0 | | | NOPLYM | |
| 0547 | REP | 1 | | | 34,2510 | 01673 1 | CORPPOLY | ADRES | POLYLOC | |
| 0548 | | | | | 34,2511 | 01476 0 | V08N62 | VN | 0862 | |

R0552 SATURN TAKEOVER FUNCTION

R0553 *****

R0554 PROGRAM DESCRIPTION

R0555 MOD NUMBER 1
R0556 MOD BY ELIASSEN

R0557 FUNCTIONAL DESCRIPTION

R0558 DURING THE COASTING PHASE OF SIVR ATTACHED, THE
R0559 ASTRONAUT MAY REQUEST SATURN TAKEOVER THROUGH
R0560 EXTENDED VERB 46 (BITS 13,14 OF DAPDATR1 SET).
R0561 THE QMC REGARDS RMC COMMANDS AS BODY-AXES RATE
R0562 COMMANDS AND IT TRANSMITS THESE TO SATURN AS DC
R0563 VOLTAGES. THE VALUE OF THE CONSTANT RATE COMMAND
R0564 IS 0.5 DEG/SEC. AN ABSENCE OF RMC ACTIVITY RE-
R0565 SULTS IN A ZERO RATE COMMAND.

R0566 THE PDAI ERROR NEEDLES WILL INDICATE THE VALUE
R0567 OF THE RATE COMMAND.

R0568 CALLING SEQUENCE

R0569 DAPFIG +D TC POSTJUMP
R0570 CADR SATSTCON

R0571 SUBROUTINES CALLED

R0572 ERDCT
R0573 TRNCALL
R0574 STICKON



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R0575 NEEDLER
R0576 TSDUPT
R0577 RESUME

R0578 ASTRONAUT REQUESTS

R0579 ENTRY - VERB 46 ENTER
R0580 (CONDITION - BITS 13, 14 OF DAPDATR1 SET)

R0581 EXIT - VERB 46 ENTER (FLASH V06N46)
R0582 VERB 21 ENTER AXXXX ENTER WHERE A=0 OR 1
R0583 VERB 34 ENTER
R0584 VERB 46 ENTER

R0585 NORMAL EXIT MODE

R0586 VERB 46 ENTER (SEE ASTRONAUT ABOVE)

R0587 ALARM OR ABORT EXIT MODES

R0588 NONE

R0589 OUTPUT

R0590 SATURN RATES IN CDUXCMD, CDUYCMD, CDUZCMD

R0591 ERASABLE INITIALIZATION

R0592 DAPDATR1 (BITS 13,14 MUST BE SET)

R0593 DEBRIS

R0594 CENTRALS
R0595 CDUXCMD, CDUYCMD, CDUZCMD

| | | | | | | |
|--------|-----|----|------|---------|------------------|-----------------|
| 0596 | | | | 43,3211 | | BANK 43 |
| 0597 | REP | 3 | LAST | 248 | 43,2000 | SETLOC EXTVERRS |
| 0598 | | | | | 43,3211 | BANK |
| 0599 | REP | 1 | | | | COUNT 23/STIKE |
| 0600 | | | | | 43,3211 0 0006 1 | SATSTICK EXTEND |
| 06001 | REP | 1 | | | 43,3212 3 3227 0 | DCA 2REDOSAT |
| 06002 | | | | | 43,3213 0 0004 0 | INHINT |
| 06003 | REP | 5 | LAST | 255 | 43,3214 53=313 0 | DXCH TSILOC |
| 06004 | REP | 12 | LAST | 424 | 43,3215 3 4872 0 | CAP POSMAX |
| 0601 | REP | 3 | LAST | 186 | 43,3216 54 030 0 | TS TIMES |
| 06011 | REP | 11 | LAST | 532 | 43,3217 4 0102 0 | CS FLAGWRD6 |
| 06012 | REP | 2 | LAST | 130 | 43,3220 7 4105 0 | MASK RELTAB11 |
| 06013 | REP | 12 | LAST | 538 | 43,3221 28 102 0 | ADS FLAGWRD6 |
| 060132 | REP | 21 | LAST | 531 | 43,3222 0 4633 0 | TC IRKCALL |

TURN ON BITS 15,14 OF
FLAGWRD6
SATSTICK CONTROL OF TS
ZERO JET CHANNELS IN 14 MS AND THEN

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| | | | | | | | | | | | | |
|--------|-----|----|------|---------|---------|-------|--------|---------|----------|-----------------------------|-----------------------------------|------------------------------------|
| 000134 | REP | 1 | | 43,3223 | 42616 | 0 | CADR | ZEROJET | | LEAVE THE TS CLOCK DISABLED | | |
| 00014 | | | | 43,3224 | 0 | 0003 | RELINT | | | | | |
| 00015 | REP | 27 | LAST | 261 | 43,3225 | 0 | 2121 | 1 | TC | GOPIN | EXIT THIS BECAUSE WE CAME VIA V46 | |
| 000151 | REP | 7 | LAST | 531 | E6,1704 | | | | BRANK | BODY3 | | |
| 00016 | REP | 2 | LAST | 189 | 43,3226 | 02765 | 1 | | 2REDOSAT | 2CADR | REDOSAT | |
| 00016 | | | | | 43,3227 | 46106 | 1 | | | | | |
| 000162 | | | | | 32,2017 | | | | BANK | 32 | | |
| 000164 | REP | 1 | | | 23,2000 | | | | SETLOC | P11FOUR | | |
| 000166 | | | | | 23,2765 | | | | BANK | | | |
| 0002 | REP | 3 | LAST | 219 | 23,2765 | 22 | 016 | 0 | REDOSAT | LXCH | BANKRUPT | ALSO COMES HERE FOR RESTARTS |
| 00021 | | | | | 23,2766 | 0 | 0006 | 1 | EXTEND | | | |
| 00022 | REP | 3 | LAST | 219 | 23,2767 | 22 | 012 | 1 | QKCH | CRUPT | | |
| 00023 | REP | 8 | LAST | 531 | 23,2770 | 4 | 1501 | 0 | CS | RCSFLAGS | | TURN ON BITS OF RCSFLAGS |
| 00024 | REP | 18 | LAST | 531 | 23,2771 | 7 | 4710 | 1 | MASK | BIT3 | | FOR |
| 00025 | REP | 9 | LAST | 539 | 23,2772 | 27 | 501 | 0 | ADS | RCSFLAGS | | NEEDLER INITIALIZATION |
| 0003 | REP | 22 | LAST | 538 | 23,2773 | 0 | 4633 | 0 | TC | IRKCALL | | |
| 0004 | REP | 3 | LAST | 536 | 23,2774 | 42404 | 1 | | CADR | NEEDLER | | DISABLE IMU ERR COUNTERS ETC. |
| 0005 | REP | 18 | LAST | 251 | 23,2775 | 3 | 4702 | 0 | CAP | BIT9 | | SIVE |
| 0006 | | | | | 23,2776 | 0 | 0006 | 1 | EXTEND | | | TAKROVER |
| 0007 | REP | 25 | LAST | 536 | 23,2777 | 05 | 012 | 1 | WOR | CHAN12 | | ENABLE |
| 0008 | | | | | 23,3000 | 0 | 0006 | 1 | EXTEND | | | SET UP TS CYCLE |
| 0009 | REP | 1 | | | 23,3001 | 3 | 3046 | 0 | DCA | 2SATSTCK | | |
| 0010 | REP | 6 | LAST | 538 | 23,3002 | 53 | 313 | 0 | DYCH | TSLOC | | |
| 0011 | REP | 1 | | | 23,3003 | 3 | 3044 | 1 | CAP | 100MST5 | | IN 100 MSEC5 |
| 0012 | REP | 4 | LAST | 538 | 23,3004 | 54 | 030 | 0 | TS | TIM55 | | |
| 0013 | REP | 25 | LAST | 228 | 23,3005 | 1 | 5222 | 1 | TCF | RESUME | | END OF SATURN STICK INITIALIZATION |

00014

THIS SECTION IS EXECUTED EVERY 100 MSEC5

| | | | | | | | | | | | | |
|------|-----|----|------|-----|---------|-------|------|---|----------|----------|----------|----------------------------|
| 0015 | REP | 4 | LAST | 539 | 23,3006 | 22 | 016 | 0 | SATSTICK | LXCH | BANKRUPT | |
| 0016 | | | | | 23,3007 | 0 | 0006 | 1 | EXTEND | | | |
| 0017 | REP | 4 | LAST | 539 | 23,3010 | 22 | 012 | 1 | QKCH | CRUPT | | |
| 0018 | REP | 2 | LAST | 539 | 23,3011 | 3 | 3045 | 0 | CAP | 2SATSTCK | | SET UP RUPT |
| 0019 | REP | 7 | LAST | 539 | 23,3012 | 55 | 312 | 1 | TS | TSLOC | | LO ORDER LOC SET |
| 0020 | REP | 2 | LAST | 539 | 23,3013 | 3 | 3044 | 1 | CAP | 100MST5 | | 100 MSEC5 |
| 0021 | REP | 5 | LAST | 539 | 23,3014 | 54 | 030 | 0 | TS | TIM55 | | |
| 0022 | REP | 1 | | | 23,3015 | 3 | 3043 | 0 | CAP | STIKRITS | | |
| 0023 | | | | | 23,3016 | 0 | 0006 | 1 | EXTEND | | | |
| 0024 | REP | 2 | LAST | 384 | 23,3017 | 06 | 031 | 0 | RKOR | CHAN31 | | CHECK IF MAN ROT RITS SAME |
| 0025 | REP | 2 | LAST | 539 | 23,3020 | 7 | 3043 | 1 | MASK | STIKRITS | | |
| 0026 | REP | 23 | LAST | 539 | 23,3021 | 0 | 4633 | 0 | TC | IRKCALL | | SET RATE INDIC55 |
| 0027 | REP | 1 | | | 23,3022 | 43114 | 1 | | CADR | STICKCHK | | FOR PITCH YAW AND ROLI. |
| 0028 | REP | 2 | LAST | 108 | 23,3023 | 51 | 656 | 0 | INDEX | RWANDX | | SET SATURN RATES |
| 0029 | REP | 1 | | | 23,3024 | 3 | 3037 | 0 | CA | SATRAT5 | | |
| 0030 | REP | 11 | LAST | 538 | 23,3025 | 55 | 476 | 1 | TS | AK | | ROLI. |



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| | | | | | | | | |
|------|-----|----|------|-----|---------|----------|----------|----------------|
| 0631 | REP | 2 | LAST | 108 | 23,3026 | 51=657 1 | INDEX | PMANDEX |
| 0632 | REP | 2 | LAST | 539 | 23,3027 | 3 3037 0 | CA | SATRAT |
| 0633 | REP | 2 | LAST | 536 | 23,3030 | 55=477 0 | TS | AK1 |
| 0634 | REP | 2 | LAST | 112 | 23,3031 | 51=660 0 | INDEX | YMANDEX |
| 0635 | REP | 3 | LAST | 540 | 23,3032 | 3 3037 0 | CA | SATRAT |
| 0636 | REP | 2 | LAST | 536 | 23,3033 | 55=500 1 | TS | AK2 |
| 0637 | REP | 24 | LAST | 539 | 23,3034 | 0 4633 0 | TC | IBKCALL |
| 0638 | REP | 4 | LAST | 539 | 23,3035 | 42404 1 | CADR | NEEDLER |
| 0639 | REP | 26 | LAST | 539 | 23,3036 | 1 5222 1 | TCF | RESLNE |
| 0640 | | | | | 23,3037 | 00000 1 | SATRAT | DEC |
| 0641 | | | | | 23,3040 | 00476 1 | DEC | +316 |
| 0642 | | | | | 23,3041 | 77301 0 | DEC | -316 |
| 0643 | | | | | 23,3042 | 00000 1 | DEC | 0 |
| 0644 | | | | | 23,3043 | 00077 1 | STIKRITS | OCT 00077 |
| 0645 | | | | | 23,3044 | 37766 1 | 100MSTS | DEC 16374 |
| 0646 | REP | 8 | LAST | 539 | B6,1704 | | BRANK= | BODY3 |
| 0647 | REP | 1 | | | 23,3045 | 03006 1 | 2SATSTCK | 2CADR SATSTICK |
| 0647 | REP | 1 | | | 23,3046 | 46106 1 | | |

PITCH

YAW

FOR SATURN INTERSPACE AND PDAI DISPLAY

END OF SATURN STICK CONTROL
 IN DETENT - ZERO RATE
 POS RATE .50/S R, .30/S P AND Y
 NEG RATE DITTO
 POS NEG BITS ON ASSUME IN DETENT

L TPI SEARCH

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R2000 PROGRAM DESCRIPTION S17.1 AND S17.2

R2001 FUNCTIONAL DESCRIPTION

R2002 THE TPI SEARCH ROUTINE DETERMINES THE MINIMUM TOTAL VELOCITY TRANSFER TRAJECTORY FROM A GIVEN TPI
R2004 MANEUVER TIME WITHIN THE CONSTRAINT OF A SAFE PERICENTER. THIS VELOCITY IS THE SUM OF THE IMPULSIVE VELOCITIES
R2006 FOR THE TPI AND TPF MANEUVERS.

R2007 THE S17.1 ROUTINE EXTRAPOLATES THE STATE VECTORS OF BOTH VEHICLES TO THE TPI TIME AND COMPUTES THE
R2009 RELATIVE PHASE ANGLE BETWEEN THE VEHICLES, THE ALTITUDE DIFFERENCE (I.E. THE MAGNITUDE DIFFERENCE OF THE
R2011 POSITION VECTORS) AND SELECTS A SEARCH SECTOR BASED ON THE SIGN OF THE ALTITUDE DIFFERENCE.

R2013 THE S17.2 ROUTINE FURTHER DEFINES THE SEARCH SECTOR BY COMPUTING ANGULAR LIMITS AND USES THE TIME THETA
R2015 SUBROUTINE TO COMPUTE THE SEARCH START AND END TIMES. THE SEARCH IS THEN MADE IN AN ITERATIVE LOOP USING THE
R2017 LAMBERT SUBROUTINE TO COMPUTE THE VELOCITIES REQUIRED AT TPI TIME AND AT TPF TIME. EXIT FROM THE SEARCH LOOP
R2019 IS MADE WHEN SOLUTION CRITERIA ARE MET (NORMAL EXIT) OR AS SOON AS IT IS EVIDENT THAT NO SOLUTION EXISTS IN
R2021 THE SECTOR SEARCHED.

R2022 CALLING SEQUENCE

R2023 BOTH ROUTINES ARE CALLED IN INTERPRETIVE CODE AND RETURN VIA QPRET. S17.1 HAS ONLY A NORMAL EXIT.
R2025 S17.2 RETURNS VIA QPRET FOR NORMAL EXIT AND TO ALARMS FOR ERROR EXIT.
R2026 SUBROUTINES CALLED

R2029 CSMCONIC
R2030 LEMCONIC
R2031 TIMETHET
R2032 INITVEL

| | | | |
|------|-----------------|---------|--------------|
| 2033 | | 36,2000 | BANK 36 |
| 2034 | REP 1 | 36,2000 | SETLOC P175 |
| 2035 | | 36,2000 | BANK |
| 2036 | REP 1 | | COUNT 36/TPI |
| 2037 | REP 17 LAST 520 | B7,1537 | EBANK= RACT3 |

R2038 **** TEMPORARY ****

| | | | | | | |
|------|---------|---------|----------|------|-----------------|--|
| 2039 | 36,2000 | 00004 0 | HPE | 2DEC | 157420.0 B-29 | EARTH'S MIN. PERICENTER ALTITUDE 85 N.M. |
| 2039 | 36,2001 | 31566 0 | | | | |
| 2040 | 36,2002 | 00000 1 | HPL | 2DEC | 10668.0213 B-29 | MOON'S MIN. PERICENTER ALTITUDE 35000FT |
| 2040 | 36,2003 | 12326 0 | | | | |
| 2041 | 36,2004 | 00002 0 | CDSEC | 2DEC | 40000 | |
| 2041 | 36,2005 | 16100 1 | | | | |
| 2042 | 36,2006 | 00000 1 | CLSEC | 2DEC | 15000 | |
| 2042 | 36,2007 | 35230 0 | | | | |
| 2043 | 36,2010 | 12137 1 | PIINVERS | 2DEC | .3183098862 | |
| 2043 | 36,2011 | 06033 1 | | | | |
| 2044 | 36,2012 | 06161 1 | SFC1THET | 2DEC | .1944444444 | |
| 2044 | 36,2013 | 30707 1 | | | | |



L TPI SEARCH

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| | | | | | | | | | | | | |
|------|-----|----|------|---------|---------|-------|----------|------|-------------|---------|--------------------------------|-------|
| 2045 | | | | 36,2014 | 35252 | 1 | SEC2THET | 2DEC | .9166666667 | | | |
| 2045 | | | | 36,2015 | 25253 | 1 | | | | | | |
| 2046 | | | | 36,2016 | 67777 | 1 | MANYPEST | 2DEC | -1.0 | B-2 | | |
| 2046 | | | | 36,2017 | 77777 | 0 | | | | | | |
| 2047 | | | | 36,2020 | 00000 | 1 | LIMVEL | 2DEC | .6096 | E-2 B-7 | 2PPS | |
| 2047 | | | | 36,2021 | 30760 | 0 | | | | | | |
| 2048 | | | | 36,2022 | 00000 | 1 | DPTMOON | 2DEC | .1524 | E3 R-29 | 500 FEET | |
| 2048 | | | | 36,2023 | 00114 | 0 | | | | | | |
| 2049 | | | | 36,2024 | 00040 | 0 | DP-.002 | 2DEC | 0.002 | | | |
| 2049 | | | | 36,2025 | 30447 | 0 | | | | | | |
| 2050 | | | | 36,2026 | 71220 | 1 | S17.1 | STO | DLOAD | | | |
| 2051 | REP | 17 | LAST | 490 | 36,2027 | 01340 | 1 | | NORMEX | | | |
| 2052 | REP | 19 | LAST | 464 | 36,2030 | 03663 | 1 | | TPI | | | |
| 2053 | REP | 22 | LAST | 522 | 36,2031 | 34041 | 0 | | STCALL | TDEC1 | ADVANCE PASSIVE VEHICLE TO TPI | |
| 2054 | REP | 1 | | | 36,2032 | 27057 | 0 | | LEMCONIC | | | |
| 2055 | | | | | 36,2033 | 77624 | 1 | | CALL | | | |
| 2056 | REP | 2 | LAST | 490 | 36,2034 | 45372 | 0 | | LEMSTORE | | | |
| 2057 | | | | | 36,2035 | 77745 | 1 | | DLOAD | | | |
| 2058 | REP | 11 | LAST | 542 | 36,2036 | 03663 | 1 | | TPI | | | |
| 2059 | REP | 23 | LAST | 542 | 36,2037 | 34041 | 0 | | STCALL | TDEC1 | ADVANCE ACTIVE VEHICLE TO TPI | |
| 2060 | REP | 1 | | | 36,2040 | 27045 | 0 | | CSMCONIC | | | |
| 2061 | | | | | 36,2041 | 77624 | 1 | | CALL | | | |
| 2062 | REP | 2 | LAST | 490 | 36,2042 | 45402 | 0 | | CSMSTORE | | | |
| 2063 | | | | | 36,2043 | 77775 | 1 | | VLOAD | | | |
| 2064 | REP | 18 | LAST | 541 | 36,2044 | 03540 | 0 | | RACT3 | | | |
| 2065 | | | | | 36,2045 | 63248 | 1 | | ARVAL | PDVL | /RA/ 0D | PL 2D |
| 2066 | REP | 9 | LAST | 522 | 36,2046 | 03554 | 0 | | RPASS3 | | | |
| 2067 | | | | | 36,2047 | 65256 | 0 | | UNIT | PDLL | UNIT RP 0D | PL 6D |
| 2068 | | | | | 36,2050 | 43021 | 0 | | BDSU | SET | | |
| 2069 | | | | | 36,2051 | 00045 | 0 | | 36D | | /RP/ -/RA/ | |
| 2070 | REP | 1 | | | 36,2052 | 00076 | 0 | | KFLAG | | OPP = + | |
| 2071 | | | | | 36,2053 | 43040 | 1 | | RAN | CLEAR | | |
| 2072 | | | | | 36,2054 | 74056 | 1 | | +2 | | | |
| 2073 | REP | 2 | LAST | 542 | 36,2055 | 00276 | 1 | | KFLAG | | ON = - | |
| 2074 | REP | 2 | LAST | 276 | 36,2056 | 27754 | 1 | | STOVL | DELHITE | | |
| 2075 | | | | | 36,2057 | 00001 | 0 | | 0D | | | |
| 2076 | | | | | 36,2060 | 53435 | 0 | | VXV | UNIT | | |
| 2077 | REP | 9 | LAST | 522 | 36,2061 | 03562 | 0 | | VPASS3 | | | |
| 2078 | REP | 1 | | | 36,2062 | 27646 | 0 | | STOVL | E2 | ALMOST IT SAVE FOR 17.2 | |
| 2079 | REP | 19 | LAST | 542 | 36,2063 | 03540 | 0 | | RACT3 | | | |
| 2080 | | | | | 36,2064 | 48206 | 1 | | PUSH | VPROJ | | |
| 2081 | REP | 2 | LAST | 542 | 36,2065 | 03646 | 0 | | E2 | | | |
| 2082 | | | | | 36,2066 | 51352 | 1 | | VSI.2 | BVSU | RPA | |
| 2083 | | | | | 36,2067 | 50256 | 0 | | UNIT | DOT | | |
| 2084 | | | | | 36,2070 | 00001 | 0 | | 0D | | | |
| 2085 | | | | | 36,2071 | 65552 | 0 | | SL1 | ACOS | | |
| 2086 | | | | | 36,2072 | 77715 | 1 | | PDVL | | | |
| 2087 | | | | | 36,2073 | 50235 | 0 | | VXV | DOT | | |
| 2088 | REP | 20 | LAST | 542 | 36,2074 | 03540 | 0 | | RACT3 | | | |
| 2089 | REP | 3 | LAST | 542 | 36,2075 | 03646 | 0 | | E2 | | | |

L TPI SEARCH

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| | | | | | | | |
|--------|--|----|----------|---------|---------|--------|----------|
| 2090 | | | 36,2076 | 75325 1 | FDDL | SIGN | |
| 2091 | | | 36,2077 | 77626 0 | STADR | | |
| 2092 | REP | 3 | LAST 276 | 36,2100 | 61160 1 | STOCL | THETZERO |
| 2093 | REP | 8 | LAST 519 | 36,2101 | 00047 1 | | X1 |
| 2094 | REP | 2 | LAST 124 | 36,2102 | 37746 0 | STCALL | XRS |
| 2095 | REP | 18 | LAST 542 | 36,2103 | 01340 1 | | MONKEY |
| 2096 | | | 36,2104 | 77220 1 | STQ | VLOAD | 817.2 |
| 2097 | REP | 2 | LAST 121 | 36,2105 | 03657 0 | | OTEMP |
| 2098 | REP | 21 | LAST 542 | 36,2106 | 03540 0 | | FACT3 |
| 2099 | | | 36,2107 | 50256 0 | UNIT | DOT | |
| 2100 | REP | 4 | LAST 542 | 36,2110 | 03646 0 | | B2 |
| 2101 | | | 36,2111 | 75446 0 | ABS | SCRT | |
| 2102 | | | 36,2112 | 43352 1 | SL1 | DAD | |
| 2103 | REP | 1 | | 36,2113 | 34025 1 | | DP-.002 |
| 2104 | | | 36,2114 | 57414 1 | BCN | DCOMP | |
| 2105 | REP | 3 | LAST 542 | 36,2115 | 00316 0 | | KFLAG |
| 2106 | | | 36,2116 | 74117 0 | | | +1 |
| R2107 | PHI(0)=180-(-(THETAZERO+K5IT)), PHI(1)=180-(-(THETAZERO+K2IT)) | | | | | | |
| R2108 | SIN(180-ALPHA)=SIN(ALPHA) ETC | | | | | | |
| 2109 | | | 36,2117 | 40205 1 | DMP | SETD | |
| 210905 | REP | 1 | | 36,2120 | 34011 0 | | PIINVERS |
| 2110 | | | 36,2121 | 00001 0 | | GD | |
| 2111 | | | 36,2122 | 45206 1 | PUSH | DSU | |
| 2112 | REP | 4 | LAST 543 | 36,2123 | 02617 0 | | THETZERO |
| 2113 | REP | 2 | LAST 92 | 36,2124 | 02611 0 | STORE | IT |
| 2114 | | | 36,2125 | 41525 0 | FDDL | PUSH | |
| 2115 | | | 36,2126 | 43342 0 | SR1 | DAD | |
| 2116 | | | 36,2127 | 41415 1 | DAD | PUSH | |
| 2117 | | | 36,2130 | 43156 1 | SIN | SET | |
| 2118 | REP | 3 | LAST 522 | 36,2131 | 03466 0 | | RVS |
| 2119 | REP | 4 | LAST 522 | 36,2132 | 16732 0 | STOCL | SNH |
| 2120 | | | 36,2133 | 50146 1 | COS | RNN | |
| 212005 | | | 36,2134 | 74136 0 | | +2 | |
| 21201 | | | 36,2135 | 77676 0 | DCOMP | | |
| 2121 | REP | 4 | LAST 522 | 36,2136 | 16734 0 | STOCL | CSTH |
| 212105 | REP | 3 | LAST 543 | 36,2137 | 03746 1 | | XRS |
| 21211 | REP | 9 | LAST 543 | 36,2140 | 24047 1 | STOVL | X1 |
| 2122 | REP | 10 | LAST 542 | 36,2141 | 03554 0 | | RPASS3 |
| 2123 | | | 36,2142 | 77657 0 | VSR* | | |
| 2124 | | | 36,2143 | 57176 0 | | 0,2 | |
| 2125 | REP | 4 | LAST 522 | 36,2144 | 26657 1 | STOVL | RVEC |
| 2126 | REP | 10 | LAST 542 | 36,2145 | 03562 0 | | VPASS3 |
| 2127 | | | 36,2146 | 77657 0 | VSR* | | |
| 2128 | | | 36,2147 | 57176 0 | | 0,2 | |
| 2129 | REP | 6 | LAST 522 | 36,2150 | 36746 1 | STCALL | VVEC |
| 2130 | REP | 3 | LAST 522 | 36,2151 | 24737 1 | | TIMSTHET |
| 2131 | | | 36,2152 | 77745 1 | DLOAD | | |
| 2132 | REP | 4 | LAST 522 | 36,2153 | 00037 0 | | T |
| 2133 | REP | 2 | LAST 124 | 36,2154 | 03752 1 | STORE | TP |
| 2134 | REP | 2 | LAST 92 | 36,2155 | 16627 0 | STOCL | TPO |

CENTRAL ANGLE
 SAVE INDICES FOR FURTHER USE
 += ACTIVE AHEAD -= ACTIVE BEHIND
 COMPUTE SEARCH SECTOR LIMITS

ADD .002 RADIANS TO IT
 GIVES CORRECT SINE, COSINE MUST BE
 COMP. ADD .5 FOR ANGLE

REVOLUTIONARY HERES TWO IT

PHI(1) , -(THETZERO + K2IT)

PHI(0) , -(THETZERO + K5IT)

SAVE START TIME AND GET END TIME



L TPI SEARCH

| | | | | | | | |
|--------|-----------------------------------|----|------|-----|---------|-------|---|
| 2135 | REP | 3 | LAST | 543 | 36,2156 | 02611 | 0 |
| 2136 | | | | | 36,2157 | 73408 | 1 |
| 2137 | REP | 5 | LAST | 543 | 36,2160 | 16732 | 0 |
| 2138 | | | | | 36,2161 | 50146 | 1 |
| 213805 | | | | | 36,2162 | 74164 | 1 |
| 21381 | | | | | 36,2163 | 77676 | 0 |
| 2139 | REP | 5 | LAST | 543 | 36,2164 | 02734 | 0 |
| 2140 | | | | | 36,2165 | 45150 | 1 |
| 2141 | REP | 4 | LAST | 543 | 36,2166 | 03745 | 1 |
| 2142 | REP | 4 | LAST | 543 | 36,2167 | 24737 | 1 |
| R2143 | INITIALIZE LOOP | | | | | | |
| 2144 | | | | | 36,2170 | 43145 | 0 |
| 2145 | REP | 5 | LAST | 543 | 36,2171 | 00037 | 0 |
| 2146 | REP | 5 | LAST | 461 | 36,2172 | 03661 | 0 |
| 2147 | REP | 2 | LAST | 92 | 36,2173 | 16621 | 0 |
| 2148 | REP | 6 | LAST | 497 | 36,2174 | 15340 | 1 |
| 2149 | REP | 2 | LAST | 92 | 36,2175 | 16623 | 1 |
| 2150 | REP | 1 | | | 36,2176 | 34017 | 0 |
| 2151 | REP | 2 | LAST | 92 | 36,2177 | 16625 | 1 |
| 2152 | REP | 1 | | | 36,2200 | 34013 | 1 |
| 2153 | | | | | 36,2201 | 71214 | 0 |
| 2154 | REP | 4 | LAST | 543 | 36,2202 | 00318 | 0 |
| 2155 | | | | | 36,2203 | 74205 | 0 |
| 2156 | REP | 1 | | | 36,2204 | 34015 | 1 |
| 2157 | REP | 2 | LAST | 124 | 36,2205 | 37750 | 1 |
| 2158 | REP | 1 | | | 36,2206 | 74230 | 0 |
| 2159 | | | | | 36,2207 | 70545 | 1 |
| 2160 | REP | 6 | LAST | 544 | 36,2210 | 02734 | 0 |
| 2161 | REP | 2 | LAST | 282 | 36,2211 | 14021 | 1 |
| 2162 | REP | 6 | LAST | 544 | 36,2212 | 02732 | 0 |
| 2163 | | | | | 36,2213 | 77742 | 0 |
| 2164 | REP | 2 | LAST | 282 | 36,2214 | 34023 | 1 |
| 2165 | REP | 2 | LAST | 282 | 36,2215 | 47211 | 0 |
| 2166 | | | | | 36,2216 | 43244 | 1 |
| 2167 | | | | | 36,2217 | 74221 | 0 |
| 2168 | REP | 7 | LAST | 544 | 36,2220 | 15340 | 1 |
| 2169 | | | | | 36,2221 | 65221 | 0 |
| 2170 | REP | 3 | LAST | 544 | 36,2222 | 03750 | 0 |
| 2171 | REP | 3 | LAST | 543 | 36,2223 | 03752 | 1 |
| 2172 | | | | | 36,2224 | 75225 | 0 |
| 2173 | REP | 3 | LAST | 544 | 36,2225 | 02621 | 0 |
| 2174 | | | | | 36,2226 | 77640 | 0 |
| 2175 | REP | 1 | | | 36,2227 | 74432 | 1 |
| R2176 | ADVANCE PASSIVE FOR TARGET VECTOR | | | | | | |
| 2177 | | | | | 36,2230 | 77745 | 1 |
| 2178 | REP | 12 | LAST | 542 | 36,2231 | 03663 | 1 |
| 2179 | | | | | 36,2232 | 43015 | 1 |
| 2180 | REP | 4 | LAST | 544 | 36,2233 | 03752 | 1 |
| 2181 | REP | 5 | LAST | 523 | 36,2234 | 01312 | 0 |
| 2182 | REP | 1 | | | 36,2235 | 74242 | 0 |

| | | |
|--|---------------|-------------------------|
| | IT | |
| | PUSH SIN | |
| | STODL SNTH | |
| | COS RMN | |
| | +2 | |
| | DCOMP | |
| | STORE CSTH | |
| | LXA,1 CALL | |
| | XRS | |
| | TIMEHET | |
| | DLOAD CLEAR | |
| | T | |
| | ITSWICH | |
| | STODL TPI | SAVE TIME FOR LOOP TEST |
| | DPPOS MAX | |
| | STODL DELVEE | |
| | MANYPEST | |
| | STODL HP | |
| | SEC1THET | 70 DEGREES |
| | BON DLOAD | |
| | KFLAG | |
| | +2 | |
| | SEC2THET | 330 DEGREES |
| | STCALL THETL | |
| | CONCALL | |
| | DLOAD SR1 | |
| | CSTH | |
| | STODL COSTH | |
| | SNTH | |
| | SR1 | |
| | STCALL SINTH | GET 4 QUADRANT THETA |
| | ARCTRIG | |
| | DAD | |
| | +2 | |
| | DPPOS MAX | PUT THETA BETWEEN 0,1 |
| | PDDL | |
| | THETL | |
| | TP | |
| | DSU SIGN | FAST TIMES |
| | TPI | |
| | RMN | |
| | RNGTEST | TIME MUST HAVE A STOP |
| | CONCALL DLOAD | |
| | TPI | |
| | RMN | |
| | TP | |
| | AVFLAG | |
| | ADVCSM | |



L TPI SEASON

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| | | | | | | | | | | |
|--------|-----------------------------------|----|------|-----|---------|-------|---|--------|--------------|--|
| 2103 | REP | 24 | LAST | 542 | 36,2236 | 34041 | 0 | STCALL | TDEC1 | |
| 2104 | REP | 2 | LAST | 542 | 36,2237 | 27057 | 0 | | LEMCNIC | |
| 2105 | | | | | 36,2240 | 77650 | 1 | GOTO | | |
| 2106 | REP | 1 | | | 36,2241 | 74244 | 0 | | JUNCT3 | |
| 2107 | REP | 25 | LAST | 545 | 36,2242 | 34041 | 0 | ADVCM | STCALL TDEC1 | |
| 2108 | REP | 2 | LAST | 542 | 36,2243 | 27045 | 0 | | CSMCNIC | |
| R2109 | SAVE BACK VALUES OF HP AND DELVES | | | | | | | | | |
| 2109 | | | | | 36,2244 | 77775 | 1 | JUNCT3 | VLOAD | |
| 2101 | REP | 12 | LAST | 519 | 36,2245 | 00007 | 0 | | VATT | |
| 2102 | REP | 5 | LAST | 520 | 36,2246 | 27640 | 0 | STOVL | VPASS4 | |
| 2103 | REP | 10 | LAST | 519 | 36,2247 | 00001 | 0 | | RATT | |
| 2104 | REP | 2 | LAST | 121 | 36,2250 | 03632 | 0 | STORE | RPASS4 | |
| 210405 | REP | 9 | LAST | 483 | 36,2251 | 17415 | 1 | STOVL | RDARG | |
| 2105 | REP | 5 | LAST | 544 | 36,2252 | 03752 | 1 | | TP | |
| 2106 | REP | 7 | LAST | 482 | 36,2253 | 17423 | 1 | STOVL | DELLT4 | |
| 2107 | REP | 3 | LAST | 544 | 36,2254 | 02625 | 1 | | HP | |
| 2108 | REP | 2 | LAST | 92 | 36,2255 | 16631 | 1 | STOVL | HPO | |
| 2109 | REP | 3 | LAST | 544 | 36,2256 | 02623 | 1 | | DELVEE | |
| 2200 | REP | 2 | LAST | 92 | 36,2257 | 16633 | 0 | STOVL | DELVEO | |
| R2201 | PREPARE FOR LANBERT | | | | | | | | | |
| 2202 | REP | 13 | LAST | 544 | 36,2260 | 03663 | 1 | | TTP1 | |
| 2203 | REP | 8 | LAST | 519 | 36,2261 | 17503 | 1 | STOVL | INTIME | |
| 220305 | REP | 5 | LAST | 544 | 36,2262 | 03746 | 1 | | XRS | |
| 22031 | REP | 8 | LAST | 491 | 36,2263 | 17746 | 1 | STOVL | RTX1 | |
| 220313 | REP | 3 | LAST | 528 | 36,2264 | 15332 | 1 | | HI6ZEROS | |
| 220315 | | | | | 36,2265 | 65201 | 1 | SETPD | FDL | |
| 22032 | | | | | 36,2266 | 00001 | 0 | | OD | |
| 220325 | REP | 2 | LAST | 467 | 36,2267 | 33147 | 0 | | EPSPOUR | |
| 22033 | | | | | 36,2270 | 77715 | 1 | FDVL | | |
| 220335 | REP | 22 | LAST | 543 | 36,2271 | 03540 | 0 | | RACT3 | |
| 22034 | REP | 10 | LAST | 485 | 36,2272 | 27570 | 0 | STOVL | RINIT | |
| 220345 | REP | 8 | LAST | 490 | 36,2273 | 03546 | 0 | | VACT3 | |
| 22035 | REP | 9 | LAST | 485 | 36,2274 | 37576 | 1 | STCALL | VINIT | |
| 2207 | REP | 2 | LAST | 467 | 36,2275 | 22000 | 1 | | INITVEL | |
| R2208 | COMPUTE H ET CETERA | | | | | | | | | |
| 2209 | | | | | 36,2276 | 52375 | 1 | VLOAD | VSI | |
| 2210 | REP | 8 | LAST | 520 | 36,2277 | 03620 | 0 | | VTRIME | |
| 2211 | REP | 8 | LAST | 545 | 36,2300 | 03640 | 0 | | VPASS4 | |
| 2212 | | | | | 36,2301 | 41446 | 1 | ARVAL | PUSH | |
| 2213 | REP | 2 | LAST | 92 | 36,2302 | 26637 | 1 | STOVL | RELDLV | |
| 2214 | REP | 14 | LAST | 520 | 36,2303 | 03646 | 0 | | DELVEE3 | |
| 2215 | | | | | 36,2304 | 77646 | 0 | ARVAL | | |
| 2216 | REP | 2 | LAST | 92 | 36,2305 | 02635 | 0 | STORE | MAO/TPI | |
| 2217 | | | | | 36,2306 | 45415 | 0 | DAD | STADR | |
| 2218 | REP | 4 | LAST | 545 | 36,2307 | 61154 | 0 | STOVL | DELVEE | |
| 2219 | REP | 6 | LAST | 545 | 36,2310 | 03746 | 1 | | XRS | |
| 2220 | REP | 10 | LAST | 543 | 36,2311 | 24047 | 1 | STOVL | X1 | |
| 2221 | REP | 10 | LAST | 520 | 36,2312 | 03612 | 1 | | VTRIME | |
| 2222 | | | | | 36,2313 | 77657 | 0 | VSR* | | |
| 2223 | | | | | 36,2314 | 57176 | 0 | | 0,2 | |

/V2-VP(TPI+TP)/
V1-VA
/V1-VA/

L TPI SEARCH

| | | | | | | | | | |
|------|-----|----|------|-----|---------|---------|--------|--------|----------|
| 2224 | REP | 7 | LAST | 543 | 36,2315 | 26746 0 | | | |
| 2225 | REP | 23 | LAST | 545 | 36,2316 | 03540 0 | | STOVL | WVEC |
| 2226 | | | | | 36,2317 | 77657 0 | | | INACT3 |
| 2227 | | | | | 36,2320 | 57176 0 | | VSR* | |
| 2228 | REP | 5 | LAST | 543 | 36,2321 | 36657 0 | | | 0,2 |
| 2229 | REP | 1 | | | 36,2322 | 45322 0 | | STCALL | RVEC |
| 2230 | | | | | 36,2323 | 71354 0 | | | PERIAPO |
| 2231 | REP | 7 | LAST | 545 | 36,2324 | 03746 1 | | LJA,2 | DLOAD |
| 2232 | | | | | 36,2325 | 77657 0 | | | XRS +1 |
| 2233 | | | | | 36,2326 | 57576 1 | | SL* | |
| 2234 | REP | 4 | LAST | 545 | 36,2327 | 02625 1 | | | 0,2 |
| 2235 | | | | | 36,2330 | 71214 0 | | STORE | HP |
| 2236 | | | | | 36,2331 | 03701 1 | | | IS POCED |
| 2237 | REP | 6 | LAST | 544 | 36,2332 | 74443 1 | | BON | DLOAD |
| 2238 | REP | 1 | | | 36,2333 | 02321 0 | | | ITSWICH |
| 2239 | REP | 7 | LAST | 514 | 36,2334 | 50025 0 | | | ENDEN |
| 2240 | | | | | 36,2335 | 02625 1 | | DSU | HPERMIN |
| 2241 | REP | 5 | LAST | 546 | 36,2336 | 74401 1 | | | RMN |
| 2242 | REP | 1 | | | 36,2337 | 45325 1 | | | HP |
| 2243 | | | | | 36,2340 | 02321 0 | | PDDL | NALPSAFE |
| 2244 | REP | 8 | LAST | 546 | 36,2341 | 02631 1 | | | DSU |
| 2245 | REP | 3 | LAST | 545 | 36,2342 | 45240 0 | | | HPERMIN |
| 2246 | | | | | 36,2343 | 74360 1 | | | HPO |
| 2247 | REP | 1 | | | 36,2344 | 71240 1 | | RMN | DSU |
| 2248 | | | | | 36,2345 | 73534 1 | | | INTERP |
| 2249 | REP | 1 | | | 36,2346 | 34005 0 | | | DLOAD |
| 2250 | REP | 1 | | | 36,2347 | 57414 1 | | | ALARMS |
| 2251 | | | | | 36,2350 | 00356 1 | JUNCT1 | BOFP | COSEC |
| 2252 | REP | 5 | LAST | 544 | 36,2351 | 74352 0 | | | DCOMP |
| 2253 | | | | | 36,2352 | 03744 0 | | | KFLAG |
| 2254 | REP | 2 | LAST | 124 | 36,2353 | 43345 1 | | | +1 |
| 2255 | | | | | 36,2354 | 03744 0 | JUNCT2 | STORE | DELTEE |
| 2256 | REP | 3 | LAST | 546 | 36,2355 | 03752 1 | | | DAD |
| 2257 | REP | 6 | LAST | 545 | 36,2356 | 37752 0 | | | DELTEE |
| 2258 | REP | 7 | LAST | 546 | 36,2357 | 74207 1 | | | TP |
| 2259 | REP | 1 | | | 36,2360 | 45214 1 | | STCALL | TP |
| 2260 | | | | | 36,2361 | 03461 1 | INTERP | SET | RIS |
| 2261 | REP | 7 | LAST | 546 | 36,2362 | 65301 0 | | | DSU |
| 2262 | | | | | 36,2363 | 00047 1 | | | ITSWICH |
| 2263 | REP | 11 | LAST | 545 | 36,2364 | 34023 1 | | NORM | PDDL |
| 2264 | REP | 1 | | | 36,2365 | 45215 0 | | | X1 |
| 2265 | | | | | 36,2366 | 02321 0 | | | DFTMOON |
| 2266 | REP | 9 | LAST | 546 | 36,2367 | 02625 1 | | DAD | DSU |
| 2267 | REP | 6 | LAST | 546 | 36,2370 | 70501 1 | | | HPERMIN |
| 2268 | | | | | 36,2371 | 00050 1 | | | HP |
| 2269 | REP | 6 | LAST | 508 | 36,2372 | 56284 1 | | NORM | SR1 |
| 2270 | | | | | 36,2373 | 00046 0 | | | X2 |
| 2271 | REP | 12 | LAST | 546 | 36,2374 | 53605 1 | | XSU,2 | DDV |
| 2272 | | | | | 36,2375 | 03744 0 | | | X1 |
| 2273 | REP | 4 | LAST | 546 | | | DMP | SR* | |
| | | | | | | | | | DFL.TFR |

WAS PERICENTER ALT SAFE

(HPLIM-HPO)-(HPLIM-HP)=HP-HPO
SOLUTION AT HAND

ITS GETTING WORSE - SOUND THE ALARM

OFF IS PLUS ON IS MINUS

RECYCLE
HP-HPO

L TPI SEARCH

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| | | | | | | | | | |
|--------|------|-----|------|---------|----------|---------|----------|------------|----------|
| 2274 | | | | 36,2376 | 51177 1 | | | | 0 -1,2 |
| 2275 | REP | 5 | LAST | 546 | 36,2377 | 37744 1 | | STCALL | DELTEE |
| 2276 | REP | 1 | | | 36,2400 | 74353 1 | | | JUNCT2 |
| 2277 | | | | | 36,2401 | 45325 1 | HALPSAPE | PDDL | DSU |
| 2278 | REP | 5 | LAST | 545 | 36,2402 | 02823 1 | | | DELVEE |
| 2279 | REP | 3 | LAST | 545 | 36,2403 | 02833 0 | | | DELVEE |
| 2280 | | | | | 36,2404 | 51406 1 | | PUSH | ABS |
| 2281 | | | | | 36,2405 | 50025 0 | | DSU | RMN |
| 2282 | REP | 1 | | | 36,2406 | 34021 0 | | | LIMVEL |
| 2283 | REP | 2 | LAST | 546 | 36,2407 | 74443 1 | | | ENDEN |
| 2284 | | | | | 36,2410 | 45345 1 | | DLOAD | DSU |
| 2285 | REP | 10 | LAST | 546 | 36,2411 | 02321 0 | | | HPERMIN |
| 2286 | REP | 4 | LAST | 546 | 36,2412 | 02831 1 | | | HPO |
| 2287 | | | | | 36,2413 | 77725 1 | | PDDL | |
| 2288 | | | | | 36,2414 | 71240 1 | | RMN | DLOAD |
| 2289 | REP | 1 | | | 36,2415 | 74424 0 | | | LRRDVO |
| 2290 | | | | | 36,2416 | 71244 0 | | BPL | DLOAD |
| 2291 | REP | 2 | LAST | 546 | 36,2417 | 74380 1 | | | INTERP |
| 2292 | REP | 6 | LAST | 547 | 36,2420 | 03744 0 | | | DELTEE |
| 2293 | | | | | 36,2421 | 57542 0 | | SR1 | DCOMP |
| 2294 | REP | 7 | LAST | 547 | 36,2422 | 37744 1 | | STCALL | DELTEE |
| 2295 | REP | 2 | LAST | 547 | 36,2423 | 74353 1 | | | JUNCT2 |
| 2296 | | | | | 36,2424 | 77745 1 | LRRDVO | DLOAD | |
| 2297 | | | | | 36,2425 | 71240 1 | | RMN | DLOAD |
| 2298 | REP | 3 | LAST | 547 | 36,2426 | 74353 1 | | | JUNCT2 |
| 2299 | REP | 1 | | | 36,2427 | 34007 1 | | | CLSEC |
| 2300 | | | | | 36,2430 | 77650 1 | | GOTO | |
| 2301 | REP | 1 | | | 36,2431 | 74347 1 | | | JUNCT1 |
| 2302 | TIME | RAN | OUT | ASSUME | SOLUTION | IP | SAFE | PERICENTER | |
| 2303 | | | | | 36,2432 | 45345 1 | RNGTEST | DLOAD | DSU |
| 2304 | REP | 7 | LAST | 546 | 36,2433 | 02825 1 | | | HP |
| 2305 | REP | 11 | LAST | 547 | 36,2434 | 02321 0 | | | HPERMIN |
| 2306 | | | | | 36,2435 | 71240 1 | | RMN | DLOAD |
| 2307 | REP | 2 | LAST | 546 | 36,2436 | 73534 1 | | | ALARMS |
| 2308 | REP | 6 | LAST | 546 | 36,2437 | 03752 1 | | | TF |
| 2309 | | | | | 36,2440 | 77625 0 | | DSU | |
| 2310 | REP | 8 | LAST | 547 | 36,2441 | 03744 0 | | | DELTEE |
| 2311 | REP | 9 | LAST | 547 | 36,2442 | 03752 1 | | STORE | TF |
| 2312 | | | | | 36,2443 | 77775 1 | ENDEN | VLOAD | |
| 2313 | REP | 9 | LAST | 545 | 36,2444 | 03820 0 | | | VTRIME |
| 2314 | | | | | 36,2445 | 65241 0 | | DOT | PDDL |
| 2315 | REP | 3 | LAST | 545 | 36,2446 | 03832 0 | | | RPASS4 |
| 2316 | REP | 3 | LAST | 545 | 36,2447 | 02637 1 | | | RELDLV |
| 2317 | | | | | 36,2450 | 45565 0 | | SIGN | STADR |
| 2318 | REP | 4 | LAST | 547 | 36,2451 | 41140 1 | | STCALL | RELDLV |
| 231805 | REP | 1 | | | 36,2452 | 16440 0 | | | TRANSANG |
| 23181 | | | | | 36,2453 | 50375 0 | | VLOAD | DOT |
| 2319 | REP | 24 | LAST | 546 | 36,2454 | 03540 0 | | | RACT3 |
| 2320 | REP | 11 | LAST | 545 | 36,2455 | 03612 1 | | | VTRIME |
| 2321 | | | | | 36,2456 | 51165 1 | | SIGN | RPL |

SAVE HP-HPLIM FOR POSSIBLE

SAVE THIS TOO

2 FT PS

TIME OF SOLUTION

SG2 WITH MAGNITUDE

NOW SIGN(RELDLV)=SIGN(SG2)

COMPUTE OMEGA T , CENTRAL ANGLE

SG1
IF POSITIVE THEN SG1 = SG2 OTHERWISE



L TPI SEARCH

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| | | | | | | | | | |
|--------|-----|---|------|-----|---------|-------|---|--------|----------|
| 2322 | REP | 5 | LAST | 547 | 36,2457 | 02637 | 1 | | |
| 2323 | REP | 1 | | | 36,2460 | 74470 | 1 | | |
| 2324 | | | | | 36,2461 | 57535 | 0 | | |
| 2325 | REP | 2 | LAST | 467 | 36,2462 | 33144 | 0 | SLOAD | DCOMP |
| 2326 | | | | | 36,2463 | 51165 | 1 | | |
| 2327 | REP | 6 | LAST | 548 | 36,2464 | 02637 | 1 | SIGN | BPL |
| 2328 | REP | 1 | | | 36,2465 | 74476 | 1 | | RELDLW |
| 232805 | | | | | 36,2466 | 52076 | 1 | | NEXUS |
| 23281 | REP | 2 | LAST | 548 | 36,2467 | 74474 | 0 | DCOMP | GOTO |
| 2329 | | | | | 36,2470 | 43135 | 1 | USEKAY | SLOAD |
| 2330 | REP | 3 | LAST | 548 | 36,2471 | 33144 | 0 | | BN |
| 2331 | REP | 6 | LAST | 548 | 36,2472 | 00316 | 0 | | DECTWO |
| 2332 | REP | 2 | LAST | 548 | 36,2473 | 74476 | 1 | | KFLAG |
| 2333 | | | | | 36,2474 | 77625 | 0 | | NEXUS |
| 2334 | REP | 2 | LAST | 450 | 36,2475 | 38100 | 0 | DSU | |
| 2335 | REP | 2 | LAST | 275 | 36,2476 | 17646 | 0 | | P21ONRNN |
| 233505 | REP | 8 | LAST | 547 | 36,2477 | 02625 | 1 | NEXUS | STOCL |
| 2336 | REP | 4 | LAST | 520 | 36,2500 | 36641 | 1 | | NN1 |
| 2337 | REP | 3 | LAST | 543 | 36,2501 | 03657 | 0 | | HP |
| 23371 | | | | | 07,2440 | | | STCALL | POSTTPI |
| 23372 | REP | 1 | | | 07,2000 | | | | OTEMP |
| 23373 | | | | | 07,2440 | | | RANK | 07 |
| 23374 | REP | 1 | | | | | | SETLOC | XANG |
| | | | | | | | | RANK | |
| | | | | | | | | COUNT | 07/XANG |

SIGN(SQ2-SQ1)=SIGN(SQ2)=SIGN(RELDLW)

R2338 CENTRAL ANGLE SUBROUTINE
R2339 THIS SUBROUTINE COMPUTES THE CENTRAL ANGLE OF TRAVEL OF THE
R2340 PASSIVE VEHICLE DURING THE TRANSFER.

| | | | | | | | | | | | | |
|------|-----|----|------|-----|---------|-------|---|----------|-----|--------------|-----------------------------|-----|
| 2341 | | | | | 07,2440 | 40220 | 0 | TRANSANG | STO | SETPD | | |
| 2342 | REP | 15 | LAST | 519 | 07,2441 | 02370 | 1 | | | SUREXIT | | |
| 2343 | | | | | 07,2442 | 00001 | 0 | | | 0 | | |
| 2344 | | | | | 07,2443 | 73150 | 1 | LXA,1 | | LXA,2 | | |
| 2345 | REP | 8 | LAST | 546 | 07,2444 | 03745 | 1 | | | XRS | | |
| 2346 | REP | 9 | LAST | 548 | 07,2445 | 03746 | 1 | | | XRS +1 | | |
| 2347 | | | | | 07,2446 | 53775 | 1 | VLOAD | | VSR* | | |
| 2348 | REP | 7 | LAST | 545 | 07,2447 | 03640 | 0 | | | VPASS4 | | |
| 2349 | | | | | 07,2450 | 57176 | 0 | | | 0,2 | | |
| 2350 | REP | 8 | LAST | 546 | 07,2451 | 22746 | 1 | STOCL* | | VVEC | | |
| 2351 | REP | 3 | LAST | 486 | 07,2452 | 11633 | 1 | | | MUTABLE +2,1 | | |
| 2352 | | | | | 07,2453 | 53715 | 1 | PDVL | | VSR* | SORT MU (+18 OR +15) | 00D |
| 2353 | REP | 4 | LAST | 547 | 07,2454 | 03632 | 0 | | | RPASS4 | | |
| 2354 | | | | | 07,2455 | 57176 | 0 | | | 0,2 | | |
| 2355 | | | | | 07,2456 | 64646 | 1 | ARVAL | | PDDL* | MAGNITUDE OF R (+29 OR +27) | 02D |
| 2356 | REP | 4 | LAST | 548 | 07,2457 | 11631 | 0 | | | MUTABLE,1 | | |
| 2357 | | | | | 07,2460 | 47515 | 0 | PDVL | | VSO | 1/MU (+34 OR +28) | 04D |
| 2358 | REP | 9 | LAST | 548 | 07,2461 | 02746 | 0 | | | VVRC | | |
| 2359 | | | | | 07,2462 | 57301 | 1 | NORM | | DMPR | PUSH LIST AT 02D | |
| 2360 | REP | 13 | LAST | 546 | 07,2463 | 00047 | 1 | | | X1 | | |
| 2361 | | | | | 07,2464 | 53605 | 1 | DMP | | SRR* | | |
| 2362 | | | | | 07,2465 | 00003 | 1 | | | 02D | | |

L TPI SEARCH

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2363          07,2466 21576 0
2364          07,2467 77621 1
2365 RESP 1      07,2470 11506 1
2366          07,2471 65301 0
2367 RESP 14 LAST 548 07,2472 00047 1
2368          07,2473 56362 0
2369          07,2474 41457 1
2370          07,2475 20174 1
2371          07,2476 75542 0
2372          07,2477 77605 1
2373          07,2500 65301 0
2374 RESP 15 LAST 549 07,2501 00047 1
2375          07,2502 56342 1
2376          07,2503 53605 1
2377 RESP 10 LAST 547 07,2504 03752 1
2378          07,2505 20201 0
237805        07,2506 60325 0
23781 RESP 1      07,2507 11520 0
237815 RESP 16 LAST 549 07,2510 00047 1
23782        07,2511 56325 0
237825        07,2512 77657 0
23783        07,2513 20176 0
2379 RESP 6 LAST 522 07,2514 37754 0
2380 RESP 16 LAST 548 07,2515 02370 1
2381          35,3431
2382 RESP 1      35,2000
2383          35,3431
23835 RESP 1
    
```

```

EDSU 0 -3,1
D1/32
NORM FDDL
X1
SR1R DDV
SL* PUSH
0 -5,1
SR1 SORT
DMP
NORM FDDL
SR1 DDV
DMP SL*
TP
0,1
FDDL NORM
2PISC
X1
FDDL DDV
SL*
0 -3,1
STCALL CENTANG
SURREXIT
BANK 35
SETLOC P17S1
BANK
COUNT 35/P17
    
```

```

R V**/MU (+6)
(2 - R V**/MU) (+6-N)
MAGNITUDE OF R (+30 OR +28)
R/(2 - R V**/MU) (+29 OR +27)02D
    
```

ABLBP*** 000

CENTANG = (SORT(MU/ASUP***))TF
IN REVOLUTIONS B-0

R2384 TPI SEARCH DISPLAY ROUTINE

```

2385 RESP 5 LAST 521 35,3431 0 3726 1 P17
2386 RESP 1          35,3432 0 3434 1
2387 RESP 5 LAST 521 35,3433 0 3741 0 P77
2388 RESP 5 LAST 521 35,3434 0 3746 1 P17.1
238805 RESP 3 LAST 456 35,3435 3 3125 1
2389 RESP 5 LAST 472 35,3436 0 3114 0
2390 RESP 72 LAST 537 35,3437 0 6008 1
2391          35,3440 45014 0
2392 RESP 8 LAST 520 35,3441 00670 0
2393 RESP 1          35,3442 74026 0
2394          35,3443 76014 0
2395 RESP 9 LAST 549 35,3444 00470 1
2396          35,3445 00002 0
2397          35,3446 76014 0
2398 RESP 7 LAST 548 35,3447 00356 1
2399          35,3450 73452 0
2400          35,3451 00001 0
2401          35,3452 77530 1
2402 RESP 6 LAST 518 35,3453 01132 0
    
```

```

TC AVFLAGA
TC P17.1
TC AVFLAGP
TC P20PLOGN
CAP V06N37
TC VNPOCH
TC INTPRET
CLEAR CALL
UPDATPLG
S17.1
SET AXT,1
UPDATPLG
DEC 2
ROFF AXT,1
KFLAG
+2
DEC 1
SKA,1 EXIT
OPTION2
    
```

AVFLAG = C&M , SET TRACK + UPDATE FLAGS
AVFLAG = I&M , SET TRACK + UPDATE FLAGS
SET UPDATE FLAG
DISPLAY TPI TIME

UPDATE STATE VECTORS TO TPI

DELTA H = 2 K POSITIVE , KFLAG OFF

DELTA H = 1 K NEGATIVE , KFLAG ON



L TPI SEARCH

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| | | | | | |
|--------|------|-----|----------|---------|----------|
| 2403 | RESP | 1 | | 35,3454 | 3 3543 0 |
| 2404 | RESP | 1 | | 35,3455 | 0 3517 1 |
| 2405 | RESP | 73 | LAST 549 | 35,3456 | 0 6006 1 |
| 2406 | | | | 35,3457 | 43014 0 |
| 2407 | RESP | 10 | LAST 549 | 35,3460 | 00670 0 |
| 2408 | RESP | 8 | LAST 549 | 35,3461 | 00076 0 |
| 2409 | | | | 35,3462 | 45335 0 |
| 2410 | RESP | 7 | LAST 549 | 35,3463 | 01133 1 |
| 2411 | RESP | 3 | LAST 548 | 35,3464 | 36100 0 |
| 2412 | | | | 35,3465 | 43030 0 |
| 2413 | | | | 35,3466 | 73470 0 |
| 2414 | RESP | 9 | LAST 550 | 35,3467 | 00276 1 |
| 2415 | | | | 35,3470 | 46135 1 |
| 2416 | RESP | 10 | LAST 548 | 35,3471 | 03747 0 |
| 2417 | | | | 35,3472 | 73476 0 |
| 2418 | | | | 35,3473 | 52145 0 |
| 2419 | RESP | 1 | | 35,3474 | 34003 0 |
| 2420 | RESP | 1 | | 35,3475 | 73500 0 |
| 2421 | | | | 35,3476 | 77745 1 |
| 2422 | RESP | 1 | | 35,3477 | 34001 1 |
| 2423 | RESP | 12 | LAST 547 | 35,3500 | 36321 1 |
| 2424 | RESP | 1 | | 35,3501 | 74104 1 |
| 2425 | | | | 35,3502 | 77414 0 |
| 2426 | RESP | 11 | LAST 550 | 35,3503 | 00470 1 |
| 2427 | RESP | 2 | LAST 457 | 35,3504 | 3 3127 0 |
| 2428 | RESP | 2 | LAST 550 | 35,3505 | 0 3517 1 |
| 2429 | RESP | 2 | LAST 475 | 35,3506 | 3 3126 1 |
| 2430 | RESP | 120 | LAST 536 | 35,3507 | 0 4555 0 |
| 2431 | RESP | 5 | LAST 518 | 35,3510 | 20763 1 |
| 2432 | RESP | 17 | LAST 523 | 35,3511 | 0 4106 1 |
| 2433 | RESP | 18 | LAST 550 | 35,3512 | 0 4106 1 |
| 2434 | RESP | 2 | LAST 549 | 35,3513 | 0 3434 1 |
| 2435 | RESP | 29 | LAST 506 | 35,3514 | 3 4711 1 |
| 2436 | RESP | 5 | LAST 518 | 35,3515 | 0 5415 1 |
| 2437 | RESP | 66 | LAST 536 | 35,3516 | 1 5112 1 |
| 24375 | RESP | 13 | LAST 523 | E4,1767 | |
| 2438 | | | | 35,3517 | 0 0006 1 |
| 2439 | RESP | 4 | LAST 474 | 35,3520 | 23=766 1 |
| 2440 | RESP | 6 | LAST 523 | 35,3521 | 55=765 0 |
| 2441 | RESP | 7 | LAST 550 | 35,3522 | 3 1765 1 |
| 2442 | RESP | 121 | LAST 550 | 35,3523 | 0 4555 0 |
| 2443 | RESP | 17 | LAST 523 | 35,3524 | 20624 0 |
| 2444 | | | | 35,3525 | 0 3522 1 |
| 2445 | RESP | 5 | LAST 550 | 35,3526 | 0 1766 1 |
| 2446 | RESP | 246 | LAST 537 | 35,3527 | 4 0154 0 |
| 244605 | RESP | 32 | LAST 536 | 35,3530 | 6 4705 1 |
| 24461 | | | | 35,3531 | 0 0006 1 |
| 244615 | RESP | 3 | LAST 550 | 35,3532 | 1 3434 0 |
| 24462 | RESP | 3 | LAST 550 | 35,3533 | 0 3522 1 |

CAP V06N72
 TC VNCOMP17
 TC INTPRBT
 CLEAR SET
 UPDATPLG
 KFLAG
 SLOAD DSU
 OPTION2
 P21ONENN
 CLEAR
 RHIZ
 CLEAR
 +2
 KFLAG
 SLOAD RHIZ
 XRS +1
 +4
 DLOAD GOTO
 HPL
 P17.2
 DLOAD
 HPE
 STCALL HPERMIN
 S17.2
 SET EXIT
 UPDATPLG
 CAP V06N58
 TC VNCOMP17
 CAP V06N55
 TC BANKCALL
 CADR GOPLASH
 TC GOTOPOCH
 TC GOTOPOCH
 TC P17.1
 CAP TWO
 TC BLANKET
 TCP ENDOFJOB
 BRANK= RTRN

DISPLAY PHI , DELTA H , SEARCH OPTION K

RESET KFLAG ON FOR OPTION =1
 OFF FOR OPTION =2

P17.2

P17.3

DISPLAY DELTA VTPI , DELTA VTTP , AND H
 DISPLAY PERICENTER CODE AND CENTRAL ANG,

TERMINATE PROGRAM
 END PROGRAM
 RECYCLE WITH NEW TPI OR SEARCH OPTION
 BLANK R2

VNCOMP17 EXTEND

QXCH QSAVED
 TS VERENOLN
 CA VERENOLN
 TCR BANKCALL
 CADR GOPLASH
 TC -3
 TC QSAVED
 CS MPAC
 AD R176
 EXTEND
 BZF P17.1
 TC VNCOMP17 +3

TERMINATE ILLEGAL REDISPLAY
 PROCEED
 RECYCLE WITH NEW TPI TIME
 OR PROCEED WITH NEW SEARCH OPTION



L TPI SEARCH

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| | | | | | | | | | |
|------|-----|----|------|---------|---------|--------|--------|-----|----------|
| 2447 | | | | 35,3534 | 77414 | 0 | ALARMS | SET | EXIT |
| 2448 | REP | 12 | LAST | 550 | 35,3535 | 00470 | 1 | | UPDATPLG |
| 2449 | REP | 25 | LAST | 456 | 35,3536 | 0 5537 | 0 | TC | ALARM |
| 2450 | | | | 35,3537 | 00124 | 0 | | GOT | 00124 |
| 2451 | REP | 2 | LAST | 456 | 35,3540 | 3 4743 | 0 | CAP | V06N09 |
| 2452 | REP | 4 | LAST | 550 | 35,3541 | 0 3517 | 1 | TC | VNCOMP17 |
| 2453 | REP | 19 | LAST | 550 | 35,3542 | 0 4108 | 1 | TC | GOTOPOOH |
| 2454 | | | | 35,3543 | 01510 | 1 | V06N72 | VN | 0672 |

NO SAFE PERCENTER IN THIS SECTOR

PROCEED ILLEGAL TERMINATE PROGRAM

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P0001 RENDEZVOUS NAVIGATION PROGRAM 20
 R0002 PROGRAM DESCRIPTION
 R0003 MOD NO -1
 R0004 MOD BY - N. BRODEUR
 R0005 FUNCTIONAL DESCRIPTION
 R0006
 R0007 TO CONTROL THE CSM ATTITUDE AND OPTICS TO ACQUIRE THE LEM IN THE S-T
 R0008 FIELD AND TO POINT THE CSM TRANSPONDER AT THE LEM. TO UPDATE EITHER THE
 R0009 LEM OR CSM STATE VECTOR (AS SPECIFIED BY THE ASTRONAUT BY THE DSKY
 R0010 ENTRY) ON THE BASIS OF OPTICAL TRACKING DATA (REQUESTED BY DSKY)
 R0011 CALLING SEQUENCE -
 R0012
 R0013 ASTRONAUT REQUEST THROUGH DSKY V37E20B
 R0014 SUBROUTINES CALLED-
 R0015 R02BOTH (IMU STATUS CHECK) BANKCALL
 R0016 FLAGUP 2PHSCHKG LOADTIME
 R0017 R01CSM (PREFERRED TRACKING ATTITUDE) FLAGDOWN
 R0018 R52 (AUTO OPTICS POSITIONING ROUT) SETINTG
 R0018 R22 (REND TRACK DATA PROC ROUT) PRIOCHKG
 R0019 ENDFJOB INTEGRTV GRP2PC
 R0020 INTPRET MGRLES PINDVAC
 R0021 NORMAL EXIT MODES-
 R0022 P20 MAY BE TERMINATED IN TWO WAYS-ASTRONAUT SELECTION OF IDLING
 R0023 PROGRAM (P00) BY KEYING V37E00B OR BY KEYING IN V56B
 R0024 ALARM OR ABORT EXIT MODES-
 R0025 NONE DIRECTLY FROM P20
 R0026 OUTPUT
 R0027 TRCKCNT = NO OF RENDEZVOUS TRACKING MARKS TAKEN (COUNTER)
 R0028 VHFPCNT = NO OF VHF RANGING MARKS INCORPORATED (COUNTER)
 R0029 FLAGS SET + RESET
 R0030 RNDVZFLG, VEHUPFLG, UPDATFLG, TRACKFLG, TARG1FLG
 R0031 HOLDFLAG, WBCDY, WBCDY1, WBCDY2, DELCDUX, DELCDUY, DELCDUZ
 R0032 STIKFLAG, PRPTRKAT, VINTFLAG, DIMOFLAG, R00FLAG, R01CNTR
 0033 BANK 33
 0034 REF 2 LAST 450 37,2000 SETLOC P20S
 0035 BANK

 0036 REF 4 LAST 206 E6,1412 BRANK= ESTRCKR
 0037 REF 1 COUNT* SS/P20

 0038 REF 122 LAST 550 37,2207 0 4555 0 PROO20 TC BANKCALL
 0039 REF 1 37,2210 17573 0 CADR R02BOTH
 A0040
 0041 REF 117 LAST 536 37,2211 3 4714 1 CAP ZERO
 0042 REF 3 LAST 180 37,2212 55=126 1 TS TRCKCNT
 0043 REF 5 LAST 504 37,2213 55=125 1 TS VHFPCNT
 0044 REF 19 LAST 503 37,2214 0 5435 0 TC UPFLAG
 0045 REF 3 LAST 258 37,2215 00120 1 ADRES PRPTRKAT
 0046 REF 23 LAST 444 37,2216 0 5447 0 TC DOWNFLAG
 0047 REF 3 LAST 254 37,2217 00026 0 ADRES VEHUPFLG

IMU STATUS CHECK
 BLOCKING OF UPLINK IS DONE BY UPLINK PRG

 ZERO REND TRACKING MARK COUNTER
 ZERO REND VHF RNG MRK COUNTER
 SET PREP TRACK ATT FLAG
 BIT 10 FLAG 5
 LEM TO BE UPDATED. VEHUPFLG RSRT.
 BIT 8 FLAG 1



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| | | | | | | | | | |
|------|-----|----|------|-----|---------|----------|---------|----------|--------------------------------|
| 0050 | REP | 20 | LAST | 552 | 37,2220 | 0 5435 0 | TC | UPFLAG | SET TRACKFLAG |
| 0051 | REP | 3 | LAST | 502 | 37,2221 | 00031 0 | ADRES | TRACQFLO | BIT 5 FLAG 1 |
| 0052 | REP | 21 | LAST | 553 | 37,2222 | 0 5435 0 | TC | UPFLAG | SET UPDATFLO |
| 0053 | REP | 13 | LAST | 551 | 37,2223 | 00027 1 | ADRES | UPDATFLO | BIT 7 FLAG 1 |
| 0054 | REP | 22 | LAST | 553 | 37,2224 | 0 5435 0 | TC | UPFLAG | SET RNDVZFLG |
| 0055 | REP | 2 | LAST | 253 | 37,2225 | 00010 0 | ADRES | RNDVZFLG | BIT 7 FLAG 0 |
| 0056 | REP | 5 | LAST | 530 | 37,2226 | 0 5261 1 | TC | 2PHSCHNG | |
| 0057 | | | | | 37,2227 | 00004 0 | OCT | 00004 | |
| 0058 | | | | | 37,2230 | 05022 1 | OCT | 05022 | |
| 0059 | | | | | 37,2231 | 29000 0 | OCT | 26000 | |
| 0060 | REP | 74 | LAST | 550 | 37,2232 | 0 6006 1 | TC | INTPRST | |
| 0061 | | | | | 37,2233 | 77634 0 | RTS | | |
| 0062 | REP | 10 | LAST | 522 | 37,2234 | 45505 0 | | LOADTIME | |
| 0063 | REP | 2 | LAST | 76 | 37,2235 | 35225 1 | STCALL | MARCTIME | |
| 0064 | REP | 1 | | | 37,2236 | 56343 0 | | SETINTG | SET INTEGRATION FLAGS |
| 0065 | | | | | 37,2237 | 43014 0 | ROFF | SET | |
| 0066 | REP | 2 | LAST | 204 | 37,2240 | 02756 1 | | RNDVZFLG | |
| 0067 | REP | 1 | | | 37,2241 | 76243 0 | | P20.1 | |
| 0068 | REP | 3 | LAST | 204 | 37,2242 | 01476 0 | | DIM0FLAG | SET TO INTEGRATE THE W MATRIX |
| 0069 | | | | | 37,2243 | 43014 0 | P20.1 | RON | |
| 0070 | REP | 4 | LAST | 552 | 37,2244 | 00101 1 | | VERUPFLO | |
| 0071 | REP | 1 | | | 37,2245 | 76241 1 | | P20.2 | |
| 0072 | REP | 4 | LAST | 204 | 37,2246 | 01674 0 | | VINTFLAG | SET FOR IM INTEGRATION |
| 0073 | | | | | 37,2247 | 77624 1 | P20.2 | CALL | |
| 0074 | REP | 3 | LAST | 204 | 37,2250 | 27113 1 | | INTEGRV | |
| 0075 | | | | | 37,2251 | 11624 1 | CALL | | |
| 0076 | REP | 1 | | | 37,2252 | 56741 0 | | GRP2PC | GROUP 2 PHASE CHANGE |
| 0077 | | | | | 37,2253 | 77624 1 | CALL | | |
| 0078 | REP | 2 | LAST | 553 | 37,2254 | 56343 0 | | SETINTG | SET INTEGRATION FLAGS |
| 0079 | | | | | 37,2255 | 43014 0 | ROFF | CLEAR | |
| 0080 | REP | 5 | LAST | 553 | 37,2256 | 00141 0 | | VERUPFLO | |
| 0081 | REP | 1 | | | 37,2257 | 76261 0 | | P20.3 | |
| 0082 | REP | 5 | LAST | 553 | 37,2260 | 01674 0 | | VINTFLAG | SET FOR IM INTEGRATION |
| 0083 | | | | | 37,2261 | 71624 1 | P20.3 | CALL | |
| 0084 | REP | 4 | LAST | 553 | 37,2262 | 27113 1 | | INTEGRV | |
| 0085 | | | | | 37,2263 | 77776 1 | EXIT | | |
| 0086 | REP | 2 | LAST | 410 | 37,2264 | 3 7663 0 | CAP | PRIO26 | |
| 0088 | REP | 21 | LAST | 531 | 37,2265 | 0 5042 1 | TC | FINDVAC | |
| 0089 | REP | 7 | LAST | 504 | 57,1734 | | BRANK= | MRCRUP2 | |
| 0090 | REP | 2 | LAST | 201 | 37,2266 | 02512 0 | | 2CADR | R22 |
| 0090 | | | | | 37,2267 | 70067 1 | | | |
| 0092 | REP | 1 | LAST | 553 | 37,2270 | 0 5261 1 | TC | 2PHSCHNG | |
| 0093 | | | | | 37,2271 | 00072 1 | OCT | 00072 | |
| 0094 | | | | | 37,2272 | 00111 0 | OCT | 00111 | |
| 0095 | REP | 2 | LAST | 385 | 37,2273 | 3 4761 0 | PIKUP20 | PRIO14 | ALLOW HIGHER PRIO THAN LAMBERT |
| 0096 | REP | 5 | LAST | 440 | 37,2274 | 0 5103 0 | TC | PRIOCHNG | |
| 0097 | REP | 29 | LAST | 511 | 37,2275 | 3 4706 1 | CAP | RTS | IS TRACK FLAG SET |
| 0098 | REP | 33 | LAST | 224 | 37,2276 | 7 0075 1 | MASK | STATE +1 | |
| 0099 | | | | | 37,2277 | 0 0006 1 | EXTEND | | |
| 0100 | REP | 67 | LAST | 550 | 37,2300 | 1 5112 1 | RZF | ENDOPJCR | No |

e .



L P20-P25

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0101 REP 16 LAST 336 37,2301 3 4876 1
 0102 REP 34 LAST 553 37,2302 7 0077 0
 0103 REP 1 37,2303 0 0008 1
 0104 REP 68 LAST 553 37,2304 1 5112 1
 0107 REP 118 LAST 552 37,2305 3 4714 1
 0108 REP 2 LAST 114 37,2306 55=775 1
 0111 REP 23 LAST 553 37,2307 0 5435 0
 0112 REP 1 37,2310 00126 1
 0113 REP 123 LAST 552 37,2311 0 4555 0
 0114 REP 1 37,2312 76536 0
 0115 REP 24 LAST 552 37,2313 0 5447 0
 0116 REP 2 LAST 554 37,2314 00126 1
 0117 REP 2 LAST 98 85,1777
 0118 REP 2 LAST 236 37,2315 3 4751 0
 0119 REP 24 LAST 529 37,2316 54 003 0
 01191 REP 24 LAST 554 37,2317 0 5435 0
 01192 REP 2 LAST 384 37,2320 00024 1
 0120 REP 75 LAST 553 37,2321 0 6006 1
 0121 REP 1 37,2322 77624 1
 0122 REP 1 37,2323 30002 0
 0123 REP 1 37,2324 77776 1
 0124 REP 124 LAST 554 37,2325 0 4555 0
 0125 REP 1 37,2326 16070 1
 0126 REP 66 LAST 530 37,2327 3 4712 1
 0127 REP 4 LAST 409 37,2330 55=332 0
 0128 REP 69 LAST 554 37,2331 0 5112 0
 0129 REP 1 37,2332 00203 0
 0130 REP 1 7707

CAP BIT13
 MASK STATE +3
 EXTEND
 BZF ENDOFJOB
 CAP ZERO
 TS R61CNTR
 TC UPFLAG
 ADRES R60FLAG
 TC BANKCALL
 CADR R61CSM
 TC DOWNFLAG
 ADRES R60FLAG
 EBANK= QMIN
 CAP EBANKS
 TS EBANK
 TC UPFLAG
 ADRES TARG1FLAG
 TC INTERPRET
 CALL
 R52
 EXIT
 TC BANKCALL
 CADR MKRLEES
 CAP ONE
 TS HOLDFLAG
 TC ENDOFJOB
 OCT203 OCT 00203
 FIRST3 EQUALS FURST3

IS RESPFLAG SET
 INITIALIZE R61 COUNTER
 SET R60FLAG
 BIT 4 FLAG 5
 RESET R60FLAG
 BIT 4 FLAG 5
 SET TARGET FLAG TO LEN
 BIT 10 FLAG 1
 SET UP AUTO OPTICS JOB
 HOLD PRESENT ATTITUDE

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P0131 ORBITAL NAVIGATION PROGRAM 22
 0132 31,2021
 0133 REP 1 30,2000
 0134 30,2000

 0135 REP 12 LAST 276 E5,1751
 0136 REP 1

 0139 REP 25 LAST 554 30,2000 0 5447 0
 01394 REP 3 LAST 553 30,2001 00010 0
 013941 REP 25 LAST 554 30,2002 0 5435 0
 013942 REP 1 30,2003 00025 0
 01396 REP 125 LAST 554 30,2004 0 4555 0
 0140 REP 2 LAST 552 30,2005 17573 0
 0141 REP 76 LAST 554 30,2006 0 6006 1
 0142 30,2007 77634 0
 0143 REP 11 LAST 553 30,2010 45505 0
 0145 REP 26 LAST 545 30,2011 34041 0
 0146 REP 3 LAST 545 30,2012 27045 0
 0147 30,2013 47375 0
 0148 REP 13 LAST 545 30,2014 00007 0
 0149 REP 17 LAST 545 30,2015 00001 0
 0150 30,2016 50256 0
 0151 REP 13 LAST 529 30,2017 01744 1
 0152 30,2020 77646 0
 0153 30,2021 65552 0
 0154 REP 7 LAST 485 30,2022 03626 0
 0155 30,2023 77414 0
 0156 REP 3 LAST 553 30,2024 02678 1
 0157 REP 1 30,2025 3 2162 0
 0158 REP 126 LAST 555 30,2026 0 4555 0
 0159 REP 6 LAST 550 30,2027 20763 1
 0160 REP 20 LAST 551 30,2030 0 4106 1
 0161 REP 1 30,2031 0 2036 0
 0162 30,2032 0 2025 1
 0163 REP 17 LAST 517 30,2033 3 6214 0
 0164 REP 6 LAST 550 30,2034 0 5415 1
 0165 REP 70 LAST 554 30,2035 0 5112 0
 0166 REP 1 30,2036 4 2172 0
 01661 REP 13 LAST 555 30,2037 7 1751 1
 01662 REP 14 LAST 555 30,2040 55-751 1
 01663 REP 77 LAST 555 30,2041 0 6006 1
 01664 30,2042 77614 1
 01665 REP 1 30,2043 01664 1
 0167 30,2044 43014 0
 0168 REP 3 LAST 528 30,2045 00462 1
 0169 REP 6 LAST 504 30,2046 04343 1
 0170 REP 1 30,2047 60113 1
 0171 30,2050 77614 1
 0172 REP 3 LAST 451 30,2051 01463 1

BANK 31
 SETLOC P2051
 BANK

 EBANK= LANDMARK
 COUNT= 88/P22

 PROG22 TC DOWNFLAG RESET RNDVZPLG BIT 7 FLAG 0
 ADRES RNDVZPLG
 TC UPFLAG
 ADRES TARQ2PLG
 TC BANKCALL
 CADR R0280TH IMU STATUS CHECK
 TC INTPRET COMPUTE ANGLE BETWEEN Y AND VXR SM
 RTB

 LOADTIME
 STCALL TDEC1
 CSMCONIC INTEGRATE TO PRESENT TIME
 VLOAD VXV CROSS PRODUCT BETWEEN V AND R
 VATT
 RATT
 UNIT DOT
 REFSMMAT +6

 ARS
 SL1 ARCCOS
 STORE +MGA
 CLEAR EXIT
 RENDWPLG
 CAP V06N45R
 TC BANKCALL
 CADR GORFLASR
 TC GOTOPOCH TERM P22
 TC PROG22A PROC
 TC -5 ENTER
 CAP THREE
 TC BLANKET BLANK OUT R1 + R2
 TC ENDOPJOB
 CS OCTL7000 SET OFFSET NO.=0
 MASK LANDMARK
 TS LANDMARK
 TC INTPRET
 CLEAR

 P22-KPLG
 ROPP
 ERADFLAG
 CMOONPLG
 PROG22R EARTH
 MOON

 SET L1NAFLAG



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| | | | | | | | |
|-------|-----|-----|------|---------|---------|--------|---|
| 0174 | | | | 30,2052 | 77776 | 1 | |
| 0176 | REP | 1 | | 30,2053 | 3 2163 | 1 | |
| 0179 | REP | 127 | LAST | 555 | 30,2054 | 0 4555 | 0 |
| 0180 | REP | 7 | LAST | 555 | 30,2055 | 20783 | 1 |
| 0181 | REP | 21 | LAST | 555 | 30,2056 | 0 4106 | 1 |
| 0182 | | | | 30,2057 | 0 2084 | 1 | |
| 0183 | | | | 30,2080 | 0 2053 | 0 | |
| 0184 | REP | 9 | LAST | 517 | 30,2081 | 3 4715 | 0 |
| 0185 | REP | 7 | LAST | 555 | 30,2082 | 0 5415 | 1 |
| 0186 | REP | 71 | LAST | 555 | 30,2083 | 0 5112 | 0 |
| 01861 | REP | 10 | LAST | 556 | 30,2084 | 3 4715 | 0 |
| 01862 | REP | 3 | LAST | 202 | 30,2085 | 54 301 | 1 |
| 0187 | REP | 78 | LAST | 555 | 30,2086 | 0 6006 | 1 |
| 0188 | | | | 30,2087 | 77624 | 1 | |
| 0189 | REP | 1 | | 30,2070 | 60234 | 1 | |
| 0190 | | | | 30,2071 | 45335 | 0 | |
| 0191 | REP | 2 | LAST | 95 | 30,2072 | 02745 | 0 |
| 0192 | REP | 1 | | 30,2073 | 20166 | 1 | |
| 0193 | | | | 30,2074 | 45044 | 0 | |
| 0194 | REP | 1 | | 30,2075 | 60101 | 1 | |
| 0195 | REP | 1 | | 30,2076 | 76333 | 0 | |
| 0196 | | | | 30,2077 | 77650 | 1 | |
| 0197 | REP | 1 | | 30,2100 | 60120 | 1 | |
| 0198 | | | | 30,2101 | 77624 | 1 | |
| 0199 | REP | 1 | | 30,2102 | 30208 | 0 | |
| 01991 | | | | 30,2103 | 77776 | 1 | |
| 01992 | REP | 7 | LAST | 553 | 30,2104 | 0 5281 | 1 |
| 01993 | | | | 30,2105 | 00004 | 0 | |
| 01994 | | | | 30,2106 | 05022 | 1 | |
| 01995 | | | | 30,2107 | 13000 | 0 | |
| 01996 | REP | 79 | LAST | 556 | 30,2110 | 0 6006 | 1 |
| 0200 | | | | 30,2111 | 77650 | 1 | |
| 0201 | REP | 1 | | 30,2112 | 60132 | 1 | |
| 0202 | | | | 30,2113 | 43014 | 0 | |
| 0203 | REP | 4 | LAST | 555 | 30,2114 | 01663 | 0 |
| 0204 | REP | 2 | LAST | 56 | 30,2115 | 03087 | 0 |
| 0205 | | | | 30,2116 | 77624 | 1 | |
| 0206 | REP | 1 | | 30,2117 | 60217 | 0 | |
| 0207 | | | | 30,2120 | 77776 | 1 | |
| 02111 | REP | 8 | LAST | 556 | 30,2121 | 0 5281 | 1 |
| 02112 | | | | 30,2122 | 00004 | 0 | |
| 02113 | | | | 30,2123 | 05022 | 1 | |
| 02114 | | | | 30,2124 | 13000 | 0 | |
| 0212 | REP | 11 | LAST | 556 | 30,2125 | 3 4715 | 0 |
| 0213 | REP | 4 | LAST | 556 | 30,2126 | 54 301 | 1 |
| 0217 | REP | 80 | LAST | 556 | 30,2127 | 0 6006 | 1 |
| 0218 | | | | 30,2130 | 77624 | 1 | |
| 0219 | REP | 2 | LAST | 554 | 30,2131 | 30002 | 0 |
| 0220 | | | | 30,2132 | 77776 | 1 | |
| 0221 | REP | 1 | | 30,2133 | 3 2164 | 0 | |

| | |
|-----------|----------|
| EXIT | |
| CAP | V05N7022 |
| TC | BANKCALL |
| CADR | GOFLASH |
| TC | GOTOPOCH |
| TC | +5 |
| TC | -5 |
| CAP | FIVE |
| TC | BLANKST |
| TC | ENDJOB |
| CAP | FIVE |
| TS | MARKINDX |
| TC | INTPRET |
| CALL | |
| UNPACKAB | |
| LOAD | DSU |
| | 22SUBSCL |
| | P22MAXDE |
| BPL | CALL |
| | DE-OR-50 |
| | P22SUBRA |
| GOTO | |
| CALLR52 | |
| DE-OR-50 | CALL |
| | ADVORB |
| EXIT | |
| TC | 2PHSCHNG |
| OCT | 00004 |
| OCT | 05022 |
| OCT | 13000 |
| TC | INTPRET |
| GOTO | |
| DOV5N71 | |
| SET | |
| LUNARFLAG | |
| KNOWNFLAG | |
| CALL | |
| P22SUBRR | |
| CALLR52 | EXIT |
| TC | 2PHSCHNG |
| OCT | 00004 |
| OCT | 05022 |
| OCT | 13000 |
| CAP | FIVE |
| TS | MARKINDX |
| TC | INTPRET |
| CALL | |
| RS2 | |
| DOV5N71 | EXIT |
| CAP | V05N7122 |

TERMINATE
 PROCEED UNPACK ABCDE
 RECYCLE
 IMMEDIATE RETURN BLANK OUT R1,R2

UNPACK ABCDE FROM LANDMARK

DE GREATER THAN MAX
 SUBROUTINE A SETS LAT/LONG/ALT

CALL ADVANCED ORBIT ROUTINE

EARTH ORBIT

GET LAT/LONG/ALT FROM ASTRO

SET MARK INDEX=5 FOR RS2

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| | | | | | | | | | | |
|-------|-----|-----|------|-----|---------|----------|----------|----------|-----------|--|
| 0222 | REP | 128 | LAST | 556 | 30,2134 | 0 4555 0 | TC | BANKCALL | | |
| 0223 | REP | 8 | LAST | 556 | 30,2135 | 20763 1 | CADR | GOFLASHR | | |
| 0224 | REP | 22 | LAST | 556 | 30,2136 | 0 4100 1 | TC | GOTOPOCH | | TERMINATE |
| 0225 | | | | | 30,2137 | 0 2144 1 | TC | +5 | | PROCEED UNPACK ABCDE |
| 0226 | | | | | 30,2140 | 0 2133 1 | TC | -5 | | RECYCLE |
| 0227 | REP | 12 | LAST | 556 | 30,2141 | 3 4715 0 | CAP | FIVE | | IMMEDIATE ENTRY BLANK OUT R1,R3 |
| 0228 | REP | 8 | LAST | 556 | 30,2142 | 0 5415 1 | TC | BLANKET | | |
| 0229 | REP | 72 | LAST | 556 | 30,2143 | 0 5112 0 | TC | ENDOFJOB | | |
| 0230 | REP | 81 | LAST | 556 | 30,2144 | 0 6006 1 | TC | INTPRET | | |
| 0231 | | | | | 30,2145 | 77624 1 | CALL | | | |
| 0232 | REP | 2 | LAST | 556 | 30,2146 | 60234 1 | | | | |
| 0233 | | | | | 30,2147 | 77624 1 | CALL | UNPACKAB | | SET LAT/LONG/ALT |
| 0234 | REP | 2 | LAST | 556 | 30,2150 | 76333 0 | | | | |
| 0235 | | | | | 30,2151 | 66744 0 | PROG22C | LXC,2 | P22SURRA | |
| 0236 | REP | 29 | LAST | 447 | 30,2152 | 01330 0 | | | SLOAD* | |
| 0237 | REP | 11 | LAST | 504 | 30,2153 | 77724 0 | | | MARKSTAT | |
| 0238 | REP | 3 | LAST | 175 | 30,2154 | 30750 0 | | | OPRET,2 | |
| 0240 | REP | 1 | | | 30,2155 | 60255 0 | | | STCALL | |
| 0241 | | | | | 30,2156 | 77776 1 | P22OVER | EXIT | SNN | |
| 02411 | REP | 27 | LAST | 536 | 30,2157 | 0 5301 0 | | | S22.1 | ESTABLISH LANDMARK - COMPUTE ORBITAL. |
| 02412 | | | | | 30,2160 | 04022 0 | | | | |
| 0242 | REP | 2 | LAST | 555 | 30,2161 | 0 2036 0 | | | | |
| 0243 | | | | | 30,2162 | 01455 1 | | | | |
| 0244 | | | | | 30,2163 | 01308 0 | V06N45R | VN | 0645 | POINT A ON GSOP |
| 0245 | | | | | 30,2164 | 01307 1 | V05N7022 | VN | 00570 | |
| 0246 | | | | | 30,2165 | 00033 1 | V05N7122 | VN | 00571 | |
| 0246 | | | | | 30,2166 | 00000 1 | P22MAXDE | 2DEC | 27 R-14 | |
| 0247 | | | | | 30,2167 | 01531 1 | V06N69 | VN | 00689 | |
| 0248 | | | | | 30,2170 | 00077 1 | OCTL77 | OCT | 77 | DR MASK OF ABCDE |
| 0249 | | | | | 30,2171 | 00700 0 | OCTL700 | OCT | 700 | C MASK OF ABCDE |
| 0250 | | | | | 30,2172 | 07000 0 | OCTL7000 | OCT | 7000 | R MASK OF ABCDE |
| 02505 | REP | 3 | LAST | 552 | 37,2000 | | | | SETLOC | |
| 02506 | | | | | 37,2333 | | | | P20S | |
| 0251 | | | | | 37,2333 | 43020 1 | P22SURRA | STO | ROFF | SET LAT/LONG/ALT FOR KNOWN LANDMARK |
| 0252 | REP | 2 | LAST | 123 | 37,2334 | 03667 0 | | | S22TOPF | |
| 0253 | REP | 3 | LAST | 556 | 37,2335 | 03347 1 | | | KNOWNPLG | |
| 0254 | REP | 3 | LAST | 557 | 37,2336 | 03667 0 | | | S22TOPF | UNKNOWN LANDMARK,EXIT |
| 0255 | | | | | 37,2337 | 48135 1 | | | SLOAD | |
| 0256 | REP | 3 | LAST | 556 | 37,2340 | 02745 0 | | | RHIZ | |
| 0257 | REP | 1 | | | 37,2341 | 60213 1 | | | 22SUBSCL | |
| 0258 | | | | | 37,2342 | 50025 0 | | | ORTR INLL | GET LAT/LONG/ALT FROM ASTRO |
| 0259 | REP | 1 | | | 37,2343 | 21646 0 | DSU | RNN | | |
| 0260 | REP | 1 | | | 37,2344 | 60173 1 | | | RDWID | 2 R-14 |
| 0261 | | | | | 37,2345 | 70152 0 | | | S22L.SITE | GET LAT/LONG/ALT FROM RLS (LANDING SITE) |
| 0262 | REP | 247 | LAST | 550 | 37,2346 | 00154 1 | SL1 | LXC,1 | MPAC | GET LAT/LONG/ALT FROM TABLES |
| 0263 | | | | | 37,2347 | 70601 1 | | | SETPD | |
| 0264 | | | | | 37,2350 | 00001 0 | | | DLOAD* | |
| 0265 | REP | 1 | | | 37,2351 | 23705 1 | | | OD | |
| 0266 | | | | | 37,2352 | 64723 0 | | | ALTTAR,1 | |
| | | | | | | | PDDI.* | PDDI.* | | |

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| | | | | | | | | | |
|-------|-----|-----|------|---------|---------|----------|----------|------------|--|
| 0267 | REP | 1 | | 37,2353 | 23823 1 | | | LONOTAB,1 | |
| 0268 | REP | 1 | | 37,2354 | 23541 0 | | | LATTAB,1 | |
| 0269 | | | | 37,2355 | 77666 1 | | | VDEP | |
| 0270 | REP | 7 | LAST | 528 | 37,2356 | 35104 1 | | STCALL | LAT |
| 0271 | REP | 4 | LAST | 557 | 37,2357 | 03867 0 | | S22TOFF | EXIT |
| 02715 | REP | 2 | LAST | 555 | 30,2000 | | | SETLOC | P20S1 |
| 02716 | | | | | 30,2173 | | | BANK | |
| 0272 | | | | | 30,2173 | 77634 0 | S22LSITE | RTR | CONVERT RLS FROM MOON-FIXED TO BASIC REP |
| 0273 | REP | 12 | LAST | 555 | 30,2174 | 45505 0 | | LOADTIME | |
| 02731 | | | | | 30,2175 | 24007 0 | | STOVL | GD |
| 02732 | REP | 9 | LAST | 510 | 30,2176 | 02026 1 | | RLS | 6-7D= TIME |
| 02733 | | | | | 30,2177 | 14001 0 | | STOVL | GD |
| 02734 | REP | 4 | LAST | 440 | 30,2200 | 15330 0 | | HIDHALF | 0-5D= LANDING SITE VECTOR |
| 02735 | | | | | 30,2201 | 77624 1 | | CALL | MPAC= ANY NON-ZERO FOR MOON |
| 02736 | REP | 1 | | | 30,2202 | 55341 1 | | RP-TO-R | RLS IN BASIC REP B-27 IN MPAC |
| 02737 | | | | | 30,2203 | 77742 0 | | VSR2 | LUNAPLAG AND ERADPLAG SET ABOVE |
| 0274 | REP | 3 | LAST | 451 | 30,2204 | 02152 0 | | STORE | SCALE RLS B-29 FOR LAT-LONG |
| 0275 | | | | | 30,2205 | 77634 0 | | RTR | |
| 0276 | REP | 13 | LAST | 558 | 30,2206 | 45505 0 | | LOADTIME | SET PRESENT TIME IN MPAC FOR LAT-LONG |
| 0277 | | | | | 30,2207 | 77624 1 | | CALL | |
| 0278 | REP | 2 | LAST | 451 | 30,2210 | 26322 0 | | LAT-LONG | |
| 0279 | | | | | 30,2211 | 77650 1 | | GOTO | |
| 0280 | REP | 5 | LAST | 558 | 30,2212 | 03867 0 | | S22TOFF | EXIT |
| 0281 | | | | | 30,2213 | 77624 1 | OBTAINL | CALL | GET LAT/LONG/ALT FROM ASTRO |
| 0282 | REP | 2 | LAST | 556 | 30,2214 | 60217 0 | | P22SUBRR | |
| 0283 | | | | | 30,2215 | 77650 1 | | GOTO | |
| 0284 | REP | 6 | LAST | 558 | 30,2216 | 03867 0 | | S22TOFF | EXIT |
| 0285 | | | | | 30,2217 | 77420 1 | P22SUBRR | STO | GET LAT/LONG/ALT FROM ASTRO |
| 0286 | REP | 7 | LAST | 558 | 30,2220 | 03870 0 | | S22TOFF +1 | |
| 0287 | REP | 1 | | | 30,2221 | 3 3858 1 | CAF | V08N99R | |
| 0288 | REP | 129 | LAST | 557 | 30,2222 | 0 4555 0 | TC | BANKCALL | |
| 0289 | REP | 18 | LAST | 550 | 30,2223 | 20624 0 | CADR | GOFASH | |
| 0290 | REP | 23 | LAST | 557 | 30,2224 | 0 4108 1 | TC | GOTOPOCH | TERMINATE |
| 0291 | | | | | 30,2225 | 0 2227 1 | TC | +2 | PROCEED |
| 0292 | | | | | 30,2226 | 0 2221 1 | TC | -5 | ENTER OR RECYCLE |
| 0293 | REP | 62 | LAST | 687 | 30,2227 | 0 6006 1 | TC | INTERP | |
| 0294 | | | | | 30,2230 | 77624 1 | CALL | | |
| 0295 | REP | 1 | | | 30,2231 | 61345 1 | | LLASRDA | |
| 0296 | | | | | 30,2232 | 77650 1 | | GOTO | |
| 0297 | REP | 8 | LAST | 558 | 30,2233 | 03870 0 | | S22TOFF +1 | EXIT |
| 0298 | | | | | 30,2234 | 77776 1 | UNPACKAE | EXIT | UNPACK LANDMARK INTO ARCDR |
| 0299 | REP | 15 | LAST | 555 | 30,2235 | 3 1751 0 | CA | LANDMARK | |
| 0300 | REP | 1 | | | 30,2236 | 7 2170 1 | MASK | OCTL77 | |
| 0301 | REP | 4 | LAST | 557 | 30,2237 | 55=744 0 | TS | 22SUBSCI. | DE=LANDM ID NO. N 00,01, 02-28 |
| 0302 | REP | 16 | LAST | 558 | 30,2240 | 3 1751 0 | CA | LANDMARK | |
| 0303 | REP | 2 | LAST | 555 | 30,2241 | 7 2172 0 | MASK | OCTL7000 | |
| 0304 | REP | 2 | LAST | 95 | 30,2242 | 55=745 1 | TS | CYOFF | B= OFFSET INDICATOR |
| 0305 | REP | 26 | LAST | 555 | 30,2243 | 0 5435 0 | TC | UPFLAG | SET KNOWNFLG |
| 0306 | REP | 4 | LAST | 557 | 30,2244 | 00141 0 | ADRES | KNOWNFLG | RIT 8 FLAG 6 |



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| | | | | | | | | |
|------|-----|----|------|-----|---------|----------|--------|-----------|
| 0307 | REP | 17 | LAST | 558 | 30,2245 | 3 1751 0 | CA | LANDMARK |
| 0308 | REP | 38 | LAST | 417 | 30,2246 | 7 4875 0 | MASK | BIT14 |
| 0309 | | | | | 30,2247 | 0 0006 1 | EXTEND | |
| 0310 | | | | | 30,2250 | 1 2253 0 | BZF | +3 |
| 0311 | REP | 26 | LAST | 555 | 30,2251 | 0 5447 0 | TC | DOWNFLAG |
| 0312 | REP | 5 | LAST | 558 | 30,2252 | 00141 0 | ADRES | KNOWNFLAG |
| 0313 | REP | 83 | LAST | 558 | 30,2253 | 0 6006 1 | TC | INTPRST |
| 0314 | | | | | 30,2254 | 77616 0 | RVO | |

IF BIT14 OF LANDMARK=1, A=2 OTHERWISE A=1

A=1 LEAVE KNOWNFLAG SET FOR KNOWN LMK
A=2 CLEAR KNOWNFLAG (BIT 8 FLAG 6) FOR UNKNOWN LMK



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R0315 PROGRAM NAME- OPTICS CALIBRATION ROUTINE
 R0316 MOD NO- 1
 R0317 MOD BY- TOM KNATT

R0318
 R0319 FUNCTIONAL DESCRIPTION- TO MEASURE THE EFFECT OF SOLAR RADIATION ON
 R0320 THE SXT TRUNNION ANGLE AND TO STORE THE MEASURED TRUNNION BIAS FOR P23
 R0321

R0322 CALLING SEQUENCE- CALL
 R0323 RST

R0324 SUBROUTINES CALLED- DISPLAY ROUTINES

R0325 NORMAL EXIT MODES-VIA BGRESS

R0326 ALARMS- NONE

R0330 ABORT MODES- P23ABORT IF MARKING SYSTEM OR EXTENDED VERR ACTIVE

R0331 INPUT- NONE REQUIRED, NORMALLY CALLED BY P23

R0332 OUTPUT- TRUNNION BIAS ANGLE- ANGLE DETERMINED WHEN SHAFT LINE OF SIGHT

R0333 (SLOS) AND LANDMARK LINE OF SIGHT (LLOS) ARE SUPERIMPOSED. THIS ANGLE

R0334 MAY NOT BE EXACTLY ZERO BECAUSE OF UNEVEN HEATING OF THE OPTICS, FOR

R0335 EXAMPLE.

R0336 ERASABLE INITIALIZATION REQUIRED- MRKRUP1, EXTTRACT

R0337 DEBRIS- RUPTRES USED BY MARKRUPT AND ERASABLES USED BY DISPLAYS

| | | | | | | | | | |
|-------|-----|-----|------|---------|---------|--------|---|--------|----------|
| 0338 | | | | 33,3772 | | | | BANK | 33 |
| 0339 | REP | 4 | LAST | 557 | | | | SETLOC | P20S |
| 0340 | | | | | 37,2360 | | | BANK | |
| 0341 | REP | 1 | | | | | | COUNT* | SS/R57 |
| 0342 | REP | 20 | LAST | 277 | 57,1725 | | | BRANK= | MRKRUP1 |
| 0343 | | | | | 37,2360 | 77420 | 1 | STO | EXIT |
| 0344 | REP | 2 | LAST | 88 | 37,2361 | 02317 | 0 | | BGRESS |
| 03442 | REP | 3 | LAST | 434 | 37,2362 | 3 4753 | 1 | CAP | BRANK7 |
| 03444 | REP | 25 | LAST | 554 | 37,2363 | 54 003 | 0 | TS | BRANK |
| 0345 | REP | 19 | LAST | 518 | 37,2364 | 3 6211 | 0 | CAP | SIX |
| 0346 | REP | 16 | LAST | 511 | 37,2365 | 7 1044 | 1 | MASK | EXTTRACT |
| 0347 | REP | 143 | LAST | 530 | 37,2366 | 10 000 | 0 | CCS | A |
| 0348 | REP | 1 | | | 37,2367 | 0 2437 | 0 | TC | P23ABRT |
| 0349 | REP | 23 | LAST | 509 | 37,2370 | 3 4711 | 1 | CAP | RIT2 |
| 0350 | REP | 17 | LAST | 560 | 37,2371 | 27-044 | 1 | ADS | EXTTRACT |
| 0351 | REP | 27 | LAST | 558 | 37,2372 | 0 5435 | 0 | TC | UPFLAG |
| 0352 | REP | 1 | | | 37,2373 | 00118 | 1 | ADRES | V59FLAG |
| 0353 | REP | 1 | | | 37,2374 | 3 2442 | 1 | CAP | V59NR |
| 0354 | REP | 130 | LAST | 558 | 37,2375 | 0 4555 | 0 | TC | BANKCALL |
| 0355 | REP | 1 | | | 37,2376 | 20504 | 1 | CADR | GOMARKPR |
| 0356 | REP | 24 | LAST | 558 | 37,2377 | 0 4106 | 1 | TC | GOTOPOOH |
| 0357 | REP | 1 | | | 37,2400 | 0 2424 | 1 | TC | ENDR57 |
| 0358 | REP | 2 | LAST | 560 | 37,2401 | 0 2424 | 1 | TC | ENDR57 |
| 0359 | REP | 10 | LAST | 368 | 37,2402 | 3 4716 | 0 | CAP | SEVEN |

BIT2 = MARKING SYSTEM IN USE
 BIT3 = EXTENDED VERR IN PROGRESS

SET, THEREFORE ABORT
 NOT SET
 SET IT
 SET V59FLAG (BIT 12 FLAG 5) TO INDICATE
 CALIBRATION MARK

TERMINATE

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| | | | | | | | | | |
|--------|-------|-----|----------|-------|---------|----------|----------|------------|----------|
| 0360 | REP | 9 | LAST | 557 | 37,2403 | 0 5415 1 | TC | BLANKET | |
| 0361 | REP | 73 | LAST | 557 | 37,2404 | 0 5112 0 | TC | ENDJOB | |
| 0362 | STOPS | | TRUNNIGN | ANGLE | (OCDU) | | | | |
| 0363 | REP | 1 | | | 37,2405 | 3 2441 1 | MARKDISP | CAP | V06N7NR |
| 0364 | REP | 131 | LAST | 560 | 37,2406 | 0 4555 0 | TC | BACKCALL | |
| 0365 | REP | 2 | LAST | 560 | 37,2407 | 20504 1 | CADR | GOACQPR | |
| 0366 | REP | 25 | LAST | 560 | 37,2410 | 0 4106 1 | TC | GOTOPOGH | |
| 0367 | REP | 1 | | | 37,2411 | 0 2416 0 | TC | R57B | |
| 0368 | REP | 1 | | | 37,2412 | 0 2372 0 | TC | R57A | |
| 0369 | REP | 13 | LAST | 557 | 37,2413 | 3 4715 0 | CAP | FIVE | |
| 0370 | REP | 10 | LAST | 561 | 37,2414 | 0 5415 1 | TC | BLANKET | |
| 0371 | REP | 74 | LAST | 561 | 37,2415 | 0 5112 0 | TC | ENDJOB | |
| 03712 | REP | 1 | | | 37,2416 | 3 2444 1 | R57B | CA | 19.77DEG |
| 03714 | REP | 61 | LAST | 533 | 37,2417 | 54 001 1 | TS | L | |
| 0372 | REP | 21 | LAST | 560 | 37,2420 | 3 1732 0 | CA | MARKUP1 +5 | |
| 037245 | | | | | 37,2421 | 0 0008 1 | EXTEND | | |
| 03725 | REP | 62 | LAST | 561 | 37,2422 | 20 001 1 | MSU | L | |
| 0373 | REP | 1 | | | 37,2423 | 55-342 1 | TS | TRUNBIAS | |
| 0376 | REP | 27 | LAST | 559 | 37,2424 | 0 5447 0 | ENDRST | TC | DOWNFLAG |
| 0377 | REP | 2 | LAST | 560 | 37,2425 | 00116 1 | ADRES | V59FLAG | |
| 03772 | REP | 3 | LAST | 554 | 37,2426 | 3 4751 0 | CAP | BRANKS | |
| 03774 | REP | 28 | LAST | 560 | 37,2427 | 54 003 0 | TS | BRANK | |
| 03776 | REP | 3 | LAST | 553 | 37,2430 | 3 4761 0 | CAP | PRIO14 | |
| 03777 | REP | 16 | LAST | 509 | 37,2431 | 0 5027 1 | TC | NOVAC | |
| 03778 | REP | 30 | LAST | 557 | 1330 | | BRANK= | MARKSTAT | |
| 037785 | REP | 2 | LAST | 227 | 37,2432 | 05423 1 | 2CADR | ENDMARK | |
| 037785 | | | | | 37,2433 | 04062 1 | | | |
| 0378 | REP | 64 | LAST | 559 | 37,2434 | 0 6006 1 | TC | INTPRET | |
| 0379 | | | | | 37,2435 | 77650 1 | GOTO | | |
| 0380 | REP | 3 | LAST | 560 | 37,2436 | 02317 0 | | EGRESS | |
| 0381 | REP | 3 | LAST | 217 | 37,2437 | 0 5604 0 | P23ARRT | TC | RAILOUT |
| 0382 | | | | | 37,2440 | 01211 1 | | OCT | 01211 |
| 0383 | | | | | 37,2441 | 01527 0 | V06N7NR | VN | 0667 |
| 0384 | | | | | 37,2442 | 16600 0 | V59NR | VN | 5900 |
| 0385 | | | | | 37,2443 | 14600 1 | V51NR | VN | 5100 |
| 03852 | | | | | 37,2444 | 61740 0 | 19.77DEG | OCT | 61740 |

BLANK OUT R1,R2,R3

TERMINATE
PROCEED
ENTER (RECYCLE)

BLANK OUT R1,R3

PUT FIXED INTO ERASABLE FOR MSU
INSTRUCTION COMING UP
CONTAINS TRUNNIGN

CORRECTS TRUNBIAS FROM 2=5 TO 1=5

RESET V59FLAG
BIT 12 FLAG 5

THIS JOB CLEARS BIT IN

MARKING IN R57 SO R53 CAN TAKE OVER



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R0386 PROGRAM DESCRIPTION
R0387 MOD NO - 1
R0388 MOD BY - N.BRODEUR
R0389 FUNCTIONAL DESCRIPTION
R0390
R0391 TO PERFORM SIGHTING MARKS IN CONJUNCTION WITH THE RENDEZVOUS NAVIG-
R0392 ATION PROGRAM, CALLED BY ASTRONAUT VIA EXTENDED VERB
R0394 CALLING SEQUENCE -
R0395 R21 VIA V 57
R0396 R23 VIA V 54
R0399 SUBROUTINES CALLED -
R0400 FLAGUP FLAGDOWN BANKCALL
R0401 ENDOPJOB GOMARK2 GOMARKF
R04011 INTPRET GENTRAN KLEENEX
R04012 ENMARK
R0402 NORMAL EXIT MODES -
R0403 MARKRUPT USED BY ENMARK HAS BEEN MODIFIED TO STORE MARK IN MRKRUP2
R0404 FOR USE BY R22. WHEN ASTRONAUT IS FINISHED TAKING MARKS, HE HITS AN
R0405 PROCEED, R21 IS TERMINATED THUS CAUSING THE FINAL MARK TO BE TRANSPRD
R04051 TO MRKRUP2 FOR PROCESSING BY R22
R0406 ALARM OR ABORT EXIT MODES -
R0407 NONE
R0408 OUTPUT -
R0409 7 REGISTER MRKRUP2 CONTAINING TIME2, TIME1, CDUY, OPTICS X, CDUZ, OPTICS Y,
R0410 CDUX.
R0411 ERASABLE INITIALIZATION REQUIRED
R0412 FLAGS SET AND RESET
R0413 R21MARK (COMMUNICATION TO MARKRUPT TO STORE MARKS IN MRKRUP1 + 2)
R0414 R23FLG INDICATES COAS MARKING
R0415 DEBRIS -
0416 REP 22 LAST 561 37,1725 EBANK= MRKRUP1
0417 REP 1 37,2000 SETLOC RENDEZ
0418 37,2445 BANK
0419 REP 1 COUNT# 88/R21
0420 REP 28 LAST 560 37,2445 0 5435 0 R21CSM TC UPFLAG SET R21MARK
0421 REP 2 LAST 195 37,2448 00037 0 ADRES R21MARK HIT 14 FLAG 2
0422 REP 12 LAST 504 37,2447 3 7716 0 R23CSM CA NBOONE
0423 REP 23 LAST 562 37,2450 55=725 1 TS MRKRUP1
0424 REP 8 LAST 553 37,2451 55=734 1 TS MRKRUP2
0427 REP 12 LAST 446 37,2452 3 0075 0 CA FLAGWRD1
0428 REP 19 LAST 539 37,2453 7 4702 1 MASK BIT9 TEST R23FLG
0429 37,2454 0 0006 1 EXTEND
0430 REP 1 37,2455 1 2510 0 RZF R21C1 NOT SET REGULAR R21 MARKING
0431 REP 1 37,2456 3 2535 0 CAP V0694 R23 BACKUP MARKING
0432 REP 132 LAST 561 37,2457 0 4555 0 TC BANKCALL DISPLAY SHAFT + TRNNION
0433 REP 5 LAST 496 37,2460 20465 1 CADR GOMARKF
0434 REP 1 37,2461 0 2527 0 TC R21END TERM
0435 37,2462 0 2464 0 TC +2 PROC

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| | | | | | | | | | | | |
|-------|-----|-----|------|---------|---------|-------|-------|---------|---------|------------|---------------------------------------|
| 0436 | | | | 37,2463 | 0 | 2456 | 1 | | TC | -5 | ENTER |
| 0437 | REP | 1 | | 37,2464 | 3 | 2534 | 1 | R23CSM1 | CAP | V53 | PERFORM ALT LOS SIGHT MARK |
| 0438 | REP | 133 | LAST | 562 | 37,2465 | 0 | 4555 | 0 | TC | BANKCALL | |
| 0439 | REP | 1 | | 37,2466 | 0 | 20470 | 0 | | CADR | GOMARK2 | |
| 0440 | REP | 2 | LAST | 562 | 37,2467 | 0 | 2527 | 0 | TC | R21END | V34-TERMINATE R23 |
| 0441 | REP | 1 | | 37,2470 | 1 | 2516 | 0 | | TCP | R21CSMA | PROCEED-END BACK UP MARKING (R23) |
| 0442 | REP | 20 | LAST | 560 | 37,2471 | 3 | 6211 | 0 | CAP | SIX | TRANSFER MRKRUP1 TO MRKRUP2 |
| 0443 | REP | 7 | LAST | 560 | 37,2472 | 0 | 5475 | 1 | TC | GENTRAN | |
| 0444 | REP | 24 | LAST | 562 | 37,2473 | 0 | 01725 | 0 | ADRES | MRKRUP1 | |
| 0445 | REP | 9 | LAST | 562 | 37,2474 | 0 | 01734 | 0 | ADRES | MRKRUP2 | |
| 0451 | | | | 37,2475 | 0 | 0006 | 1 | | EXTEND | | |
| 0452 | REP | 17 | LAST | 532 | 37,2476 | 3 | 0025 | 0 | DCA | TIME2 | |
| 0453 | REP | 25 | LAST | 563 | 37,2477 | 53 | 726 | 1 | DxCH | MRKRUP1 | READ TIME |
| 0454 | REP | 4 | LAST | 528 | 37,2500 | 3 | 0033 | 1 | CA | CDUJ | READ CDU ANGLES |
| 0455 | REP | 26 | LAST | 563 | 37,2501 | 55 | 727 | 0 | TS | MRKRUP1 +2 | |
| 0456 | REP | 8 | LAST | 528 | 37,2502 | 3 | 0034 | 0 | CA | CDUZ | |
| 0457 | REP | 27 | LAST | 563 | 37,2503 | 55 | 731 | 1 | TS | MRKRUP1 +4 | |
| 0458 | REP | 11 | LAST | 528 | 37,2504 | 3 | 0032 | 0 | CA | CDUX | |
| 0459 | REP | 28 | LAST | 563 | 37,2505 | 55 | 733 | 0 | TS | MRKRUP1 +6 | |
| 0464 | | | | 37,2506 | 0 | 0003 | 1 | | RELINT | | |
| 0465 | REP | 1 | | 37,2507 | 0 | 2464 | 0 | | TC | R23CSM1 | |
| 0466 | REP | 1 | | 37,2510 | 3 | 2443 | 0 | R21C1 | CAP | V51NB | |
| 0467 | REP | 134 | LAST | 563 | 37,2511 | 0 | 4555 | 0 | TC | BANKCALL | |
| 0468 | REP | 2 | LAST | 563 | 37,2512 | 0 | 20470 | 0 | CADR | GOMARK2 | |
| 0469 | REP | 3 | LAST | 563 | 37,2513 | 0 | 2527 | 0 | TC | R21END | V34-TERMINATE R21 |
| 0470 | REP | 2 | LAST | 563 | 37,2514 | 1 | 2516 | 0 | TCP | R21CSMA | PROCEED-END R21 |
| 0471 | REP | 2 | LAST | 562 | 37,2515 | 1 | 2510 | 0 | TCP | R21C1 | RECYCLE |
| 0473 | REP | 29 | LAST | 563 | 37,2516 | 3 | 1725 | 0 | R21CSMA | CA | MRKRUP1 |
| 0474 | REP | 67 | LAST | 564 | 37,2517 | 6 | 4712 | 1 | AD | ONE | IF -1 NO MARK |
| 0475 | | | | 37,2520 | 0 | 0006 | 1 | | EXTEND | | |
| 0476 | REP | 4 | LAST | 563 | 37,2521 | 1 | 2527 | 1 | BZP | R21END | ZERO = NO MARK |
| 0478 | REP | 21 | LAST | 563 | 37,2522 | 3 | 6211 | 0 | CAP | SIX | MARK THEREFORE TRANSFER IT TO MRKRUP2 |
| 0479 | REP | 8 | LAST | 563 | 37,2523 | 0 | 5475 | 1 | R21CSM1 | TC | GENTRAN |
| 0480 | REP | 30 | LAST | 563 | 37,2524 | 0 | 01725 | 0 | ADRES | MRKRUP1 | TRANSFER MRKRUP1 TO MRKRUP2 |
| 0481 | REP | 10 | LAST | 563 | 37,2525 | 0 | 01734 | 0 | ADRES | MRKRUP2 | |
| 0482 | | | | 37,2526 | 0 | 0003 | 1 | | RELINT | | |
| 0487 | REP | 135 | LAST | 563 | 37,2527 | 0 | 4555 | 0 | R21END | TC | BANKCALL |
| 0488 | REP | 2 | LAST | 226 | 37,2530 | 0 | 20464 | 0 | CADR | KLEPNEX | |
| 04881 | REP | 28 | LAST | 561 | 37,2531 | 0 | 5447 | 0 | TC | DOWNFLAG | RESET R21MARK |
| 04882 | REP | 3 | LAST | 562 | 37,2532 | 0 | 00037 | 0 | ADRES | R21MARK | RIT 14 FLAG 2 |
| 0491 | REP | 3 | LAST | 561 | 37,2533 | 0 | 5423 | 1 | TC | ENDMARK | END MARKING AND ENDJOB |
| 0494 | | | | 37,2534 | 15200 | 1 | | V53 | VN | 5300 | |
| 0495 | | | | 37,2535 | 01536 | 0 | | V0694 | VN | 0694 | |

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P0496 PREFERRED TRACKING ATTITUDE ROUTINE R01CSM

R0497 PROGRAM DESCRIPTION

R0498 MOD NO - 2

R0499 MOD BY - N.BRODEUR

R0500 FUNCTIONAL DESCRIPTION-

R0501 TO COMPUTE THE PREFERRED TRACKING ATTITUDE OF THE CSM TO ENABLE OPTICS

R0502 TRACKING OF THE LM AND TO PERFORM THE MANEUVER TO THE PREFERRED

R0503 OR X-AXIS TRACKING ATTITUDE.

R0504 CALLING SEQUENCE-

R0505 TC BANKCALL

R0506 CADR R01CSM

R0507 SUBROUTINES CALLED

R0508 MAKECADR BANKCALL

R0509 INTPRET FLAGUP FLAGDOWN

R0510 BANKJMP CRS61.1 R00CSM

R0511 PHASCRNG

R0512 NORMAL EXIT MODES-

R0513 NORMAL RETURN IS TO CALLER + 1

R0517 OUTPUT -

R0518 SEE OUTPUT FOR CRS61.1 d ATTITUDE MANEUVER ROUTINE (R00CSM)

R0519 ERASABLE INITIALIZATION REQUIRED

R0520 GENRET USED TO SAVE 0 FOR RETURN

R0521 R01CNTR MUST BE PRESET TO ZERO

R0522 FLAG3 SET + RESET

R0523 3-AXIS FLAG

R0524 DERRIS

R0525 SEE SUBROUTINES

0527 REP 3 LAST 114 86,1770

0528 REP 1

ERANK= GENRET
COUNT# 88/R01

ROUTINES - NAVIGATION - PRFP. TR. 9TT-

0529 REP 9 LAST 529 37,2536 3 4752 0 R01CSM

0530 REP 27 LAST 561 37,2537 58 003 1

0531 REP 2 LAST 113 37,2540 55=771 0

0532 REP 2 LAST 383 37,2541 0 4804 1

0533 REP 4 LAST 584 37,2542 55=770 1

0534 REP 3 LAST 554 37,2543 11=775 1

0535 REP 1 37,2544 0 2575 1

0536 REP 1 37,2545 0 2547 0

0537 REP 2 LAST 584 37,2546 0 2576 1

0538 REP 85 LAST 581 37,2547 0 8008 1

0539 REP 1 37,2550 77624 1

0540 REP 1 37,2551 71225 1

0541 REP 1 37,2552 77776 1

0542 REP 248 LAST 557 37,2553 50 154 1

0543 REP 1 37,2554 0 2555 0

0544 REP 1 37,2555 0 2574 0

A05441

A05442

0545 REP 29 LAST 563 37,2556 0 5447 0 R01C1

0553 REP 3 LAST 391 37,2557 00124 0

CAP ERANK6
XCH ERANK
TS SAVRANK
TC MAKECADR
TS GENRET
CCS R01CNTR
TC DECRM01
TC +2
TC DECRM01 +1
TC INTPRET
CALL
CRS61.1
EXIT
INDEX MPAC
TC +1
TC R01END

SWITCH TO ERANK 6
SAVE ERANK
TEST R01CNTR
NOT READY TO DO R01.
DO R01
LOS DETERMINATION + VERH ATTITUDE
SUBROUTINE DRIVING DAP (EXIT R01)
OR AUTO MODE NOT SET (EXIT R01)
OR STIKFLAG SET (EXIT R01)
RFRST 3-AXIS FLAG
BIT 6 FLAG 5

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| | | | | | | | |
|-------|-----|-----|------|-----|---------|--------|---|
| 0554 | REP | 06 | LAST | 563 | 37,2560 | 4 4712 | 0 |
| 0555 | REP | 4 | LAST | 564 | 37,2561 | 55=775 | 1 |
| 0556 | REP | 29 | LAST | 562 | 37,2562 | 0 5435 | 0 |
| 0557 | REP | 2 | LAST | 384 | 37,2563 | 00077 | 1 |
| 0558 | REP | 136 | LAST | 563 | 37,2564 | 0 4555 | 0 |
| 0559 | REP | 2 | LAST | 391 | 37,2565 | 56000 | 1 |
| 0560 | REP | 30 | LAST | 564 | 37,2566 | 0 5447 | 0 |
| 0561 | REP | 3 | LAST | 565 | 37,2567 | 00077 | 1 |
| 0564 | REP | 28 | LAST | 557 | 37,2570 | 0 5301 | 0 |
| 0565 | | | | | 37,2571 | 00111 | 0 |
| 05651 | REP | 119 | LAST | 564 | 37,2572 | 3 4714 | 1 |
| 05652 | REP | 3 | LAST | 564 | 37,2573 | 0 2575 | 1 |
| 0567 | REP | 18 | LAST | 555 | 37,2574 | 3 6214 | 0 |
| 0568 | REP | 5 | LAST | 565 | 37,2575 | 55=775 | 1 |
| 0569 | REP | 5 | LAST | 564 | 37,2576 | 31=770 | 0 |
| 0570 | REP | 144 | LAST | 560 | 37,2577 | 22 000 | 1 |
| 0571 | REP | 3 | LAST | 564 | 37,2600 | 3 1771 | 1 |
| 0572 | REP | 28 | LAST | 564 | 37,2601 | 56 003 | 1 |
| 0573 | REP | 145 | LAST | 565 | 37,2602 | 22 000 | 1 |
| 0574 | REP | 6 | LAST | 384 | 37,2603 | 0 4577 | 0 |
| 0575 | | | | | 13,2176 | | |
| 0576 | REP | 1 | | | 23,2000 | | |
| 0577 | | | | | 23,3047 | | |
| 0578 | REP | 31 | LAST | 563 | 37,1725 | | |

| | |
|---------|----------|
| CS | ONE |
| TS | R61CNTR |
| TC | UPFLAG |
| ADRES | PDSPLAG |
| TC | BANKCALL |
| CADR | R60CM |
| TC | DOWNFLAG |
| ADRES | PDSPLAG |
| TC | PHASCHNG |
| OCT | 00111 |
| CAP | ZERO |
| TC | DECRM61 |
| CAP | THREE |
| R61END | |
| DECRM61 | TS |
| TS | R61CNTR |
| CAB | GENRST |
| LXCH | A |
| CA | SAVRNK |
| XCH | BRANK |
| LXCH | A |
| TC | RANKJUMP |
| BANK | 13 |
| SETLOC | P20S2 |
| BANK | |
| BRANK | MRCRUP1 |

SET R61CNTR NEG. TO INDICATE KALOMANU

SET FLAG FOR PROIRITY DISPLAYS FOR R60
BIT 12 FLAG 4

RESST FLAG FOR PRIORITY DISPLAYS IN R60
BIT 12 FLAG 4

RETURN IS IN L
RESTORE BRANK

RETURN IS NOW BACK IN A
EXIT R61

VECTOR PERFORMS COMPUTATIONS FOR
DELTA, THE MEASURED DEVIATION BASED ON THE DIFFERENCE BETWEEN THE GSN-LB
M STATE VECTOR ESTIMATES AND THE ACTUAL TRACKING MEASUREMENT.

US, THE MODIFIED PICTIOUS STAR DIRECTION VECTOR
GEOMETRY VECTOR B ASSOCIATED WITH EACH TRACKING MEASUREMENT.

INPUT
UM, 1/2 UNIT VECTOR ALONG THE GSN-LB LINE OF SIGHT (BASIC REF. SYSTEM)
USMR, PICTIOUS STAR DIRECTION (1/2 UNIT VECTOR)
RCLP, RELATIVE CSM TO LM POSITION VECTOR

OUTPUT
USMR, MODIFIED PICTIOUS STAR DIRECTION (1/2 UNIT VECTOR)
VECTOR = 9 DIMENSIONAL VECTOR (1/2 UNIT VEC.)
DELTA = MEASURED DEVIATION

CALLING SEQUENCE
L CALL VECTORS

L+1 OF CALLING SEQUENCE

| 0597 | REP | 1 | COUNT 23/20SUB |
|------|-----|-------------|-----------------|
| 0597 | REP | 4 LAST 581 | 23,3050 02317 0 |
| 0598 | REP | 4 LAST 581 | 23,3051 53375 0 |
| 0599 | REP | 4 LAST 581 | 23,3050 02317 0 |
| 0600 | REP | 2 LAST 119 | 23,3052 03531 0 |
| 0601 | REP | 2 LAST 119 | 23,3053 14033 1 |
| 0602 | REP | 2 LAST 119 | 23,3054 00045 0 |
| 0603 | REP | 1 LAST 78 | 23,3055 25301 1 |
| 0604 | REP | 2 LAST 78 | 23,3056 01245 0 |
| 0605 | REP | 2 LAST 78 | 23,3057 53435 0 |
| 0606 | REP | 2 LAST 78 | 23,3058 01245 0 |
| 0607 | REP | 3 LAST 119 | 23,3061 37502 1 |
| 0608 | REP | 2 LAST 553 | 23,3062 56741 0 |
| 0609 | REP | 2 LAST 78 | 23,3063 77775 1 |
| 0610 | REP | 4 LAST 566 | 23,3064 03502 0 |
| 0611 | REP | 3 LAST 566 | 23,3065 01245 0 |
| 0612 | REP | 2 LAST 78 | 23,3066 72441 0 |
| 0613 | REP | 2 LAST 78 | 23,3067 01235 1 |
| 0614 | REP | 2 LAST 78 | 23,3070 45326 1 |
| 0615 | REP | 3 LAST 393 | 23,3071 15322 0 |
| 0616 | REP | 3 LAST 393 | 23,3072 41301 0 |
| 0617 | REP | 17 LAST 549 | 23,3073 00047 1 |
| 0618 | REP | 1 | 23,3074 07107 0 |
| 0619 | REP | 1 | 23,3075 53805 1 |
| 0620 | REP | 2 LAST 566 | 23,3076 01301 1 |
| 0621 | REP | 2 LAST 119 | 23,3077 21576 0 |
| 0622 | REP | 2 LAST 119 | 23,3100 27524 1 |
| 0623 | REP | 6 LAST 535 | 23,3101 15332 1 |
| 0624 | REP | 6 LAST 566 | 23,3102 03510 0 |
| 0625 | REP | 6 LAST 566 | 23,3103 03516 0 |
| 0626 | REP | 6 LAST 566 | 23,3104 17650 1 |

RCLP ARS VALUE
ADJUST SCALING

USMR DOT UM

PHASE CHANGE

USMR = UNIT(VUS X UCL)

RELATIVE POSITION VECTOR
RCLP UNIT VEC
RCLP ARS VALUE
MOVE TO SAFE LOCATION

ADDRESS
VLOAD UNIT
RCLP UNIT
STOX 28D
STOX 26D
STOX 28D
UNIT VEC
USMR UNIT
VAV UNIT
VAV UNIT
UNIT VEC
USMR UNIT
USMR UNIT
STOX 28D
STOX 26D
STOX 28D
RCLP UNIT VEC
RCLP ARS VALUE
MOVE TO SAFE LOCATION
PHASE CHANGE
USMR = UNIT(VUS X UCL)
VLOAD
VECTOR
STORE USMR
DOT
UM
ACOS
DSU
NORM
DMP
DPI/4TH
DPI/4TH
DMP
XI
PI/4.0
SRM
DMP
TEMPOR
0 - 3.1
STOVL DELTA
ZENOVERS
STORE VECTOR +6
STORE VECTOR +12D
GOTO

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| | | | | | | | | |
|------|-----|---|------|-----|---------|-------|---|------------------------|
| 0627 | REP | 5 | LAST | 566 | 23,3105 | 02317 | 0 | EXRESS |
| 0628 | | | | | 23,3106 | 31103 | 1 | PI/4.0 2DEC .785398164 |
| 0628 | | | | | 23,3107 | 36652 | 0 | |



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R0629 GETUM-DETERMINES THE LINE OF SIGHT UNIT VECTOR LM IN THE BASIC REFERENC
R0630 E COORDINATE SYSTEM FROM THE OPTICS SHAFT AND TRUNNION ANGLES AND THE IM
R0631 U GINICAL ANGLES.
R0632 INPUT
R0633 MARKDATA, BASE ADDRESS OF MARK DATA
R0634 REPSMAT, ROTATION MATRIX FROM STABLE MEMBER TO BASIC REF. COORD. SYSTEM
R0635 SUBROUTINES CALLED-
R0636 SCTNB - SECT. ANGLAR READINGS TO NAV. BASE COOR.
R0637 NBSM - TRANSFORM FROM NAV. BASE TO STABLE MEMBER
R0638 OUTPUT
R0639 MPAC = LINE OF SIGHT 1/2 UNIT VECTOR IN BASIC REFERENCE SYSTEM
R0640 CALLING SEQUENCE
R0641 L CALL GETUM

R0642 NORMAL EXIT
R0643 L+1 OF CALLING SEQUENCE

| | | | | | | | | |
|------|-----|----|---------|---------|-------|--------|-------------|--|
| 0644 | | | 23,3110 | 40220 0 | GETUM | STO | SETPD | |
| 0645 | REP | 6 | LAST | 567 | | | BORESS | |
| 0646 | | | 23,3111 | 02317 0 | | | 0 | |
| 0647 | | | 23,3112 | 00001 0 | | LXC, 1 | VLOAD* | |
| 0648 | REP | 2 | LAST | 78 | | | MARKDATA | CONTAINS ADDRESS OF MARK DATA |
| 0649 | | | 23,3113 | 76740 0 | | | 1, 1 | |
| 0650 | REP | 7 | LAST | 222 | | STOCL* | MARKDOWN +1 | TRANSFER DATA FROM WORKING STORAGE |
| 0651 | | | 23,3114 | 01242 1 | | | 0, 1 | TO MARKDOWN ARRAY FOR DOWNLINK |
| 0652 | REP | 8 | LAST | 568 | | STORE | MARKDOWN | |
| 0653 | | | 23,3115 | 00002 0 | | ACT, 2 | 2 | |
| 0654 | | | 23,3116 | 23876 1 | | | XSA, 2 | |
| 0655 | | | 23,3117 | 00001 0 | | XSU, 2 | X1 | X1 = MARKDATA |
| 0656 | REP | 18 | LAST | 566 | | | S1 | S1 = MARKDATA(ADR) +2 |
| 0657 | REP | 6 | LAST | 431 | | CALL | | |
| 0658 | | | 23,3120 | 03875 0 | | | SCTNB | SECT. ANGLAR READINGS TO NAV. BASE COOR. |
| 0659 | REP | 3 | LAST | 501 | | CALL | | |
| 0660 | | | 23,3121 | 77774 0 | | | NBSM | TRANSFORM FROM NAV. BASE TO STABLE MEM. |
| 0661 | REP | 1 | | | | VCM | VSL1 | |
| 0662 | | | 23,3122 | 00002 0 | | | REPSMAT | |
| 0663 | REP | 14 | LAST | 555 | | GOTO | | MPAC = (LM) LINE OF SIGHT VECTOR |
| 0664 | | | 23,3123 | 67064 1 | | | BORESS | EXIT |
| 0665 | REP | 7 | LAST | 568 | | | | |
| | | | 23,3124 | 00046 0 | | | | |
| | | | 23,3125 | 00050 1 | | | | |
| | | | 23,3126 | 77624 1 | | | | |
| | | | 23,3127 | 46000 0 | | | | |
| | | | 23,3128 | 77624 1 | | | | |
| | | | 23,3129 | 47541 1 | | | | |
| | | | 23,3130 | 76505 0 | | | | |
| | | | 23,3131 | 01736 1 | | | | |
| | | | 23,3132 | 77650 1 | | | | |
| | | | 23,3133 | 02317 0 | | | | |



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06666 RENDEZVOUS TRACKING DATA PROCESSING ROUTINE (R22)

06667 PURPOSE (1) TO PROCESS RENDEZVOUS SIGHTING MARK DATA TO UPDATE THE STATE VECTOR OF EITHER THE CSM OR LM AS
06669 DEFINED BY THE RENDEZVOUS NAVIGATION PROGRAM (P20).

06670 ASSUMPTIONS (1) THIS ROUTINE IS MANUALLY SELECTED BY THE ASTRONAUT BY V558 WHENEVER RENDEZVOUS SIGHTING MARKS
06672 ARE DESIRED. ITS SELECTION HOWEVER IS LIMITED TO PERIODS WHEN THE CMC IS HOLDING FOR A V/N FLASHING
06674 DATA DISPLAY. THIS ROUTINE RETURNS TO THE ORIGINAL PROGRAM AT THE INTERRUPTED DISPLAY.

06675 34,2512 BANK 34
06677 REP 1 34,2000 SETLOC P2053
06678 34,2512 BANK

06679 REP 1 COUNT 34/R22

| | | | | | | | | | | |
|-------|-----|----|------|-----|---------|----------|--------|--------|-----------|--|
| 06680 | REP | 3 | LAST | 553 | 34,2512 | 3 7663 0 | R22 | CAP | PRIO28 | |
| 06681 | REP | 2 | LAST | 198 | 34,2513 | 55-056 1 | | TS | PHSPRT2 | |
| 06681 | REP | 6 | LAST | 553 | 34,2514 | 0 5103 0 | | TC | PRIOCHNG | |
| 06682 | REP | 1 | | | 34,2515 | 3 7714 1 | | CA | NEG3 | |
| 06683 | REP | 11 | LAST | 563 | 34,2516 | 55-734 1 | | TS | MRKRUP2 | |
| 06684 | REP | 86 | LAST | 564 | 34,2517 | 0 6006 1 | | TC | INTPRRT | |
| 06685 | | | | | 34,2520 | 77634 0 | | RTB | | |
| 06687 | REP | 14 | LAST | 558 | 34,2521 | 45505 0 | | | LOADTIME | |
| 06688 | REP | 2 | LAST | 171 | 34,2522 | 01152 0 | | STORE | VHTIME | PRESENT TIME |
| 06689 | | | | | 34,2523 | 77624 1 | REND1 | CALL | | |
| 06690 | REP | 3 | LAST | 566 | 34,2524 | 56741 0 | | | GRP2PC | |
| 06690 | | | | | 34,2525 | 77624 1 | | CALL | | |
| 06691 | REP | 1 | | | 34,2526 | 56404 1 | | | WAITONE | |
| 06692 | | | | | 34,2527 | 77776 1 | REND1A | EXIT | | |
| 0700 | REP | 12 | LAST | 569 | 34,2530 | 3 1734 0 | | CA | MRKRUP2 | |
| 0701 | | | | | 34,2531 | 0 0006 1 | | EXTEND | | |
| 0702 | REP | 1 | | | 34,2532 | 1 2535 1 | | R2P | REND2 | |
| 0703 | | | | | 34,2533 | 0 0006 1 | | EXTEND | | |
| 0704 | REP | 1 | | | 34,2534 | 6 2554 1 | | R2MF | REND3A | |
| 0705 | REP | 22 | LAST | 563 | 34,2535 | 3 6211 0 | REND2 | CAP | SIX | |
| 0706 | REP | 9 | LAST | 563 | 34,2536 | 0 5475 1 | | TC | CENTRAN | |
| 0707 | REP | 13 | LAST | 569 | 34,2537 | 01734 0 | | ADRES | MRKRUP2 | |
| 0708 | REP | 3 | LAST | 553 | 34,2540 | 01224 1 | | ADRES | MARKTIME | MARKTIME MUST BE CONTIGUOUS WITH VTEMP |
| 0718 | REP | 2 | LAST | 569 | 34,2541 | 3 7714 1 | | CAP | NEG3 | NEG VALUE TO INDICATE VALUES USED |
| 0719 | REP | 14 | LAST | 569 | 34,2542 | 55-734 1 | | TS | MRKRUP2 | |
| 0720 | | | | | 34,2543 | 0 0003 1 | | RELINT | | |
| 0721 | REP | 87 | LAST | 569 | 34,2544 | 0 6006 1 | | TC | INTPRRT | |
| 0722 | | | | | 34,2545 | 45014 0 | | CLEAR | CALL | |
| 0723 | REP | 1 | | | 34,2546 | 04667 1 | | | SOURCEP/O | 0 = OPTICS DATA |
| 0724 | REP | 4 | LAST | 569 | 34,2547 | 56741 0 | | | GRP2PC | PHASE CHANGE |
| 0725 | | | | | 34,2550 | 52131 0 | | SSP | GOTO | |
| 0726 | REP | 3 | LAST | 566 | 34,2551 | 01243 0 | | | MARKDATA | |
| 0727 | REP | 2 | LAST | 78 | 34,2552 | 01224 1 | | BCADR | VTEMP -2 | |
| 0728 | REP | 1 | | | 34,2553 | 70577 0 | | | REND4 | |
| 0729 | REP | 86 | LAST | 569 | 34,2554 | 0 6006 1 | REND3A | TC | INTPRRT | |
| 0732 | | | | | 34,2555 | 77624 1 | REND3 | CALL | | |



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| | | | | | | |
|-------|-----|----|------|-----|---------|---------|
| 07321 | REP | 5 | LAST | 569 | 34,2556 | 56741 0 |
| 07322 | | | | | 34,2557 | 77624 1 |
| 0733 | REP | 2 | LAST | 569 | 34,2560 | 56404 1 |
| 0734 | | | | | 34,2561 | 77614 1 |
| 0736 | REP | 4 | LAST | 256 | 34,2562 | 04746 0 |
| 0737 | REP | 1 | | | 34,2563 | 70527 0 |
| 0738 | | | | | 34,2564 | 77634 0 |
| 0739 | REP | 15 | LAST | 569 | 34,2565 | 45505 0 |
| 0740 | | | | | 34,2566 | 45225 0 |
| 0741 | REP | 1 | | | 34,2567 | 14647 1 |
| 0742 | REP | 3 | LAST | 569 | 34,2570 | 01152 0 |
| 0743 | | | | | 34,2571 | 45040 1 |
| 0744 | REP | 2 | LAST | 570 | 34,2572 | 70527 0 |
| 0745 | REP | 1 | | | 34,2573 | 56415 1 |
| 0746 | | | | | 34,2574 | 77745 1 |
| 0747 | REP | 4 | LAST | 569 | 34,2575 | 01225 0 |
| 0748 | REP | 4 | LAST | 570 | 34,2576 | 01152 0 |
| 0749 | | | | | 34,2577 | 77624 1 |
| 0750 | REP | 3 | LAST | 553 | 34,2600 | 56343 0 |
| 0751 | | | | | 34,2601 | 45014 0 |
| 0752 | REP | 6 | LAST | 553 | 34,2602 | 00707 1 |
| 0753 | REP | 1 | | | 34,2603 | 71034 0 |
| 0754 | REP | 5 | LAST | 553 | 34,2604 | 27113 1 |
| 0755 | | | | | 34,2605 | 77624 1 |
| 0756 | REP | 6 | LAST | 570 | 34,2606 | 56741 0 |
| 0757 | | | | | 34,2607 | 77624 1 |
| 0758 | REP | 4 | LAST | 570 | 34,2610 | 56343 0 |
| 0759 | | | | | 34,2611 | 77614 1 |
| 0760 | REP | 6 | LAST | 553 | 34,2612 | 01674 0 |
| 0761 | | | | | 34,2613 | 43014 0 |
| 0762 | REP | 4 | LAST | 555 | 34,2614 | 02756 1 |
| 0763 | REP | 1 | | | 34,2615 | 70617 0 |
| 0764 | REP | 4 | LAST | 553 | 34,2616 | 01476 0 |
| 0765 | | | | | 34,2617 | 77624 1 |
| 0766 | REP | 6 | LAST | 570 | 34,2620 | 27113 1 |
| 0767 | | | | | 34,2621 | 77624 1 |
| 0768 | REP | 1 | | | 34,2622 | 56526 0 |
| 0769 | | | | | 34,2623 | 77624 1 |
| 0770 | REP | 1 | | | 34,2624 | 71123 1 |
| 0771 | | | | | 34,2625 | 45014 0 |
| 0772 | REP | 1 | | | 34,2626 | 02464 0 |
| 0773 | REP | 1 | | | 34,2627 | 71132 1 |
| 0774 | | | | | 34,2630 | 43014 0 |
| 0775 | REP | 3 | LAST | 257 | 34,2631 | 01671 0 |
| 0776 | REP | 5 | LAST | 570 | 34,2632 | 02716 0 |
| 0777 | REP | 1 | | | 34,2633 | 70643 1 |
| 0778 | | | | | 34,2634 | 77745 1 |
| 07781 | REP | 1 | | | 34,2635 | 02001 1 |
| 07782 | | | | | 34,2636 | 34001 1 |
| 0779 | REP | 1 | | | 34,2637 | 56544 1 |

| | | |
|----------|----------|--------------------------------|
| CALL | GRP2PC | |
| CALL | WAITONE | |
| BOFF | | |
| | VHFRFLAG | |
| | REND1A | |
| RTB | | |
| LOADTIME | | PRESENT TIME |
| DSJ | | DSJ |
| | 60SECDP | 1 MIN |
| | VHFTIME | LAST READING OF RADAR |
| CALL | | |
| | REND1A | |
| | NANCRD | READ RADAR RANGE |
| DLOAD | | |
| MARKTIME | | |
| STORE | VHFTIME | FOR DOWNLINK |
| CALL | | |
| | REND4 | |
| | SETINTG | SET INTEG RV FLAGS |
| CALL | | |
| | REND4 | |
| | VERUPFLG | BRANCH IF CSM UPDATE |
| | CSMUPP | |
| | INTEGRV | |
| CALL | | |
| | GRP2PC | PHASE CHANGE |
| CALL | | |
| | SETINTG | SET INTEG RV FLAGS |
| CLEAR | | |
| | VINTFLAG | SET INTEGRATION VEHICLE TO LM |
| BOFF | SET | |
| | RENDWFLG | |
| | REND5A | DO NOT INTEGRATE W IP FLAG = 0 |
| | DIMOFLAG | |
| REND5A | CALL | |
| | INTEGRV | |
| CALL | | |
| | SHIPINDX | SET EARTH MOON SCALING INDEX |
| CALL | | |
| | CMPOS | SET CSM POSITION |
| SET | CALL | |
| | INCRFLG | SET FOR 1ST PASS |
| | LMPOS | SET LM POSITION |
| CLEAR | RON | |
| | ORWFLG | CLEAR FOR ORBITAL AND CISIANAR |
| | RENDWFLG | |
| | REND6 | |
| DLOAD | | |
| | WRENDPOS | |
| STCALL | 0 | 0 = WRENDPOS 1 = WRENDVFL |
| | INITIALW | INITIALIZE W MATRIX |

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| | | | | | | | | |
|-------|-----|----|------|---------|-----------------|-------|-----------|---------------------------------------|
| 07791 | | | | 34,2640 | 77745 1 | DLOAD | | |
| 07792 | REP | 9 | LAST | 566 | 34,2641 15332 1 | | ZEROVCS | |
| 07793 | REP | 6 | LAST | 552 | 34,2642 01126 0 | STORE | VHFCNT | ZERO OUT VHFCNT AND TRMKCNT |
| 0780 | | | | 34,2643 | 77614 1 | SET | | |
| 0781 | REP | 6 | LAST | 570 | 34,2644 02476 0 | | RENDWFLD | |
| 0782 | | | | 34,2645 | 52375 1 | VLOAD | VSU | |
| 0783 | REP | 2 | LAST | 78 | 34,2646 01215 0 | | LENPOS | |
| 0784 | REP | 2 | LAST | 78 | 34,2647 01207 0 | | CMPOS | |
| 0785 | REP | 3 | LAST | 566 | 34,2650 03531 0 | STORE | RCLP | LM - CM |
| 0786 | | | | 34,2651 | 43056 0 | UNIT | BCN | |
| 0787 | REP | 2 | LAST | 569 | 34,2652 04707 0 | | SOURCEFLD | |
| 0788 | REP | 1 | | | 34,2653 71045 0 | | REND14 | BRANCH IF DATA IS RADAR |
| 0789 | REP | 1 | | | 34,2654 01273 0 | STORE | UCL | |
| 0790 | | | | 34,2655 | 45014 0 | BOFF | CALL | |
| 0791 | REP | 2 | LAST | 570 | 34,2656 02744 1 | | INCORFLD | |
| 0792 | REP | 1 | | | 34,2657 70671 0 | | REND9 | |
| 0793 | REP | 1 | | | 34,2660 47110 1 | | GETIM | CALCULATE LM LINE OF SIGHT |
| 0794 | REP | 3 | LAST | 566 | 34,2661 25235 1 | STOVL | UM | |
| 0795 | REP | 2 | LAST | 571 | 34,2662 01273 0 | | UCL | |
| 0796 | | | | 34,2663 | 40035 0 | VXV | BOV | |
| 0797 | REP | 4 | LAST | 571 | 34,2664 01235 1 | | UM | UCL X UM |
| 0798 | REP | 1 | | | 34,2665 70666 0 | | REND8 | |
| 0799 | | | | 34,2666 | 40056 0 | UNIT | BOV | |
| 0800 | REP | 1 | | | 34,2667 70555 0 | | REND3 | BRANCH IF OVERFLOW IGNORE MARK |
| 0801 | REP | 4 | LAST | 566 | 34,2670 01245 0 | STORE | USTAR | |
| 0802 | | | | 34,2671 | 77624 1 | CALL | | |
| 0803 | REP | 1 | | | 34,2672 47047 1 | | BVECTORS | |
| 0804 | | | | 34,2673 | 77214 0 | BCN | VLOAD | |
| 0805 | REP | 7 | LAST | 570 | 34,2674 00707 1 | | VENUPFLD | |
| 0806 | REP | 1 | | | 34,2675 70701 0 | | REND9A | |
| 0807 | REP | 7 | LAST | 566 | 34,2676 03502 0 | | BVECTOR | |
| 0808 | | | | 34,2677 | 77676 0 | VCOMP | | |
| 0809 | REP | 8 | LAST | 571 | 34,2700 03602 0 | STORE | BVECTOR | |
| 0810 | | | | 34,2701 | 77624 1 | CALL | | |
| 08101 | REP | 7 | LAST | 570 | 34,2702 56741 0 | | GRP2PC | |
| 08102 | | | | 34,2703 | 77614 1 | BCN | | |
| 0811 | REP | 3 | LAST | 251 | 34,2704 00706 0 | | R23PLD | |
| 0812 | REP | 1 | | | 34,2705 71076 0 | | REND15 | BRANCH IF BACKUP OPTICS (R23 WORKING) |
| 0813 | | | | 34,2706 | 43345 1 | DLOAD | DAD | |
| 0814 | REP | 1 | | | 34,2707 31220 0 | | SKTVAR | |
| 0815 | REP | 1 | | | 34,2710 31222 1 | | IMUVAR | |
| 0816 | REP | 2 | LAST | 119 | 34,2711 27526 0 | STOVL | VARIANCE | TEMP STORAGE FOR VARIANCE CALC. |
| 0817 | REP | 4 | LAST | 571 | 34,2712 03531 0 | | RCLP | |
| 0818 | | | | 34,2713 | 60246 1 | ARVAL | NORM | |
| 0819 | REP | 19 | LAST | 568 | 34,2714 00047 1 | | X1 | |
| 0820 | | | | 34,2715 | 41316 0 | DSO | DMP | |
| 0821 | REP | 3 | LAST | 571 | 34,2716 03526 0 | | VARIANCE | |
| 0822 | | | | 34,2717 | 45070 1 | XAD,1 | CALL | |
| 0823 | REP | 20 | LAST | 571 | 34,2720 00046 0 | | X1 | |
| 0824 | REP | 2 | LAST | 570 | 34,2721 56526 0 | | SHIPINDX | GET EARTH MOON SCALING INDRX |



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0625      34,2722 56070 0
0626 REP 7 LAST 546 34,2723 00047 1
0627 REP 8 LAST 572 34,2724 00047 1
0628      34,2725 72257 1
0629      34,2726 20577 0
0630 REP 249 LAST 564 34,2727 00155 0
0631 REP 4 LAST 571 34,2730 03526 0
06311     34,2731 54335 0
063114 REP 2 LAST 90 34,2732 02400 1
063116     34,2733 20832 1
063122     34,2734 47171 0
063126 REP 5 LAST 572 34,2735 03526 0
063128 REP 1      34,2736 45562 1
06313 REP 6 LAST 572 34,2737 03526 0
0632      34,2740 76214 1
0633 REP 3 LAST 571 34,2741 04747 1
0634 REP 1      34,2742 70751 0
0635 REP 1      34,2743 03005 1
0636      34,2744 72244 0
0637 REP 2 LAST 572 34,2745 70751 0
0638 REP 2 LAST 572 34,2746 03005 1
06381     34,2747 77646 0
0639 REP 7 LAST 572 34,2750 03526 0
0640      34,2751 45014 0
0641 REP 1      34,2752 02866 0
0642 REP 1      34,2753 75250 1
06421     34,2754 77624 1
06422 REP 8 LAST 571 34,2755 56741 0
0643      34,2756 45014 0
0644 REP 3 LAST 571 34,2757 02744 1
0645 REP 1      34,2760 71006 1
0646 REP 3 LAST 571 34,2761 56526 0
0647      34,2762 51575 1
0648 REP 5 LAST 78 34,2763 01265 1
0649      34,2764 77657 0
0650      34,2765 57176 0
0651 REP 4 LAST 275 34,2766 27504 0
0652 REP 6 LAST 572 34,2767 01257 0
0653      34,2770 53646 0
0654      34,2771 57176 0
0655 REP 5 LAST 572 34,2772 03502 0
06551     34,2773 77735 0
0656 REP 1      34,2774 02003 0
0657      34,2775 45261 0
0658      34,2776 20613 1
0659 REP 6 LAST 572 34,2777 03502 0
0660      34,3000 67240 0
0661 REP 1      34,3001 71141 0
0662 REP 1      34,3002 02004 1
0663      34,3003 50025 0

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XAD,1 XAD,1
X2
X2
SR* TLOAD
0 -2,1
STORE VARIANCE
SLOAD SR
INTVAR
26D
TAD RTB
VARIANCE
TPMODE
STORE VARIANCE
BOFF TAD
BURLCPLG
REND10A
RVARMIN
RPL TLOAD
REND10A
RVARMIN
ARS
STORE VARIANCE
REND10A CLEAR CALL
DMENPLG
INCRP1
CALL
GRP2PC
CALL
INCRP1G
REND12
SHIPINDX
VLOAD ARVAL
DEL.TAX +6
SR*
0,2
STOVL N49DISP +2
DEL.TAX
ARVAL SR*
0,2
STORE N49DISP
SLOAD
RMAX
SR DSJ
10D
N49DISP
RMN SLOAD
RENDTSP
VMAX
DSJ RMN

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ADJUST SCALING TO B-40
INTEGRATION VARIANCE SCALED B-15
SCALE IT B-40
BRANCH IF NOT VHP RADAR
VHP RADAR MIN. VARIANCE
MIN. VALUE WAS STORED AS NEG.
STORE MIN. VALUE
CLEAR FOR 6 X 6 W MATRIX
CALCULATE UPDATE
GET EARTH MOON SCALING INDEX
BRANCH IF POS UP GREATER THAN MAX.

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| | | | | | | | | | | |
|------|-----|----|------|-----|---------|---------|--------|-------|--------------|--|
| 0864 | REP | 7 | LAST | 572 | 34,3004 | 03504 0 | | | N40DISP +2 | |
| 0865 | REP | 2 | LAST | 572 | 34,3005 | 71141 0 | | | RENDISP | BRANCH IF VEL.UPDATE GREATER THAN MAX. |
| 0866 | | | | | 34,3006 | 77624 1 | REND12 | CALL | | |
| 0869 | REP | 1 | | | 34,3007 | 75462 0 | | | INCRP2 | INCORPORATE UPDATE VALUES INTO STATE VEC |
| 0870 | | | | | 34,3010 | 43014 0 | | BCN | BOFF | |
| 0871 | REP | 4 | LAST | 572 | 34,3011 | 04707 0 | | | SOURCPLD | |
| 0872 | REP | 1 | | | 34,3012 | 71103 0 | | | REND16 | BRANCH IF DATA IS RADAR |
| 0873 | REP | 4 | LAST | 572 | 34,3013 | 02744 1 | | | INCRPLO | |
| 0874 | REP | 1 | | | 34,3014 | 71111 0 | | | REND17 | |
| 0875 | | | | | 34,3015 | 77624 1 | | CALL | | |
| 0876 | REP | 4 | LAST | 572 | 34,3016 | 56526 0 | | | SHIFINDX | GET EARTH MOON SCALING INDEX |
| 0877 | | | | | 34,3017 | 45014 0 | | BCN | CALL | |
| 0878 | REP | 6 | LAST | 571 | 34,3020 | 00707 1 | | | VERUPPLD | |
| 0879 | REP | 1 | | | 34,3021 | 71117 0 | | | REND18 | BRANCH IF CSM UPDATE |
| 0880 | REP | 2 | LAST | 570 | 34,3022 | 71132 1 | | | LMPOS | GET LM POSITION |
| 0881 | | | | | 34,3023 | 77624 1 | REND13 | CALL | | |
| 0882 | REP | 9 | LAST | 572 | 34,3024 | 56741 0 | | | GRP2PC | PHASE CHANGE |
| 0883 | | | | | 34,3025 | 52375 1 | | VLOAD | VSU | |
| 0884 | REP | 3 | LAST | 571 | 34,3026 | 01215 0 | | | LEMPOS | |
| 0885 | REP | 3 | LAST | 571 | 34,3027 | 01207 0 | | | CSMPOS | |
| 0886 | REP | 5 | LAST | 571 | 34,3030 | 03531 0 | | STORE | RCLP | LM - CSM |
| 0887 | | | | | 34,3031 | 77614 1 | | CLRCO | | |
| 0888 | REP | 5 | LAST | 573 | 34,3032 | 02624 0 | | | INCRPLO | |
| 0889 | REP | 1 | | | 34,3033 | 70651 1 | | | REND7 | BRANCH FOR 2ND PASS THIS OPTICS MARK |
| 0890 | | | | | 34,3034 | 45014 0 | CSMIPP | CLEAR | | |
| 0891 | REP | 7 | LAST | 570 | 34,3035 | 01674 0 | | | VINTFLAG | SET INTEGRATION VEHICLE EQ LM |
| 0892 | REP | 7 | LAST | 570 | 34,3036 | 27113 1 | | | INTEGRV | |
| 0893 | | | | | 34,3037 | 77624 1 | | CALL | | |
| 0894 | REP | 10 | LAST | 573 | 34,3040 | 56741 0 | | | GRP2PC | PHASE CHANGE |
| 0895 | | | | | 34,3041 | 77624 1 | | CALL | | |
| 0896 | REP | 5 | LAST | 570 | 34,3042 | 56343 0 | | | SETINTG | SET FLAGS FOR INTEGRATION |
| 0897 | | | | | 34,3043 | 77650 1 | | GOTO | | |
| 0898 | REP | 1 | | | 34,3044 | 70613 1 | | | REND5 | |
| 0899 | REP | 9 | LAST | 571 | 34,3045 | 27502 0 | REND14 | STOVL | RVECTOR | VHF RADAR RVECTOR |
| 0900 | REP | 10 | LAST | 571 | 34,3046 | 15332 1 | | | ZEROVECS | |
| 0901 | REP | 10 | LAST | 573 | 34,3047 | 03510 0 | | STORE | RVECTOR +6 | |
| 0902 | REP | 11 | LAST | 573 | 34,3050 | 27516 0 | | STOVL | RVECTOR +12D | |
| 0903 | REP | 6 | LAST | 573 | 34,3051 | 03531 0 | | | RCLP | |
| 0904 | | | | | 34,3052 | 71256 0 | | UNIT | DLOAD | |
| 0905 | REP | 1 | | | 34,3053 | 01257 0 | | | VHFRANGE | VHFRANGE SCALED R-27 |
| 0906 | | | | | 34,3054 | 60414 0 | | BCN | SR2 | |
| 0907 | REP | 7 | LAST | 510 | 34,3055 | 04303 0 | | | MOONTHIS | |
| 0908 | | | | | 34,3056 | 71057 0 | | | +1 | |
| 0909 | | | | | 34,3057 | 43025 1 | | DSU | SET | |
| 0910 | | | | | 34,3060 | 00045 0 | | | 36D | ARVAL (RCLP) |
| 0911 | REP | 6 | LAST | 573 | 34,3061 | 02464 0 | | | INCRPLO | |
| 0912 | REP | 3 | LAST | 566 | 34,3062 | 03524 1 | | STORE | DELTAQ | |
| 0913 | | | | | 34,3063 | 77214 0 | | ROFF | VLOAD | |
| 0914 | REP | 9 | LAST | 573 | 34,3064 | 00747 0 | | | VERUPPLD | |
| 0915 | REP | 1 | | | 34,3065 | 71071 1 | | | REND14A | |



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| | | | | | | | | | | |
|-------|-----|----|------|-----|---------|----------|---------|--------|----------|----------------------------------|
| 0916 | REP | 12 | LAST | 573 | 34,3066 | 03502 0 | | | BVECTOR | |
| 0917 | | | | | 34,3067 | 77676 0 | | VCOMP | | |
| 0918 | REP | 13 | LAST | 574 | 34,3070 | 03502 0 | | STORE | BVECTOR | |
| 0919 | | | | | 34,3071 | 77624 1 | REND14A | CALL | | |
| 09191 | REP | 11 | LAST | 573 | 34,3072 | 56741 0 | | | ORP2PC | |
| 09192 | | | | | 34,3073 | 52145 0 | | DLOAD | GOTO | |
| 0920 | REP | 1 | | | 34,3074 | 03003 1 | | | RVAR | |
| 0921 | REP | 1 | | | 34,3075 | 70711 1 | | | REND10 | |
| 0922 | | | | | 34,3076 | 43335 0 | REND15 | SLOAD | DAD | GET ALT LOS VARIANCE |
| 0923 | REP | 1 | | | 34,3077 | 01357 1 | | | ALTVAR | BACKUP OPTICS |
| 0924 | REP | 2 | LAST | 571 | 34,3100 | 31222 1 | | | INUVAR | IMU VARIANCE |
| 0925 | | | | | 34,3101 | 77650 1 | | GOTO | | |
| 0926 | REP | 2 | LAST | 574 | 34,3102 | 70711 1 | | | REND10 | |
| 0927 | | | | | 34,3103 | 62150 1 | REND16 | LXA,1 | INCR,1 | |
| 0928 | REP | 7 | LAST | 571 | 34,3104 | 01125 0 | | | VHPCNT | VHF RADAR UPDATE COUNT |
| 0929 | | | | | 34,3105 | 00001 0 | | DEC | 1 | |
| 0930 | | | | | 34,3106 | 52130 1 | | SKA,1 | GOTO | |
| 0931 | REP | 8 | LAST | 574 | 34,3107 | 01125 0 | | | VHPCNT | UPDATE COUNT |
| 0932 | REP | 1 | | | 34,3110 | 70523 1 | | | REND1 | |
| 0933 | | | | | 34,3111 | 62150 1 | REND17 | LXA,1 | INCR,1 | |
| 0934 | REP | 4 | LAST | 552 | 34,3112 | 01126 0 | | | TRMCKNT | OPTICS MARK COUNT |
| 0935 | | | | | 34,3113 | 00001 0 | | DEC | 1 | |
| 0936 | | | | | 34,3114 | 52130 1 | | SKA,1 | GOTO | |
| 0937 | REP | 5 | LAST | 574 | 34,3115 | 01126 0 | | | TRMCKNT | UPDATE COUNT |
| 0938 | REP | 2 | LAST | 571 | 34,3116 | 70555 0 | | | REND3 | |
| 0939 | | | | | 34,3117 | 77624 1 | REND18 | CALL | | |
| 0940 | REP | 2 | LAST | 570 | 34,3120 | 71123 1 | | | CMPOS | GET CSM POSITION |
| 0941 | | | | | 34,3121 | 77650 1 | | GOTO | | |
| 0942 | REP | 1 | | | 34,3122 | 71023 0 | | | REND13 | |
| 0943 | | | | | 34,3123 | 53775 1 | CMPOS | VLOAD | VSR* | |
| 0944 | REP | 1 | | | 34,3124 | 01573 1 | | | DELTACSM | |
| 0945 | | | | | 34,3125 | 57187 0 | | | 7,2 | |
| 0946 | | | | | 34,3126 | 77655 1 | | VAD | | |
| 0947 | REP | 1 | | | 34,3127 | 01607 1 | | | RCVCSM | |
| 0948 | REP | 4 | LAST | 573 | 34,3130 | 01207 0 | | STORE | CSMPOS | CSM POSITION SCALED R-27 OR R-29 |
| 0949 | | | | | 34,3131 | 77616 0 | | RVO | | |
| 0950 | | | | | 34,3132 | 53775 1 | LMPOS | VLOAD | VSR* | |
| 0951 | REP | 1 | | | 34,3133 | 01645 1 | | | DELTALRM | |
| 0952 | | | | | 34,3134 | 57167 0 | | | 7,2 | |
| 0953 | | | | | 34,3135 | 77655 1 | | VAD | | |
| 0954 | REP | 1 | | | 34,3136 | 01661 1 | | | RCVLEM | |
| 0955 | REP | 4 | LAST | 573 | 34,3137 | 01215 0 | | STORE | LMPOS | LM POSITION SCALED R-27 OR R-29 |
| 0956 | | | | | 34,3140 | 77616 0 | | RVO | | |
| 0963 | | | | | 34,3141 | 77776 1 | RENDISP | EXIT | | |
| 0964 | REP | 8 | LAST | 496 | 34,3142 | 3 0105 0 | | CA | FLAGWRD9 | |
| 0965 | REP | 22 | LAST | 436 | 34,3143 | 7 4703 0 | | MASK | BIT8 | |
| 0966 | | | | | 34,3144 | 0 0008 1 | | EXTEND | | |
| 0967 | | | | | 34,3145 | 1 3150 1 | | RZP | +3 | |
| 0968 | REP | 24 | LAST | 560 | 34,3146 | 3 4711 1 | | CA | BIT2 | |
| 0969 | | | | | 34,3147 | 0 3151 1 | | TC | +2 | |



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| | | | | | | | | | |
|--------|-----|-----|------|-----|---------|----------|----------|-------------|---|
| 0970 | REP | 37 | LAST | 509 | 34,3150 | 3 4712 1 | CA | BIT1 | |
| 0971 | REP | 8 | LAST | 573 | 34,3151 | 55=505 1 | TS | N49DISP +4 | |
| 09711 | REP | 120 | LAST | 565 | 34,3152 | 3 4714 1 | CAP | ZERO | SET TEMPOR1 & ZERO TO INDICATE |
| 09712 | REP | 3 | LAST | 566 | 34,3153 | 55=300 1 | TS | TEMPOR1 | V06 N49 DISPLAY HASNT BEEN ANSWERED |
| 09713 | REP | 29 | LAST | 565 | 34,3154 | 0 5301 0 | TC | PHASCHNG | |
| 09714 | | | | | 34,3155 | 04022 0 | OCT | 04022 | |
| 09715 | REP | 1 | | | 34,3156 | 3 7664 1 | CAP | PRIO27 | SET UP DISPLAY JOB WITH HIGHER PRIORITY |
| 09716 | REP | 17 | LAST | 561 | 34,3157 | 0 5027 1 | TC | NOVAC | |
| 097165 | REP | 32 | LAST | 565 | E7,1725 | | EBANK= | MRK(R)P1 | THAN PRESENT JOB |
| 09717 | REP | 1 | | | 34,3160 | 03172 0 | ZCADR | RENDISP2 | |
| 09717 | REP | 1 | | | 34,3161 | 70067 1 | | | |
| 097175 | REP | 89 | LAST | 569 | 34,3162 | 0 6006 1 | RENDISP7 | TC | INTPRET |
| 097177 | REP | 250 | LAST | 572 | 34,3163 | 00155 0 | STORE | MPAC | |
| 097179 | | | | | 34,3164 | 53135 0 | SLOAD | BZS | |
| 097181 | REP | 4 | LAST | 575 | 34,3165 | 01301 1 | | TEMPOR1 | |
| 097183 | REP | 1 | | | 34,3166 | 71163 0 | | RENDISP7 +1 | DISPLAY HAS NOT BEEN ANSWERED YET |
| 097185 | | | | | 34,3167 | 52040 1 | BNN | GOTO | |
| 097187 | REP | 2 | LAST | 572 | 34,3170 | 71006 1 | | REND12 | NEG INDICATES PROCEED |
| 097189 | REP | 1 | | | 34,3171 | 71201 1 | | RENDISP3 | POS INDICATES RECYCLE |
| 0972 | REP | 1 | | | 34,3172 | 3 3223 1 | RENDISP2 | CAP | V06N49 |
| 0973 | REP | 137 | LAST | 565 | 34,3173 | 0 4555 0 | TC | RANKCALL | |
| 0974 | REP | 1 | | | 34,3174 | 20635 0 | CADR | PRICDSP | |
| 0975 | REP | 2 | LAST | 385 | 34,3175 | 0 4550 0 | TC | GOTOV56 | TERM EXIT P20 VIA V56 |
| 0976 | REP | 69 | LAST | 565 | 34,3176 | 4 4712 0 | CS | ONE | NEG INDICATES PROCEED RENDISP7 JOB |
| 0977 | REP | 5 | LAST | 575 | 34,3177 | 55=300 1 | TS | TEMPOR1 | POS INDICATES RECYCLE RENDISP7 JOB |
| 0978 | REP | 75 | LAST | 561 | 34,3200 | 0 5112 0 | TC | ENDOFJOB | GO COMPLETE ABOVE JOB |
| 0986 | | | | | 34,3201 | 77614 1 | RENDISP3 | RON | |
| 0988 | REP | 5 | LAST | 573 | 34,3202 | 04707 0 | | SOURCPLG | |
| 0989 | REP | 2 | LAST | 574 | 34,3203 | 70523 1 | | REND1 | DATA WAS RADAR GO LOOK FOR OPTICS NEXT |
| 0990 | | | | | 34,3204 | 77776 1 | | | |
| 0991 | REP | 33 | LAST | 575 | E7,1725 | | EXIT | | |
| 0992 | | | | | 34,3205 | 0 0004 0 | EBANK= | MRK(R)P1 | |
| 0993 | REP | 1 | | | 34,3206 | 3 3224 0 | INHINT | | |
| 0994 | REP | 13 | LAST | 413 | 34,3207 | 54 006 0 | CAP | RUPFRANK | |
| 0995 | REP | 13 | LAST | 562 | 34,3210 | 3 7716 0 | TS | REANK | |
| 0996 | REP | 34 | LAST | 575 | 34,3211 | 55=725 1 | CA | NEGONE | |
| 0997 | REP | 15 | LAST | 569 | 34,3212 | 55=734 1 | TS | MRK(R)P1 | BRASE MARK ONE BUFFER |
| 0998 | | | | | 34,3213 | 0 0003 1 | TS | MRK(R)P2 | BRASE MARK TWO BUFFER |
| 0999 | REP | 90 | LAST | 575 | 34,3214 | 0 8006 1 | RENDISP4 | TC | INTPRET |
| 1000 | | | | | 34,3215 | 77650 1 | | GOTO | |
| 1001 | REP | 3 | LAST | 574 | 34,3216 | 70555 0 | | REND3 | |
| 1002 | | | | | 34,3217 | 00052 0 | SXTVAR | ZDEC | 0.04 E-6 R+16 |
| 1002 | | | | | 34,3220 | 36307 0 | | | SXT ERROR VARIANCE = .04 (MR)SO |
| 1003 | | | | | 34,3221 | 00052 0 | IMUVAR | ZDEC | 0.04 E-6 R+16 |
| 1003 | | | | | 34,3222 | 36307 0 | | | IMU ERROR VARIANCE = .04 (MR)SO |
| 1008 | | | | | 34,3223 | 01461 0 | V06N49 | VN | 0649 |
| 1009 | REP | 35 | LAST | 575 | E7,1725 | | EBANK= | MRK(R)P1 | |
| 1010 | REP | 2 | LAST | 575 | 34,3224 | 70067 1 | RUPFRANK | RRCN | RENDISP3 |
| 1011 | | | | | 31,2021 | | BANK | 31 | |
| 1012 | REP | 1 | | | 27,2000 | | SETLOC | R22S1 | |

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| | | | | | | | | | | |
|-------|-----|-----|------|---------|---------|--------|---------|----------|-----------|---|
| 1013 | | | | 27,2343 | | | BANK | | | |
| 1014 | | | | 27,2343 | 45020 | 1 | SETINTG | STO | CALL | |
| 1015 | REP | 8 | LAST | 568 | 27,2344 | 02317 | 0 | | BORESS | |
| 1016 | REP | 14 | LAST | 511 | 27,2345 | 27371 | 1 | | INTSTALL | RESERVE INTEGRATION |
| 1017 | | | | | 27,2346 | 43145 | 0 | | SET | |
| 1018 | REP | 5 | LAST | 570 | 27,2347 | 01225 | 0 | DLOAD | MARKTIME | |
| 1019 | REP | 1 | | | 27,2350 | 01472 | 1 | | STATEPLO | |
| 1020 | REP | 27 | LAST | 555 | 27,2351 | 00041 | 1 | STORE | TDSC1 | MARKTIME |
| 1021 | | | | | 27,2352 | 43014 | 0 | CLEAR | CLEAR | |
| 1022 | REP | 8 | LAST | 503 | 27,2353 | 01673 | 1 | | INTYPLO | PRECISION INTEGRATION |
| 1023 | REP | 5 | LAST | 570 | 27,2354 | 01678 | 1 | | DIM0FLAG | |
| 1024 | | | | | 27,2355 | 43014 | 0 | SET | CLROO | |
| 1025 | REP | 8 | LAST | 573 | 27,2356 | 01474 | 1 | | VINTFLAG | SET VEHICLE EQ. CSM |
| 1026 | REP | 1 | | | 27,2357 | 01635 | 0 | | D6CR0FLAG | SET W MATRIX DIM. EQ 6 |
| 1027 | REP | 9 | LAST | 576 | 27,2360 | 02317 | 0 | | BORESS | EXIT |
| 1028 | | | | | 27,2361 | 77620 | 0 | CONTCHK | STO | |
| 1029 | REP | 2 | LAST | 77 | 27,2362 | 01150 | 1 | | POINTEX | |
| 10291 | | | | | 27,2363 | 77614 | 1 | CONTCHK | BOFF | |
| 10292 | REP | 3 | LAST | 529 | 27,2364 | 01742 | 1 | | REFSMPLG | BRANCH TO END OF JOB IF REFSMAT NO GOOD |
| 10293 | REP | 1 | | | 27,2365 | 30147 | 0 | | ENDPLAC | |
| 1030 | | | | | 27,2366 | 50135 | 0 | SLOAD | RIN | |
| 10301 | REP | 8 | LAST | 565 | 27,2367 | 03376 | 0 | | R61CNTR | |
| 10302 | REP | 1 | | | 27,2370 | 56406 | 0 | | WAITONE1 | |
| 10303 | | | | | 27,2371 | 43014 | 0 | RON | BOFF | IS TRACK FLAG SET |
| 1031 | REP | 14 | LAST | 553 | 27,2372 | 00710 | 1 | | UPDATPLO | |
| 1032 | REP | 3 | LAST | 576 | 27,2373 | 01150 | 1 | | POINTEX | |
| 1033 | REP | 4 | LAST | 553 | 27,2374 | 00752 | 1 | | TRACKFLAG | |
| 1034 | REP | 2 | LAST | 576 | 27,2375 | 30147 | 0 | | ENDPLAC | |
| 1035 | | | | | 27,2376 | 77776 | 1 | | EXIT | |
| 1036 | REP | 30 | LAST | 575 | 27,2377 | 0 5301 | 0 | REDOR22 | TC | PHASCHG |
| 1037 | | | | | 27,2400 | 00132 | 1 | | OCT | 00132 |
| 1038 | REP | 4 | LAST | 569 | 27,2401 | 3 7663 | 0 | | CAP | PRIO26 |
| 1039 | REP | 7 | LAST | 569 | 27,2402 | 0 5103 | 0 | | TC | PRIOCHG |
| 1040 | REP | 3 | LAST | 570 | 27,2403 | 0 2407 | 0 | | TC | WAITONE +3 |
| 1041 | | | | | 27,2404 | 77620 | 0 | WAITONE | STO | |
| 1042 | REP | 4 | LAST | 576 | 27,2405 | 01150 | 1 | | POINTEX | |
| 10421 | | | | | 27,2406 | 77776 | 1 | WAITONE1 | EXIT | |
| 1043 | REP | 2 | LAST | 139 | 27,2407 | 3 4740 | 0 | | CAP | 4SECS |
| 1044 | REP | 138 | LAST | 575 | 27,2410 | 0 4555 | 0 | | TC | BANKCALL |
| 1045 | REP | 7 | LAST | 536 | 27,2411 | 01732 | 0 | | CADR | DELAYJOB |
| 1046 | REP | 91 | LAST | 575 | 27,2412 | 0 6006 | 1 | | TC | INTPRET |
| 1047 | | | | | 27,2413 | 77650 | 1 | | GOTO | |
| 1048 | REP | 1 | | | 27,2414 | 56363 | 1 | | CONTCHK | CHECK AGAIN NOW |
| 1049 | | | | | 27,2415 | 77776 | 1 | RANGERD | EXIT | |
| 1050 | | | | | 27,2416 | 0 0004 | 0 | | INHINT | |
| 1051 | REP | 1 | | | 27,2417 | 4 2472 | 0 | | CS | OCT17 |
| 1052 | | | | | 27,2420 | 0 0006 | 1 | | EXTEND | |
| 1053 | REP | 6 | LAST | 381 | 27,2421 | 03 013 | 0 | | WAND | CHAN13 |
| 1054 | REP | 1 | | | 27,2422 | 3 4334 | 1 | | CAP | OCT11 |
| 1055 | | | | | 27,2423 | 0 0006 | 1 | | EXTEND | ZERO OUT BITS 1-4 OF CHANNEL 13 |

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| | | | | | | | | | |
|--------|-----|-----|------|-----|---------|----------|-----------|-----------|--|
| 1056 | REP | 7 | LAST | 576 | 27,2424 | 05 013 0 | WOR | CHAN13 | GENERATE SHIPT PULSES TO RADR,SET R,BIT |
| 1057 | | | | | 27,2425 | 0 0003 1 | RELINT | | |
| 1058 | | | | | 27,2426 | 0 0006 1 | EXTEND | | |
| 1059 | REP | 18 | LAST | 563 | 27,2427 | 3 0025 0 | DCA | TIME2 | |
| 1060 | REP | 6 | LAST | 576 | 27,2430 | 53=225 1 | DXCH | MARKTIME | READ PRESENT TIME |
| 1061 | REP | 139 | LAST | 576 | 27,2431 | 0 4555 0 | TC | BANKCALL | |
| 1062 | REP | 1 | | | 27,2432 | 17514 1 | CADR | BADSTALL | WAIT FOR RANGE COMPLETE |
| 1063 | REP | 1 | | | 27,2433 | 0 2461 0 | TC | LIGHTON | BAD DATA GOOD BIT |
| 10635 | REP | 2 | LAST | 256 | 27,2434 | 0 5520 0 | TC | TRPAILOP | TURN TRACKER LIGHT OFF |
| 1065 | REP | 92 | LAST | 576 | 27,2435 | 0 6006 1 | RANGERR1 | TC | INTPRET |
| 1066 | | | | | 27,2436 | 50135 0 | SLOAD | RN | |
| 1067 | REP | 2 | LAST | 123 | 27,2437 | 03704 1 | | RN | |
| 10671 | REP | 1 | | | 27,2440 | 56447 0 | | RANGERR3 | |
| 1068 | | | | | 27,2441 | 77605 1 | DMP | | |
| 1069 | REP | 1 | | | 27,2442 | 16475 0 | | CONVRNGE | CONVERT RANGE TO METERS R-27 |
| 10691 | | | | | 27,2443 | 77614 1 | RANGERR2 | SET | |
| 1070 | REP | 6 | LAST | 575 | 27,2444 | 04467 0 | | SOURCEPLO | SOURCE OF DATA TO VHF RADAR |
| 1071 | REP | 2 | LAST | 573 | 27,2445 | 01257 0 | STORE | VHFPRANGE | |
| 1072 | | | | | 27,2446 | 77616 0 | RVO | | |
| 10721 | | | | | 27,2447 | 77776 1 | RANGERR3 | EXIT | |
| 10722 | REP | 251 | LAST | 575 | 27,2450 | 3 0154 1 | CA | MPAC | |
| 10723 | REP | 13 | LAST | 538 | 27,2451 | 7 4672 1 | MASK | POSMAX | |
| 10724 | REP | 252 | LAST | 577 | 27,2452 | 54 154 0 | TS | MPAC | MASK OUT NEG. SIGN BIT |
| 10725 | REP | 93 | LAST | 577 | 27,2453 | 0 6006 1 | TC | INTPRET | |
| 1073 | | | | | 27,2454 | 77605 1 | DMP | | |
| 10731 | REP | 2 | LAST | 577 | 27,2455 | 16475 0 | | CONVRNGE | CONVERT FROM NM TO METERS AND SCALE R-27 |
| 10732 | | | | | 27,2456 | 52015 1 | DAD | GOTO | |
| 10733 | REP | 1 | | | 27,2457 | 16471 1 | | RANGERR14 | VALUE IN METERS OF SIGN BIT SCALED R-27 |
| 10734 | REP | 1 | | | 27,2460 | 56443 1 | | RANGERR2 | |
| 10738 | REP | 1 | | | 27,2461 | 0 5532 0 | LIGHTON | TC | TURN TRACKER LIGHT ON |
| 107406 | REP | 94 | LAST | 577 | 27,2462 | 0 6006 1 | TC | INTPRET | |
| 10741 | | | | | 27,2463 | 77745 1 | SLOAD | | |
| 10742 | REP | 7 | LAST | 577 | 27,2464 | 01225 0 | | MARKTIME | |
| 10743 | REP | 5 | LAST | 570 | 27,2465 | 01152 0 | STORE | VHFPTIME | |
| 1075 | | | | | 27,2466 | 77650 1 | GOTO | | |
| 1076 | REP | 3 | LAST | 575 | 27,2467 | 70523 1 | | REND1 | |
| 10761 | | | | | 27,2470 | 00045 0 | RANGERR14 | 2DEC | 16384 X 18.52 SCALED R-27 |
| 10761 | | | | | 27,2471 | 01217 1 | | | |
| 1077 | | | | | 27,2472 | 00017 1 | OCT17 | OCT | 00017 |
| 10781 | | | | | 27,2473 | 40200 1 | CC40200 | OCT | 40200 |
| 1079 | | | | | 27,2474 | 00045 0 | CONVRNGE | 2DEC | 18.52 R-13 |
| 1079 | | | | | 27,2475 | 01217 1 | | | |
| 1080 | | | | | 27,2476 | 0 0006 1 | VHFPREAD | EXTEND | |
| 1081 | REP | 9 | LAST | 368 | 27,2477 | 04 007 1 | ROR | SUPERANK | MUST SAVE SRANK BECAUSE OF RIPT |
| 1082 | REP | 5 | LAST | 539 | 27,2500 | 54 016 1 | TS | BANKRUPT | EXITS VIA TASKOVER RADEND OR GOODEND |
| 10821 | REP | 121 | LAST | 575 | 27,2501 | 4 4714 0 | CS | ZERO | |
| 10822 | REP | 2 | LAST | 72 | 27,2502 | 54 734 0 | TS | RIFTRON | |
| 1083 | | | | | 27,2503 | 0 0006 1 | EXTEND | | |
| 1084 | REP | 5 | LAST | 539 | 27,2504 | 22 012 1 | QXCH | GRUPT | |
| 10841 | REP | 34 | LAST | 439 | 27,2505 | 3 4704 0 | CAP | RIT7 | |



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R1190 INPUT CONSISTS OF

R1191 (A) VECTOR OF ANGULAR INCREMENTS, DTHETASM, STORED
R1192 IN V(DTHETASM).

R1193 (B) SIN, COS CDUX, Y, Z FROM SUBR CDUTRIG.

R1194 TRANSFER OUTPUT OF SMCURES FROM V(DCDU) TO VAC14D.

R1195 (12) CALCULATE ANG LOS RATE IN BODY(NB) COORDS USING SUBR S4NB.

R1196 $\Omega\text{EGANB} = (\text{S4NB})(\Omega\text{EGATHSM})$

R1197 SUBR S4NB REQUIRES $\Omega\text{EGATHSM}$ IN V(VAC32D) AND ACTUAL CDUS
R1198 (Y, X, Z ORDER) IN V(VAC20D) WITH S1 OF VAC = BASE ADDRESS
R1199 OF CDUS (FIXLOC + 20D).

R1200 (13) CALCULATE ANG LOS RATE IN CONTROL COORDS AS FOLLOWS

R1201 $\text{WBODY} = (\text{MRDYCTL})(\Omega\text{EGANB}) \text{ UNITS} = \text{RVS}/\text{SEC}(\text{RO}).$

R1202
$$\text{MRDYCTL}(R1) = \begin{pmatrix} 0.5 & 0 & 0 \\ 0 & \cos(7.25)R1 & -\sin(7.25)R1 \\ 0 & \sin(7.25)R1 & \cos(7.25)R1 \end{pmatrix}$$
 BODY TO
R1203 CONTROL.
R1204 AXES
R1205 CONVERSION
R1206 MATRIX

R1207 (14) RESCALE WBODY TO UNITS OF 450 DEG/SEC BY APPLYING FACTOR
R1208 OF 0.8 TO RVS/SEC.

R1209 (15) ADDRESS LIVE AUTOPILOT REGISTERS IN BASIC (UNDER INHINT).

R1210 TRANSFER DESIRED CDUS, SCALED 180 DEGREES, FROM T(SAVEDCDU)
R1211 TO V(CDUD).

R1212 TRANSFER DELCDUS, SCALED 180 DEG, FROM V(VAC14D)
R1213 TO V(DELCDUX).

R1214 TRANSFER ΩEGAC CONTROL, SCALED 450 DEG/SEC, FROM V(MPAC)
R1215 TO V(WBODY).

R1216 RELINT, SET MPAC=0, EXIT CRS61.1

R1217 CALL L CALL CRS61.1

R1218 RETURNS ALL TO L+1.

R1219 (1) S(MPAC)=0. NORMAL EXIT. 3 SETS OF INPUTS FWD TO DAP.
R1220 (2) S(MPAC)=1. CALCULATED DESIRED CDUS, SP, SET IN T(CPHI)
R1221 FOR KALCMANU. ABS(ACDU - DCDU) EXCEEDS 10 DEGREES.
R1222 (3) S(MPAC)=2. GNCS AUTO MODE NOT SELECTED (BIT10=1).
R1223 (4) S(MPAC)=3. DAP HOLD FLAG (HOLDFLAG) NOT EQUAL -1.



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| Line | Op | Count | Label | Address | Value | Op | Label | Value | Comment |
|-------|-----|-------|-------|---------|---------|-------|-------|----------|---|
| 1262 | REP | 10 | LAST | 570 | 34,3231 | 45505 | 0 | LOADTIME | LOAD CLOCK TIME _{2,1} INTO MPAC. |
| A1263 | | | | | | | | | |
| 1264 | REP | 8 | LAST | 451 | 34,3232 | 38316 | 0 | STOPT | STORE CLOCK TIME FOR SUBR R63 |
| 1265 | REP | 1 | | | 34,3233 | 71461 | 1 | STCALL | SUBR TO CALC DCDU(T=PRESENT,PASS1) |
| 1266 | | | | | 34,3234 | 77751 | 1 | R63 | |
| 1267 | REP | 13 | LAST | 421 | 34,3235 | 81156 | 1 | TLOAD | SAVE DCDU(T) FROM CALCDU FOR STEP4. |
| 1268 | REP | 2 | LAST | 113 | 34,3236 | 83373 | 0 | THEPAD | |
| A1269 | | | | | | | | STORE | SAVEDCDU |
| 1270 | | | | | 34,3237 | 77776 | 1 | EXIT | |
| 12701 | REP | 1 | | | 34,3240 | 83265 | 0 | TC | ELIMINATE FORCED R60 MANUEVER |
| 1271 | REP | 8 | LAST | 383 | 34,3241 | 34371 | 0 | STEP2CK | |
| 1272 | | | | | 34,3242 | 80008 | 1 | PRIO30 | |
| 1273 | REP | 3 | LAST | 539 | 34,3243 | 88031 | 0 | AUTOCK | |
| 1274 | REP | 2 | LAST | 554 | 34,3244 | 77707 | 1 | CAP | |
| 1275 | | | | | 34,3245 | 80008 | 1 | EXTEND | |
| 1276 | REP | 1 | | | 34,3246 | 13250 | 1 | RKOR | CHAN31 |
| 1278 | REP | 1 | | | 34,3247 | 83254 | 1 | MARK | FURST3 |
| | | | | | | | | EXTEND | AUTO MODE SELECTED (BITS 15-13=011) |
| | | | | | | | | RZF | YRS-CONTINUE. |
| | | | | | | | | TC | |
| | | | | | | | | ASBT | |
| 1279 | REP | 13 | LAST | 562 | 34,3250 | 40075 | 1 | DAPCK | IS STIKFLAG SET (I.E. IS SOMEONE ON RHC) |
| 1280 | REP | 37 | LAST | 559 | 34,3251 | 74875 | 0 | CS | |
| 1281 | REP | 146 | LAST | 565 | 34,3252 | 10000 | 0 | MASK | |
| 1282 | REP | 1 | | | 34,3253 | 03320 | 0 | CCS | A |
| 1283 | REP | 122 | LAST | 577 | 34,3254 | 34714 | 1 | TC | STEP3CK |
| 1284 | REP | 253 | LAST | 577 | 34,3255 | 54154 | 0 | CAP | ZERO |
| 1285 | REP | 95 | LAST | 577 | 34,3256 | 06006 | 1 | TS | MPAC |
| 1286 | | | | | 34,3257 | 77650 | 1 | TC | INTPRET |
| 1287 | REP | 3 | LAST | 582 | 34,3260 | 83704 | 1 | GOTO | EXIT CRS61.1 |
| | | | | | | | | Q611 | |
| 1288 | REP | 9 | LAST | 439 | 34,3261 | 40101 | 0 | STEP2CK | IS R60FLAG-SET |
| 1289 | REP | 25 | LAST | 508 | 34,3262 | 74707 | 1 | CS | |
| 1290 | | | | | 34,3263 | 80006 | 1 | MASK | BIT4 |
| 1291 | REP | 1 | | | 34,3264 | 13452 | 0 | EXTEND | |
| 12911 | REP | 140 | LAST | 577 | 34,3265 | 84555 | 0 | RZF | MANUEXIS |
| 12912 | REP | 2 | LAST | 195 | 34,3266 | 57750 | 1 | TC | BANKCALL |
| | | | | | | | | CADR | UPACTOFF |
| 1292 | REP | 32 | LAST | 578 | 34,3267 | 34711 | 1 | CAP | TWO |
| 1293 | REP | 2 | LAST | 107 | 34,3270 | 55611 | 1 | TS | DTHETASM |
| 1294 | REP | 3 | LAST | 583 | 34,3271 | 51611 | 0 | INDEX | DTHETASM |
| 1295 | REP | 12 | LAST | 563 | 34,3272 | 30032 | 0 | CA | CDUX |
| 1296 | | | | | 34,3273 | 80006 | 1 | EXTEND | |
| 1297 | REP | 4 | LAST | 583 | 34,3274 | 51611 | 0 | INDEX | DTHETASM |
| 1298 | REP | 14 | LAST | 583 | 34,3275 | 21155 | 0 | MSU | THEPAD |
| 1299 | REP | 254 | LAST | 583 | 34,3276 | 54154 | 0 | TS | MPAC |
| 1300 | REP | 96 | LAST | 583 | 34,3277 | 80006 | 1 | TC | INTPRET |
| 1301 | | | | | 34,3300 | 45246 | 0 | ABS | DSU |
| 1302 | REP | 1 | | | 34,3301 | 31550 | 0 | DEGREE10 | |
| 1303 | | | | | 34,3302 | 77444 | 0 | BPL | EXIT |
| 1304 | REP | 1 | | | 34,3303 | 71307 | 0 | STKTEST | |
| 1305 | REP | 5 | LAST | 583 | 34,3304 | 11611 | 1 | CCS | DTHETASM |
| 1306 | REP | 1 | | | 34,3305 | 83270 | 1 | TC | CDU.LOOP |
| | | | | | | | | | SET TEMPORARY INDEX DTHETASM = 2 |
| | | | | | | | | | SET A = ACTUAL CDU (ACDU). |
| | | | | | | | | | SET INDEX TO ACCESS DESIRED CDU (DCDU). |
| | | | | | | | | | A = DIFF = ACDU - DCDU. |
| | | | | | | | | | RETURN TO INTERPRETER FOR 10 DEGREE CK. |
| | | | | | | | | | (DP APPROX SP QK FOR ROUGH CHECK) |
| | | | | | | | | | IS (ACDU - DCDU) MORE THAN 10 DEGREES. |
| | | | | | | | | | NO - QK, CONTINUE CHECKING OTHER ANGLES. |
| | | | | | | | | | TEST STICK FLAG |
| | | | | | | | | | HAVE ALL 3 ANGLE DIFFS BEEN CHECKED. |
| | | | | | | | | | NO - DIM COUNT, CHECK NEXT ANGLE DIFF. |

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| | | | | | | | | |
|--------|-----|-----|------|---------|----------|----------|--------|----------|
| 13061 | REP | 1 | | 34,3308 | 0 3241 0 | | TC | AUTOCK |
| 13062 | | | | 34,3307 | 77776 1 | STKTEST | EXIT | |
| 130625 | REP | 14 | LAST | 583 | 34,3310 | 4 0075 1 | CS | FLAGWRD1 |
| 13063 | REP | 38 | LAST | 583 | 34,3311 | 7 4675 0 | MASK | BIT14 |
| 130635 | REP | 147 | LAST | 583 | 34,3312 | 10 000 0 | CCS | A |
| 13064 | REP | 2 | LAST | 583 | 34,3313 | 0 3452 1 | TC | MANLEXIS |
| 130645 | REP | 19 | LAST | 539 | 34,3314 | 3 4710 0 | CAP | BIT3 |
| 13065 | | | | 34,3315 | 0 0006 1 | | EXTEND | |
| 130655 | REP | 21 | LAST | 381 | 34,3316 | 05 011 1 | WOR | DSALMOUT |
| 130665 | REP | 2 | LAST | 583 | 34,3317 | 0 3254 1 | TC | ASET |
| 1307 | REP | 97 | LAST | 583 | 34,3320 | 0 8006 1 | TC | INTPRET |
| 1308 | | | | 34,3321 | 77601 0 | | SETPD | |
| 1309 | | | | 34,3322 | 00001 0 | | | |
| A1310 | | | | | | | | |
| A1311 | | | | | | | | |
| 1312 | | | | 34,3323 | 52375 1 | CRS61.2 | VLOAD | VSU |
| 1313 | REP | 3 | LAST | 110 | 34,3324 | 03204 1 | | DCDU |
| 1314 | REP | 2 | LAST | 124 | 34,3325 | 03715 1 | | SAVEVEL |
| 1315 | | | | 34,3326 | 57456 1 | | UNIT | VCOMP |
| 1316 | | | | 34,3327 | 74235 0 | | VXV | VXSC |
| 1317 | REP | 2 | LAST | 123 | 34,3330 | 03707 1 | | SAVEPOS |
| 1318 | REP | 1 | | | 34,3331 | 31551 1 | | RVC5/RDS |
| 1319 | | | | 34,3332 | 77606 1 | | PUSH | |
| 1320 | | | | 34,3333 | 60345 0 | | DLOAD | NORM |
| 1321 | REP | 9 | LAST | 583 | 34,3334 | 02316 1 | | P21TIME |
| 1322 | REP | 21 | LAST | 571 | 34,3335 | 00047 1 | | X1 |
| 1323 | | | | 34,3336 | 77606 1 | | PUSH | |
| A1324 | | | | | | | | |
| 1325 | | | | 34,3337 | 60345 0 | | DLOAD | NORM |
| 1326 | | | | 34,3340 | 00045 0 | | | 36D |
| 1327 | REP | 8 | LAST | 578 | 34,3341 | 00051 0 | | S1 |
| A1328 | | | | | | | | |
| 1329 | | | | 34,3342 | 70460 1 | | XSU,1 | SR1 |
| 1330 | REP | 9 | LAST | 584 | 34,3343 | 00050 1 | | S1 |
| 1331 | | | | 34,3344 | 74271 0 | | DDV | VXSC |
| 1332 | | | | 34,3345 | 77730 0 | | SA,1 | |
| 1333 | REP | 2 | LAST | 123 | 34,3346 | 03705 0 | | QB111 |
| A1334 | | | | | | | | |
| A1335 | | | | | | | | |
| A1336 | | | | | | | | |
| A1337 | | | | | | | | |
| 1338 | | | | 34,3347 | 76521 0 | | MKV | VSL1 |
| 1339 | REP | 15 | LAST | 568 | 34,3350 | 01736 1 | | REFSMAT |
| 1340 | | | | 34,3351 | 00025 0 | | STORR | 20D |
| A1341 | | | | | | | | |
| 1342 | | | | 34,3352 | 77761 1 | | VXSC | |
| 1343 | REP | 1 | | | 34,3353 | 31553 0 | | TRNTH |
| 1344 | REP | 6 | LAST | 583 | 34,3354 | 03212 0 | STORE | DTHETASM |
| 1345 | | | | 34,3355 | 77624 1 | | CALL | |

STIKFLAG IS NOT SET (DO R63)

STIKPLG IS SET
TURN ON UPACTY LIGHT

EXIT AND SET R61CNTR

*
NOW HAVE DCDUS STORED IN T(SAVEDCDU).
DO CALC OTHER DAP INPUTS (DELCDU,WRBODY)

DV = VL - VC
V(MPAC) = -UNITDV.VAC36D=ARSDV.
(-UNITDV)CROSS(UNITLOS).

(UNITLOS B1)(UNITDV B1)(CONST B4)=CROSS.
HOLD CROSS IN PUSHLIST0. SCALED R6.
OBTAIN ABS VALUE OF LOS.
P21TIME IS TEMP STORE FOR ABSLOS.

NORM ABSLOS(DENOM) AND HOLD IN PUSH1.

NORM ABS VALUE OF DV(NLM).

X1 = X1(N DENOM) - S1(N NUM).
SR1 TO AVOID OFLOW ON DDV.
ARSDV(MPAC)/ABSLOS(PUSH1) = QUOT.
QUOT(MPAC) X CROSS(PUSH1)
SAVE SCALE OF RESULT (R-15,X1).
X1 = NORM OF QUOT. QUOT SCALE R7-R29=R-22
CROSS IS SCALED R6. NEED S1.1 TO RECOVER
SR1 SO THAT -22+6+1=-15. MPAC NOW HOLDS
ORTH0 LOS RATE (OMEGA TH, R-15,X1).
OBTAIN RATE IN SM COORDS (OMEGTHSM) AND
ADJUST FOR REFSMAT SCALE OF R1.
OMEGTHSM = VAC20D
DELTA THETA SM = OMEGTHSM * .1R-3.

STORE S4 INCRM ANGLES FOR S4CXIRS.



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1346 REP 3 LAST 535 34,3358 47432 1
 1347 34,3357 45001 1
 1348 34,3360 00001 0
 1349 REP 1 34,3361 47675 0
 1350 34,3362 77750 0
 1351 REP 3 LAST 584 34,3363 03705 0
 1352 34,3364 53775 1
 1353 REP 4 LAST 584 34,3365 03204 1
 1354 34,3366 20180 1
 1355 34,3367 00017 1
 A1356
 1357 34,3370 77624 1
 1358 REP 4 LAST 585 34,3371 47432 1
 1359 34,3372 45175 0
 1360 34,3373 00025 0
 1361 REP 2 LAST 281 34,3374 47577 1
 1362 34,3375 77721 0
 1363 REP 2 LAST 537 34,3376 31557 1
 1364 34,3377 77761 1
 1365 REP 1 34,3400 15270 0
 1366 34,3401 53750 0
 1367 REP 4 LAST 585 34,3402 03705 0
 1368 34,3403 20183 1
 A1369
 1370 34,3404 77776 1
 1371 34,3405 0 0004 0
 1372 REP 123 LAST 583 34,3406 3 4714 1
 1373 REP 7 LAST 582 34,3407 55-647 1
 1374 REP 4 LAST 412 34,3410 55-651 0
 1375 REP 4 LAST 412 34,3411 55-653 1
 1376 REP 3 LAST 583 34,3412 3 1772 1
 1377 REP 8 LAST 585 34,3413 55-646 0
 1378 REP 4 LAST 585 34,3414 3 1773 0
 1379 REP 5 LAST 585 34,3415 55-650 1
 1380 REP 5 LAST 585 34,3416 3 1774 1
 1381 REP 5 LAST 585 34,3417 55-652 0
 A1382
 1383 34,3420 0 0006 1
 1384 REP 255 LAST 583 34,3421 3 0155 0
 1385 REP 9 LAST 411 34,3422 53-528 0
 1386 34,3423 0 0006 1
 1387 REP 256 LAST 585 34,3424 3 0160 0
 1388 REP 4 LAST 411 34,3425 53-530 1
 1389 34,3426 0 0006 1
 1390 REP 257 LAST 585 34,3427 3 0162 1
 1391 REP 5 LAST 411 34,3430 53-532 0
 A1392
 1393 34,3431 0 0006 1
 1394 REP 9 LAST 537 34,3432 5 0120 1
 1395 34,3433 3 0017 1

SETPD COUTRIG
 CALL
 0
 SMCURES
 LXA,1
 VLOAD OS111
 VSL*
 DCDU
 0 -17D,1
 STORE 14D
 CALL
 COUTRIG
 VLOAD CALL
 20D
 *S*NB*
 MVV
 MFDYCTL
 VXSC
 POINTS
 LXA,1
 VSL*
 OS111
 0 -14D,1
 CR561.2A EXIT
 INHINT
 CAP ZERO
 TS CDU0D +1
 TS CDU1D +1
 TS CDU2D +1
 CA SAVEDCDU
 TS CDU0D
 CA SAVEDCDU +1
 TS CDU1D
 CA SAVEDCDU +2
 TS CDU2D
 EXTEND
 DCA MPAC
 DXCH WRBODY
 EXTEND
 DCA MPAC +3
 DXCH WRBODY1
 EXTEND
 DCA MPAC +5
 DXCH WRBODY2
 EXTEND
 INDRX FIXLOC
 DCA 14D

OBTAIN SIN, COS, CUS FOR SMCURES.
 SMCURES USES PUSH
 OBTAIN DELCDU IN V(DCDU).
 RELOAD X1
 RECOVER SCALE.
 (B-15,X1) + TENTH(B-3) + HALPREVS(B1)
 EQUALS B-17D,1 TO OBTAIN HALPREVS BO.
 HOLD DELS IN V(VAC14D) FOR AUTOPILOT.
 COMPUTES SINES AND COSINES FOR *S*NB*
 LOAD VECTOR AND CALL TRANSFORMATION
 VECTOR FOR TRG*S*NB INTO MPAC
 OBTAIN ANG. RATE REFERRED TO NB (BODY)
 CONVERT RATE(Omega) TO CONTROL COORDS.
 MULT. BY 0.8 TO RESCALE REVS TO 450 DEG.
 RECOVER SCALE.
 RELOAD X1 TO RECOVER NORMALIZ.
 (B-15,X1) + MFDYCTL(B1) = B-14D,1 TO
 OBTAIN REVS SCALED AT 450 DEGREES.
 TRANSFER DESIRED GIMBAL ANGLES
 FROM TV SAVEDCDU() TO V(CDU0D).
 TRANSFER OMEGA CONTROL (ANG LOS RATE)
 FROM V(MPAC) TO V(WRBODY).
 TRANSFER CDU INCREMENTS
 FROM V(VAC14D) TO V(DRIFTX).



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| | | | | | | | | | | |
|------|-----|----|------|-----|---------|-------|---|----------|----------|------------------------------|
| 1448 | REP | 11 | LAST | 389 | 34,3515 | 37351 | 1 | STCALL | SCAXIS | TRACK AXIS UNIT VECTOR |
| 1447 | REP | 3 | LAST | 383 | 34,3516 | 56126 | 1 | | VECPOINT | FOR X-AXIS TRACKING ATTITUDE |
| 1446 | REP | 7 | LAST | 277 | 34,3517 | 01334 | 1 | STORE | CPHIX | STORE ANGLES FOR N96 DISPLAY |
| 1449 | | | | | 34,3520 | 77775 | 1 | VLOAD | | |
| 1450 | REP | 1 | | | 34,3521 | 31542 | 0 | | PRPLNIT | |
| 1451 | REP | 12 | LAST | 587 | 34,3522 | 37351 | 1 | STCALL | SCAXIS | |
| 1452 | REP | 4 | LAST | 587 | 34,3523 | 56126 | 1 | | VECPOINT | |
| 1453 | REP | 5 | LAST | 277 | 34,3524 | 03723 | 1 | STORE | PRAXIS | STORE ANGLES FOR N95 DISPLAY |
| 1454 | | | | | 34,3525 | 77614 | 1 | BOFF | | |
| 1455 | REP | 4 | LAST | 552 | 34,3526 | 02745 | 0 | | PRPTRKAT | |
| 1456 | REP | 1 | | | 34,3527 | 71533 | 1 | | CRSTOR1 | |
| 1457 | REP | 15 | LAST | 583 | 34,3530 | 01158 | 1 | CRSTOR | STORE | STORE ANGLES FOR N18 DISPLAY |
| 1458 | | | | | 34,3531 | 77650 | 1 | | THEPAD | |
| 1459 | REP | 8 | LAST | 586 | 34,3532 | 03705 | 0 | | GOTO | |
| 1460 | | | | | 34,3533 | 77775 | 1 | CRSTOR1 | VLOAD | Q6111 |
| 1461 | REP | 5 | LAST | 586 | 34,3534 | 15330 | 0 | | UNITX | |
| 1462 | REP | 13 | LAST | 587 | 34,3535 | 03351 | 0 | STORE | SCAXIS | |
| 1463 | | | | | 34,3536 | 52151 | 0 | TLOAD | GOTO | |
| 1464 | REP | 8 | LAST | 587 | 34,3537 | 01334 | 1 | | CPHIX | |
| 1465 | REP | 1 | | | 34,3540 | 71530 | 1 | | CRSTOR | |
| 1466 | | | | | 34,3541 | 15066 | 0 | PRPLNIT | ZDEC | .40957802 |
| 1467 | | | | | 34,3543 | 00000 | 1 | | ZDEC | 0.0 |
| 1467 | | | | | 34,3544 | 00000 | 1 | | | |
| 1468 | | | | | 34,3545 | 11132 | 1 | | ZDEC | .28678622 |
| 1468 | | | | | 34,3546 | 27477 | 0 | | | |
| 1469 | | | | | 34,3547 | 01616 | 1 | DECRFR10 | ZDEC | .05556 |
| 1470 | | | | | 34,3550 | 37651 | 1 | RVCB/RDS | ZDEC | 15.915494 R-4 |
| 1470 | | | | | 34,3551 | 16721 | 1 | | | |
| 1471 | | | | | 34,3552 | 31463 | 1 | TENVH | ZDEC | .1 R+3 |
| 1471 | | | | | 34,3553 | 06315 | 0 | | | |
| 1474 | | | | | 34,3554 | 20000 | 0 | MAT1R1 | ZDEC | 1.0 R-1 |
| 1474 | | | | | 34,3555 | 00000 | 1 | | | |
| 1475 | | | | | 34,3556 | 20000 | 0 | MRDYCTL | ZDEC | .5 |
| 1475 | | | | | 34,3557 | 00000 | 1 | | | |
| 1476 | | | | | 34,3560 | 00000 | 1 | | ZDEC | 0 |
| 1476 | | | | | 34,3561 | 00000 | 1 | | | |
| 1477 | | | | | 34,3562 | 00000 | 1 | | ZDEC | 0 |
| 1477 | | | | | 34,3563 | 00000 | 1 | | | |
| 1478 | | | | | 34,3564 | 00000 | 1 | | ZDEC | 0 |
| 1478 | | | | | 34,3565 | 00000 | 1 | | | |
| 1479 | | | | | 34,3566 | 17676 | 0 | | ZDEC | .99200495 R-1 |
| 1479 | | | | | 34,3567 | 20113 | 0 | | | COS7.25 R1 |
| 1480 | | | | | 34,3570 | 75766 | 1 | | ZDEC | -.12619897 R-1 |
| 1480 | | | | | 34,3571 | 45544 | 0 | | | -SIN7.25 R1 |
| 1481 | | | | | 34,3572 | 00000 | 1 | | ZDEC | 0 |
| 1481 | | | | | 34,3573 | 00000 | 1 | | | |
| 1482 | | | | | 34,3574 | 02011 | 0 | | ZDEC | .12619897 R-1 |
| 1482 | | | | | 34,3575 | 32233 | 1 | | | SIN7.25 R1 |
| 1483 | | | | | 34,3576 | 17676 | 0 | | ZDEC | .99200495 R-1 |
| 1483 | | | | | 34,3577 | 20113 | 0 | | | COS7.25 R1 |

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P1466 S22.1 ORBITAL NAVIGATION ROUTINE
R1467 MOD 1

R1468 FUNCTIONAL DESCRIPTION
R1469 1. UPDATE CSM STATE VECTOR
R1490 2. UPDATE LANDMARK POSITION
R1491 3. CONVERT W MATRIX FROM 9 TO 6 DIMENSIONS

R1492 SUBROUTINES CALLED
R1493 INSTALL, INTEGRT, GETUM, SETRS, R-TO-TP, RP-TO-R, RVECTORS, INCORP1, INCORP2
R1494 LALOTRV, S22P2410, LAT-LONG, ROWDOT

R1495 ERASABLE INITIALIZATION
R1496 W=9X9 MATRIX
R1497 ORBWPLAC=0 FOR INVALID W MATRIX, =1 FOR VALID W MATRIX
R1498 ASTRONAUT ENTRY OF KNOWN, L, OFF
R1499 9NN= NUMBER OF MARKS DECIMAL INTEGER 8-14
R1500 RSPMMAT= TRANSFORMATION MATRIX
R1501 MARKSTAT= ADDRESS OF START OF MARK DATA (MARK DATA OF EACH MARK IS
R1502 STORED AS FOLLOWS, TIME, AIG, SA, AMG, PA, ACG) TIME IS IN DOUBLE
R1503 PRECISION, ALL OTHERS ARE IN SINGLE PRECISION
R1504 CSM STATE VECTOR

R1505 OUTPUT
R1506 UPDATED CSM STATE VECTOR
R1507 UPDATED LANDMARK POSITION
R1508 NEW 6 DIMENSIONAL W MATRIX

R1509 DEBRIS
R1510 PUSH LIST, COMPOS, ALPHAV, BRADM, LM, RCLP, USTAR, VARIANCE, X789, RVECTOR, BKK,
R1511 S22LOC, SWMKDAT TABLE, 22SUBSCL, LANDMARK, CKOFF, S22C, LAT, LONG, ALT,
R1512 TEMPOR1, S22TOPF, S221OFF, DSPTRM1, S22BORM, S22TPRIM

| | | | | | | | | |
|------|-----|----|----------|---------|---------|--------|----------|-----------------------------------|
| 1513 | | | 13,2176 | | | BANK | 13 | |
| 1514 | REP | 1 | 30,2000 | | | SETLOC | P2056 | |
| 1515 | | | 30,2255 | | | BANK | | |
| 1516 | REP | 18 | LAST 559 | 85,1751 | | EBANK= | LANDMARK | |
| 1517 | REP | 1 | | | | COUNT | 35/LUORR | |
| 1518 | | | 30,2255 | 66220 1 | S22.1 | STO | SSP | |
| 1519 | REP | 2 | LAST 123 | 30,2256 | 03703 0 | | S22RTNEX | |
| 1520 | REP | 10 | LAST 584 | 30,2257 | 00051 0 | | S1 | |
| 1521 | | | 30,2260 | 00006 1 | | DEC | 6 | |
| 1522 | | | 30,2261 | 66331 0 | | SSP | SSP | SET I=1 ITEM BKK IS 1 |
| 1523 | REP | 2 | LAST 95 | 30,2262 | 02747 1 | | BKK | |
| 1524 | | | 30,2263 | 00001 0 | | DEC | 1 | |
| 1525 | REP | 2 | LAST 95 | 30,2264 | 02751 0 | | S22LOC | |
| 1526 | REP | 5 | LAST 175 | 30,2265 | 03537 0 | BCADR | SWMKDAT | SET MARK DATA ADDRESS INTO S22LOC |

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| | | | | | | | | |
|-------|-----|-----|---------------|-----------------|---|----------|----------------|---|
| 1527 | | | 30,2266 | 76144 | 1 | LXC,2 | AXT,1 | |
| 1528 | REP | 31 | LAST | 561 | | | MARKSTAT | |
| 1529 | | | 30,2270 | 00044 | 1 | DEC | 36 | |
| 1530 | | | 30,2271 | 77773 | 1 | S22.111 | VLOAD* | MOVE MARK DATA (5 SETS) FROM ADDR. IN |
| 1531 | | | 30,2272 | 77776 | 1 | | 0,2 | MARKSTAT TO SVMRDAT TABLE TO AVOID LOSS |
| 1532 | REP | 6 | LAST | 569 | | STORE | SVMRDAT +36D,1 | IF RESTART OCCURS |
| 1533 | | | 30,2274 | 60114 | 0 | INCR,2 | TIX,1 | |
| 1534 | | | 30,2275 | 77771 | 0 | DEC | -6 | |
| 1535 | REP | 1 | | | | | S22.111 | |
| 1536 | | | 30,2277 | 77414 | 0 | SET | EXIT | |
| 15361 | REP | 2 | LAST | 555 | | | P22MPLG | DOWNLINKED SVMRDAT HOLDS PRESENT MARKS |
| 1537 | REP | 141 | LAST | 563 | | TC | BANKCALL | RELEASE VAC AREA WHERE MARK DATA WAS |
| 1538 | REP | 5 | LAST | 444 | | CADR | MCRLEAS | |
| 1539 | REP | 9 | LAST | 556 | | TC | ZPHSCHNG | |
| 1540 | | | 30,2304 | 00004 | 0 | OCT | 00004 | |
| 1541 | | | 30,2305 | 05022 | 1 | OCT | 05022 | |
| 15411 | | | 30,2306 | 13000 | 0 | OCT | 13000 | |
| 1542 | REP | 99 | LAST | 566 | | TC | INTPRET | |
| 1543 | | | 30,2310 | 43170 | 0 | AXT,1 | BOFF | |
| 1544 | | | 30,2311 | 00000 | 1 | | 0D | |
| 1545 | REP | 8 | LAST | 578 | | | CMOONPLG | =0 EARTH,=1 MOON |
| 1546 | REP | 1 | | | | | S22SHIPT | |
| 1547 | | | 30,2314 | 77710 | 1 | INCR,1 | | |
| 1548 | | | 30,2315 | 77775 | 1 | DEC | -2 | |
| 1549 | | | 30,2316 | 40330 | 0 | S22SHIPT | SXA,1 | SETPD |
| 1550 | REP | 2 | LAST | 123 | | | S22BORN | SET =0 EARTH,=-2 MOON FOR SHIPTING |
| 1551 | | | 30,2320 | 00001 | 0 | | 0D | |
| 1554 | | | 30,2321 | 77624 | 1 | PIO2EXIT | CALL | |
| 1555 | REP | 15 | LAST | 576 | | | INTSTALL | |
| 1556 | | | 30,2323 | 77624 | 1 | CALL | | |
| 1557 | REP | 1 | | | | | S22FLOS | |
| R1558 | | | FLOWCHART D=0 | THEN DIM0FLAG=0 | | D6OR9PLG | NOT TESTED | |
| R1559 | | | FLOWCHART D=6 | THEN DIM0FLAG=1 | | D6OR9PLG | =0 | |
| R1560 | | | FLOWCHART D=9 | THEN DIM0FLAG=1 | | D6OR9PLG | =1 | |
| 1561 | | | 30,2325 | 43014 | 0 | BOFF | CLAGO | |
| 1562 | REP | 4 | LAST | 570 | | | ORWFLAG | |
| 1563 | REP | 1 | | | | | SETW5D | BRANCH TO SET W0-W5,ORWFLAG,D |
| 1564 | REP | 2 | LAST | 576 | | | D6OR9PLG | FLOWCHART D=6 PATH |
| 1565 | REP | 1 | | | | | SETVANDI | |
| 1566 | | | 30,2332 | 77614 | 1 | SETW5D | CLEAR | |
| 1567 | REP | 6 | LAST | 576 | | | DIM0FLAG | FLOWCHART D=0 PATH |
| 1568 | | | 30,2334 | 66370 | 0 | AXT,1 | SSP | |
| 1569 | | | 30,2335 | 00154 | 1 | DEC | 108 | |
| 1570 | REP | 11 | LAST | 589 | | | S1 | |
| 1571 | | | 30,2337 | 00006 | 1 | DEC | 6 | |
| 1572 | | | 30,2340 | 77214 | 0 | CLEAR | VLOAD | |
| 1573 | REP | 7 | LAST | 571 | | | RENDWPLG | OSOP CHANGE 8/18/67 |
| 1574 | REP | 12 | LAST | 576 | | | ZEROWPCS | |
| 1575 | REP | 13 | LAST | 579 | | CLEARW5 | STORE | W +108D,1 |



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| | | | | | | | |
|-------|-----|----|----------|---------|---------|----------|----------|
| 1576 | | | 30,2344 | 67300 0 | TIX,1 | SLOAD | |
| 1577 | REP | 1 | 30,2345 | 60343 0 | | CLEARWWS | |
| 1578 | REP | 1 | 30,2346 | 02005 0 | | WORSPOS | |
| 1580 | REP | 14 | LAST 590 | 30,2347 | 02401 0 | STORE | W |
| 1581 | REP | 15 | LAST 591 | 30,2350 | 02411 1 | STORE | W +8D |
| 1582 | REP | 16 | LAST 591 | 30,2351 | 02421 1 | STORE | W +16D |
| 1583 | | | | 30,2352 | 77735 0 | SLOAD | |
| 1584 | REP | 1 | | 30,2353 | 02006 0 | | WORSVEL |
| 1585 | REP | 17 | LAST 591 | 30,2354 | 02511 0 | STORE | W +72D |
| 1586 | REP | 18 | LAST 591 | 30,2355 | 02521 0 | STORE | W +80D |
| 1587 | REP | 19 | LAST 591 | 30,2356 | 02531 1 | STORE | W +88D |
| 1588 | | | | 30,2357 | 77614 1 | SETVANDI | CLEAR |
| 1589 | REP | 2 | LAST 572 | 30,2360 | 02666 0 | | DMENPLG |
| 1590 | | | | 30,2361 | 77624 1 | S22XTIN | CALL |
| 1591 | REP | 1 | | 30,2362 | 61322 0 | | GETTP |
| 1592 | REP | 30 | LAST 588 | 30,2363 | 34041 0 | STCALL | TDEC1 |
| 1593 | REP | 6 | LAST 573 | 30,2364 | 27113 1 | | INTEGRV |
| 1594 | | | | 30,2365 | 77624 1 | CALL | |
| 1595 | REP | 1 | | 30,2366 | 61273 0 | | S22CALRC |
| 1596 | | | | 30,2367 | 66150 0 | LXA,1 | SXA,1 |
| 1597 | REP | 3 | LAST 589 | 30,2370 | 02750 1 | | S22LOC |
| 1598 | REP | 4 | LAST 589 | 30,2371 | 01242 1 | | MARKDATA |
| 1599 | | | | 30,2372 | 77624 1 | CALL | |
| 1600 | REP | 2 | LAST 571 | 30,2373 | 47110 1 | S22ETUM | GETUM |
| 1601 | REP | 5 | LAST 571 | 30,2374 | 01235 1 | STORE | UM |
| 1604 | | | | 30,2375 | 41535 1 | DMPINTEG | SLOAD |
| 1605 | REP | 3 | LAST 589 | 30,2376 | 02747 1 | | PUSH |
| 1606 | | | | 30,2377 | 50535 1 | SLOAD | SR3 |
| 1607 | REP | 3 | LAST 558 | 30,2400 | 02746 0 | | CXOFF |
| 1608 | | | | 30,2401 | 50442 0 | SR3 | SR3 |
| 1609 | | | | 30,2402 | 77625 0 | DSU | |
| 1610 | | | | 30,2403 | 43030 0 | RHIZ | RON |
| 1611 | REP | 1 | | 30,2404 | 60720 1 | | S22OFF=I |
| 1612 | REP | 3 | LAST 591 | 30,2405 | 02706 1 | | DMENPLG |
| 1613 | REP | 1 | | 30,2406 | 60726 1 | | S22D=9 |
| 16131 | | | | 30,2407 | 77624 1 | CALL | |
| 16132 | REP | 12 | LAST 574 | 30,2410 | 56741 0 | | GRP2PC |
| 1614 | | | | 30,2411 | 77614 1 | SET | |
| 1615 | REP | 5 | LAST 590 | 30,2412 | 01471 1 | | ORWFLAG |
| 1616 | | | | 30,2413 | 43014 0 | SET | |
| 1617 | REP | 4 | LAST 591 | 30,2414 | 02468 1 | | DMENPLG |
| 1618 | REP | 1 | | 30,2415 | 01062 1 | | 22DSPPLG |
| 1619 | | | | 30,2416 | 43014 0 | SET | RON |
| 1620 | REP | 4 | LAST 555 | 30,2417 | 00462 1 | | BRADFLAG |
| 1621 | REP | 6 | LAST 559 | 30,2420 | 03307 0 | | KNOWNPLG |
| 1622 | REP | 1 | | 30,2421 | 61070 1 | | S22ROK22 |
| 1623 | | | | 30,2422 | 53575 0 | VLOAD | UNIT |
| 1624 | REP | 5 | LAST 574 | 30,2423 | 01207 0 | | CSMPOS |
| 1625 | REP | 4 | LAST 556 | 30,2424 | 02152 0 | STORE | ALPHAV |
| 1626 | | | | 30,2425 | 43014 0 | CLEAR | ROFF |

SET DIAGONALS OF W0

SET DIAGONALS OF W4

0=6X6W, 1=9X9W

CALC. RC R-29 OR R-27 (CSMPOS)

SETUP ADDR. OF MARK DATA FOR GETUM SURR.

COMPUTE UM

TEST OFF=I

CXOFF SCALED R-5, MUST MOVE TO R-14

REPORT SURT.

BRANCH HERE IF OFF=I

0=6X6W, 1=9X9W

=0 ON FIRST PASS THRU HRRR FOR D=0, OR

=1 TO DISPLAY DR, DV ON FIRST PASS

=1 TO COMPUTE FISCHER RADIUS

UNIT ALSO PUTS ARVAL(RC) IN 36D

ALPHAV +4=SINL FOR SETRP

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| | | | | | | | | | |
|-------|-----|----|------|-----|---------|---------|---------|-----------|--|
| 1627 | REP | 6 | LAST | 556 | 30,2426 | 01663 0 | | LINAFLAG | |
| 1628 | REP | 9 | LAST | 590 | 30,2427 | 04343 1 | | CHCONPLO | |
| 1629 | REP | 1 | | | 30,2430 | 60433 0 | | S22C=I | |
| 1630 | | | | | 30,2431 | 77614 1 | | SET | |
| 1631 | REP | 6 | LAST | 592 | 30,2432 | 01463 1 | | LINAFLAG | |
| 1632 | | | | | 30,2433 | 77624 1 | S22C=1 | CALL | BRADM= R0 METERS B-29 BOTH EARTH/MOON |
| 1633 | REP | 1 | | | 30,2434 | 26533 0 | | SETRE | |
| 1634 | | | | | 30,2435 | 77624 1 | | CALL | COMPUTE RL FROM EQUATION 2.4.10 |
| 1635 | REP | 1 | | | 30,2436 | 61240 0 | | S22P2410 | STORED IN XT89,MPAC B-27,R-29 |
| 1636 | | | | | 30,2437 | 70414 1 | | BOFF | SCALE RL B-29 FOR BOTH EARTH/MOON |
| 1637 | REP | 10 | LAST | 592 | 30,2440 | 04343 1 | | CHCONPLO | |
| 1638 | | | | | 30,2441 | 60442 0 | | +1 | |
| 1639 | REP | 1 | | | 30,2442 | 02635 0 | | STORE | |
| 1640 | | | | | 30,2443 | 72441 0 | | DOT | S22RL |
| 1641 | REP | 6 | LAST | 591 | 30,2444 | 01235 1 | | UM | |
| 1642 | REP | 1 | | | 30,2445 | 24037 0 | | STOVL | S22D |
| 1643 | REP | 13 | LAST | 590 | 30,2446 | 15332 1 | | ZEROVECS | D= UM,RL B-29 |
| 1644 | | | | | 30,2447 | 41401 1 | | SETPD | PUSH |
| 1645 | | | | | 30,2450 | 00001 0 | | 0D | |
| 1646 | | | | | 30,2451 | 65206 0 | | PUSH | PDDL |
| 1647 | REP | 5 | LAST | 558 | 30,2452 | 15330 0 | | HIDPHALP | SET 0-18D = 1 BACKWARDS |
| 16471 | | | | | 30,2453 | 77702 1 | | SR2 | PD 18 |
| 1648 | | | | | 30,2454 | 00005 1 | | STORE | R-3 |
| 1649 | | | | | 30,2455 | 00011 1 | | STORE | |
| 1650 | | | | | 30,2456 | 24015 0 | | STOVL | 12D |
| 1651 | REP | 7 | LAST | 592 | 30,2457 | 01235 1 | | UM | R-1 |
| 1652 | REP | 1 | | | 30,2460 | 24023 0 | | STOVL | S223X1 |
| 1653 | REP | 2 | LAST | 592 | 30,2461 | 02635 0 | | S22RL | B-29 |
| 1654 | | | | | 30,2462 | 77624 1 | | CALL | (UM)(RL T) R-30 STORED IN S22LMRL THRU |
| 1655 | REP | 1 | | | 30,2463 | 61303 0 | | S2231X13 | S22LMRL +17D |
| 1656 | | | | | 30,2464 | 66370 0 | | AKT,1 | SSP |
| 1657 | | | | | 30,2465 | 00022 1 | | DEC | 18 |
| 1658 | REP | 12 | LAST | 590 | 30,2466 | 00051 0 | | S1 | |
| 1659 | | | | | 30,2467 | 00006 1 | | DEC | 6 |
| 1660 | | | | | 30,2470 | 70573 1 | S22NXTU | VLOAD* | VSR2 |
| 1661 | REP | 1 | | | 30,2471 | 03524 1 | | S22LMRL | +18D,1 |
| 16611 | | | | | 30,2472 | 77741 0 | | V/SC | |
| 1662 | REP | 2 | LAST | 592 | 30,2473 | 00037 0 | | S22D | D R-29 |
| 1663 | | | | | 30,2474 | 45445 0 | | RVSU | STADR |
| 1664 | REP | 2 | LAST | 592 | 30,2475 | 70253 1 | | STORE | S22LMRL +18D,1 |
| 1665 | | | | | 30,2476 | 76100 1 | | TIX,1 | AKT,1 |
| 1666 | REP | 1 | | | 30,2477 | 60470 1 | | S22NXTU | PD 0 AFTER TIX |
| 1667 | | | | | 30,2500 | 00044 1 | | 36 | |
| 1668 | | | | | 30,2501 | 64373 1 | | VLOAD* | S1 STILL 6 FROM ABOVE |
| 1669 | REP | 20 | LAST | 591 | 30,2502 | 02445 0 | | W +36D,1 | R-19 |
| 1670 | REP | 3 | LAST | 592 | 30,2503 | 03502 0 | | S22LMRL | R-3 |
| 1671 | | | | | 30,2504 | 71136 1 | | | |
| 1672 | REP | 21 | LAST | 592 | 30,2505 | 06621 1 | | W +144D,1 | W(I+18)= (W(I) R-19 |
| 1673 | | | | | 30,2506 | 71300 1 | | DLOAD | |
| 1674 | REP | 1 | | | 30,2507 | 60501 0 | | S22NXTU | |

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| | | | | | |
|------|-----|----|----------|---------|---------|
| 1675 | REP | 1 | | 30,2510 | 00041 1 |
| 1677 | REP | 11 | LAST 592 | 30,2512 | 04343 1 |
| 1678 | | | | 30,2513 | 00514 1 |
| 1680 | REP | 8 | LAST 572 | 30,2515 | 00050 1 |
| 1681 | REP | 10 | LAST 593 | 30,2516 | 00047 1 |
| 1682 | | | | 30,2517 | 41316 0 |
| 1683 | REP | 1 | | 30,2520 | 21650 1 |
| 1684 | | | | 30,2521 | 77742 0 |
| 1685 | REP | 2 | LAST 593 | 30,2522 | 00041 1 |
| 1688 | | | | 30,2523 | 77770 1 |
| 1687 | | | | 30,2524 | 00022 1 |
| 1688 | | | | 30,2525 | 64373 1 |
| 1689 | REP | 4 | LAST 592 | 30,2526 | 03524 1 |
| 1690 | REP | 5 | LAST 593 | 30,2527 | 03502 0 |
| 1691 | | | | 30,2530 | 53761 1 |
| 1692 | REP | 3 | LAST 593 | 30,2531 | 00041 1 |
| 1693 | | | | 30,2532 | 57212 1 |
| 1694 | REP | 1 | | 30,2533 | 05301 0 |
| 1695 | | | | 30,2534 | 77300 1 |
| 1696 | REP | 1 | | 30,2535 | 00525 0 |
| 1697 | REP | 8 | LAST 592 | 30,2536 | 01235 1 |
| 1698 | REP | 2 | LAST 592 | 30,2537 | 34023 1 |
| 1699 | REP | 2 | LAST 592 | 30,2540 | 61303 0 |
| 1700 | | | | 30,2541 | 50545 0 |
| 1701 | REP | 2 | LAST 67 | 30,2542 | 02241 1 |
| 1702 | | | | 30,2543 | 63471 0 |
| 1703 | REP | 3 | LAST 592 | 30,2544 | 00037 0 |
| 1704 | | | | 30,2545 | 77605 1 |
| 1705 | REP | 1 | | 30,2546 | 02010 1 |
| 1706 | REP | 4 | LAST 593 | 30,2547 | 00041 1 |
| 1707 | | | | 30,2550 | 77770 1 |
| 1708 | | | | 30,2551 | 00022 1 |
| 1709 | | | | 30,2552 | 74373 0 |
| 1710 | REP | 6 | LAST 593 | 30,2553 | 03524 1 |
| 1711 | REP | 5 | LAST 593 | 30,2554 | 00041 1 |
| 1712 | | | | 30,2555 | 77653 1 |
| 1713 | REP | 2 | LAST 593 | 30,2556 | 01301 1 |
| 1714 | REP | 3 | LAST 593 | 30,2557 | 05301 0 |
| 1715 | | | | 30,2560 | 77775 1 |
| 1716 | REP | 14 | LAST 592 | 30,2561 | 15332 1 |
| 1717 | REP | 22 | LAST 592 | 30,2562 | 06843 0 |
| 1718 | | | | 30,2563 | 40100 1 |
| 1719 | REP | 1 | | 30,2564 | 80552 0 |
| 1720 | | | | 30,2565 | 80586 1 |
| 1721 | | | | 30,2566 | 50145 1 |
| 1722 | REP | 4 | LAST 593 | 30,2567 | 01277 1 |
| 1723 | REP | 1 | | 30,2570 | 80607 0 |
| 1724 | | | | 30,2571 | 53166 0 |

| | |
|---------------------|------------------------------------|
| S22RHO | B-28, B-30 |
| CMOONPLG | |
| +1 | |
| X2 | |
| X2 | |
| DSP | DMP |
| SCTVAR | B+18 |
| SR1 | ACCOUNTS FOR 1/2 IN NEXT FORMULA |
| STORE S22RHO | 1/2(RHO SO)(VARSCY) |
| AXT,1 | |
| DEC 18 | S1 STILL 6 FROM ABOVE |
| S22NOXA | |
| VLOAD* MXV | |
| S22MRL +18D,1 | B-3 |
| S22MRL | B-3 |
| VXSC | VSR* |
| S22RHO | |
| 0 -12D,2 | WITH VARRP SCALED B-28 |
| STORE S22AUT +18D,1 | 1/2(RHO SO)(VARSCY)(U)(U T) |
| TIK,1 | VLOAD |
| S22NOXA | |
| UM | |
| STCALL S223X1 | UM ALSO IN MPAC FOR S2231X13 SURR. |
| S2231X13 | (UM)(UM T) B-2 IN S22MRL,P17D |
| DLOAD SR3 | |
| BRADM | R0 B-29 |
| DDV | DSO |
| S22D | B-29 |
| DMP | |
| RPVAR | **** METERS SO |
| STORE S22RHO | TEMP (VARRP)(R0/D) |
| AXT,1 | |
| DEC 18 | S1 STILL 6 FROM ABOVE |
| S22NOXB | |
| VLOAD* VXSC | |
| S22MRL +18D,1 | (UM)(UM T) B-2 |
| S22RHO | |
| VAD* | |
| S22AUT +18D,1 | |
| STORE S22AUT +18D,1 | SMALL B MATRIX |
| VLOAD | |
| ZEROVCS | |
| STORE W +18D,1 | CLEAR W6 |
| TIK,1 | ROV |
| S22NOXB | |
| +1 | |
| DLOAD R-N | |
| S22AUT +18D | B5 |
| S22*76X | |
| SQRT | R2* |

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| | | | | | | | | | | |
|------|-----|----|------|-----|---------|---------|----------|--|--|--|
| 1725 | REP | 2 | LAST | 593 | 30,2572 | 60607 0 | | | | |
| 1726 | REP | 23 | LAST | 593 | 30,2573 | 16625 1 | | | | |
| 1727 | REP | 5 | LAST | 593 | 30,2574 | 01275 0 | | | | |
| 1728 | | | | | 30,2575 | 40071 0 | | | | |
| 1729 | REP | 24 | LAST | 594 | 30,2576 | 02625 1 | | | | |
| 1730 | REP | 1 | | | 30,2577 | 60601 0 | | | | |
| 1731 | REP | 25 | LAST | 594 | 30,2600 | 02623 1 | | | | |
| 1732 | | | | | 30,2601 | 56345 0 | S22W72X | | | |
| 1733 | REP | 8 | LAST | 594 | 30,2602 | 01273 0 | | | | |
| 1734 | REP | 26 | LAST | 594 | 30,2603 | 02625 1 | | | | |
| 1735 | | | | | 30,2604 | 77600 1 | | | | |
| 1736 | REP | 3 | LAST | 594 | 30,2605 | 60607 0 | | | | |
| 1737 | REP | 27 | LAST | 594 | 30,2606 | 02621 0 | | | | |
| 1738 | | | | | 30,2607 | 63545 0 | S22W76X | | | |
| 1739 | REP | 28 | LAST | 594 | 30,2610 | 02623 1 | | | | |
| 1740 | | | | | 30,2611 | 50021 1 | | | | |
| 1741 | REP | 7 | LAST | 594 | 30,2612 | 01267 0 | | | | |
| 1742 | REP | 1 | | | 30,2613 | 60627 1 | | | | |
| 1743 | | | | | 30,2614 | 53166 0 | | | | |
| 1744 | REP | 2 | LAST | 594 | 30,2615 | 60627 1 | | | | |
| 1745 | REP | 29 | LAST | 594 | 30,2616 | 16631 1 | | | | |
| 1746 | REP | 30 | LAST | 594 | 30,2617 | 02621 0 | | | | |
| 1747 | | | | | 30,2620 | 44205 0 | | | | |
| 1748 | REP | 31 | LAST | 594 | 30,2621 | 02623 1 | | | | |
| 1749 | REP | 6 | LAST | 594 | 30,2622 | 01265 1 | | | | |
| 1750 | | | | | 30,2623 | 40071 0 | | | | |
| 1751 | REP | 32 | LAST | 594 | 30,2624 | 02631 1 | | | | |
| 1752 | REP | 3 | LAST | 594 | 30,2625 | 60627 1 | | | | |
| 1753 | REP | 33 | LAST | 594 | 30,2626 | 02627 0 | | | | |
| 1754 | | | | | 30,2627 | 63545 0 | S22W78X | | | |
| 1755 | REP | 34 | LAST | 594 | 30,2630 | 02627 0 | | | | |
| 1756 | | | | | 30,2631 | 63525 0 | | | | |
| 1757 | REP | 35 | LAST | 594 | 30,2632 | 02621 0 | | | | |
| 1758 | | | | | 30,2633 | 77615 0 | | | | |
| 1759 | | | | | 30,2634 | 50021 1 | | | | |
| 1760 | REP | 9 | LAST | 594 | 30,2635 | 01257 0 | | | | |
| 1761 | REP | 1 | | | 30,2636 | 60641 1 | | | | |
| 1762 | | | | | 30,2637 | 77766 0 | | | | |
| 1763 | REP | 36 | LAST | 594 | 30,2640 | 02635 0 | | | | |
| 1764 | | | | | 30,2641 | 74575 0 | S22SCLW | | | |
| 1765 | REP | 37 | LAST | 594 | 30,2642 | 02621 0 | | | | |
| 1766 | REP | 38 | LAST | 594 | 30,2643 | 26621 0 | | | | |
| 1767 | REP | 39 | LAST | 594 | 30,2644 | 02627 0 | | | | |
| 1768 | | | | | 30,2645 | 77762 1 | | | | |
| 1769 | REP | 40 | LAST | 594 | 30,2646 | 26627 0 | | | | |
| 1770 | REP | 41 | LAST | 594 | 30,2647 | 02635 0 | | | | |
| 1771 | | | | | 30,2650 | 77762 1 | | | | |
| 1772 | REP | 42 | LAST | 594 | 30,2651 | 02635 0 | | | | |
| 1773 | | | | | 30,2652 | 77624 1 | S22SAVRT | | | |
| 1774 | REP | 2 | LAST | 591 | 30,2653 | 61322 0 | | | | |

S22W76X
 STODL W +148D
 S22AUT +14D
 DDV BOV
 W +148D
 S22W72X
 STORE W +148D
 DLOAD DDV
 S22AUT +12D
 W +148D
 BOV
 S22W76X
 STORE W +144D
 DLOAD DSQ
 W +148D
 BDSU RMN
 S22AUT +8D
 S22W78X
 SQRD RZB
 S22W78X
 STODL W +152D
 W +144D
 DMP BDSU
 W +148D
 S22AUT +8D
 DDV BOV
 W +152D
 S22W78X
 STORE W +150D
 DLOAD DSQ
 W +150D
 PDDL DSQ
 W +144D
 DAD
 BDSU RMN
 S22AUT
 S22SCLW
 SQRD
 STORE W +156D
 S22SCLW VLOAD VSR1
 W +144D
 STODL W +144D
 W +150D
 VSR1
 STODL W +150D
 W +156D
 VSR1
 STODL W +156D
 S22SAVRT CALL
 CRTTP

W74= SQ ROOT E5
 E4
 W73= E4/W74
 E3
 W72= E4/W74
 W73
 E2
 W76= SQ ROOT (E2-W73 SQ)
 W72
 W73
 E1
 W76
 W75= (E1-W72W73)/W76
 W72
 E0
 W78= SQ RT(E0-W72 SQ-W75 SQ)
 SCALE W8 METERS R-19

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| | | | | | | | | | | | |
|------|-----|-----|------|-----|---------|--------|------|----------|--------|------------|--|
| 1775 | REP | 2 | LAST | 123 | 30,2654 | 03672 | 1 | | STORE | S22TPRIM | SAVE PRESENT TIME FOR PIOS |
| 1776 | | | | | 30,2655 | 77776 | 1 | S22I=N | EXIT | | TEST I=N |
| 1777 | REP | 31 | LAST | 576 | 30,2656 | 0 | 5301 | 0 | TC | PHASCHNG | |
| 1778 | | | | | 30,2657 | 04022 | 0 | | OCT | 04022 | |
| 1779 | REP | 4 | LAST | 591 | 30,2660 | 4 | 1746 | 1 | CS | 8KK | |
| 1780 | REP | 4 | LAST | 557 | 30,2661 | 6 | 1747 | 1 | AD | 8NN | |
| 1781 | | | | | 30,2662 | 0 | 0006 | 1 | EXTEND | | |
| 1782 | REP | 1 | | | 30,2663 | 6 | 3126 | 1 | RZMP | S22P244X | EXIT TO FIGURE 2.4-4 |
| 1783 | REP | 5 | LAST | 595 | 30,2664 | 3 | 1746 | 0 | CA | 8KK | I=I+1 |
| 1784 | REP | 11 | LAST | 586 | 30,2665 | 8 | 4712 | 1 | AD | ONE | |
| 1785 | REP | 6 | LAST | 575 | 30,2666 | 55=300 | 1 | | TS | TEMPOR1 | ADD 7 TO LOC TO GET ADDR. OF NEXT MARK |
| 1786 | REP | 4 | LAST | 591 | 30,2667 | 3 | 1750 | 1 | CA | S22LOC | |
| 1787 | REP | 11 | LAST | 560 | 30,2670 | 6 | 4716 | 0 | AD | SEVEN | |
| 1788 | REP | 7 | LAST | 595 | 30,2671 | 55=301 | 0 | | TS | TEMPOR1 +1 | |
| 1789 | REP | 32 | LAST | 595 | 30,2672 | 0 | 5301 | 0 | TC | PHASCHNG | |
| 1790 | | | | | 30,2673 | 04022 | 0 | | OCT | 04022 | |
| 1791 | REP | 8 | LAST | 595 | 30,2674 | 3 | 1300 | 0 | CA | TEMPOR1 | |
| 1792 | REP | 6 | LAST | 595 | 30,2675 | 55=746 | 1 | | TS | 8KK | |
| 1793 | REP | 9 | LAST | 595 | 30,2676 | 3 | 1301 | 1 | CA | TEMPOR1 +1 | |
| 1794 | REP | 5 | LAST | 595 | 30,2677 | 55=750 | 0 | | TS | S22LOC | |
| 1795 | REP | 100 | LAST | 590 | 30,2700 | 0 | 6006 | 1 | TC | INTPRET | |
| 1796 | | | | | 30,2701 | 77624 | 1 | | CALL | | FOR ALL INTEGRATIONS OTHER THAN FIRST |
| 1797 | REP | 16 | LAST | 590 | 30,2702 | 27371 | 1 | S2INTS1 | CALL | INTSTALL | |
| 1798 | | | | | 30,2703 | 77624 | 1 | | CALL | | |
| 1799 | REP | 2 | LAST | 590 | 30,2704 | 61326 | 1 | | | S22PLGS | |
| 1800 | | | | | 30,2705 | 43014 | 0 | | RON | CLEAR | |
| 1801 | REP | 5 | LAST | 591 | 30,2706 | 02706 | 1 | | | DMENPLG | RETURN ALWAYS EXCEPT OFFSET POINT MARK |
| 1802 | REP | 1 | | | 30,2707 | 60361 | 0 | | | S22NXTIN | |
| 1803 | REP | 7 | LAST | 590 | 30,2710 | 01676 | 1 | | | DIM0FLAG | |
| 1804 | | | | | 30,2711 | 43014 | 0 | | BOFF | SET | |
| 1805 | REP | 6 | LAST | 591 | 30,2712 | 01751 | 0 | | | ORWFLAG | |
| 1806 | REP | 2 | LAST | 595 | 30,2713 | 60361 | 0 | | | S22NXTIN | OFFSET POINT MARK 1, NO W INTEGRATION |
| 1807 | REP | 8 | LAST | 595 | 30,2714 | 01476 | 0 | | | DIM0FLAG | |
| 1808 | | | | | 30,2715 | 77614 | 1 | | CLGO | | |
| 1809 | REP | 3 | LAST | 590 | 30,2716 | 01635 | 0 | | | D6OR9PLG | |
| 1810 | REP | 3 | LAST | 595 | 30,2717 | 60361 | 0 | | | S22NXTIN | OFFSET POINT MARK 1, INTEGRATE W 6X6 |
| 1811 | | | | | 30,2720 | 77624 | 1 | S22OFF=1 | CALL | | |
| 1812 | REP | 3 | LAST | 594 | 30,2721 | 61322 | 0 | | | GETIP | |
| 1813 | REP | 9 | LAST | 556 | 30,2722 | 27670 | 0 | | STOVL | S22TOFF | TIME SUB OFF |
| 1814 | REP | 9 | LAST | 593 | 30,2723 | 01235 | 1 | | | UM | |
| 1815 | REP | 1 | | | 30,2724 | 35215 | 1 | | STCALL | S22UOFF | U SUB OFF |
| 1816 | REP | 1 | | | 30,2725 | 60655 | 1 | | | S22I=N | TEST I=N |
| 1817 | | | | | 30,2726 | 77775 | 1 | S22D=9 | VLOAD | | D=9 PATH |
| 1818 | REP | 1 | | | 30,2727 | 01701 | 0 | | | X789 | |
| 1819 | | | | | 30,2730 | 14001 | 0 | | STOVL | 6D | CALL PIOS TWICE TO TRANSFORM RI. TO TIME |
| 1820 | REP | 3 | LAST | 595 | 30,2731 | 03672 | 1 | | | S22TPRIM | (SUB P) FROM TIME T PRIME |
| 1821 | | | | | 30,2732 | 00007 | 0 | | STORE | 6D | |
| 1822 | | | | | 30,2733 | 45135 | 1 | | SLOAD | CALL | |
| 1823 | REP | 3 | LAST | 590 | 30,2734 | 03674 | 1 | | | S22BORM | 0=EARTH, NON-ZERO=MOON |
| 1824 | REP | 1 | | | 30,2735 | 55366 | 1 | S2RTRP | | R-TO-RP | |



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| Line | REP | LAST | 595 | 30,2736 | 45000 0 | PUSH CALL | R-T0-RP LEAVES PUSHLOC AT 0 |
|------|---------|----------|-----|---------|---------|---------------------|--|
| 1825 | | | | 30,2737 | 61322 0 | GETIF | |
| 1826 | REP 4 | LAST 595 | | 30,2740 | 00007 0 | GD | |
| 1827 | | | | 30,2741 | 45135 1 | STORE CALL | |
| 1828 | | | | 30,2742 | 03874 1 | S22BORM | |
| 1829 | REP 4 | LAST 595 | | 30,2743 | 55341 1 | RP-T0-R | |
| 1830 | REP 2 | LAST 595 | | 30,2744 | 01701 0 | STORE X789 | |
| 1831 | REP 2 | LAST 595 | | 30,2745 | 40014 0 | SET ROV | |
| 1832 | | | | 30,2746 | 02464 0 | INCORPLO | FLAG=1 |
| 1833 | REP 7 | LAST 573 | | 30,2747 | 60750 0 | +1 | CLEAR OVERFLOW |
| 1834 | | | | 30,2750 | 77651 0 | VSI | |
| 1835 | | | | 30,2751 | 01207 0 | CS#POS | |
| 1836 | REP 6 | LAST 591 | | 30,2752 | 03531 0 | STORE RCLP | RCL=RL-RC |
| 1837 | REP 7 | LAST 573 | | 30,2753 | 47256 0 | UNIT VIV | USTAR=UNIT(UNIT(RCL))XUM |
| 1838 | | | | 30,2754 | 01235 1 | UM | |
| 1839 | REP 10 | LAST 595 | | 30,2755 | 40056 0 | UNIT ROV | |
| 1840 | | | | 30,2756 | 60652 0 | S22SAVET | COMPUTATION OVERFLOW, SAVE TP |
| 1841 | REP 1 | | | 30,2757 | 01245 0 | STORE USTAR | |
| 1842 | REP 5 | LAST 571 | | 30,2760 | 43014 0 | SET SET | |
| 1843 | | | | 30,2761 | 02466 1 | DMENPLO | =1 FOR 9X9 W |
| 1844 | REP 6 | LAST 595 | | 30,2762 | 00467 1 | VERUPPLO | =1 FOR CS4 |
| 1845 | REP 11 | LAST 578 | | 30,2763 | 43345 1 | DLOAD DAD | |
| 1846 | | | | 30,2764 | 21650 1 | SCTVAR | B+18 |
| 1847 | REP 2 | LAST 593 | | 30,2765 | 21652 0 | INVARR | R+18 |
| 1848 | REP 1 | | | 30,2766 | 27526 0 | VARIANCE | |
| 1849 | REP 8 | LAST 572 | | 30,2767 | 03531 0 | RCLP | R-29 OR R-27 |
| 1850 | REP 6 | LAST 596 | | 30,2770 | 60246 1 | ARVAL NORM | |
| 1851 | | | | 30,2771 | 00047 1 | X1 | |
| 1852 | REP 22 | LAST 584 | | 30,2772 | 41316 0 | DSO DMP | |
| 1853 | | | | 30,2773 | 03526 0 | VARIANCE | |
| 1854 | REP 9 | LAST 596 | | 30,2774 | 56070 0 | XAD,1 XAD,1 | |
| 1855 | | | | 30,2775 | 00046 0 | X1 | DOUBLE NORM SHIPT SINCE RCLP WAS SQUARED |
| 1856 | REP 23 | LAST 596 | | 30,2776 | 03873 0 | S22BORM | DOUBLE EARTH OR MOON SHIPT, SAME REASON |
| 1857 | REP 5 | LAST 596 | | 30,2777 | 53870 0 | XAD,1 SR# | |
| 1858 | | | | 30,3000 | 03873 0 | S22BORM | |
| 1859 | REP 6 | LAST 596 | | 30,3001 | 20601 1 | 0,1 | SCALE VARIANCE R-40 FOR BOTH EARTH, MOON |
| 1860 | | | | 30,3002 | 77751 1 | TLOAD | CHANGE MODE TO TRIPLE |
| 1861 | | | | 30,3003 | 00155 0 | MPAC | |
| 1862 | REP 258 | LAST 585 | | 30,3004 | 37528 1 | STCALL VARIANCE | CALC R0,R1,DELTAQ, NEW USTAR |
| 1863 | REP 10 | LAST 596 | | 30,3005 | 47047 1 | S2RVTRS RVECTORS | |
| 1864 | REP 2 | LAST 571 | | 30,3006 | 67575 1 | VLOAD VCOMP | |
| 1865 | | | | 30,3007 | 03502 0 | RVECTOR | |
| 1866 | REP 14 | LAST 574 | | 30,3010 | 37518 1 | STCALL RVECTOR +12D | R2=-Rn |
| 1867 | REP 25 | LAST 596 | | 30,3011 | 75250 1 | S2INUP1 INCORP1 | |
| 1868 | | | | 30,3012 | 77624 1 | CALL | |
| 1869 | REP 13 | LAST 591 | | 30,3013 | 56741 0 | ROFF | |
| 1870 | | | | 30,3014 | 43014 0 | 22DSPFLG | |
| 1871 | REP 2 | LAST 591 | | 30,3015 | 01342 0 | S22BORM42 | =1 DISPLAY DRIFT R,V =0 DO NOT |
| 1872 | REP 1 | | | 30,3016 | 61047 0 | 22DSPFLG | |
| 1873 | REP 3 | LAST 596 | | 30,3017 | 01262 0 | 22DSPFLG | |
| 1874 | | | | | | | |

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| | | | | | | | | |
|-------|-----|-----|------|---------|------------------|----------|------------|--|
| 18741 | | | | 30,3020 | 77624 1 | CALL | | |
| 18742 | REP | 14 | LAST | 596 | 30,3021 56741 0 | VLOAD | ORP2PC | |
| 1875 | | | | 30,3022 | 51575 1 | | ABVAL | |
| 1876 | REP | 7 | LAST | 572 | 30,3023 01257 0 | | DELTA R | |
| 1877 | | | | 30,3024 | 53750 0 | LXA,1 | SR* | |
| 1878 | REP | 7 | LAST | 596 | 30,3025 03673 0 | | S22BORM | SCALE DELTA R ALWAYS METERS B-29 |
| 1879 | | | | 30,3026 | 20801 1 | | 0,1 | |
| 1880 | REP | 9 | LAST | 575 | 30,3027 27502 0 | STOVL | N49DISP | |
| 1881 | REP | 8 | LAST | 597 | 30,3030 01265 1 | | DELTA V | |
| 1882 | | | | 30,3031 | 53646 0 | ABVAL | SR* | DELTA V=METERS/CSEC B-7 ALWAYS |
| 1883 | | | | 30,3032 | 20801 1 | | 0,1 | |
| 1884 | REP | 10 | LAST | 597 | 30,3033 03504 0 | STORE | N49DISP +2 | |
| 1885 | | | | 30,3034 | 77776 1 | EXIT | | |
| 1886 | REP | 1 | | | 30,3035 3 3655 1 | CAP | V08N49EE | |
| 1887 | REP | 142 | LAST | 590 | 30,3036 0 4555 0 | TC | BANKCALL | |
| 1888 | REP | 9 | LAST | 557 | 30,3037 20763 1 | CADR | GOFLASHR | |
| 1889 | REP | 26 | LAST | 551 | 30,3040 0 4106 1 | TC | GOTOPOOH | V34E TERMINATE |
| 1890 | | | | 30,3041 | 0 3046 0 | TC | +5 | INCORPORATE CHANGES |
| 1891 | REP | 1 | | | 30,3042 0 3230 0 | TC | S22EXEX | V32E RECYCLE |
| 1892 | REP | 20 | LAST | 584 | 30,3043 3 4710 0 | CAP | BIT3 | |
| 1893 | REP | 11 | LAST | 561 | 30,3044 0 5415 1 | TC | BLANKET | |
| 1894 | REP | 76 | LAST | 575 | 30,3045 0 5112 0 | TC | ENDOPJCR | |
| 1895 | REP | 101 | LAST | 595 | 30,3046 0 6006 1 | TC | INTPRET | |
| 1896 | | | | 30,3047 | 77624 1 | S22ROK42 | CALL | |
| 1897 | REP | 2 | LAST | 573 | 30,3050 75462 0 | | INCRP2 | |
| 1898 | | | | 30,3051 | 77624 1 | CALL | | CSMPOS=RC B-29 OR B-27 |
| 1899 | REP | 2 | LAST | 591 | 30,3052 61273 0 | | S22CALRC | |
| 1902 | | | | 30,3053 | 77414 0 | DMPINCP2 | ROFF | |
| 1903 | REP | 8 | LAST | 596 | 30,3054 02744 1 | | EXIT | |
| 1904 | REP | 2 | LAST | 596 | 30,3055 60652 0 | | INCRPLG | |
| 1905 | REP | 33 | LAST | 595 | 30,3056 0 5301 0 | | S22SAVET | SAVE TP AND TEST I=N |
| 1906 | | | | 30,3057 | 04022 0 | TC | PHASCHNG | |
| 1907 | REP | 102 | LAST | 597 | 30,3060 0 6006 1 | OCT | 04022 | |
| 1908 | | | | 30,3061 | 77214 0 | TC | INTPRET | |
| 1909 | REP | 9 | LAST | 597 | 30,3062 02664 1 | CLEAR | VLOAD | FLAG=0 |
| 1910 | REP | 3 | LAST | 596 | 30,3063 01701 0 | | INCRPLG | |
| 1911 | | | | 30,3064 | 77651 0 | | X789 | |
| 1912 | REP | 7 | LAST | 596 | 30,3065 01207 0 | VSI | | |
| 1913 | REP | 9 | LAST | 596 | 30,3066 37531 1 | STCALL | CSMPOS | |
| 1914 | REP | 1 | | | 30,3067 60760 0 | | RCLP | RCL=RL-RC |
| 1915 | | | | 30,3070 | 66370 0 | S22ROK22 | AXT,1 | CLEAR W6,WT,W8 . (27 ELEMENTS 54 RQGS) |
| 1916 | | | | 30,3071 | 00066 1 | | SSP | |
| 1917 | REP | 13 | LAST | 592 | 30,3072 00051 0 | | DEC | 54 |
| 1918 | | | | 30,3073 | 00006 1 | | 51 | |
| 1919 | | | | 30,3074 | 77775 1 | | 6 | |
| 1920 | REP | 15 | LAST | 593 | 30,3075 15332 1 | | VLOAD | |
| 1921 | REP | 43 | LAST | 594 | 30,3076 06643 0 | CLRW678 | STORE | ZERO/ECS |
| 1922 | | | | 30,3077 | 67300 0 | | W +162D,1 | |
| 1923 | REP | 1 | | | 30,3100 61076 1 | | SLOAD | |
| 1924 | REP | 1 | | | 30,3101 02007 1 | | CLRW678 | |
| | | | | | | | S22WSURI | |



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| | | | | | | | | | |
|------|-----|-----|------|-----|---------|----------|----------|----------|---------------------------------------|
| 1926 | REP | 44 | LAST | 597 | 30,3102 | 02621 0 | STORE | W +144D | |
| 1927 | REP | 45 | LAST | 598 | 30,3103 | 02631 1 | STORE | W +152D | |
| 1928 | REP | 46 | LAST | 598 | 30,3104 | 02641 0 | STORE | W +160D | |
| 1929 | | | | | 30,3105 | 43014 0 | CLEAR | BOFF | |
| 1930 | REP | 7 | LAST | 592 | 30,3106 | 01663 0 | | LUNAPLAG | SET LUNAPLAG, TIME FOR LALOTORV |
| 1931 | REP | 12 | LAST | 593 | 30,3107 | 04343 1 | | CMOONFLO | BRADFLAG,LAT, LONG,ALT SET PREVIOUSLY |
| 1932 | REP | 1 | | | 30,3110 | 61113 0 | | S22PX22A | CHECK SCALING OF ITEMS,ALT INPUT AND |
| 1933 | | | | | 30,3111 | 77614 1 | SET | | RL OUTPUT IN ALPHAV BOTH B-29 |
| 1934 | REP | 6 | LAST | 598 | 30,3112 | 01463 1 | | LUNAPLAG | |
| 1935 | | | | | 30,3113 | 77624 1 | S22PX22A | CALL | |
| 1936 | REP | 5 | LAST | 598 | 30,3114 | 61322 0 | | GETTF | |
| 1937 | | | | | 30,3115 | 77624 1 | CALL | | COMPUTE RL |
| 1938 | REP | 2 | LAST | 528 | 30,3116 | 26373 1 | | LALOTORV | |
| 1939 | | | | | 30,3117 | 43178 0 | VLOAD | BOFF | |
| 1940 | REP | 5 | LAST | 591 | 30,3120 | 02152 0 | | ALPHAV | RL B-29 |
| 1941 | REP | 13 | LAST | 598 | 30,3121 | 04343 1 | | CMOONFLO | |
| 1942 | REP | 1 | | | 30,3122 | 61124 1 | | S22PX22B | |
| 1943 | | | | | 30,3123 | 77752 1 | VSL-2 | | SCALE RL B-27 FOR MOON |
| 1944 | | | | | 30,3124 | 77650 1 | S22PX22B | GOTO | |
| 1945 | REP | 1 | | | 30,3125 | 60744 0 | | S22PX32 | |
| 1946 | REP | 103 | LAST | 597 | 30,3126 | 0 6006 1 | S22P244X | TC | INTPRST |
| 1947 | | | | | 30,3127 | 46135 1 | S22P244 | SLOAD | PHIZ |
| 1948 | REP | 4 | LAST | 591 | 30,3130 | 02746 0 | | OXOFF | FIG 2.4-4 TEST OFF=0 |
| 1949 | REP | 1 | | | 30,3131 | 61160 1 | | S22PX44 | |
| 1950 | | | | | 30,3132 | 77776 1 | EXIT | | |
| 1951 | REP | 34 | LAST | 597 | 30,3133 | 0 5301 0 | TC | PHASCHNO | |
| 1952 | | | | | 30,3134 | 04022 0 | OCT | 04022 | |
| 1953 | REP | 104 | LAST | 598 | 30,3135 | 0 6006 1 | TC | INTPRST | |
| 1954 | | | | | 30,3136 | 77745 1 | DLOAD | | |
| 1955 | REP | 10 | LAST | 595 | 30,3137 | 03870 0 | | S22TOFF | CALC RC AT OFFSET TIME |
| 1956 | REP | 31 | LAST | 591 | 30,3140 | 34041 0 | STCALL | TDEC1 | |
| 1957 | REP | 4 | LAST | 523 | 30,3141 | 27022 1 | | CSMPREC | |
| 1958 | | | | | 30,3142 | 77775 1 | VLOAD | | |
| 1959 | REP | 5 | LAST | 503 | 30,3143 | 00017 1 | | RATT1 | NO METERS B-29 OR B-27 |
| 1960 | REP | 8 | LAST | 597 | 30,3144 | 25207 0 | STOVL | CSMPOS | |
| 1961 | REP | 2 | LAST | 595 | 30,3145 | 01215 0 | | S22UOFF | U=UOFF |
| 1962 | REP | 11 | LAST | 596 | 30,3146 | 25235 1 | STOVL | UM | |
| 1963 | REP | 4 | LAST | 597 | 30,3147 | 01701 0 | | X789 | |
| 1964 | | | | | 30,3150 | 43046 1 | APVAL | BOFF | |
| 1965 | REP | 14 | LAST | 598 | 30,3151 | 04343 1 | | CMOONFLO | |
| 1966 | | | | | 30,3152 | 61154 0 | | +2 | |
| 1967 | | | | | 30,3153 | 77702 1 | SR2 | | SCALE MOON R0 B-28 FOR S22P2410 SUBR |
| 1968 | REP | 3 | LAST | 593 | 30,3154 | 36241 0 | STCALL | BRADM | |
| 1969 | REP | 2 | LAST | 592 | 30,3155 | 61240 0 | | S22P2410 | |
| 1970 | | | | | 30,3156 | 77650 1 | GOTO | | |
| 1971 | REP | 1 | | | 30,3157 | 61163 1 | | S22PX44A | |
| 1972 | | | | | 30,3160 | 77624 1 | S22PX44 | CALL | |
| 1973 | REP | 6 | LAST | 598 | 30,3161 | 61322 0 | | GETTF | |
| 1974 | REP | 11 | LAST | 598 | 30,3162 | 03870 0 | | S22TOFF | PRESENT TIME FOR LAT-LONG SETUP |
| 1975 | | | | | 30,3163 | 77214 0 | S22PX44A | CLEAR | VLOAD |



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| | | | | | | | | | |
|-------|-----|-----|------|-----|---------|----------|----------|-------|----------|
| 1976 | REP | 9 | LAST | 598 | 30,3164 | 01663 0 | | | LUNAFLAG |
| 1977 | REP | 5 | LAST | 598 | 30,3165 | 01701 0 | | | X789 |
| 1978 | | | | | 30,3166 | 43014 0 | | BOFF | SET |
| 1979 | REP | 15 | LAST | 598 | 30,3167 | 04343 1 | | | CHCKNPLG |
| 1980 | REP | 1 | | | 30,3170 | 61173 0 | | | S22PX44B |
| 1981 | REP | 10 | LAST | 599 | 30,3171 | 01463 1 | | | LUNAFLAG |
| 1982 | | | | | 30,3172 | 77742 0 | | VSR2 | |
| 1983 | REP | 6 | LAST | 598 | 30,3173 | 18152 0 | S22PX44B | STOVL | ALPHAV |
| 1984 | REP | 12 | LAST | 598 | 30,3174 | 03670 0 | | | S22TOPP |
| 1985 | | | | | 30,3175 | 77624 1 | | CALL | |
| 1986 | REP | 3 | LAST | 598 | 30,3176 | 26322 0 | | | LAT-LONG |
| 1989 | | | | | 30,3177 | 77624 1 | | CALL | |
| 1990 | REP | 1 | | | 30,3200 | 61336 0 | | | LLASRD |
| 1991 | | | | | 30,3201 | 77776 1 | | EXIT | |
| 1992 | REP | 2 | LAST | 598 | 30,3202 | 3 3656 1 | | CAF | V08N89B |
| 1993 | REP | 143 | LAST | 597 | 30,3203 | 0 4555 0 | | TC | BANKCALL |
| 1994 | REP | 19 | LAST | 598 | 30,3204 | 20824 0 | | CADR | GOFLASH |
| 1995 | REP | 1 | | | 30,3205 | 0 3233 0 | | TC | S22GTP |
| 1996 | | | | | 30,3206 | 0 3210 1 | | TC | +2 |
| 1997 | REP | 1 | | | 30,3207 | 0 3224 0 | | TC | S22.981X |
| 1998 | REP | 105 | LAST | 598 | 30,3210 | 0 6006 1 | | TC | INTPRET |
| 1999 | | | | | 30,3211 | 70740 0 | | LXC,1 | DLOAD* |
| 2000 | REP | 6 | LAST | 595 | 30,3212 | 02750 1 | | | S22LOC |
| 2001 | | | | | 30,3213 | 00001 0 | | | 0,1 |
| 2002 | | | | | 30,3214 | 24007 0 | | STOVL | 6D |
| 2003 | REP | 6 | LAST | 599 | 30,3215 | 01701 0 | | | X789 |
| 2004 | | | | | 30,3216 | 00001 0 | | STORE | 6D |
| 2005 | | | | | 30,3217 | 45135 1 | | SLOAD | CALL |
| 2006 | REP | 6 | LAST | 592 | 30,3220 | 15330 0 | | | HIDPHALP |
| 2007 | REP | 2 | LAST | 595 | 30,3221 | 55366 1 | | | R-TO-RP |
| 2008 | REP | 6 | LAST | 598 | 30,3222 | 02026 1 | | | RLS |
| 2009 | | | | | 30,3223 | 77776 1 | | STORE | |
| 2010 | REP | 106 | LAST | 599 | 30,3224 | 0 6006 1 | S22.981X | TC | INTPRET |
| 2011 | | | | | 30,3225 | 77624 1 | | CALL | |
| 2012 | REP | 1 | | | 30,3226 | 61354 1 | | | 9DWT06DW |
| 20121 | | | | | 30,3227 | 77776 1 | | EXIT | |
| 20122 | REP | 107 | LAST | 599 | 30,3230 | 0 6006 1 | S22PXEX | TC | INTPRET |
| 2013 | | | | | 30,3231 | 77650 1 | | GOTO | |
| 2014 | REP | 3 | LAST | 598 | 30,3232 | 03703 0 | | | S22RTNEX |
| 20141 | REP | 108 | LAST | 599 | 30,3233 | 0 6006 1 | S22GTP | TC | INTPRET |
| 20142 | | | | | 30,3234 | 77624 1 | | CALL | |
| 20143 | REP | 2 | LAST | 599 | 30,3235 | 61354 1 | | | 9DWT06DW |
| 20144 | | | | | 30,3236 | 77776 1 | | EXIT | |
| 20145 | REP | 27 | LAST | 597 | 30,3237 | 0 4108 1 | | TC | GOTOPOCH |
| 2015 | | | | | 30,3240 | 77201 1 | S22P2410 | SETPD | VLOAD |
| 2016 | | | | | 30,3241 | 00001 0 | | | 6D |
| 2017 | REP | 9 | LAST | 598 | 30,3242 | 01207 0 | | | CSMPOS |
| 2018 | | | | | 30,3243 | 50256 0 | | UNIT | DOT |
| 2019 | REP | 12 | LAST | 598 | 30,3244 | 01235 1 | | | LN |

SET = 1 FOR LAT-LONG
SCALE RL MOON B-29 FOR LAT-LONG
RL SCALED B-29 FOR LAT-LONG
EITHER PRESENT OR OFFSET TIME

*** ALT OUTPUT ALWAYS B-29
DISPLAY LAT/LONG/ALT

V34E TERMINATE
PROCEED SAVE LANDING SITE COORD
RECYCLE POINT A IN GSOP

6-7D= LANDING SITE TIME FOR R-TO-RP

0-6D= LANDING SITE VEC FOR R-TO-RP

ANY NON-ZERO FOR MOON
CONVERT RLS TO MOON-FIXED COORD
LANDING SITE VECTOR

GO TO POINT A IN CHAPTER 5
WITHOUT CONVERTING W

CONVERT W REPORT TC GOTOPOCH

COMPUTE FORMULA 2.4.10

RC R-29 EARTH, R-27 MOON
UNIT ALSO SRTS 36D=ARVAL(RC) USRD RPL0W

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| | | | | | | | |
|------|-----|----|---------|---------|----------|----------------|---|
| 2020 | | | 30,3245 | 57552 1 | SL-1 | DCOMP | OSOP CHANGE 8/18/67 |
| 2021 | | | 30,3246 | 77606 1 | PUSH | | FD 2D 0D=COSA-(LM,RC)/ABVAL(RC) B-1 |
| 2022 | | | 30,3247 | 44316 0 | DSO | EDSU | |
| 2023 | REP | 1 | 30,3250 | 21654 0 | | DEC1B2 | |
| 2024 | | | 30,3251 | 43125 0 | FDL | SOFP | FD 4D 2D=1-COSA 3D=SINA SO B-2 |
| 2025 | REP | 4 | 30,3252 | 02241 1 | | ENADM | RD ALWAYS B-29 FROM SETS |
| 2026 | REP | 16 | 30,3253 | 04343 1 | | CHONPLD | |
| 2027 | | | 30,3254 | 81256 1 | | +2 | |
| 2028 | | | 30,3255 | 77712 0 | SL-2 | | SCALE RD B-27 FOR MOON |
| 2029 | | | 30,3256 | 56362 0 | SR1R | DDV | (RD/RC) B-1 |
| 2030 | | | 30,3257 | 00045 0 | | 36D | |
| 2031 | | | 30,3260 | 45316 1 | DSO | DSU | FD 2D (RD/RC) SO - SINA SO B-2 |
| 2032 | | | 30,3261 | 44366 1 | SOFT | EDSU | FD 0D COSA-SOFT(RD/RC)SO-SINA SO) B-1 |
| 2033 | | | 30,3262 | 77605 1 | DMP | | DMP RESULT B-29 MOON, B-30 EARTH |
| 2034 | | | 30,3263 | 00045 0 | | 36D | VXSC RESULT B-29 MOON, B-31 EARTH |
| 2035 | REP | 6 | 30,3264 | 00041 1 | STORE | S22RHO | RHO FOR W INIT. OF UNKNOWN LMK B-28, B-30 |
| 2036 | | | 30,3265 | 77761 1 | VXSC | | |
| 2037 | REP | 13 | 30,3266 | 01235 1 | | LM | |
| 2038 | | | 30,3267 | 53352 0 | VSL-2 | VAD | SCALE B-27 MOON, B-29 EARTH AND ADD RC |
| 2039 | REP | 10 | 30,3270 | 01207 0 | | CSMPOS | |
| 2040 | REP | 7 | 30,3271 | 01701 0 | STORE | X789 | |
| 2041 | | | 30,3272 | 77616 0 | RVD | | B-27 FOR EARTH OR B-29 FOR MOON |
| 2042 | | | 30,3273 | 77350 1 | S22CALRC | LXA,1 | COMPUTE RC B-29 OR B-27 |
| 2043 | REP | 8 | 30,3274 | 03673 0 | | VLOAD | =8 FOR EARTH, -2 FOR MOON |
| 2044 | REP | 2 | 30,3275 | 01573 1 | | S22BORN | |
| 2045 | | | 30,3276 | 53257 1 | VSR* | DEL.DACSM | |
| 2046 | | | 30,3277 | 20610 1 | | VAD | |
| 2047 | REP | 2 | 30,3300 | 01607 1 | | T,1 | |
| 2048 | REP | 11 | 30,3301 | 01207 0 | STORE | RCVCSM | |
| 2049 | | | 30,3302 | 77616 0 | RVD | CSMPOS | |
| 2050 | REP | 1 | 30,3303 | 00031 0 | S2231X13 | STORE | S221X3 |
| 2051 | | | 30,3304 | 77131 1 | SSP | AKT,2 | MULT 3X1 BY 1X3, STORE RESULTING 3X3 IN |
| 2052 | REP | 7 | 30,3305 | 00052 0 | | S2 | S221X3L- S221X3L +17D |
| 2053 | | | 30,3306 | 00002 0 | DEC | 2 | |
| 2054 | | | 30,3307 | 00006 1 | DEC | 6 | |
| 2055 | | | 30,3310 | 77770 1 | AKT,1 | | |
| 2056 | | | 30,3311 | 00022 1 | DEC | 18 | |
| 2057 | | | 30,3312 | 73775 0 | S2231NXT | VLOAD | VXSC* |
| 2058 | REP | 2 | 30,3313 | 00031 0 | | S221X3 | |
| 2059 | REP | 3 | 30,3314 | 77746 1 | | S223X1 +6,2 | |
| 2060 | REP | 7 | 30,3315 | 07524 0 | STORE | S221X3L +18D,1 | |
| 2061 | | | 30,3316 | 81110 0 | INCR,1 | TRX,2 | |
| 2062 | | | 30,3317 | 77771 0 | DEC | -6 | |
| 2063 | REP | 1 | 30,3320 | 81312 0 | | S2231NXT | |
| 2064 | | | 30,3321 | 77616 0 | RVD | | |
| 2065 | | | 30,3322 | 70740 0 | GRTPP | LXC,1 | SET MPAC= TP |
| 2066 | REP | 7 | 30,3323 | 02750 1 | | DLOAD* | |
| 2067 | | | 30,3324 | 00001 0 | | S221CC | |
| 2068 | | | 30,3325 | 77616 0 | RVD | 0,1 | |

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| | | | | | | | | | | |
|-------|-----|----|------|-----|---------|---------|----------------|-----------|-----------------------|--|
| 2110 | REP | 2 | LAST | 601 | 30,3401 | 00013 0 | | gDWI | | |
| 2111 | REP | 1 | | | 30,3402 | 01411 1 | | gDWTESTJ | | |
| 2110 | | | | | 30,3403 | 77625 0 | DSU | | I=I-1 | |
| 2119 | REP | 2 | LAST | 557 | 30,3404 | 21646 0 | | gDWID | | |
| 2120 | REP | 3 | LAST | 602 | 30,3405 | 00013 0 | STORE | gDWI | | |
| 2121 | | | | | 30,3406 | 46025 1 | DSU | RHIZ | TEST I=26 | |
| 2122 | REP | 1 | | | 30,3407 | 21644 1 | | gDW26D | | |
| 8123 | REP | 1 | | | 30,3410 | 01413 0 | | gDWSBTI2 | | |
| 2194 | | | | | 30,3411 | 77650 1 | GOTO | | NEXT E SUB P | |
| at25 | REP | 1 | | | 30,3412 | 61370 1 | | gDWEPCAL | | |
| 2126 | | | | | 30,3413 | 52131 0 | gDWSBTI2 SSP | GOTO | I=2 | |
| 2127 | REP | 4 | LAST | 002 | 30,3414 | 90913 0 | | gDWI | | |
| 2124 | | | | | 30,3415 | 00004 0 | DEC | 4 | | |
| 2129 | REP | 2 | LAST | 602 | 30,3416 | 61370 1 | | gDWEPCAL | | |
| 2130 | | | | | 30,3417 | 46135 1 | gDWTESTJ SLOAD | RHIZ | TEST J=0 | |
| 2131 | REP | 3 | LAST | 601 | 30,3420 | 00017 1 | | gDWJ | | |
| 2132 | REP | 1 | | | 30,3421 | 61436 1 | | gDWPIC6 | | |
| 2133 | | | | | 30,3422 | 77625 0 | DSU | | | |
| 2134 | REP | 3 | LAST | 602 | 30,3423 | 21646 0 | | gDWID | | |
| 2135 | REP | 4 | LAST | 602 | 30,3424 | 00017 1 | STORE | gDWJ | J=J-1 | |
| 2136 | | | | | 30,3425 | 46025 1 | DSU | RHIZ | TEST J=26 | |
| 2137 | REP | 2 | LAST | 602 | 30,3426 | 21644 1 | | gDW26D | | |
| at38 | REP | 1 | | | 30,3427 | 61432 0 | | gDWSBTJ2 | | |
| 2139 | | | | | 30,3430 | 77650 1 | GOTO | | | |
| 9140 | REP | 1 | | | 30,3431 | 61365 0 | | gDWI=J | | |
| 2141 | | | | | 30,3432 | 52131 0 | gDWSBTJ2 SSP | GOTO | SET J=2 | |
| 2142 | REP | 5 | LAST | 602 | 30,3433 | 00017 1 | | gDWJ | | |
| 2143 | | | | | 30,3434 | 00004 0 | DEC | 4 | | |
| 8144 | REP | 2 | LAST | 602 | 30,3435 | 01385 0 | | gDWI=J | | |
| 2145 | | | | | 30,3436 | 77624 1 | gDWPIC6 CALL | | | |
| 81451 | REP | 15 | LAST | 597 | 30,3437 | 56741 0 | | GRP2PC | | |
| 21459 | | | | | 30,3440 | 77331 0 | SSP | VLOAD | START OF FIGURE 2.4-6 | |
| 2146 | REP | 6 | LAST | 602 | 30,3441 | 00017 1 | | gDWJ | J=29 | |
| 2147 | | | | | 30,3442 | 00072 1 | DEC | 58 | | |
| 2148 | REP | 5 | LAST | 601 | 30,3443 | 15332 1 | | HIGZEROS | | |
| 2149 | REP | 3 | LAST | 601 | 30,3444 | 00011 1 | STORE | gDWP | P,N,I=0 | |
| 2150 | | | | | 30,3445 | 66370 0 | AXT,1 | SSP | | |
| 2151 | | | | | 30,3446 | 00154 1 | DEC | 108 | CLEAR WO TO W54 | |
| 2152 | REP | 14 | LAST | 597 | 30,3447 | 90051 0 | | S1 | | |
| 2153 | | | | | 30,3450 | 00006 1 | | 6 | | |
| 2154 | REP | 47 | LAST | 598 | 30,3451 | 06555 1 | CLEARW54 STORE | W +108D,1 | | |
| 2155 | | | | | 30,3452 | 77700 0 | TIX,1 | | | |
| 2156 | REP | 1 | | | 30,3453 | 61451 0 | | CLEARW54 | | |
| 2157 | | | | | 30,3454 | 66150 0 | gDWI=JA LXA,1 | SXA,1 | I=J | |
| 2158 | REP | 7 | LAST | 602 | 30,3455 | 00016 0 | | gDWJ | | |
| 9150 | REP | 5 | LAST | 602 | 30,3456 | 00012 1 | | gDWI | | |
| 2160 | | | | | 30,3457 | 77624 1 | CALL | | | |
| 2161 | REP | 2 | LAST | 601 | 30,3460 | 61606 0 | | ROWDOT | | |
| 2162 | | | | | 30,3461 | 43150 1 | LXA,1 | RDSL* | | |
| 2163 | REP | 4 | LAST | 602 | 30,3462 | 00010 0 | | gDWP | | |

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| | | | | | | | | | | | |
|-------|-----|----|------|-----|---------|---------|----------|--------|-----------|--------------------------------------|--|
| 2214 | REP | 49 | LAST | 603 | 30,3545 | 06401 1 | gDWSBTK | STORE | W,1 | | |
| 2215 | | | | | 30,3546 | 77650 1 | | GOTO | | | |
| 2216 | REP | 1 | | | 30,3547 | 61505 0 | | | TST2I=0 | | |
| 2217 | | | | | 30,3550 | 62150 1 | gDWN=N+3 | LXA,1 | INCR,1 | N=N+3 | |
| 2218 | REP | 3 | LAST | 603 | 30,3551 | 00014 1 | | | gDWN | | |
| 2219 | | | | | 30,3552 | 00006 1 | | | 6 | | |
| 2220 | | | | | 30,3553 | 67330 0 | | SXA,1 | SLOAD | J=J-1 | |
| 2221 | REP | 4 | LAST | 604 | 30,3554 | 00014 1 | | | gDWN | | |
| 2222 | REP | 9 | LAST | 603 | 30,3555 | 00017 1 | | | gDWJ | | |
| 2223 | | | | | 30,3556 | 77626 0 | | DSU | | | |
| 2224 | REP | 5 | LAST | 603 | 30,3557 | 21646 0 | | | gDWID | | |
| 2225 | REP | 10 | LAST | 604 | 30,3560 | 00017 1 | | STORE | gDWJ | | |
| 2226 | | | | | 30,3561 | 46025 1 | | DSU | BHIZ | TEST J=26 | |
| 2227 | REP | 4 | LAST | 603 | 30,3562 | 21644 1 | | | gDW2gD | | |
| 2228 | REP | 1 | | | 30,3563 | 61666 0 | | | SETJ=2A | | |
| 2229 | | | | | 30,3564 | 77650 1 | | GOTO | | | |
| 2230 | REP | 1 | | | 30,3565 | 61454 0 | | | gDWI=JA | | |
| 2231 | | | | | 30,3566 | 52131 0 | SETJ=2A | SSP | GOTO | J=2 | |
| 2232 | REP | 11 | LAST | 604 | 30,3567 | 00017 1 | | | gDWJ | | |
| 2233 | | | | | 30,3570 | 00004 0 | | | 4 | | |
| 2234 | REP | 2 | LAST | 604 | 30,3571 | 61454 0 | | | gDWI=JA | | |
| 2235 | | | | | 30,3572 | 77624 1 | gDWBXITX | CALL | | | |
| 22351 | REP | 16 | LAST | 602 | 30,3573 | 56741 0 | | | GRP2PC | | |
| 22352 | | | | | 30,3574 | 66370 0 | | AXT,1 | SSP | CLEAR W6,W7,W8 USED TEMP FOR EMATRIX | |
| 2236 | | | | | 30,3575 | 00066 1 | | DEC | S4 | | |
| 2237 | REP | 15 | LAST | 602 | 30,3576 | 00051 0 | | | S1 | | |
| 2238 | | | | | 30,3577 | 00006 1 | | | 6 | | |
| 2239 | | | | | 30,3600 | 77775 1 | | VLOAD | | | |
| 2240 | REP | 8 | LAST | 603 | 30,3601 | 15332 1 | | | H16ZEROS | | |
| 2241 | REP | 50 | LAST | 604 | 30,3602 | 06643 0 | gDWBXXXA | STORE | W +162D,1 | | |
| 2242 | | | | | 30,3603 | 52100 1 | | TIX,1 | GOTO | | |
| 2243 | REP | 1 | | | 30,3604 | 61602 1 | | | gDWBXXXA | | |
| 2244 | REP | 2 | LAST | 601 | 30,3605 | 01214 1 | | | gDWBXX | | |
| 2245 | | | | | 30,3606 | 40131 0 | ROWDOT | SSP | ROV | | |
| 2246 | REP | 1 | | | 30,3607 | 00007 0 | | | XTMP1 | | |
| 2247 | | | | | 30,3610 | 00377 1 | | OCT | 377 | | |
| 2248 | | | | | 30,3611 | 61612 0 | | | +1 | | |
| 2249 | | | | | 30,3612 | 71140 1 | | LXC,1 | LXC,2 | | |
| 2250 | REP | 11 | LAST | 603 | 30,3613 | 00012 1 | | | gDWI | | |
| 2251 | REP | 12 | LAST | 604 | 30,3614 | 00016 0 | | | gDWJ | | |
| 2252 | | | | | 30,3615 | 41545 0 | | DLOAD | PUSH | | |
| 2253 | REP | 9 | LAST | 604 | 30,3616 | 15332 1 | | | H16ZEROS | | |
| 2254 | | | | | 30,3617 | 56743 1 | ROWDOT1 | DLOAD* | DMPR* | | |
| 2255 | REP | 51 | LAST | 604 | 30,3620 | 02401 0 | | | W,1 | | |
| 2256 | REP | 52 | LAST | 604 | 30,3621 | 75378 1 | | | W,2 | | |
| 2257 | | | | | 30,3622 | 41415 1 | | DAD | PUSH | | |
| 2258 | | | | | 30,3623 | 62000 0 | | ROV | INCR,1 | | |
| 2259 | REP | 1 | | | 30,3624 | 61640 1 | | | ROWDOT3 | | |
| 2260 | | | | | 30,3625 | 77771 0 | | DEC | -8 | | |
| 2261 | | | | | 30,3626 | 67314 0 | | INCR,2 | SLOAD | | |



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| | | | | | | | | |
|------|--------|----------|---------|---------|----------|---------|---------------|----|
| 2262 | | | 30,3627 | 77771 0 | DEC | -6 | | |
| 2263 | REP 2 | LAST 604 | 30,3630 | 00007 0 | | XTMP1 | | |
| 2264 | | | 30,3631 | 70430 1 | RHIZ | SR1 | | |
| 2265 | REP 1 | | 30,3632 | 61636 0 | | RORDOT2 | | |
| 2266 | REP 3 | LAST 605 | 30,3633 | 00007 0 | STORE | XTMP1 | | |
| 2267 | | | 30,3634 | 77650 1 | GOTO | | | |
| 2268 | REP 1 | | 30,3635 | 61617 0 | | RORDOT1 | | |
| 2269 | | | 30,3636 | 77745 1 | RORDOT2 | DLOAD | | |
| 2270 | | | 30,3637 | 77616 0 | | RVO | | |
| 2271 | | | 30,3640 | 77614 1 | RORDOT3 | CLROO | | |
| 2272 | REP 7 | LAST 595 | 30,3641 | 01431 1 | | ORFLAG | | |
| 2273 | REP 2 | LAST 605 | 30,3642 | 61636 0 | | RORDOT2 | | |
| 2274 | | | 0000 | | WORKW | = | 6D | |
| 2275 | | | 0006 | | XTMP1 | = | 6D | |
| 2276 | | | 0010 | | 9DWP | = | 6D | P |
| 2277 | | | 0012 | | 9DWI | = | 10D | I |
| 2278 | | | 0014 | | 9DWN | = | 12D | N |
| 2279 | | | 0016 | | 9DWJ | = | 14D | J |
| 2280 | REP 3 | LAST 598 | 1214 | | 9DWX | = | S22UOFF | |
| 2281 | REP 16 | LAST 598 | E7,1501 | | S22UMRL | = | EVECTOR | 18 |
| 2282 | REP 9 | LAST 597 | 1256 | | S22AUT | = | DEL.TAX | 18 |
| 2283 | | | 0022 | | S223X1 | = | 18D | 6 |
| 2284 | | | 0030 | | S221X3 | = | 24D | 6 |
| 2285 | | | 0036 | | S22D | = | 30D | 2 |
| 2286 | | | 0040 | | S22RHO | = | 32D | 2 |
| 2287 | REP 53 | LAST 604 | E5,1634 | | S22RL | = | W +156D | 6 |
| 2288 | | | 30,3643 | 00064 0 | 9DW26D | ZDEC | 52 B-14 | |
| 2289 | | | 30,3644 | 00000 1 | | | | |
| 2290 | | | 30,3645 | 00002 0 | 9DWID | ZDEC | 2 B-14 | |
| 2291 | | | 30,3646 | 00000 1 | | | | |
| 2292 | | | 30,3647 | 10306 0 | SCIVAR | ZDEC | 1.0 E-6 R+18 | |
| 2293 | | | 30,3650 | 36750 0 | | | | |
| 2294 | | | 30,3651 | 00253 0 | IMVARR | ZDEC | 0.04 E-6 R+18 | |
| 2295 | | | 30,3652 | 31436 1 | | | | |
| 2296 | | | 30,3653 | 10000 0 | DEC1R2 | ZDEC | 1 R-2 | |
| 2297 | | | 30,3654 | 00000 1 | | | | |
| 2298 | | | 30,3655 | 01461 0 | V08N49EE | VN | 00649 | |
| 2299 | REP 5 | LAST 574 | 1214 | | V08N89B | VN | 00689 | |
| 2300 | REP 2 | LAST 565 | 23,2000 | | S22UOFF | = | LEMPOS | 6 |
| 2301 | | | 23,3136 | | | SETLOC | P20S2 | |
| | | | | | BANK | | | |

U SUB OFF



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P2371

L P20-P25

USER=5 PAGE NO. 56 55 53

R2372 SUBROUTINE NAME' V89CALL
R2373 MOD NO' 0 DATE' 8 FEB 1968
R2374 MOD BY' DIGITAL DEVEL GROUP LOG SECTION' P20-P25

R2375 FUNCTIONAL DESCRIPTION'

R2376 CALLED BY V89 ENTER DURING P00. PRIO 10 USED. CALCULATES AND
R2377 DISPLAYS FINAL GIMBAL ANGLES TO POINT CSM *X AXIS OR PREFERRED AXIS
R2378 (UNIT*Z)COS55 DEG + UNIT*X)SIN55 DEG) AT LM.

R2379 1. KEY IN V 89 B ONLY IF IN PROG 00. IF NOT IN P00, OPERATOR ERROR AND
R2380 EXIT R63, OTHERWISE CONTINUE.

R2381 2. IF IN P00, DO IMU STATUS CHECK (R02BOTH). IF IMU ON AND ITS
R2382 ORIENTATION KNOWN TO COC, CONTINUE.

R2383 3. FLASH DISPLAY V 04 N 06. R2 INDICATES WHICH SPACECRAFT AXIS IS TO
R2384 BE POINTED AT LM. INITIAL CHOICE IS PREFERRED AXIS. (R2=1).
R2385 ASTRONAUT CAN CHANGE TO (*X) AXIS (R2 NOT= 1) BY V 22 B 2 E. CONTINUE
R2386 AFTER KEYING IN PROCEED.

R2387 4. SET PREFERRED ATTITUDE FLAG ACCORDING TO OPTION DESIRED. SET FLAG
R2388 FOR PREFERRED AXIS. RESET FLAG FOR X AXIS.

R2389 5. CURRENT TIME IS STORED AND R63COMP IS CALLED

R2390 R63COMP JOB'

R2391 UPDATES CSM AND LM STATE VECTORS USING CONIC EQUATIONS

R2392 CALCULATES BOTH PREFERRED AND X AXIS TRACKING ATT FROM 3SM TO LM.

R2393 DESIRED GIMBAL ANGLES AS INDICATED BY PREFERRED ATTITUDE FLAG
R2394 ARE STORED FOR LATER R60CSM CALL.

R2395 6. FLASH DISPLAY V 06 N18 AND AWAIT RESPONSE.

R2396 7. RECYCLE- RETURN TO STEP 5.
R2397 TERMINATE- EXIT R63 ROUTINE
R2398 PROCEED- RESET 3AXISFLG AND CALL R60CSM FOR ATTITUDE MANEUVER.
R2399 CALLING SEQUENCE' V 89 B

R2400 SUBROUTINES CALLED' CRKPOCH, R02BOTH, GONDSPP, R63COMP, R60CSM

R2401 ALARMS 1. OPERATOR ERROR IF NOT IN P00
R2402 2. PROGRAM ALARM IF IMU IS OFF
R2403 3. PROGRAM ALARM IF IMU ORIENTATION IS UNKNOWN

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R2404 ERASABLE INITIALIZATION REQUIRED NONE

R2405 DEBRIS' OPTION1, OPTION1+1, PRPTRCAT(PREP ATT FLAG), P21TIME, 3AXISPLG

| Address | REP | OP | LAST | Address | Value | Value | Value | Value | Value |
|---------|-----|-----|------|---------|---------|--------|--------|-------|---------|
| 24055 | | | | 23,3136 | 00000 | 1 | DP1MIN | 2DEC | 0000 |
| 24060 | | | | 23,3137 | 13300 | 0 | | | |
| 2406 | REP | 13 | LAST | 586 | E4,1715 | | | | |
| 2407 | | | | 34,3801 | | | | | |
| 2408 | REP | 2 | LAST | 582 | 34,2000 | | | | |
| 2409 | | | | 34,3801 | | | | | |
| 2410 | REP | 1 | | | | | | | |
| 2411 | REP | 144 | LAST | 599 | 34,3801 | 0 | 4555 | 0 | V89CALL |
| 2412 | REP | 3 | LAST | 555 | 34,3802 | 17573 | 0 | | |
| 2413 | REP | 19 | LAST | 565 | 34,3803 | 3 | 6214 | 0 | |
| 2414 | REP | 3 | LAST | 518 | 34,3804 | 55=131 | 1 | | |
| 2415 | REP | 72 | LAST | 595 | 34,3805 | 3 | 4712 | 1 | |
| 2416 | REP | 4 | LAST | 608 | 34,3806 | 55=132 | 1 | | |
| 2417 | REP | 1 | | | 34,3807 | 3 | 3850 | 1 | |
| 2418 | REP | 145 | LAST | 608 | 34,3810 | 0 | 4555 | 0 | |
| 2419 | REP | 20 | LAST | 599 | 34,3811 | 20624 | 0 | | |
| 2420 | REP | 26 | LAST | 511 | 34,3812 | 0 | 5423 | 1 | |
| 2421 | | | | | 34,3813 | 0 | 3815 | 0 | |
| 2422 | | | | | 34,3814 | 0 | 3807 | 0 | |
| A2423 | | | | | | | | | |
| 2424 | REP | 5 | LAST | 608 | 34,3815 | 4 | 1132 | 1 | |
| 2425 | REP | 73 | LAST | 608 | 34,3816 | 8 | 4712 | 1 | |
| 2426 | | | | | 34,3817 | 0 | 0008 | 1 | |
| 2427 | REP | 1 | | | 34,3820 | 1 | 3845 | 1 | |
| 2428 | REP | 31 | LAST | 565 | 34,3821 | 0 | 5447 | 0 | RSTPAP |
| 2429 | REP | 2 | LAST | 54 | 34,3822 | 00120 | 1 | | |
| 2430 | REP | 109 | LAST | 599 | 34,3823 | 0 | 6006 | 1 | V89RECL |
| 2431 | | | | | 34,3824 | 43234 | 0 | | |
| 2432 | REP | 17 | LAST | 583 | 34,3825 | 45505 | 0 | | |
| 24325 | REP | 1 | | | 34,3826 | 07137 | 0 | | |
| 2433 | REP | 14 | LAST | 608 | 34,3827 | 38316 | 0 | | |
| 2434 | REP | 1 | | | 34,3830 | 71461 | 1 | | |
| 2435 | | | | | 34,3831 | 77776 | 1 | | |
| 2436 | REP | 1 | | | 34,3832 | 3 | 3851 | 0 | |
| 2437 | REP | 146 | LAST | 608 | 34,3833 | 0 | 4555 | 0 | |
| 2438 | REP | 21 | LAST | 608 | 34,3834 | 20624 | 0 | | |
| 2439 | REP | 27 | LAST | 608 | 34,3835 | 0 | 5423 | 1 | |
| 2440 | | | | | 34,3836 | 0 | 3840 | 0 | |
| 2441 | REP | 1 | | | 34,3837 | 0 | 3823 | 0 | |
| 2442 | REP | 32 | LAST | 608 | 34,3840 | 0 | 5447 | 0 | |
| 2443 | REP | 4 | LAST | 564 | 34,3841 | 00124 | 0 | | |

EBANK= P21TIME
 BANK 34
 SETLOC P2054
 BANK
 COLINT* 88/R83
 TC BANKCALL
 CADR R02BOTH
 CAP THREE
 TS OPTION1
 CAP ONE
 TS OPTION1 +1
 CAP V804N08
 TC BANKCALL
 CADR GOFLASH
 TC ENDEXT
 TC +2
 TC -5
 CS OPTION1 +1
 AD ONE
 EXTEND
 R2P SETPAP
 TC DOWNFLAG
 ADRES R03CPLG
 V89RECL TC INTPRET
 RTB DAD
 LOADTIME
 DP1MIN
 SITCALL P21TIME
 R83COMP
 EXIT
 CAP V806N18
 TC BANKCALL
 CADR GOFLASH
 TC ENDEXT
 TC +2
 TC V89RECL
 TC DOWNFLAG
 ADRES 3AXISPLG

IMU STATUS CHECK. RETURNS IF ORIENTATION KNOWN. ALARMS IF NOT. ALLOW ASTRONAUT TO SELECT DESIRED TRACKING ATTITUDE AXIS.
 V 04 N 06
 TERMINATE
 PROCEED
 DATA IN. OPTION1 +1 = 1 FOR PREP AXIS
 = 2 FOR X AXIS
 1 FOR PREP AXIS. 2 FOR X AXIS.
 RESET PREP ATT FLAG FOR R83COMP TO DO X AXIS. RESET BIT 10 FLAG 5
 READ PRESENT TIME
 INTEGRATE TO 1 MIN FROM NOW
 STORE TIME FOR CALL TO R83COMP. R83COMP LEAVES DESIRED GIM ANGS IN THETAD, LOS IN POINTVSM, AND SELECTED AXIS IN SCAxis.
 V 06 N 18
 NQUN 18 REFERS TO THE DESIRED GIMRAL
 TERMINATE
 PROCEED
 RECYCLE
 RESET 3 AXIS FLAG
 RESET BIT 6 FLAG 5



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| | | | | | | | | |
|------|-----|-----|------|-----|---------|----------|---------|------------|
| 2444 | REF | 147 | LAST | 608 | 34,3842 | 0 4555 0 | TC | BANKCALL |
| 2445 | REF | 3 | LAST | 585 | 34,3843 | 56000 1 | CADR | R60C64 |
| 2446 | REF | 28 | LAST | 608 | 34,3844 | 1 5423 0 | TCF | REDST |
| 2447 | REF | 30 | LAST | 585 | 34,3845 | 0 5435 0 | SETPAP | TC |
| 2448 | REF | 3 | LAST | 608 | 34,3846 | 00120 1 | ADRES | R60CPL0 |
| 2449 | REF | 2 | LAST | 608 | 34,3847 | 0 3823 0 | TC | V89R2CL |
| 2450 | | | | | 34,3850 | 01008 0 | VB04N08 | VN |
| 2451 | | | | | 34,3851 | 01422 1 | VB06N18 | VN |
| 2452 | REF | 2 | LAST | 583 | 34,3481 | | R63COMP | EQUALS R63 |

PERFORMS CM MANEUVER TO ALIGN SELECTED SPACECRAFT AXIS TO LOS.

SET PREFERRED ATT FLAG FOR R63COMP TO DO PREP AXIS. SET BIT 10 FLAG 5.

L P20-P25

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P2453 PROGRAM NAME- P23 CISELINAR MIDCOURSE NAVIGATION
 R2454 MOD NO
 R2455 MOD BY- TOM KNATT
 R2456 FUNCTIONAL DESCRIPTION- DO MIDCOURSE NAVIGATION BY INCORPORATION OF STAR
 /EARTH AND STAR/MOON OPTICAL MEASUREMENTS.
 R2458 CALLING SEQUENCE- ASTRONAUT OPERATED
 R2459 SUBROUTINES CALLED-RS2,RS3,RS7,R30,ORBITAL INTEGRATION (INTEGRV)
 R2460 INCORP1,INCORP2,LALOTORV,LINLMKLD,AND DISPLAY INTERPACE ROUTINES.
 R2461 NORMAL EXIT MODES- VIA R00
 R2462 ALARMS- NONE
 R2463 ABORT MODES- NONE
 R2464 ERASABLE INITIALIZATION REQUIRED- PAD-LOADED ERASABLES,ORBNFLAG RESET,
 REPS=PLG=0 IF IMU OFF AND REPS=PLG=1 IF IMU ON
 R24645 INPUTS BY USER REQUIRED- STAR NUMBER, LANDMARK LAT, LONG/2, ALT OR ID NUMB.
 R24646 IF LANDMARK IS USED, NEAR OR FAR HORIZON IF HORIZON IS USED, AND
 R24649 BODY TO BE MARKED ON(EARTH OR MOON). SEE GSOP CHAPT 4.
 R2465 OUTPUT-UPDATED GNC STATE VECTOR. VECTOR FROM S/C TO HORIZON OR LANDMARK
 R24651 IN POINTAXS. POINTAXS CAN BE USED TO GENERATE THIS VECTOR APART FROM
 R24652 P23 IF DESIRED.
 R2466 DEBRIS-NO USABLE DEBRIS IS GENERATED. RENDWPLG IS RESET FOR P20 UPON
 R24665 COMPLETION OF P23. RUPTREBS AND ERASABLES USED BY DISPLAYS ARE DEBRIS

| | | | | | | | | | | |
|-------|-----|-----|------|---------|---------|--------|------|---|--------|----------|
| 2467 | | | | 31,2021 | | | | | BANK | 31 |
| 2468 | REP | 1 | | 31,2000 | | | | | SETLOC | RT23 |
| 2469 | | | | 31,2021 | | | | | BANK | |
| 2470 | REP | 1 | | | | | | | COUNT | 31/S23 |
| 2471 | REP | 54 | LAST | 605 | RS,1400 | | | | EBANK= | W |
| 24712 | REP | 33 | LAST | 608 | 31,2021 | 0 | 5447 | 0 | TC | DOWNFLAG |
| 24714 | REP | 4 | LAST | 555 | 31,2022 | 00010 | 0 | | ADRES | RNDVZPLG |
| 2472 | REP | 10 | LAST | 590 | 31,2023 | 0 | 5261 | 1 | TC | 2PHSCHNO |
| 2473 | | | | | 31,2024 | 00004 | 0 | | OCT | 00004 |
| 2474 | | | | | 31,2025 | 00012 | 1 | | OCT | 00012 |
| 2475 | REP | 1 | | | 31,2026 | 3 | 4760 | 1 | CAF | PRIO13 |
| 2476 | REP | 3 | LAST | 589 | 31,2027 | 55=056 | 1 | | TS | PHSPDT2 |
| 2477 | REP | 110 | LAST | 608 | 31,2030 | 0 | 6008 | 1 | TC | INTPRET |
| 2478 | | | | | 31,2031 | 43131 | 0 | | SSP | CLEAR |
| 2479 | REP | 5 | LAST | 556 | 31,2032 | 00302 | 0 | | | MARKINDX |
| 2480 | | | | | 31,2033 | 00001 | 0 | | | 1 |
| 2481 | REP | 2 | LAST | 555 | 31,2034 | 00666 | 1 | | | TARG2PLG |
| 2482 | | | | | 31,2035 | 66214 | 0 | | CLEAR | SSP |
| 2483 | REP | 3 | LAST | 554 | 31,2036 | 00665 | 1 | | | TARG1PLG |
| 2484 | REP | 3 | LAST | 202 | 31,2037 | 00305 | 1 | | | STARIND |
| 2485 | | | | | 31,2040 | 00000 | 1 | | | 0 |
| 2486 | | | | | 31,2041 | 43131 | 0 | | SSP | CLEAR |
| 2487 | REP | 6 | LAST | 209 | 31,2042 | 00303 | 1 | | | BESTI |
| 2488 | | | | | 31,2043 | 00000 | 1 | | | 0 |
| 24882 | REP | 1 | | | 31,2044 | 03287 | 1 | | | RS7FLAG |
| 24883 | | | | | 31,2045 | 77414 | 0 | | CLEAR | EXIT |
| 24884 | REP | 2 | LAST | 260 | 31,2046 | 04664 | 1 | | | V94FLAG |
| 24885 | REP | 111 | LAST | 610 | 31,2047 | 0 | 6008 | 1 | TC | INTPRET |

LEAVE GROUP 4
 ENTER GROUP 2

TARGET FLAG USED BY RS2 AND RS3

SET = DO NOT REPRFORM RS7

SET = ALLOW V94



L P20-P25

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| Address | Op | Count | Label | Address | Op | Count | Label | Code | Comment |
|---------|-----|-------|----------|---------|--------|-------|-------|--------|----------|
| 2489 | | | | 31,2050 | 45014 | 0 | | SON | CALL |
| 2490 | REP | 4 | LAST 578 | 31,2051 | 01702 | 0 | | | RESP=PLD |
| 2491 | REP | 1 | | 31,2052 | 82080 | 0 | | | P23.05 |
| 2492 | REP | 1 | | 31,2053 | 76360 | 0 | | | R57 |
| 2493 | | | | 31,2054 | 77624 | 1 | | CALL | |
| 2494 | REP | 1 | | 31,2055 | 31322 | 0 | | | R53 |
| 2495 | | | | 31,2056 | 77650 | 1 | | GOTO | |
| 2496 | REP | 1 | | 31,2057 | 82236 | 1 | | | P23.60 |
| 2500 | | | | 31,2060 | 77414 | 0 | | P23.05 | CLEAR |
| 2501 | REP | 1 | | 31,2061 | 04685 | 0 | | | EXIT |
| 2502 | REP | 1 | | 31,2062 | 3 3050 | 1 | | CAP | SAVECPLD |
| 2503 | REP | 148 | LAST 609 | 31,2063 | 0 4555 | 0 | | TC | V05N70 |
| 2504 | REP | 22 | LAST 608 | 31,2064 | 20624 | 0 | | TC | BANKCALL |
| 2505 | REP | 28 | LAST 599 | 31,2065 | 0 4106 | 1 | | CADR | GOFLASH |
| 2506 | REP | 1 | | 31,2066 | 0 2070 | 1 | | TC | GOTOPOCH |
| 2507 | | | | 31,2067 | 0 2082 | 1 | | TC | P23.15 |
| 2508 | REP | 19 | LAST 589 | 31,2070 | 3 1751 | 0 | | TC | -5 |
| 2509 | | | | 31,2071 | 0 0006 | 1 | | P23.15 | CA |
| 2510 | | | | 31,2072 | 1 2074 | 1 | | | LANDMARK |
| 2511 | | | | 31,2073 | 0 2075 | 1 | | EXTEND | |
| 2512 | REP | 4 | LAST 276 | 31,2074 | 3 1752 | 0 | | RZF | +2 |
| 2513 | REP | 23 | LAST 574 | 31,2075 | 7 4703 | 0 | | TC | +2 |
| 2514 | | | | 31,2076 | 0 0006 | 1 | | CA | HORIZON |
| 2515 | REP | 1 | | 31,2077 | 1 2104 | 1 | | EXTEND | BITS |
| 2516 | REP | 112 | LAST 610 | 31,2100 | 0 6006 | 1 | | RZF | P23.16 |
| 2517 | | | | 31,2101 | 82014 | 0 | | TC | INTPRST |
| 2518 | REP | 11 | LAST 599 | 31,2102 | 01463 | 1 | | SRT | GOTO |
| 2519 | REP | 1 | | 31,2103 | 82107 | 0 | | | LINAPLAG |
| 2520 | REP | 113 | LAST 611 | 31,2104 | 0 6006 | 1 | | P23.16 | P23.17 |
| 2521 | | | | 31,2105 | 77614 | 1 | | TC | INTPRST |
| 2522 | REP | 12 | LAST 611 | 31,2106 | 01663 | 0 | | CLEAR | |
| 2523 | | | | 31,2107 | 41535 | 1 | | P23.17 | SLOAD |
| 25231 | REP | 5 | LAST 444 | 31,2110 | 00736 | 0 | | | LINAPLAG |
| 25232 | | | | 31,2111 | 41335 | 1 | | | PUSH |
| 25233 | REP | 1 | | 31,2112 | 23055 | 0 | | SLOAD | STARCODE |
| 25234 | | | | 31,2113 | 66150 | 0 | | | DMP |
| 25235 | REP | 259 | LAST 596 | 31,2114 | 00155 | 0 | | LXA,1 | SPSIX |
| 25236 | REP | 7 | LAST 610 | 31,2115 | 00302 | 0 | | | SKA,1 |
| 25237 | | | | 31,2116 | 77624 | 1 | | | MPAC +1 |
| 25238 | REP | 1 | | 31,2117 | 30000 | 1 | | CALL | BESTI |
| 25239 | REP | 2 | LAST 92 | 31,2120 | 02617 | 0 | | | |
| 252395 | | | | 31,2121 | 77778 | 1 | | STORE | LOWMEMRY |
| 2524 | REP | 20 | LAST 611 | 31,2122 | 3 1751 | 0 | | EXIT | STARSVA2 |
| 2525 | REP | 1 | | 31,2123 | 7 3052 | 1 | | CA | LANDMARK |
| 2526 | REP | 2 | LAST 95 | 31,2124 | 55-753 | 0 | | CA | OCT00077 |
| 2527 | REP | 5 | LAST 611 | 31,2125 | 3 1752 | 0 | | TS | IDOFPLAK |
| 2528 | | | | 31,2126 | 0 0006 | 1 | | CA | HORIZON |
| 2529 | REP | 1 | | 31,2127 | 1 2144 | 0 | | EXTEND | |
| 2530 | REP | 30 | LAST 553 | 31,2130 | 7 4706 | 0 | | RZF | P23.12 |
| 2531 | | | | 31,2131 | 0 0006 | 1 | | EXTEND | BITS |

SRT NOW AS INPUT, NORMALLY EXTERNAL CONT WHEN ALIGNED, PERFORM MEASUREMENT DO OPTICS CALIBRATION IF IMU NOT ALIGNED

USED TO SAVE SPACE IN P23.05 REQUEST RESPONSE AND DISPLAY MEASUREMENT IDENTIFICATION- STAR, LMK, HOR IDENT.

TERMINATE REDISPLAY IF C=2, LINAPLAG=1. IF C=1, LINAPLAG=0

SRT LINAPLAG FROM HORIZON OR LANDMARK

BESTI = 6XSTAR NUMBER

NEEDED TO RETRIEVE STAR VECTOR FROM LOW STORE FOR R53, P23. (IS IN P23)=STARSVA2

FOR R3(DR) LINAPLAG ALREADY SRT

IF D=1, NORPHOR=0 (NEAR), D=2, NORPHOR=1, FAR



L P20-P25

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| | | | | | | | | |
|-------|-----|-----|------|---------|---------|----------|---------|----------------|
| 2587 | | | | 31,2213 | 00012 1 | | OCT | 00012 |
| 25871 | REP | 151 | LAST | 612 | 31,2214 | 0 4556 0 | R60CALL | TC BANKCALL |
| 25872 | REP | 4 | LAST | 609 | 31,2215 | 56000 1 | | CADR R60CBM |
| 25873 | REP | 36 | LAST | 612 | 31,2216 | 0 5301 0 | | TC PHASCRNG |
| 25874 | | | | | 31,2217 | 04022 0 | | OCT 04022 |
| 2588 | REP | 119 | LAST | 612 | 31,2220 | 0 6006 1 | | TC INTPRET |
| 2589 | REP | 7 | LAST | 610 | 31,2222 | 03307 0 | | ROTFLAG |
| 2591 | REP | 1 | | | 31,2223 | 62226 0 | | P23.57 |
| 2592 | | | | | 31,2224 | 77624 1 | P23.56 | CALL |
| 2593 | REP | 2 | LAST | 611 | 31,2225 | 76360 0 | | R67 |
| 2594 | | | | | 31,2226 | 43014 0 | P23.57 | SET |
| 2595 | REP | 3 | LAST | 610 | 31,2227 | 04464 0 | | V84FLAG |
| 2596 | REP | 3 | LAST | 613 | 31,2230 | 03067 0 | | R57FLAG |
| 2597 | | | | | 31,2231 | 77624 1 | | CALL |
| 2598 | REP | 3 | LAST | 656 | 31,2232 | 30002 0 | | R62 |
| 2608 | | | | | 31,2233 | 43014 0 | | CLEAR CLEAR |
| 2609 | REP | 4 | LAST | 613 | 31,2234 | 04664 1 | | V84FLAG |
| 2610 | REP | 4 | LAST | 613 | 31,2235 | 03267 1 | | R57FLAG |
| 2611 | | | | | 31,2236 | 77776 1 | P23.60 | EXIT |
| 2612 | | | | | 31,2237 | 0 0004 0 | | INHINT |
| 2613 | REP | 32 | LAST | 590 | 31,2240 | 3 1330 0 | | CA MARKSTAT |
| 2614 | REP | 6 | LAST | 413 | 31,2241 | 7 4747 0 | | MASK LOW10 |
| 2615 | REP | 5 | LAST | 591 | 31,2242 | 55=242 0 | | TS MARKDATA |
| 2616 | | | | | 31,2243 | 0 0006 1 | | EXTEND |
| 2617 | REP | 6 | LAST | 613 | 31,2244 | 5 1242 1 | | INDEX MARKDATA |
| 2618 | | | | | 31,2245 | 3 0001 0 | | DCA 0 |
| 2619 | REP | 9 | LAST | 612 | 31,2246 | 53=225 1 | | DYCH MARKTIME |
| 2620 | REP | 7 | LAST | 613 | 31,2247 | 51=242 1 | | INDEX MARKDATA |
| 2621 | | | | | 31,2250 | 3 0005 1 | | CA 5 |
| 2622 | REP | 1 | | | 31,2251 | 57=754 0 | | XCH TRUNION |
| 2623 | | | | | 31,2252 | 0 0003 1 | | RELINT |
| 2624 | REP | 1 | | | 31,2253 | 1 3081 0 | | CAP |
| 2625 | REP | 152 | LAST | 613 | 31,2254 | 0 4555 0 | | TC BANKCALL |
| 2626 | REP | 24 | LAST | 612 | 31,2255 | 20624 0 | | CADR COFLASH |
| 2627 | REP | 1 | | | 31,2257 | 0 2261 0 | | TC |
| 2628 | REP | 1 | | | 31,2260 | 0 2253 1 | | TC P23.65 |
| 2629 | | | | | 31,2261 | 0 6006 1 | P23.65 | TC -5 |
| 2630 | REP | 120 | LAST | 613 | 31,2262 | 77414 0 | | TC INTPRET |
| 2631 | | | | | 31,2263 | 04465 1 | | SET EXIT |
| 2632 | REP | 3 | LAST | 612 | 31,2263 | 04465 1 | | SAVECPLD |
| 2633 | REP | 2 | LAST | 611 | 31,2264 | 0 2070 1 | | TC P23.15 |
| 2639 | | | | | 31,2265 | 45014 0 | P23.85 | CLEAR CALL |
| 2640 | REP | 8 | LAST | 590 | 31,2266 | 02676 1 | | RENDWFLG |
| 2641 | REP | 2 | LAST | 612 | 31,2267 | 62272 1 | | POINTAXS |
| 2642 | | | | | 31,2270 | 77650 1 | | GOTO |
| 2643 | REP | 1 | | | 31,2271 | 62364 1 | | R63.55 |
| 2644 | REP | 1 | | | 31,2272 | 67220 0 | | POINTAXS STO |
| 2645 | | | | | | | | LOAD |
| 2646 | | | | | | | | |

DO NOT REPERFORM RST

TERMINATE
STORE DATA
REDISPLAY

L P20-P25

| | | | | | | | | | |
|-------|-----|-----|------|-----|---------|--------|---|--------|--|
| 2847 | REP | 5 | LAST | 576 | 31,2273 | 01150 | 1 | | |
| 2848 | REP | 21 | LAST | 611 | 31,2274 | 02752 | 0 | | |
| 28481 | | | | | 31,2275 | 07230 | 1 | | |
| 28482 | REP | 1 | | | 31,2276 | 02307 | 1 | | |
| 28483 | REP | 4 | LAST | 612 | 31,2277 | 02754 | 0 | | |
| 2849 | | | | | 31,2300 | 45030 | 0 | | |
| 2850 | REP | 1 | | | 31,2301 | 02305 | 0 | | |
| 2851 | REP | 1 | | | 31,2302 | 03064 | 0 | | |
| 2852 | | | | | 31,2303 | 77650 | 1 | | |
| 2853 | REP | 2 | LAST | 614 | 31,2304 | 02307 | 1 | | |
| 2854 | | | | | 31,2305 | 77624 | 1 | R23.0 | |
| 2855 | REP | 2 | LAST | 558 | 31,2306 | 01345 | 1 | | |
| 2856 | | | | | 31,2307 | 71214 | 0 | R23.05 | |
| 2857 | REP | 8 | LAST | 605 | 31,2310 | 01711 | 1 | | |
| 2858 | REP | 1 | | | 31,2311 | 02315 | 1 | | |
| 28582 | REP | 1 | | | 31,2312 | 03001 | 0 | | |
| 28584 | | | | | 31,2313 | 34001 | 1 | | |
| 2859 | REP | 2 | LAST | 570 | 31,2314 | 56544 | 1 | | |
| 2860 | | | | | 31,2315 | 77624 | 1 | R23.1 | |
| 2861 | REP | 6 | LAST | 573 | 31,2316 | 56343 | 0 | | |
| 2862 | | | | | 31,2317 | 43014 | 0 | | |
| 2863 | REP | 9 | LAST | 614 | 31,2320 | 01751 | 0 | | |
| 2864 | REP | 1 | | | 31,2321 | 02323 | 1 | | |
| 2865 | REP | 10 | LAST | 601 | 31,2322 | 01476 | 0 | | |
| 2866 | | | | | 31,2323 | 45014 | 0 | R23.2 | |
| 2867 | REP | 10 | LAST | 614 | 31,2324 | 01471 | 1 | | |
| 2868 | REP | 9 | LAST | 591 | 31,2325 | 27113 | 1 | | |
| 2869 | | | | | 31,2326 | 77776 | 1 | | |
| 2870 | REP | 37 | LAST | 613 | 31,2327 | 0 5301 | 0 | | |
| 2871 | | | | | 31,2330 | 04022 | 0 | | |
| 2872 | REP | 121 | LAST | 613 | 31,2331 | 0 6006 | 1 | | |
| 2873 | | | | | 31,2332 | 77624 | 1 | | |
| 2874 | REP | 1 | | | 31,2333 | 62767 | 0 | | |
| 2875 | | | | | 31,2334 | 77214 | 0 | | |
| 2876 | REP | 1 | | | 31,2335 | 00345 | 0 | | |
| 2877 | REP | 1 | | | 31,2336 | 62341 | 0 | | |
| 2878 | REP | 4 | LAST | 87 | 31,2337 | 02272 | 1 | | |
| 2879 | REP | 2 | LAST | 119 | 31,2340 | 03627 | 1 | | |
| 2880 | | | | | 31,2341 | 46135 | 1 | R23.3 | |
| 2881 | REP | 22 | LAST | 614 | 31,2342 | 02752 | 0 | | |
| 2882 | REP | 1 | | | 31,2343 | 62353 | 0 | | |
| 2883 | | | | | 31,2344 | 77614 | 1 | | |
| 2884 | REP | 5 | LAST | 591 | 31,2345 | 00462 | 1 | | |
| 2885 | | | | | 31,2346 | 45145 | 0 | | |
| 2886 | REP | 10 | LAST | 613 | 31,2347 | 01225 | 0 | | |
| 2887 | REP | 3 | LAST | 598 | 31,2350 | 26373 | 1 | | |
| 2888 | | | | | 31,2351 | 77650 | 1 | | |
| 2889 | REP | 1 | | | 31,2352 | 62355 | 0 | | |
| 2890 | | | | | 31,2353 | 77624 | 1 | R23.4 | |
| 2891 | REP | 1 | | | 31,2354 | 62527 | 0 | | |

POINTEX
 LANDMARK
 SLOAD
 R23.05
 IDOPLMK
 CALL
 R23.0
 LINLAKLD
 GOTO
 R23.05
 CALL
 R23.0
 LLASRDA
 DLOAD
 ORWFLAG
 R23.1
 WIDPOS
 STCALL
 0
 INITIALW
 CALL
 R23.1
 SETINTG
 SET
 ORWFLAG
 R23.2
 DIMOFLAG
 CALL
 ORWFLAG
 INTEGRV
 R23.2
 SET
 EXIT
 TC
 OCT
 TC
 CALL
 R23.1
 RECT.1
 VLOAD
 ZMEASURE
 R23.3
 ROVV
 STORE
 R2C
 SLOAD
 R23.3
 R23
 R23
 R23.3
 LANDMARK
 R23.4
 SET
 ERADFLAG
 CALL
 MARKTIME
 LALOTORV
 GOTO
 R23.5
 CALL
 R23.4
 HORIZ

IF LANDMARK=0 HORIZON IS DESIRED.
 DO NOT PICK UP LMK VALUES FROM TABLE
 OR DISPLAY IN HORIZON CASE

MUST BE DONE 2ND TIME, TO ALLOW CHANCES

INITIALIZE W-MATRIX FIRST PASS IN P23

SETUP FOR CSM INTEGRATION

INTEGRATE CSM STATE VEC. TO MARKTIME

PICKUP CSM STATE VECTOR FROM PERM

IN SPHERE OF INFLUENCE OF PRIMARY BODY

CALCULATED BY INTEGRATION R29

IF LANDMARK = 0, USE HORIZ SURR



L P20-P25

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| | | | | | | | | | |
|------|-----|---|------|-----|---------|---------|-------|-------|---------|
| 2092 | NSP | 2 | LAST | 119 | 31,2355 | 03665 1 | R23.5 | STORE | RL |
| 2093 | | | | | 31,2356 | 40251 0 | | V8U | STPD |
| 2094 | NSP | 3 | LAST | 614 | 31,2357 | 03627 1 | | | R2C |
| 2095 | | | | | 31,2360 | 00001 0 | | | 0 |
| 2096 | NSP | 2 | LAST | 119 | 31,2361 | 03657 0 | | STORE | NCLL |
| 2097 | | | | | 31,2362 | 77650 1 | | GOTO | |
| 2098 | NSP | 6 | LAST | 614 | 31,2363 | 01150 I | | | POINTEX |

L P20-P25

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| Address | Operation | Value 1 | Value 2 | Value 3 | Value 4 | Value 5 | Value 6 | Value 7 | Value 8 |
|---------|------------------|---------|---------|---------|---------|---------|--------------|---------|---------|
| 2700 | | 31,2364 | 41456 | 0 | R23.55 | UNIT | PUSH | | |
| 2701 | | 31,2365 | 77775 | 1 | | VLOAD | | | |
| 2702 | | 31,2366 | 00043 | 0 | | | 34D | | |
| 2703 | | 31,2367 | 24037 | 0 | | STOVL | 30D | | |
| 2704 | REP 2 LAST 119 | 31,2370 | 03635 | 1 | | | VZC | | |
| 2705 | | 31,2371 | 54361 | 1 | | VXSC | VSR | | |
| 2706 | REP 1 | 31,2372 | 23030 | 0 | | | ONE/C | | |
| 2707 | | 31,2373 | 20620 | 1 | | | 16D | | |
| 2708 | | 31,2374 | 77655 | 1 | | VAD | | | |
| 2709 | | 31,2375 | 77656 | 1 | | UNIT | | | |
| 2710 | REP 2 LAST 119 | 31,2376 | 27643 | 0 | | STOVL | UCLSTAR | | |
| 2711 | REP 3 LAST 616 | 31,2377 | 03635 | 1 | | | VZC | | |
| 2712 | | 31,2400 | 52342 | 0 | | VSR2 | VBU | | |
| 2713 | REP 2 LAST 87 | 31,2401 | 02141 | 1 | | | VSSO | | |
| 2714 | | 31,2402 | 54361 | 1 | | VXSC | VSR | | |
| 2715 | REP 2 LAST 616 | 31,2403 | 23030 | 0 | | | ONE/C | | |
| 2716 | | 31,2404 | 20616 | 1 | | | 13D | | |
| 2717 | | 31,2405 | 53455 | 0 | | VAD | UNIT | | |
| 2718 | REP 1 | 31,2406 | 02617 | 0 | | | US | | |
| 2719 | REP 2 LAST 119 | 31,2407 | 03651 | 0 | | STORE | USSTAR | | |
| 2720 | | 31,2410 | 72441 | 0 | | DOT | SL1 | | |
| 2721 | REP 3 LAST 616 | 31,2411 | 03643 | 0 | | | UCLSTAR | | |
| 2722 | | 31,2412 | 77206 | 0 | | PUSH | VLOAD | | |
| 2723 | REP 4 LAST 616 | 31,2413 | 03643 | 0 | | | UCLSTAR | | |
| 2724 | | 31,2414 | 57561 | 1 | | VXSC | VCOMP | | |
| 2725 | | 31,2415 | 53372 | 1 | | VSL1 | VAD | | |
| 2726 | REP 3 LAST 616 | 31,2416 | 03651 | 0 | | | USSTAR | | |
| 2727 | | 31,2417 | 77656 | 1 | | UNIT | | | |
| 2728 | REP 17 LAST 605 | 31,2420 | 27502 | 0 | | STOVL | RVECTOR | | |
| 2729 | REP 16 LAST 597 | 31,2421 | 15332 | 1 | | | ZEROVECS | | |
| 2730 | REP 18 LAST 616 | 31,2422 | 03510 | 0 | | STORE | RVECTOR +6 | | |
| 2731 | REP 19 LAST 616 | 31,2423 | 17516 | 0 | | STOVL | RVECTOR +12D | | |
| 2732 | | 31,2424 | 00001 | 0 | | | 0 | | |
| 2733 | | 31,2425 | 57526 | 1 | | ACOS | DCOMP | | |
| 2734 | | 31,2426 | 71206 | 0 | | PUSH | DLOAD | | |
| 273405 | REP 17 LAST 616 | 31,2427 | 15332 | 1 | | | ZEROVECS | | |
| 27341 | | 31,2430 | 77776 | 1 | | EXIT | | | |
| 27342 | REP 1 | 31,2431 | 3 3041 | 1 | | CA | VARSURL | | |
| 27344 | REP 63 LAST 561 | 31,2432 | 54 001 | 1 | | TS | L | | |
| 2735 | REP 2 LAST 613 | 31,2433 | 3 1754 | 0 | | CA | TRUNION | | |
| 27351 | | 31,2434 | 0 0006 | 1 | | EXTEND | | | |
| 27352 | REP 64 LAST 616 | 31,2435 | 20 001 | 1 | | MSU | L | | |
| 27353 | REP 260 LAST 611 | 31,2436 | 54 154 | 0 | | TS | MPAC | | |
| 27354 | REP 122 LAST 614 | 31,2437 | 0 6006 | 1 | | TC | INTPRFT | | |
| 27355 | | 31,2440 | 67206 | 1 | | PUSH | SLOAD | | |
| 27356 | REP 2 LAST 561 | 31,2441 | 01343 | 1 | | | TRUNRIAS | | |
| 27357 | | 31,2442 | 77621 | 1 | | RDSU | | | |
| 2736 | | 31,2443 | 43242 | 1 | | SR3 | DAD | | |
| 2737 | | 31,2444 | 41215 | 1 | | DAD | DMP | | |

RCLL IS IN MPAC
RCLL * RCLL
PUSH 30-31 =RCLL*RCLL 32-33=ABVAL RCLL

PUSH UP RCLL(UNIT)

PD 0,1 = USSTAR(DOT)UCLSTAR

USSTAR - COSQ(UCLSTAR)

PUT FIXED INTO ERASABLE FOR MSU
INSTRUCTION COMING UP
REQUIRED TO CHANGE 2'S COMPLEMENT
TRUNION TO 1'S COMPLEMENT
TRUNION(2=5)-00000 CONVERTS TRUNION TO
1'S. VARSURL=00000

PUSH IS DP. WHEN RDSU IS EXECUTED, 2ND
HALF OF PUSH.LIST IS GUARANTEED ZERO FROM
DLOAD ZEROVECS ABOVE

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| | | | | | | | | |
|------|-----|-----|---------|---------|---------|--------|-----------|-------------------------------------|
| 2783 | | | 31,2527 | 40220 0 | HORIZ | STO | SETPD | |
| 2784 | REP | 1 | 31,2530 | 03872 1 | | | SRESSTURN | |
| 2785 | | | 31,2531 | 00001 0 | | | 0 | |
| 2786 | | | 31,2532 | 65345 0 | | DLOAD | PDDL | PUSH 0-1 = -AYO SCALED B0 |
| 2787 | REP | 1 | 31,2533 | 01714 1 | | | -AYO | |
| 2788 | REP | 1 | 31,2534 | 01718 0 | | | AKO | |
| 2789 | | | 31,2535 | 83325 0 | | PDDL | PDVL | PUSH 2-3 = +AX SCALED B0 |
| 2790 | REP | 8 | 31,2536 | 15340 1 | | | DPPOS MAX | |
| 2791 | REP | 2 | 31,2537 | 02817 0 | | | US | |
| 2792 | | | 31,2540 | 53435 0 | | VXV | UNIT | |
| 2793 | REP | 4 | 31,2541 | 03827 1 | | | RZC | |
| 2794 | REP | 2 | 31,2542 | 27621 1 | | STOVL | UBAR2 | |
| 2795 | | | 31,2543 | 53435 0 | | VXV | UNIT | PUSH UP |
| 2796 | REP | 3 | 31,2544 | 03821 1 | | | UBAR2 | |
| 2797 | REP | 2 | 31,2545 | 27605 1 | | STOVL | UBAR0 | |
| 2798 | REP | 4 | 31,2546 | 03821 1 | | | UBAR2 | |
| 2799 | | | 31,2547 | 53435 0 | | VXV | UNIT | |
| 2800 | REP | 3 | 31,2550 | 03805 1 | | | UBAR0 | |
| 2801 | REP | 2 | 31,2551 | 03813 0 | | STORE | UBAR1 | |
| 2802 | | | 31,2552 | 50214 0 | | RQN | DOT | |
| 2803 | REP | 13 | 31,2553 | 01703 1 | | | LUNAPLAG | |
| 2804 | REP | 1 | 31,2554 | 62752 0 | | | HORIZ.6 | |
| 2805 | | | 31,2555 | 00001 0 | | | 0 | UBAR1 DOT UZ |
| 2806 | REP | 7 | 31,2556 | 38156 0 | | STCALL | ALPHAV +4 | |
| 2807 | REP | 1 | 31,2557 | 26437 0 | | | GSTRAD | |
| 2808 | | | 31,2560 | 65215 1 | | DAD | PDDL | MPAC HAS RADIUS OF FISHER ELLIPSOID |
| 2809 | REP | 1 | 31,2561 | 01355 0 | | | HORIZALT | PUSH 0-1 = RH SCALED B29 |
| 2810 | REP | 1 | 31,2562 | 23032 1 | | | ABARTH | |
| 2811 | | | 31,2563 | 41415 1 | | DAD | PUSH | PUSH 2-3 = AH B29 |
| 2812 | REP | 2 | 31,2564 | 01355 0 | | | HORIZALT | |
| 2813 | | | 31,2565 | 64375 1 | HORIZ.1 | VLOAD | MKV | |
| 2814 | REP | 5 | 31,2566 | 03827 1 | | | RZC | B29 |
| 2815 | REP | 4 | 31,2567 | 03805 1 | | | UBAR0 | B1 |
| 2816 | | | 31,2570 | 63372 1 | | VSL1 | PDVL | PUSH 4-9 = RH(XH,YH,ZH) B29 |
| 2817 | REP | 3 | 31,2571 | 02817 0 | | | US | |
| 2818 | | | 31,2572 | 76621 0 | | MKV | VSL1 | |
| 2819 | REP | 5 | 31,2573 | 03805 1 | | | UBAR0 | |
| 2820 | | | 31,2574 | 77725 1 | | PDDL | | PUSH 10-15 = USH B1 |
| 2821 | | | 31,2575 | 00003 1 | | | 2 | AH |
| 2822 | | | 31,2576 | 14043 0 | | STOVL | 34D | |
| 2823 | | | 31,2577 | 00005 1 | | | 4 | XH |
| 2824 | | | 31,2600 | 77624 1 | | CALL | | |
| 2825 | REP | 1 | 31,2601 | 62756 1 | | | DIVIDE | |
| 2826 | | | 31,2602 | 41257 1 | | SR* | DMP | |
| 2827 | | | 31,2603 | 20811 0 | | | 8D,1 | NOW SCALED B9 |
| 2828 | REP | 261 | 31,2604 | 00155 0 | | | MPAC | |
| 2829 | | | 31,2605 | 14037 0 | | STOVL | 30D | |
| 2830 | | | 31,2606 | 00001 0 | | | 0 | |
| 2831 | | | 31,2607 | 14043 0 | | STOVL | 34D | |
| 2832 | | | 31,2610 | 00007 0 | | | 6 | YH |



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| | | | | | | | |
|------|-----|-----|---------|---------|---------|---------|--------------------------|
| 2833 | | | 31,2811 | 77624 1 | CALL | DIVIDE | |
| 2834 | REP | 2 | LAST | 618 | 31,2812 | 62756 1 | |
| 2835 | | | 31,2813 | 41257 1 | SR* | DMP | |
| 2836 | | | 31,2814 | 20811 0 | | 8D,1 | B9 |
| 2837 | REP | 262 | LAST | 618 | 31,2815 | 00155 0 | B18 |
| 2838 | | | 31,2816 | 41415 1 | DAD | PUSH | PUSH 16-17 =A SCALED B18 |
| 2839 | | | 31,2817 | 00037 0 | | 30D | |
| 2840 | | | 31,2820 | 75425 0 | DSJ | SCRT | |
| 2841 | REP | 1 | | | 31,2821 | 23040 1 | 1.0B18 |
| 2842 | | | 31,2822 | 77725 1 | PDDL | | PUSH 18-19 SORT(A-1) B9 |
| 2843 | | | 31,2823 | 00021 1 | | 18D | |
| 2844 | | | 31,2824 | 14043 0 | STCDL | 34D | |
| 2845 | | | 31,2825 | 00005 1 | | 4 | XH |
| 2846 | | | 31,2826 | 77624 1 | CALL | | |
| 2847 | REP | 3 | LAST | 619 | 31,2827 | 62756 1 | |
| 2848 | | | 31,2830 | 65257 1 | SR* | DIVIDE | |
| 2849 | | | 31,2831 | 20822 0 | | PDDL | |
| 2850 | | | 31,2832 | 00007 0 | | 17D,1 | PUSH 20-21 = XH/A B29 |
| 2851 | | | 31,2833 | 77624 1 | CALL | | YH |
| 2852 | REP | 4 | LAST | 619 | 31,2834 | 62756 1 | |
| 2853 | | | 31,2835 | 65257 1 | SR* | DIVIDE | |
| 2854 | | | 31,2836 | 20822 0 | | PDDL | |
| 2855 | | | 31,2837 | 00021 1 | | 17D,1 | PUSH 22-23 = YH/A B29 |
| 2856 | | | 31,2840 | 14043 0 | STCDL | 18D | A |
| 2857 | | | 31,2841 | 00023 0 | | 34D | |
| 2858 | | | 31,2842 | 77624 1 | CALL | 18D | SORT(A-1) |
| 2859 | REP | 5 | LAST | 619 | 31,2843 | 62756 1 | |
| 2860 | | | 31,2844 | 77657 0 | SR* | DIVIDE | |
| 2861 | | | 31,2845 | 20811 0 | | 8D,1 | |
| 2862 | | | 31,2846 | 14035 1 | STCDL | 28D | |
| 2863 | | | 31,2847 | 00001 0 | | 0 | BH |
| 2864 | | | 31,2850 | 14043 0 | STCDL | 34D | |
| 2865 | | | 31,2851 | 00003 1 | | 2 | AH |
| 2866 | | | 31,2852 | 77624 1 | CALL | | |
| 2867 | REP | 6 | LAST | 619 | 31,2853 | 62756 1 | |
| 2868 | | | 31,2854 | 41257 1 | SR* | DIVIDE | |
| 2869 | | | 31,2855 | 20801 1 | | DMP | AH/RH SCALED B1 |
| 2870 | | | 31,2856 | 00035 1 | | 0,1 | |
| 2871 | | | 31,2857 | 72405 0 | | 28D | SORT(A-1)/A |
| 2872 | | | 31,2860 | 00007 0 | DMP | SI,1 | |
| 2873 | | | 31,2861 | 77725 1 | | 6 | YH |
| 2874 | | | 31,2862 | 00003 1 | PDDL | | |
| 2875 | | | 31,2863 | 14043 0 | | 2 | AH |
| 2876 | | | 31,2864 | 00001 0 | STCDL | 34D | |
| 2877 | | | 31,2865 | 77624 1 | | 0 | |
| 2878 | REP | 7 | LAST | 619 | 31,2866 | 62756 1 | |
| 2879 | | | 31,2867 | 41257 1 | CALL | | |
| 2880 | | | 31,2870 | 20801 1 | | DIVIDE | |
| 2881 | | | 31,2871 | 00035 1 | SR* | DMP | RH/AH SCALED B1 |
| 2882 | | | 31,2872 | 72405 0 | | 0,1 | |
| | | | | | | 28D | SORT(A-1)/A |
| | | | | | DMP | SI,1 | |



L P20-P25

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| | | | | | | | |
|------|-----------------|---------|---------|---------|----------|--------------------------------|--|
| 2883 | | 31,2673 | 00005 1 | | | | |
| 2884 | | 31,2674 | 43325 1 | FDDL | 4 | XH | |
| 2885 | | 31,2675 | 00025 0 | | DAD | | |
| 2886 | | 31,2676 | 00031 0 | | 20D | XH/A | |
| 2887 | | 31,2677 | 45325 1 | FDDL | 24D | ALPHA | |
| 2888 | | 31,2700 | 00027 1 | | DSU | | |
| 2889 | | 31,2701 | 00033 1 | | 22D | YH/A | |
| 2890 | | 31,2702 | 40206 1 | PUSH | 26D | BETA | |
| 2891 | | 31,2703 | 00021 1 | | SETPD | | |
| 2892 | | 31,2704 | 45345 1 | DLOAD | 16D | | |
| 2893 | | 31,2705 | 00025 0 | | DSU | | |
| 2894 | | 31,2706 | 00031 0 | | 20D | XH/A | |
| 2895 | | 31,2707 | 43325 1 | FDDL | 24D | ALPHA | |
| 2896 | | 31,2710 | 00027 1 | | DAD | | |
| 2897 | | 31,2711 | 00033 1 | | 22D | YH/A | |
| 2898 | | 31,2712 | 41525 0 | FDDL | 26D | BETA | |
| 2899 | REP 18 LAST 616 | 31,2713 | 15332 1 | PUSH | PUSH | | |
| 2900 | | 31,2714 | 24041 1 | | ZEROVECS | | |
| 2901 | | 31,2715 | 00035 1 | STOVL | 32D | ZERO THIRD COMP. OF T-0 VECTOR | |
| 2902 | | 31,2716 | 53451 1 | | 26D | | |
| 2903 | | 31,2717 | 00005 1 | VSU | UNIT | | |
| 2904 | | 31,2720 | 63241 0 | | 4 | RH VECTOR | |
| 2905 | | 31,2721 | 00013 0 | DOT | FDVL | PUSH 22-23 A-SUB-ZERO | |
| 2906 | | 31,2722 | 00021 1 | | 10D | UH VECTOR | |
| 2907 | | 31,2723 | 53451 1 | | 16D | T1 VECTOR | |
| 2908 | | 31,2724 | 00005 1 | VSU | UNIT | | |
| 2909 | | 31,2725 | 41441 0 | | 4 | RH VECTOR | |
| 2910 | | 31,2726 | 00013 0 | DOT | PUSH | PUSH 24-25 A-SUB-ONE | |
| 2911 | | 31,2727 | 50021 1 | | 10D | | |
| 2912 | | 31,2730 | 00027 1 | RDSU | RNN | | |
| 2913 | REP 1 | 31,2731 | 62740 0 | | 22D | A-SUB-ZERO | |
| 2914 | | 31,2732 | 77614 1 | | HORIZ.3 | | |
| 2915 | REP 3 LAST 612 | 31,2733 | 00304 0 | BN | | | |
| 2916 | REP 1 | 31,2734 | 62744 1 | | NORPHOR | | |
| 2917 | | 31,2735 | 52175 0 | HORIZ.2 | VLOAD | HORIZ.4 | |
| 2918 | | 31,2736 | 00035 1 | | GOTO | | |
| 2919 | REP 1 | 31,2737 | 62740 0 | | 26D | T-0 VECTOR | |
| 2920 | | 31,2740 | 52014 0 | HORIZ.3 | BN | HORIZ.5 | |
| 2921 | REP 4 LAST 620 | 31,2741 | 00304 0 | | GOTO | | |
| 2922 | REP 1 | 31,2742 | 62735 1 | | NORPHOR | | |
| 2923 | REP 2 LAST 620 | 31,2743 | 62744 1 | | HORIZ.2 | | |
| 2924 | | 31,2744 | 77775 1 | HORIZ.4 | VLOAD | HORIZ.4 | |
| 2925 | | 31,2745 | 00021 1 | | 16D | | |
| 2926 | | 31,2746 | 76505 0 | HORIZ.5 | VXM | T1 VECTOR | |
| 2927 | REP 6 LAST 618 | 31,2747 | 03605 1 | | VSL1 | | |
| 2928 | | 31,2750 | 77650 1 | | URAR0 | | |
| 2929 | REP 2 LAST 618 | 31,2751 | 03672 1 | | GOTO | | |
| 2930 | | 31,2752 | 41545 0 | HORIZ.6 | DLOAD | SRRFTURN | |
| 2931 | REP 1 | 31,2753 | 23034 1 | | PUSH | | |
| 2932 | | 31,2754 | 52006 0 | | RADMOON | | |
| | | | | PUSH | GOTO | | |



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| | | | | | | | | | |
|--------|-----|-----|------|---------|----------|-----------|----------|---------------------|------------|
| 2980 | | | | 31,3037 | 00000 1 | 1.0B18 | 2DEC | 1.0 B-18 | |
| 2980 | | | | 31,3040 | 02000 0 | | | | |
| 29805 | | | | 31,3041 | 00000 1 | VARSEL | DEC | 0 | |
| 298055 | | | | 31,3042 | 01505 0 | VARSEL3 | 2DEC* | 3.4299040 E+6 B-26* | |
| 298055 | | | | 31,3043 | 14100 0 | | | | |
| 29806 | | | | 31,3044 | 00012 1 | TRUNVAR | 2DEC | 2.5 E-9 B+18 | |
| 29806 | | | | 31,3045 | 27462 1 | | | | |
| 2981 | | | | 31,3046 | 01461 0 | V8N49 | VN | 0649 | |
| 2982 | | | | 31,3047 | 01531 1 | V8N89 | VN | 0689 | |
| 2983 | | | | 31,3050 | 01306 0 | V05N70 | VN | 0570 | |
| 2984 | | | | 31,3051 | 01307 1 | V05N71 | VN | 0571 | |
| 2985 | | | | 31,3052 | 00077 1 | OCT00077 | OCT | 00077 | |
| 2986 | | | | 31,3053 | 00202 1 | V05N25P | OCT | 00202 | |
| 2987 | | | | 31,3054 | 00008 1 | SFSIX | OCT | 00008 | |
| 2988 | | | | 31,3055 | 10461 0 | JCAxis | 2DEC | .288849805 | TRACK AXIS |
| 2988 | | | | 31,3056 | 21675 0 | | | | |
| 2989 | | | | 31,3057 | 00000 1 | | 2DEC | 0 | |
| 2989 | | | | 31,3060 | 00000 1 | | | | |
| 2990 | | | | 31,3061 | 15375 1 | | 2DEC | .421895725 | |
| 2990 | | | | 31,3062 | 02004 1 | | | | |
| 2991 | REP | 1 | | 31,3063 | 02217 1 | R60ADRS | CADR | R60CALL +3 | |
| 2992 | | | | 31,3064 | 77735 0 | LNLNKLID | SLOAD | | |
| 2994 | REP | 5 | LAST | 614 | 31,3065 | 02754 0 | | IDOFLMK | |
| 2995 | | | | 31,3066 | 45230 1 | | BHIZ | DSU | |
| 2996 | REP | 1 | | 31,3067 | 63101 1 | | | LNLNKRND | |
| 2997 | REP | 6 | LAST | 604 | 31,3070 | 21646 0 | | gDWID | |
| 2998 | | | | 31,3071 | 70152 0 | | SL1 | LXC,1 | |
| 2999 | REP | 283 | LAST | 619 | 31,3072 | 00154 1 | | MPAC | |
| 3000 | | | | 31,3073 | 64743 0 | | DLOAD* | FDOL* | |
| 3001 | REP | 2 | LAST | 557 | 31,3074 | 23705 1 | | ALTTAB,1 | |
| 3002 | REP | 2 | LAST | 558 | 31,3075 | 23623 1 | | LQNTAB,1 | |
| 3003 | | | | 31,3076 | 55523 0 | | FDOL* | VDEF | |
| 3004 | REP | 2 | LAST | 558 | 31,3077 | 23541 0 | | LATTAB,1 | |
| 3005 | REP | 8 | LAST | 558 | 31,3100 | 01104 0 | | LAT | |
| 3006 | | | | 31,3101 | 77816 0 | LNLNKEND | RVO | | |
| 3007 | REP | 1 | | 14,2000 | | | SETLOC | RTS3 | |
| 3008 | | | | 14,2000 | | | BANK | | |
| 3009 | | | | 14,2000 | 43573 1 | LOWMEMORY | VLOAD* | RVO | |
| 3010 | REP | 1 | | 14,2001 | 31744 1 | | | CATLOG,1 | |
| 3011 | | | | 4550 | | | BLOCK | 02 | |
| 3012 | | | | 4550 | 0 0006 1 | GOTOV56 | EXTEND | | |
| 3013 | REP | 1 | | 4551 | 3 4554 1 | | DCA | VR56CADR | |
| 3014 | REP | 3 | LAST | 369 | 4552 | 1 5122 1 | TCP | SUPDKCHZ | |
| 3015 | REP | 4 | LAST | 208 | 57,1777 | | BRANK= | WHOCARBS | |
| 3016 | REP | 2 | LAST | 230 | 4553 | 02637 1 | VR56CADR | 2CADR | TRACKTRM |
| 3016 | | | | 4554 | 66107 1 | | | | |
| 3017 | REP | 1 | | 4000 | | | SETLOC | FPTAG2 | |
| 3018 | | | | 4555 | | | BANK | | |
| 3019 | REP | 1 | | | | | COUNT* | 58/P20 | |
| 5000 | | | | 48,3574 | | | BANK | 40 | |

P20 TERMINATES BY GOTOV56 INSTEAD OF GOTOPOCH



L P20-P25

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| | | | | | | | | | |
|-------|-----|----|------|-----|---------|--------|---|----------|------------|
| 5056 | REP | 9 | LAST | 613 | 40,3653 | 02676 | 1 | | RENDWPLD |
| 5059 | | | | | 40,3654 | 77776 | 1 | EXIT | |
| 5060 | REP | 31 | LAST | 623 | 40,3655 | 1 5423 | 0 | TCF | ENDEXT |
| 5061 | | | | | 40,3656 | 40020 | 1 | STO | BOV |
| 5062 | REP | 8 | LAST | 600 | 40,3657 | 00051 | 0 | V8TW | S2 |
| 5063 | | | | | 40,3660 | 61661 | 1 | | +1 |
| 5064 | | | | | 40,3661 | 45014 | 0 | CLEAR | CALL |
| 5065 | REP | 3 | LAST | 623 | 40,3662 | 04661 | 1 | | V8YFLAG |
| 5066 | REP | 17 | LAST | 595 | 40,3663 | 27371 | 1 | | INTSMALL |
| 5067 | | | | | 40,3664 | 71331 | 0 | SSP | DLOAD |
| 5068 | REP | 18 | LAST | 621 | 40,3665 | 00051 | 0 | | S1 |
| 5069 | | | | | 40,3666 | 00006 | 1 | DEC | 6 |
| 5070 | REP | 19 | LAST | 620 | 40,3667 | 15332 | 1 | | Z8ROVCS |
| 5071 | REP | 3 | LAST | 623 | 40,3670 | 02321 | 0 | STORE | WWPOS |
| 5072 | REP | 3 | LAST | 623 | 40,3671 | 02323 | 1 | STORE | WWVEL |
| 50721 | REP | 3 | LAST | 623 | 40,3672 | 02325 | 1 | STORE | WWOPT |
| 5073 | | | | | 40,3673 | 77770 | 1 | AKT,1 | |
| 5074 | | | | | 40,3674 | 00044 | 1 | DEC | 36 |
| 5075 | | | | | 40,3675 | 47573 | 0 | NXPOSVEL | VLOAD* V8Q |
| 5076 | REP | 55 | LAST | 610 | 40,3676 | 02445 | 0 | | W +36D,1 |
| 5077 | | | | | 40,3677 | 77615 | 0 | DAD | |
| 5078 | REP | 4 | LAST | 624 | 40,3700 | 02321 | 0 | | WWPOS |
| 5079 | REP | 5 | LAST | 624 | 40,3701 | 02321 | 0 | STORE | WWPOS |
| 5080 | | | | | 40,3702 | 47573 | 0 | VLOAD* | V8Q |
| 5081 | REP | 56 | LAST | 624 | 40,3703 | 02533 | 0 | | W +90D,1 |
| 5082 | | | | | 40,3704 | 77615 | 0 | DAD | |
| 5083 | REP | 1 | LAST | 624 | 40,3705 | 02323 | 1 | | WWVEL |
| 5084 | REP | 6 | LAST | 624 | 40,3706 | 00000 | 1 | STORE | WWVEL |
| 5085 | | | | | 40,3707 | 75500 | 0 | TIX,1 | SORT |
| 5086 | REP | 1 | | | 40,3710 | 61675 | 1 | | NXPOSVEL |
| 5087 | REP | 6 | LAST | 624 | 40,3711 | 16323 | 1 | STOCL | WWVEL |
| 5088 | REP | 6 | LAST | 624 | 40,3712 | 02321 | 0 | | WWPOS |
| 5089 | | | | | 40,3713 | 77766 | 0 | SORT | |
| 5090 | REP | 7 | LAST | 624 | 40,3714 | 02321 | 0 | STORE | WWPOS |
| 5091 | | | | | 40,3715 | 52000 | 0 | BOV | GOTO |
| 5092 | | | | | 40,3716 | 61720 | 0 | | +2 |
| 5093 | REP | 1 | | | 40,3717 | 61724 | 1 | | V8TXX |
| 5094 | | | | | 40,3720 | 77745 | 1 | DLOAD | |
| 5095 | REP | 9 | LAST | 618 | 40,3721 | 15340 | 1 | | DPPOS MAX |
| 5096 | REP | 6 | LAST | 624 | 40,3722 | 02321 | 0 | STORE | WWPOS |
| 5097 | REP | 7 | LAST | 624 | 40,3723 | 02323 | 1 | STORE | WWVEL |
| 5098 | | | | | 40,3724 | 66150 | 0 | V8TXX | LXA,1 |
| 5099 | REP | 9 | LAST | 624 | 40,3725 | 00051 | 0 | | S2 |
| 5100 | REP | 12 | LAST | 557 | 40,3726 | 00052 | 0 | | OPRET |
| 5101 | | | | | 40,3727 | 77770 | 1 | EXIT | |
| 5102 | REP | 39 | LAST | 578 | 40,3730 | 0 4574 | 0 | TC | POSTJMP |
| 5103 | REP | 2 | LAST | 259 | 40,3731 | 27406 | 0 | CADR | INTWAKR |
| 5104 | REP | 11 | LAST | 496 | 64,1720 | | | WWPOS | = |
| 5105 | REP | 7 | LAST | 497 | E4,1722 | | | WWVEL | = |
| 5106 | REP | 12 | LAST | 497 | E4,1724 | | | WWOPT | = |



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L P20-P25

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| | | | | | | |
|------|---------|-------|---|---------|------|-----------|
| 8107 | 40,3732 | 01543 | 1 | V06N99A | VN | 0600 |
| 8108 | 40,3733 | 22363 | 1 | 1/SQRT3 | 2DEC | 0.5773502 |
| 8109 | 40,3734 | 11620 | 0 | | | |
| 8109 | 40,3735 | 00002 | 0 | V87DEC2 | 2DEC | 2 B-14 |
| 8109 | 40,3736 | 00000 | 1 | | | |



L P30,P37

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| | | | | | | | | | |
|-------|-----|-----|------|---------|---------|--------|--------|--------|----------|
| 0001 | | | | 32,2017 | | | | BANK | 32 |
| 0002 | REP | 1 | | 35,2000 | | | | SETLOC | P30S1 |
| 0003 | | | | 35,3544 | | | | BANK | |
| 0004 | REP | 8 | LAST | 555 | 57,1625 | | | BRANK= | JMCA |
| 0005 | REP | 1 | | | | | | COUNT | 35/P34 |
| 0006 | | | | 35,3544 | 77420 | 1 | DISPMA | STO | EXIT |
| 0007 | REP | 2 | LAST | 90 | 35,3545 | 02370 | 1 | | ROEXIT |
| 0008 | REP | 2 | LAST | 473 | 35,3546 | 0 | 3564 | 0 | TC |
| 0009 | REP | 2 | LAST | 473 | 35,3547 | 3 | 3132 | 1 | DISP45 |
| 0010 | REP | 155 | LAST | 623 | 35,3550 | 0 | 4555 | 0 | TC |
| 0011 | REP | 11 | LAST | 617 | 35,3551 | 20763 | 1 | | CADR |
| 0012 | REP | 33 | LAST | 617 | 35,3552 | 0 | 4106 | 1 | TC |
| 0013 | REP | 1 | | | 35,3553 | 0 | 3560 | 1 | TC |
| 0014 | REP | 1 | | | 35,3554 | 0 | 3547 | 1 | TC |
| 0015 | REP | 39 | LAST | 617 | 35,3555 | 0 | 5301 | 0 | P30PHSI |
| 0016 | | | | | 35,3556 | 00014 | 1 | | OCT |
| 0017 | REP | 78 | LAST | 617 | 35,3557 | 0 | 5112 | 0 | TCR |
| 0018 | REP | 126 | LAST | 623 | 35,3560 | 0 | 6008 | 1 | END45 |
| 0019 | | | | | 35,3561 | 52014 | 0 | | CLEAR |
| 0020 | REP | 1 | | | 35,3562 | 03664 | 0 | | TIMRFLAG |
| 0021 | REP | 3 | LAST | 626 | 35,3563 | 02370 | 1 | | ROEXIT |
| 0022 | | | | | 35,3564 | 0 | 0006 | 1 | COMPTOO |
| 00221 | REP | 1 | | | 35,3565 | 23=066 | 0 | | EXTEND |
| 00222 | REP | 32 | LAST | 623 | 35,3566 | 0 | 5435 | 0 | QKCH |
| 00223 | REP | 2 | LAST | 626 | 35,3567 | 00155 | 0 | | PHSPRDT6 |
| 00224 | REP | 126 | LAST | 586 | 35,3570 | 3 | 4714 | 1 | TC |
| 00225 | REP | 1 | | | 35,3571 | 55=145 | 1 | | UPFLAG |
| 00226 | | | | | 35,3572 | 0 | 0004 | 0 | ADRES |
| 00227 | REP | 74 | LAST | 608 | 35,3573 | 3 | 4712 | 1 | CAP |
| 00228 | REP | 22 | LAST | 530 | 35,3574 | 0 | 5140 | 1 | TS |
| 00229 | REP | 27 | LAST | 522 | 57,1412 | | | | NWORD1 |
| 0023 | REP | 3 | LAST | 213 | 35,3575 | 03172 | 0 | | ININT |
| 0023 | | | | | 35,3576 | 50067 | 0 | | CAP |
| 00231 | REP | 11 | LAST | 610 | 35,3577 | 0 | 5261 | 1 | TC |
| 00232 | | | | | 35,3600 | 40036 | 0 | | ONE |
| 00233 | | | | | 35,3601 | 05024 | 1 | | TC |
| 00234 | | | | | 35,3602 | 13000 | 0 | | WAITLIST |
| 00235 | REP | 2 | LAST | 626 | 35,3603 | 0 | 1066 | 0 | BRANK= |

USED IN P30

USED TO COMPUTE TGOO
** GROUP 6 TEMPORARY USED ,, BEWARE **

SET TIMRFLAG
BIT 11 FLAG 7

6.3SPOT FOR CLOKTASK
GROUP 4 CONTINUES HERE

TC PHSPRDT6

L P30,P37

USSR-5 PAGE NO. 2 BY 53

P00239 PROGRAM DESCRIPTION P30 DATE 3-8-67

R00245 MOD. I BY S. ZELDIN- TO ADD P31 AND AD APT P30 FOR P31 USE. 22DEC67

R0025 FUNCTIONAL DESCRIPTION

R0026 +30(EXTERNAL DELTA-V TARGETTING PROGRAM)

R0027 ACCEPTS ASTRONAUT INPUTS OF TIG,DELV(LV) AND COMPUTES, FOR DISPLAY,
R0028 APOGEE, PERIGEE, DELV(MAG), MGA ASSOCIATED WITH DESIRED MANEUVER

R0029 P31(GENERAL LAMBERT AIMPOINT GUIDANCE)

R00291 A GROUND RULE FOR P31 IS THE ANGLE BETWEEN THE TARGET VECTOR AND

R00292 POSITION VECTOR AT TIG IS NOT 185-195 DEGREES APART

R0030 BASED ON STORED INPUT OF OFFSET TARGET(B.29) AND DELTA T TRANS, AND

R0031 ASTRONAUT ENTRY OF TIG, P31 COMPUTES REQUIRED VELOCITY FOR MANEUVER

R0032 AND, FOR DISPLAY, APOGEE, PERIGEE, DELV(MAG), MGA ASSOCIATED WITH

R0033 DESIRED MANEUVER

R0034 THE FOLLOWING SUBROUTINES ARE USED IN P30 AND P31

R0035 S30.1 (P30 ONLY)

R0036 S31.1 (P31 ONLY)

R0037 P30/P31 - DISPLAYS TIG

R0038 CNTUP30 - DISPLAYS DELV(LV)

R00381 PARAM30 - DISPLAYS APOGEE, PERIGEE, DELV(MAG), MGA, TIME FROM TIG,

R00382 MARKS SINCE LAST THRUSTING MANEUVER

R00383 CALLING SEQUENCE VIA JOB FROM V37

R00384 EXIT VIA V37 CALL OR GOTOP00H

R00385 OUTPUT FOR POWERED FLIGHT

R00386 VTIG X

R00387 RTIG XSEE S30.1

R00388 DELVSIN X

R00389 VCDISP

R003891 RTARD X

R003892 TPASS4 X SEE S31.1

R003893 X

0039 REP 1

COUNT 35/P30

003901 REP 1 35,3604 0 3638 1 P30
 003903 REP 1 35,3605 0 3655 1
 003905 REP 35 LAST 612 35,3606 0 5447 0
 003907 REP 15 LAST 576 35,3607 0 0027 1
 003909 REP 127 LAST 626 35,3610 0 6006 1
 003911 35,3611 77624 1
 003913 REP 1 35,3612 63102 1
 003915 35,3613 77776 1
 003919 REP 1 35,3614 0 3665 1
 003921 REP 33 LAST 626 35,3615 0 5435 0

TC P30/P31
 TC CNTNUP30
 TC DOWNFLAG
 ADRES UPDATFLG
 TC INTPRET
 CALL
 S30.1
 EXIT
 TC PARAM30
 TC UPFLAG

RESET UPDATFLG
 BIT 7 FLAG 1

L P30,P37

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| | | | | | | | | | | |
|--------|-----|-----|------|-----|---------|--------|---|----------|-------|-------------|
| 003923 | REP | 3 | LAST | 620 | 35,3616 | 00045 | 0 | | ADRES | XDELVPLG |
| 003925 | REP | 34 | LAST | 626 | 35,3617 | 1 4108 | 0 | | TCP | GOTOPOCH |
| 003927 | REP | 2 | LAST | 627 | 35,3620 | 0 3638 | 1 | P31 | TC | P30/P31 |
| 003929 | REP | 36 | LAST | 627 | 35,3621 | 0 5447 | 0 | | TC | DOWNFLAG |
| 003931 | REP | 18 | LAST | 627 | 35,3622 | 00027 | 1 | | ADRES | UPDATPLG |
| 003932 | REP | 37 | LAST | 626 | 35,3623 | 0 5447 | 0 | | TC | DOWNFLAG |
| 003933 | REP | 3 | LAST | 480 | 35,3624 | 00158 | 0 | | ADRES | NORMSW |
| 003934 | REP | 128 | LAST | 627 | 35,3625 | 0 6008 | 1 | | TC | INTRPT |
| 003935 | | | | | 35,3626 | 77624 | 1 | | CALL | |
| 003937 | REP | 1 | | | 35,3627 | 63154 | 1 | | | 531.1 |
| 003939 | | | | | 35,3630 | 77776 | 1 | | EXIT | |
| 003943 | REP | 2 | LAST | 627 | 35,3631 | 0 3655 | 1 | | TC | CNTNUP30 |
| 003945 | REP | 2 | LAST | 627 | 35,3632 | 0 3655 | 1 | | TC | PARAM30 |
| 003947 | REP | 38 | LAST | 628 | 35,3633 | 0 5447 | 0 | | TC | DOWNFLAG |
| 003949 | REP | 4 | LAST | 628 | 35,3634 | 00045 | 0 | | ADRES | XDELVPLG |
| 003951 | REP | 35 | LAST | 628 | 35,3635 | 1 4108 | 0 | | TCP | GOTOPOCH |
| 00396 | REP | 152 | LAST | 476 | 35,3636 | 56 002 | 0 | P30/P31 | XCH | 0 |
| 00397 | REP | 1 | | | 35,3637 | 55=664 | 0 | | TS | P30/31RT |
| 0040 | REP | 34 | LAST | 627 | 35,3640 | 0 5435 | 0 | | TC | UPFLAG |
| 00405 | REP | 17 | LAST | 628 | 35,3641 | 00027 | 1 | | ADRES | UPDATPLG |
| 0041 | REP | 35 | LAST | 628 | 35,3642 | 0 5435 | 0 | | TC | UPFLAG |
| 00415 | REP | 5 | LAST | 576 | 35,3643 | 00031 | 0 | | ADRES | TRACKPLG |
| 0042 | REP | 1 | | | 35,3644 | 3 3722 | 0 | | CAP | V06N33 |
| 0043 | REP | 156 | LAST | 626 | 35,3645 | 0 4555 | 0 | | TC | BANKCALL |
| 0044 | REP | 12 | LAST | 626 | 35,3646 | 20763 | 1 | | CADR | GOFLASH |
| 0045 | REP | 36 | LAST | 628 | 35,3647 | 1 4108 | 0 | | TCP | GOTOPOCH |
| 00467 | REP | 2 | LAST | 628 | 35,3650 | 0 1664 | 1 | | TC | P30/31RT |
| 0047 | REP | 3 | LAST | 628 | 35,3651 | 1 3642 | 0 | | TCP | P30/P31 +4 |
| 0048 | REP | 40 | LAST | 626 | 35,3652 | 0 5301 | 0 | | TC | PHASCHNG |
| 0049 | | | | | 35,3653 | 00014 | 1 | | OCT | 00014 |
| 0050 | REP | 78 | LAST | 626 | 35,3654 | 0 5112 | 0 | | TC | ENDOFJOB |
| 00501 | REP | 153 | LAST | 628 | 35,3655 | 56 002 | 0 | CNTNUP30 | XCH | 0 |
| 00502 | REP | 1 | | | 35,3656 | 55=127 | 0 | | TS | P30/RET |
| 0051 | REP | 2 | LAST | 472 | 35,3657 | 3 3131 | 1 | | CAP | V06N61 |
| 0052 | REP | 157 | LAST | 628 | 35,3660 | 0 4555 | 0 | | TC | BANKCALL |
| 0053 | REP | 25 | LAST | 613 | 35,3661 | 20824 | 0 | | CADR | GOFLASH |
| 0054 | REP | 37 | LAST | 628 | 35,3662 | 1 4108 | 0 | | TCP | GOTOPOCH |
| 0055 | REP | 2 | LAST | 628 | 35,3663 | 0 1127 | 1 | | TC | P30/RET |
| 0056 | REP | 3 | LAST | 628 | 35,3664 | 1 3657 | 1 | | TCP | CNTNUP30 +2 |
| 0067 | REP | 154 | LAST | 628 | 35,3665 | 56 002 | 0 | PARAM30 | XCH | 0 |
| 00675 | REP | 3 | LAST | 628 | 35,3666 | 55=664 | 0 | | TS | P30/31RT |
| 0068 | REP | 1 | | | 35,3667 | 3 3723 | 1 | | CAP | V06N42 |
| 0069 | REP | 158 | LAST | 628 | 35,3670 | 0 4555 | 0 | | TC | BANKCALL |
| 0070 | REP | 26 | LAST | 628 | 35,3671 | 20824 | 0 | | CADR | GOFLASH |
| 0071 | REP | 38 | LAST | 628 | 35,3672 | 0 4106 | 1 | | TC | GOTOPOCH |
| 0072 | REP | 1 | | | 35,3673 | 1 3675 | 1 | | TCP | REPTEST |

SET XDELVPLG BIT 6 FLAG 2

RESET UPDATPLG BIT 7 FLAG 1

RESET NORMSW BIT 10 FLAG 7

BIT 6 FLAG 2

SET UPDATPLG BIT 7 FLAG 1

SET TRACKPLG BIT 5 FLAG 1
T OF IQN

ON TERMINATION GOTOPOCH
ON PROCEED GO DO REPTST

L P30,P37

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| | | | | | | | | | | |
|-------|-----|-----|------|-----|---------|----|------|---|----------|------------|
| 0073 | REP | 3 | LAST | 628 | 35,3674 | 1 | 3667 | 1 | TCF | PARAM30 +2 |
| 0074 | REP | 19 | LAST | 554 | 35,3675 | 3 | 4676 | 1 | REPTST | CAP BIT13 |
| 0075 | REP | 36 | LAST | 578 | 35,3676 | 7 | 0077 | 0 | MARK | STATE +3 |
| 0076 | | | | | 35,3677 | 0 | 0006 | 1 | EXTEND | |
| 0077 | REP | 1 | | | 35,3700 | 1 | 3710 | 0 | BZF | NOTSET |
| 0078 | REP | 129 | LAST | 628 | 35,3701 | 0 | 6006 | 1 | TC | INTPRET |
| 0079 | | | | | 35,3702 | 4 | 1575 | 0 | VLOAD | PUSH |
| 0080 | REP | 6 | LAST | 520 | 35,3703 | 0 | 3646 | 0 | | DELVSIN |
| 0081 | | | | | 35,3704 | 7 | 7624 | 1 | CALL | |
| 0082 | REP | 3 | LAST | 465 | 35,3705 | 1 | 0660 | 0 | | GET-MGA |
| 0084 | | | | | 35,3706 | 7 | 7650 | 1 | GOTO | |
| 0085 | REP | 1 | | | 35,3707 | 7 | 3714 | 1 | | FLASHMGA |
| 0086 | | | | | 35,3710 | 0 | 0006 | 1 | NOTSET | EXTEND |
| 0087 | REP | 1 | | | 35,3711 | 4 | 3721 | 1 | DCS | MARSDP |
| 0088 | REP | 9 | LAST | 626 | 35,3712 | 53 | 626 | 0 | DYCH | -MGA |
| 0089 | REP | 130 | LAST | 629 | 35,3713 | 0 | 6006 | 1 | TC | INTPRET |
| 0090 | | | | | 35,3714 | 7 | 7624 | 1 | FLASHMGA | CALL |
| 0091 | REP | 1 | | | 35,3715 | 7 | 3544 | 0 | | DISPMGA |
| 0092 | | | | | 35,3716 | 7 | 7776 | 1 | EXIT | |
| 00935 | REP | 4 | LAST | 628 | 35,3717 | 0 | 1664 | 1 | TC | P30/31RT |
| 0097 | | | | | 35,3720 | 0 | 0000 | 1 | MARSDP | OCT 00000 |
| 0098 | | | | | 35,3721 | 3 | 5100 | 0 | OCT | 35100 |
| A0099 | | | | | | | | | | |
| 0100 | | | | | 35,3722 | 0 | 1441 | 1 | V08N33 | VN 0633 |
| 0102 | | | | | 35,3723 | 0 | 1452 | 0 | V08N42 | VN 0642 |
| 0103 | | | | | 35,3724 | 0 | 4043 | 1 | V16N35 | VN 1635 |
| 0104 | | | | | 35,3725 | 0 | 1455 | 1 | V08N45 | VN 0645 |

REFSMFLAG

REFSMFLAG = 0 , THEN BRANCH TO NOTSET

-MGA, -MGA+1 CONTAINS (-00001)

(00000) (16440) = (+00001)

(.01) DEGREES IN THE LOW ORDER REGISTER

L P30,P37

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R0105 PROGRAM DESCRIPTION S30.1 DATE 9NOV66

R0106 MOD NO 1 LOG SECTION P30,P37
 R0107 MOD BY RANA AIYAWAR **
 R01075 MOD.2 BY S.ZELDIN - TO CORRECT MOD.1 FOR COLOSSUS 29DEC67
 R0108 FUNCTIONAL DESCRIPTION
 R0109 BASED ON STORED TARGET PARAMETERS(R OF IGNITION(RTIG),V OF
 R0110 IGNITION(VTIG) TIME OF IGNITION(TIG), DELTA(LV), COMPUTE PERIGEE ALTITUDE
 R0111 APOGEE ALTITUDE AND DELTA-V REQUIRED IN REF. COORDS.(DELVSIN)
 R0112 CALLING SEQUENCE
 R0113 L CALL
 R0114 L+1 S30.1
 R0115 NORMAL EXIT MODE
 R0116 AT L+2 OR CALLING SEQUENCE (GOTO L+2)
 R0117 SUBROUTINES CALLED
 R0118 THISPREC
 R0119 PERIAPO
 R0120 ALARM OR ABORT EXIT MODES
 R0121 NONE
 R0122 ERASABLE INITIALIZATION REQUIRED
 R0123 TIG TIME OF IGNITION DP B28CS
 R0124 DELVSLV SPECIFIED DELTA-V IN LOCAL VERT.
 R0125 COORDS. OF ACTIVE VEHICLE AT
 R0126 TIME OF IGNITION VCT. B+7M/CS
 R0127 OUTPUT
 R0128 RTIG POSITION AT TIG VCT. B+29M
 R0129 VTIG VELOCITY AT TIG VCT. B+7M
 R0130 HAPO APOGEE ALT. DP B+29M
 R0131 HPER PERIGEE ALT. DP B+29M
 R0132 DELVSIN DELVSLV IN REF COORDS VCT. B+7M/CS
 R0133 VDISP MAG. OF DELVSIN DP B+7M/CS
 R0134 DERRIS QTEMP TEMP. ERASABLE
 R0137 QPRST,MPAC
 R0138 PUSHLIST

| | | | | | | | | | |
|-------|-----|----|------|---------|---------|-------|-------|--|---------------|
| 0139 | REP | 1 | | 31,2000 | | | | | SETLOC P30S1A |
| 0140 | | | | 31,3102 | | | | | BANK |
| 0141 | REP | 1 | | | | | | | COUNT 35/S30S |
| 0142 | | | | 31,3102 | 71220 | 1 | S30.1 | | STO DLOAD |
| 0143 | REP | 4 | LAST | 548 | 31,3103 | 03057 | 0 | | QTEMP |
| 0144 | REP | 28 | LAST | 628 | 31,3104 | 03413 | 1 | | TIG |
| 0145 | REP | 32 | LAST | 598 | 31,3105 | 34041 | 0 | | STCALL TDEC1 |
| 0146 | REP | 5 | LAST | 508 | 31,3106 | 27022 | 1 | | THISPREC |
| 0147 | | | | 31,3107 | 67175 | 0 | | | VLOAD SIA,2 |
| 0148 | REP | 16 | LAST | 588 | 31,3110 | 00007 | 0 | | VATT |
| 01485 | REP | 11 | LAST | 528 | 31,3111 | 03748 | 1 | | RTX2 |
| 0149 | REP | 2 | LAST | 121 | 31,3112 | 27640 | 0 | | STOVL VTIG |

TIME IGNITION SCALED AT 2(+28)CS
 ENCKE ROUTINE FOR



L P30,P37

| | | | | | | |
|-------|-----|----|------|-----|---------|---------|
| 0150 | REP | 20 | LAST | 566 | 31,3113 | 00001 0 |
| 0151 | REP | 3 | LAST | 121 | 31,3114 | 03632 0 |
| 0152 | REP | 25 | LAST | 547 | 31,3115 | 03540 0 |
| 0153 | | | | | 31,3116 | 53435 0 |
| 0154 | REP | 3 | LAST | 630 | 31,3117 | 03640 0 |
| 0155 | REP | 9 | LAST | 471 | 31,3120 | 36617 1 |
| 0156 | REP | 3 | LAST | 469 | 31,3121 | 72667 0 |
| 0157 | | | | | 31,3122 | 61375 1 |
| 0158 | REP | 4 | LAST | 171 | 31,3123 | 03405 0 |
| 0159 | | | | | 31,3124 | 00001 0 |
| 0160 | | | | | 31,3125 | 66172 0 |
| 0161 | REP | 9 | LAST | 545 | 31,3126 | 03745 1 |
| 0162 | REP | 7 | LAST | 629 | 31,3127 | 03646 0 |
| 0163 | | | | | 31,3130 | 77646 0 |
| 0164 | REP | 4 | LAST | 276 | 31,3131 | 27654 0 |
| 0165 | REP | 4 | LAST | 631 | 31,3132 | 03632 0 |
| 0166 | | | | | 31,3133 | 53315 0 |
| 0167 | REP | 8 | LAST | 631 | 31,3134 | 03646 0 |
| 0168 | REP | 4 | LAST | 631 | 31,3135 | 03640 0 |
| 0169 | | | | | 31,3136 | 77624 1 |
| 0170 | REP | 3 | LAST | 520 | 31,3137 | 45312 0 |
| 0171 | | | | | 31,3140 | 77624 1 |
| 0172 | REP | 3 | LAST | 520 | 31,3141 | 45422 1 |
| 01725 | | | | | 31,3142 | 77624 1 |
| 01726 | REP | 3 | LAST | 513 | 31,3143 | 46754 0 |
| 0173 | REP | 2 | LAST | 274 | 31,3144 | 16366 0 |
| 0174 | | | | | 31,3145 | 00005 1 |
| 0175 | | | | | 31,3146 | 77624 1 |
| 0176 | REP | 4 | LAST | 631 | 31,3147 | 45422 1 |
| 01765 | | | | | 31,3150 | 77624 1 |
| 01766 | REP | 4 | LAST | 631 | 31,3151 | 46754 0 |
| 0177 | REP | 4 | LAST | 274 | 31,3152 | 36364 0 |
| 0178 | REP | 5 | LAST | 630 | 31,3153 | 03657 0 |

| | | |
|--------|----------|------------------|
| | RATT | |
| STORE | RTIG | |
| STORE | RACT3 | |
| VXV | UNIT | |
| | VTIG | |
| STCALL | UNRM | |
| | LOMAT | |
| VLOAD | VX4 | |
| | DELVSIN | |
| | 0 | |
| VEL1 | SXA,1 | |
| | RTX1 | |
| STORE | DELVSIN | |
| ARVAL | | |
| STOVL | VCDISP | MAG DELV |
| | RTIG | |
| FDVI | VAD | |
| | DELVSIN | |
| | VTIG | |
| CALL | | |
| | PERIAP01 | |
| CALL | | |
| | SHIPTR1 | |
| CALL | | |
| | MAXCHK | |
| STOVL | HPER | PERIGRE ALT R+29 |
| | 4D | |
| CALL | | |
| | SHIPTR1 | |
| CALL | | |
| | MAXCHK | |
| STCALL | HAPO | APOGRE ALT R+29 |
| | OTEMP | |

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R0181 S31.1 PROGRAM DESCRIPTION
R0182 MOD.1 BY S.ZELDIN

29DEC67

R0183 S31.1 COMPUTES DELV IN REF AND LV COORDS,MAG OF DELV,INTERCEPT TIME,
R0184 APOGEE AND PERIGEE ALT FOR REQUIRED MANEUVER

R0185 CALLING SEQUENCE

R0186 L CALL

R0187 L +1 S31.1

R0188 NORMAL EXIT MODE

R0189 AT L +2 OF CALLING SEQUENCE(GOTO L+2)

R0190 SUBROUTINES CALLED

R0191 AGAIN

R0192 PERIAPO1

R0193 SHIPTR1

R0194 MIDGIM

R0195 NO ALARM OR ABORT MODES

R0196 INPUT

R0197 DELTA DP +28

R0198 TIG DP +28

R0199 RTARG VCT +29

R01982 OUTPUT

R01983 DELVLVC VCT +7

R01984 VCDISP DP +7

R01985 HAPO DP +29

R01986 HPER DP +29

R01987 TPASS4 DP +28

R01988 DEPRIS - QTEMP

| | | | | | | | |
|-------|-----|----|------|---------|---------|-------|-------|
| 0200 | | | | 31,3154 | 71220 | 1 | S31.1 |
| 0201 | REP | 6 | LAST | 631 | 31,3155 | 03657 | 0 |
| 0202 | REP | 29 | LAST | 630 | 31,3156 | 03413 | 1 |
| 0203 | REP | 33 | LAST | 630 | 31,3157 | 34041 | 0 |
| 0204 | REP | 1 | | | 31,3160 | 01603 | 0 |
| 0205 | | | | | 31,3161 | 03375 | 0 |
| 0206 | REP | 5 | LAST | 631 | 31,3162 | 03632 | 0 |
| 0207 | REP | 12 | LAST | 647 | 31,3163 | 03612 | 1 |
| 0208 | | | | | 31,3164 | 77624 | 1 |
| 0209 | REP | 4 | LAST | 631 | 31,3165 | 45312 | 0 |
| 0210 | | | | | 31,3166 | 77624 | 1 |
| 0211 | REP | 5 | LAST | 631 | 31,3167 | 45422 | 1 |
| 02115 | | | | | 31,3170 | 77624 | 1 |
| 02116 | REP | 5 | LAST | 631 | 31,3171 | 46754 | 0 |
| 0212 | REP | 3 | LAST | 631 | 31,3172 | 16366 | 0 |
| 0213 | | | | | 31,3173 | 00005 | 1 |
| 0214 | | | | | 31,3174 | 77624 | 1 |
| 0215 | REP | 6 | LAST | 632 | 31,3175 | 45422 | 1 |
| 02155 | | | | | 31,3176 | 77624 | 1 |
| 02156 | REP | 6 | LAST | 632 | 31,3177 | 46754 | 0 |
| 0216 | REP | 5 | LAST | 631 | 31,3200 | 26364 | 1 |

STO DLOAD
QTEMP
TIG
STCALL TDEC1
AGAIN
VLOAD PDVL
RTIG
VIPRIME
CALL PERIAPO1
CALL SHIPTR1
CALL SHIPTR1
CALL SHIPTR1
STOVL HPER
4D
CALL SHIPTR1
CALL SHIPTR1
STOVL HAPO

RETURNS RTX2,RTX1,RATT,VATT,VIPRIME
DELRST3

R29

R29

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| | | | | | | | |
|-------|-----|----|------|-----|---------|-------|---|
| 0217 | REP | 15 | LAST | 545 | 31,3201 | 03646 | 0 |
| 02175 | | | | | 31,3202 | 00001 | 0 |
| 0218 | | | | | 31,3203 | 45014 | 0 |
| 0219 | REP | 6 | LAST | 544 | 31,3204 | 01072 | 0 |
| 0220 | REP | 1 | | | 31,3205 | 10653 | 0 |
| 0221 | | | | | 31,3206 | 77646 | 0 |
| 0222 | REP | 5 | LAST | 631 | 31,3207 | 17654 | 0 |
| 0223 | REP | 8 | LAST | 545 | 31,3210 | 03423 | 1 |
| 0224 | | | | | 31,3211 | 77615 | 0 |
| 0225 | REP | 30 | LAST | 632 | 31,3212 | 03413 | 1 |
| 0226 | REP | 8 | LAST | 469 | 31,3213 | 37656 | 0 |
| 0227 | REP | 7 | LAST | 632 | 31,3214 | 03657 | 0 |

DELVEBT3
 STORS 0
 SET CALL
 AVFLAG
 MIDDIM
 ABVAL
 STCDL VEDISP
 DELLT4
 DAD
 TIO
 STCALL TPASS4
 QTEMP

GET DELALVC BY FORDISPLAY

B-7 FOR DISPLAY

FOR 840.1

L P30,P37

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P0327 SUBROUTINE NAME' DELRSPL (CONTINUATION OF V 82 IN CS4 IF P11 ACTI
 R0328 TRANSFERRED COMPLETELY FROM SUNDISK, P30S REV 33. 9 SEPT 67.
 R0330 MOD NO' 0 MOD BY' ZELDIN DATE' 11 APR 67
 R0331 MOD NO' 1 MOD BY' RR BAINSPATER DATE' 12 MAY 67
 R0332 MOD NO' 2 MOD BY' RR BAINSPATER DATE' 5 JULY 67
 R0334 MOD NO' 2.1 MOD BY' RR BAINSPATER DATE' 12 JUL 67
 R0336 MOD NO' 3 MOD BY' S.ZELDIN DATE' 3 APRIL 68
 R0337 MOD 4
 R0338 FUNCTION' CALCULATE (FOR DISPLAY ON CALL) AN APPROXIMATE MEASURE OF IN-PLANE SPLASH DOWN
 R0340 ERROR. IF THE FREE-FALL TRANSFER ANGLE TO 300K FT ABOVE PAD RADIUS IS POSITIVE'
 R0342 SPLASH ERROR= -RANGE TO TARGET + FREE-FALL TRANSFER ANGLE + ESTIMATED ENTRY ANGLE.
 R0344 THE TARGET LOCATION AT ESTIMATED TIME OF IMPACT IS USED. IF THE FREE-FALL TRANSFER
 R0346 ANGLE IS NEGATIVE' SPLASH ERROR= -RANGE TO TARGET
 R0347 THE PRESENT TARGET LOCATION IS USED.
 R0348 CALLING SEQUENCE CALLED AFTER SR30.1 IF IN CS4 AND IF P11 OPERATING (UNDER CONTROL OF V82)
 R0349 SUBROUTINES CALLED' VGAMCALC, TFP/TRIG, LALOTRV.
 R0350 EXIT RETURN DIRECTLY TO V 82 FROM AT SPLRST
 R0351 ERASABLE INITIALIZATION LEFT BY SR30.1 AND V82OON1
 R0352 OUTPUT' RSP-RREC RANGE IN REVOLUTIONS
 R0354 DEBRIS' OPRST, POLO ...PDL7 ,PDL10
 DSKY DISPLAY IN N. MI.

R03541 THETA(1)
R0355

| | | | | | |
|------|-----------------|---------|---------|-----------------------|---|
| 0356 | | 32,2017 | | BANK 32 | |
| 0357 | REP 1 | 32,2000 | | SETLOC DELRSPL1 | |
| 0358 | | 32,2017 | | BANK | |
| 0359 | REP 1 | | | COUNT* 88/P30 | PROGRAMS' P30 EXTERNAL DELTA V: |
| 0360 | | 32,2017 | 00011 1 | DELRSPL STORE 8D | |
| 0361 | | 32,2020 | 45244 1 | BPL DSU | |
| 0362 | REP 1 | 32,2021 | 64067 1 | CANTDO | GONE PAST 300K FT ALT |
| 0363 | REP 1 | 32,2022 | 16328 1 | INITDP | |
| 0364 | | 32,2023 | 45000 0 | BOV CALL | |
| 0365 | REP 2 LAST 634 | 32,2024 | 64067 1 | CANTDO | POS MAX INDICATES NO 300K FT SOLUTION. |
| 0366 | REP 1 | 32,2025 | 55050 0 | VGAMCALC | VGAMMA(REV) IN PMAC,V300 MAG(R-7)=PDL 0 |
| 0367 | | 32,2026 | 45006 0 | PUSH CALL | |
| 0368 | REP 1 | 32,2027 | 56573 0 | TFP/TRIG | |
| 0369 | | 32,2030 | 77624 1 | CALL | |
| 0370 | REP 1 | 32,2031 | 64075 1 | ALGEXLCEL | |
| 0371 | | 32,2032 | 65525 0 | PDDL ACOS | T ENTRY PDL 6 |
| 0372 | REP 1 | 32,2033 | 00017 1 | CDEL P/2 | |
| 0373 | | 32,2034 | 77615 0 | DAD | |
| 0374 | | 32,2035 | 00005 1 | 4. | |
| 0375 | REP 2 LAST 89 | 32,2036 | 26350 0 | GETARG STOVL THETA(1) | |
| 0376 | REP 7 LAST 434 | 32,2037 | 03401 1 | LAT(SPL) | |
| 0377 | REP 9 LAST 622 | 32,2040 | 15104 0 | STOVL LAT | |
| 0378 | REP 10 LAST 604 | 32,2041 | 15332 1 | HIGZPROS | |
| 0379 | REP 6 LAST 601 | 32,2042 | 15110 0 | STOVL ALT | ALT=0 = IAT +4 |
| 0381 | REP 5 LAST 500 | 32,2043 | 01205 1 | PIPTIME | |

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0382          32,2044  71214  0
0383 REP 2 LAST 499 32,2045  93711  0
03831        32,2046  64050  0
03832 REP 6 LAST 509 32,2047  92325  1
03833        32,2050  43225  0
03834        32,2051  80011  1
0384         32,2052  45014  0
0385 REP 8 LAST 614 32,2053  00662  0
0386 REP 4 LAST 614 32,2054  26373  1

0387         32,2055  63256  0
0388 REP 14 LAST 513 32,2056  92327  0
03881        32,2057  50256  0
0389         32,2060  65552  0
0390         32,2061  77621  1
A0391
A0392
0393 REP 3 LAST 634 32,2062  02350  0
0394 REP 3 LAST 275 32,2063  36356  1
03941 REP 1         32,2064  27404  1
03942        32,2065  77624  1
0395 REP 1         32,2066  46653  0
0396        32,2067  65345  0
A0397
0398 REP 7 LAST 599 32,2070  15330  0
0399 REP 11 LAST 634 32,2071  15332  1
0400        32,2072  77608  1
0401        32,2073  34011  0
0402 REP 1         32,2074  64036  0

0405         32,2075  77775  1
0406 REP 1         32,2076  24251  1
0407 REP 25 LAST 621 32,2077  14045  0
0408        32,2100  00001  0
0409        32,2101  50025  0
0410 REP 1         32,2102  24243  1
0411 REP 1         32,2103  64130  1
0412        32,2104  65060  1
0413 REP 19 LAST 624 32,2105  00050  1
0414 REP 26 LAST 635 32,2106  00046  0
0415        32,2107  45324  0
0416 REP 20 LAST 635 32,2110  00050  1
0417 REP 1         32,2111  24231  1
0418        32,2112  65040  0
0419 REP 2 LAST 635 32,2113  64130  1
0420 REP 21 LAST 635 32,2114  00050  1
0421        32,2115  50025  0
0422 REP 1         32,2116  24241  0
0423 REP 3 LAST 635 32,2117  64130  1
0424        32,2120  65124  0
    
```

```

BON DLOAD
V37FLAG
+2
TSTARTS2
DSU DAD
SD
CLEAR CALL
BRADFLAG
LALOTOW

UNIT FDL
RONE
UNIT DOT
SL1 ARCCOS
BDSU

DELNDONE STCALL
CALL
CANTDO DLOAD
PUSH
STCALL
AUDEQUCL VLOAD
STODL
DSU
XSU,1
XCHX,2
RNN
DSU
XCHX,2
    
```

```

R RECOV. IN ALPHA AND MPAC

ERROR = THETA EST - THETA TARG
NEGATIVE NUMBER SIGNIFIES THAT WILL FALL SHORT.
POSITIVE NUMBER SIGNIFIES THAT WILL OVERSHOOT.

DOWNRANGE RECOVERY RANGE ERROR /360

INITIALIZE ERASE TO DOT TARGET AND UR
FOR RANGE ANGLE.
TO FDL 0 FOR DEN IN DDV.

ZERO TO FDL 2 FOR PHI ENTRY

GO SET RSP-RREC =0
    
```




L P30,P37

USER=5 PAGE NO. 12 BY 53

| | | | | | | |
|-------|---------|---------|---------------|-----------------|-------|---|
| 0463 | 32,2174 | 00013 0 | 2DEC | 7.07304526 E-4 | 5500 | |
| 0463 | 32,2175 | 22652 0 | | | | |
| 0464 | 32,2176 | 00005 1 | 2DEC | 3.08641975 E-4 | 2400 | |
| 0464 | 32,2177 | 01642 0 | | | | |
| 0465 | 32,2200 | 00005 1 | 2DEC | 3.08641975 E-4 | 2400 | |
| 0465 | 32,2201 | 01642 0 | | | | |
| 0466 | 32,2202 | 77558 1 | 2DEC | -8.8888888 E-3 | -3.2 | |
| 0466 | 32,2203 | 53522 1 | | | | |
| 0467 | 32,2204 | 00055 1 | 2DEC | 2.7777777 E-3 | 1 | |
| 0467 | 32,2205 | 20288 1 | | | | |
| 0468 | 32,2206 | 00155 0 | CK1K2 2DEC | 6.6666666 E-3 | 2.4 | |
| 0468 | 32,2207 | 07202 0 | | | | |
| 0469 | 32,2210 | 00000 1 | 2DEC | 0 | 0 | |
| 0469 | 32,2211 | 00000 1 | | | | |
| 0470 | 32,2212 | 77730 0 | 2DEC* | -1.66909989 E-5 | B7* | -.443 |
| 0470 | 32,2213 | 71525 0 | | | | |
| 0471 | 32,2214 | 00000 1 | 2DEC | 0 | | |
| 0471 | 32,2215 | 00000 1 | | | | |
| 0472 | 32,2216 | 04445 0 | 2DEC* | 1.11639691 E-3 | B7* | .001225 |
| 0472 | 32,2217 | 10102 0 | | | | |
| 0473 | 32,2220 | 03728 1 | 2DEC* | 9.56911636 E-4 | B7* | .00105 |
| 0473 | 32,2221 | 31201 0 | | | | |
| 0474 | 32,2222 | 01040 1 | YK1K2 2DEC* | 2.59733157 E-4 | B7* | .000285 |
| 0474 | 32,2223 | 28313 1 | | | | |
| 0475 | 32,2224 | 00234 1 | V(400) 2DEC | 1.2192 | R-7 | |
| 0475 | 32,2225 | 01660 0 | | | | |
| 0476 | 32,2226 | 25254 0 | V(28K) 2DEC | 85.344 | R-7 | |
| 0476 | 32,2227 | 01014 0 | | | | |
| 0477 | 32,2230 | 02222 1 | V(3K) 2DEC | 9.144 | R-7 | |
| 0477 | 32,2231 | 15646 1 | | | | |
| 0478 | 32,2232 | 22223 1 | V(24K) 2DEC | 73.152 | R-7 | |
| 0478 | 32,2233 | 18457 0 | | | | |
| 0479 | 32,2234 | 25254 0 | 2DEC | 85.344 | R-7 | |
| 0479 | 32,2235 | 01014 0 | | | | |
| 0480 | 32,2236 | 30304 0 | V(32K) 2DEC | 97.536 | R-7 | |
| 0480 | 32,2237 | 23351 1 | | | | |
| 0481 | 32,2240 | 03030 1 | V(4K) 2DEC | 12.192 | R-7 | |
| 0481 | 32,2241 | 22335 1 | | | | |
| 0482 | 32,2242 | 20000 0 | V(21K) 2DEC | 64.000 | R-7 | |
| 0482 | 32,2243 | 00000 1 | | | | |
| 0483 | 32,2244 | 00033 1 | TLESS26 2DEC* | 5.70146688 E7 | B-35* | 8660PHI/V |
| 0483 | 32,2245 | 05763 0 | | | | |
| 0484 | 32,2246 | 00053 1 | TGR26CON 2DEC | 7.2 E5 | R-28 | PHI/3 |
| 0484 | 32,2247 | 36200 0 | | | | |
| 0485 | 32,2250 | 23637 1 | V(28K) 2DEC | 79.248 | R-7 | 26000 |
| 0485 | 32,2251 | 27636 1 | | | | |
| 0486 | 32,2252 | 00012 1 | X1CON DEC | 10 | | |
| 0487 | 32,2253 | 00010 0 | DEC | 8 | | |
| 0488 | 32,2254 | 00008 1 | DEC | 6 | | |
| A0489 | | | | | | *** TABLE IS INDEXED. KEEP IN ORDER *** |



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A0400

ABOVE

L P30,P37

USRR-B PAGE NO. 14 BY 83

P0491 AVFLAG/P

00492 SUBROUTINES USED

00493 UPFLAG
00494 DOWNFLAG

| Address | Op | Count | Label | PC | PC+1 | PC+2 | PC+3 |
|---------|-----|-------|-------|-----|---------|----------|------|
| 0496 | REP | 2 | LAST | 626 | 35,2000 | | |
| 0497 | | | | | 35,3726 | | |
| 0498 | REP | 17 | LAST | 549 | E4,1770 | | |
| 0499 | | | | | 35,3726 | 0 0008 1 | |
| 0500 | REP | 18 | LAST | 639 | 35,3727 | 23=770 0 | |
| 0501 | REP | 39 | LAST | 626 | 35,3730 | 0 5447 0 | |
| 0502 | REP | 7 | LAST | 633 | 35,3731 | 00050 1 | |
| 05025 | REP | 4 | LAST | 560 | 35,3732 | 3 4753 1 | |
| 05026 | REP | 29 | LAST | 565 | 35,3733 | 54 003 0 | |
| 05027 | REP | 2 | LAST | 171 | E7,1424 | | |
| 0503 | REP | 20 | LAST | 629 | 35,3734 | 3 4676 1 | |
| 0504 | REP | 3 | LAST | 639 | 35,3735 | 55=424 0 | |
| 05045 | REP | 1 | | | 35,3735 | 3 4700 1 | |
| 05046 | REP | 30 | LAST | 639 | 35,3737 | 54 003 0 | |
| 05047 | REP | 19 | LAST | 639 | E4,1770 | | |
| 0505 | REP | 20 | LAST | 639 | 35,3740 | 0 1770 0 | |
| 0506 | | | | | 35,3741 | 0 0006 1 | |
| 0507 | REP | 21 | LAST | 639 | 35,3742 | 23=770 0 | |
| 0508 | REP | 36 | LAST | 628 | 35,3743 | 0 5435 0 | |
| 0509 | REP | 8 | LAST | 639 | 35,3744 | 00050 1 | |
| 05091 | REP | 22 | LAST | 639 | 35,3745 | 0 1770 0 | |
| 0510 | | | | | 35,3746 | 0 0008 1 | |
| 0511 | REP | 23 | LAST | 639 | 35,3747 | 23=770 0 | |
| 05111 | REP | 37 | LAST | 639 | 35,3750 | 0 5435 0 | |
| 05112 | REP | 8 | LAST | 628 | 35,3751 | 00031 0 | |
| 05113 | REP | 38 | LAST | 639 | 35,3752 | 0 5435 0 | |
| 05114 | REP | 16 | LAST | 626 | 35,3753 | 00027 1 | |
| 0512 | REP | 24 | LAST | 639 | 35,3754 | 0 1770 0 | |

SETLOC P30S1
BRANK
BRANK= SUBEXIT
EXTEND
OKCH SUBEXIT
TC DOWNFLAG
ADRES AVFLAG
CAP BRANK7
TS BRANK
BRANK= ECSTEER
CAP BIT13
TS ECSTEER
CAP BRANK4
TS BRANK
BRANK= SUBEXIT
TC SUBEXIT
EXTEND
OKCH SUBEXIT
TC UPFLAG
ADRES AVFLAG
TC SUBEXIT
P20PLOGN EXTEND
OKCH SUBEXIT
TC UPFLAG
ADRES TRACKFLG
TC UPFLAG
ADRES UPDATFLG
TC SUBEXIT

AVFLAG = CSM

BIT 5 FLAG 2

SET ECSTEER = 1

AVFLAG = 1EM

BIT 5 FLAG 2



L P40-P47

USER=8 PAGE NO. 1 E0 53

| R1000 | PROGRAM DESCRIPTION | **P40CSM** | | | | | | | |
|-------|---------------------|------------|----------|---------|--------|-------------|--|--|---|
| 1129 | REP 14 LAST 274 | E0,1486 | | | | | | | |
| 1130 | | 31,3215 | | | | | | | |
| 1131 | REP 1 | 24,2000 | | | | | | | |
| 1132 | | 24,2002 | | | | | | | |
| 1133 | REP 1 | | | | | | | | |
| 1134 | REP 46 LAST 639 | 24,2002 | 0 5447 0 | P40CSM | TC | DONFLAG | | | |
| 1135 | REP 1 | 24,2003 | 00023 0 | | ADRES | ENG2FLAG | | | |
| 1136 | REP 131 LAST 629 | 24,2004 | 0 6006 1 | | TC | INTPRST | | | |
| 1137 | | 24,2005 | 43135 1 | | SLOAD | BOFF | | | |
| 1138 | REP 4 LAST 639 | 24,2006 | 03425 1 | | | BCSTEER | | | IS THIS AN EXTERNAL DELTA V BURN |
| 1139 | REP 5 LAST 628 | 24,2007 | 01347 0 | | | XDELVFLG | | | NO - CSTEER = ECSTEER |
| 1140 | REP 1 | 24,2010 | 50013 0 | | | P40S/C | | | YES CSTEER = ZERO |
| 1141 | | 24,2011 | 77745 1 | | DLOAD | | | | |
| 1142 | REP 12 LAST 635 | 24,2012 | 15332 1 | | | HIGZEROS | | | |
| 1143 | REP 3 LAST 167 | 24,2013 | 17703 0 | P40S/C | STOCL | CSTEER | | | |
| 1144 | REP 1 | 24,2014 | 10335 0 | | | FEND | | | SET UP THRUST FOR P40 20,000 LBS |
| 1145 | REP 2 LAST 122 | 24,2015 | 17727 0 | P40S/P | STOCL | F | | | P41 ENTERS HERE |
| 1146 | REP 31 LAST 627 | 24,2016 | 03413 1 | | | TIG | | | ORIGINAL TIG MAY BE SLIPPED BY P40S/SV |
| 1147 | REP 2 LAST 115 | 24,2017 | 03450 0 | | STORE | NOXTIG | | | SET ORIGINAL TIME OF IGNITION FOR S40.9 |
| 1148 | | 24,2020 | 77776 1 | | EXIT | | | | |
| 1149 | REP 159 LAST 628 | 24,2021 | 0 4555 0 | | TC | RANKCALL | | | |
| 1150 | REP 4 LAST 608 | 24,2022 | 17573 0 | | CADR | R02BOTH | | | IMU STATUS CHECK |
| 1151 | REP 132 LAST 640 | 24,2023 | 0 6006 1 | P40PVA | TC | INTPRST | | | |
| 1152 | | 24,2024 | 77624 1 | | CALL | | | | |
| 1153 | REP 1 | 24,2025 | 34000 0 | | | S40.1 | | | COMPUTE VGTIG,UT |
| 1154 | | 24,2026 | 77624 1 | | CALL | | | | |
| 1155 | REP 1 | 24,2027 | 51512 0 | | | S40.2,3 | | | COMPUTE PREFERRED ATTITUDE |
| 1156 | | 24,2030 | 77414 0 | | SET | EXIT | | | |
| 1157 | REP 1 | 24,2031 | 01073 1 | | | PPRATPLG | | | |
| 1158 | REP 2 LAST 199 | 24,2032 | 0 2212 1 | P40SKTY | TCR | SETMINDR -1 | | | NARROW DEADBAND FOR MANEUVER (BRANK6) |
| 1159 | | 24,2033 | 0 0003 1 | | RELINT | | | | |
| 1160 | REP 169 LAST 640 | 24,2034 | 0 4555 0 | | TC | RANKCALL | | | |
| 1161 | REP 5 LAST 613 | 24,2035 | 56000 1 | | CADR | R00CSM | | | ATTITUDE MANEUVER |
| 1162 | REP 75 LAST 626 | 24,2036 | 4 4712 0 | | CS | ONE | | | FOR UPDATESVG |
| 1163 | REP 2 LAST 103 | 24,2037 | 00740 1 | | TS | NRNCYLS | | | |
| 1164 | REP 39 LAST 639 | 24,2040 | 0 5435 0 | | TC | UPFLAG | | | |
| 1165 | REP 3 LAST 626 | 24,2041 | 00155 0 | | ADRES | TIMRFLAG | | | ALLOW CLOCTASK |
| 1166 | REP 1 | 24,2042 | 0 2252 0 | | TC | P41/P40 | | | |
| 1167 | REP 1 | 24,2043 | 0 2267 0 | | TC | P41/DSP | | | P41 |
| 1168 | REP 1 | 24,2044 | 3 2351 1 | P40TTOG | CAP | V06N40 | | | INITIALIZE FOR CLOCTASK WHICH IS CALLED |

L P40-P47

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| Line | REP | LAST | Address | Value | Label | Comments |
|-------|---------|----------|---------|----------|-------------|---|
| 1169 | REP 2 | LAST 626 | 24,2045 | 55=145 1 | TS | NVWORD1 BELOW |
| 1170 | REP 133 | LAST 640 | 24,2046 | 0 6006 1 | TC | INTPRBT |
| 1171 | | | 24,2047 | 51575 1 | VLOAD | ABVAL FOR R2 |
| 1172 | REP 6 | LAST 169 | 24,2050 | 03721 0 | | VOTIO |
| 1173 | REP 6 | LAST 633 | 24,2051 | 17654 0 | STOOL | VODISP |
| 11731 | REP 13 | LAST 640 | 24,2052 | 15332 1 | | H16ZSR0S |
| 11732 | REP 4 | LAST 276 | 24,2053 | 03426 1 | STORE | DVTOTAL |
| 1174 | | | 24,2054 | 77776 1 | EXIT | |
| 1175 | | | 24,2055 | 0 0006 1 | EXTEND | |
| 1176 | REP 1 | | 24,2056 | 3 2773 0 | DCA | STERRADS SET FOR UPDATEVG AND TEST FOR STEERING |
| 1177 | REP 3 | LAST 77 | 24,2057 | 53=223 1 | DCH | AVERAGEIT AFTER AVERAGE G |
| 1178 | REP 1 | | 24,2060 | 3 2344 0 | P40GNS CAP | P40CKLS2 (4.1 PROTECTION) |
| 1179 | REP 161 | LAST 640 | 24,2061 | 0 4555 0 | TC | BANKCALL |
| 1180 | REP 2 | LAST 612 | 24,2062 | 20751 0 | CADR | GOPERF1 |
| 1181 | REP 1 | | 24,2063 | 1 2204 1 | TCF | POST41 V34 |
| 1182 | REP 1 | | 24,2064 | 1 2362 0 | TCF | TST,TRIM V33 |
| 1183 | REP 38 | LAST 575 | 24,2065 | 4 4712 0 | TRIMONLY CS | BIT1 SET MRKRTMP FOR GIMRAL TRIM (-1) |
| 1184 | REP 1 | | 24,2066 | 55=445 1 | +1 TS | MRKRTMP ENTRY FROM TST,TRIM |
| 1185 | REP 126 | LAST 626 | 24,2067 | 3 4714 1 | CAP | ZERO SET CNTR +0 FOR RESTART LOGIC IN S40.6 |
| 1186 | REP 1 | | 24,2070 | 55=447 0 | TS | CNTR +0 SAYS NORMAL ENTRY. |
| 1187 | | | | | | +1 (PRE40.6) SAYS RESTART ENTRY |
| 1188 | REP 76 | LAST 640 | 24,2071 | 3 4712 1 | CAP | ONE |
| 1189 | REP 23 | LAST 626 | 24,2072 | 0 5140 1 | TC | WAITLIST |
| 1190 | REP 15 | LAST 640 | E6,1466 | | EBANK= | DAPDATR1 |
| 1191 | REP 1 | | 24,2073 | 02051 1 | 2CADR | S40.6 |
| 1191 | REP 1 | | 24,2074 | 40066 0 | | |
| 1192 | REP 2 | LAST 641 | 24,2075 | 11=445 1 | CCS | MRKRTMP TEST TO FIND TIME TO WAIT FOR GIMRAL TEST |
| 1193 | REP 1 | | 24,2076 | 3 2343 1 | CAP | 18SEC PLUS, DELAY FOR 18 SECONDS |
| 1194 | | | 24,2077 | 1 2101 1 | TCF | +2 HOLD |
| 1195 | REP 1 | | 24,2100 | 3 2776 0 | CAP | 5SEC DELAY FOR TRIM ONLY TASK |
| 1196 | REP 162 | LAST 641 | 24,2101 | 0 4555 0 | TC | BANKCALL |
| 1197 | REP 8 | LAST 576 | 24,2102 | 01732 0 | CADR | DELAYJOB |
| 1198 | REP 12 | LAST 626 | 24,2103 | 0 5261 1 | TC | 2PHSCHNG |
| 1199 | | | 24,2104 | 40026 1 | OCT | 40026 |
| 1200 | | | 24,2105 | 00234 1 | OCT | 00234 |
| 1201 | REP 77 | LAST 641 | 24,2106 | 3 4712 1 | P40S/RS CAP | ONE |
| 1202 | REP 24 | LAST 641 | 24,2107 | 0 5140 1 | TC | WAITLIST P41/SDP |
| 1203 | REP 32 | LAST 640 | E7,1412 | | EBANK= | TIO |
| 1204 | REP 4 | LAST 626 | 24,2110 | 03172 0 | 2CADR | CLKTASK |
| 1204 | | | 24,2111 | 50067 0 | | |
| 1205 | | | 24,2112 | 0 0002 1 | RES.INT | |
| 1206 | REP 1 | | 24,2113 | 0 3304 0 | P40S/SV TCR | BYSETTER JOB, 4.23 PROTECTS, PRIO12 |
| 1207 | REP 33 | LAST 641 | E7,1412 | | EBANK= | TIO |

L P40-P47

| | | | | | | | | | |
|------|-----|-----|------|-----|---------|--------|---|----------|----------|
| 1208 | REP | 134 | LAST | 641 | 24,2114 | 0 6006 | 1 | TC | INTPRST |
| 1209 | | | | | 24,2115 | 45345 | 1 | DLOAD | DSU |
| 1210 | REP | 34 | LAST | 641 | 24,2116 | 03413 | 1 | | TIG |
| 1211 | REP | 1 | | | 24,2117 | 10342 | 0 | | SEC29.96 |
| 1212 | REP | 34 | LAST | 632 | 24,2120 | 00041 | 1 | STORE | TDEC1 |
| 1213 | | | | | 24,2121 | 77624 | 1 | CALRS | |
| 1214 | REP | 1 | | | 24,2122 | 27577 | 1 | | MIDTORV1 |
| 1215 | | | | | 24,2123 | 1 2125 | 1 | TCP | +2 |
| 1216 | REP | 1 | | | 24,2124 | 0 2146 | 0 | TC | P40SNEW |
| 1217 | | | | | 24,2125 | 0 0006 | 1 | P40SET | EXTEND |
| 1218 | REP | 266 | LAST | 623 | 24,2126 | 3 0155 | 0 | DCA | MPAC |
| 1219 | REP | 9 | LAST | 210 | 24,2127 | 53-673 | 0 | DXCH | P40TMP |
| 1223 | | | | | 24,2130 | 0 0006 | 1 | EXTEND | |
| 1224 | REP | 1 | | | 24,2131 | 4 2776 | 1 | DCA | SSECDP |
| 1225 | REP | 10 | LAST | 442 | 24,2132 | 21-472 | 0 | DAS | P40TMP |
| 1226 | | | | | 24,2133 | 0 0006 | 1 | EXTEND | |
| 1227 | REP | 11 | LAST | 642 | 24,2134 | 3 1873 | 1 | DCA | P40TMP |
| 1228 | REP | 2 | LAST | 417 | 24,2135 | 0 5231 | 1 | TC | LONGCALL |
| 1229 | REP | 35 | LAST | 642 | E7,1412 | | | EBANK= | TIG |
| 1230 | REP | 3 | LAST | 209 | 24,2136 | 02364 | 1 | 2CADR | TIGRLNK |
| 1230 | | | | | 24,2137 | 50067 | 0 | | |
| 1231 | REP | 41 | LAST | 628 | 24,2140 | 0 5301 | 0 | TC | PHASCHG |
| 1232 | | | | | 24,2141 | 20214 | 1 | OCT | 20214 |
| 1233 | REP | 80 | LAST | 628 | 24,2142 | 1 5112 | 1 | TCP | ENDOPJOB |
| 1234 | REP | 163 | LAST | 641 | 24,2143 | 0 4555 | 0 | P40RLNKR | RANKCALL |
| 1235 | REP | 4 | LAST | 527 | 24,2144 | 20607 | 1 | CADR | CLEANDSP |
| 1236 | REP | 81 | LAST | 642 | 24,2145 | 1 5112 | 1 | TCP | ENDOPJOB |
| 1237 | | | | | 24,2146 | 0 0006 | 1 | P40SNEW | EXTEND |
| 1238 | REP | 5 | LAST | 301 | 24,2147 | 3 1246 | 0 | DCA | PIPTIME1 |
| 1239 | REP | 37 | LAST | 642 | 24,2150 | 53-413 | 1 | DXCH | TIG |
| 1240 | | | | | 24,2151 | 0 0006 | 1 | EXTEND | |
| 1241 | REP | 2 | LAST | 642 | 24,2152 | 3 2342 | 0 | DCA | SEC29.96 |
| 1242 | REP | 38 | LAST | 642 | 24,2153 | 21-413 | 1 | DAS | TIG |
| 1243 | REP | 1 | | | 24,2154 | 1 2125 | 1 | TCP | P40SET |
| 1244 | REP | 16 | LAST | 641 | E6,1466 | | | EBANK= | DAPDATR1 |
| 1245 | REP | 1 | | | 24,2155 | 3 2353 | 0 | POSTBURN | CAP |
| 1246 | REP | 164 | LAST | 642 | 24,2156 | 0 4555 | 0 | TC | V16N40 |
| 1247 | REP | 1 | | | 24,2157 | 20610 | 1 | CADR | RANKCALL |
| 1248 | REP | 2 | LAST | 641 | 24,2160 | 1 2204 | 1 | TCP | REFLASH |
| 1249 | REP | 1 | | | 24,2161 | 1 2163 | 0 | TCP | POST41 |
| 1250 | REP | 2 | LAST | 209 | 24,2162 | 1 2155 | 0 | TCP | P40RCS |
| 1252 | | | | | 24,2163 | 0 0006 | 1 | P40RCS | POSTBURN |
| 1253 | REP | 1 | | | 24,2164 | 3 2407 | 0 | EXTEND | |
| 1254 | REP | 4 | LAST | 641 | 24,2165 | 53-223 | 1 | DCA | ACADN85 |
| 1255 | REP | 2 | LAST | 530 | 24,2166 | 3 4735 | 1 | DXCH | AVGRXIT |
| 1256 | REP | 165 | LAST | 642 | 24,2167 | 0 4555 | 0 | CAP | 2SECS |
| | | | | | | | | TC | RANKCALL |

RETURN IN BASIC

INTEGRATION TIME GREATER THAN ALLOWED

DELTA TIME TO PREREAD (INT. INT.)

FOR TIGRLNK

4.21 = TIGRLNK (P40TMP C8)

REMOVE RESIDUE

SET NEW TIG FOR 06 40

FOR LONGCALL OF TIG-30(OR -35)

V34 GO FINISH

PROCEED

RECYCLE

V99N40 ENTERS HERE ON A P40 BYPASS-SPS

WAIT FOR CALCN85 VIA AVGRXIT

L P40-P47

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| | | | | | | | | | |
|-------|-----|-----|------|-----|---------|--------|---|----------|-----------------|
| 1257 | REP | 0 | LAST | 641 | 24,2170 | 01732 | 0 | CADR | DELAYJCR |
| 1258 | REP | 3 | LAST | 640 | 24,2171 | 0 2212 | 1 | P40MINDB | TCR SETMINDB -1 |
| 1259 | | | | | 24,2172 | 0 0003 | 1 | | RELINT |
| 1260 | REP | 42 | LAST | 642 | 24,2173 | 0 5301 | 0 | TIGNOW | TC FWASCRNG |
| 12602 | | | | | 24,2174 | 05024 | 1 | | OCT 05024 |
| 12604 | | | | | 24,2175 | 20000 | 0 | | OCT 20000 |
| 12606 | REP | 1 | | | 24,2176 | 3 2350 | 0 | | CAP V16N65B |
| 1261 | REP | 166 | LAST | 642 | 24,2177 | 0 4555 | 0 | | TC BANKCALL |
| 1262 | REP | 2 | LAST | 642 | 24,2200 | 20810 | 1 | CADR | REPLASH |
| 1263 | REP | 3 | LAST | 642 | 24,2201 | 1 2204 | 1 | TCF | POST41 |
| 1264 | REP | 4 | LAST | 643 | 24,2202 | 1 2204 | 1 | TCF | POST41 |
| 1265 | REP | 1 | | | 24,2203 | 1 2173 | 1 | TCF | TIGNOW |
| 1267 | | | | | 24,2204 | 0 0006 | 1 | POST41 | EXTEND |
| 1268 | REP | 1 | | | 24,2205 | 3 2405 | 1 | | DCA .SERVADR |
| 1269 | REP | 5 | LAST | 642 | 24,2206 | 53=223 | 1 | | D/CH AVGBXIT |
| 1271 | REP | 39 | LAST | 628 | 24,2207 | 1 4106 | 0 | | TCF GOTOPOCH |
| 1272 | | | | | 24,2210 | 00056 | 1 | MINDB | DEC 46 |
| 1273 | | | | | 24,2211 | 00707 | 1 | MAXDR | DEC 455 |
| 12732 | REP | 17 | LAST | 642 | E6,1466 | | | | BRANK= DAPDATR1 |
| 1274 | | | | | 24,2212 | 0 0004 | 0 | -1 | INHINT |
| 1275 | REP | 13 | LAST | 583 | 24,2213 | 3 0032 | 0 | SETMINDB | CA CDUX |
| 1276 | REP | 4 | LAST | 168 | 24,2214 | 55=572 | 1 | | TS THEADK |
| 1277 | | | | | 24,2215 | 0 0006 | 1 | | EXTEND |
| 1278 | REP | 5 | LAST | 583 | 24,2216 | 3 0034 | 0 | | DCA CDUY |
| 1279 | REP | 2 | LAST | 107 | 24,2217 | 53=574 | 1 | | D/CH THEADY |
| 1280 | REP | 1 | | | 24,2220 | 3 2210 | 0 | | CA MINDB |
| 1281 | REP | 2 | LAST | 108 | 24,2221 | 55=655 | 1 | | TS ADB |
| 1282 | REP | 26 | LAST | 583 | 24,2222 | 4 4707 | 1 | | CS BIT4 |
| 1283 | REP | 16 | LAST | 643 | 24,2223 | 7 1466 | 0 | | MASK DAPDATR1 |
| 1284 | REP | 19 | LAST | 643 | 24,2224 | 55=466 | 0 | | TS DAPDATR1 |
| 1285 | REP | 155 | LAST | 628 | 24,2225 | 0 0002 | 0 | | TC 0 |
| 12852 | REP | 29 | LAST | 643 | E6,1466 | | | | BRANK= DAPDATR1 |
| 1286 | | | | | 24,2226 | 0 0004 | 0 | -1 | INHINT |
| 1287 | REP | 1 | | | 24,2227 | 3 2211 | 1 | SETMAXDR | CA MAXDR |
| 1288 | REP | 3 | LAST | 643 | 24,2230 | 55=655 | 1 | | TS ADR |
| 1289 | REP | 21 | LAST | 643 | 24,2231 | 4 1466 | 0 | | CS DAPDATR1 |
| 1290 | REP | 27 | LAST | 643 | 24,2232 | 7 4707 | 1 | | MASK BIT4 |
| 1291 | REP | 22 | LAST | 643 | 24,2233 | 27=466 | 0 | | ADS DAPDATR1 |
| 1292 | REP | 156 | LAST | 643 | 24,2234 | 0 0002 | 0 | | TC 0 |

TYPE C GROUP 4 BELOW FOR NOUN 85
PRIO 20

FINISH P40/P41
V03 PROCEED WITH REST OF THE CLEAN-UP
V32 NOT GSOP RESPONSE BUT REDISPLAY N85

ROUTINE FOR SETTING
THE MINIMUM DEADDRAND
IN AUTOPILOT

SHOULD BE CALLED UNDER
INTERRUPT INHIBITED
BRANK = E6

ROUTINE FOR SETTING
THE MAXIMUM DEADDRAND IN AUTOPILOT

SHOULD BE CALLED UNDER
INTERRUPT INHIBITED
BRANK = E6

C

L P40-P47

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| | | | | | | | | | | |
|-------|-----|-----|------|-----|---------|----------|----------|---------|----------------|--|
| 1392 | REP | 13 | LAST | 641 | 24,2300 | 0 5201 1 | | TC | 2PHSQRNG | |
| 1393 | | | | | 24,2301 | 40036 0 | | OCT | 40036 | 6.3=CLOCKTASK(100CS) |
| 1394 | | | | | 24,2302 | 00234 1 | | OCT | 234 | 4.23=P40S/SV(PRIO12) |
| 1396 | REP | 1 | | | 24,2303 | 1 2106 0 | | TCP | P40S/RS | |
| 1396 | REP | 2 | LAST | 643 | 24,2304 | 3 2350 0 | P41REDS | CAP | V16N85B | ENTER FROM P41 SIDE OF TIGAVEG |
| 1397 | REP | 4 | LAST | 644 | 24,2305 | 55=145 1 | | TS | NVWCRD1 | REDISPLAY NONFLASHING |
| 1398 | REP | 3 | LAST | 642 | 24,2306 | 3 2342 0 | | CAP | SEC29.96 +1 | |
| 1399 | REP | 25 | LAST | 641 | 24,2307 | 0 5140 1 | | TC | WAITLIST | |
| 1400 | REP | 25 | LAST | 644 | E6,1466 | | | BRANK= | DAPDATR1 | |
| 1401 | REP | 2 | LAST | 208 | 24,2310 | 02290 1 | | ZCADR | TIG/O | |
| 1401 | | | | | 24,2311 | 50088 1 | | | | |
| 1402 | REP | 22 | LAST | 617 | 24,2312 | 4 4710 1 | | CS | BIT3 | 4.4 = TIG/O(2996CS), PRECHECK(-0CS) |
| 1403 | REP | 1 | | | 24,2313 | 1 2513 0 | | TCP | TIGPHS | |
| 1404 | | | | | 24,2314 | 40220 0 | P40CNV85 | STO | SETPD | |
| 1405 | REP | 1 | | | 24,2315 | 03730 0 | | | OTEMP1 | |
| 1406 | | | | | 24,2316 | 00001 0 | | | 0 | |
| 1407 | | | | | 24,2317 | 41575 0 | | VLOAD | FUSH | |
| 1408 | REP | 1 | | | 24,2320 | 03721 0 | | | VOPREV | EQUALS VOTIG (TARGETTING INPUT) |
| 1409 | | | | | 24,2321 | 77624 1 | | CALL | | |
| 1410 | REP | 1 | | | 24,2322 | 45428 0 | | | S41.1 | |
| 1411 | REP | 6 | LAST | 277 | 24,2323 | 37665 0 | | STCALL | VGBODY | |
| 1412 | REP | 2 | LAST | 645 | 24,2324 | 03730 0 | | | OTEMP1 | |
| 14122 | REP | 26 | LAST | 645 | E6,1466 | | | BRANK= | DAPDATR1 | |
| 1413 | REP | 137 | LAST | 644 | 24,2325 | 0 6006 1 | CALCN85 | TC | INTPRET | |
| 1414 | | | | | 24,2326 | 77624 1 | | CALL | | |
| 1415 | REP | 1 | | | 24,2327 | 51018 1 | | | UPDATEVG | NEW VG, S40.8(.MAYBE S40.9) |
| 1416 | | | | | 24,2330 | 77624 1 | | CALL | | |
| 1417 | REP | 2 | LAST | 644 | 24,2331 | 50314 1 | | | P40CNV85 | COMPUTE VGBODY |
| 1418 | | | | | 24,2332 | 77776 1 | | EXIT | | |
| 1419 | REP | 1 | | | 24,2333 | 0 3127 0 | | TC | SERVXT | |
| 1420 | | | | | 24,2334 | 02217 1 | PENQ | ZDEC | 9.1188544 B-7 | SPS THRUST (20500LBS), SC.AT B+7 NEWT/R4 |
| 1420 | | | | | 24,2335 | 06650 1 | | | | |
| 1421 | | | | | 24,2336 | 00013 0 | PROS2 | ZDEC | .087437637 B-7 | RCS ULLAGE (199.6COS10 LBS), SC.AT |
| 1421 | | | | | 24,2337 | 06112 0 | | | | B+7 NEWTONS/R+4 |
| A1422 | | | | | | | | | | |
| 1423 | | | | | 24,2340 | 04700 1 | SEC24.96 | DEC | 2496 | |
| 1424 | | | | | 24,2341 | 00000 1 | SEC29.96 | ZDEC | 2996 | |
| 1424 | | | | | 24,2342 | 95664 0 | | | | |
| 1425 | | | | | 24,2343 | 03410 1 | 18SEC | DEC | 1800 | |
| 1426 | | | | | 24,2344 | 09204 1 | P40CKLS2 | OCT | 204 | |
| 1427 | | | | | 24,2345 | 37730 1 | 40CST5 | OCT | 37730 | 40 CS FOR THE TS CLOCK |
| 1428 | REP | 4 | LAST | 379 | 4377 | | | OCT12 | = | TEN |
| 1429 | | | | | 24,2346 | 04123 0 | | V1683 | VN | 1683 |
| 1430 | | | | | 24,2347 | 01525 1 | | V08N85R | VN | 0685 |
| 1431 | | | | | 24,2350 | 04125 0 | | V16N85R | VN | 1685 |
| 1432 | | | | | 24,2351 | 01450 1 | | V08N40 | VN | 0640 |
| 1433 | | | | | 24,2352 | 24020 0 | P40CK99 | OCT | 24020 | RITS 14,12, AND5 FOR I.I.N.I.S VRRR 99 |
| 1434 | | | | | 24,2353 | 04050 0 | V16N40 | VN | 1640 | |

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| | | | | | | | | | | | |
|-------|-----|-----|------|---------|---------|--------|----------|---------|----------|------------|---|
| 1435 | | | | 24,2354 | 00027 | 1 | OCT27/24 | OCT | 27 | | |
| 1436 | | | | 24,2355 | 00053 | 1 | OCT53 | OCT | 53 | | |
| 1437 | | | | 24,2356 | 00035 | 1 | OCT35 | OCT | 35 | | |
| 1438 | REP | 27 | LAST | 645 | E6,1466 | | | EBANK= | DAPDATR1 | | |
| 1439 | REP | 4 | LAST | 255 | 24,2357 | 03143 | 1 | TSIDL24 | ZCADR | TSIDLOC | |
| 1439 | | | | | 24,2360 | 12068 | 1 | | | | |
| 1440 | | | | | 24,2361 | 00028 | 0 | 3MDOT | DEC | 66.6175796 | B-16 3SEC MASS LOSS (63.8 LBS/SEC), SC.AT |
| A1441 | | | | | | | | | | | B+16 KG/SEC (NOTE, ENDOT IS PAD-LOADED, |
| A1442 | | | | | | | | | | | BUT 3MDOT IS NOT A CRITICAL QUANTITY, SO |
| A1443 | | | | | | | | | | | IT CAN REMAIN IN FIXED MEMORY) |
| 1445 | REP | 30 | LAST | 641 | 24,2362 | 3 | 4712 | 1 | TST,TRIM | CAP | BIT1 |
| 1446 | REP | 1 | | | 24,2363 | 1 | 2066 | 1 | | TCP | TRIMONLY +1 |
| 1447 | REP | 2 | LAST | 641 | 24,2364 | 3 | 2776 | 0 | TIGRLNK | CAP | 5SEC |
| 1448 | REP | 28 | LAST | 645 | 24,2365 | 0 | 5140 | 1 | | TC | WAITLIST |
| 1449 | REP | 30 | LAST | 642 | E7,1412 | | | | | EBANK= | TIG |
| 1450 | REP | 2 | LAST | 209 | 24,2366 | 02502 | 1 | | | ZCADR | TIGAVEG |
| 1450 | | | | | 24,2367 | 50067 | 0 | | | | |
| 1451 | REP | 127 | LAST | 641 | 24,2370 | 3 | 4714 | 1 | CAP | ZERO | DISABLE HERE, NOT IN P40RLNKR |
| 1452 | REP | 5 | LAST | 645 | 24,2371 | 55=145 | 1 | | TS | MWORD1 | |
| 1453 | REP | 4 | LAST | 561 | 24,2372 | 3 | 4761 | 0 | CAP | PRIO14 | |
| 1454 | REP | 19 | LAST | 644 | 24,2373 | 0 | 5027 | 1 | TC | NOVAC | |
| 1455 | REP | 40 | LAST | 646 | E7,1412 | | | | EBANK= | TIG | |
| 1456 | REP | 1 | | | 24,2374 | 02143 | 0 | | | ZCADR | P40RLNKR |
| 1456 | REP | 1 | | | 24,2375 | 50067 | 0 | | | | |
| 1457 | REP | 3 | LAST | 220 | 24,2376 | 4 | 4362 | 0 | CS | OCT37 | 4.37 = TIGAVEG (500CS) |
| 1458 | REP | 2 | LAST | 430 | 24,2377 | 0 | 4114 | 1 | P40TSK | TC | NEWPHASE |
| 1459 | | | | | 24,2400 | 00004 | 0 | | OCT | 4 | |
| 1460 | REP | 27 | LAST | 644 | 24,2401 | 0 | 5213 | 1 | TC | TASKOVER | |
| 1461 | REP | 41 | LAST | 646 | E7,1412 | | | | EBANK= | TIG | |
| 1462 | REP | 1 | | | 24,2402 | 02436 | 1 | ACADN63 | ZCADR | CALCN63 | |
| 1462 | REP | 1 | | | 24,2403 | 50067 | 0 | | | | |
| 1463 | REP | 42 | LAST | 646 | E7,1412 | | | | EBANK= | TIG | |
| 1464 | REP | 2 | LAST | 531 | 24,2404 | 03132 | 1 | SERVADR | ZCADR | SERVSKIT | |
| 1464 | | | | | 24,2405 | 76067 | 1 | | | | |
| 1465 | REP | 28 | LAST | 646 | E6,1466 | | | | EBANK= | DAPDATR1 | |
| 1466 | REP | 1 | | | 24,2406 | 02325 | 1 | ACADN85 | ZCADR | CALCN85 | |
| 1466 | REP | 1 | | | 24,2407 | 50066 | 1 | | | | |



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P1467 PROGRAM DESCRIPTION **P47CSM**
1508 REP 1

COUNT 24/P47

| | | | | | | |
|-------|-----|-----|------|-----|---------|----------|
| 1508 | REP | 43 | LAST | 646 | E7,1412 | |
| 1510 | REP | 167 | LAST | 643 | 24,2410 | 0 4555 0 |
| 1511 | REP | 5 | LAST | 640 | 24,2411 | 17573 0 |
| 1512 | REP | 138 | LAST | 645 | 24,2412 | 0 8006 1 |
| 1513 | | | | | 24,2413 | 77624 1 |
| 1514 | REP | 1 | | | 24,2414 | 27573 0 |
| 1516 | REP | 267 | LAST | 642 | 24,2416 | 30 155 0 |
| 1518 | REP | 12 | LAST | 642 | 24,2418 | 55-672 1 |
| 1517 | REP | 27 | LAST | 646 | 24,2417 | 0 5140 1 |
| 1518 | REP | 44 | LAST | 647 | E7,1412 | |
| 1519 | REP | 2 | LAST | 210 | 24,2420 | 02425 0 |
| 1519 | | | | | 24,2421 | 50067 0 |
| 1520 | REP | 43 | LAST | 643 | 24,2422 | 0 5301 0 |
| 1521 | | | | | 24,2423 | 40574 0 |
| 1522 | REP | 62 | LAST | 642 | 24,2424 | 1 5112 1 |
| 15222 | REP | 13 | LAST | 647 | E7,1672 | |
| 1523 | | | | | 24,2425 | 0 0006 1 |
| 1524 | REP | 1 | | | 24,2426 | 3 2403 1 |
| 1525 | REP | 7 | LAST | 644 | 24,2427 | 53-223 1 |
| 1526 | REP | 9 | LAST | 583 | 24,2430 | 3 4371 0 |
| 1527 | REP | 20 | LAST | 646 | 24,2431 | 0 5027 1 |
| 1528 | REP | 45 | LAST | 647 | E7,1412 | |
| 1529 | REP | 2 | LAST | 208 | 24,2432 | 02461 0 |
| 1529 | | | | | 24,2433 | 50067 0 |
| 1530 | REP | 26 | LAST | 578 | 24,2434 | 4 4711 0 |
| 1531 | REP | 2 | LAST | 645 | 24,2435 | 1 2513 0 |
| 1532 | REP | 46 | LAST | 647 | E7,1412 | |
| 1533 | REP | 139 | LAST | 647 | 24,2436 | 0 6006 1 |
| 15333 | | | | | 24,2437 | 77601 0 |
| 15336 | | | | | 24,2440 | 00001 0 |
| 1534 | | | | | 24,2441 | 53375 0 |
| 1535 | REP | 1 | | | 24,2442 | 03665 1 |
| 1536 | REP | 1 | | | 24,2443 | 03433 0 |
| 1537 | REP | 1 | | | 24,2444 | 03460 0 |
| 1538 | | | | | 24,2445 | 45006 0 |
| 1539 | REP | 2 | LAST | 645 | 24,2446 | 45426 0 |
| 1540 | REP | 6 | LAST | 277 | 24,2447 | 37675 1 |
| 1541 | REP | 2 | LAST | 531 | 24,2450 | 70436 1 |
| 1542 | | | | | 24,2451 | 77776 1 |
| 1543 | REP | 44 | LAST | 647 | 24,2452 | 0 5301 0 |
| 1544 | | | | | 24,2453 | 10035 0 |

P47CSM
EBANK= TIG
TC BANKCALL
CADR R02BOTH
TC INTPRST
CALCB
MIDTOAV2
CAS MPAC +1
TS P40TMP
TC WAITLIST
EBANK= TIG
2CADR TIGON

TC PHASCHNG
OCT 40574
TCP ENDOPJOB

EBANK= P40TMP
EXTEND
DCA ACADN83
DXCH AVEDEXIT
CAP PRIO30
TC NOVAC
EBANK= TIG
2CADR P47BODY

CS BIT2
TCP TIGPHS
EBANK= TIG
TC INTPRST
SETPD
VLOAD VAD
DELACTL
DELVREP
STORE DV47TEMP
FUSH CALL
S41.1
STCALL DELVIMU
S11.1
EXIT
TC PHASCHNG
OCT 10035

IMU STATUS CHECK

DELTA TIME TO RPEREAD (LESS THAN 1000 CS, WITH A TPAGREE, INT.INIT.)

TIGON IS REQUIRED TO MATCHDAT AND AVEG

A, 4.57 = TIGON (P40TMP CS)

FORCE ZEROING OF N83 BEFORE SERVICER

4.2 = PRSCHK (-0CS), P47BODY (PRIO30)

SET UP PUSHLIST FOR S41.1

FOR COPYCYCLE BELOW

CALC. VI, H, HDOT FOR NOUN 62



L P48-P47

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| | | | | | | | | | |
|--------|-----|-----|------|-----|---------|--------|---|---------|----------|
| 1545 | REP | 14 | LAST | 561 | 24,2454 | 3 4715 | 0 | CAP | FIVE |
| 1546 | REP | 10 | LAST | 569 | 24,2455 | 0 6475 | 1 | TC | CENTRAN |
| 1547 | REP | 2 | LAST | 647 | 24,2456 | 01457 | 0 | ADRES | DVATTENP |
| 1548 | REP | 2 | LAST | 647 | 24,2457 | 01664 | 1 | ADRES | DELACTL |
| 1549 | REP | 2 | LAST | 645 | 24,2460 | 0 3127 | 0 | TC | SERVKT |
| 1550 | REP | 140 | LAST | 647 | 24,2461 | 0 6006 | 1 | P47BODY | INTPRET |
| 1551 | | | | | 24,2462 | 77775 | 1 | VLOAD | |
| 1552 | REP | 15 | LAST | 644 | 24,2463 | 15332 | 1 | | HIGZEROS |
| 1553 | REP | 7 | LAST | 647 | 24,2464 | 03875 | 0 | STORE | DELVIMU |
| 1554 | REP | 3 | LAST | 646 | 24,2465 | 03865 | 1 | STORE | DELACTL |
| 1555 | | | | | 24,2466 | 77776 | 1 | EXIT | |
| 1556 | REP | 3 | LAST | 380 | 24,2467 | 3 4762 | 0 | P47BCD | CAP |
| 15563 | REP | 8 | LAST | 576 | 24,2470 | 0 5103 | 0 | TC | PRI015 |
| 155635 | REP | 45 | LAST | 647 | 24,2471 | 0 5301 | 0 | TC | PRICORNG |
| 15564 | | | | | 24,2472 | 05024 | 1 | OCT | PHASORNG |
| 15565 | | | | | 24,2473 | 15000 | 0 | OCT | 05024 |
| 15566 | REP | 1 | | | 24,2474 | 3 2346 | 1 | OCT | 15000 |
| 1557 | REP | 168 | LAST | 647 | 24,2475 | 0 4555 | 0 | P47/DSP | CAP |
| 1558 | REP | 27 | LAST | 628 | 24,2476 | 20624 | 0 | TC | V1683 |
| 1559 | REP | 40 | LAST | 643 | 24,2477 | 0 4106 | 1 | CADR | BANKCALL |
| 1560 | REP | 41 | LAST | 646 | 24,2500 | 0 4106 | 1 | TC | GOFLASH |
| 1561 | REP | 3 | LAST | 647 | 24,2501 | 1 2461 | 1 | TC | GOTOPOOH |
| | | | | | | | | TC | GOTOPOOH |
| | | | | | | | | TCP | P47BODY |

CLEAR DISPLAY AND ACCUMULATOR STORAGE
UPON INITIATION OR-ENTER-RESPONSE

LOWER PRIORITY THAN CALC83 (20)
TO PREVENT INTERRUPTION OF CALC83

TYPE C GROUP 4 BELOW FOR NOUN 83
PRIORITY 15

RECYCLE - CLEAR ACCUMULATED VELOCITY

L P40-P47

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| P1563 | ROUTINE | **TIG-30** | DESCRIPTION | BRANK= | TIG | |
|-------|---------|------------|---------------------------|----------|----------|--|
| 1566 | REP | 47 | LAST 847 BY,1412 | BRANK= | TIG | |
| 1568 | REP | 2 | LAST 840 TO 844' 155 155* | COUNT | 24/P40 | |
| 1590 | REP | 2 | LAST 640 24,2502 0 2252 0 | TIGAVBO | TC | P41/P40 |
| 1591 | REP | 1 | 24,2503 1 2304 0 | TCF | P41REDS | TASK (4.37 PROTECTS) P41 |
| 1592 | REP | 2 | LAST 640 24,2504 3 2351 1 | CAP | V06N40 | UNBLANK DISPLAY |
| 1593 | REP | 6 | LAST 646 24,2505 55=145 1 | TS | INWORD1 | |
| 1594 | REP | 1 | 24,2506 3 2340 1 | CAP | SEC24.96 | |
| 1595 | REP | 28 | LAST 647 24,2507 0 5140 1 | TC | WAITLIST | |
| 1596 | REP | 46 | LAST 649 BY,1412 | BRANK= | TIG | |
| 1597 | REP | 3 | LAST 210 24,2510 02521 0 | 2CADR | TIG-5 | |
| 1597 | | | 24,2511 50067 0 | | | |
| 1598 | REP | 23 | LAST 569 24,2512 4 6211 1 | CS | SIX | 4.6 = TIG-5 (2496CS), PRECHECK (-0CS) |
| 1599 | REP | 3 | LAST 846 24,2513 0 4114 1 | TIGPHS | TC | ENTRY FROM P41REDS (P41) WITH A=-4, OR |
| 1600 | | | 24,2514 00004 0 | OCT | 4 | FROM TIGON (P47) WITH A=-2 |
| 1601 | REP | 2 | LAST 530 24,2515 10 763 1 | PRECHECK | CCS | PHASES |
| 1602 | REP | 28 | LAST 646 24,2516 1 5213 0 | TCF | TASKOVER | HAS SERVICER BEEN RESTARTED |
| 1603 | REP | 40 | LAST 624 24,2517 0 4574 0 | TC | POSTJUMP | YES, DONT START ANOTHER ONE |
| 1604 | REP | 2 | LAST 212 24,2520 76604 1 | CADR | PREREAD | |



L P40-P47

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| P1605 | ROUTINE | #TIG-S** | DESCRIPTION | | | |
|-------|---------|----------|-------------|----------|-------|-----------------|
| 16242 | REP 49 | LAST 649 | BT,1412 | | | |
| 1625 | REP 3 | LAST 646 | 24,2521 | 3 2776 0 | TIG-5 | BRANK= TIG |
| 1626 | REP 29 | LAST 649 | 24,2522 | 0 5140 1 | | CAP SSEC |
| 1627 | REP 29 | LAST 646 | E8,1466 | | | TC WAITLIST |
| 1628 | REP 3 | LAST 211 | 24,2523 | 02537 1 | | BRANK= DAPDATRI |
| 1628 | | | 24,2524 | 50066 1 | | ZCADR TIG-0 |
| 1629 | REP 20 | LAST 562 | 24,2525 | 4 4702 1 | | |
| 1630 | REP 7 | LAST 649 | 24,2526 | 55=145 1 | | CS BIT0 |
| | | | | | | TS MWORD1 |
| 1631 | REP 14 | LAST 645 | 24,2527 | 0 5261 1 | | |
| 1632 | | | 24,2530 | 40074 0 | | TC ZPRISONG |
| 1633 | | | 24,2531 | 00033 1 | | OCT 40074 |
| | | | | | | OCT 00033 |
| 1634 | REP 5 | LAST 644 | 24,2532 | 3 4675 1 | | CAP PRIO20 |
| 1635 | REP 22 | LAST 553 | 24,2533 | 0 5042 1 | | TC FINDVAC |
| 1636 | REP 6 | LAST 207 | BT,1427 | | | BRANK= TGO |
| 1637 | REP 2 | LAST 207 | 24,2534 | 02404 0 | | ZCADR S40.13 |
| 1637 | | | 24,2535 | 34067 1 | | |
| 1638 | REP 20 | LAST 649 | 24,2536 | 1 5213 0 | | TCP TSKOVER |

WILL CAUSE V99 FLASH

A, 4.7 = TIG-0 (500CS)
A, 3.3 = S40.13 (PRIO20)



L P40-P47

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| PC | ROUTINES | **TIG-0** | AND | **IGNITION** | DESCRIPTION | BEANK | DAPDATR1 | TASK, 4.7 PHASE, OR 4.77 (-0CS) IN R40 |
|-------|----------|-----------|------|--------------|------------------|--------------|----------|---|
| 1648 | REP | 30 | LAST | 650 | E0,1466 | CS | FLAGWRD7 | SET IGN FLAG |
| 16485 | REP | 3 | LAST | 195 | 24,2537 4 0103 1 | TIG-0 | CS | FLAGWRD7 |
| 16486 | REP | 21 | LAST | 639 | 24,2540 7 4676 0 | MASK | BIT13 | |
| 16487 | REP | 3 | LAST | 651 | 24,2541 26 103 1 | ADS | FLAGWRD7 | |
| 1649 | REP | 4 | LAST | 651 | 24,2542 30 103 0 | CAS | FLAGWRD7 | CHECK ASTN FLAG FOR V99 RESPONSE |
| 1650 | REP | 23 | LAST | 498 | 24,2543 7 4677 1 | MASK | BIT12 | |
| 1651 | | | | | 24,2544 0 0006 1 | EXTEND | | |
| 1652 | REP | 30 | LAST | 650 | 24,2545 1 5213 0 | BZF | TASKOVER | WAIT FOR V99P |
| 16522 | REP | 3 | LAST | 649 | 24,2546 3 2351 1 | CAP | V06N40 | CLEAR THE V99 (IN CASE OF A RESTART |
| 16524 | REP | 8 | LAST | 650 | 24,2547 55=145 1 | TS | NVWORD1 | DURING THE V99 SEQUENCE) |
| 1653 | REP | 46 | LAST | 646 | 24,2550 0 5301 0 | TC | PHASCHNG | V99P HAS COME ALREADY, DO IGNITION NOW |
| 1654 | | | | | 24,2551 00614 1 | OCT | 00614 | A, 4.61 = IGNITION (-0CS) TRASE OLD |
| 1660 | REP | 14 | LAST | 643 | 24,2552 30 032 0 | IGNITION CAS | CDUX | SAVE FOR ROLL DAP REFERENCE COAD |
| 1661 | REP | 1 | | | 24,2553 55=450 0 | TS | CGAD | V99PJCB (CLOCKJOB) SETS UP IGNITION |
| 1662 | | | | | 24,2554 0 0006 1 | EXTEND | | TASK (4.61 PROTECTION) |
| 1663 | REP | 19 | LAST | 577 | 24,2555 3 0025 0 | DCA | TIME2 | FOR RESTARTS |
| 1664 | REP | 4 | LAST | 169 | 24,2556 53=337 0 | DYCH | TEVENT | |
| 1665 | REP | 10 | LAST | 583 | 24,2557 4 0101 0 | CS | FLAGWRD5 | SET ENGNPLG |
| 1666 | REP | 35 | LAST | 577 | 24,2560 7 4704 1 | MASK | BIT7 | |
| 1667 | REP | 11 | LAST | 651 | 24,2561 26 101 0 | ADS | FLAGWRD5 | |
| 1668 | REP | 22 | LAST | 651 | 24,2562 3 4676 1 | SPSON | CAP | TURN ON SPS ENGINE |
| 1669 | | | | | 24,2563 0 0006 1 | EXTEND | BIT13 | |
| 1670 | REP | 22 | LAST | 584 | 24,2564 05 011 1 | WOR | DSALMOUT | |
| 1671 | REP | 21 | LAST | 650 | 24,2565 3 4702 0 | IMPULCHK | CAP | CHECK FOR IMPULSIVE BURN |
| 1672 | REP | 8 | LAST | 474 | 24,2566 7 0076 1 | MASK | RIT9 | |
| 1673 | REP | 148 | LAST | 584 | 24,2567 10 000 0 | CCS | FLAGWRD2 | |
| 1674 | REP | 1 | | | 24,2570 1 2655 1 | A | | |
| 1675 | REP | 13 | LAST | 538 | 24,2571 4 0102 0 | TCP | IMPLURN | IMPULSIVE |
| 1676 | REP | 23 | LAST | 651 | 24,2572 7 4676 0 | CS | FLAGWRD6 | NON-IMPULSIVE, SET STRJLJW FOR STEERRJL |
| 1677 | REP | 14 | LAST | 651 | 24,2573 26 102 0 | MASK | BIT13 | |
| 1678 | REP | 9 | LAST | 532 | 24,2574 4 4105 0 | PREPTVC | CS | RESET TS RITS |
| 1679 | REP | 16 | LAST | 651 | 24,2575 7 0102 0 | MASK | OCT80000 | |
| 1680 | REP | 16 | LAST | 651 | 24,2576 54 102 0 | TS | FLAGWRD6 | |
| 1681 | | | | | 24,2577 0 0006 1 | EXTEND | | KILL RCS |
| 1682 | REP | 1 | | | 24,2600 3 2360 0 | DCA | TS IDL24 | |
| 1683 | REP | 8 | LAST | 539 | 24,2601 53=313 0 | DYCH | TSLOC | |
| 1684 | REP | 26 | LAST | 608 | 24,2602 4 6214 1 | CS | THREE | 4.3 = DOTVCON (40CS) |
| 1685 | REP | 4 | LAST | 649 | 24,2603 0 4114 1 | TC | NVWPHASE | |
| 1686 | | | | | 24,2604 00004 0 | OCT | 4 | |

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| | | | | | | | | | |
|------|-----|-----|------|---------|----------|----------|-----------|-----------|--|
| 1687 | REP | 1 | | 24,2805 | 0 5156 0 | TC | FIXDELAY | | |
| 1688 | | | | 24,2806 | 00050 1 | DEC | 40 | | 0.4 SECOND DELAY FOR THRUST BUILDUP |
| 1689 | REP | 40 | LAST | 648 | 24,2807 | 4 4712 0 | DOTVCON | CS | BIT1 |
| 1690 | REP | 2 | LAST | 103 | 24,2810 | 55-654 0 | TS | TVCHASE | SET TVCHASE = TVDAPON CALL (PRES-DAP) |
| 1691 | REP | 128 | LAST | 648 | 24,2811 | 3 4714 1 | CAP | ZERO | SET TVCOSCUTIVE PHASE |
| 1692 | REP | 2 | LAST | 103 | 24,2812 | 55-651 0 | TS | TVCKPHS | |
| 1693 | REP | 10 | LAST | 651 | 24,2813 | 4 4105 0 | CS | OCT60000 | SET TS BITS TO INDICATE TVC TAKEOVER.... |
| 1694 | REP | 17 | LAST | 651 | 24,2814 | 7 0102 0 | MASK | FLAGWRD6 | BITS 15,14 = 10 |
| 1695 | REP | 31 | LAST | 411 | 24,2815 | 6 4874 0 | AD | BIT15 | |
| 1696 | REP | 18 | LAST | 652 | 24,2816 | 54 102 0 | TS | FLAGWRD6 | |
| 1697 | REP | 21 | LAST | 651 | 24,2817 | 3 6214 0 | CAP | THREE | 6.3 = CLKDASK (100CS), DROPPING PRE40.6 |
| 1698 | REP | 65 | LAST | 616 | 24,2820 | 54 001 1 | TS | L | WHICH IS HANDLED NOW BY REDOTVC |
| 1699 | | | | | 24,2821 | 4 0000 0 | COM | | |
| 1700 | REP | 2 | LAST | 181 | 24,2822 | 52 765 1 | DACH | -PHASE6 | |
| 1701 | REP | 15 | LAST | 648 | 24,2823 | 4 4715 1 | CS | FIVE | 4.5 = DOSTRULL (160 CS) |
| 1702 | REP | 5 | LAST | 651 | 24,2824 | 0 4114 1 | TC | NEWPHASE | |
| 1703 | | | | | 24,2825 | 00004 0 | OCT | 4 | |
| 1704 | REP | 14 | LAST | 577 | 24,2826 | 3 4672 0 | CAP | POS4X | SET TIMES FOR STARTING RIGHT AWAY |
| 1705 | REP | 6 | LAST | 539 | 24,2827 | 54 030 0 | TS | TIMES | |
| 1706 | | | | | 24,2830 | 0 0006 1 | EXTEND | | |
| 1707 | REP | 1 | | | 24,2831 | 3 3001 0 | DCA | TVCON2C | (TVDAPON) |
| 1708 | REP | 9 | LAST | 651 | 24,2832 | 53-313 0 | DACH | TSLOC | (KILLS RCS DAP) |
| 1709 | REP | 2 | LAST | 652 | 24,2833 | 0 5156 0 | TC | FIXDELAY | 0.4 + 1.6 = 2.0 SEC FOR ULLAGE-OFF AND |
| 1710 | | | | | 24,2834 | 00240 1 | DEC | 160 | STEERING (IF NON-IMPULSIVE) |
| 1711 | REP | 24 | LAST | 651 | 24,2835 | 3 4676 1 | DOSTRULL | CAP | RIT13 |
| 1712 | REP | 19 | LAST | 652 | 24,2836 | 7 0102 0 | MASK | FLAGWRD6 | CHECK STRULLSW FOR IMPULSIVE BURN |
| 1713 | REP | 149 | LAST | 651 | 24,2837 | 10 000 0 | OCS | A | |
| 1714 | REP | 1 | | | 24,2840 | 0 2846 1 | TCR | STEERULL | NON-IMPULSIVE, STEERING AND ULLAGE OFF |
| 1715 | REP | 1 | | | 24,2841 | 0.2851 1 | TCR | ULLAGEOFF | ULLAGE OFF (ONLY, OR AGAIN) |
| 1716 | | | | | 24,2842 | 0 0006 1 | EXTEND | | |
| 1717 | REP | 12 | LAST | 197 | 24,2843 | 3 4714 1 | DCA | NEQ0 | KILL GROUP 4 (DP NEQ0 = -0,+0) |
| 1718 | REP | 3 | LAST | 197 | 24,2844 | 52 761 0 | DACH | -PHASE4 | |
| 1719 | REP | 31 | LAST | 651 | 24,2845 | 1 5213 0 | ENDIGN | TCF | TASKOVER |
| 1720 | REP | 9 | LAST | 651 | 24,2846 | 4 0076 1 | STEERULL | CS | FLAGWRD2 |
| 1721 | REP | 18 | LAST | 415 | 24,2847 | 7 4700 0 | MASK | RIT11 | SET STEERSW |
| 1722 | REP | 10 | LAST | 652 | 24,2850 | 28 076 1 | ADS | FLAGWRD2 | |
| 1723 | REP | 129 | LAST | 652 | 24,2851 | 3 4714 1 | ULLAGEOFF | CAP | ZERO |
| 1724 | | | | | 24,2852 | 0 0006 1 | EXTEND | | |
| 1725 | REP | 2 | LAST | 178 | 24,2853 | 01 005 0 | WRITE | CHAN5 | ZERO CHANNEL 5 |

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| | | | | | | | | | | |
|-------|-----|-----|------|-----|---------|----------|----------|----|----------|--|
| 1726 | REP | 159 | LAST | 644 | 24,2654 | 0 0002 0 | TC | 0 | | |
| 1727 | REP | 25 | LAST | 652 | 24,2655 | 4 4676 0 | IMPLERN | CS | BIT13 | RESET STRULLSW (COULD BE AN IMPULSIVE ENGINE FAIL) |
| 17271 | REP | 20 | LAST | 652 | 24,2656 | 7 0102 0 | MASK | | FLAGWD6 | |
| 17272 | REP | 21 | LAST | 653 | 24,2657 | 54 102 0 | TS | | FLAGWD6 | |
| 17273 | REP | 2 | LAST | 641 | 24,2660 | 0 3304 0 | TCR | | E7SETTER | |
| 1728 | REP | 50 | LAST | 650 | E7,1412 | | EBANK= | | TIG | |
| 1729 | | | | | 24,2661 | 0 0006 1 | EXTEND | | | PREPARE FOR R1 OF V06N40 (CLOCKTACK) |
| 1730 | REP | 7 | LAST | 650 | 24,2662 | 3 1430 1 | DCA | | TGO | |
| 1731 | REP | 51 | LAST | 653 | 24,2663 | 53=413 1 | DXCH | | TIG | |
| 1732 | | | | | 24,2664 | 0 0006 1 | EXTEND | | | |
| 1733 | REP | 20 | LAST | 651 | 24,2665 | 3 0025 0 | DCA | | TIME2 | |
| 1734 | REP | 52 | LAST | 653 | 24,2666 | 21=413 1 | DAS | | TIG | |
| 1735 | REP | 8 | LAST | 653 | 24,2667 | 31=430 1 | CAE | | TGO +1 | (TPAGREE IN 840.13, LESS THAN 600CS) |
| 1736 | REP | 30 | LAST | 650 | 24,2670 | 0 5140 1 | TC | | WAITLIST | |
| 1737 | REP | 9 | LAST | 653 | E7,1427 | | EBANK= | | TGO | |
| 1738 | REP | 2 | LAST | 207 | 24,2671 | 02706 1 | ZCADR | | ENGINOFF | |
| 1738 | | | | | 24,2672 | 50067 0 | | | | |
| 1739 | REP | 15 | LAST | 650 | 24,2673 | 0 5261 1 | TC | | 2PHSCHNG | PROTECT.... |
| 1740 | | | | | 24,2674 | 40153 1 | OCT | | 40153 | A, 3.15 = ENGINOFF (TGO+1)....NOTE GROUP |
| 1741 | | | | | 24,2675 | 05014 1 | OCT | | 05014 | C, DELTAT NEXT, TASK BELOW, IN |
| 17412 | | | | | 24,2676 | 77777 0 | DEC | | -0 | -0 CS |
| 1742 | REP | 22 | LAST | 651 | 24,2677 | 4 4702 1 | CS | | RIT9 | RESET IMPULSW, ENGINOFF IS NOW SET UP |
| 1743 | REP | 11 | LAST | 652 | 24,2700 | 7 0076 1 | MASK | | FLAGWD2 | |
| 1744 | REP | 12 | LAST | 653 | 24,2701 | 54 076 1 | TS | | FLAGWD2 | |
| 1745 | REP | 1 | | | 24,2702 | 0 3307 0 | TCR | | E6SETTER | |
| 1746 | REP | 31 | LAST | 651 | E6,1466 | | EBANK= | | DAPDATR1 | |
| 17462 | REP | 130 | LAST | 652 | 24,2703 | 3 4714 1 | CAP | | ZERO | SET UP V97VCTR IN CASE ENGINOFF (MASS- RACK) ARRIVES BEFORE TVCDAPON |
| 17463 | REP | 2 | LAST | 210 | 24,2704 | 55=444 0 | TS | | V97VCTR | |
| 1747 | REP | 1 | | | 24,2705 | 1 2574 1 | TCF | | PREPTVC | |
| 1753 | REP | 10 | LAST | 653 | E7,1427 | | EBANK= | | TGO | |
| 17532 | REP | 2 | LAST | 653 | 24,2706 | 0 3307 0 | ENGINOFF | | TCR | E6SETTER |
| 17533 | REP | 32 | LAST | 653 | E6,1466 | | EBANK= | | DAPDATR1 | E7 FORCED BY 3.15 SPOT VARIABLE DELTA-T TASK, 3.15 PHASE (TGO+1 CS) GET E6 |
| 1754 | REP | 4 | LAST | 274 | 24,2707 | 31=474 1 | CAE | | CSMASS | |
| 1755 | REP | 3 | LAST | 194 | 24,2710 | 55=662 0 | TS | | MASSIMP | COPYCYCLE FOR MASSRACK |
| 1756 | REP | 16 | LAST | 653 | 24,2711 | 0 5261 1 | TC | | 2PHSCHNG | |
| 1757 | | | | | 24,2712 | 00003 1 | OCT | | 00003 | KILL GROUP 3 PROTECTION OF ENGINOFF, DO |
| 1758 | | | | | 24,2713 | 40634 1 | OCT | | 40634 | A, 4.63 = DOSPSOFF (-0CS) |
| 1759 | REP | 2 | LAST | 194 | 24,2714 | 0 2737 0 | DOSPSOFF | | TCR | SHUT DOWN SPS, MASS UPDATES, ETC. |
| 1760 | REP | 1 | | | 24,2715 | 4 2354 0 | CS | | OCT27/24 | (OCTAL 27) |

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|-------|------|-----|------|-----|---------|--------|---|-----------|----------|---|------------------------------------|
| 1761 | RESP | 6 | LAST | 652 | 24,2716 | 0 4114 | 1 | TC | NEWPHASE | | |
| 1762 | | | | | 24,2717 | 0 0004 | 0 | OCT | 4 | 4.27 = DOTVCRCS (250 CS) | |
| 1763 | RESP | 3 | LAST | 652 | 24,2720 | 0 5156 | 0 | TC | FIXDELAY | 2.5 SECOND DELAY FOR SPS TAILOFF | |
| 1764 | | | | | 24,2721 | 0 0372 | 1 | DEC | 250 | | |
| 1765 | RESP | 2 | LAST | 199 | 24,2722 | 0 2227 | 1 | DOTVCRCS | TCR | SETMAXDB | WIDE DEADBAND FOR CUTOFF TRANSIENT |
| 1766 | RESP | 25 | LAST | 540 | 24,2723 | 0 4633 | 0 | TC | IBKCALL | SET UP RCS DAP (KILLS TVCDAPS, SETS TS | |
| 1767 | RESP | 2 | LAST | 194 | 24,2724 | 4 2010 | 0 | CADR | RCSADAPN | BITS, WAITS 0.6SEC FOR TVC(X)C DIB) | |
| 17672 | RESP | 26 | LAST | 654 | 24,2725 | 0 4633 | 0 | TC | IBKCALL | UPDATE WEIGHT/G AND MASS-PROPERTIES FOR | |
| 17673 | RESP | 3 | LAST | 248 | 24,2726 | 13 207 | 0 | CADR | MASSPROP | RCS DAP STARTUP IN 0.6 SECONDS | |
| 1768 | RESP | 2 | LAST | 194 | 24,2727 | 0 3003 | 1 | TCR | TVCZAP | WIPE OUT TVC, TURN OFF CLKTASK | |
| 1769 | RESP | 47 | LAST | 651 | 24,2730 | 0 5301 | 0 | TC | PHASCHG | | |
| 1770 | | | | | 24,2731 | 0 0354 | 0 | OCT | 00354 | A, 4.35 = POSTBURN (NOVAC, PRIO12) | |
| 1771 | RESP | 2 | LAST | 179 | 24,2732 | 3 4603 | 0 | CAP | PRIO12 | SET UP POSTBURN V16N40 JOB | |
| 1772 | RESP | 21 | LAST | 647 | 24,2733 | 0 5027 | 1 | TC | NOVAC | | |
| 1773 | RESP | 33 | LAST | 653 | E6,1466 | | | ERANK= | DAPDATR1 | (SETMAXDB IN POST41) | |
| 1774 | RESP | 3 | LAST | 642 | 24,2734 | 0 2155 | 1 | ZCADR | POSTBURN | | |
| 1774 | | | | | 24,2735 | 5 0086 | 1 | | | | |
| 1775 | RESP | 32 | LAST | 652 | 24,2736 | 1 5213 | 0 | TCF | TASKOVER | | |
| 1776 | RESP | 34 | LAST | 654 | E6,1466 | | | ERANK= | DAPDATR1 | | |
| 1783 | | | | | 24,2737 | 0 0006 | 1 | SPSOFF | EXTEND | ESTABLISH SPSOFF TRVENT | |
| 1784 | RESP | 21 | LAST | 653 | 24,2740 | 3 0025 | 0 | DCA | TIME2 | | |
| 1785 | RESP | 5 | LAST | 651 | 24,2741 | 53=337 | 0 | DXCH | TEVENT | | |
| 1786 | RESP | 36 | LAST | 651 | 24,2742 | 4 4704 | 1 | CS | BIT7 | RESET ENGNFLO | |
| 1787 | RESP | 12 | LAST | 651 | 24,2743 | 7 0101 | 0 | MASK | FLAGWRD5 | (RESTARTS WILL SHUT DOWN SPS NOW) | |
| 1788 | RESP | 13 | LAST | 654 | 24,2744 | 54 101 | 0 | TS | FLAGWRD5 | SHUT DOWN SPS ENGINE | |
| 1789 | RESP | 26 | LAST | 653 | 24,2745 | 4 4676 | 0 | CS | BIT13 | | |
| 1790 | | | | | 24,2746 | 0 0006 | 1 | EXTEND | | | |
| 1791 | RESP | 23 | LAST | 651 | 24,2747 | 03 011 | 1 | WAND | DSALMOUT | | |
| 1792 | RESP | 3 | LAST | 653 | 24,2750 | 31=444 | 1 | MASSRACK | CAB | RESTORE PART OF PRE-DECREMENTED MASS | |
| A1793 | | | | | | | | V97VCONTR | | V97VCONTR = VCONTR UNLESS V97 IS | |
| A1794 | | | | | | | | | | ACTIVE. ONLY V97VCONTR IS THEN RIGHT | |
| 1795 | | | | | 24,2751 | 0 0006 | 1 | EXTEND | | VCONTR COUNTS 1/2-SECONDS IN TVC EXPC | |
| 1796 | RESP | 1 | | | 24,2752 | 7 0110 | 0 | MP | ENDOT | MDOT, SC.AT B+3 KG/CS | |
| 1797 | RESP | 150 | LAST | 652 | 24,2753 | 22 000 | 1 | LXCH | A | | |
| 1798 | | | | | 24,2754 | 0 0006 | 1 | EXTEND | | | |
| 1799 | RESP | 9 | LAST | 511 | 24,2755 | 7 4734 | 1 | MP | 18SC | DEC 100 | |
| 1800 | RESP | 4 | LAST | 653 | 24,2756 | 6 1662 | 1 | AD | MASSTMP | CORRECTION IS ACCURATE TO 5 CS OF FLOW | |
| 1801 | RESP | 5 | LAST | 653 | 24,2757 | 55=474 | 0 | TS | CENMASS | (1.44 KG OR 0.4 BITS) | |
| 1806 | RESP | 32 | LAST | 652 | 24,2760 | 3 4674 | 0 | RESTRIM | CAP | CHECK FOR SWITCHOVER, SELECT RRST TRIMS | |
| 1807 | RESP | 9 | LAST | 574 | 24,2761 | 7 0105 | 1 | MASK | FLAGWRD9 | FOR NEXT IGNITION (OR REIGNITION) | |
| 1808 | | | | | 24,2762 | 0 0006 | 1 | EXTEND | | | |

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| ADDR | OP | NO | MODE | DATA | AMOUNT | NAME | IN | FUNCTION |
|------|-----|-----|------|---------|---------|----------|----------|----------|
| 1848 | | | | 24,3036 | 10035 0 | | OCT | 10035 |
| 1850 | REP | 3 | LAST | 655 | 24,3037 | 3 1747 1 | CA | NBRCYCLP |
| 1851 | REP | 5 | LAST | 655 | 24,3040 | 55-746 1 | TS | NBRCYCLP |
| 1852 | REP | 141 | LAST | 648 | 24,3041 | 0 6006 1 | TC | INTPRET |
| 1853 | | | | | 24,3042 | 77775 1 | VLOAD | |
| 1854 | REP | 2 | LAST | 655 | 24,3043 | 03357 0 | | DELVSUMP |
| 1855 | REP | 3 | LAST | 655 | 24,3044 | 03351 0 | STORE | DELVSUM |
| 1856 | | | | | 24,3045 | 77624 1 | CALL4.8 | CALL |
| 1857 | REP | 1 | | | 24,3046 | 34130 1 | | 840.8 |
| 1858 | | | | | 24,3047 | 77650 1 | GOTO | |
| 1859 | REP | 4 | LAST | 655 | 24,3050 | 03730 0 | | OTEMP1 |
| 1860 | | | | | 24,3051 | 07214 1 | SETUP.9 | BN |
| 1861 | REP | 1 | | | 24,3052 | 01310 1 | | SLOAD |
| 1862 | REP | 1 | | | 24,3053 | 51066 0 | | FIRSTPLD |
| 1863 | REP | 4 | LAST | 656 | 24,3054 | 03350 1 | | SURELY.9 |
| 1864 | | | | | 24,3055 | 74301 0 | | NBRCYCLP |
| 1865 | REP | 28 | LAST | 638 | 24,3056 | 00047 1 | NORM | VXSC |
| 1866 | REP | 2 | LAST | 122 | 24,3057 | 03705 0 | | X1 |
| 1867 | | | | | 24,3060 | 53257 1 | | BDT |
| 1868 | | | | | 24,3061 | 20563 0 | VSR* | VAD |
| 1869 | REP | 1 | | | 24,3062 | 03646 0 | | 0 -14D,1 |
| 1870 | | | | | 24,3063 | 77651 0 | VSI | VOTEMP |
| 1871 | REP | 4 | LAST | 656 | 24,3064 | 03351 0 | | DELVSUM |
| 1872 | REP | 2 | LAST | 645 | 24,3065 | 03721 0 | STORE | VOPREV |
| 1873 | | | | | 24,3066 | 77776 1 | SURELY.9 | EXIT |
| 1874 | REP | 8 | LAST | 259 | 24,3067 | 1 4876 1 | CAP | PRIO10 |
| 1875 | REP | 23 | LAST | 650 | 24,3070 | 0 5042 1 | TC | PINDVAC |
| 1876 | REP | 38 | LAST | 655 | 24,1466 | | BRANK | DAPDAT1 |
| 1877 | REP | 1 | | | 24,3072 | 34066 0 | | |
| 1878 | REP | 17 | LAST | 653 | 24,3073 | 0 5261 1 | TC | 2PHSQRG |
| 1879 | | | | | 24,3074 | 00051 0 | OCT | 00051 |
| 1880 | | | | | 24,3075 | 10035 0 | OCT | 10035 |
| 1881 | REP | 142 | LAST | 656 | 24,3076 | 0 6006 1 | TC | INTPRET |
| 1882 | | | | | 24,3077 | 77775 1 | VLOAD | |
| 1884 | REP | 11 | LAST | 645 | 24,3101 | 27570 0 | STOVL | RINIT |
| 1885 | REP | 9 | LAST | 536 | 24,3102 | 01177 1 | | VN |
| 1886 | REP | 10 | LAST | 645 | 24,3103 | 17576 0 | STOVL | VINIT |
| 1887 | REP | 6 | LAST | 634 | 24,3104 | 01205 1 | | PIPTIME |
| 1888 | REP | 2 | LAST | 120 | 24,3105 | 03474 0 | STORE | TNIT |
| 1889 | | | | | 24,3106 | 77621 1 | RDSU | |
| 1890 | REP | 9 | LAST | 633 | 24,3107 | 03856 1 | | TPASS4 |
| 1891 | REP | 9 | LAST | 633 | 24,3110 | 27423 1 | STOVL | DELIT4 |
| 1892 | REP | 16 | LAST | 648 | 24,3111 | 15332 1 | | HIGZEROS |
| 1893 | REP | 5 | LAST | 656 | 24,3112 | 17351 0 | STOVL | DELVSUM |

TYPE 8 MONTMONT PROGRAM AMT 6.2 REPRADACTE

(NORM HANDLES ZERO PROPERLY)

A, 1.5 = REDO40.0, PRIO 10

ACTIVE VEHICLE VELOCITY VECTOR AT T1

L P46-P47

| | | | | | | | | | |
|-------|-----|-----|------|-----|---------|--------|---|----------|-----------|
| 1894 | REP | 17 | LAST | 656 | 24,3113 | 15332 | 1 | | |
| 1895 | REP | 6 | LAST | 656 | 24,3114 | 03347 | 1 | | |
| 1896 | | | | | 24,3115 | 77650 | 1 | | |
| 1897 | REP | 2 | LAST | 655 | 24,3116 | 51045 | 1 | | |
| 1898 | REP | 39 | LAST | 656 | E6,1466 | | | | |
| 1899 | REP | 143 | LAST | 656 | 24,3117 | 0 6006 | 1 | STEERING | TC |
| 1900 | | | | | 24,3120 | 77624 | 1 | | CALL |
| 1901 | REP | 2 | LAST | 646 | 24,3121 | 51016 | 1 | | UPDATESVO |
| 1902 | | | | | 24,3122 | 77776 | 1 | | |
| 1903 | REP | 23 | LAST | 653 | 24,3123 | 3 4702 | 0 | | EXIT |
| 1904 | REP | 13 | LAST | 653 | 24,3124 | 7 0076 | 1 | | CAP |
| 1905 | REP | 151 | LAST | 654 | 24,3125 | 10 000 | 0 | | MARK |
| 1906 | | | | | 24,3126 | 1 3131 | 0 | | CCS |
| 1907 | REP | 41 | LAST | 646 | 24,3127 | 0 4574 | 0 | SERVXT | TC |
| 1908 | REP | 3 | LAST | 646 | 24,3130 | 77132 | 1 | | POSTJUMP |
| 1909 | REP | 27 | LAST | 654 | 24,3131 | 3 4676 | 1 | | CADR |
| 1910 | | | | | 24,3132 | 0 0006 | 1 | | SERVXT |
| 1911 | REP | 24 | LAST | 654 | 24,3133 | 02 011 | 0 | | CAP |
| 1912 | | | | | 24,3134 | 0 0006 | 1 | | BIT13 |
| 1913 | REP | 3 | LAST | 646 | 24,3135 | 1 3127 | 1 | | EXTEND |
| 1914 | REP | 3 | LAST | 653 | 24,3136 | 0 3304 | 0 | | RAND |
| 1916 | REP | 53 | LAST | 653 | E7,1412 | | | | DSALMOUT |
| 1917 | | | | | 24,3137 | 0 0004 | 0 | | EXTEND |
| 1918 | | | | | 24,3140 | 0 0006 | 1 | | RZF |
| 1919 | REP | 54 | LAST | 657 | 24,3141 | 3 1413 | 0 | | SERVXT |
| 1920 | REP | 266 | LAST | 647 | 24,3142 | 52 155 | 1 | | TCR |
| 1921 | | | | | 24,3143 | 0 0006 | 1 | | BYSETTER |
| 1922 | REP | 22 | LAST | 654 | 24,3144 | 4 0025 | 1 | | BRANK= |
| 1923 | REP | 269 | LAST | 657 | 24,3145 | 20 155 | 1 | | TIG |
| 1924 | REP | 1 | | | 24,3146 | 0 7224 | 1 | | INHINT |
| 1925 | REP | 270 | LAST | 657 | 24,3147 | 30 155 | 0 | | EXTEND |
| 1926 | REP | 152 | LAST | 657 | 24,3150 | 10 000 | 0 | | DCA |
| 1927 | | | | | 24,3151 | 1 3154 | 0 | | DYCH |
| 1928 | | | | | 24,3152 | 1 3154 | 0 | | MPAC |
| 1929 | REP | 132 | LAST | 655 | 24,3153 | 3 4714 | 1 | | EXTEND |
| 1930 | REP | 80 | LAST | 655 | 24,3154 | 6 4712 | 1 | | DAS |
| 1931 | REP | 66 | LAST | 652 | 24,3155 | 56 001 | 0 | | TIME2 |
| 1932 | REP | 133 | LAST | 657 | 24,3156 | 3 4714 | 1 | | DAS |
| 1933 | REP | 11 | LAST | 653 | 24,3157 | 53=430 | 0 | | MPAC |
| 1934 | REP | 12 | LAST | 657 | 24,3160 | 3 1430 | 1 | | TCR |
| 1935 | REP | 31 | LAST | 653 | 24,3161 | 0 5140 | 1 | | DPAOREE |
| 1936 | REP | 13 | LAST | 657 | E7,1427 | | | | CAS |
| 1937 | REP | 3 | LAST | 653 | 24,3162 | 02706 | 1 | | MPAC +1 |
| 1937 | | | | | 24,3163 | 50067 | 0 | | CCS |
| 1938 | REP | 16 | LAST | 656 | 24,3164 | 0 5261 | 1 | | A |
| 1939 | | | | | 24,3165 | 40153 | 1 | | +3 |
| 1940 | | | | | 24,3166 | 10035 | 0 | | +2 |
| 19402 | REP | 42 | LAST | 644 | 24,3167 | 0 5447 | 0 | | CAP |
| 19403 | REP | 2 | LAST | 199 | 24,3170 | 00044 | 1 | | ZERO |
| | | | | | | | | | AD |
| | | | | | | | | | ONE |
| | | | | | | | | | L |
| | | | | | | | | | ZERO |
| | | | | | | | | | TOO |
| | | | | | | | | | TOO +1 |
| | | | | | | | | | WAITLIST |
| | | | | | | | | | TOO |
| | | | | | | | | | ENGINOFF |
| | | | | | | | | | 2PHSCHK |
| | | | | | | | | | OCT |
| | | | | | | | | | OCT |
| | | | | | | | | | DOWNFLAG |
| | | | | | | | | | IMPULSW |

CHECK IMPULSW

PRE-IGNITE, REQUEST ENG-OFF, OR POST-OFF

CHECK ENGINE-ON/-OFF

ENGINE-OFF, SO PRE-IGNITE OR POST-OFF

(LESS THAN 6 (OR 4) SECONDS TO GO)
PROTECT AGAINST NEG/ZERO W.L. CALL

A, 3.15 = ENGINOFF (TOO+1)...NOTE GROUP
R, 5.3 = RRRADAC, AND START BELOW
CLEAR IMPULSW, ENGINOFF IS NOW SET UP
RESTARTS OK



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1941 REP 4 LAST 657 24,3171 1 3127 1 TCP SERVAT

L P40-P47

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| P1042 | ROUTINE | **CLOCKTASK** | DESCRIPTION | | | |
|--------|---------|---------------|------------------|-----------|-----------------|--|
| 1042 | REP 85 | LAST 657 | E7,1412 | | EBANK= TIG | |
| 1055 | REP 20 | LAST 655 | 24,3172 3 4700 1 | CLOCKTASK | CAP BIT11 | IS TIMEFLAG SST |
| 1056 | REP 7 | LAST 655 | 24,3173 7 0103 1 | | MARK FLAGWRD7 | |
| 1057 | REP 153 | LAST 657 | 24,3174 10 000 0 | | CCS A | |
| 1058 | REP 1 | | 24,3175 1 3201 0 | | TCF CLOCKON | |
| 1059 | REP 49 | LAST 656 | 24,3176 0 5301 0 | | TC PHASCHNG | |
| 1060 | | | 24,3177 00008 1 | | OCT 00008 | KILL RESTART |
| 1061 | REP 33 | LAST 654 | 24,3200 0 5213 1 | | TC TASKOVER | |
| 1062 | | | 24,3201 0 0006 1 | CLOCKON | EXTEND | |
| 1063 | REP 23 | LAST 657 | 24,3202 3 0025 0 | | DCA TIME2 | |
| 1064 | REP 7 | LAST 276 | 24,3203 53=661 0 | | DXCH TFOGO | |
| 1065 | | | 24,3204 0 0006 1 | | EXTEND | |
| 1066 | REP 56 | LAST 659 | 24,3205 4 1413 1 | | DCS TIG | |
| 1067 | REP 8 | LAST 659 | 24,3206 21=661 0 | | DAS . TFOGO | |
| 1068 | REP 10 | LAST 654 | 24,3207 3 4734 0 | SETCLOCK | CAP 1SEC | |
| 1069 | REP 32 | LAST 657 | 24,3210 0 5140 1 | | TC WAITLIST | |
| 1070 | REP 57 | LAST 659 | E7,1412 | | EBANK= TIG | |
| 1071 | REP 5 | LAST 641 | 24,3211 03172 0 | | ZCADR CLOCKTASK | |
| 1071 | | | 24,3212 50087 0 | | | |
| 1072 | REP 10 | LAST 655 | 24,3213 11=145 1 | | CCS NWORD1 | |
| 1073 | | | 24,3214 1 3217 1 | | TCF +3 | |
| 1074 | REP 1 | | 24,3215 1 3227 1 | | TCF SETTR6 | |
| 10742 | | | 24,3216 1 3217 1 | | TCF +1 | |
| 1075 | REP 2 | LAST 644 | 24,3217 4 2347 1 | | CS V06N85R | CHECK FOR V06N85R (P41) |
| 10752 | REP 11 | LAST 659 | 24,3220 6 1145 0 | | AD NWORD1 | |
| 10753 | | | 24,3221 0 0006 1 | | EXTEND | |
| 10754 | REP 1 | | 24,3222 1 3232 0 | | BZF SETUPDYN | V06N85, SO UPDATE N85 FOR DYNAMIC DISP |
| 1076 | REP 2 | LAST 575 | 24,3223 3 7664 1 | | CAP PRIO27 | |
| 1077 | REP 22 | LAST 654 | 24,3224 0 5027 1 | | TC NOVAC | |
| 1078 | REP 40 | LAST 657 | E6,1466 | | EBANK= DAPDATR1 | |
| 1079 | REP 1 | | 24,3225 03244 0 | | ZCADR CLOCKJCR | |
| 1079 | REP 1 | | 24,3226 50066 1 | | | |
| 1080 | REP 12 | LAST 532 | 24,3227 4 0025 1 | SETTR6 | CS TIME1 | SET GROUP6 TIMEBASE |
| 1081 | REP 1 | | 24,3230 55=065 1 | | TS TRASE6 | |
| 1082 | REP 34 | LAST 659 | 24,3231 1 5213 0 | | TCF TASKOVER | |
| 10822 | REP 3 | LAST 659 | 24,3232 3 7664 1 | SETUPDYN | CAP PRIO27 | SET UP A JOB TO UPDATE N85 (FOR P41=V06) |
| 108222 | REP 24 | LAST 656 | 24,3233 0 5042 1 | | TC PINDVAC | |
| 108224 | REP 41 | LAST 659 | E6,1466 | | EBANK= DAPDATR1 | |
| 108226 | REP 1 | | 24,3234 03237 1 | | ZCADR DYNDISP | |
| 108226 | REP 1 | | 24,3235 50066 1 | | | |
| 108226 | REP 2 | LAST 659 | 24,3236 1 3227 1 | | TCF SETTR6 | CLOSE OUT CLOCKTASK |



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| | | | | | | | | | | | |
|--------|-----|-----|------|-----|---------|-------|------|---|---------|------|----------|
| 19823 | REP | 144 | LAST | 657 | 24,3237 | 0 | 6006 | 1 | DYNDISP | TC | INTPRST |
| 198232 | | | | | 24,3240 | 77824 | 1 | | | CALL | |
| 198234 | REP | 3 | LAST | 645 | 24,3241 | 50314 | 1 | | | | P40CRV85 |
| 198236 | | | | | 24,3242 | 77776 | 1 | | | EXIT | |
| 198238 | REP | 1 | | | 24,3243 | 1 | 3254 | 0 | | TOP | QONVRD1 |

UPDATES N85 FOR A DYNAMIC V08N85 IN P41, PRIOR TO BLANKING AND AV80 (V16N85)

L P40-P47

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| P1003 | ROUTINE | **CLOCKJOB** | DESCRIPTION | | | |
|--------|---------|--------------|-------------|------------------|----------|----------|
| 2003 | REP | 42 | LAST 659 | E6,1466 | BRANK= | DAPDATR1 |
| 2004 | REP | 15 | LAST 651 | 24,3244 3 0032 0 | CLOCKJOB | CA |
| 200401 | REP | 1 | | 24,3245 54 772 1 | | TS |
| 200402 | REP | 8 | LAST 643 | 24,3246 3 0033 1 | | CA |
| 200403 | REP | 1 | | 24,3247 54 766 1 | | TS |
| 200404 | REP | 9 | LAST 563 | 24,3250 3 0034 0 | | CA |
| 200405 | REP | 1 | | 24,3251 54 770 0 | | TS |
| 200406 | REP | 169 | LAST 648 | 24,3252 6 4555 0 | | TC |
| 20041 | REP | 1 | | 24,3253 47510 0 | | CADR |
| 20042 | REP | 1 | | 24,3254 6 0004 0 | QONWWD1 | INHINT |
| 20044 | REP | 12 | LAST 659 | 24,3255 11=145 1 | CCS | NWORD1 |
| 2005 | REP | 1 | | 24,3256 1 3301 1 | TCP | NOFLASH |
| 2006 | REP | 63 | LAST 647 | 24,3257 1 5112 1 | TCP | ENDOFJOB |
| 2007 | REP | 1 | | 24,3260 1 3270 0 | TCP | ENGREQST |
| 2008 | REP | 4 | LAST 651 | 24,3261 3 2351 1 | FAILDSP | CAP |
| 2009 | REP | 170 | LAST 661 | 24,3262 0 4555 0 | | TC |
| 2010 | REP | 13 | LAST 628 | 24,3263 20763 1 | | CADR |
| 2011 | REP | 1 | | 24,3264 1 3350 0 | | TCP |
| 2012 | REP | 1 | | 24,3265 1 3403 1 | | TCP |
| 2013 | REP | 1 | | 24,3266 1 3432 0 | | TCP |
| 2014 | REP | 1 | | 24,3267 1 3276 0 | | TCP |
| 2015 | REP | 5 | LAST 661 | 24,3270 3 2351 1 | ENGREQST | CAP |
| 2016 | REP | 171 | LAST 661 | 24,3271 0 4555 0 | | TC |
| 2017 | REP | 14 | LAST 661 | 24,3272 20763 1 | | CADR |
| 2018 | REP | 1 | | 24,3273 1 3320 1 | | TCP |
| 2019 | REP | 1 | | 24,3274 1 3326 1 | | TCP |
| 2020 | REP | 1 | | 24,3275 1 3312 0 | | TCP |
| 2021 | REP | 1 | | 24,3276 3 2352 1 | PASTERST | CAP |
| 2022 | REP | 2 | LAST 384 | 24,3277 6 5415 1 | | TCR |
| 2023 | REP | 64 | LAST 661 | 24,3300 1 5112 1 | | TCP |
| 2024 | REP | 13 | LAST 661 | 24,3301 31=145 0 | NOFLASH | CAB |
| 2025 | REP | 172 | LAST 661 | 24,3302 0 4555 0 | | TC |
| 2026 | REP | 1 | | 24,3303 20616 1 | | CADR |
| 2027 | REP | 5 | LAST 639 | 24,3304 3 4753 1 | B7SETTER | CAP |
| 2028 | REP | 31 | LAST 639 | 24,3305 54 003 0 | | TS |
| 2029 | REP | 58 | LAST 659 | E7,1412 | | BRANK= |
| 2030 | REP | 163 | LAST 655 | 24,3306 6 0002 0 | | TC |
| 2031 | REP | 10 | LAST 564 | 24,3307 3 4752 0 | B6SETTER | CAP |
| 2032 | REP | 32 | LAST 661 | 24,3310 54 003 0 | | TS |
| 2033 | REP | 43 | LAST 661 | E6,1466 | | BRANK= |

DETERMINE FUNCTION, INDICATED BY NWORD1

SPS ENGINE-ON-ENABLE V99 FLASH
SPS ENGINE-FAILED V97 FLASH

LINUS MAKES IT A REDO, INHINT OK
TERMINATE
PROCEED
ENTER

LINUS MAKES IT A REDO, INHINT OK
TERMINATE
PROCEED
ENTER

IMMED RETURN - SET UP V99 OR V97

DISPLAY NWORD1 NORMALLY

SET UP BRANK6

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| | | | | | | | | | |
|-------|---------|----------|---------|----------|----------|--------|-----------|--|--|
| 2034 | REP 184 | LAST 661 | 24,3311 | 0 0002 0 | | TC | 0 | | |
| 20345 | REP 44 | LAST 661 | E6,1466 | | | BRANK= | DAPDATR1 | | |
| 2035 | REP 19 | LAST 657 | 24,3312 | 0 5261 1 | V99B | TC | 2PHSCHNG | | |
| 2036 | | | 24,3313 | 00006 1 | | OCT | 00006 | | KILL PRS40.6/CLOCKTASK PROTECTION |
| 2037 | | | 24,3314 | 05024 1 | | OCT | 05024 | | C, PRIORITY NEXT, JOB BELOW |
| 20372 | | | 24,3315 | 27000 1 | | OCT | 27000 | | |
| 2038 | REP 3 | LAST 654 | 24,3316 | 0 3002 0 | V99EJOB | TCR | TVCZAP -1 | | WIPE OUT TVC, CLOCKTASK |
| 2039 | REP 2 | LAST 642 | 24,3317 | 1 2163 0 | | TCP | F40RCS | | V16N65 POST-BURN OPERATIONS |
| 20392 | REP 45 | LAST 662 | E6,1466 | | | BRANK= | DAPDATR1 | | |
| 2040 | REP 20 | LAST 662 | 24,3320 | 0 5261 1 | V99T | TC | 2PHSCHNG | | (ENTRY FROM V99T FLOW TOO) |
| 2041 | | | 24,3321 | 00006 1 | | OCT | 00006 | | KILL PRS40.6/CLOCKTASK PROTECTION |
| 2042 | | | 24,3322 | 05024 1 | | OCT | 05024 | | C, PRIORITY NEXT, JOB BELOW |
| 20422 | | | 24,3323 | 27000 1 | | OCT | 27000 | | |
| 2043 | REP 4 | LAST 662 | 24,3324 | 0 3002 0 | V99TJOB | TCR | TVCZAP -1 | | WIPE OUT TVC, CLOCKTASK |
| 2044 | REP 5 | LAST 643 | 24,3325 | 1 2204 1 | | TCP | POST41 | | AVEDEXIT, SETMAXDR, GOTOPOOH |
| 2045 | | | 24,3326 | 0 0004 0 | V99P | INHINT | | | |
| 2046 | REP 8 | LAST 659 | 24,3327 | 30 103 0 | | CAB | FLAOWRD7 | | CHECK ASTN FLAG FOR PRIOR V99P |
| 2047 | REP 24 | LAST 651 | 24,3330 | 7 4677 1 | | MASK | BIT12 | | |
| 2048 | REP 154 | LAST 659 | 24,3331 | 10 000 0 | | CCS | A | | |
| 20485 | REP 1 | | 24,3332 | 1 3345 1 | | TCP | V99P/TIO | | YES, THIS MUST BE A RESTART ENTRY |
| 20486 | REP 25 | LAST 662 | 24,3333 | 3 4677 0 | ASTNV99P | CAP | BIT12 | | SET ASTN FLAG |
| 20487 | REP 9 | LAST 662 | 24,3334 | 26 103 1 | | ADS | FLAOWRD7 | | |
| 2051 | REP 10 | LAST 662 | 24,3335 | 30 103 0 | | CAB | FLAOWRD7 | | CHECK IGN FLAG FOR TIG-0 ARRIVAL |
| 2052 | REP 26 | LAST 657 | 24,3336 | 7 4676 0 | | MASK | BIT13 | | |
| 2053 | | | 24,3337 | 0 0006 1 | | EXTEND | | | |
| 2054 | REP 2 | LAST 662 | 24,3340 | 1 3345 1 | | BZF | V99P/TIO | | NO, CLEAR THE V99 AND WAIT FOR TIG-0 |
| 2055 | REP 42 | LAST 655 | 24,3341 | 3 4712 1 | ENDV99PI | CAP | BIT1 | | TIG-0 HAS COME ALREADY |
| 2056 | REP 33 | LAST 659 | 24,3342 | 0 5140 1 | | TC | WAITLIST | | SET UP IGNITION HERE |
| 2057 | REP 46 | LAST 662 | E6,1466 | | | BRANK= | DAPDATR1 | | |
| 2058 | REP 2 | LAST 210 | 24,3343 | 02552 1 | | 2CADR | IGNITION | | |
| 2058 | | | 24,3344 | 50066 1 | | | | | |
| 20606 | REP 6 | LAST 661 | 24,3345 | 3 2351 1 | V99P/TIO | CAP | V06N40 | | CLEAR THE V99 FLASH AND WAIT FOR TIG-0 |
| 20606 | REP 14 | LAST 661 | 24,3346 | 55-145 1 | | TS | NVWORD1 | | |
| 2061 | REP 65 | LAST 661 | 24,3347 | 1 5112 1 | ENDV99P | TCP | ENDOFJOB | | |
| 20665 | REP 6 | LAST 654 | E6,1474 | | | BRANK= | CSMASS | | |
| 2067 | REP 21 | LAST 662 | 24,3350 | 0 5261 1 | V99T | TC | 2PHSCHNG | | |
| 2068 | | | 24,3351 | 00006 1 | | OCT | 00006 | | KILL GROUP 6 (CLOCKTASK) |
| 2069 | | | 24,3352 | 40674 0 | | OCT | 40674 | | A, 4.67 = V99TASK (-0 CS), TRASE NOW |
| 2070 | REP 43 | LAST 662 | 24,3353 | 3 4712 1 | | CAP | BIT1 | | |
| 2071 | REP 4 | LAST 429 | 24,3354 | 0 5130 0 | | TC | TWIDDLR | | |
| 2072 | REP 2 | LAST 210 | 24,3355 | 03357 0 | | ADDRS | V99TTASK | | KEEP BRANK6 FOR MASSRS, SPSOFF, ETC. |
| 2073 | REP 66 | LAST 662 | 24,3356 | 1 5112 1 | | TCP | ENDOFJOB | | |

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| | | | | | | | | | |
|-------|-----|-----|------|-----|---------|----------|----------|---------|----------|
| 2074 | REP | 7 | LAST | 662 | E6,1474 | | EBANK= | CS=MASS | |
| 2075 | REP | 134 | LAST | 657 | 24,3357 | 3 4714 1 | V97TASK | CAP | ZERO |
| 2076 | REP | 15 | LAST | 662 | 24,3360 | 55=145 1 | | TS | INWORD1 |
| 2077 | REP | 1 | | | 24,3361 | 3 2381 1 | | CAP | 3NDOT |
| 2078 | REP | 8 | LAST | 663 | 24,3362 | 6 1474 1 | | AD | CS=MASS |
| 2079 | REP | 5 | LAST | 654 | 24,3363 | 55=662 0 | | TS | MASSIMP |
| 2080 | REP | 50 | LAST | 659 | 24,3364 | 0 5301 0 | | TC | PHASCRNG |
| 2081 | | | | | 24,3365 | 05014 1 | | OCT | 05014 |
| 2082 | | | | | 24,3366 | 77777 0 | | DEC | -0 |
| 2083 | REP | 3 | LAST | 653 | 24,3367 | 0 2737 0 | | TCR | SPSOFF |
| 2084 | REP | 51 | LAST | 663 | 24,3370 | 0 5301 0 | | TC | PHASCRNG |
| 2085 | | | | | 24,3371 | 00714 0 | | OCT | 00714 |
| 2086 | REP | 4 | LAST | 654 | 24,3372 | 0 5156 0 | | TC | FIXDELAY |
| 2087 | | | | | 24,3373 | 00372 1 | | DEC | 250 |
| 2088 | REP | 47 | LAST | 662 | E6,1466 | | | EBANK= | DAPDTR1 |
| 2089 | REP | 27 | LAST | 654 | 24,3374 | 0 4633 0 | V97TRCS | TC | IBNRCALL |
| 2090 | REP | 3 | LAST | 654 | 24,3375 | 42010 0 | | CADR | RCSDAPON |
| 2091 | REP | 4 | LAST | 659 | 24,3376 | 3 7664 1 | | CAP | PRIO27 |
| 2092 | REP | 23 | LAST | 659 | 24,3377 | 0 5027 1 | | TC | NOVAC |
| 2093 | REP | 46 | LAST | 663 | E6,1466 | | | EBANK= | DAPDTR1 |
| 2094 | REP | 2 | LAST | 661 | 24,3400 | 03320 0 | | ZCADR | V99T |
| 2094 | | | | | 24,3401 | 50066 1 | | | |
| 2095 | REP | 35 | LAST | 659 | 24,3402 | 1 5213 0 | ENDV97T | TCR | TRSKOVER |
| 2096 | REP | 4 | LAST | 654 | E6,1444 | | | EBANK= | V97VCTR |
| 2097 | REP | 52 | LAST | 663 | 24,3403 | 0 5301 0 | V97P | TC | PHASCRNG |
| 2098 | | | | | 24,3404 | 40734 0 | | OCT | 40734 |
| 2099 | REP | 44 | LAST | 662 | 24,3405 | 3 4712 1 | | CAP | BIT1 |
| 2100 | REP | 5 | LAST | 662 | 24,3406 | 0 5130 0 | | TC | TWIDDLE |
| 2101 | REP | 2 | LAST | 210 | 24,3407 | 03411 0 | | ADRES | V97PTASK |
| 2102 | REP | 87 | LAST | 662 | 24,3410 | 1 5112 1 | | TCR | ENDOFJOB |
| 2103 | REP | 5 | LAST | 663 | E6,1444 | | | EBANK= | V97VCTR |
| 2104 | REP | 6 | LAST | 663 | 24,3411 | 31=444 1 | V97PTASK | CAB | V97VCTR |
| 2105 | REP | 2 | LAST | 103 | 24,3412 | 55=653 1 | | TS | VCTR |
| A2106 | | | | | | | | | |
| A2107 | | | | | | | | | |
| 2108 | REP | 7 | LAST | 662 | 24,3413 | 3 2351 1 | | CAP | V06N40 |
| 2109 | REP | 16 | LAST | 663 | 24,3414 | 55=145 1 | | TS | INWORD1 |
| 2110 | REP | 41 | LAST | 644 | 24,3415 | 0 5435 0 | | TC | UPFLAG |
| 2111 | REP | 1 | | | 24,3416 | 00030 1 | | ADRES | IDLEFAIL |
| 2112 | REP | 42 | LAST | 663 | 24,3417 | 0 5435 0 | | TC | UPFLAG |
| 2113 | REP | 1 | | | 24,3420 | 00042 1 | | ADRES | STERRSW |
| 2114 | REP | 53 | LAST | 663 | 24,3421 | 0 5301 0 | | TC | PHASCRNG |
| 2115 | | | | | 24,3422 | 00134 1 | | OCT | 00134 |
| 2116 | REP | 5 | LAST | 663 | 24,3423 | 0 5156 0 | | TC | FIXDELAY |
| 2117 | | | | | 24,3424 | 00310 0 | | DEC | 200 |

DISABLE CLOCKJOB

3 SECONDS OF MDOT (2-4 SEC ENDFAIL DETECTION) NOT LOST BECAUSE THRUST FAILED. COPYCYCLE FOR MASSBACK

C, DELDAT NEXT, TASK BELOW, IN -0 CS

SHUTDOWN SPS ENGINE, MASS UPDATE, ETC.

A, 4.71 = V97TRCS (250 CS), TRASE OLD DELAY 2.5 SECONDS FOR (POSSIBLE) TAIL-OFF (FALSE THRUST-LOSS)

RCs DAP IN 0.6SEC, SETTING TS BITS TO KILL TVC/RC/TVCROLLDAP STARTS SET UP V99T FOR TVCZAP AND POST41 (SET-MANOR AND GOTOPOCH) EBANK6 FOR SETMANOR IN POST41

A, 4.73 = V97PTASK (-0 CS), TRASE NOW

GET MASS UPDATES (TVC/RC) GOING AGAIN (ERRORS IF FLASE THRUST-LOSS AND/OR POOR SYNCH OF MANUAL ENGINE-ON AND THE VERR 97 PROCEED)

REDISPLAY V06N40

SET IDLEFAIL TO ALLOW R41-BYPASS, IN CASE OF UNFAVORABLE S40.8 SYNCH SET STERRSW TO RE-ENABLE STEERING

A, 4.13 = R40ENARI. (200 CS), TRASE OLD WAIT 2 SECONDS, THEN

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| | | | | | | | | | |
|-------|-----|----|------|-----|---------|----------|----------|--------|----------|
| 2118 | REP | 5 | LAST | 622 | E7,1777 | | | BRANK= | WHOCARS |
| 2119 | REP | 43 | LAST | 657 | 24,3425 | 0 5447 0 | R40ENABL | TC | DOWNFLAG |
| 2120 | REP | 2 | LAST | 663 | 24,3426 | 00030 1 | | ADRES | IDLEFAIL |
| 2121 | REP | 54 | LAST | 663 | 24,3427 | 0 5301 0 | | TC | PHASCHNG |
| 2122 | | | | | 24,3430 | 00004 0 | | OCT | 00004 |
| 2123 | REP | 36 | LAST | 663 | 24,3431 | 1 5213 0 | ENDV97P | TCP | TASKOVER |
| 2124 | REP | 6 | LAST | 664 | E7,1777 | | | BRANK= | WHOCARS |
| 2125 | REP | 55 | LAST | 664 | 24,3432 | 0 5301 0 | V97E | TC | PHASCHNG |
| 2126 | | | | | 24,3433 | 40534 1 | | OCT | 40534 |
| 2127 | REP | 45 | LAST | 663 | 24,3434 | 3 4712 1 | | CAP | BIT1 |
| 2128 | REP | 34 | LAST | 662 | 24,3435 | 0 5140 1 | | TC | WAITLIST |
| 2129 | REP | 59 | LAST | 661 | E7,1412 | | | BRANK= | TIG |
| 2130 | REP | 2 | LAST | 210 | 24,3438 | 03441 0 | | ZCADR | V97ETASK |
| 2130 | | | | | 24,3437 | 50067 0 | | | |
| 2131 | REP | 66 | LAST | 663 | 24,3440 | 1 5112 1 | | TCP | ENDOFJOB |
| 2132 | REP | 60 | LAST | 664 | E7,1412 | | | BRANK= | TIG |
| 2133 | REP | 6 | LAST | 233 | 24,3441 | 4 4112 0 | V97ETASK | CS | OCT24 |
| 2134 | REP | 61 | LAST | 664 | 24,3442 | 55=412 0 | | TS | TIG |
| 2135 | REP | 6 | LAST | 663 | 24,3443 | 3 2351 1 | | CAP | V06N40 |
| 2136 | REP | 17 | LAST | 663 | 24,3444 | 55=145 1 | | TS | NWWORD1 |
| 2137 | REP | 3 | LAST | 653 | 24,3445 | 0 3307 0 | | TCR | E6SETTER |
| 2138 | REP | 9 | LAST | 663 | E6,1474 | | | BRANK= | C6MASS |
| 2139 | REP | 2 | LAST | 663 | 24,3446 | 3 2361 1 | | CAP | 3MDOT |
| 2140 | REP | 10 | LAST | 664 | 24,3447 | 6 1474 1 | | AD | C6MASS |
| 2141 | REP | 6 | LAST | 663 | 24,3450 | 55=662 0 | | TS | MASSTMP |
| 2142 | REP | 56 | LAST | 664 | 24,3451 | 0 5301 0 | | TC | PHASCHNG |
| 2143 | | | | | 24,3452 | 00754 1 | | OCT | 00754 |
| 2145 | REP | 4 | LAST | 663 | 24,3453 | 0 2737 0 | SPSOFF97 | TCR | SPSOFF |
| 2146 | REP | 57 | LAST | 664 | 24,3454 | 0 5301 0 | | TC | PHASCHNG |
| 2147 | | | | | 24,3455 | 00114 0 | | OCT | 00114 |
| 2148 | REP | 6 | LAST | 663 | 24,3456 | 0 5156 0 | | TC | FIXDELAY |
| 2148 | | | | | 24,3457 | 00372 1 | | DEC | 250 |
| 2150 | REP | 49 | LAST | 663 | E6,1466 | | | BRANK= | DAPDTR1 |
| 2151 | REP | 46 | LAST | 664 | 24,3460 | 3 4712 1 | V97E40.6 | CAP | BIT1 |
| 2152 | REP | 35 | LAST | 664 | 24,3461 | 0 5140 1 | | TC | WAITLIST |
| 2153 | REP | 2 | LAST | 641 | E6,1447 | | | BRANK= | CNTR |
| 2154 | REP | 2 | LAST | 212 | 24,3462 | 02040 1 | | ZCADR | PRE40.6 |
| 2154 | | | | | 24,3463 | 40066 0 | | | |
| 2155 | REP | 28 | LAST | 663 | 24,3464 | 0 4633 0 | | TC | IRKCALL |
| 2156 | REP | 4 | LAST | 663 | 24,3465 | 42010 0 | | CADR | RCSADAPN |
| A2157 | | | | | | | | | |
| 2158 | REP | 22 | LAST | 662 | 24,3466 | 0 5261 1 | | TC | 2PHSCHNG |
| 2159 | | | | | 24,3467 | 00026 0 | | OCT | 00026 |
| 2160 | | | | | 24,3470 | 05014 1 | | OCT | 05014 |
| 21602 | | | | | 24,3471 | 77777 0 | | DEC | -0 |

RE-ENABLE R40 BY CLEARING IDLEFAIL

KILL GROUP 4

A, 4.53 = V97ETASK (-0 CS), TRASS NOW

FORCE R1 OF V06N40 TO READ 59X59

REDISPLAY V06N40

RETURN TO BRANK6 FOR REST OF V97ETASK

3 SECONDS OF MDOT (2-4 SEC ENGPAIL DETECTION) NOT LOST BECAUSE THRUST FAILED...COPYCYCLE FOR MASSBACK

A, 4.75 = SPSOFF97 (-0 CS), TRASS OLD

A, 4.11 = V97E40.6 (250 CS), TRASS OLD DELAY 2.5 SECONDS FOR (POSSIBLE) TAIL-OFF (FALSE THRUST-LOSS)

USE S40.6 RESTART ENTRY TO TRIM ENGINE

RCS DAP IN 0.6SEC, SETTING TS BITS TO KILL TVC(RC/TVCR)LDAP STARTS. LEAVE NARROW DEADBAND FOR REIGNITE

A, 6.2 = PRE40.6 (-0CS), CLOCTASK (1SEC) C, DELTAT NEXT, TASK BELOW, IN -0 CS



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| | | | | | | | | | | | | |
|------|-----|----|------|-----|---------|--------|------|---|----------|----------|----------|---|
| 2161 | REP | 5 | LAST | 646 | 24,3472 | 4 | 4761 | 1 | QUICKIGN | CS | PRI014 | CLEAR ASTNFLAG AND SET IGNFLAG FOR IMMEDIATE V99 RESPONSE |
| 2162 | REP | 11 | LAST | 662 | 24,3473 | 7 | 0103 | 1 | MASK | FLAGWDT | | |
| 2163 | REP | 29 | LAST | 662 | 24,3474 | 6 | 4676 | 1 | AD | BIT13 | | |
| 2164 | REP | 12 | LAST | 665 | 24,3475 | 54 | 103 | 1 | TS | FLAGWDT | | |
| 2165 | REP | 7 | LAST | 664 | 24,3476 | 0 | 5156 | 0 | TC | FIXDELAY | | DELAY TO ALLOW TIME FOR PRE40.6 |
| 2166 | | | | | 24,3477 | 00036 | 1 | | DEC | 30 | | |
| 2167 | REP | 24 | LAST | 657 | 24,3500 | 4 | 4702 | 1 | V99FLASH | CS | BIT9 | CAUSE V99 TO FLASH |
| 2168 | REP | 16 | LAST | 664 | 24,3501 | 55=145 | 1 | | TS | MWORD1 | | |
| 2169 | REP | 23 | LAST | 664 | 24,3502 | 0 | 5261 | 1 | TC | 2PHSCHK | | |
| 2170 | | | | | 24,3503 | 40774 | 1 | | OCT | 40774 | | A, 4.77 = TIG-0 (-0CS) TRASE FOR PREPTVC |
| 2171 | | | | | 24,3504 | 00033 | 1 | | OCT | 00033 | | A, 3.3 = S40.13 (PRIO 20) |
| 2172 | REP | 6 | LAST | 650 | 24,3505 | 3 | 4675 | 1 | CAP | PRI020 | | SET UP TIMEBURN |
| 2173 | REP | 25 | LAST | 659 | 24,3506 | 0 | 5042 | 1 | TC | FINDVAC | | |
| 2174 | REP | 14 | LAST | 657 | 24,1427 | | | | BRANK= | TOO | | |
| 2175 | REP | 3 | LAST | 650 | 24,3507 | 02404 | 0 | | 2CADR | S40.13 | | |
| 2175 | | | | | 24,3510 | 34067 | 1 | | | | | |
| 2176 | REP | 37 | LAST | 664 | 24,3511 | 1 | 5213 | 0 | ENDV97B | TCF | TASKOVER | WAIT FOR CLOCKJOB (IMMEDIATE) REACTION TO FLASHING V99 RESPONSE |

A2177
R2178 MOD NO2 LOG SECTION P40-P47
R2179 MOD BY ZELDIN
R2180 FUNCTIONAL DESCRIPTION
R2181 COMPUTE INITIAL THRUST DIRECTION(UT) AND INITIAL VALUE OF VG
R2182 VECTOR(VOTIG).
R2183 CALLING SEQUENCE
R2184 L CALL
R2185 L+1 S40.1
R2186 NORMAL EXIT MODE
R2187 AT L+2 OF CALLING SEQUENCE (GOTO L+2) NORMAL RETURN OR
R2188 ERROR RETURN IF NOSOFLAG =1
R2189 SUBROUTINES CALLED
R2190 COMPREC
R2191 INITVEL
R2192 CALCORAV
R2193 MIDDIM
R2194 ALARM OR ABORT EXIT MODES
R2195 L+2 OF CALLING SEQUENCE, UNSOLVABLE CONIC IF NOSOFLAG=1
R2196 ENASABLE INITIALIZATION REQUIRED
R2197 WEIGHT/G ANTICIPATED MAG. OF VEHICLE MASS SP R16KCM
R2198 XDELVPLG 1=DELTA-V MANEUVER, 0=AIMPT STEER
R2199 IP DELTA-V MANEUVER
R2200 DELVSIN SPECIFIED DELTA-V REQUIRED IN
R2201 INERTIAL COORDS. OF ACTIVE VEHICLE
R2202 AT TIME OF IGNITION VECTOR R1M/CS
R2203 MAG. OF DELVSIN DP R1M/CS
R2204 RTIG POSITION AT TIME OF IGNITION VECTOR R2M/CS
R2205 VTIG VELOCITY AT TIME OF IGNITION VECTOR R7M/CS
R2206 CSTEER = 0 DP

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R2207 IP AIMPOINT STEERING
R2208 IP AIMPT STEER
R2209 TIG TIME OF IGNITION DP B28C8
R2210 RTARG POSITION TARGET TIME VECTOR B29M
R2211 CSTEER = B0STEER(OR 0) DP B1
R2212 TPASS4 - TIME OF ARRIVAL AT AIMPOINT
R2213 OUTPUT
R2214 UT 1/2 UNIT VECTOR ALIGNED WITH THRUST DIRECTION IN REP COOR
R2215 VOTIG INITIAL VALUE OF VELOCITY
R2216 TO BE GAINED (INERT. COORD.) VECTOR B7M/C8
R2217 DELVLWC VOTIG IN LOC. VERT. COORDS. B7M/C8
R2218 F NOMINAL THRUST FOR ENG USED FOR S40.13 DP B7 M-NBWT
R2219 BDT V REQUIRED AT TIG -V REQUIRED AT (TIG-2SEC)
R2220 -BDT FOR S40.13 VECT B7M/C8
R2221 RTIG CALC IN S40.18(AIMPT) FOR S40.2,3 VECTOR B29M
R2222 POSITION AT TIME OF IGNITION
R2223 DEBRIS QTEMP1
R2224 MPAC,OPRET
R2225 PUSHLIST
R2226 RTX2,RTX1
2227 14,2002 BANK 14
2228 REP 1 16,2000 SETLOC P40S1
2229 16,2000 BANK
2230 REP 1 COLNT 16/S40.1
2231 16,2000 77214 0 S40.1 SET VLOAD
2232 REP 2 LAST 656 16,2001 01070 1 FIRSTPLG
2233 REP 1 16,2002 11456 0 LOGZSR08
2234 REP 3 LAST 656 16,2003 03705 0 STORE RDT
2235 16,2004 43020 1 STO BOP
2236 REP 6 LAST 633 16,2005 03657 0 QTEMP
2237 REP 7 LAST 655 16,2006 01347 0 XDELVPLG
2238 REP 1 16,2007 34073 1 S40.18 LAMBERT
2239 16,2010 77201 1 SETPD VLOAD EXTERNAL DELTA V
2240 16,2011 00001 0 0
2241 REP 5 LAST 631 16,2012 03640 0 VTIQ
2242 REP 11 LAST 656 16,2013 03576 0 STORE VINIT
2243 16,2014 53435 0 VKV UNIT
2244 REP 6 LAST 632 16,2015 03632 0 RTIG
2245 REP 2 LAST 122 16,2016 27713 1 STOVL UT UP IN UT
2246 REP 7 LAST 666 16,2017 03632 0 RTIG
2247 REP 12 LAST 656 16,2020 03570 0 STORE RINIT
2248 16,2021 65236 0 VSO PDDL
2249 16,2022 00045 0 36D
2250 16,2023 56205 0 DMP DDV
2251 REP 1 16,2024 34127 1 DMP THSTACON
2252 16,2025 41205 0 DMP DMP
2253 REP 3 LAST 121 16,2026 03654 0 DELVBAR
2254 REP 2 LAST 100 16,2027 03076 0 WRIGHTAG
    
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| | | | | | | |
|------|--------|----------|---------|---------|-------|----------|
| 2255 | | | 16,2030 | 77671 1 | DDV | |
| 2256 | REP 3 | LAST 640 | 16,2031 | 03727 0 | | P |
| 2257 | | | 16,2032 | 24017 1 | STOVL | 14D |
| 2258 | REP 9 | LAST 631 | 16,2033 | 03646 0 | | DELV/SIN |
| 2259 | | | 16,2034 | 74241 0 | DOT | VXSC |
| 2260 | REP 3 | LAST 666 | 16,2035 | 03713 1 | | UT |
| 2261 | REP 4 | LAST 667 | 16,2036 | 03713 1 | | UT |
| 2262 | | | 16,2042 | 00017 1 | | 14D |
| 2263 | | | 16,2045 | 53435 0 | VXV | UNIT |
| 2264 | REP 8 | LAST 667 | 16,2046 | 03713 1 | | UT |
| 2265 | | | 16,2047 | 45561 1 | VXSC | STADR |
| 2266 | REP 6 | LAST 641 | 16,2050 | 50056 1 | STOVL | VOTIG |
| 2267 | | | 16,2051 | 65256 0 | UNIT | PDDL |
| 2268 | | | 16,2052 | 00017 1 | | 14D |
| 2269 | | | 16,2053 | 74346 0 | COS | VXSC |
| 2270 | REP 7 | LAST 667 | 16,2054 | 74255 0 | VAD | VXSC |
| 2271 | | | 16,2055 | 03721 0 | | VOTIG |
| 2272 | | | 16,2056 | 00045 0 | | 36D |
| 2273 | | | 16,2057 | 53352 0 | VSL2 | VAD |
| 2274 | | | 16,2060 | 77626 0 | STADR | |
| 2275 | REP 8 | LAST 667 | 16,2061 | 74056 1 | STORE | VOTIG |
| 2276 | | | 16,2062 | 77656 1 | UNIT | |
| 2277 | REP 6 | LAST 667 | 16,2063 | 27713 1 | STOVL | UT |
| 2278 | REP 9 | LAST 667 | 16,2064 | 03721 0 | | VOTIG |
| 2279 | | | 16,2065 | 43006 0 | PUSH | SET |
| 2280 | REP 9 | LAST 639 | 16,2066 | 01072 0 | | AVFLAG |
| 2281 | | | 16,2067 | 77624 1 | CALL | MIDGIM |
| 2282 | REP 2 | LAST 633 | 16,2070 | 10653 0 | | |
| 2283 | | | 16,2071 | 77650 1 | GOTO | |
| 2284 | REP 9 | LAST 666 | 16,2072 | 03657 0 | | QTEMP |
| 2285 | | | 16,2073 | 45345 1 | DLOAD | DSU |
| 2286 | REP 12 | LAST 644 | 16,2074 | 02442 1 | | STOVL |
| 2287 | | | 16,2100 | 77425 0 | DSU | |
| 2288 | REP 2 | LAST 632 | 16,2103 | 61663 0 | | AGAIN |
| 2289 | | | 16,2104 | 77775 1 | VLOAD | |
| 2290 | REP 13 | LAST 632 | 16,2105 | 03612 1 | | VIPRIME |
| 2291 | REP 7 | LAST 667 | 16,2106 | 17713 1 | STOVL | UT |
| 2292 | REP 63 | LAST 667 | 16,2107 | 03413 1 | | TIG |

UNIT(VPXUP) SIN(THETAT) IN VOTIG
UNIT(DELTA VP) IN P.D.L. 6

VG IGNITION SCALED AT 2(+7)M/CS

THRUST DIRECTION SCALED AT 2(+1)

VOTIG IN LV COOR AT 2(+7)M/CS IN DELM.VC

LAMBERT

840.1R

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| | | | | | | | | | | | |
|------|-----|----|------|-----|---------|-------|---|--|----------|----------|---------------|
| 2303 | REP | 37 | LAST | 667 | 16,2110 | 00041 | 1 | | | | |
| 2304 | | | | | 16,2111 | 77621 | 1 | | STORE | TDEC1 | |
| 2305 | REP | 11 | LAST | 667 | 16,2112 | 03656 | 1 | | BDSU | | |
| 2306 | REP | 11 | LAST | 667 | 16,2113 | 37423 | 0 | | | TPASS4 | |
| 2307 | REP | 3 | LAST | 667 | 16,2114 | 61663 | 0 | | STCALL | DELLT4 | |
| 2308 | | | | | 16,2115 | 41575 | 0 | | | AGAIN | |
| 2309 | REP | 16 | LAST | 633 | 16,2116 | 03646 | 0 | | VLOAD | PUSH | |
| 2310 | REP | 10 | LAST | 667 | 16,2117 | 03721 | 0 | | | DELVEBT3 | |
| 2311 | | | | | 16,2120 | 45014 | 0 | | STORE | VOTIG | |
| 2312 | REP | 10 | LAST | 667 | 16,2121 | 01072 | 0 | | SET | CALL | |
| 2313 | REP | 3 | LAST | 667 | 16,2122 | 10653 | 0 | | | AVFLAG | |
| 2314 | | | | | 16,2123 | 52001 | 1 | | | MIDGIN | |
| 2315 | | | | | 16,2124 | 00001 | 0 | | SETPD | GOTO | |
| 2316 | REP | 1 | | | 16,2125 | 61716 | 0 | | | 0 | |
| | | | | | | | | | | CALCUT | |
| 2317 | | | | | 16,2126 | 00024 | 1 | | THETACON | ZDEC | .31830989 B-8 |
| 2317 | | | | | 16,2127 | 13714 | 1 | | | | |
| 2318 | REP | 1 | | | 30,2000 | | | | SETLOC | P40S3 | |
| 2319 | | | | | 30,3657 | | | | BANK | | |
| 2320 | REP | 1 | | | | | | | COUNT | 24/340.1 | |
| 2321 | | | | | 30,3657 | 04000 | 0 | | EP4(45)H | ZDEC | .125 |
| 2321 | | | | | 30,3660 | 00000 | 1 | | | | |
| 2322 | | | | | 30,3661 | 00707 | 1 | | EP4(10)H | ZDEC | .027777777 |
| 2322 | | | | | 30,3662 | 03434 | 1 | | | | |
| 2323 | | | | | 30,3663 | 45020 | 1 | | AGAIN | STO | CALL |
| 2324 | REP | 5 | LAST | 656 | 30,3664 | 03730 | 0 | | | OTEMP1 | |
| 2325 | REP | 6 | LAST | 630 | 30,3665 | 27022 | 1 | | | THISPREC | |
| 2326 | | | | | 30,3666 | 66134 | 1 | | SXA,2 | SXA,1 | |
| 2327 | REP | 12 | LAST | 630 | 30,3667 | 03746 | 1 | | | RTX2 | |
| 2328 | REP | 10 | LAST | 631 | 30,3670 | 03745 | 1 | | | RTX1 | |
| 2329 | | | | | 30,3671 | 77775 | 1 | | VLOAD | | |
| 2330 | REP | 21 | LAST | 631 | 30,3672 | 00001 | 0 | | | RATT | |
| 2331 | REP | 6 | LAST | 666 | 30,3673 | 03632 | 0 | | STORE | RTIG | |
| 2332 | REP | 13 | LAST | 666 | 30,3674 | 27570 | 0 | | STOVL | RINIT | |
| 2333 | REP | 17 | LAST | 630 | 30,3675 | 00007 | 0 | | | VATT | |
| 2334 | REP | 6 | LAST | 666 | 30,3676 | 03640 | 0 | | STORE | VTIG | |
| 2335 | REP | 12 | LAST | 666 | 30,3677 | 03576 | 0 | | STORE | VINIT | |
| 2336 | | | | | 30,3700 | 67201 | 0 | | SETPD | SLOAD | |
| 2337 | | | | | 30,3701 | 00001 | 0 | | | 0 | |
| 2338 | REP | 18 | LAST | 657 | 30,3702 | 15332 | 1 | | | HI&ZPROS | |
| 2339 | | | | | 30,3703 | 43125 | 0 | | PDDL | RON | |
| 2340 | REP | 1 | | | 30,3704 | 21660 | 1 | | | EP4(45)H | |
| 2341 | REP | 4 | LAST | 628 | 30,3705 | 03705 | 0 | | | NORMSW | |
| 2342 | | | | | 30,3706 | 61711 | 1 | | | +3 | |
| 2343 | | | | | 30,3707 | 77745 | 1 | | DLOAD | | |
| 2344 | REP | 1 | | | 30,3710 | 21662 | 0 | | | EP4(10)H | |
| 2345 | | | | | 30,3711 | 45006 | 0 | | PUSH | CALL | |
| 2346 | REP | 3 | LAST | 545 | 30,3712 | 22000 | 1 | | | INITVAL | |



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|------|-----|-------------|---------|---------|--------|----------|---|
| 2347 | | | 30,3713 | 52001 1 | STPD | GOTO | |
| 2348 | | | 30,3714 | 00001 0 | | 0 | |
| 2349 | REP | 6 LAST 668 | 30,3715 | 03730 0 | | OTEMP1 | |
| 2350 | | | 30,3716 | 45175 0 | CALCUT | VLOAD | CALL |
| 2351 | REP | 9 LAST 668 | 30,3717 | 03632 0 | | RTIG | |
| 2352 | REP | 2 LAST 628 | 30,3720 | 77256 0 | | CALCORAV | GDDEL/DAT IN MPAC AT 2(+7)M/CS |
| 2353 | | | 30,3721 | 70372 0 | | V/SC | |
| 2354 | REP | 1 | 30,3722 | 21761 1 | | 200CS | G AT 2(-5) M/CS,CS |
| 2355 | | | 30,3723 | 52315 1 | FDVL | VBU | |
| 2356 | REP | 14 LAST 667 | 30,3724 | 03612 1 | | VIPRIME | |
| 2357 | REP | 8 LAST 667 | 30,3725 | 03713 1 | | UT | |
| 2358 | | | 30,3726 | 52341 0 | | V/SC | |
| 2359 | REP | 2 LAST 669 | 30,3727 | 21761 1 | | 200CS | |
| 2360 | | | 30,3730 | 72561 0 | | VXSC | VSL2 |
| 2361 | REP | 5 LAST 644 | 30,3731 | 03703 0 | | CSTERR | |
| 2362 | | | 30,3732 | 24015 0 | STOVL | 12D | B,C SCALED AT 2(-5) PDL 12D |
| 2363 | REP | 11 LAST 668 | 30,3733 | 03721 0 | | VOTIG | |
| 2364 | | | 30,3734 | 41456 0 | UNIT | PUSH | UG PDL 0 SCALED AT 2(+1) |
| 2365 | | | 30,3735 | 74241 0 | DOT | VXSC | |
| 2366 | | | 30,3736 | 00015 0 | | 12D | |
| 2367 | | | 30,3737 | 00001 0 | | 0 | |
| 2368 | | | 30,3740 | 51352 1 | | VSL2 | BVSU |
| 2369 | | | 30,3741 | 00015 0 | | 12D | |
| 2370 | | | 30,3742 | 14015 0 | STOVL | 12D | Q PDL 12D SCALED AT 2(-5) |
| 2371 | REP | 4 LAST 667 | 30,3743 | 03727 0 | | F | |
| 2372 | | | 30,3744 | 56261 1 | SRR | DDV | |
| 2373 | | | 30,3745 | 21605 1 | | 4 | |
| 2374 | REP | 3 LAST 666 | 30,3746 | 03076 0 | | WEIGHT/G | |
| 2375 | | | 30,3747 | 63316 0 | DSQ | FDVL | P/MASS SQAURED PDL 6 AT 2(-10)M/(CS,CS) |
| 2376 | | | 30,3750 | 00015 0 | | 12D | |
| 2377 | | | 30,3751 | 77636 1 | VSO | | |
| 2378 | | | 30,3752 | 75421 1 | FDLU | SCRT | |
| 2379 | | | 30,3753 | 76561 1 | | VXSC | VSL1 |
| 2380 | | | 30,3754 | 53455 0 | | VAD | UNIT |
| 2381 | | | 30,3755 | 00015 0 | | 12D | |
| 2382 | REP | 9 LAST 669 | 30,3756 | 37713 0 | STCALL | UT | |
| 2383 | REP | 10 LAST 667 | 30,3757 | 03657 0 | | OTEMP | |
| 2384 | | | 30,3760 | 01440 0 | 200CS | 2DEC | 200 R-12 |
| 2384 | | | 30,3761 | 00000 1 | | | |

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P2385 PROGRAM DESCRIPTION S40.2,3 DATE 18,NOV,68
R2386 MOD NO 2 LOG SECTION P40-P47
R2387 MOD BY ZELDIN
R2388 FUNCTIONAL DESCRIPTION
R2389 COMPUTE GIMBAL ANGLES IF THRUSTING OCCURRED WITH PRESENT IMU
R2390 ORIENTATION, WINGS LEVEL SPACECRAFT, HEADS UP
R2391 COMPUTE X AXIS OF ENGINE BELL
R2392 COMPUTE PREFERRED IMU ORIENTATION(XSCREP)
R2393 FOR THIS CALCULATION, ASSUME X AXIS OF SC ALONG UT INITIALLY,
R2394 YSC=UNIT(XCR), ZSC=UNIT(X(XCR)) AND ROTATE ENGINE BELL ALONG UT
R2395 NEW SC AXES WILL BE APPROX. WINGS LEVEL AND NEW SC AXES IN RESP.
R2396 COORDS. WILL BE PREFERRED IMU ORIENTATION.
R2397 COMPUTE DESIRED THRUST DIRECTION IN SM COORDS.
R2398 CALLING SEQUENCE
R2399 L CALL
R2400 L+1 S40.2,3
R2401 NORMAL EXIT MODE
R2402 AT L+2 OF CALLING SEQUENCE (GOTO L+2)
R2403 SUBROUTINES CALLED
R2404 CALCOA
R2405 ALARM OR ABORT MODES
R2406 NONE
R2407 ERASABLE INITIALIZATION REQUIRED
R2408 PACTOFF TOTAL PITCH TRIM ANGLE SP AT 1.0795111 REV.
R2409 YACTOFF TOTAL YAW TRIM ANGLE SP AT 1.0795111 REV.
R2410 UT DESIRED THRUST DIRECTION VECT.B2M/(CS,CS)
R2411 RTIG POSITION AT TIME OF IGNITION VECT. B2M
R2412 ENG2FLAG ON=RCB OFF=SPS
R2413 OUTPUT
R2414 SCAXIS UNIT VECT. ALIGNED WITH ENG BELL IN SC COOR R1
R2415 XSCREP UNIT VECTORS ALIGNED WITH PREFERRED IMU R1
R2416 YSCREP
R2417 ZSCREP
R2418 GIMBAL ANGLES IN TRIPAD
R2419 POINTVSM UNIT VECT ALONG DESIRED THRUST DIRECTION IN SM R1
R2420 DEPRIS
R2421 PUSHLIST,OPRET,MPAC
R2422 QTEMP TEMP. ERASABLE
2423 24,3512 BANK 24
2424 REP 2 LAST 640 24,2000 SETLOC P40S
2425 24,3512 BANK
2426 REP 1 COUNT* SS/S40.2
2427 24,3512 64375 1 S40.2,3 VLOAD MKV
2428 REP 10 LAST 669 24,3513 03713 1 UT
2429 REP 18 LAST 612 24,3514 01736 1 REFSMAT
2430 24,3515 44172 0 VSL1 STO
2431 REP 11 LAST 669 24,3516 03657 0 QTEMP
2432 REP 5 LAST 612 24,3517 03357 0 STORF POINTVSM THRUST IN SM AT 2
2433 24,3520 43001 1 SETPD RCN
2434 24,3521 00001 0
    
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| | | | | | | | | | | |
|------|-----|----|------|-----|---------|-------|---|--|----------|------------|
| 2435 | REP | 3 | LAST | 644 | 24,3522 | 00704 | 1 | | RNO2FLAG | |
| 2436 | REP | 1 | | | 24,3523 | 51633 | 0 | | 840.2,38 | |
| 2437 | | | | | 24,3524 | 77745 | 1 | | DLOAD | |
| 2438 | REP | 19 | LAST | 668 | 24,3525 | 15332 | 1 | | W16ZEROS | |
| 2439 | | | | | 24,3526 | 67206 | 1 | | PUSH | SLOAD |
| 2440 | REP | 3 | LAST | 655 | 24,3527 | 03027 | 1 | | | ZERO PDL 0 |
| 2441 | | | | | 24,3530 | 72405 | 0 | | DMP | SL1 |
| 2442 | REP | 1 | | | 24,3531 | 11672 | 1 | | | TRIMSCAL. |
| 2443 | | | | | 24,3532 | 41415 | 1 | | DAD | PUSH |
| 2444 | REP | 1 | | | 24,3533 | 11674 | 1 | | | YBIAS |
| 2445 | | | | | 24,3534 | 65346 | 0 | | COS | PDDL |
| 2446 | | | | | 24,3535 | 41556 | 1 | | SIN | PUSH |
| 2447 | | | | | 24,3536 | 77735 | 0 | | SLOAD | |
| 2448 | REP | 13 | LAST | 655 | 24,3537 | 03026 | 0 | | | FACTOPP |
| 2449 | | | | | 24,3540 | 72405 | 0 | | DMP | SL1 |
| 2450 | REP | 2 | LAST | 671 | 24,3541 | 11672 | 1 | | | TRIMSCAL. |
| 2451 | | | | | 24,3542 | 41415 | 1 | | DAD | PUSH |
| 2452 | REP | 1 | | | 24,3543 | 11676 | 0 | | | PBIAS |
| 2453 | | | | | 24,3544 | 65346 | 0 | | COS | PDDL |
| 2454 | | | | | 24,3545 | 41556 | 1 | | SIN | PUSH |
| 2455 | REP | 1 | | | 24,3546 | 14323 | 0 | | STOCL | ZSCREP |
| 2456 | | | | | 24,3547 | 00007 | 0 | | | 6 |
| 2457 | | | | | 24,3550 | 72405 | 0 | | DMP | SL1 |
| 2458 | | | | | 24,3551 | 00005 | 1 | | | 4 |
| 2459 | | | | | 24,3552 | 65276 | 1 | | DCOMP | PDDL |
| 2460 | | | | | 24,3553 | 00007 | 0 | | | 6 |
| 2461 | | | | | 24,3554 | 72405 | 0 | | DMP | SL1 |
| 2462 | | | | | 24,3555 | 00003 | 1 | | | 2 |
| 2463 | | | | | 24,3556 | 77666 | 1 | | VDEF | |
| 2464 | REP | 1 | | | 24,3557 | 14307 | 0 | | STOCL | XSCREP |
| 2465 | REP | 2 | LAST | 671 | 24,3560 | 00323 | 0 | | | ZSCREP |
| 2466 | | | | | 24,3561 | 72405 | 0 | | DMP | SL1 |
| 2467 | | | | | 24,3562 | 00005 | 1 | | | 4 |
| 2468 | | | | | 24,3563 | 41325 | 0 | | PDDL | DMP |
| 2469 | REP | 3 | LAST | 671 | 24,3564 | 00323 | 0 | | | ZSCREP |
| 2470 | | | | | 24,3565 | 00003 | 1 | | | 2 |
| 2471 | | | | | 24,3566 | 57552 | 1 | | SL1 | DCOMP |
| 2472 | | | | | 24,3567 | 77666 | 1 | | VDEF | |
| 2473 | REP | 4 | LAST | 671 | 24,3570 | 14323 | 0 | | STOCL | ZSCREP |
| 2474 | | | | | 24,3571 | 77666 | 1 | | VDEF | |
| 2475 | REP | 1 | | | 24,3572 | 14315 | 0 | | STOCL | YSCREP |
| 2476 | REP | 5 | LAST | 671 | 24,3573 | 00323 | 0 | | | ZSCREP |
| 2477 | | | | | 24,3574 | 65325 | 0 | | PDDL | PDDL |
| 2478 | REP | 2 | LAST | 671 | 24,3575 | 00315 | 0 | | | YSCREP |
| 2479 | REP | 2 | LAST | 671 | 24,3576 | 00307 | 0 | | | XSCREP |
| 2480 | | | | | 24,3577 | 77666 | 1 | | VDEF | |



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| | | | | | | |
|------|-----|----|------|-----|---------|---------|
| 2481 | REP | 15 | LAST | 012 | 24,3600 | 27351 0 |
| 2482 | REP | 11 | LAST | 070 | 24,3601 | 03713 1 |
| 2483 | | | | | 24,3602 | 53515 0 |
| 2484 | REP | 10 | LAST | 069 | 24,3603 | 03632 0 |
| 2485 | | | | | 24,3604 | 57435 1 |
| 2486 | | | | | 24,3605 | 00001 0 |
| 2487 | | | | | 24,3606 | 41456 0 |
| 2488 | | | | | 24,3607 | 77024 1 |
| 2489 | REP | 1 | | | 24,3610 | 51652 1 |
| 2490 | | | | | 24,3611 | 57435 1 |
| 2491 | | | | | 24,3612 | 00001 0 |
| 2492 | | | | | 24,3613 | 63372 1 |
| 2493 | REP | 3 | LAST | 071 | 24,3614 | 00307 0 |
| 2494 | | | | | 24,3615 | 76505 0 |
| 2495 | | | | | 24,3616 | 00001 0 |
| 2496 | REP | 4 | LAST | 072 | 24,3617 | 24307 0 |
| 2497 | REP | 3 | LAST | 071 | 24,3620 | 00315 0 |
| 2498 | | | | | 24,3621 | 76505 0 |
| 2499 | | | | | 24,3622 | 00001 0 |
| 2500 | REP | 4 | LAST | 072 | 24,3623 | 24315 0 |
| 2501 | REP | 6 | LAST | 071 | 24,3624 | 00323 0 |
| 2502 | | | | | 24,3625 | 76505 0 |
| 2503 | | | | | 24,3626 | 00001 0 |
| 2504 | REP | 7 | LAST | 072 | 24,3627 | 00323 0 |
| 2505 | | | | | 24,3630 | 52001 1 |
| 2506 | | | | | 24,3631 | 00001 0 |
| 2507 | REP | 12 | LAST | 070 | 24,3632 | 03657 0 |
| 2508 | | | | | 24,3633 | 77775 1 |
| 2509 | REP | 6 | LAST | 087 | 24,3634 | 15330 0 |
| 2510 | REP | 16 | LAST | 072 | 24,3635 | 27351 0 |
| 2511 | REP | 12 | LAST | 072 | 24,3636 | 03713 1 |
| 2512 | REP | 5 | LAST | 072 | 24,3637 | 00307 0 |
| 2513 | | | | | 24,3640 | 53435 0 |
| 2514 | REP | 11 | LAST | 072 | 24,3641 | 03632 0 |
| 2515 | | | | | 24,3642 | 34007 1 |
| 2516 | REP | 2 | LAST | 072 | 24,3643 | 51652 1 |
| 2517 | REP | 5 | LAST | 072 | 24,3644 | 00315 0 |
| 2518 | | | | | 24,3645 | 57435 1 |
| 2519 | REP | 6 | LAST | 072 | 24,3646 | 00307 0 |
| 2520 | | | | | 24,3647 | 77772 0 |
| 2521 | REP | 8 | LAST | 072 | 24,3650 | 34323 1 |
| 2522 | REP | 13 | LAST | 072 | 24,3651 | 03657 0 |
| 2523 | | | | | 24,3652 | 46145 0 |
| 2524 | | | | | 24,3653 | 00045 0 |
| 2525 | REP | 1 | | | 24,3654 | 51657 1 |
| 2526 | | | | | 24,3655 | 43575 1 |
| 2527 | | | | | 24,3656 | 00007 0 |
| 2528 | | | | | 24,3657 | 53575 0 |
| 2529 | REP | 12 | LAST | 072 | 24,3660 | 03632 0 |
| 2540 | | | | | 24,3661 | 53515 0 |

| | |
|----------|-----------------|
| STOVL | SCAXIS |
| | UT |
| FDVL | UNIT |
| | RTIG |
| VXV | VCOMP |
| | 0 |
| UNIT | PUSH |
| CALL | |
| | TSTRUT |
| VXV | VCOMP |
| | 0 |
| VSL1 | FDVL |
| | XSCREP |
| VXV | VSL1 |
| | 0 |
| STOVL | XSCREP |
| | YSCREP |
| VXV | VSL1 |
| | 0 |
| STOVL | YSCREP |
| | ZSCREP |
| VXV | VSL1 |
| | 0 |
| STORE | ZSCREP |
| SETD | GOTO |
| | 0 |
| | QTEMP |
| | S40.2, 3R VLOAD |
| | UNITX |
| STOVL | SCAXIS |
| | UT |
| STORE | XSCREP |
| VXV | UNIT |
| | RTIG |
| STCALL | 0D |
| | TSTRUT |
| STORE | YSCREP |
| VXV | VCOMP |
| | XSCREP |
| VSL1 | |
| STCALL | ZSCREP |
| | QTEMP |
| TSTRUT | DLOAD |
| | RHIZ |
| | 3RD |
| | RADVCTOR |
| | VLOAD |
| | RVO |
| | 0D |
| RADVCTOR | VLOAD |
| | UNIT |
| | RTIG |
| FDVL | UNIT |

ENGINE BELL SCALED AT 2

2 RP/SC IN FOL 12D

X OF PREP IMU, X OF SC IN REP COOR. AT 2

Y OF PREP IMU, Y OF SC IN REP COOR. AT 2

Z OF PREP IMU, Z OF SC IN REP COOR. AT 2

ZNR AXIS IN REP COOR



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| | | | | | | | | | |
|------|-----|----|---------|-------|---|---------|-------|-----|---------------|
| 2586 | | | 22,3435 | 74321 | 1 | | | | |
| 2587 | REP | 2 | LAST | 405 | | | | PKV | VXSC |
| 2588 | REP | 1 | | | | 22,3436 | 05004 | 0 | QUADROT |
| 2589 | | | | | | 22,3437 | 05443 | 1 | TENENK14 |
| 2590 | REP | 15 | LAST | 673 | | 22,3440 | 52072 | 0 | GOTO |
| 2591 | | | | | | 22,3441 | 03657 | 0 | OTEMP |
| 2591 | | | | | | 22,3442 | 24000 | 1 | TENENK14 2DEC |
| 2591 | | | | | | 22,3443 | 00000 | 1 | 10. B-4 |

VG IN CONTROL COORD IN MPAC SCALED AT
VG IN CONTROL COORDS. IN MPAC AT 2(+7)



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R2592 NAME 840.8 - CROSS PRODUCT STEERING
R2593 FUNCTION (1) UPDATES THE VELOCITY-TO-BE-GAINED VECTOR.
R2594 (2) GENERATES ANGULAR RATE STEERING COMMANDS FOR AUTOPILOT.
R2595 (3) ESTABLISHES ENGINE CUT-OFF SIGNALS AT APPROPRIATE TIMES.
R2596 (4) INITIATES THRUST-PAIL ROUTINE, R40
R2597 CALLING SEQ CALL 840.8
R2598 INPUT VOPREV - LAST VALUE OF THE VELOCITY-TO-BE-GAINED VECTOR
R2599 PRIOR TO UPDATING IN METERS/CS AT +7.
R2600 DELVREP - CHANGE IN VEHICLE VELOCITY SINCE LAST MEASUREMENT
R2601 IN METERS/CS AT +7.
R2602 BDT - EFFECT OF RATE OF CHANGE OF REQUIRED VELOCITY AND
R2603 GRAVITY DURING DT UPON VELOCITY-TO-BE-GAINED IN
R2604 METERS/CS AT +7.
R2605 CSTEER - A SCALAR OF THE STEERING LAW, SC.AT B+1, USED FOR
R2606 SPS AIMPOINT STEERING MANEUVERS
R2607 IDLEFAIL - A FLAG TO INHIBIT (IDLE) THE THRUST-PAIL ROUTINE
R2608 STEERSW - A SWITCH TO PRECLUDE NEEDLESS CONDUCT OF STEERING
R2609 REFSMAT, DAPDATR1, PIPTIME
R2610 BRPPFRAC, BIDECCAY, KPRIMEDT FOR TVC
R2611 OUTPUT TTOO - TIME REMAINING FOR ENGINE BURN IN CS AT +28
R2612 OMEGAC - DP VECTOR RATE COMMAND, SC.AT 1/(2TVCDT) REVS/SEC
R2613 VG, VOPREV, VGDISP, TOO, TIG, SCALED AS NOTED IN CODING
R2614 STEERSW, IMPULSW, NWORD1
R2615 REPPFRAC, CNTR, VCNTR, VCNTRIMP FOR TVC (R40 INTERFACING)
R2616 DERRIS OMEGAC,+1
R2617 SUBROUTINES USED - *S*NS* , ALARM

| | | | | | | | | | |
|------|-----|-----|------|-----|---------|----------|---------|----------|---------------------------------------|
| 2618 | REP | 2 | LAST | 666 | 16,2000 | | SETLOC | P40S1 | |
| 2619 | | | | | 16,2130 | | BANK | | |
| 2620 | REP | 50 | LAST | 664 | 86,1468 | | BRANK= | DAPDATR1 | |
| 2621 | REP | 1 | | | | | COUNT | 16/840.8 | |
| 2622 | | | | | 16,2130 | 44001 0 | SETPD | STO | |
| 2623 | | | | | 16,2131 | 66001 0 | SPBIT1 | 000 | |
| 2624 | REP | 16 | LAST | 674 | 16,2132 | 03657 0 | QTEMP | | |
| 2625 | | | | | 16,2133 | 51375 1 | VLOAD | BVSL/ | CONSTRUCT DELVG, SC.AT B+7 M/CS |
| 2626 | REP | 3 | LAST | 655 | 16,2134 | 03433 0 | DELVREP | | |
| 2627 | REP | 4 | LAST | 666 | 16,2135 | 03705 0 | BDT | | |
| 2628 | | | | | 16,2136 | 77655 1 | VAD | | |
| 2629 | REP | 3 | LAST | 656 | 16,2137 | 03721 0 | VOPREV | | |
| 2630 | REP | 3 | LAST | 122 | 16,2140 | 03460 0 | STORE | VG | VELOCITY-TO-BE-GAINED, SC.AT B+7 M/CS |
| 2631 | | | | | 16,2141 | 77646 0 | ARVAL | | |
| 2632 | REP | 7 | LAST | 641 | 16,2142 | 03654 0 | STORE | VGDISP | FOR DISPLAY PURPOSES |
| 2633 | | | | | 16,2143 | 77778 1 | EXIT | | |
| 2634 | REP | 58 | LAST | 664 | 16,2144 | 0 5301 0 | TC | PHASCRNG | |
| 2635 | | | | | 16,2145 | 10035 0 | OCT | 10035 | TYPE B RESTART RFLW AND 5.3 RRRADAC |
| 2636 | REP | 145 | LAST | 660 | 16,2146 | 0 6006 1 | TC | INTRPT | |
| 2637 | | | | | 16,2147 | 77775 1 | VLOAD | | |

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| | | | | | | |
|-------|-----|-----|------|-----|---------|----------|
| 2838 | REP | 4 | LAST | 875 | 16,2150 | 03460 0 |
| 2839 | REP | 4 | LAST | 875 | 16,2151 | 03721 0 |
| 2840 | | | | | 16,2152 | 77214 0 |
| 2841 | REP | 2 | LAST | 863 | 16,2153 | 01344 0 |
| 2842 | REP | 17 | LAST | 875 | 16,2154 | 03657 0 |
| 2843 | REP | 4 | LAST | 875 | 16,2155 | 03433 0 |
| 2844 | | | | | 16,2156 | 41448 1 |
| 2845 | | | | | 16,2157 | 41335 1 |
| 28453 | REP | 1 | | | 16,2160 | 01354 1 |
| 28454 | REP | 1 | | | 16,2161 | 36011 1 |
| 28456 | | | | | 16,2162 | 77621 1 |
| 2846 | | | | | 16,2163 | 77440 1 |
| 2847 | REP | 1 | | | 16,2164 | 40021 0 |
| 2848 | REP | 51 | LAST | 875 | 16,2165 | 31466 1 |
| 2849 | REP | 39 | LAST | 864 | 16,2166 | 7 4675 0 |
| 2850 | REP | 155 | LAST | 862 | 16,2167 | 10 000 0 |
| 2851 | REP | 47 | LAST | 864 | 16,2170 | 3 4712 1 |
| 2852 | REP | 156 | LAST | 876 | 16,2171 | 50 000 1 |
| 2853 | REP | 1 | | | 16,2172 | 31423 0 |
| 2854 | REP | 2 | LAST | 103 | 16,2173 | 554652 0 |
| 2855 | REP | 146 | LAST | 875 | 16,2174 | 0 6006 1 |
| 2856 | | | | | 16,2175 | 51375 1 |
| 2857 | REP | 5 | LAST | 876 | 16,2176 | 03433 0 |
| 2858 | REP | 5 | LAST | 875 | 16,2177 | 03705 0 |
| 2859 | | | | | 16,2200 | 77656 1 |
| 2860 | | | | | 16,2201 | 41441 0 |
| 2861 | REP | 5 | LAST | 876 | 16,2202 | 03460 0 |
| 2862 | | | | | 16,2203 | 56244 0 |
| 2863 | REP | 1 | | | 16,2204 | 40013 1 |
| 2864 | REP | 1 | | | 16,2205 | 36005 1 |
| 2865 | | | | | 16,2206 | 41215 1 |
| 2866 | REP | 1 | | | 16,2207 | 11454 1 |
| 2867 | | | | | 16,2210 | 70501 1 |
| 2868 | REP | 29 | LAST | 856 | 16,2211 | 00047 1 |
| 2869 | | | | | 16,2212 | 60325 0 |
| 2870 | | | | | 16,2213 | 00045 0 |
| 2871 | REP | 11 | LAST | 593 | 16,2214 | 00050 1 |
| 2872 | | | | | 16,2215 | 77665 1 |
| 2873 | | | | | 16,2216 | 53664 0 |
| 2874 | REP | 30 | LAST | 876 | 16,2217 | 00046 0 |
| 2875 | | | | | 16,2220 | 57607 1 |
| 2876 | | | | | 16,2221 | 41405 0 |
| 2877 | REP | 1 | | | 16,2222 | 36003 1 |
| 2878 | | | | | 16,2223 | 54335 0 |
| 2879 | REP | 1 | | | 16,2224 | 03016 0 |
| 2880 | | | | | 16,2225 | 20617 0 |
| 2881 | | | | | 16,2226 | 45421 1 |
| 2882 | REP | 15 | LAST | 665 | 16,2227 | 74347 1 |
| 2883 | | | | | 16,2230 | 77615 0 |

| | | |
|---------|----------|-----------------------------------|
| VG | | |
| STORE | VOPREV | |
| BOFF | VLOAD | |
| | STRESSW | SKIP TOO AND CROSS-PRODUCT |
| | QTRP | |
| | DELVREP | |
| ABVAL | PUSH | CHECK FOR LOTHRUST |
| SLOAD | DMP | |
| | DVTHRESH | SC,AT B-2 M/CS |
| | DPB-9 | |
| RDSU | | |
| RNN | EXIT | |
| | LOTHRUST | |
| CAB | DAPDTR1 | ENABLE TVCDAP CO TRACKING |
| MASK | BIT14 | |
| CCS | A | |
| CAP | 91T1 | |
| TS | A | LM-OFF, LM-ON VALUE |
| CAB | REPFRAC | |
| TS | REPFRAC | |
| TC | INTPRC | |
| TOOCALC | VLOAD | GET DELVG |
| | RVSU | |
| | DELVREP | |
| | RDT | |
| UNIT | | |
| DOT | PUSH | (00D) |
| | VG | |
| BPL | DDV | ANGLE SHOULD BE GREATER THAN P1/2 |
| | INCRVQ | DISPLAY ALARM IF NOT |
| | ZVGRUST | |
| DAD | DMP | (DOT PRODUCT UP FROM 00D) |
| | LODPHALP | |
| NORM | SR1 | |
| | X1 | |
| PODL | NORM | (MAG DELVG) |
| | 36D | |
| | X2 | |
| RDDV | | |
| XSL,2 | SL* | |
| | X1 | |
| | 0 -9D,2 | |
| DMP | PUSH | (00D) |
| | -FOURDT | |
| SLOAD | SR | |
| | BTDCAY | BTDCAY SC,AT B+14 CS |
| | 14D | |
| RDSU | STADR | |
| STORE | TOO | TIME TO GO IN CS, AT +28 |
| DAD | | |

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| | | | | | | | | | | | |
|------|-----|----|------|-----|---------|-------|---|----------|--------|---------------|--|
| 2684 | REP | 7 | LAST | 656 | 16,2231 | 01205 | 1 | | | PIPTIME | |
| 2685 | REP | 84 | LAST | 667 | 16,2232 | 17413 | 1 | STOCL | | TIG | |
| 2686 | REP | 16 | LAST | 676 | 16,2233 | 03430 | 0 | | | TGO | |
| 2687 | | | | | 16,2234 | 50025 | 0 | DSJ | | RN | |
| 2688 | REP | 1 | | | 16,2235 | 36007 | 0 | | | FOURSEC | |
| 2689 | REP | 1 | | | 16,2236 | 40000 | 0 | | | 840.81 | |
| 2690 | | | | | 16,2237 | 74375 | 0 | XPRODUCT | VLOAD | VXSC | |
| 2691 | REP | 6 | LAST | 676 | 16,2240 | 03705 | 0 | | | EDT | |
| 2692 | REP | 6 | LAST | 669 | 16,2241 | 03703 | 0 | | | CSTERR | |
| 2693 | | | | | 16,2242 | 52352 | 1 | | VSL2 | VSI | |
| 2694 | REP | 6 | LAST | 676 | 16,2243 | 03433 | 0 | | | DEL/REP | |
| 2695 | | | | | 16,2244 | 63256 | 0 | | UNIT | FDVL | |
| 2696 | REP | 6 | LAST | 676 | 16,2245 | 03460 | 0 | | | VG | |
| 2697 | | | | | 16,2246 | 47256 | 0 | | UNIT | VXV | |
| 2698 | | | | | 16,2247 | 45121 | 1 | | MOV | CALL | |
| 2699 | REP | 20 | LAST | 673 | 16,2250 | 01736 | 1 | | | REPSMAT | (REPSMAT/2) |
| 2700 | REP | 4 | LAST | 673 | 16,2251 | 47577 | 1 | | | *SMNB* | |
| 2701 | | | | | 16,2252 | 77761 | 1 | | VXSC | | |
| 2702 | REP | 2 | LAST | 103 | 16,2253 | 03245 | 1 | | | KPRIMEDT | (KPRIMEDT SCIAT PI/8 RAD) |
| 2703 | REP | 5 | LAST | 101 | 16,2254 | 03126 | 1 | OMEGACL | STORE | OMEGAC | |
| 2704 | | | | | 16,2255 | 77650 | 1 | | GOTO | | |
| 2705 | REP | 18 | LAST | 676 | 16,2256 | 03657 | 0 | | | GTRMP | |
| 2706 | REP | 1 | | | 17,2000 | | | | SETLOC | DAPS7 | |
| 2707 | | | | | 17,2000 | | | | BANK | | |
| 2708 | REP | 1 | | | | | | | COUNT | 17/840.8 | |
| 2709 | | | | | 17,2000 | 00000 | 1 | TWODT | 2DEC | 200.0 R-28 | 2 SEC |
| 2709 | | | | | 17,2001 | 00310 | 0 | | | | |
| 2710 | | | | | 17,2002 | 77715 | 1 | -FOURDT | 2DEC | -800 R-18 | -4(200CS), SC.AT R+18CS (-4 FOR SCALING) |
| 2710 | | | | | 17,2003 | 77777 | 0 | | | | |
| 2711 | | | | | 17,2004 | 17602 | 0 | ZVEGUST | 2DEC | 63.020792 R-7 | 2(10338.0564 FPS), SC.AT B+7 M/CS |
| 2711 | | | | | 17,2005 | 25124 | 1 | | | | |
| 2712 | | | | | 17,2006 | 00000 | 1 | FOURSEC | 2DEC | 400.0 R-28 | 4 SEC |
| 2712 | | | | | 17,2007 | 00620 | 0 | | | | |
| 2713 | | | | | 17,2010 | 00040 | 0 | DPB-9 | 2DEC | 1 B-9 | |
| 2713 | | | | | 17,2011 | 00000 | 1 | | | | |
| 2714 | REP | 1 | | | 20,2000 | | | | SETLOC | DAPS6 | |
| 2715 | | | | | 20,2000 | | | | BANK | | |
| 2716 | REP | 1 | | | | | | | COUNT | 20/840.8 | |
| 2717 | | | | | 20,2000 | 77214 | 0 | 840.81 | SRT | VLOAD | TGO LESS THAN 4 SECONDS |
| 2718 | REP | 3 | LAST | 657 | 20,2001 | 01066 | 0 | | | IMPULSW | FOR ENGINE-OFF CALL. |
| 2719 | REP | 20 | LAST | 671 | 20,2002 | 15332 | 1 | | | HIZEROS | |
| 2720 | REP | 6 | LAST | 677 | 20,2003 | 03126 | 1 | RATEZRO | STORE | OMEGAC | TVC TO ATTITUDE HOLD |
| 2721 | | | | | 20,2004 | 77776 | 1 | | EXIT | | |
| 2722 | REP | 15 | LAST | 652 | 20,2005 | 34672 | 0 | | CAP | POSMAX | INHIBIT SWITCHOVER/TVC PD TRACKING |
| 2723 | REP | 3 | LAST | 664 | 20,2006 | 55447 | 0 | | TS | CNTR | |

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| | | | | | | | | | |
|------|-----|-----|------|-----|---------|--------|---|----------|----------|
| 2724 | REP | 147 | LAST | 876 | 20,2007 | 0 8006 | 1 | TC | INTPRST |
| 2725 | | | | | 20,2010 | 52014 | 0 | CLEAR | GOTO |
| 2726 | REP | 3 | LAST | 876 | 20,2011 | 01284 | 0 | | STEERSW |
| 2727 | REP | 19 | LAST | 877 | 20,2012 | 03857 | 0 | | OTEMP |
| 2728 | | | | | 20,2013 | 77776 | 1 | INCRVNG | EXIT |
| 2729 | REP | 26 | LAST | 551 | 20,2014 | 0 5537 | 0 | TC | ALARM |
| 2730 | | | | | 20,2015 | 01407 | 0 | OCT | 01407 |
| 2731 | REP | 148 | LAST | 878 | 20,2016 | 0 6006 | 1 | TC | INTPRST |
| 2732 | | | | | 20,2017 | 77650 | 1 | GOTO | |
| 2733 | REP | 20 | LAST | 878 | 20,2020 | 03857 | 0 | | OTEMP |
| 2734 | | | | | 20,2021 | 77214 | 0 | LOTHRUST | BN |
| 2735 | REP | 3 | LAST | 884 | 20,2022 | 00711 | 0 | | VLOAD |
| 2736 | REP | 21 | LAST | 878 | 20,2023 | 03857 | 0 | | IDLEFAIL |
| 2737 | REP | 21 | LAST | 877 | 20,2024 | 15332 | 1 | | OTEMP |
| 2738 | REP | 7 | LAST | 877 | 20,2025 | 03126 | 1 | STORE | HIGZEROS |
| 2739 | | | | | 20,2026 | 77776 | 1 | EXIT | OMEGAC |
| 2740 | REP | 135 | LAST | 883 | 20,2027 | 4 4714 | 0 | CS | ZERO |
| 2741 | REP | 3 | LAST | 883 | 20,2030 | 55-853 | 1 | TS | VONTR |
| 2742 | REP | 2 | LAST | 103 | 20,2031 | 55-883 | 1 | TS | VONTRIMP |
| 2743 | REP | 3 | LAST | 876 | 20,2032 | 55-852 | 0 | TS | REPPFRAC |
| 2744 | REP | 19 | LAST | 885 | 20,2033 | 55-145 | 1 | TS | NWORD1 |
| 2745 | REP | 149 | LAST | 878 | 20,2034 | 0 6006 | 1 | TC | INTPRST |
| 2746 | | | | | 20,2035 | 52014 | 0 | CLEAR | GOTO |
| 2747 | REP | 4 | LAST | 878 | 20,2036 | 01284 | 0 | | STEERSW |
| 2748 | REP | 22 | LAST | 878 | 20,2037 | 03857 | 0 | | OTEMP |

RESTARTS OK

ALARM INDICATING THAT THRUST IS POINTING IN WRONG DIRECTION.

THRUST FAILURE (LO-OR-NO) INDICATED SET BY V97P. ALLOWS 1 BYPASS IN CASE OF UNFAVORABLE S40.8 SYNCH START OF ENGINE-FAIL (R40) OPERATIONS PUT TVC IN ATTITUDE HOLD

KILL CSMMASS UPDATING (TVCSKBC LOGIC REQUIRES THIS TOO) KILL TVCDAP CG TRIM TRACKING SET UP ENGINE-FAIL V97FLASH (CLOCKJOB)

INHIBIT STEERING AND TOO CALC (MANUAL SHUTDOWN IF NOT SET UP AGAIN) RESTARTS OK



L P40-P47

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P2749 NAME      S40.9 - VTGAIN (AIMPOINT MANEUVERS ONLY)
P2750 FUNCTION (1) GENERATES REQUIRED VELOCITY AND VELOCITY-TO-BE-GAINED
P2751          VECTORS FOR USE DURING AIMPOINT MANEUVERS
P2752          (2) UPDATES THE B VECTOR WHICH IS USED IN THE FINAL
P2753          CALCULATION OF EXTRAPOLATING THE VELOCITY-TO-BE-GAINED
P2754 CALLING SEQ VIA PINDVAC AS NEW JOB.
P2755 INPUT      RINIT - ACTIVE VEHICLE RADIUS VECTOR IN METERS AT +29.
P2756          VNIT  - ACTIVE VEHICLE VELOCITY VECTOR IN METERS/CS AT +7
P2757          VPREV - LAST COMPUTED VELOCITY REQUIRED VECTOR IN
P2758          METERS/CS AT +7.
P2759          NONTIG - TIME OF IGN. USED IN TARGETTING ROUTINES+28A
P2760          DELTA  - TRANSFER TIME FROM PIPTIME TO TARGET+28A
P2761          RINIT - TIME OF RINIT AND VNIT IN CS AT +28
P2762          GDT/2  - HALF OF VELOCITY GAINED IN DELTA T TIME DUE TO
P2763          ACCELERATION OF GRAVITY IN METERS/CS AT +7.
P2764          DELAREP - CHANGE IN VELOCITY DURING LAST 2 SEC IN
P2765          METERS/CS AT +7.
P2766          NORMSW SET-CENTRAL ANGLE BETWEEN RTARG AND RTIG IS BETWEEN
P2767          165 TO 195 DEGREES
P2768          RESET-CENTRAL ANGLE OUTSIDE CONE DESCRIBED ABOVE
P2769 OUTPUT     VOTEMP - VELOCITY TO BE GAINED VECTOR IN METERS/CS AT +7.
P2770          COGA  - INPUT OF INITIAL GUESS FOR LAMBERT FROM S40.1 0
P2771          OR PREVIOUS PASS THRU S40.9
P2772          GORL/2 - ORLATNESS TERM IN AVG GRAV CALC-GORLARSO/MU
P2773          VPREV - VELOCITY REQUIRED VECTOR IN METERS/CS AT +7.
P2774          BDT   - B VECTOR IN METERS/CS AT +7.
P2775 SUBROUTINES USED - INITVEL.
P2776 REP 3 LAST 675 16,2000 SETLOC P40S1
P2777          16,2257 BANK
P2778 REP 7 LAST 657 16,1746 BRANK= NBRCYCLS
P2779 REP 1          16,2257 COUNT 16/S40.9
P2780 REP 150 LAST 676 16,2257 0 6006 1 S40.9 TC INTPRET
P2781          16,2260 71201 1 SETPD DLOAD
P2782          16,2261 00001 0 00D
P2783 REP 2 LAST 686 16,2262 11456 0 LOGZEROS
P2784          16,2263 77725 1 POOL
P2785 REP 1          16,2264 34401 0 SP4(45)L
P2786          16,2265 71214 0 BCN DLOAD
P2787 REP 5 LAST 686 16,2266 03705 0 NORMSW
P2788          16,2267 34271 1 +2
P2789 REP 1          16,2270 34403 1 SP4(10)L
P2790          16,2271 77608 1 PUSH
P2791          16,2272 45014 0 CLEAR CALL
P2792          16,2273 00675 0 GUESSW
P2793          16,2274 22002 0 HAVEGLES
P2794 REP 3 LAST 481 16,2275 77776 1 EXIT
P2795 REP 1          16,2276 0 5301 0 TC HASQNG
P2796 REP 59 LAST 675 16,2277 05021 1 OCT 05021

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SAVE TIME BY NOT REDOING LAMBERT CALCS
C, PRIORITY NEXT, JOB BELOW

L P40-P47

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| | | | | | | | |
|-------|-----|-----|------|---------|---------|----------|----------|
| 27954 | | | | 16,2300 | 10000 0 | OCT | 10000 |
| 27955 | REP | 151 | LAST | 679 | 16,2301 | 0 6006 1 | INTPRST |
| 2796 | | | | 16,2302 | 77614 1 | ENDLAMB | BCN |
| 2797 | REP | 3 | LAST | 666 | 16,2303 | 01310 1 | FIRSTPLO |
| 2798 | REP | 1 | | | 16,2304 | 34322 0 | FIRSTIME |
| 2799 | | | | | 16,2305 | 52375 1 | VLOAD |
| 2800 | REP | 15 | LAST | 669 | 16,2306 | 03612 1 | VSU |
| 2801 | REP | 2 | LAST | 120 | 16,2307 | 03466 0 | VIPRIME |
| 2802 | | | | | 16,2310 | 45325 1 | VRPRV |
| 2803 | REP | 3 | LAST | 656 | 16,2311 | 03474 0 | FDL |
| 2804 | REP | 2 | LAST | 120 | 16,2312 | 03476 1 | DSU |
| 2805 | | | | | 16,2313 | 55261 1 | TNIT |
| 2806 | | | | | 16,2314 | 20222 1 | TNITPRV |
| 2807 | REP | 1 | | | 16,2315 | 34375 1 | SL |
| 2808 | | | | | 16,2316 | 77761 1 | DDV |
| 2809 | | | | | 16,2317 | 76451 0 | 1PD |
| 2810 | REP | 2 | LAST | 77 | 16,2320 | 01207 0 | 200CSH1 |
| 2811 | REP | 7 | LAST | 677 | 16,2321 | 03705 0 | VXSC |
| 2812 | | | | | 16,2322 | 57535 0 | VSU |
| 2813 | REP | 13 | LAST | 668 | 16,2323 | 03747 0 | VSL1 |
| 28131 | | | | | 16,2324 | 77640 0 | GDT/2 |
| 2814 | REP | 1 | | | 16,2325 | 34342 0 | STORE |
| 2815 | | | | | 16,2326 | 53575 0 | FIRSTIME |
| 2816 | REP | 10 | LAST | 656 | 16,2327 | 01171 1 | SLOAD |
| 2817 | | | | | 16,2330 | 45345 1 | DCOMP |
| 2818 | REP | 6 | LAST | 677 | 16,2331 | 01205 1 | RTX2 |
| 2819 | REP | 3 | LAST | 640 | 16,2332 | 03456 0 | RN |
| 2820 | | | | | 16,2333 | 56205 0 | MOONCASE |
| 2821 | REP | 1 | | | 16,2334 | 34377 0 | UNIT |
| 2822 | | | | | 16,2335 | 00043 0 | RN |
| 2823 | | | | | 16,2336 | 53361 0 | DSU |
| 2824 | REP | 2 | LAST | 77 | 16,2337 | 01215 0 | PIPTIME |
| 2825 | REP | 2 | LAST | 656 | 16,2340 | 03646 0 | NOMPIG |
| 2826 | REP | 3 | LAST | 660 | 16,2341 | 03646 0 | DDV |
| 2827 | | | | | 16,2342 | 77776 1 | EARTHU |
| 2828 | REP | 60 | LAST | 679 | 16,2343 | 0 5301 0 | 3AD |
| 2829 | | | | | 16,2344 | 04021 0 | VAD |
| 2830 | REP | 152 | LAST | 680 | 16,2345 | 0 6006 1 | GDR/2 |
| 2831 | | | | | 16,2346 | 77745 1 | VOTEMP |
| 2832 | REP | 4 | LAST | 680 | 16,2347 | 03474 0 | VOTEMP |
| 2833 | REP | 3 | LAST | 680 | 16,2350 | 27476 1 | MOONCASE |
| 2834 | REP | 16 | LAST | 680 | 16,2351 | 03612 1 | EXIT |
| 2835 | REP | 3 | LAST | 680 | 16,2352 | 03466 0 | TC |
| 2836 | | | | | 16,2353 | 77414 0 | PHASCHG |
| 2837 | REP | 4 | LAST | 680 | 16,2354 | 01270 0 | OCT |
| 2838 | REP | 81 | LAST | 657 | 16,2355 | 4 4712 0 | INTPRST |
| 2839 | REP | 8 | LAST | 679 | 16,2356 | 55-746 1 | DLOAD |
| 2840 | REP | 61 | LAST | 680 | 16,2357 | 0 5301 0 | TNIT |
| 2841 | | | | | 16,2360 | 00001 0 | TNITPRV |

NOTE NO TEST IS MADE TO SUBTRACT CORL INSIDE 165-195 DEGREE CONR AREA.

C, JOB BELOW

REDO40.9 (RESTART) ENTRY TO END 840.9



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| | | | | | | | | | | | | |
|--------|-----|-----|------|-----|---------|---|-------|---|----------|-------|---------------------|--|
| 2842 | REP | 89 | LAST | 664 | 16,2361 | 1 | 5112 | 1 | | TCP | ENDOFJOB | |
| 28421 | REP | 153 | LAST | 660 | 16,2362 | 0 | 6008 | 1 | REDO40.9 | TC | INTRPT | 840.9 RESTARTS COME HERE TO GRACEFULLY |
| 28422 | | | | | 16,2363 | | 7775 | 1 | | VLOAD | | TERMINATE 840.9 SO THAT IT CAN BE |
| 28423 | REP | 3 | LAST | 679 | 16,2364 | | 11456 | 0 | | | LOGZEROS | SET UP WITH LATEST R,V,T NEXT PASS |
| 28424 | REP | 6 | LAST | 656 | 16,2365 | | 17351 | 0 | | STOOL | DELVSUM | (TYPE C PHASE POINTS "04021" WILL |
| 28425 | REP | 4 | LAST | 681 | 16,2366 | | 11456 | 0 | | | LOGZEROS | FORCE NORMAL 840.9 TERMINATIONS, |
| 28426 | REP | 9 | LAST | 680 | 16,2367 | | 27347 | 1 | | STOVL | NBRCYCLS | RATHER THAN LOSE TIME OF BRAND NEW |
| 284262 | REP | 5 | LAST | 676 | 16,2370 | | 03721 | 0 | | | VOPREV | PASS -- QUICK OLD DATA BETTER THAN |
| 284264 | REP | 4 | LAST | 680 | 16,2371 | | 03646 | 0 | | STORE | VOTEMP | NONE) NOW CAN GO THRU SETUP.9 |
| 28427 | | | | | 16,2372 | | 7776 | 1 | | EXIT | | WITHOUT DISTURBING VOPREV |
| 28428 | REP | 1 | | | 16,2373 | 1 | 2355 | 1 | | TCP | ENDS40.9 -2 | STORE 0,0 COVERED NBRCYCLS,P -- FIX UP S |
| 2843 | | | | | 16,2374 | | 01440 | 0 | 200C5H1 | 2DEC | 200 R-12 | |
| 2843 | | | | | 16,2375 | | 00000 | 1 | | | | |
| 2844 | | | | | 16,2376 | | 55340 | 0 | EARTHQU | 2DEC* | -3.986032 E10 B-36* | |
| 2844 | | | | | 16,2377 | | 61710 | 0 | | | | |
| 2845 | | | | | 16,2400 | | 04000 | 0 | EP4(45)L | 2DEC | .125 | |
| 2845 | | | | | 16,2401 | | 00000 | 1 | | | | |
| 2846 | | | | | 16,2402 | | 00707 | 1 | EP4(10)L | 2DEC | .027777777 | |
| 2846 | | | | | 16,2403 | | 03434 | 1 | | | | |

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P2847 NAME S40.13 - TIMEBURN
 R2848 FUNCTION (1) DETERMINE WHETHER A GIVEN COMBINATION OF VELOCITY-TO-
 R2849 BE-GAINED AND ENGINE CHOICE RESULT IN A BURN TIME SUFFICIENT
 R2850 TO ALLOW STEERING AT THE VEHICLE DURING THE BURN, AND
 R2851 (2) THE MAGNITUDE OF RESULTING BURN TIME - IF IT IS SHORT -
 R2852 AND THE ASSOCIATED TIME OF THE ENGINE-OFF SIGNAL.
 R2853 CALLING SEQ VIA FINDVAC AS NEW JOB.
 R2854 INPUT VOTIG - VELOCITY TO BE GAINED VECTOR (METERS/C.S.) AT +7
 R2855 WEIGHT/G - MASS OF VEHICLE IN KG AT TIG
 R2856 MDOT - RATE OF DECREASE OF VEHICLE MASS DURING ENGINE BURN
 R2857 IN KILOGRAMS/CENTISECOND AT +3. THIS SCALING MAY
 R2858 REQUIRE MODIFICATION FOR OTHER BURNS.
 R2859 OUTPUT IMPULSW - ZERO FOR STEERING
 R2860 - ONE FOR ATTITUDE HOLD
 R2861 TBU - TIME TO BURN IN CENTISECONDS AT +14
 R2862 THE QUANTITY M,NEWTON SHALL BE USED TO EXPRESS WEIGHT IN TERMS OF
 R2863 (KILOGRAMMETER)/(CENTISECOND-CENTISECOND)
 R2864 (1) M,NEWTON = (10000) NEWTONS
 R2865

2866 REP 17 LAST 677 57,1427 BRANK= TOO
 2867 REP 1 COUNT 16/40.13

| | | | | | | | | | | |
|------|-----|-----|------|-----|---------|--------|---|---------|---------|----------|
| 2868 | REP | 154 | LAST | 681 | 16,2404 | 0 6006 | 1 | S40.13 | TC | INTPRET |
| 2869 | | | | | 16,2405 | 43001 | 1 | | SETPD | SRT |
| 2870 | | | | | 16,2406 | 00001 | 0 | | | 00D |
| 2871 | REP | 4 | LAST | 677 | 16,2407 | 01066 | 0 | | IMPULSW | |
| 2872 | | | | | 16,2410 | 51575 | 1 | | VLOAD | ABVAL |
| 2873 | REP | 12 | LAST | 669 | 16,2411 | 03721 | 0 | | | VOTIG |
| 2874 | | | | | 16,2412 | 77776 | 1 | | EXIT | |
| 2875 | REP | 37 | LAST | 654 | 16,2413 | 3 4704 | 0 | | CAP | BITY |
| 2876 | | | | | 16,2414 | 0 0006 | 1 | | EXTEND | |
| 2877 | REP | 4 | LAST | 583 | 16,2415 | 06 031 | 0 | | ROR | CHAN31 |
| 2878 | REP | 38 | LAST | 662 | 16,2416 | 7 4704 | 1 | | MARK | BITY |
| 2879 | | | | | 16,2417 | 0 0006 | 1 | | EXTEND | |
| 2880 | REP | 1 | | | 16,2420 | 1 2502 | 0 | | BZF | NOTADDL |
| 2881 | REP | 155 | LAST | 662 | 16,2421 | 0 6006 | 1 | | TC | INTPRET |
| 2882 | | | | | 16,2422 | 56325 | 0 | | PODL | DDV |
| 2883 | REP | 1 | | | 16,2423 | 38027 | 1 | | | S40.135 |
| 2884 | REP | 4 | LAST | 669 | 16,2424 | 03076 | 0 | | | WEIGHT/G |
| 2885 | | | | | 16,2425 | 72414 | 0 | | BCN | SL1 |
| 2886 | REP | 2 | LAST | 644 | 16,2426 | 00700 | 0 | | | NJETSPLD |
| 2887 | REP | 1 | | | 16,2427 | 34430 | 1 | | | S40.130 |
| 2888 | | | | | 16,2430 | 77621 | 1 | S40.130 | BDSU | |
| 2889 | | | | | 16,2431 | 56325 | 0 | | PODL | DDV |
| 2890 | REP | 1 | | | 16,2432 | 36013 | 0 | | | KIVAL |
| 2891 | REP | 5 | LAST | 682 | 16,2433 | 03076 | 0 | | | WEIGHT/G |
| 2892 | | | | | 16,2434 | 50021 | 1 | | BDSU | RNN |
| 2893 | | | | | 16,2435 | 00001 | 0 | | | 00D |
| 2894 | REP | 1 | | | 16,2436 | 34461 | 0 | | | S40.131 |
| 2895 | | | | | 16,2437 | 41325 | 0 | | PODL | DMP |

ASSUME NO STEERING UNTIL FOUND OTHERWISE
 VELOCITY TO BE GAINED AT +7

TEST +X TRANSLATION

00D = MAG OF VOTIG AT +7
 COMPENSATION FOR 2 JET (L) LAGE AT +24
 MASS IN KGMS AT +16
 DOUBLE CORRECTION IF FOUR JETS

00D = MAG OF VOTIG CORRECTED FOR (L) LAGE
 M,NEWTON-CS AT +24

TOO LESS THAN 100 CS
 02D = TEMP1 AT +7



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| Line | REP | Count | Label | Address | Value | Code | Instruction | Comment |
|------|-----|-------|-------|---------|---------|--------|-------------|--------------|
| 2898 | REP | 2 | LAST | 654 | 16,2440 | 00111 | 0 | ENDOT |
| 2900 | REP | 1 | | | 16,2441 | 36023 | 0 | 3.5SEC |
| 2901 | | | | | 16,2442 | 85221 | 0 | BDSU PDDL |
| 2902 | REP | 6 | LAST | 662 | 16,2443 | 03076 | 0 | WEIGHT/G |
| 2903 | REP | 5 | LAST | 669 | 16,2444 | 03727 | 0 | P |
| 2904 | | | | | 16,2445 | 80405 | 0 | DMP SR3 |
| 2905 | REP | 1 | | | 16,2446 | 36025 | 0 | 5SECND |
| 2906 | | | | | 16,2447 | 41471 | 0 | DDV PUSH |
| 2907 | | | | | 16,2450 | 51021 | 0 | BDSU BPL |
| 2908 | | | | | 16,2451 | 00003 | 1 | 02D |
| 2909 | REP | 1 | | | 16,2452 | 34475 | 0 | S40.133 |
| 2910 | | | | | 16,2453 | 55345 | 0 | DLOAD BDDV |
| 2911 | | | | | 16,2454 | 43205 | 1 | DMP DAD |
| 2912 | REP | 2 | LAST | 663 | 16,2455 | 36025 | 0 | 5SECND |
| 2913 | REP | 1 | | | 16,2456 | 36021 | 1 | 1SEC2D |
| 2914 | | | | | 16,2457 | 77650 | 1 | GOTO |
| 2915 | REP | 1 | | | 16,2460 | 34466 | 1 | S40.132 |
| 2916 | | | | | 16,2461 | 41345 | 0 | DLOAD DMP |
| 2917 | REP | 7 | LAST | 663 | 16,2462 | 03076 | 0 | WEIGHT/G |
| 2918 | | | | | 16,2463 | 56215 | 1 | DAD DDV |
| 2919 | REP | 1 | | | 16,2464 | 36015 | 0 | K2VAL |
| 2920 | REP | 1 | | | 16,2465 | 36017 | 1 | K3VAL |
| 2921 | | | | | 16,2466 | 77776 | 1 | S40.132 |
| 2922 | REP | 16 | LAST | 662 | 17,1427 | | | EXIT |
| 2923 | REP | 7 | LAST | 347 | 16,2467 | 0 7226 | 0 | BRANK= TGO |
| 2924 | REP | 271 | LAST | 657 | 16,2470 | 3 0154 | 1 | TC TPAGRES |
| 2925 | REP | 67 | LAST | 657 | 16,2471 | 56 001 | 0 | CA MPAC |
| 2926 | REP | 136 | LAST | 678 | 16,2472 | 3 4714 | 1 | XCH L |
| 2927 | REP | 19 | LAST | 663 | 16,2473 | 53=430 | 0 | CA ZERO |
| 2928 | REP | 1 | | | 16,2474 | 0 2477 | 1 | DxCH TGO |
| 2929 | | | | | 16,2475 | 77414 | 0 | TC S40.134 |
| 2930 | REP | 5 | LAST | 662 | 16,2476 | 01266 | 1 | S40.133 |
| 2931 | REP | 62 | LAST | 660 | 16,2477 | 0 5301 | 0 | CLEAR |
| 2932 | | | | | 16,2500 | 00003 | 1 | EXIT |
| 2933 | REP | 90 | LAST | 661 | 16,2501 | 1 5112 | 1 | TC |
| 2934 | REP | 156 | LAST | 662 | 16,2502 | 0 6006 | 1 | NOTADDUL |
| 2935 | | | | | 16,2503 | 77650 | 1 | TC |
| 2936 | REP | 2 | LAST | 662 | 16,2504 | 34431 | 0 | GOTO |
| 2937 | REP | 2 | LAST | 677 | 17,2000 | | | S40.130 +1 |
| 2938 | | | | | 17,2012 | | | SETLOC DAPS7 |
| 2939 | REP | 1 | | | | | | BANK |
| 2940 | | | | | 17,2012 | 00001 | 0 | COUNT |
| 2940 | | | | | 17,2013 | 27221 | 0 | 17/40.13 |
| 2941 | | | | | 17,2014 | 00000 | 1 | K1VAL |
| 2941 | | | | | 17,2015 | 22244 | 0 | 2DEC |

SPS FLOW RATE SC.AT B+3 KO/CS (SP, NOTE)
350 CS AT +14
P AT +7
500 CS AT +14
04D = TEMP2
TGO GREATER THAN 600 CS
500 CS AT +14
100 CS AT +14
TGO LESS THAN 100 CS
M,NEWTON-CS AT +24
M,NEWTONS AT +10
TGO IN CS AT +28
WILL STEER VEHICLE
KILL GROUP 3
DO NOT COMPENSATE FOR 7 SEC OF ULIAGE

19885 LR-SRC, SC.AT R+23 NEWTON-SRC/R+2
293.137805 R-23 6590 LR-SRC, SC.AT R+23 NEWTON-SRC/R+2



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| | | | | | | | |
|---------|---------|---------|---------|------|------------|------|--|
| 2942 | 17,2016 | 00570 0 | K3VAL | 2DEC | 11.7766668 | B-9 | 26475 LBS, SC.AT B+9 NEWTONS/B+4 |
| 2942 | 17,2017 | 33235 0 | | | | | |
| 2943 | 17,2020 | 00144 0 | 1SEC2D | 2DEC | 100.0 | B-14 | 100.0 CS AT +14 |
| 2943 | 17,2021 | 00000 1 | | | | | |
| 2944 | 17,2022 | 01274 1 | 3.5SEC | 2DEC | 350.0 | B-13 | 350.0 CS AT +13 |
| 2944 | 17,2023 | 00000 1 | | | | | |
| 2945 | 17,2024 | 00764 1 | 5SECOND | 2DEC | 500.0 | B-14 | 500 CS AT +14 |
| 2945 | 17,2025 | 00000 1 | | | | | |
| 2946 | 17,2026 | 00000 1 | 540.135 | 2DEC | 68.6005183 | B-23 | IMPULSE FROM 7.96 SECS OF 2-JET FIRING |
| 2946 | 17,2027 | 04263 1 | | | | | |
| A294602 | | | | | | | 7.96(100.6)COS(10) LB-SEC, SC.AT |
| A294603 | | | | | | | B+23 NEWTON-SEC/B+2 (7 SEC ULLAGE |
| A294604 | | | | | | | TO GO, PLUS 0.06 SEC FROM PIPTIME) |

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P2947 NAME      S40.6 GIMBAL DRIVE TEST AND/OR GIMBAL TRIM
R2948 MOD NO 5          DATE 8 MARCH, 1967
R2949 MOD BY ENCEL      LOG SECTION P40-P47
R2950 FUNCTIONAL DESCRIPTION
R2951 GIMBAL DRIVE TEST...0,+2,-2,0 DEGREE ENGINE COMMANDS, AT 2 SECOND
R2952 INTERVALS, FIRST IN PITCH, THEN IN YAW. ASTRONAUT VERIFICATION
R2953 OF GIMBAL MOTION ON GPI
R2954 GIMBAL TRIM...AFTER A 4 SECOND DELAY,ENGINE COMMANDED TO
R2955 PRE-COMPUTED TRIM POSITION. ASTRONAUT VERIFICATION ON GPI.
R2956 PRE40.6...RESTART ENTRY TO RE-DO S40.6, ONLY IF RCS IS ON - IF TVC
R2957 IS NOT ON - PRIMARILY TO GET ACTUATORS TRIMMED FOR IGNITION.
R2958 BYPASS 4 SEC DELAY. SPEED IS CRITICAL NEAR IGNITION.
R2959 IF TVC IS ON (TVCDAPON OR LATER) THEN REDOTVC WILL TAKE CARE
R2960 OF RESTARTING ACTUATORS.
R2961 CALLING SEQUENCE....
R2962 WAITLIST, WITH 2CADR FOR S40.6 (OR PRE40.6), WITH EBANK= CNTR
R2963 NORMAL EXIT MODES - FIXDELAY, TASKOVER
R2964 SUBROUTINES CALLED....
R2965 OUTPUT (INTERNAL)
R2966 FIXDELAY
R2967 ALARM OR ABORT EXIT MODES - NONE
R2968 ERASABLE INITIALIZATION REQUIRED
R2969 CNTR = +0, NORMALLY SET BY THE P40 CALL AT TST,TRIM
R2970 MRKTRMP...POSITIVE FOR GIMBAL DRIVE TEST AND GIMBAL TRIM (BOTH)
R2971 NEGATIVE FOR GIMBAL TRIM ONLY
R2972 FACTOFF, YACTOFF SC.AT 85.41 ARCSEC/BIT (V48N48 P,YTRIM)
R2973 ..SC CONT.. SWITCH AT ..CMC.. (A/P CONTROL SWITCH AT ..GNC..)
R2974 ACTIVE SPS GIMBAL MOTOR POWER(S), PITCH, YAW
R2975 OUTPUT
R2976 TVCYAW, TVCPITCH (BITS RELEASED)
R2977 TVC ENABLE AND OPTICS ERROR COUNTER ENABLE
R2978 DERRIS
R2979 TEMPR60, CNTR
R2980
2981                                17,2030                                BANK 17
2982 REP 2 LAST 677 20,2000                                SETLOC DAPS6
2983                                20,2040                                BANK
2984 REP 4 LAST 677 58,1447                                EBANK= CNTR
2985 REP 1                                COUNT 20/S40.6
2986 REP 22 LAST 653 20,2040 4 0102 0 PRE40.6 CS FLAGWRD6 RESTART ENTRY TO S40.6 (DO NOT PERMIT
2987 REP 11 LAST 652 20,2041 7 4105 0 MASK OCT60000 IF TVC, BITS 15,Y4 = 1,0)
2988                                20,2042 0 0008 1 EXTEND
2989                                20,2043 6 2045 1 BZMP +2
29892 REP 38 LAST 665 20,2044 1 5213 0 TCP TASKOVER TVC, REDOTVC WILL REESTABLISH INTERFACE
2990 REP 48 LAST 676 20,2045 4 4712 0 CS BIT1 RCS, SO DO S40.6, GIMTRIM ONLY
    
```

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| | | | | | | | | | | | |
|-------|-----|-----|------|-----|---------|--------|---|----------|----------|----------|--|
| 2991 | REP | 3 | LAST | 841 | 20,2046 | 55-445 | 1 | TS | MRKTRMP | | |
| 2992 | REP | 49 | LAST | 885 | 20,2047 | 3 4712 | 1 | CAP | BIT1 | | |
| 2993 | REP | 5 | LAST | 885 | 20,2050 | 55-447 | 0 | TS | CNTR | | FOR REVISED 540.6 TIMING FOR RESTARTS... TO INDICATE A RESTART ENTRY (CNTR IS NORMALLY +0, BY 540.6) |
| A2994 | | | | | | | | | | | |
| 2994S | REP | 6 | LAST | 886 | 58,1447 | | | BRANK= | CNTR | | |
| 2995 | REP | 137 | LAST | 883 | 20,2051 | 4 4714 | 0 | CS | ZERO | 540.6 | INHIBIT OPTICS ACTIVITY |
| 2996 | REP | 24 | LAST | 855 | 20,2052 | 55-303 | 1 | TS | OPTIND | | |
| 2997 | REP | 27 | LAST | 847 | 20,2053 | 4 4711 | 0 | CS | BIT2 | | DISABLE OPTICS ERROR COUNTERS (ZERO, AND INHIBIT PULSE TRANSMISSION - NORMAL STATE) |
| 2998 | REP | 27 | LAST | 855 | 20,2054 | 0 0006 | 1 | EXTEND | | | |
| 2999 | REP | 27 | LAST | 855 | 20,2055 | 03 012 | 1 | WAND | CHAN12 | | |
| 3000 | REP | 1 | | | 20,2056 | 3 2143 | 0 | CAP | OCT02200 | | TVC ENABLE (SPS SERVO AMPS SEE DAC VOLTAGES) AND DISENGAGE OPTICS/DAC |
| 3001 | REP | | | | 20,2057 | 0 0006 | 1 | EXTEND | | | |
| 3002 | REP | 26 | LAST | 886 | 20,2060 | 05 012 | 1 | WOR | CHAN12 | | |
| 3003 | REP | 6 | LAST | 865 | 20,2061 | 0 5156 | 0 | TC | FIXDELAY | | 60MS PROCEDURAL DELAY (40MS MINIMUM) FOR RELAY LATCHING |
| 3004 | REP | | | | 20,2062 | 00006 | 1 | DEC | 6 | | |
| 3005 | REP | 28 | LAST | 886 | 20,2063 | 3 4711 | 1 | CAP | BIT2 | | ENABLE OPTICS ERROR COUNTERS |
| 3006 | REP | | | | 20,2064 | 0 0006 | 1 | EXTEND | | | |
| 3007 | REP | 29 | LAST | 886 | 20,2065 | 05 012 | 1 | WOR | CHAN12 | | |
| 3008 | REP | 9 | LAST | 886 | 20,2066 | 0 5156 | 0 | TC | FIXDELAY | | 20MS PROCEDURAL DELAY (4MS MINIMUM) FOR RELAY LATCHING |
| 3009 | REP | | | | 20,2067 | 00002 | 0 | DEC | 2 | | |
| 3010 | REP | 7 | LAST | 886 | 20,2070 | 11-447 | 0 | RSTRST | CCS | CNTR | CHECK FOR RESTART ENTRY (PRE40.6) - RESTART ENTRY... BYPASS 4 SECOND DELAY |
| 3011 | REP | 1 | | | 20,2071 | 1 2131 | 1 | TCP | GIMTRIM | +2 | TST, TRIM SETS +0 ON NORMAL ENTRY |
| A3012 | | | | | | | | | | | |
| 3013 | REP | 4 | LAST | 886 | 20,2072 | 31-445 | 0 | CAR | MRKTRMP | | CHECK FOR TEST/TRIM OR TRIM ONLY |
| 3014 | REP | 6 | LAST | 886 | 20,2073 | 55-447 | 0 | TS | CNTR | | MRKTRMP SAVES CNTR FOR RESTARTS |
| 3015 | REP | | | | 20,2074 | 0 0006 | 1 | EXTEND | | | (TRIM ONLY) |
| 3016 | REP | 2 | LAST | 886 | 20,2075 | 6 2127 | 1 | BZP | GIMTRIM | | |
| 3017 | REP | 138 | LAST | 886 | 20,2076 | 4 4714 | 0 | GDTSETUP | CS | ZERO | GIMRAL DRIVE TEST SETUP, FOR PITCH |
| 3018 | REP | 9 | LAST | 886 | 20,2077 | 55-447 | 0 | TS | CNTR | | |
| 3019 | REP | 1 | | | 20,2100 | 3 2145 | 0 | GIMDTEST | CAP | +2ACIDEG | GIMRAL DRIVE TEST, 1ST INCREMENT (LEAVES GIMRAL AT +2 DEG) |
| 3020 | REP | 1 | | | 20,2101 | 0 2114 | 1 | TC | OUTPUT | | |
| 3021 | REP | 1 | | | 20,2102 | 3 2144 | 1 | CAP | -4ACIDEG | | 2ND INCREMENT (LEAVES GIMRAL AT -2) |
| 3022 | REP | 2 | LAST | 886 | 20,2103 | 0 2114 | 1 | TC | OUTPUT | | |
| 3023 | REP | 2 | LAST | 886 | 20,2104 | 3 2145 | 0 | CAP | +2ACIDEG | | 3RD INCREMENT (LEAVES GIMRAL AT -0) |
| 3024 | REP | 3 | LAST | 886 | 20,2105 | 0 2114 | 1 | TC | OUTPUT | | |
| 3025 | REP | 10 | LAST | 886 | 20,2106 | 4 1447 | 0 | CS | CNTR | | CHECK FOR COMPLETION OF YAW TEST |



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| | | | | | | | | | | |
|-------|---|-----|------|-----|---------|----------|----------|----------|---------|--|
| 3026 | REP | 157 | LAST | 676 | 20,2107 | 10 000 0 | CCS | A | | |
| 3027 | REP | 3 | LAST | 686 | 20,2110 | 1 2127 0 | TCP | GIMTRIM | | COMPLETED, GO TO GIMBAL TRIM ROUTINE |
| 3028 | REP | 50 | LAST | 686 | 20,2111 | 4 4712 0 | CS | BIT1 | | SET UP YAW TEST |
| 3029 | REP | 11 | LAST | 686 | 20,2112 | 55-447 0 | TS | CNTR | | |
| 3030 | REP | 1 | | | 20,2113 | 1 2100 0 | TCP | GIMDTEST | | FOR YAW TEST |
| 3031 | | | | | 20,2114 | 0 0006 1 | EXTEND | | | OUTPUT THE INCREMENT....SAVE 0 |
| 3032 | REP | 4 | LAST | 384 | 20,2115 | 23-146 0 | QXCH | TEMPR60 | | |
| 3033 | REP | 12 | LAST | 687 | 20,2116 | 51-447 1 | INDEX | CNTR | | |
| 3034 | REP | 1 | | | 20,2117 | 54 054 1 | TS | TVCPTCH | | |
| 3035 | REP | 13 | LAST | 687 | 20,2120 | 51-447 1 | INDEX | CNTR | | |
| 3036 | REP | 21 | LAST | 659 | 20,2121 | 3 4700 1 | CAP | BIT11 | | |
| 3037 | | | | | 20,2122 | 0 0006 1 | EXTEND | | | |
| 3038 | REP | 5 | LAST | 179 | 20,2123 | 05 014 1 | WOR | CHAN14 | | |
| 3039 | REP | 10 | LAST | 686 | 20,2124 | 0 5156 0 | TC | FIXDELAY | | WAIT 2SEC, WHILE ASTRONAUT VERIFIES |
| 3040 | | | | | 20,2125 | 00310 0 | DEC | 200 | | GIMBAL MOTION ON GPI |
| 3041 | REP | 5 | LAST | 687 | 20,2126 | 0 1146 0 | TC | TEMPR60 | | |
| 3042 | REP | 11 | LAST | 687 | 20,2127 | 0 5156 0 | GIMTRIM | FIXDELAY | | WAIT 4 SECONDS BEFORE GIMBAL TRIM |
| 3043 | | | | | 20,2130 | 00620 0 | DEC | 400 | | |
| 3044 | REP | 139 | LAST | 686 | 20,2131 | 4 4714 0 | +2 | CS | ZERO | PICK UP TRIM VALUES AND OUTPUT THEM |
| 3045 | REP | 14 | LAST | 671 | 20,2132 | 6 1425 0 | AD | PACTOPP | | (AVOID +0) ENTRY POINT FROM RSTRST |
| 3046 | REP | 2 | LAST | 687 | 20,2133 | 54 054 1 | TS | TVCPTCH | | ON A RESTART, TO AVOID 4SEC DELAY |
| 3047 | REP | 140 | LAST | 687 | 20,2134 | 4 4714 0 | CS | ZERO | | |
| 3048 | REP | 4 | LAST | 671 | 20,2135 | 6 1426 0 | AD | YACTOPP | | |
| 3049 | REP | 1 | | | 20,2136 | 54 053 0 | TS | TVCYAW | | |
| 3050 | REP | 2 | LAST | 165 | 20,2137 | 3 4755 1 | CAP | PRIO6 | | RELEASE THE COUNTERS, BITS 11,12 |
| 3051 | | | | | 20,2140 | 0 0006 1 | EXTEND | | | |
| 3052 | REP | 6 | LAST | 687 | 20,2141 | 05 014 1 | WOR | CHAN14 | | |
| 3053 | REP | 39 | LAST | 685 | 20,2142 | 1 5213 0 | ENDS40.6 | TCP | TASKOVR | |
| 3053S | | | | | 20,2143 | 02200 1 | OCT02200 | OCT | 02200 | BITS 8,11 FOR CHANNEL 12 TVC/OPTICS |
| 3054 | | | | | 20,2144 | 77527 1 | -4ACTDEG | DEC | -168 | -2(+2ACTDEG), WHOLE BITS, NO ROUNDUP |
| 3055 | | | | | 20,2145 | 00124 0 | +2ACTDEG | DEC | +84 | +2 DEG, SC. AT 85.41 ARCSEC/BIT (+84D) |
| 3056 | CALLED BY ..DONOLN46.. (VERB 48), OR DIRECTLY BY ..PRESHDAP.. (RCS DAP) VIA IBKCALL | | | | | | | | | |
| 3058 | REP | 1 | | | | | COUNT | 20/541.2 | | |
| 3059 | REP | 52 | LAST | 676 | 20,2146 | 3 1466 1 | 541.2 | CA | DAPDTRI | |

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| | | | | | | | | | | | |
|------|-----|-----|------|-----|---------|----|------|---|-------------|----------|--|
| 3060 | REP | 22 | LAST | 652 | 20,2147 | 7 | 6214 | 1 | MASK | THREE | |
| 3061 | REP | 156 | LAST | 667 | 20,2150 | 6 | 0000 | 1 | AD | A | |
| 3062 | REP | 4 | LAST | 409 | 20,2151 | 55 | =130 | 0 | TS | RATINDEX | |
| 3063 | | | | | 20,2152 | 0 | 0004 | 0 | INHINT | | |
| 3064 | REP | 53 | LAST | 667 | 20,2153 | 31 | =466 | 1 | CA | DAPDATR1 | IS LEM ATTACHED (BITS 14,13 OF DAPDATR1 |
| 3065 | REP | 10 | LAST | 647 | 20,2154 | 7 | 4371 | 1 | MASK | PRIO30 | +10) |
| 3066 | REP | 1 | | | 20,2155 | 6 | 7705 | 1 | AD | -BIT14 | (OCTSTTTT) |
| 3067 | | | | | 20,2156 | 0 | 0006 | 1 | EXTEND | | YES |
| 3068 | REP | 1 | | | 20,2157 | 1 | 2164 | 1 | BZF | TOGETHER | |
| 3069 | REP | 29 | LAST | 666 | 20,2160 | 4 | 4711 | 0 | CS | BIT2 | NO, UNSET FLAG |
| 3070 | REP | 13 | LAST | 665 | 20,2161 | 7 | 0103 | 1 | MASK | FLAGWRD7 | |
| 3071 | REP | 14 | LAST | 668 | 20,2162 | 54 | 103 | 1 | TS | FLAGWRD7 | |
| 3072 | | | | | 20,2163 | 1 | 2167 | 1 | TCF | +4 | |
| 3073 | REP | 15 | LAST | 668 | 20,2164 | 4 | 0103 | 1 | TOGETHER CS | FLAGWRD7 | ATTACHED, SET FLAG FOR INTEGRATION |
| 3074 | REP | 30 | LAST | 668 | 20,2165 | 7 | 4711 | 0 | MASK | BIT2 | |
| 3075 | REP | 16 | LAST | 668 | 20,2166 | 26 | 103 | 1 | ADS | FLAGWRD7 | |
| 3076 | | | | | 20,2167 | 0 | 0003 | 1 | RELINT | | |
| 3077 | REP | 54 | LAST | 668 | 20,2170 | 3 | 1466 | 1 | CA | DAPDATR1 | |
| 3078 | REP | 28 | LAST | 643 | 20,2171 | 7 | 4707 | 1 | MASK | BIT4 | |
| 3079 | | | | | 20,2172 | 0 | 0006 | 1 | EXTEND | | |
| 3080 | | | | | 20,2173 | 6 | 2175 | 0 | BZMP | +2 | DEC 46 MEANS NARROW DR |
| 3081 | REP | 1 | | | 20,2174 | 3 | 2275 | 0 | CA | DEC409 | |
| 3082 | REP | 1 | | | 20,2175 | 6 | 2276 | 0 | AD | DEC46 | DEC 455 MEANS WIDE DR |
| 3083 | REP | 4 | LAST | 643 | 20,2176 | 55 | =655 | 1 | TS | ADR | |
| 3084 | REP | 55 | LAST | 668 | 20,2177 | 3 | 1466 | 1 | CA | DAPDATR1 | |
| 3085 | REP | 39 | LAST | 662 | 20,2200 | 7 | 4704 | 1 | MASK | RIT7 | QUAD RD |
| 3086 | | | | | 20,2201 | 0 | 0006 | 1 | EXTEND | | |
| 3087 | | | | | 20,2202 | 6 | 2204 | 0 | BZMP | +2 | |
| 3088 | REP | 02 | LAST | 660 | 20,2203 | 3 | 4712 | 1 | CA | ONE | |
| 3089 | REP | 2 | LAST | 107 | 20,2204 | 55 | =631 | 0 | TS | XTRANS | |
| 3090 | REP | 56 | LAST | 668 | 20,2205 | 3 | 1466 | 1 | CA | DAPDATR1 | |
| 3091 | REP | 27 | LAST | 418 | 20,2206 | 7 | 4701 | 1 | MASK | BIT10 | QUAD AC |
| 3092 | | | | | 20,2207 | 0 | 0006 | 1 | EXTEND | | |
| 3093 | | | | | 20,2210 | 6 | 2212 | 1 | BZMP | +2 | |
| 3094 | REP | 63 | LAST | 668 | 20,2211 | 4 | 4712 | 0 | CS | ONE | |
| 3095 | REP | 3 | LAST | 668 | 20,2212 | 27 | =631 | 0 | ADS | XTRANS | |
| 3096 | | | | | 20,2213 | 0 | 0004 | 0 | INHINT | | |
| 3097 | | | | | 20,2214 | 0 | 0006 | 1 | EXTEND | | |
| 3098 | | | | | 20,2215 | 1 | 2222 | 0 | BZF | +5 | |
| 3099 | REP | 15 | LAST | 584 | 20,2216 | 4 | 0075 | 1 | CS | FLAGWRD1 | CLEAR NJRTSPLG (4 JRTS, OR NO JRTS) |
| 3100 | REP | 33 | LAST | 654 | 20,2217 | 7 | 4674 | 1 | MASK | RIT15 | SET NJRTSPLG (2 JRTS, AC OR RD QUADS) |
| 3101 | REP | 16 | LAST | 668 | 20,2220 | 26 | 075 | 1 | ADS | FLAGWRD1 | NJRTSPLG = 1 FOR 2 JRT IN PLACE (AC OR RD) |



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| | | | | | |
|-------|---|----------|--|---------|----------|
| 3102 | | | | 20,2221 | 1 2225 1 |
| 3103 | REP 34 | LAST 688 | | 20,2222 | 4 4674 1 |
| 3104 | REP 17 | LAST 688 | | 20,2223 | 7 0075 1 |
| 3105 | REP 18 | LAST 689 | | 20,2224 | 54 075 1 |
| 3106 | | | | 20,2225 | 0 0003 1 |
| 3107 | REP 2 | LAST 274 | | 20,2226 | 3 1467 0 |
| 3108 | REP 30 | LAST 685 | | 20,2227 | 7 4676 0 |
| 3109 | | | | 20,2230 | 0 0006 1 |
| 3110 | | | | 20,2231 | 0 2233 1 |
| 3111 | | | | 20,2232 | 1 2234 1 |
| 3112 | REP 84 | LAST 688 | | 20,2233 | 4 4712 0 |
| 3113 | | | | 20,2234 | 4 0000 0 |
| 3114 | REP 2 | LAST 107 | | 20,2235 | 55=630 1 |
| 3115 | REP 3 | LAST 689 | | 20,2236 | 3 1467 0 |
| 3116 | REP 28 | LAST 688 | | 20,2237 | 7 4701 1 |
| 3117 | REP 159 | LAST 688 | | 20,2240 | 10 000 0 |
| 3118 | | | | 20,2241 | 1 2245 1 |
| 3119 | REP 85 | LAST 689 | | 20,2242 | 3 4712 1 |
| 3120 | REP 2 | LAST 107 | | 20,2243 | 55=626 0 |
| 3121 | REP 1 | | | 20,2244 | 1 2255 0 |
| 3122 | REP 141 | LAST 687 | | 20,2245 | 3 4714 1 |
| 3123 | REP 3 | LAST 689 | | 20,2246 | 55=626 0 |
| 3124 | REP 4 | LAST 689 | | 20,2247 | 3 1467 0 |
| 3125 | REP 29 | LAST 688 | | 20,2250 | 7 4707 1 |
| 3126 | REP 180 | LAST 689 | | 20,2251 | 10 000 0 |
| 3127 | REP 2 | LAST 689 | | 20,2252 | 1 2255 0 |
| 3128 | REP 86 | LAST 689 | | 20,2253 | 4 4712 0 |
| 3129 | REP 4 | LAST 689 | | 20,2254 | 55=626 0 |
| 3130 | REP 5 | LAST 689 | | 20,2255 | 3 1467 0 |
| 3131 | REP 40 | LAST 688 | | 20,2256 | 7 4704 1 |
| 3132 | REP 161 | LAST 689 | | 20,2257 | 10 000 0 |
| 3133 | | | | 20,2260 | 1 2264 1 |
| 3134 | REP 87 | LAST 689 | | 20,2261 | 3 4712 1 |
| 3135 | REP 2 | LAST 107 | | 20,2262 | 55=627 1 |
| 3136 | REP 165 | LAST 682 | | 20,2263 | 0 0002 0 |
| 3137 | REP 142 | LAST 689 | | 20,2264 | 3 4714 1 |
| 3138 | REP 3 | LAST 689 | | 20,2265 | 55=627 1 |
| 3139 | REP 6 | LAST 689 | | 20,2266 | 3 1467 0 |
| 3140 | REP 51 | LAST 687 | | 20,2267 | 7 4712 0 |
| 3141 | REP 162 | LAST 689 | | 20,2270 | 10 000 0 |
| 3142 | REP 166 | LAST 689 | | 20,2271 | 0 0002 0 |
| 3143 | REP 88 | LAST 689 | | 20,2272 | 4 4712 0 |
| 3144 | REP 4 | LAST 689 | | 20,2273 | 55=627 1 |
| 3145 | REP 167 | LAST 689 | | 20,2274 | 0 0002 0 |
| R3146 | DAPFIG ENTRY VIA TC POSTJUMP AS JOB FROM ..STARLISH.. (VERR 46) | | | | |
| 3147 | | | | 42,3521 | |
| 3148 | REP 2 | LAST 247 | | 42,2000 | |

| | |
|--------|----------|
| TCP | +4 |
| CS | BIT15 |
| MASK | FLAGWD1 |
| TS | FLAGWD1 |
| RELINT | |
| CA | DAPDATR2 |
| MASK | BIT13 |
| EXTEND | |
| BZMP | +2 |
| TCP | +2 |
| CS | ONE |
| COM | |
| TS | ACORD |
| CA | DAPDATR2 |
| MASK | BIT10 |
| CCS | A |
| TCP | +4 |
| CA | ONE |
| TS | RACPA IL |
| TCP | RDPA IL |
| CA | ZERO |
| TS | RACPA IL |
| CA | DAPDATR2 |
| MASK | BIT4 |
| CCS | A |
| TCP | RDPA IL |
| CS | ONE |
| TS | RACPA IL |
| CA | DAPDATR2 |
| MASK | BIT7 |
| CCS | A |
| TCP | +4 |
| CA | ONE |
| TS | RDPA IL |
| TC | 0 |
| CA | ZERO |
| TS | RDPA IL |
| CA | DAPDATR2 |
| MASK | BIT1 |
| CCS | A |
| TC | 0 |
| CS | ONE |
| TS | RDPA IL |
| TC | 0 |
| BANK | 42 |
| SETLOC | EXTVRS |

NJETSPLG = 0 FOR 4 JET (OR 0 JET) ULLAGE

MINUS FOR A-C, PLUS FOR B-D

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| | | | | | | | |
|-------|---------|----------|---------|--------|---|---------|----------------|
| 3149 | | | 42,3521 | | | BANK | |
| 3150 | REP 25 | LAST 665 | 42,3521 | 4 4702 | 1 | DAPFIG | CS BIT9 |
| 3151 | | | 42,3522 | 0 0006 | 1 | | EXTEND |
| 3152 | REP 30 | LAST 666 | 42,3523 | 03 012 | 1 | | WARD CHAN12 |
| 3153 | REP 57 | LAST 668 | 42,3524 | 31-486 | 1 | | CAB DAPDATR1 |
| 3154 | | | 42,3525 | 0 0006 | 1 | | EXTEND |
| 3155 | REP 23 | LAST 645 | 42,3526 | 7 4710 | 1 | | MP BIT3 |
| 3156 | REP 23 | LAST 668 | 42,3527 | 7 6214 | 1 | | MARK THREE |
| 3157 | REP 163 | LAST 669 | 42,3530 | 50 000 | 1 | | INDEX A |
| 3158 | | | 42,3531 | 1 3532 | 1 | | TCP +1 |
| 3159 | REP 1 | | 42,3532 | 1 3544 | 0 | | TOP NODAPUP |
| 3160 | REP 1 | | 42,3533 | 1 3537 | 1 | | TOP RCDAPUP |
| 3161 | REP 2 | LAST 690 | 42,3534 | 1 3537 | 1 | | TOP RCDAPUP |
| 3162 | REP 42 | LAST 657 | 42,3535 | 0 4574 | 0 | | TC POSTJUMP |
| 3163 | REP 1 | | 42,3536 | 87211 | 1 | | CADR SATSTRON |
| 3164 | | | 42,3537 | 0 0004 | 0 | RCDAPUP | INHINT |
| 3165 | REP 20 | LAST 664 | 42,3540 | 0 4633 | 0 | | TCR IRKCALL |
| 3166 | REP 5 | LAST 664 | 42,3541 | 42010 | 0 | | CADR RCDAPON |
| 3167 | | | 42,3542 | 0 0003 | 1 | | RELINT |
| 3168 | REP 1 | | 42,3543 | 1 3561 | 1 | | TCP ENDFIG |
| 3169 | | | 42,3544 | 0 0006 | 1 | NODAPUP | EXTEND |
| 3170 | REP 1 | | 42,3545 | 3 3564 | 0 | | DCA TSIDLAP |
| 3171 | REP 10 | LAST 652 | 42,3546 | 53-313 | 0 | | DXCH TSLOC |
| 3172 | REP 44 | LAST 664 | 42,3547 | 0 5447 | 0 | | TC DOWNFLAG |
| 3172S | REP 1 | | 42,3550 | 00132 | 1 | | ADRES DAPBIT1 |
| 3173 | REP 45 | LAST 690 | 42,3551 | 0 5447 | 0 | | TC DOWNFLAG |
| 3173Z | REP 1 | | 42,3552 | 00133 | 0 | | ADRES DAPBIT2 |
| 3173A | | | 42,3553 | 0 0004 | 0 | | INHINT |
| 3173S | REP 30 | LAST 690 | 42,3554 | 0 4633 | 0 | | TC IRKCALL |
| 3173B | REP 2 | LAST 539 | 42,3555 | 42616 | 0 | | CADR ZEROJET |
| 3173D | | | 42,3556 | 0 0003 | 1 | | RELINT |
| 3174 | REP 52 | LAST 689 | 42,3557 | 3 4712 | 1 | | CAP BIT1 |
| 3175 | REP 6 | LAST 566 | 42,3560 | 55-332 | 0 | | TS HOLDFLAG |
| 3176 | REP 43 | LAST 690 | 42,3561 | 0 4574 | 0 | ENDFIG | TC POSTJUMP |
| 3177 | REP 26 | LAST 539 | 42,3562 | 66121 | 0 | | CADR GOPIN |
| 3178 | REP 15 | LAST 687 | E6,1425 | | | | EBANK= FACTOFF |
| 3179 | REP 5 | LAST 646 | 42,3563 | 03143 | 1 | TSIDLAP | 2CADR TSIDLOC |
| 3179 | | | 42,3564 | 12106 | 0 | | |
| 3180 | | | 17,2030 | | | BANK | 17 |
| 3181 | REP 3 | LAST 665 | 20,2000 | | | SETLOC | DAPS6 |
| 3182 | | | 20,2275 | | | BANK | |
| 3183 | | | 20,2275 | 00631 | 0 | DEC409 | DEC 409 |
| 3184 | | | 20,2276 | 00056 | 1 | DEC46 | DEC 46 |

TURN OFF SIVB TAKEOVER

DETERMINE VEHICLE CONFIGURATION

RIGHT SHIFT 4 OCTAL DIGITS
(IN CASE BIT 15 IS USED)

BRANCH BASED ON CONFIG....

ON.....ACTIVATE NODAP
CSM.....ACTIVATE RCDAP
CSM/LEM..ACTIVATE RCDAP

CALL TO ACTIVATE RCDAP, AND RETURN

CAME IN VIA V46, GO OUT VIA GOPIN
TS IDLE FOR NODAP (DONT WORRY ABOUT T)

RESET TS-USAGE FLAGS FOR NODAP
BIT 15 FLAG 6 = 0

BIT 14 FLAG 6 = 0

ZERO JET CHANNELS IN 14 MS AND THEN
LEAVE THE TS CLOCK DISABLED.

KILL KALOMANU JOB

CAME IN VIA V46, GO OUT VIA GOPIN

R3185 CALLED BY ..DQNLN47.. (VERR 46), OR DIRECTLY BY ..PRESHDAP.. (RCS DAP)



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| Line | REP | Count | Address | Value | Label | Code | Value | Code | Value |
|------|------------------|-------|---------|----------|---------|--------|----------|------|-----------|
| 3186 | REP 1 | | 20,2277 | 31=470 0 | S40.14 | CAR | IXX | | RCS ENTRY |
| 3187 | | | 20,2300 | 0 0008 1 | | EXTEND | | | |
| 3188 | REP 1 | | 20,2301 | 7 2324 1 | | MP | CONTONE | | |
| 3189 | REP 2 LAST 107 | | 20,2302 | 55=623 0 | | TS | J/M | | |
| 3190 | REP 1 | | 20,2303 | 3 1471 1 | | CA | IAGV | | |
| 3191 | | | 20,2304 | 0 0008 1 | | EXTEND | | | |
| 3192 | REP 2 LAST 691 | | 20,2305 | 7 2324 1 | | MP | CONTONE | | |
| 3193 | REP 2 LAST 107 | | 20,2306 | 55=624 1 | | TS | J/M1 | | |
| 3194 | REP 2 LAST 107 | | 20,2307 | 55=625 0 | | TS | J/M2 | | |
| 3195 | | | 20,2310 | 0 0008 1 | | EXTEND | | | |
| 3196 | REP 1 | | 20,2311 | 3 2326 1 | | DCA | CONTWO | | |
| 3197 | | | 20,2312 | 0 0008 1 | | EXTEND | | | |
| 3198 | REP 2 LAST 691 | | 20,2313 | 11=470 1 | | DV | IXX | | |
| 3199 | REP 2 LAST 107 | | 20,2314 | 55=620 0 | | TS | KMJ | | |
| 3200 | | | 20,2315 | 0 0008 1 | | EXTEND | | | |
| 3201 | REP 2 LAST 691 | | 20,2316 | 3 2326 1 | | DCA | CONTWO | | |
| 3202 | | | 20,2317 | 0 0008 1 | | EXTEND | | | |
| 3203 | REP 2 LAST 691 | | 20,2320 | 11=471 0 | | DV | IAGV | | |
| 3204 | REP 2 LAST 107 | | 20,2321 | 55=621 1 | | TS | KMJ1 | | |
| 3205 | REP 2 LAST 107 | | 20,2322 | 55=622 1 | | TS | KMJ2 | | |
| 3206 | REP 166 LAST 689 | | 20,2323 | 0 0002 0 | | TC | 0 | | |
| 3207 | | | 20,2324 | 25137 0 | CONTONE | DEC | .662034 | | 2PI/M |
| 3208 | | | 20,2325 | 00023 0 | CONTWO | 2DEC | .00118 | | |
| 3209 | REP 1 | | 20,2326 | 12522 1 | | COUNT | 24/TVNG | | |
| 3210 | | | 31,3215 | | | RANK | 31 | | |
| 3211 | REP 3 LAST 670 | | 24,2000 | | | SETLOC | P40S | | |
| 3212 | | | 24,3677 | | | BANK | | | |
| 3213 | | | 24,3677 | 37405 1 | POS-2.5 | OCT | 37405 | | |
| 3214 | REP 56 LAST 690 | | 24,1466 | | | ERANK= | DAPDTR1 | | |
| 3215 | REP 1 | | 24,3700 | 02000 0 | RCSADR | 2CADR | RCSUP | | |
| 3216 | REP 1 | | 24,3701 | 42106 0 | | | | | |
| 3217 | REP 1 | | 24,3702 | 37704 0 | 6SECTS | OCT | 37704 | | |
| 3218 | | | | | | COUNT | 21/RCSUP | | |
| 3219 | | | 20,2327 | | | RANK | 20 | | |
| 3220 | REP 1 | | 21,2000 | | | SETLOC | DAPS3 | | |
| 3221 | | | 21,2000 | | | BANK | | | |
| 3222 | REP 6 LAST 577 | | 21,2000 | 22 016 0 | RCSUP | LXCH | RANKRUPT | | |

L P40-P47

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| | | | | | | | | | |
|-------|-----|-----|------|---------|----------|----------|----------|----------|--|
| 3223 | | | | 21,2001 | 0 0006 1 | | EXTEND | | |
| 3224 | REP | 6 | LAST | 577 | 21,2002 | 22 012 1 | OKCH | CRUPT | |
| 3225 | REP | 6 | LAST | 600 | 21,2003 | 0 2010 1 | TCR | RCSADAPN | ACTIVATE RCS DAP |
| 3226 | REP | 27 | LAST | 646 | 21,2004 | 1 5222 1 | TCR | RCSLMS | |
| 3227 | REP | 59 | LAST | 691 | E6,1466 | | EBANK | DAPDAPR1 | |
| 3228 | REP | 2 | LAST | 200 | 21,2005 | 02106 1 | RCSADDR | ZCADR | RCSATT |
| 3228 | | | | | 21,2006 | 42106 0 | | | |
| 3229 | | | | | 21,2007 | 37704 0 | 0.6SECTS | OCT | 37704 |
| A3230 | | | | | | | | | |
| 3231 | REP | 1 | | | 21,2010 | 3 2007 1 | RCSADAPN | CAP | 0.6SECTS |
| 3232 | REP | 7 | LAST | 652 | 21,2011 | 54 030 0 | +1 | TS | TIMES |
| 3233 | REP | 1 | | | 21,2012 | 55-465 0 | | TS | TS PHASE |
| 3234 | REP | 10 | LAST | 539 | 21,2013 | 4 1501 0 | CS | RCSPLAGS | SET BITS TO REINITIALIZE FDI ERROR |
| 3235 | REP | 24 | LAST | 690 | 21,2014 | 7 4710 1 | MASK | BIT3 | DISPLAY, IN CASE SC CNT SWITCH |
| 3236 | REP | 11 | LAST | 692 | 21,2015 | 27-501 0 | ADS | RCSPLAGS | IN SC NOT QNC (GUIDEMODE PRIMARY) |
| 3237 | | | | | 21,2016 | 0 0006 1 | EXTEND | | |
| 3238 | REP | 1 | | | 21,2017 | 3 2006 0 | DCA | RCSADDR | (RCSATT) |
| 3239 | REP | 11 | LAST | 690 | 21,2020 | 53-313 0 | OKCH | TSLOC | |
| 3240 | REP | 12 | LAST | 685 | 21,2021 | 4 4105 0 | CS | OCT60000 | SET BITS 15,14 TO 01 TO INDICATE |
| 3241 | REP | 23 | LAST | 685 | 21,2022 | 7 0102 0 | MASK | FLAGWRD6 | TS TAKEOVER BY RCSADAP |
| 3242 | REP | 40 | LAST | 676 | 21,2023 | 6 4675 1 | AD | BIT14 | |
| 3243 | REP | 24 | LAST | 692 | 21,2024 | 54 102 0 | TS | FLAGWRD6 | KILLS TVCXRRC AND ROLLDAP STARTS |
| 3244 | REP | 169 | LAST | 691 | 21,2025 | 0 0002 0 | TC | 0 | RETURN TO CALLER (TVCDAPOR OR RCSADAPUP) |



L P51-P53

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R0001 PROGRAM NAME- PROG52
 R0003 MOD NO- 2
 R0005 MODIFICATION BY- LONSKO

DATE- NOV 30, 1966
 LOG SECTION- P51-P53
 ASSEMBLY- SUNDISK REV 30

R0007 FUNCTIONAL DESCRIPTION-

R0008 ALIGNS THE IMU TO ONE OF THREE ORIENTATIONS SELECTED BY THE ASTRONAUT. THE PRESENT IMU ORIENTATION IS KNOWN
 R0010 AND IS STORED IN REPSMAT. THE THREE POSSIBLE ORIENTATIONS MAY BE

R0011 (A) PREFERRED ORIENTATION

R0012 AN OPTIMUM ORIENTATION FOR A PREVIOUSLY CALCULATED MANUEVER. THIS ORIENTATION MUST BE CALCULATED AND
 R0014 STORED BY A PREVIOUSLY SELECTED PROGRAM.

R0015 (B) NOMINAL ORIENTATION

R0016 $X = \text{UNIT}(X \ Z)$
 R0017 $-SM \quad -SM \quad -SM$

R0018 $Y = \text{UNIT}(V \ X \ R)$
 R0019 $-SM \quad - \quad -$

R0020 $Z = \text{UNIT}(-R)$
 R0021 $-SM \quad -$

R0022 WHERE

R0023 $R =$ THE GEOCENTRIC RADIUS VECTOR AT TIME T(ALIGN) SELECTED BY THE ASTRONAUT
 R0025 $-$

R0026 $V =$ THE INERTIAL VELOCITY VECTOR AT TIME T(ALIGN) SELECTED BY THE ASTRONAUT
 R0028 $-$

R0029 (C) REPSMAT ORIENTATION

R0030 THIS SELECTION CORRECTS THE PRESENT IMU ORIENTATION. THE PRESENT ORIENTATION DIFFERS FROM THAT TO WHICH IT
 R0032 WAS LAST ALIGNED ONLY DUE TO GYRO DRIFT(I.E. NEITHER GIMBAL LOCK NOR IMU POWER INTERRUPTION HAS OCCURED
 R0034 SINCE THE LAST ALIGNMENT).

R0035 AFTER A IMU ORIENTATION HAS BEEN SELECTED ROUTINE S52.2 IS OPERATED TO COMPUTE THE GIMBAL ANGLES USING THE
 R0037 NEW ORIENTATION AND THE PRESENT VEHICLE ATTITUDE. CAL52A THEN USES THESE ANGLES, STORED IN THETA0,+1,+2, TO
 R0039 COARSE ALIGN THE IMU. THE STAR SELECTION ROUTINE, R56, IS THEN OPERATED. IF 2 STARS ARE NOT AVAILABLE AN ALARM
 R0041 IS FLASHED TO NOTIFY THE ASTRONAUT. AT THIS POINT THE ASTRONAUT WILL MANUEVER THE VEHICLE AND SELECT 2 STARS
 R0043 EITHER MANUALLY OR AUTOMATICALLY. AFTER 2 STARS HAVE BEEN SELECTED THE IMU IS FINE ALIGNED USING ROUTINE R51. IF
 R0045 THE RENDEZVOUS NAVIGATION PROCESS IS OPERATING(INDICATED BY RNDVZFLG) P20 IS DISPLAYED. OTHERWISE P00 IS
 R0047 REQUESTED.

R0048 CALLING SEQUENCE-

R0049 THE PROGRAM IS CALLED BY THE ASTRONAUT BY D&Y ENTRY.

L P51-P53

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R0050 SUBROUTINES CALLED-

| | | | |
|-------|-------------|-------------|--------------|
| R0051 | 1. FLAGDOWN | 7. S52.2 | 13. NEWMODEX |
| R0052 | 2. R02BOTH | 8. CALS3A | 14. PRICLARM |
| R0053 | 3. GOPERF4 | 9. FLAGUP | |
| R0054 | 4. MATMOVE | 10. R56 | |
| R0055 | 5. GOFLASH | 11. R51 | |
| R0056 | 6. S02.3 | 12. GOPERF3 | |

R0057 NORMAL EXIT MODES-

R0058 EXITS TO ENDJOB

R0059 ALARM OR ABORT EXIT MODES-

R0060 NONE

R0061 OUTPUT-

R0062 THE FOLLOWING MAY BE FLASHED ON THE DSKY

| | |
|-------|--|
| R0063 | 1. IMJ ORIENTATION CODE |
| R0064 | 2. ALARM CODE 215 -PREFERRED IMJ ORIENTATION NOT SPECIFIED |
| R0065 | 3. TIME OF NEXT IGNITION |
| R0066 | 4. GIMBAL ANGLES |
| R0067 | 5. ALARM CODE 405 -TWO STARS NOT AVAILABLE |
| R0068 | 6. PLEASE PERFORM P00 |
| R0069 | THE MODE DISPLAY MAY BE CHANGED TO 20 |

R0070 ERASABLE INITIALIZATION REQUIRED-

R0071 PFRATPLG SHOULD BE SET IF A PREFERRED ORIENTATION HAS BEEN COMPUTED. IF IT HAS BEEN COMPUTED IT IS STORED IN

R0073 XSMO,YSMO,ZSMO.

R0074 RNDVZPLG INDICATES WHETHER THE RENDEZVOUS NAVIGATION PROCESS IS OPERATING.

R0076 DEBRIS-

R0077 WORK AREA

| | | | | | | | | |
|-------|-----|----|------|-----|---------|----------|--------|-------------|
| 0078 | REP | 3 | LAST | 209 | 15,2000 | P54 | = | PROG2 |
| 0079 | | | | | 33,3772 | | BANK | 33 |
| 0080 | REP | 1 | | | 15,2000 | | SETLOC | P505 |
| 0081 | | | | | 15,2000 | | BANK | |
| 0082 | REP | 4 | LAST | 450 | 30,2000 | | SRANK= | LOWSUPER |
| 0083 | REP | 7 | LAST | 448 | BR.1773 | | BRANK= | SAC |
| 0084 | REP | 1 | | | | | COUNT | 15/P52 |
| 0085 | REP | 63 | LAST | 683 | 15,2000 | 0 5301 0 | PROG2 | TC PHASCHNG |
| 0086 | | | | | 15,2001 | 00254 1 | | OCT 00254 |
| 0087 | REP | 46 | LAST | 690 | 15,2002 | 0 5447 0 | | TC DOWNPLAG |
| 00875 | REP | 19 | LAST | 639 | 15,2003 | 00027 1 | ADRS | UPDATPLG |

RIT 7 FLAG 1

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| | | | | | | |
|-------|-----|-----|------|-----|---------|----------|
| 0000 | REP | 47 | LAST | 694 | 15,2004 | 0 5447 0 |
| 00005 | REP | 7 | LAST | 639 | 15,2005 | 00031 0 |
| 0000 | REP | 173 | LAST | 661 | 15,2006 | 0 4555 0 |
| 0000 | REP | 6 | LAST | 647 | 15,2007 | 17573 0 |
| 0001 | REP | 30 | LAST | 689 | 15,2010 | 3 4707 0 |
| 0002 | REP | 37 | LAST | 629 | 15,2011 | 7 0076 1 |
| 0003 | REP | 164 | LAST | 690 | 15,2012 | 10 000 0 |
| 0004 | REP | 1 | | | 15,2013 | 0 2016 1 |
| 0005 | REP | 31 | LAST | 688 | 15,2014 | 3 4711 1 |
| 0006 | REP | 2 | LAST | 695 | 15,2015 | 0 2017 0 |
| 0007 | REP | 53 | LAST | 690 | 15,2016 | 3 4712 1 |
| 0008 | REP | 6 | LAST | 530 | 15,2017 | 55=132 1 |
| 0009 | REP | 54 | LAST | 695 | 15,2020 | 3 4712 1 |
| 0100 | REP | 174 | LAST | 695 | 15,2021 | 0 4555 0 |
| 0101 | REP | 1 | | | 15,2022 | 21041 1 |
| 0102 | REP | 42 | LAST | 648 | 15,2023 | 0 4106 1 |
| 0103 | | | | | 15,2024 | 0 2031 1 |
| 0104 | REP | 1 | | | 15,2025 | 0 2020 1 |
| 0105 | REP | 64 | LAST | 694 | 15,2026 | 0 5301 0 |
| 0106 | | | | | 15,2027 | 00014 1 |
| 0107 | REP | 91 | LAST | 683 | 15,2030 | 0 5112 0 |
| 0108 | REP | 9 | LAST | 695 | 15,2031 | 3 1132 0 |
| 0109 | REP | 24 | LAST | 690 | 15,2032 | 7 6214 1 |
| 0110 | REP | 165 | LAST | 695 | 15,2033 | 50 000 1 |
| 0111 | | | | | 15,2034 | 0 2035 0 |
| 0112 | REP | 1 | | | 15,2035 | 0 2041 0 |
| 0113 | REP | 1 | | | 15,2036 | 0 2110 0 |
| 0114 | REP | 2 | LAST | 695 | 15,2037 | 0 2041 0 |
| 0115 | REP | 1 | | | 15,2040 | 1 2120 1 |
| 0116 | | | | | 15,2041 | 0 0008 1 |
| 0117 | REP | 13 | LAST | 652 | 15,2042 | 3 4714 1 |
| 0118 | REP | 32 | LAST | 518 | 15,2043 | 53=046 0 |
| 0119 | REP | 1 | | | 15,2044 | 3 2155 1 |
| 0120 | REP | 175 | LAST | 695 | 15,2045 | 0 4555 0 |
| 0121 | REP | 28 | LAST | 648 | 15,2046 | 20624 0 |
| 0122 | REP | 43 | LAST | 695 | 15,2047 | 0 4106 1 |
| 0123 | | | | | 15,2050 | 0 2052 1 |
| 0124 | | | | | 15,2051 | 0 2044 0 |
| 0125 | | | | | 15,2052 | 0 0008 1 |
| 0126 | REP | 33 | LAST | 695 | 15,2053 | 3 1046 1 |
| 0127 | | | | | 15,2054 | 0 0008 1 |
| 0128 | | | | | 15,2055 | 1 2057 0 |
| 0129 | | | | | 15,2056 | 1 2062 0 |
| 0130 | | | | | 15,2057 | 0 0008 1 |
| 0131 | REP | 24 | LAST | 659 | 15,2060 | 3 0025 0 |
| 0132 | REP | 34 | LAST | 695 | 15,2061 | 53=046 0 |
| 0133 | REP | 10 | LAST | 695 | 15,2062 | 3 1132 0 |
| 0134 | REP | 32 | LAST | 695 | 15,2063 | 7 4711 0 |
| 0135 | REP | 168 | LAST | 695 | 15,2064 | 10 000 0 |

TC DOWNFLAG
 ADRES TRACKPLG
 TC BANKCALL
 CADR R02BOTH
 CAP BIT4
 MASK STATS +2
 CCS A
 TC P52A
 CAP BIT2
 TC P52A +1
 CAP BIT1
 TS OPTION2
 CAP BIT1
 TC BANKCALL
 CADR GOPERPAR
 TC GOTOPOCH
 TC +5
 TC P52B
 TC PHASCHNG
 OCT 00014
 TC ENDOPJOB
 CA OPTION2
 MASK THREE
 INDEX A
 TC +1
 TC P52T
 TC P52J
 TC P52T
 TCP P52C
 EXTEND
 DCA NEG0
 DXCH DSPTM1
 CAP V08N34
 TC BANKCALL
 CADR GOFASH
 TC GOTOPOCH
 TC +2
 TC -5
 EXTEND
 DCA DSPTM1
 EXTEND
 PZP +2
 TCP +4
 EXTEND
 DCA TIME2
 DXCH DSPTM1
 CA OPTION2
 MASK BIT2
 CCS A

BIT 5 FLAG 1
 IMU STATUS CHECK
 IS PFRATPLG SET (PREFERRED ORIENTATION)
 YES
 NO
 FLASH OPTION CODE AND ORIENTATION CODE
 NEW CODE - NEW ORIENTATION CODE INPUT
 L.S.
 PREP
 NOM
 REP

| L P51-P53 | | | | | | | |
|-----------|---------|----------|--|---------|----------|--------------|--------------------------------------|
| 0136 | | | | 15,2065 | 1 2073 0 | TOP +8 | |
| 0137 | REP 157 | LAST 683 | | 15,2066 | 0 6006 1 | TC INTPRET | NOM |
| 0138 | | | | 15,2067 | 77624 1 | CALL | LS |
| 0139 | REP 1 | | | 15,2070 | 34508 0 | | |
| 0140 | | | | 15,2071 | 77650 1 | GOTO P52L8 | |
| 0141 | REP 1 | | | 15,2072 | 32100 1 | | |
| 0142 | REP 158 | LAST 696 | | 15,2073 | 0 6006 1 | TC INTPRET | |
| 0143 | | | | 15,2074 | 77745 1 | DLOAD | |
| 0144 | REP 35 | LAST 695 | | 15,2075 | 01048 1 | | |
| 0145 | | | | 15,2076 | 77624 1 | CALL DSPTRM1 | |
| 0146 | REP 1 | | | 15,2077 | 34636 0 | | |
| 0147 | | | | 15,2100 | 77624 1 | CALL S52.3 | COMPUTE NOMINAL IMJ |
| 0148 | REP 1 | | | 15,2101 | 22256 0 | | ORIENTATION |
| 0149 | | | | 15,2102 | 77776 1 | CALL S52.2 | READ VEHICLE ATTITUDE AND |
| 0150 | REP 1 | | | 15,2103 | 3 2156 1 | EXIT | COMPUTE GIMBAL ANGLES |
| 0151 | REP 176 | LAST 695 | | 15,2104 | 0 4555 0 | CAP VB06N22 | |
| 0152 | REP 29 | LAST 695 | | 15,2105 | 20624 0 | TC BANKCALL | DISPLAY GIMBAL ANGLES |
| 0153 | REP 44 | LAST 695 | | 15,2106 | 0 4106 1 | CADR COFLASH | |
| 0154 | | | | 15,2107 | 0 2113 0 | TC GOTOPOOH | |
| 0155 | REP 159 | LAST 696 | | 15,2110 | 0 6006 1 | TC +4 | PROCEED |
| 0156 | | | | 15,2111 | 77650 1 | TC INTPRET | RECYCLE- VEHICLE HAS BEEN MANUEVERED |
| 0157 | REP 2 | LAST 696 | | 15,2112 | 32100 1 | GOTO | |
| 0158 | REP 160 | LAST 696 | | 15,2113 | 0 6006 1 | TC P52D | |
| 0159 | | | | 15,2114 | 77624 1 | INTPRET | |
| 0160 | REP 1 | | | 15,2115 | 30756 0 | CALL | DO COARSE ALIGN |
| 0161 | | | | 15,2116 | 77414 0 | | ROUTINE |
| 0162 | REP 5 | LAST 611 | | 15,2117 | 01462 0 | SET | |
| 0163 | REP 1 | | | 15,2120 | 3 4720 0 | EXIT | |
| 0164 | REP 177 | LAST 696 | | 15,2121 | 0 4555 0 | REP5MPLG | |
| 0165 | REP 3 | LAST 641 | | 15,2122 | 20751 0 | CAP ALRM15 | |
| 0166 | REP 45 | LAST 696 | | 15,2123 | 0 4106 1 | TC BANKCALL | |
| 0167 | | | | 15,2124 | 0 2126 0 | CADR GOPERP1 | |
| 0168 | REP 1 | | | 15,2125 | 0 2140 0 | TC GOTOPOOH | |
| 0169 | REP 161 | LAST 696 | | 15,2126 | 0 6006 1 | TC +2 | V33 |
| 0170 | | | | 15,2127 | 43234 0 | TC P52F | 5 |
| 0171 | REP 19 | LAST 612 | | 15,2130 | 45505 0 | TC INTPRET | |
| 0172 | REP 1 | | | 15,2131 | 32176 0 | TC | |
| 0173 | | | | 15,2132 | 77624 1 | RTR DAD | |
| 0174 | REP 1 | | | 15,2133 | 30216 1 | LOADTIME | |
| 0175 | | | | 15,2134 | 77776 1 | TSIGHT1 | |
| 0176 | REP 178 | LAST 696 | | 15,2135 | 0 4555 0 | CALL | |
| 0177 | REP 1 | | | 15,2136 | 30324 1 | LOCSAM | |
| 0178 | REP 1 | | | 15,2137 | 0 2145 0 | EXIT | |
| 0179 | REP 162 | LAST 696 | | 15,2140 | 0 6006 1 | TC BANKCALL | DO STAR SELECTION |
| 0180 | | | | 15,2141 | 77624 1 | CADR PICAPAR | |
| 0181 | REP 2 | LAST 209 | | 15,2142 | 30523 0 | TC P52I | 2 STARS NOT AVAILABLE |
| 0182 | | | | 15,2143 | 77776 1 | TC INTPRET | 2 STARS AVAILABLE |
| 0183 | REP 46 | LAST 696 | | 15,2144 | 0 4106 1 | CALL | |
| 0186 | REP 27 | LAST 678 | | 15,2145 | 0 5537 0 | RS1 | |
| 0187 | | | | 15,2146 | 00405 0 | ENDP50S | |
| | | | | | | TC GOTOPOOH | |
| | | | | | | TC ALARM | |
| | | | | | | OCT | 405 |

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| | | | | | | | | |
|------|-----|-----|------|-----|---------|----------|---------|--------------|
| 0198 | REP | 3 | LAST | 551 | 15,2147 | 3 4743 0 | CAP | V06N09 |
| 0199 | REP | 179 | LAST | 696 | 15,2150 | 0 4555 0 | TC | BANKCALL |
| 0200 | REP | 30 | LAST | 696 | 15,2151 | 20824 0 | CADR | COPLASH |
| 0201 | REP | 47 | LAST | 696 | 15,2152 | 0 4106 1 | TC | OOTPOOH |
| 0202 | REP | 2 | LAST | 696 | 15,2153 | 0 2140 0 | TC | P52P |
| 0203 | REP | 2 | LAST | 696 | 15,2154 | 0 2120 0 | TC | P52C |
| 0204 | | | | | 15,2155 | 01442 1 | V06N34 | VN 00634 |
| 0205 | | | | | 15,2156 | 01426 0 | V06N22 | VN 00622 |
| 0206 | REP | 2 | LAST | 153 | 4720 | | ALRM15 | EQUALS OCT15 |
| 0207 | REP | 1 | | | 16,2000 | | | SETLOC P5052 |
| 0208 | | | | | 16,2505 | | | BANK |
| 0209 | | | | | 16,2505 | 01531 1 | V06N09* | VN 0689 |

PROCEED - DO FINE ALIGN-R61
RECYCLE- VEHICLE HAS BEEN MANUEVERED

NAME-P52LS

R0210 FUNCTION - TO DISPLAY THE LANDING SITE LATITUDE,
R0211 LONGITUDE AND ALTITUDE. TO ACCEPT NEW DATA VIA
R0212 THE KEYBOARD. TO COMPUTE THE LANDING SITE
R0213 ORIENTATION FOR P52 OR P54
R0214

LET'

R0215
R0216 RLS = LANDING SITE VECTOR IN REP COORDINATES
R0217 R = CSM POSITION VECTOR IN REP COORDINATES
R0218 V = CSM VELOCITY VECTOR IN REP COORDINATES
R0219 THEN THE LANDING SITE ORIENTATION IS'

R0220
R0221 XSD = UNIT(RLS)
R0222 YSD = UNIT(ZSD)*XSD
R0223 ZSD = UNIT(RW)*RLS

R0224 CALL - CALL

R0225

R0226 INPUTS- DSPTM1=TIME OF ALIGNMENT

R0227 RLS=LANDING SITE VECTOR IN MOON FIXED COORINATES

R0228 OUTPUTS- XSD,YSD,ZSD

R0229 SUBROUTINES- RP-TO-R ,LAT-LONG,LLASRD,LLASRDA,CSMPREC

R0230 DEBRIS- VAC, SEE SUBROUTINES

R0231

| | | | | | | | | | |
|------|-----|----|------|-----|---------|---------|-------|--------|----------|
| 0232 | | | | | 16,2506 | 43020 1 | P52LS | STQ | SET |
| 0233 | REP | 2 | LAST | 70 | 16,2507 | 00300 1 | | | QMAJ |
| 0234 | REP | 16 | LAST | 621 | 16,2510 | 01463 1 | | | LUNAFAG |
| 0235 | | | | | 16,2511 | 77745 1 | | DLOAD | |
| 0236 | REP | 36 | LAST | 696 | 16,2512 | 01046 1 | | | DSPTM1 |
| 0237 | REP | 2 | LAST | 91 | 16,2513 | 02807 1 | | STORE | TSIGHT |
| 0238 | | | | | 16,2514 | 43175 0 | | VLOAD | SET |
| 0239 | REP | 7 | LAST | 599 | 16,2515 | 02026 1 | | | RLS |
| 0240 | REP | 7 | LAST | 635 | 16,2516 | 00462 1 | | | BRADFLAG |
| 0241 | | | | | 16,2517 | 14001 0 | | STODL | 0D |
| 0242 | REP | 3 | LAST | 697 | 16,2520 | 02807 1 | | | TSIGHT |
| 0243 | | | | | 16,2521 | 34007 1 | | STCALL | 6D |
| 0244 | REP | 3 | LAST | 596 | 16,2522 | 55341 1 | | | RP-TO-R |
| 0245 | | | | | 16,2523 | 77742 0 | | VSR2 | |
| 0246 | REP | 8 | LAST | 618 | 16,2524 | 16152 0 | | STODL | ALPHAV |
| 0247 | REP | 4 | LAST | 697 | 16,2525 | 02807 1 | | | TSIGHT |

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| | | | | | | | |
|------|-----|-----|---------|---------|------|--------|----------|
| 0248 | | | 16,2528 | 77824 | 1 | CALL | |
| 0249 | REP | 1 | LAST | 099 | | CALL | LAT-LONG |
| 0252 | | | 16,2530 | 77824 | 1 | CALL | |
| 0253 | REP | 2 | LAST | 599 | | LLASRD | |
| 0254 | | | 16,2532 | 77778 | 1 | EXIT | |
| 0255 | REP | 1 | | 3 | 2505 | LSDISP | CAP |
| 0256 | REP | 180 | LAST | 697 | | TC | V08N99* |
| 0257 | REP | 31 | LAST | 697 | | TC | BANKCALL |
| 0258 | REP | 48 | LAST | 697 | | CADR | GOFLASH |
| 0259 | | | 16,2537 | 0 | 2541 | TC | GOTOPOCH |
| 0260 | REP | 1 | | 0 | 2533 | TC | +2 |
| 0261 | REP | 183 | LAST | 696 | | TC | LSDISP |
| 0262 | | | 16,2542 | 77824 | 1 | TC | INTPRST |
| 0263 | REP | 3 | LAST | 614 | | CALL | |
| 0264 | | | 16,2544 | 61345 | 1 | LLASRD | |
| 0265 | REP | 5 | LAST | 697 | | DLOAD | CALL |
| 0266 | REP | 5 | LAST | 635 | | | TSIGHT |
| 0267 | | | 16,2547 | 53575 | 0 | | LALOTRV |
| 0268 | REP | 9 | LAST | 697 | | VLOAD | UNIT |
| 0269 | REP | 3 | LAST | 71 | | | ALPHAV |
| 0270 | REP | 6 | LAST | 698 | | STOCL | XSD |
| 0271 | REP | 38 | LAST | 668 | | | TSIGHT |
| 0272 | REP | 5 | LAST | 598 | | STCALL | TDC1 |
| 0273 | | | 16,2554 | 27022 | 1 | | COMPRES |
| 0274 | REP | 22 | LAST | 668 | | VLOAD | VXV |
| 0275 | REP | 18 | LAST | 668 | | | RATT |
| 0276 | | | 16,2560 | 53435 | 0 | | VATT |
| 0277 | REP | 4 | LAST | 698 | | VXV | UNIT |
| 0278 | REP | 2 | LAST | 71 | | | XSD |
| 0279 | | | 16,2563 | 53435 | 0 | STORE | XSD |
| 0280 | REP | 5 | LAST | 698 | | VXV | UNIT |
| 0281 | REP | 3 | LAST | 71 | | | XSD |
| 0282 | REP | 3 | LAST | 697 | | STCALL | YSD |
| 0283 | REP | 1 | | 14,2000 | | | QMAJ |
| 0284 | | | 14,2002 | | | SETLOC | P5081 |
| 0285 | | | | | | BANK | |

R0285 NAME- AUTOMATIC OPTICS POSITIONING ROUTINE

R0286 FUNCTION- (1) TO POINT THE STAR LOS OF THE OPTICS AT A STAR OR LANDMARK DEFINED BY THE PROGRAM OR BY DSKY INPUT.
R0286 (2) TO POINT THE STAR LOS OF THE OPTICS AT THE LEM DURING RENDEZVOUS TRACKING OPERATIONS.

R0290 CALLING SEQUENCE- CALL R52

R0291 INPUT- 1. TARG1PLO AND TARG2PLO- PRESET BY CALLER
R0292 2. REVZPLO AND TRAKPLO- PRESET BY CALLER
R0293 3. STAR CODE- PRESET BY CALLER. ALSO INPUT THROUGH DSKY
R0294 4. LAT, LONG AND ALT OF LANDMARK- INPUT THROUGH DSKY
R0295 5. NO. OF MARKS(MARKINDX)- PRESET BY CALLER

R0296 OUTPUT- DRIVE SHAFT AND TRANSMISSION COUS



L P51-P53

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R0297 SUBROUTINES- 1. FIDELAY 7. CLEANDFP
 R0298 2. GOPERF1 8. GCDSPR
 R0299 3. GOFLASH 9. REFLASHR
 R0300 4. RS3 10. RS2.2
 R0301 5. ALARM 11. RS2.3
 R0302 6. SR52.1

| Address | Operation | Count | Label | Value | Register | Control | Comments |
|---------|-----------|-------|----------|---------|----------|---------|----------------|
| 0303 | REP | 1 | | | | | COUNT 15/R52 |
| 0304 | | | | 14,2002 | 43020 1 | R52 | STO CLEAR |
| 0305 | REP | 2 | LAST 91 | 14,2003 | 02576 1 | | SAVORS2 |
| 0306 | REP | 1 | | 14,2004 | 04265 1 | | ADVTRK |
| 0307 | | | | 14,2005 | 77776 1 | R52/R5 | EXIT |
| 0308 | | | | 14,2006 | 0 0006 1 | | EXTEND |
| 0309 | REP | 8 | LAST 500 | 14,2007 | 3 0036 1 | | DCA CDUT |
| 0310 | REP | 6 | LAST 446 | 14,2010 | 53=161 1 | | DXCH DESOPTT |
| 0311 | REP | 164 | LAST 698 | 14,2011 | 0 6006 1 | | TC INTPRET |
| 0312 | | | | 14,2012 | 43131 0 | | SSP CLEAR |
| 0313 | REP | 25 | LAST 686 | 14,2013 | 01304 1 | | OPTIND |
| 0314 | | | | 14,2014 | 00000 1 | | 0 |
| 0315 | REP | 1 | | 14,2015 | 00271 0 | | R53PLAG |
| 0316 | | | | 14,2016 | 77776 1 | | EXIT |
| 0317 | REP | 165 | LAST 699 | 14,2017 | 0 6006 1 | R52A | TC INTPRET |
| 0318 | | | | 14,2020 | 43014 0 | | SET BCN |
| 0319 | REP | 1 | | 14,2021 | 00073 0 | | TRINPLAG |
| 0320 | REP | 4 | LAST 610 | 14,2022 | 00705 0 | | TARD1PLG |
| 0321 | REP | 1 | | 14,2023 | 30103 0 | | R52H |
| 0322 | | | | 14,2024 | 77414 0 | | CLEAR EXIT |
| 0323 | REP | 1 | | 14,2025 | 03660 1 | | TERMIFLG |
| 0324 | REP | 8 | LAST 236 | 14,2026 | 3 1314 0 | R52C | CA SWSAMPLE |
| 0325 | | | | 14,2027 | 0 0006 1 | | EXTEND |
| 0326 | REP | 1 | | 14,2030 | 6 2131 0 | | R52M R52M |
| 0327 | REP | 181 | LAST 698 | 14,2031 | 0 4555 0 | R52D | TC RANKCALL |
| 0328 | REP | 1 | | 14,2032 | 26176 0 | | CADR SR52.1 |
| 0329 | REP | 1 | | 14,2033 | 1 2161 1 | | TCF R52L |
| 0330 | REP | 1 | | 14,2034 | 1 2124 0 | | TCF R52J |
| 0331 | REP | 43 | LAST 663 | 14,2035 | 0 5435 0 | | TC UPPLAG |
| 0332 | REP | 2 | LAST 699 | 14,2036 | 00013 0 | | ADRES TRINPLAG |
| 0333 | REP | 29 | LAST 689 | 14,2037 | 3 4701 0 | R52JA | CAP BIT10 |
| 0334 | REP | 38 | LAST 695 | 14,2040 | 7 0075 1 | | MASK STATE +1 |
| 0335 | REP | 167 | LAST 695 | 14,2041 | 10 000 0 | | CCS A |
| 0336 | REP | 1 | | 14,2042 | 0 2052 1 | | TC R52E |
| 0337 | REP | 33 | LAST 550 | 14,2043 | 3 4705 1 | | CAP BIT6 |
| 0338 | REP | 39 | LAST 699 | 14,2044 | 7 0074 0 | | MASK STATE |
| 0339 | REP | 168 | LAST 699 | 14,2045 | 10 000 0 | | CCS A |
| 0340 | REP | 2 | LAST 699 | 14,2046 | 1 2052 0 | | TCF R52E |
| 0341 | REP | 1 | | 14,2047 | 3 2151 0 | | CAP V06N92 |
| 0342 | REP | 182 | LAST 699 | 14,2050 | 0 4555 0 | | TC RANKCALL |
| 0343 | REP | 2 | LAST 384 | 14,2051 | 20602 1 | | CADR GCDSPR |
| 0344 | REP | 9 | LAST 699 | 14,2052 | 3 1314 0 | R52E | CA SWSAMPLE |

IS OPTICS MODE IN ACC

MANUAL
ACC

OR 90 DEGREES
OR 50 DEGREES
LS 50 DEGREES
SET TRINFLAG BIT 4 FLAG 0
IS THIS A LEM

YES
NO, IS R53PLAG SET

YES
NO

IS OSS IN CMC MODE



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| ID | REP | LAST | LOC | ADDR | DATA | STATUS | PARAMS | NOTES |
|------|---------|------|-----|---------|----------|---------|-----------------|--|
| 0387 | REP 48 | LAST | 700 | 14,2132 | 7 0074 0 | MASK | STATE | |
| 0388 | REP 173 | LAST | 700 | 14,2133 | 10 000 0 | CCS | A | |
| 0389 | REP 3 | LAST | 700 | 14,2134 | 0 2085 0 | TC | R52P | YES |
| 0390 | | | | 14,2135 | 0 0004 0 | INHINT | | NO |
| 0391 | REP 1 | | | 14,2136 | 3 7661 1 | CAP | PRIO24 | |
| 0392 | REP 26 | LAST | 665 | 14,2137 | 0 5042 1 | TC | PINDVAC | |
| 0393 | REP 9 | LAST | 700 | 14,2138 | 0 5042 1 | EBANK | SAC | |
| 0394 | REP 1 | | | 14,2140 | 02144 1 | 2CADR | R53JOB | |
| 0395 | REP 1 | | | 14,2141 | 30065 1 | | | |
| 0396 | REP 4 | LAST | 701 | 14,2142 | 0 0003 1 | RELINT | | |
| 0397 | REP 187 | LAST | 700 | 14,2143 | 1 2065 1 | TCP | R52P | |
| 0398 | | | | 14,2144 | 0 6006 1 | R53JOB | INTPRET | |
| 0399 | | | | 14,2145 | 77624 1 | CALL | | |
| 0400 | REP 2 | LAST | 611 | 14,2146 | 31322 0 | | R53 | |
| 0401 | REP 92 | LAST | 695 | 14,2147 | 77776 1 | ENDPLAC | EXIT | INTERPRETER RETURN TO ENDOFJOB(R22 USES) |
| 0402 | | | | 14,2150 | 0 5112 0 | TC | ENDOFJOB | |
| 0403 | | | | 14,2151 | 01534 1 | V08N92 | VN | 00692 |
| 0404 | | | | 14,2152 | 01531 1 | V08N99A | VN | 0669 |
| 0405 | | | | 14,2153 | 10464 0 | SHAXIS | 2DEC | .5376381241 R-1 |
| 0406 | | | | 14,2154 | 12470 1 | | | |
| 0407 | | | | 14,2155 | 00000 1 | 2DEC | 0 | |
| 0408 | | | | 14,2156 | 00000 1 | | | |
| 0409 | | | | 14,2157 | 15373 1 | 2DEC | .8431766920 R-1 | |
| 0410 | | | | 14,2160 | 11554 0 | | | |
| 0411 | REP 32 | LAST | 700 | 14,2161 | 3 4701 0 | R52L | CAP | RIT10 |
| 0412 | REP 47 | LAST | 701 | 14,2162 | 7 0075 1 | MASK | STATE +1 | IS THIS A LFM |
| 0413 | REP 174 | LAST | 701 | 14,2163 | 10 000 0 | CCS | A | |
| 0414 | REP 2 | LAST | 699 | 14,2164 | 0 2124 1 | TC | R52J | YES |
| 0415 | REP 1 | | | 14,2165 | 3 2174 1 | CAP | OCT404 | |
| 0416 | REP 185 | LAST | 700 | 14,2166 | 0 4555 0 | TC | RANKCALL | |
| 0417 | REP 1 | | | 14,2167 | 21671 1 | CADR | PRICLARM | |
| 0418 | REP 2 | LAST | 226 | 14,2170 | 1 2176 1 | TCP | TERMS2 | TERMINATE |
| 0419 | REP 5 | LAST | 701 | 14,2171 | 1 2065 1 | TCP | R52P | PROCEED |
| 0420 | REP 6 | LAST | 701 | 14,2172 | 1 2065 1 | TCP | R52P | NO PROVISION FOR NEW DATA |
| 0421 | REP 93 | LAST | 701 | 14,2173 | 1 5112 1 | TCP | ENDOFJOB | |
| 0422 | | | | 14,2174 | 00404 1 | OCT404 | OCT | 404 |
| 0423 | | | | 14,2175 | 00264 1 | 1.8SEC | DEC | 180 |
| 0424 | REP 3 | LAST | 226 | 14,2176 | 0 5425 1 | TERMS2 | TC | CLEARMRK |
| 0425 | REP 106 | LAST | 701 | 14,2177 | 0 4555 0 | TC | RANKCALL | KILL MARK SYSTEM |
| 0426 | REP 6 | LAST | 590 | 14,2200 | 16063 0 | CADR | MKRREAS | |
| 0427 | REP 143 | LAST | 689 | 14,2201 | 3 4714 1 | CAP | ZERO | |
| 0428 | REP 3 | LAST | 236 | 14,2202 | 55-323 0 | TS | OPTCADR | |
| 0429 | REP 187 | LAST | 701 | 14,2203 | 0 4555 0 | TC | RANKCALL | CLEAR OUT EXTENDED VERRS |



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| | | | | | | | | | |
|------|-----|----|------|-----|---------|-------|------|--------|----------|
| 0426 | REP | 3 | LAST | 563 | 14,2204 | 20464 | 0 | CADR | KLEBNEX |
| 0427 | REP | 40 | LAST | 698 | 14,2205 | 0 | 4108 | TC | GOTOPOOH |
| 0428 | | | | | 14,2206 | 43020 | 1 | ADVORR | STO |
| 0429 | REP | 4 | LAST | 700 | 14,2207 | 02578 | 1 | | SET |
| 0430 | REP | 2 | LAST | 699 | 14,2210 | 04065 | 0 | | SAVORS2 |
| 0431 | | | | | 14,2211 | 43014 | 0 | | ADVTRK |
| 0432 | REP | 17 | LAST | 697 | 14,2212 | 01463 | 1 | | SET |
| 0433 | REP | 8 | LAST | 697 | 14,2213 | 00462 | 1 | | LINAPLAG |
| 0434 | | | | | 14,2214 | 77650 | 1 | | BRADFLAG |
| 0435 | REP | 1 | | | 14,2215 | 30005 | 1 | GOTO | R62VR8 |

NOW GO TO P00

SETS UP ADVANCED ORBIT TRACKING



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R0436 NAME -550 ALIAS LOCSAM
R0437 NAME- LOCSAM
R0438 FUNCTION -TO COMPUTE QUANTITIES LISTED BELOW ,USED IN THE
R0439 INU ALIGNMENT PROGRAMS
R0440 DEFINE'
R0441 RATT=POSITION VECTOR OF CM WRT PRIMARY BODY
R0442 VATT=VELOCITY VECTOR OF CM WRT PRIMARY BODY
R0443 RE =RADIUS OF EARTH
R0444 RM =RADIUS OF MOON
R0445 ECLIPOL= POLE OF ECLIPTIC SCALED BY TANGENTIAL VELOCITY OF EARTH
R0446 WRT TO SUN OVER THE VELOCITY OF LIGHT
R0447 REM =POSITION OF MOON WRT EARTH
R0448 RES =POSITION OF SUN WRT EARTH
R0449 C = VELOCITY OF LIGHT
R0450
R0451
R0452 EARTH IS PRIMARY          MOON IS PRIMARY
R0453
R0454 VEARTH=-1(RATT)          VMOON=-1(REM,RATT)
R0455
R0456
R0457 VMOON= 1(REM-RATT)       VMOON =-1(RATT)
R0458
R0459
R0460 VSUN = 1(RES)           VSUN =1(RES-REM)
R0461
R0462 CEARTH=COS(SIN (RE/RATT)*5)  CEARTH=COS 5
R0463
R0464
R0465 CMOON=COS 5             CMOON=COS(SIN CRM/RATT)*5
R0466
R0467
R068 CSUN = COS 15          CSUN = COS 15
R0469
R0470
R0471 VEL/C = VSUN X ECLIPOL + VATT/C
R0472
R0473
R0474
R0475 CALL - DLOAD CALL
R0476 DESIRED TIME
R0477 LOCSAM
R0478
R0479 INPUTS - MPAC = TIME
R0480
R0481 OUTPUTS- VEARTH,VMOON,VSUN,CEARTH,CMOON,CSUN,VEL/C
R0482
R0483 SURROUTINES- LSPOS,CSMCNIC
R0484
R0485 DERRIS - VAC AREA,SEE SURROUTINES

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ASSEMBLE REVISION 249 OF AGC PROGRAM COLOSSUS BY NASA 2021111-041

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0575
0575

15,2201 07504 1 CSSLN 208C .24148
15,2202 15042 0

COS 15 /4



L P51-P53

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R0576 PROGRAM NAME - PICAPAR DATE DEC 20 68
 R0577 MOD 1 LOG SECTION P51-P53
 R0578 BY KEN VINCENT ASSEMBLY SUNDISK REV40

R0581 FUNCTION

R0582 THIS PROGRAM READ THE IMU-CDUS AND COMPUTES THE VEHICLE ORIENTATION
 R0583 WITH RESPECT TO INERTIAL SPACE. IT THEN COMPUTES THE SHAFT AXIS (SAX)
 R0584 WITH RESPECT TO REFERENCE INERTIAL. EACH STAR IN THE CATALOG IS TESTED
 R0585 TO DETERMINE IF IT IS OCCULTED BY EITHER THE EARTH, SUN OR MOON. IF A
 R0586 STAR IS NOT OCCULTED THEN IT IS PAIRED WITH ALL STAR OF LOWER INDEX.
 R0587 THE PAIRED STAR IS TESTED FOR OCCULTATION. PAIRS OF STARS THAT PASS
 R0588 THE OCCULTATION TESTS ARE TESTED FOR GOOD SEPARATION. A PAIR OF STARS
 R0589 HAVE GOOD SEPARATION IF THE ANGLE BETWEEN THEM IS LESS THAN 60DEGREES
 R0590 AND MORE THAN 40DEGREES. THOSE PAIRS OF STARS WITH GOOD SEPARATION
 R0591 ARE THEN TESTED TO SEE IF THEY LIE IN CURRENT FIELD OF VIEW. (WITHIN
 R0592 33DEGREES OF SAX). THE PAIR WITH MAXIMUM SEPARATION IS CHOSEN FROM
 R0593 THOSE WITH GOOD SEPARATION, AND IN FIELD OF VIEW.

R0594 CALLING SEQUENCE

R0595 L TC BANKCALL
 R0596 L+1 CADR PICAPAR
 R0597 L+2 ERROR RETURN - NO STARS IN FIELD OF VIEW
 R0598 L+3 NORMAL RETURN

R0600 OUTPUT

R0601 BESTI, BESTJ - SINGLE PREC, INTEGERS, STAR NUMBERS TIMES 6
 R0602 VFLAG - FLAG BIT SET IMPLIES NO STARS IN FIELD OF VIEW

R0603 INITIALIZATION

R0604 1) A CALL TO LOCSAM MUST BE MADE
 R0605 2) VEARTH = -UNIT(R) WHERE R HAS BEEN UPDATED TO APPROXIMATE TIME OF
 R0606 SIGHTINGS.

R0607 DEBRIS

R0608 WORK AREA
 R0609 X, Y, ZNB
 R0610 SINCDU, COSCDU
 R0611 STARAD - STAR +5
 R0612 REP 1

COUNT 14/PICAP

| | | | | | | | | | | |
|-------|-----|-----|------|-----|---------|----------|---------|------|----------|-------|
| R0616 | REP | 3 | LAST | 704 | 14,2000 | | | | SETLOC | P5051 |
| R0617 | | | | | 14,2324 | | | | BANK | |
| R0618 | REP | 3 | LAST | 564 | 14,2324 | 0 4604 1 | PICAPAR | TC | MAKECADR | |
| R0619 | REP | 3 | LAST | 554 | 14,2325 | 55-777 0 | | TS | QM IN | |
| R0620 | REP | 108 | LAST | 701 | 14,2326 | 0 6006 1 | | TC | INTPRET | |
| R0621 | | | | | 14,2327 | 77624 1 | | CALL | | |
| R0622 | REP | 6 | LAST | 673 | 14,2330 | 47432 1 | | | CDUTRIG | |
| R0623 | | | | | 14,2331 | 77624 1 | | CALL | | |
| R0624 | REP | 1 | | | 14,2332 | 34567 1 | | | CALCSMSC | |



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| | | | | |
|------|-----|---------|---------|---------|
| 0625 | | | 14,2333 | 77601 0 |
| 0626 | | | 14,2334 | 00001 0 |
| 0627 | | | 14,2335 | 71214 0 |
| 0628 | REP | 1 | 14,2336 | 01465 1 |
| 0629 | REP | 1 | 14,2337 | 11456 0 |
| 0630 | REP | 8 LAST | 14,2340 | 24303 1 |
| 0631 | REP | 4 LAST | 14,2341 | 02714 1 |
| 0632 | | | 14,2342 | 63361 0 |
| 0633 | REP | 1 | 14,2343 | 30502 0 |
| 0634 | REP | 4 LAST | 14,2344 | 02730 1 |
| 0635 | | | 14,2345 | 74370 0 |
| 0636 | | | 14,2346 | 00344 1 |
| 0637 | REP | 1 | 14,2347 | 30504 0 |
| 0638 | | | 14,2350 | 77655 1 |
| 0639 | | | 14,2351 | 53505 1 |
| 0640 | REP | 31 LAST | 14,2352 | 01736 1 |
| 0641 | REP | 1 | 14,2353 | 02780 1 |
| 0642 | | | 14,2354 | 06331 0 |
| 0643 | REP | 25 LAST | 14,2355 | 00051 0 |
| 0644 | | | 14,2356 | 00006 1 |
| 0645 | REP | 11 LAST | 14,2357 | 00052 0 |
| 0646 | | | 14,2360 | 00006 1 |
| 0647 | | | 14,2361 | 52100 1 |
| 0648 | REP | 1 | 14,2362 | 30384 0 |
| 0649 | REP | 1 | 14,2363 | 30513 0 |
| 0650 | | | 14,2364 | 45173 0 |
| 0651 | REP | 2 LAST | 14,2365 | 31744 1 |
| 0652 | REP | 1 | 14,2366 | 30457 1 |
| 0653 | | | 14,2367 | 73014 0 |
| 0654 | REP | 4 LAST | 14,2370 | 01710 0 |
| 0655 | REP | 1 | 14,2371 | 30361 0 |
| 0656 | REP | 31 LAST | 14,2372 | 00046 0 |
| 0657 | | | 14,2373 | 52104 0 |
| 0658 | REP | 1 | 14,2374 | 30376 0 |
| 0659 | REP | 2 LAST | 14,2375 | 30361 0 |
| 0660 | | | 14,2376 | 45173 0 |
| 0661 | REP | 3 LAST | 14,2377 | 46033 0 |
| 0662 | REP | 2 LAST | 14,2400 | 30457 1 |
| 0663 | | | 14,2401 | 76614 0 |
| 0664 | REP | 5 LAST | 14,2402 | 01710 0 |
| 0665 | REP | 1 | 14,2403 | 30373 0 |
| 0666 | REP | 4 LAST | 14,2404 | 31744 1 |
| 0667 | | | 14,2405 | 45237 0 |
| 0668 | REP | 5 LAST | 14,2406 | 46033 0 |
| 0669 | REP | 1 | 14,2407 | 30506 1 |
| 0670 | | | 14,2410 | 43240 0 |
| 0671 | REP | 2 LAST | 14,2411 | 30373 0 |
| 0672 | REP | 1 | 14,2412 | 30510 0 |
| 0673 | | | 14,2413 | 77644 1 |
| 0674 | REP | 3 LAST | 14,2414 | 30373 0 |

| | | |
|--------|----------|------------------------------|
| BSTPD | 0 | |
| SET | DLOAD | VFLAG = 1 |
| | VFLAG | |
| | DPZSR0 | |
| STOVL | BESTI | |
| | XNB | |
| VXSC | FDVL | |
| | SIN33 | |
| | ZNB | |
| AKT,1 | VXSC | X1 = 37 X 6 +6 |
| | Z20D | |
| | COB33 | |
| VAD | | |
| VXM | UNIT | |
| | REPMMAT | |
| STORE | SAX. | SAX = SHAFT AXIS |
| SSP | SSP | S1=S2=6 |
| | S1 | |
| | 6 | |
| | S2 | |
| | 6 | |
| | 6 | MAJOR STAR |
| TIX,1 | GOTO | |
| | PIC2 | |
| | PICEND | |
| VLOAD* | CALL | |
| | CATLOG,1 | |
| | OCCLT | |
| RON | LXA,2 | |
| | CULTPLAG | |
| | PIC1 | |
| | X1 | |
| TIX,2 | GOTO | |
| | PIC4 | |
| | PIC1 | |
| VLOAD* | CALL | |
| | CATLOG,2 | |
| | OCCLT | |
| RON | VLOAD* | |
| | CULTPLAG | |
| | PIC3 | |
| | CATLOG,1 | |
| DOT* | DSJ | |
| | CATLOG,2 | |
| | CSS66 | SEPERATION LESS THAN 66 DEG. |
| RWN | DAD | |
| | PIC3 | |
| | CSS6640 | SEPERATION MORE THAN 40 DEG. |
| RPL | | |
| | PIC3 | |



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| Address | Operation | Label | Address | Value | Instruction | Comments |
|---------|-----------|----------|---------|---------|-------------|--------------------|
| 0675 | | | 14,2415 | 50373 0 | VLOAD* DOT | |
| 0676 | REP 6 | LAST 708 | 14,2416 | 31744 1 | CATLOG,1 | |
| 0677 | REP 2 | LAST 708 | 14,2417 | 02760 1 | SAX | |
| 0678 | | | 14,2420 | 50025 0 | DSU | MAJOR STAR IN CONE |
| 0679 | REP 1 | | 14,2421 | 30512 1 | RMN | |
| 0680 | REP 3 | LAST 708 | 14,2422 | 30361 0 | CSS33 | |
| 0681 | | | 14,2423 | 50373 0 | PIC1 | |
| 0682 | REP 7 | LAST 709 | 14,2424 | 46033 0 | VLOAD* DOT | |
| 0683 | REP 3 | LAST 709 | 14,2425 | 02760 1 | CATLOG,2 | |
| 0684 | | | 14,2426 | 51025 1 | SAX | |
| 0685 | REP 2 | LAST 709 | 14,2427 | 30512 1 | DSU | |
| 0686 | REP 1 | | 14,2430 | 30433 0 | BPL | |
| 0687 | | | 14,2431 | 77650 1 | CSS33 | |
| 0688 | REP 4 | LAST 708 | 14,2432 | 30373 0 | STRATGY | |
| 0689 | | | 14,2433 | 77614 1 | GOTO | |
| 0690 | REP 2 | LAST 708 | 14,2434 | 01605 0 | PIC3 | |
| 0691 | REP 1 | | 14,2435 | 30452 1 | STRATGY | |
| 0692 | | | 14,2436 | 65120 1 | BNCLR | |
| 0693 | REP 9 | LAST 708 | 14,2437 | 00302 0 | VFLAG | |
| 0694 | REP 2 | LAST 70 | 14,2440 | 00303 1 | NEWPAR | |
| 0695 | | | 14,2441 | 47773 1 | XCHK,1 | |
| 0696 | REP 8 | LAST 709 | 14,2442 | 31744 1 | XCHK,2 | |
| 0697 | REP 9 | LAST 709 | 14,2443 | 46033 0 | BESTI | |
| 0698 | | | 14,2444 | 43006 0 | BESTJ | |
| 0699 | REP 3 | LAST 709 | 14,2445 | 01545 1 | VLOAD* DOT* | |
| 0700 | REP 1 | | 14,2446 | 30436 0 | CATLOG,1 | |
| 0701 | | | 14,2447 | 45345 1 | CATLOG,2 | |
| 0702 | | | 14,2450 | 77644 1 | FUSH | |
| 0703 | REP 5 | LAST 709 | 14,2451 | 30373 0 | ROPINV | |
| 0704 | | | 14,2452 | 67130 1 | VFLAG | |
| 0705 | REP 10 | LAST 709 | 14,2453 | 00302 0 | STRAT -3 | |
| 0706 | REP 3 | LAST 709 | 14,2454 | 00303 1 | DSU | |
| 0707 | | | 14,2455 | 77650 1 | BPL | |
| 0708 | REP 6 | LAST 709 | 14,2456 | 30373 0 | PIC3 | |
| 0709 | | | 14,2457 | 51321 0 | SKA,1 | |
| 0710 | REP 1 | | 14,2460 | 02736 1 | SKA,2 | |
| 0711 | REP 1 | | 14,2461 | 00017 1 | BESTI | |
| 0712 | | | 14,2462 | 77654 0 | BESTJ | |
| 0713 | REP 1 | | 14,2463 | 30476 1 | GOTO | |
| 0714 | | | 14,2464 | 75240 0 | PIC3 | |
| 0715 | REP 2 | LAST 709 | 14,2465 | 30476 1 | BVSU | |
| 0716 | REP 272 | LAST 683 | 14,2466 | 00160 0 | CULTRIX | |
| 0717 | | | 14,2467 | 75240 0 | CSS | |
| 0718 | REP 3 | LAST 709 | 14,2470 | 30476 1 | RZE | |
| 0719 | REP 273 | LAST 709 | 14,2471 | 00162 1 | RMN | |
| 0720 | | | 14,2472 | 43040 1 | CULTED | |
| 0721 | REP 4 | LAST 709 | 14,2473 | 30476 1 | SIGN | |
| 0722 | REP 6 | LAST 708 | 14,2474 | 01630 0 | CULTED | |
| 0723 | REP 13 | LAST 624 | 14,2475 | 00052 0 | MPAC +3 | |
| 0724 | | | 14,2476 | 77614 1 | SIGN | |
| | | | | | MPAC +5 | |
| | | | | | CULTED | |
| | | | | | CLROO | |
| | | | | | CULTED | |
| | | | | | CULTFLAG | |
| | | | | | OPRET | |
| | | | | | SRTIO | |



L P51-P53

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| | | | | | | | | | | | |
|-------|-----|----|------|-----|---------|--------|---|---------|------|-------------|-------------------|
| 0725 | REP | 7 | LAST | 709 | 14,2477 | 01430 | 1 | | | QULTFLAG | |
| 0726 | REP | 14 | LAST | 709 | 14,2500 | 00052 | 0 | | | QPRST | |
| 0727 | REP | 3 | LAST | 705 | 0016 | | | CSS | = | QBRTH | |
| 0728 | | | | | 14,2501 | 21150 | 0 | SIN33 | 2DB0 | .5376381241 | |
| 0729 | | | | | 14,2502 | 25187 | 0 | | | | |
| 0729 | | | | | 14,2503 | 32786 | 1 | COS33 | 2DB0 | .8431758920 | |
| 0729 | | | | | 14,2504 | 22713 | 1 | | | | |
| 0730 | | | | | 14,2505 | 01736 | 1 | CSS66 | 2DB0 | .060460472 | (COS76)/4 |
| 0730 | | | | | 14,2506 | 35137 | 1 | | | | |
| 0731 | | | | | 14,2507 | 73003 | 0 | CSS6640 | 2DB0 | -.15602567 | (COS76 - COS30)/4 |
| 0731 | | | | | 14,2510 | 85403 | 0 | | | | |
| 0732 | | | | | 14,2511 | 06233 | 0 | CSS33 | 2DB0 | .197002688 | COS(1/2(76))/4 |
| 0732 | | | | | 14,2512 | 26112 | 1 | | | | |
| 0733 | | | | | 14,2513 | 77414 | 0 | PICEND | ROFF | EXIT | |
| 0734 | REP | 4 | LAST | 709 | 14,2514 | 01745 | 0 | | | VFLAG | |
| 0735 | REP | 1 | | | 14,2515 | 30517 | 1 | | | PICXNT | |
| 0736 | REP | 1 | | | 14,2516 | 0 2521 | 0 | | | TC | |
| 0737 | | | | | 14,2517 | 77776 | 1 | PICXNT | EXIT | PICXNT | |
| 0738 | REP | 4 | LAST | 707 | 14,2520 | 25=777 | 1 | | | INCR | QMIN |
| 0739 | REP | 5 | LAST | 710 | 14,2521 | 3 1777 | 1 | PICXNT | CA | QMIN | |
| 0740 | REP | 3 | LAST | 413 | 14,2522 | 0 4561 | 1 | | | TC | SWCALL |
| A0741 | | | | | | | | V1 | = | 120 | |



L P51-P53

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P0742 NAME-R51 FINE ALIGN
 P0743 FUNCTION-TO ALIGN THE STABLE MEMBER TO REFSMAT
 P0744 CALLING SEQ- CALL R51
 P0745 INPUT- BEST1, R52V (PAIR OF STAR NO)
 P0746 OUTPUT- GYRO TORQUE PULSES
 P0747 SUBROUTINES- R52, R54, R55 (SKINR, NRS4, AXISOEN)
 P748 REP 1

COUNT 14/R51

| Address | REP | Label | Value 1 | Value 2 | Value 3 | Value 4 | Value 5 | Value 6 | Value 7 | Value 8 | Value 9 | Value 10 | Value 11 | Value 12 | Value 13 | Value 14 |
|---------|---------|----------|---------|---------|---------|---------|----------------|---------|---------|---------|---------|----------|----------|----------|----------|-------------|
| 0749 | | | 14,2523 | 77776 | 1 | R51 | EXIT | | | | | | | | | |
| 0750 | REP 55 | LAST 695 | 14,2524 | 3 4712 | 1 | | CAP BIT1 | | | | | | | | | |
| 0751 | REP 4 | LAST 610 | 14,2525 | 54 304 | 1 | | TS STARIND | | | | | | | | | |
| 0752 | REP 6 | LAST 610 | 14,2526 | 54 301 | 1 | | TS MARKINDX | | | | | | | | | |
| 0753 | REP 169 | LAST 707 | 14,2527 | 0 6006 | 1 | R51.2 | TC INTPRET | | | | | | | | | |
| 0754 | | | 14,2530 | 43014 | 0 | R51.3 | CLEAR CLEAR | | | | | | | | | |
| 0755 | REP 3 | LAST 610 | 14,2531 | 00666 | 1 | | TARG2FLG | | | | | | | | | |
| 0756 | REP 5 | LAST 699 | 14,2532 | 00665 | 1 | | TARG1FLG | | | | | | | | | |
| 0757 | | | 14,2533 | 77776 | 1 | | EXIT | | | | | | | | | |
| 0758 | REP 65 | LAST 695 | 14,2534 | 0 5301 | 0 | | TC PHASCHG | | | | | | | | | |
| 0759 | | | 14,2535 | 05024 | 1 | | OCT 05024 | | | | | | | | | |
| 0760 | | | 14,2536 | 13000 | 0 | | OCT 13000 | | | | | | | | | |
| 0761 | REP 5 | LAST 711 | 14,2537 | 50 304 | 0 | | INDEX STARIND | | | | | | | | | |
| 0762 | REP 11 | LAST 709 | 14,2540 | 3 0302 | 0 | | CA REPT1 | | | | | | | | | |
| 0763 | | | 14,2541 | 0 0006 | 1 | | EXTEND | | | | | | | | | |
| 0764 | REP 1 | | 14,2542 | 7 2701 | 1 | | MP 1/6TH | | | | | | | | | |
| 0765 | REP 6 | LAST 611 | 14,2543 | 54 735 | 1 | | TS STARCODE | | | | | | | | | |
| 0766 | REP 1 | | 14,2544 | 3 2700 | 1 | | CAP VOINTO | | | | | | | | | |
| 0767 | REP 168 | LAST 701 | 14,2545 | 0 4555 | 0 | | TC BANKCALL | | | | | | | | | |
| 0768 | REP 15 | LAST 661 | 14,2546 | 20763 | 1 | | CADR GOFASHR | | | | | | | | | |
| 0769 | REP 50 | LAST 702 | 14,2547 | 0 4106 | 1 | | TC GOTOPCH | | | | | | | | | |
| 0770 | | | 14,2550 | 0 2555 | 0 | | TC +5 | | | | | | | | | |
| 0771 | | | 14,2551 | 0 2544 | 0 | | TC -5 | | | | | | | | | |
| 0772 | REP 24 | LAST 649 | 14,2552 | 3 6211 | 0 | | CAP SIX | | | | | | | | | |
| 0773 | REP 13 | LAST 617 | 14,2553 | 0 5415 | 1 | | TC BLANKST | | | | | | | | | |
| 0774 | REP 94 | LAST 701 | 14,2554 | 1 5112 | 1 | | TCP ENDOPJOB | | | | | | | | | |
| 0775 | REP 170 | LAST 711 | 14,2555 | 0 6006 | 1 | | TC INTPRET | | | | | | | | | |
| 0776 | | | 14,2556 | 45034 | 1 | | RTR CALL | | | | | | | | | |
| 0777 | REP 20 | LAST 696 | 14,2557 | 45505 | 0 | | LOADTIME | | | | | | | | | |
| 0778 | REP 1 | | 14,2560 | 32363 | 0 | | PLANET | | | | | | | | | |
| 0779 | | | 14,2561 | 72131 | 1 | | SSP LXA,1 | | | | | | | | | |
| 0780 | REP 26 | LAST 708 | 14,2562 | 00051 | 0 | | S1 | | | | | | | | | |
| 0781 | | | 14,2563 | 00000 | 1 | | 0 | | | | | | | | | |
| 0782 | REP 6 | LAST 711 | 14,2564 | 00304 | 0 | | STARIND | | | | | | | | | |
| 0783 | | | 14,2565 | 77700 | 0 | | TIX,1 | | | | | | | | | |
| 0784 | REP 1 | | 14,2566 | 30571 | 1 | | R51ST | | | | | | | | | |
| 0785 | REP 3 | LAST 611 | 14,2567 | 36617 | 1 | | STCALL STARSV2 | | | | | | | | | 2ND STAR |
| 0786 | REP 2 | LAST 711 | 14,2570 | 30572 | 1 | | R51ST +1 | | | | | | | | | |
| 0787 | REP 2 | LAST 91 | 14,2571 | 02611 | 0 | R51ST | STORE STARSV1 | | | | | | | | | 1ST STAR |
| 0788 | | | 14,2572 | 77776 | 1 | | EXIT | | | | | | | | | |
| 0789 | REP 12 | LAST 644 | 14,2573 | 4 1011 | 1 | | CS MODREG | | | | | | | | | IS THIS P54 |
| 0790 | REP 1 | | 14,2574 | 6 2677 | 0 | | AD OCT66 | | | | | | | | | |

RESTART OR 4 FOR R52 - R53

L P51-P53

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| | | | | | | | |
|------|-----|-----|------|---------|---------|--------|---|
| 0791 | | | | 14,2575 | 0 0006 | 1 | |
| 0792 | REP | 1 | | 14,2576 | 1 2072 | 1 | |
| 0793 | REP | 171 | LAST | 711 | 14,2577 | 0 8006 | 1 |
| 0794 | | | | 14,2600 | 77624 | 1 | |
| 0795 | REP | 4 | LAST | 613 | 14,2601 | 30002 | 0 |
| 0796 | | | | 14,2602 | 77624 | 1 | |
| 0797 | REP | 1 | | 14,2603 | 31266 | 1 | |
| 0798 | REP | 4 | LAST | 711 | 14,2604 | 02617 | 0 |
| 0799 | | | | 14,2605 | 77776 | 1 | |
| 0800 | REP | 100 | LAST | 711 | 14,2606 | 0 4555 | 0 |
| 0801 | REP | 7 | LAST | 701 | 14,2607 | 16063 | 0 |
| 0802 | REP | 172 | LAST | 712 | 14,2610 | 0 6006 | 1 |
| 0803 | | | | 14,2611 | 45145 | 0 | |
| 0804 | REP | 9 | LAST | 704 | 14,2612 | 02607 | 1 |
| 0805 | REP | 2 | LAST | 711 | 14,2613 | 32363 | 0 |
| 0806 | | | | 14,2614 | 77776 | 1 | |
| 0807 | REP | 7 | LAST | 711 | 14,2615 | 10 304 | 1 |
| 0808 | REP | 1 | | 14,2616 | 0 2857 | 1 | |
| 0809 | REP | 173 | LAST | 712 | 14,2617 | 0 8006 | 1 |
| 0810 | | | | 14,2620 | 53521 | 1 | |
| 0811 | REP | 22 | LAST | 708 | 14,2621 | 01736 | 1 |
| 0812 | REP | 5 | LAST | 443 | 14,2622 | 02736 | 1 |
| 0818 | | | | 14,2623 | 77776 | 1 | |
| 0819 | REP | 5 | LAST | 712 | 14,2624 | 02617 | 0 |
| 0820 | | | | 14,2625 | 24007 | 0 | |
| 0821 | REP | 3 | LAST | 711 | 14,2626 | 02611 | 0 |
| 0822 | | | | 14,2627 | 24015 | 0 | |
| 0823 | REP | 2 | LAST | 91 | 14,2630 | 02601 | 1 |
| 0824 | REP | 8 | LAST | 712 | 14,2631 | 36744 | 0 |
| 0825 | REP | 1 | | 14,2632 | 30702 | 1 | |
| 0826 | | | | 14,2633 | 45014 | 0 | |
| 0827 | REP | 1 | | 14,2634 | 00354 | 0 | |
| 0828 | REP | 1 | | 14,2635 | 30643 | 0 | |
| 0829 | REP | 2 | LAST | 444 | 14,2636 | 47334 | 0 |
| 0830 | | | | 14,2637 | 77624 | 1 | |
| 0831 | REP | 1 | | 14,2640 | 32203 | 1 | |
| 0832 | | | | 14,2641 | 77614 | 1 | |
| 0833 | REP | 2 | LAST | 640 | 14,2642 | 01273 | 0 |
| 0834 | | | | 14,2643 | 77776 | 1 | |
| 0835 | REP | 2 | LAST | 155 | 14,2644 | 3 5656 | 1 |
| 0836 | REP | 100 | LAST | 712 | 14,2645 | 0 4555 | 0 |
| 0837 | REP | 4 | LAST | 696 | 14,2646 | 20751 | 0 |
| 0838 | REP | 51 | LAST | 711 | 14,2647 | 0 4106 | 1 |
| 0839 | | | | 14,2650 | 0 2652 | 1 | |
| 0840 | | | | 14,2651 | 0 2654 | 1 | |
| 0841 | REP | 101 | LAST | 712 | 14,2652 | 0 4555 | 0 |
| 0842 | REP | 3 | LAST | 697 | 14,2653 | 32120 | 0 |
| 0843 | REP | 174 | LAST | 712 | 14,2654 | 0 6006 | 1 |
| 0844 | | | | 14,2655 | 77650 | 1 | |
| 0845 | REP | 1 | | 14,2656 | 32143 | 0 | |

| | |
|--------|-----------|
| EXTEND | |
| BZF | R51B |
| TC | INTPRET |
| CALL | |
| CALL | R52 |
| | RCTEN |
| STORE | STARSAV2 |
| EXIT | |
| TC | BANKCALL |
| CADR | MCRLEAS |
| TC | INTPRET |
| DLOAD | CALL |
| | TSIGHT |
| | PLANET |
| EXIT | |
| CCS | STARIND |
| TC | R51.4 |
| TC | INTPRET |
| MKV | UNIT |
| | REFS-MAT |
| STORE | STARAD |
| VLOAD | |
| | STARSAV2 |
| STOVL | 6D |
| | STARSAV1 |
| STOVL | 12D |
| | PLANVEC |
| STCALL | STARAD +6 |
| | R54 |
| BOFF | CALL |
| | FREEFLAG |
| | R51K |
| | AKISGEN |
| CALL | |
| | R55 |
| CLEAR | |
| | PPRATPLD |
| EXIT | |
| CAP | OCT14 |
| TC | BANKCALL |
| CADR | GOMERP1 |
| TC | GOTOPOCH |
| TC | +2 |
| TC | +3 |
| TC | BANKCALL |
| CADR | P52C |
| TC | INTPRET |
| GOTO | |
| | ENDP505 |

YES

ACP WILL MAKE CALLS TO SIGHTING
COMPUTE LOS IN SM FROM MARK DATA

STAR DATA TRST

GYRO TORQUE

V33

L P51-P53

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| | | | | | | | |
|------|---------|----------|---------|----------|--------|-------|-----------|
| 0846 | REP 175 | LAST 712 | 14,2657 | 0 8006 1 | R51.4 | TC | INTPRET |
| 0847 | | | 14,2660 | 53521 1 | | MOV | UNIT |
| 0848 | REP 23 | LAST 712 | 14,2661 | 01736 1 | | | REPFORMAT |
| 0849 | REP 3 | LAST 712 | 14,2662 | 26601 1 | | STOVL | PLANVEC |
| 0850 | REP 6 | LAST 712 | 14,2663 | 02617 0 | | | STARSAV2 |
| 0851 | REP 4 | LAST 712 | 14,2664 | 02611 0 | | STORE | STARSAV1 |
| 0852 | | | 14,2665 | 77731 1 | | SSP | |
| 0853 | REP 8 | LAST 712 | 14,2306 | 00305 1 | | | STARIND |
| 0854 | | | 14,2667 | 00000 1 | | | 0 |
| 0855 | | | 14,2670 | 77650 1 | | GOTO | |
| 0856 | REP 1 | | 14,2671 | 30530 1 | | | R51.3 |
| 0857 | REP 176 | LAST 713 | 14,2672 | 0 8006 1 | R51B | TC | INTPRET |
| 0858 | | | 14,2673 | 77624 1 | | CALL | |
| 0859 | REP 1 | | 14,2674 | 32252 0 | | | R56 |
| 0860 | | | 14,2675 | 77650 1 | | GOTO | |
| 0861 | REP 1 | | 14,2676 | 30602 0 | | | R51A |
| 0862 | | | 14,2677 | 00066 1 | OCT66 | OCT | 00066 |
| 0863 | | | 14,2700 | 00306 1 | V01N70 | VN | 0170 |
| 0864 | | | 14,2701 | 05253 0 | 1/6TH | DEC | .1666667 |

L PS1-PS3

USBR-S PAGE NO. 22 RS 83

```

00005  RW5-R55 GYRO TORQUE
00006  POSITION-COMPUTE AND SEND GYRO PULSES
00007  CHALLENGE SEQ- CALL R55
00008  INPUT- X,Y,ZDC- REFSMAT WRT PRESENT STABLE MEMBER
00009  OUTPUT- GYRO PULSES
00010  SUBROUTINES- CALCOPA,GOFLASH,GDSPR,IMPUNE,IMPULSE,GOPERF1
00705  R5P 3 LAST 705 15,2000 SETLOC P508
00711  R5P 1 15,2203 BANK
00715  R5P 1 15,2203 77620 0 R55 COUNT* 88/R55
0072  R5P 6 LAST 710 15,2204 02777 1 STO
0073  R5P 3 LAST 710 15,2205 77624 1 CALL QMIN
0074  R5P 3 LAST 534 15,2206 47140 1 CALL CALCOPA
0075  R5P 1 15,2207 77778 1 PULSEN EXIT
0076  R5P 1 15,2210 3 2234 0 R55.1 CAP V08N93
0078  R5P 192 LAST 712 15,2211 0 4555 0 TC BANKCALL
0079  R5P 32 LAST 698 15,2212 20824 0 CADR GOFLASH
0080  R5P 52 LAST 712 15,2213 0 4106 1 TC GOTOPOCH
0081  R5P 1 15,2214 0 2216 0 TC R55.2
0082  R5P 1 15,2215 0 2231 0 TC R55RET
0083  R5P 66 LAST 711 15,2216 0 5301 0 R55.2 TC PHASCHNO
0084  R5P 1 15,2217 00314 1 OCT 00314
0085  R5P 1 15,2220 3 2235 1 CA R55CDR
0086  R5P 193 LAST 714 15,2221 0 4555 0 TC BANKCALL
0087  R5P 5 LAST 439 15,2222 17125 1 CADR IMPULSE
0088  R5P 194 LAST 714 15,2223 0 4555 0 TC BANKCALL
0089  R5P 8 LAST 439 15,2224 17516 0 CADR IMSTALL
0090  R5P 1 15,2225 0 5644 1 TC CURTAINS
0091  R5P 67 LAST 714 15,2226 0 5301 0 TC PHASCHNO
0092  R5P 1 15,2227 05024 1 OCT 05024
0093  R5P 1 15,2230 13000 0 OCT 13000
0094  R5P 177 LAST 713 15,2231 0 6006 1 R55RET TC INTPRST
0095  R5P 1 15,2232 77650 1 GOTO
0096  R5P 7 LAST 714 15,2233 02777 1 QMIN
0097  R5P 1 15,2234 01535 0 V08N93 VN 0693
0098  R5P 16 LAST 535 15,2235 02757 0 R55CDR ECADR 00C
0099  R5P 1 14,2702 R54 = CHKSDATA
00000  ROUTINE NAME- CHKSDATA
00002  MOD NO- 0
00004  MODIFICATION BY- LONK6
    
```

DATE- JAN 9, 1967
LOG SECTION- PS1-PS3
ASSEMBLY-

00006 FUNCTIONAL DESCRIPTION - CHECKS THE VALIDITY OF A PAIR OF STAR SIGHTINGS. WHEN A PAIR OF STAR SIGHTINGS ARE MADE BY THE ASTRONAUT THIS ROUTINE OPERATES AND CHECKS THE OBSERVED SIGHTINGS AGAINST STORED STAR VECTORS IN THE COMPUTER TO INSURE A PROPER SIGHTING WAS MADE. THE FOLLOWING COMPUTATIONS ARE PERFORMED

```

00012 OS1 = OBSERVED STAR 1 VECTOR
00013 OS2 = OBSERVED STAR 2 VECTOR
00014 SS1 = STORED STAR 1 VECTOR
00015 SS2 = STORED STAR 2 VECTOR
00016 A1 = ARCCOS(OS1 - OS2)
    
```

L P51-P53

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R0917 $A_2 = \text{ARCCOS}(SS1 - SS2)$
 R0918 $A = \text{ABS}(2(A_1 - A_2))$

R0919 THE ANGULAR DIFFERENCE IS DISPLAYED FOR ASTRONAUT ACCEPTANCE
 R0920 EXIT MODE 1. FREEFLAG SET IMPLIES ASTRONAUT WANTS TO PROCEED
 R0921 2. FREEFLAG RESET IMPLIES ASTRONAUT WANTS TO RECYCLE (BRANCH)
 R0922 OUTPUT - 1. VERB 6, NOUN 3- DISPLAYS ANGULAR DIFFERENCE BETWEEN 2 SETS OF STARS.
 R0923 2. STAR VECTORS FROM STAR CATALOG ARE LEFT IN 6D AND 12D.
 R0925

R0926 ERASABLE INITIALIZATION REQUIRED -
 R0927 1. MARK VECTORS ARE STORED IN STARAD AND STARAD +6.
 R0928 2. CATALOG VECTORS ARE STORED IN 6D AND 12D.

R0929 DEBRIS -

| | | | | | | | | | | | |
|-------|-----|-----|------|-----|---------|--------|---|----------|----------|----------|-------------------------------------|
| 09295 | REP | 4 | LAST | 707 | 14,2000 | | | SETLOC | P6051 | | |
| 0930 | | | | | 14,2702 | | | BANK | | | |
| 09305 | REP | 1 | | | | | | COUNT* | SS/R60 | | |
| 0931 | | | | | 14,2702 | 43020 | 1 | CHKSDATA | STO | SET | |
| 0932 | REP | 6 | LAST | 714 | 14,2703 | 02777 | 1 | | | CMIN | |
| 0933 | REP | 2 | LAST | 712 | 14,2704 | 00074 | 1 | | | FREEFLAG | |
| 0934 | | | | | 14,2705 | 77760 | 0 | CHKSBAR | AXC,1 | | SET X1 TO STORE EPHEMERIS DATA |
| 0935 | REP | 7 | LAST | 712 | 14,2706 | 02735 | 1 | | | STARAD | |
| R0936 | | | | | | | | | | | |
| 0937 | | | | | 14,2707 | 47773 | 1 | CHKSB | VLOAD* | DOT* | CAL. ANGLE THETA |
| 0938 | | | | | 14,2710 | 00001 | 0 | | | 0,1 | |
| 0939 | | | | | 14,2711 | 00007 | 0 | | | 6,1 | |
| 0940 | | | | | 14,2712 | 85552 | 0 | SL1 | ACOS | | |
| 0941 | REP | 1 | | | 14,2713 | 00025 | 0 | STORE | THETA | | BRANCH TO CHKSD IF THIS IS 2ND PASS |
| 0942 | | | | | 14,2714 | 43014 | 0 | BOFF | INVERT | | |
| 0943 | REP | 3 | LAST | 715 | 14,2715 | 00354 | 0 | | FREEFLAG | | |
| 0944 | REP | 1 | | | 14,2716 | 30726 | 1 | | CHKSD | | CLEAR FREEFLAG |
| 0945 | REP | 4 | LAST | 715 | 14,2717 | 00174 | 0 | | FREEFLAG | | SET X1 TO MARK ANGLES |
| 0946 | | | | | 14,2720 | 71360 | 1 | AXC,1 | DLOAD | | |
| 0947 | | | | | 14,2721 | 00008 | 1 | | 6D | | |
| 0948 | REP | 2 | LAST | 715 | 14,2722 | 00025 | 0 | | THETA | | |
| 0949 | | | | | 14,2723 | 00023 | 0 | STORE | 16D | | |
| 0950 | | | | | 14,2724 | 77650 | 1 | GOTO | | | |
| 0951 | REP | 1 | | | 14,2725 | 30707 | 1 | | CHKSB | | RETURN TO CAL. 2ND ANGLE |
| 0952 | | | | | 14,2726 | 45345 | 1 | CHKSD | DLOAD | DSJ | |
| 0953 | REP | 3 | LAST | 715 | 14,2727 | 00025 | 0 | | THETA | | |
| 0954 | | | | | 14,2730 | 00023 | 0 | | 16D | | COMPUTE POS DIFF |
| 0955 | | | | | 14,2731 | 47046 | 0 | ARS | RTN | | |
| 0956 | REP | 3 | LAST | 495 | 14,2732 | 45541 | 0 | | SONAGREE | | |
| 0957 | REP | 1 | | | 14,2733 | 01046 | 1 | STORE | NORMTEM1 | | |
| 0958 | | | | | 14,2734 | 77414 | 0 | SET | EXIT | | |
| 0959 | REP | 5 | LAST | 715 | 14,2735 | 00074 | 1 | | FREEFLAG | | |
| 09594 | REP | 144 | LAST | 701 | 14,2736 | 3 4714 | 1 | CAP | ZERO | | |
| 09595 | REP | 195 | LAST | 714 | 14,2737 | 0 4555 | 0 | TC | RANKCALL | | |
| 09596 | REP | 5 | LAST | 642 | 14,2740 | 20607 | 1 | CADR | CLEANDSP | | |
| 0960 | REP | 1 | | | 14,2741 | 3 2755 | 1 | CAP | VR6N5 | | |

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| | | | | | | | | |
|------|--|-----------------|---------|----------|---------------|-------------|----------------------------------|--|
| 0961 | REP 196 | LAST 715 | 14,2742 | 0 4555 0 | TC | BANKCALL | | |
| 0962 | REP 33 | LAST 714 | 14,2743 | 20624 0 | CADR | GOFLASH | | |
| 0963 | REP 53 | LAST 714 | 14,2744 | 1 4100 0 | TCF | GOTOPOOH | | |
| 0964 | REP 1 | | 14,2745 | 0 2752 0 | TC | CHKSDA | PROCEED | |
| 0965 | REP 178 | LAST 714 | 14,2746 | 0 8006 1 | TC | INTRPT | | |
| 0966 | | | 14,2747 | 52014 0 | CLEAR | GOTO | | |
| 0967 | REP 8 | LAST 715 | 14,2750 | 00274 0 | | FREEFLAG | | |
| 0968 | REP 9 | LAST 715 | 14,2751 | 02777 1 | | GMIN | | |
| 0969 | REP 179 | LAST 716 | 14,2752 | 0 8006 1 | CHKSDA TC | INTRPT | | |
| 0970 | | | 14,2753 | 77650 1 | GOTO | | | |
| 0971 | REP 10 | LAST 716 | 14,2754 | 02777 1 | | GMIN | | |
| 0972 | | | 14,2755 | 01405 1 | VBONS VN | 605 | | |
| 0973 | NAME - CAL53A | | | | | | | |
| 0974 | NAME - CAL53A | | | | | | | |
| 0975 | FUNCTION - COARSE ALIGN THE IMU, IF NECESSARY. | | | | | | | |
| 0976 | CALLING SEQUENCE - CALL CAL53A | | | | | | | |
| 0977 | INPUT - PRESENT GIMBAL ANGLES - CDUX, CDUY, CDUZ | | | | | | | |
| 0978 | DESIRED GIMBAL ANGLES - THETA, +1, +2 | | | | | | | |
| 0979 | OUTPUT - THE IMU COORDINATES ARE STORED IN REFSMMAT | | | | | | | |
| 0980 | SUBROUTINES USED - 1. IMUCOARS 2. IMUSTALL 3. CURTAINS | | | | | | | |
| 0981 | REP 2 | LAST 715 TO 716 | 44 | 44* | COUNT | 14/R50 | | |
| 0982 | | | 14,2756 | 45020 1 | CAL53A STO | CALL | | |
| 0983 | | | 14,2757 | 00035 1 | | 29D | | |
| 0984 | REP 2 | LAST 696 | 14,2760 | 22256 0 | | SS 2.2 | MAKE FINAL COMP OF GIMBAL ANGLES | |
| 0985 | | | 14,2761 | 66234 1 | RTR | SSP | | |
| 0986 | REP 1 | | 14,2762 | 32236 1 | | NOCDUS | READ CDUS | |
| 0987 | REP 27 | LAST 711 | 14,2763 | 00051 0 | | 51 | | |
| 0988 | | | 14,2764 | 00001 0 | | 1 | | |
| 0989 | | | 14,2765 | 40370 1 | AKT,1 | SETPD | | |
| 0990 | | | 14,2766 | 00003 1 | | 3 | | |
| 0991 | | | 14,2767 | 00005 1 | | 4 | | |
| 0992 | | | 14,2770 | 70543 1 | CALOOP DLOAD* | SR1 | | |
| 0993 | REP 16 | LAST 667 | 14,2771 | 01181 0 | | THETA +3D,1 | | |
| 0994 | | | 14,2772 | 70523 1 | PDDL* | SR1 | | |
| 0995 | | | 14,2773 | 00005 1 | | 4,1 | | |
| 0996 | | | 14,2774 | 51425 0 | DSU | ARS | | |
| 0997 | | | 14,2775 | 45206 1 | PUSH | DSU | | |
| 0998 | REP 1 | | 14,2776 | 31053 0 | | DEGREE1 | | |
| 0999 | | | 14,2777 | 71240 1 | RWV | DLOAD | | |
| 1000 | REP 1 | | 14,3000 | 31027 0 | | CALOOP1 | | |
| 1001 | | | 14,3001 | 51025 1 | DSU | RPL | | |
| 1002 | REP 1 | | 14,3002 | 31054 1 | | DEG359 | | |
| 1003 | REP 2 | LAST 716 | 14,3003 | 31027 0 | | CALOOP1 | | |
| 1004 | | | 14,3004 | 77776 1 | COARFINE EXIT | | | |
| 1005 | REP 197 | LAST 716 | 14,3005 | 0 4555 0 | TC | BANKCALL | | |
| 1006 | REP 4 | LAST 421 | 14,3006 | 16602 1 | CADR | IMUCOARS | PERFORM COARSE ALIGNMENT | |
| 1007 | REP 198 | LAST 716 | 14,3007 | 0 4555 0 | TC | BANKCALL | | |
| 1008 | REP 9 | LAST 714 | 14,3010 | 17516 0 | CADR | IMUSTALL | REQUEST MODE SWITCH | |
| 1009 | REP 2 | LAST 714 | 14,3011 | 0 5644 1 | TC | CURTAINS | | |



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| | | | | | | | | |
|------|-----|-----|------|-----|---------|----------|----------|-----------|
| 1010 | REP | 100 | LAST | 716 | 14,3012 | 0 4555 0 | TC | BANKCALL |
| 1011 | REP | 1 | | | 14,3013 | 17012 1 | CADR | IMUPIN20 |
| 1012 | REP | 200 | LAST | 717 | 14,3014 | 0 4555 0 | TC | BANKCALL |
| 1013 | REP | 10 | LAST | 718 | 14,3015 | 17516 0 | CADR | IMUSTALL |
| 1014 | REP | 3 | LAST | 716 | 14,3016 | 0 5644 1 | TC | CURTAINS |
| 1015 | REP | 180 | LAST | 718 | 14,3017 | 0 6006 1 | TC | INTPRST |
| 1016 | | | | | 14,3020 | 77234 1 | RTB | VLOAD |
| 1017 | REP | 1 | | | 14,3021 | 31263 1 | | SET1/PDT |
| 1018 | REP | 3 | LAST | 480 | 14,3022 | 11456 0 | | ZEROVEC |
| 1019 | REP | 18 | LAST | 427 | 14,3023 | 01472 1 | STORE | GCOMP |
| 1020 | | | | | 14,3024 | 52014 0 | SET | GOTO |
| 1021 | REP | 1 | | | 14,3025 | 01060 0 | | DRIFTPLG |
| 1022 | REP | 1 | | | 14,3026 | 31031 1 | | FINEONLY |
| 1023 | | | | | 14,3027 | 77700 0 | CALOOP1 | TIX,1 |
| 1024 | REP | 1 | | | 14,3030 | 30770 1 | | CALOOP |
| 1025 | | | | | 14,3031 | 75160 1 | FINEONLY | AXC,1 |
| 1026 | REP | 31 | LAST | 528 | 14,3032 | 02671 0 | | AXC,2 |
| 1027 | REP | 24 | LAST | 713 | 14,3033 | 01735 1 | | XSM |
| 1028 | | | | | 14,3034 | 77624 1 | CALL | REPSMAT |
| 1029 | REP | 1 | | | 14,3035 | 31040 1 | | MATMOVE |
| 1030 | | | | | 14,3036 | 77650 1 | GOTO | |
| 1031 | | | | | 14,3037 | 00035 1 | | 29D |
| 1032 | | | | | 14,3040 | 77773 1 | MATMOVE | VLOAD* |
| 1033 | | | | | 14,3041 | 00001 0 | | 0,1 |
| 1034 | | | | | 14,3042 | 10001 1 | STORE | 0,2 |
| 1035 | | | | | 14,3043 | 77773 1 | VLOAD* | |
| 1036 | | | | | 14,3044 | 00007 0 | | 6D,1 |
| 1037 | | | | | 14,3045 | 10007 1 | STORE | 6D,2 |
| 1038 | | | | | 14,3046 | 77773 1 | VLOAD* | |
| 1039 | | | | | 14,3047 | 00015 0 | | 12D,1 |
| 1040 | | | | | 14,3050 | 10015 1 | STORE | 12D,2 |
| 1041 | | | | | 14,3051 | 77616 0 | RVC | |
| 1042 | | | | | 14,3052 | 00056 1 | DEGREE51 | DEC 46 |
| 1043 | | | | | 14,3053 | 37722 1 | DEG359 | DEC 16336 |
| 1044 | REP | 4 | LAST | 714 | 15,2000 | | SETLOC | P505 |
| 1045 | | | | | 15,2236 | | BANK | |
| 1046 | | | | | 15,2236 | 0 0004 0 | RDCDUS | INHINT |
| 1047 | REP | 16 | LAST | 661 | 15,2237 | 3 0032 0 | CA | CDUX |
| 1048 | REP | 12 | LAST | 586 | 15,2240 | 50 120 1 | INDEX | FIXLOC |
| 1049 | | | | | 15,2241 | 54 001 1 | TS | 1 |
| 1050 | REP | 7 | LAST | 661 | 15,2242 | 3 0033 1 | CA | CDUY |
| 1051 | REP | 13 | LAST | 717 | 15,2243 | 50 120 1 | INDEX | FIXLOC |
| 1052 | | | | | 15,2244 | 54 002 1 | TS | 2 |
| 1053 | REP | 10 | LAST | 661 | 15,2245 | 3 0034 0 | CA | CDUZ |
| 1054 | REP | 14 | LAST | 717 | 15,2246 | 50 120 1 | INDEX | FIXLOC |
| 1055 | | | | | 15,2247 | 54 003 0 | TS | 3 |
| 1056 | | | | | 15,2250 | 0 0003 1 | RELINT | |
| 1057 | REP | 5 | LAST | 537 | 15,2251 | 0 6030 1 | TC | DANZIG |

TEST FOR MALFUNCTION

TRANSFER MATRIX

READ CDUS

R1058 NAME - GIMR
R1059 FUNCTION - DETERMINE AND COMPUTE THE DESIRED GIMRAL ANGLES TO BE USED

FOR COARSE ALIGNMENT.

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R1061 CALLING SEQUENCE - CALL GIMB
R1062 INPUT - DESIRED IMU INERTIAL ORIENTATION VECTORS-XSMD,YSMD,ZSMD
R1063 OUTPUT - GIMBAL ANGLES LEFT IN THSTAD,+1,+2
R1064 SUBROUTINES USED - 1.COUTRIG 2.CALCSMSC 3.CALCOA
1065 REP 2 LAST 697 18,2000
1066 REP 1 18,2567
1067 REP 1
1068 18,2567 41345 0 CALCSMSC DLOAD DMP
1069 REP 1 18,2570 00737 1 SINCDUY
1070 REP 2 LAST 535 18,2571 00747 0 COSCDUZ
1071 18,2572 77676 0 DCOMP
1072 18,2573 70525 1 PDDL SR1
1073 REP 2 LAST 535 18,2574 00741 0 SINCDUZ
1074 18,2575 41325 0 PDDL DMP
1075 REP 1 18,2576 00745 1 COSCDUY
1076 REP 3 LAST 718 18,2577 00747 0 COSCDUZ
1077 18,2600 76486 1 VDEP VSL1
1078 REP 5 LAST 708 18,2601 02714 1 STORE XNR
1079 18,2602 41345 0 DLOAD DMP
1080 REP 3 LAST 535 18,2603 00743 1 SINCDUX
1081 REP 3 LAST 718 18,2604 00741 0 SINCDUZ
1082 18,2605 77752 1 SL1
1083 18,2606 00033 1 STORE 26D
1084 18,2607 77605 1 DMP
1085 REP 2 LAST 718 18,2610 00737 1 SINCDUY
1086 18,2611 41325 0 PDDL DMP
1087 REP 3 LAST 535 18,2612 00751 1 COSCDUX
1088 REP 2 LAST 718 18,2613 00745 1 COSCDUY
1089 18,2614 77625 0 DSJ
1090 18,2615 41325 0 PDDL DMP
1091 REP 4 LAST 718 18,2616 00743 1 SINCDUX
1092 REP 4 LAST 718 18,2617 00747 0 COSCDUZ
1093 18,2620 77676 0 DCOMP
1094 18,2621 41325 0 PDDL DMP
1095 REP 4 LAST 718 18,2622 00751 1 COSCDUX
1096 REP 3 LAST 718 18,2623 00737 1 SINCDUY
1097 18,2624 41325 0 PDDL DMP
1098 REP 3 LAST 718 18,2625 00745 1 COSCDUY
1099 18,2626 00033 1 26D
1100 18,2627 55415 1 DAD VDEP
1101 18,2630 77772 0 VSL1
1102 REP 5 LAST 708 18,2631 02730 1 STORE ZNR
1103 18,2632 76435 1 VXV VSL1
1104 REP 6 LAST 718 18,2633 02714 1 XNR
1105 REP 4 LAST 417 18,2634 02722 1 STORE YNR
1106 18,2635 77616 0 RVO
R1107 NAME - P51 - IMU ORIENTATION DETERMINATION
R1108 MOD.NO.2 21 DEC 66
R1110 MOD BY STURLAGSON
    
```

LOC SECTION - P51-P53
ASSEMBLY SINDISK RW15

L P51-P53

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R1112 FUNCTIONAL DESCRIPTION

R1113 DETERMINES THE INERTIAL ORIENTATION OF THE IMJ. THE PROGRAM IS SELECTED BY DSKY ENTRY. THE SIGHTING
R1115 ROUTINE IS CALLED TO COLLECT THE CDU COUNTERS AND SHAFT AND TRUNNION ANGLES FOR A SIGHTED STAR. THE DATA IS
R1117 THEN PROCESSED AS FOLLOWS.

R1118 1. SEXTANT ANGLES ARE COMPUTED IN TERMS OF NAVIGATIONAL BASE COORDINATES. LET SA AND TA BE THE SHAFT AND
R1120 TRUNNION ANGLES, RESPECTIVELY. THEN,

R1121
$$\vec{V} = (\sin(TA) \cos(SA), \sin(TA) \sin(SA), \cos(TA))$$
 (A COLUMN VECTOR)
R1122 NB

R1123 THE OUTPUT IS A HALF-UNIT VECTOR STORED IN STARN.

R1126 2. THIS VECTOR IN NAV. BASE COORDS. IS THEN TRANSFORMED TO ONE IN STARLE MEMBER COORDINATES.

R1128
$$\vec{V} = \begin{matrix} & T & T & T \\ \begin{matrix} 0 & 0 & 0 \end{matrix} & * & \begin{matrix} 0 & 0 & 0 \end{matrix} & * & \vec{V} \\ \begin{matrix} 1 & 2 & 3 \end{matrix} & & & & \text{NB} \end{matrix}$$
, WHERE

R1131
$$\begin{matrix} \begin{matrix} 0 \\ 1 \end{matrix} \\ \begin{matrix} 1 \\ 2 \end{matrix} \\ \begin{matrix} 3 \end{matrix} \end{matrix} = \begin{pmatrix} \cos(I0) & 0 & -\sin(I0) \\ 0 & 1 & 0 \\ \sin(I0) & 0 & \cos(I0) \end{pmatrix}$$

THE GIMBAL ANGLES ARE COMPUTED FROM THE CDU COUNTERS AT NBSM (USING AXIS-ROT AND CDU LOGIC)

R1139
$$\begin{matrix} \begin{matrix} 2 \\ 3 \end{matrix} \\ \begin{matrix} 1 \\ 2 \end{matrix} \\ \begin{matrix} 3 \end{matrix} \end{matrix} = \begin{pmatrix} \cos(M0) & \sin(M0) & 0 \\ -\sin(M0) & \cos(M0) & 0 \\ 0 & 0 & 1 \end{pmatrix}$$
, M0=MIDDLE GIMBAL ANGLE

R1145
$$\begin{matrix} \begin{matrix} 3 \\ 1 \end{matrix} \\ \begin{matrix} 1 \\ 2 \end{matrix} \\ \begin{matrix} 3 \end{matrix} \end{matrix} = \begin{pmatrix} 1 & 0 & 0 \\ 0 & \cos(O0) & \sin(O0) \\ 0 & -\sin(O0) & \cos(O0) \end{pmatrix}$$
, O0=OUTER GIMBAL ANGLE

R1151 3. THE STAR NUMBER IS SAVED AND THE SECOND STAR IS THEN SIMILARLY PROCESSED.

R1153 4. THE ANGLE BETWEEN THE TWO STARS IS THEN CHECKED AT OKSDATA.

R1154 5. REPSMAT IS THEN COMPUTED AT AXISORN AS FOLLOWS.

R1155 LET S AND S BE TWO STAR VECTORS EXPRESSED IN TWO COORDINATE SYSTEMS, A AND B (BASIC AND STARLE MEMBER).
R1156 1 2

R1159 DEFINE, - -



L PS1-PS3

R1160
R1161

$$U = S$$

$$A \quad A_1$$

R1162
R1163
R1164

$$V = \text{UNITS } X \text{ S })$$

$$A \quad A_1 \quad A_2$$

R1165
R1166
R1167
R1168
R1169
R1170
R1171

AND

$$W = U X V$$

$$A \quad A \quad A$$

$$U = S$$

$$B \quad B_1$$

R1172
R1173
R1174

$$V = \text{UNITS } X \text{ S })$$

$$B \quad B_1 \quad B_2$$

R1175
R1176
R1177

$$W = U X V$$

$$B \quad B \quad B$$

R1178
R1179
R1180

THEN

$$X = U * U + V * V + W * W$$

$$B_1 \quad A \quad B_1 \quad A \quad B_1 \quad A$$

(REPEAT)

R1181
R1182
R1183

$$Y = U * U + V * V + W * W$$

$$B_2 \quad A \quad B_2 \quad A \quad B_2 \quad A$$

R1184
R1185
R1186

$$Z = U * U + V * V + W * W$$

$$B_3 \quad A \quad B_3 \quad A \quad B_3 \quad A$$

R1187

THE INPUTS CONSIST OF THE FOUR HALF-UNIT VECTORS STORED AS FOLLOWS

R1188
R1189
R1190

S IN 6-11 OF THE VAC AREA

$$A_1$$

R1191
R1192
R1193

S IN 12-17 OF THE VAC AREA

$$A_2$$

R1194
R1195
R1196

S IN STARAD

$$B_1$$

R1197

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R1198 S IN STARAD +6
R1199 B2

R1200 CALLING SEQUENCE

R1201 THE PROGRAM IS CALLED BY THE ASTRONAUT BY DSKY ENTRY.

R1202 SUBROUTINES CALLED.

R1203 GOPERF3
R1204 GOPERF1R
R1205 GDSFR
R1206 IMUCOARS
R1207 IMUPIN20
R1208 R53
R1209 SKTNR
R1210 NBSM
R1211 MKRELEAS
R1212 CHKSDATA
R1213 MATMOVE

R1214 ALARMS

R1215 NONE.
R1216 ERASABLE INITIALIZATION

R1217 IMU ZERO FLAG SHOULD BE SET.

R1218 OUTPUT

R1219 REFSMAT
R1220 REFSPLG

R1221 DEBRIS

R1222 WORK AREA
R1223 STARAD
R1224 STARIND
R1225 BESTI
R1226 BESTJ

| | | | | | | | | | | |
|------|-----|-----|------|-----|---------|----|------|-----|-----|----------------|
| 1227 | REP | 5 | LAST | 715 | 14,2000 | | | | | SETLOC P5081 |
| 1228 | | | | | 14,3054 | | | | | BANK |
| 1229 | REP | 1 | | | | | | | | COUNT 14/P5153 |
| 1230 | REP | 2 | LAST | 200 | 14,3054 | | | P53 | | EQUALS P51 |
| 1231 | REP | 42 | LAST | 381 | 14,3054 | 4 | 1320 | 0 | P51 | CS IMODS30 |
| 1232 | REP | 26 | LAST | 690 | 14,3055 | 7 | 4702 | 1 | | MASK RIT9 |
| 1233 | REP | 175 | LAST | 701 | 14,3056 | 10 | 000 | 0 | | CCS A |
| 1234 | REP | 1 | | | 14,3057 | 0 | 3083 | 1 | | TC P51A |



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| | | | | | | | | | | |
|------|-----|-----|------|-----|---------|--------|-------|---|-------|-----------|
| 1235 | REP | 20 | LAST | 700 | 14,3060 | 0 | 5537 | 0 | TC | ALARM |
| 1236 | | | | | 14,3061 | 0 | 00210 | 1 | OCT | 210 |
| 1237 | REP | 54 | LAST | 710 | 14,3062 | 0 | 4108 | 1 | TC | GOTOPOOH |
| 1238 | REP | 201 | LAST | 717 | 14,3063 | 0 | 4555 | 0 | TC | BANKCALL |
| 1239 | REP | 1 | | | 14,3064 | 1 | 17607 | 0 | CADR | R02Z0RO |
| | | | | | | | | | P51A | |
| 1240 | REP | 1 | | | 14,3065 | 3 | 4720 | 0 | P51AA | CAP |
| 1241 | REP | 202 | LAST | 722 | 14,3066 | 0 | 4555 | 0 | TC | PRFMSTAO |
| 1242 | REP | 5 | LAST | 712 | 14,3067 | 20751 | 0 | 0 | CADR | BANKCALL |
| 1243 | REP | 85 | LAST | 722 | 14,3070 | 0 | 4108 | 1 | TC | GOPRFP1 |
| 1244 | REP | 1 | | | 14,3071 | 0 | 3134 | 1 | TC | GOTOPOOH |
| 1245 | REP | 68 | LAST | 714 | 14,3072 | 0 | 5301 | 0 | TC | P51B |
| 1246 | | | | | 14,3073 | 0 | 05024 | 1 | TC | PHASCHNG |
| 1247 | | | | | 14,3074 | 1 | 13000 | 0 | OCT | 05024 |
| 1248 | REP | 1 | | | 14,3075 | 3 | 4714 | 1 | OCT | 13000 |
| 1249 | REP | 17 | LAST | 716 | 14,3076 | 55=155 | 0 | 0 | CAP | P51Z0RO |
| 1250 | REP | 18 | LAST | 722 | 14,3077 | 55=156 | 0 | 0 | TS | THETAD |
| 1251 | REP | 19 | LAST | 722 | 14,3100 | 55=157 | 1 | 1 | TS | THETAD +1 |
| 1252 | REP | 1 | | | 14,3101 | 3 | 3261 | 1 | TS | THETAD +2 |
| 1253 | REP | 203 | LAST | 722 | 14,3102 | 0 | 4555 | 0 | CAP | V8N22 |
| 1254 | REP | 2 | LAST | 442 | 14,3103 | 20577 | 0 | 0 | TC | BANKCALL |
| 1255 | REP | 1 | | | 14,3104 | 3 | 3262 | 1 | CADR | GODSPRET |
| 1256 | REP | 204 | LAST | 722 | 14,3105 | 0 | 4555 | 0 | CAP | V41K |
| 1257 | REP | 3 | LAST | 722 | 14,3106 | 20577 | 0 | 0 | TC | BANKCALL |
| 1258 | REP | 205 | LAST | 722 | 14,3107 | 0 | 4555 | 0 | CADR | GODSPRET |
| 1259 | REP | 5 | LAST | 716 | 14,3110 | 16602 | 1 | 1 | TC | BANKCALL |
| 1260 | REP | 206 | LAST | 722 | 14,3111 | 0 | 4555 | 0 | CADR | IMUCOARS |
| 1261 | REP | 11 | LAST | 717 | 14,3112 | 17516 | 0 | 0 | TC | BANKCALL |
| 1262 | REP | 4 | LAST | 717 | 14,3113 | 0 | 5644 | 1 | CADR | IMUSTALL |
| 1263 | REP | 207 | LAST | 722 | 14,3114 | 0 | 4555 | 0 | TC | CURTAINS |
| 1264 | REP | 2 | LAST | 717 | 14,3115 | 17012 | 1 | 1 | TC | IMUPIN20 |
| 1265 | REP | 208 | LAST | 722 | 14,3116 | 0 | 4555 | 0 | CADR | BANKCALL |
| 1266 | REP | 12 | LAST | 722 | 14,3117 | 17516 | 0 | 0 | TC | IMUSTALL |
| 1267 | REP | 5 | LAST | 722 | 14,3120 | 0 | 5644 | 1 | TC | CURTAINS |
| 1268 | REP | 181 | LAST | 717 | 14,3121 | 0 | 6006 | 1 | TC | INTPRET |
| 1269 | | | | | 14,3122 | 77234 | 1 | 1 | RTB | VLOAD |
| 1270 | REP | 2 | LAST | 717 | 14,3123 | 31263 | 1 | 1 | | SET1/PDT |
| 1271 | REP | 4 | LAST | 717 | 14,3124 | 11456 | 0 | 0 | | ZEROVBC |
| 1272 | REP | 19 | LAST | 717 | 14,3125 | 01472 | 1 | 1 | STORE | GCOMP |
| 1273 | | | | | 14,3126 | 77414 | 0 | 0 | SET | EXIT |
| 1274 | REP | 2 | LAST | 717 | 14,3127 | 01060 | 0 | 0 | | DRIFTPLG |
| 1275 | REP | 69 | LAST | 722 | 14,3130 | 0 | 5301 | 0 | TC | PHASCHNG |
| 1276 | | | | | 14,3131 | 0 | 05024 | 1 | OCT | 05024 |
| 1277 | | | | | 14,3132 | 1 | 13000 | 0 | OCT | 13000 |
| 1278 | REP | 1 | | | 14,3133 | 1 | 3065 | 0 | TCF | P51AA |

TERM.
V 33

ZERO THE GIMBALS

NOW DISPLAY COARSE ALIGN VERR 41

CAGING OR RAD END
SCHEDULE IFAILOK AND IMUPIN20 TASKS, IN 5
AND 20 SECS. DIRECT RETURN AND NO STALL,
IF CAGING, BUT T4 WILL ZERO C/A ENABLE.
IF PUT TO SLEEP, IMUPIN20 WILL WAKE US
UP.

COARSE ALIGN DONE - RECYCLE FOR PINE



L P51-P53

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P1279 DO STAR SIGHTING AND COMPUTE NEW REFSMAT

| | | | | | | | | |
|------|---------|----------|---------|----------|--------|-------|----------|----------------------------------|
| 1280 | REP 70 | LAST 722 | 14,3134 | 0 5301 0 | P51B | TC | PHASCHNG | |
| 1281 | | | 14,3135 | 00014 1 | | OCT | 00014 | |
| 1282 | REP 182 | LAST 722 | 14,3136 | 0 6006 1 | | TC | INTPRST | |
| 1283 | | | 14,3137 | 40331 1 | | SSP | SETPD | |
| 1284 | REP 9 | LAST 713 | 14,3140 | 00305 1 | | | STARIND | INDEX-STAR 1 OR 2 |
| 1285 | | | 14,3141 | 00000 1 | | | 0 | |
| 1286 | | | 14,3142 | 00001 0 | | | 0 | |
| 1287 | | | 14,3143 | 77414 0 | | CLEAR | EXIT | |
| 1288 | REP 4 | LAST 711 | 14,3144 | 00686 1 | | | TARD2PLD | SHOW STAR MARK-NOT LAND MARK |
| 1289 | REP 56 | LAST 711 | 14,3145 | 3 4712 1 | | CAP | BIT1 | |
| 1290 | REP 7 | LAST 711 | 14,3146 | 54 301 1 | | TS | MARKINDX | INITIALIZE FOR ONE MARK |
| 1291 | REP 71 | LAST 723 | 14,3147 | 0 5301 0 | P51C | TC | PHASCHNG | |
| 1292 | | | 14,3150 | 05024 1 | | OCT | 05024 | |
| 1293 | | | 14,3151 | 13000 0 | | OCT | 13000 | |
| 1294 | REP 10 | LAST 511 | 14,3152 | 0 5253 0 | | TC | CHECKM | |
| 1295 | | | 14,3153 | 00085 1 | | MM | 53 | BACKUP PROGRAM |
| 1296 | REP 1 | | 14,3154 | 1 3162 0 | | TCP | P51C.1 | NOT P53 |
| 1297 | REP 183 | LAST 723 | 14,3155 | 0 6006 1 | | TC | INTPRST | |
| 1298 | | | 14,3156 | 77624 1 | | CALL | | |
| 1299 | REP 2 | LAST 713 | 14,3157 | 32252 0 | | | R56 | |
| 1300 | | | 14,3160 | 77650 1 | | GOTO | | |
| 1301 | REP 1 | | 14,3161 | 31165 1 | | | P51C.2 | |
| 1302 | REP 164 | LAST 723 | 14,3162 | 0 6006 1 | P51C.1 | TC | INTPRST | |
| 1303 | | | 14,3163 | 77624 1 | | CALL | | |
| 1304 | REP 3 | LAST 701 | 14,3164 | 31322 0 | | | R53 | SIGHTING ROUTINE |
| 1305 | | | 14,3165 | 77624 1 | P51C.2 | CALL | | COMPUTE LOS IN SM FROM MARK DATA |
| 1306 | REP 2 | LAST 712 | 14,3166 | 31266 1 | | | SKTSM | |
| 1307 | | | 14,3167 | 77606 1 | | PUSH | | |
| 1308 | | | 14,3170 | 53135 0 | | SLOAD | RZE | |
| 1309 | REP 10 | LAST 723 | 14,3171 | 00305 1 | | | STARIND | |
| 1310 | REP 1 | | 14,3172 | 31177 1 | | | P51D | |
| 1311 | | | 14,3173 | 45575 1 | | VLOAD | STADR | |
| 1312 | REP 7 | LAST 713 | 14,3174 | 75160 1 | | STORE | STARSAV2 | DOWNLINK |
| 1313 | | | 14,3175 | 77650 1 | | GOTO | | |
| 1314 | REP 1 | | 14,3176 | 31205 1 | | | P51E | |
| 1315 | | | 14,3177 | 45575 1 | P51D | VLOAD | STADR | |
| 1316 | REP 5 | LAST 713 | 14,3200 | 61166 1 | | STOCL | STARSAV1 | |
| 1317 | REP 10 | LAST 712 | 14,3201 | 02607 1 | | | TSIGHT | |
| 1318 | | | 14,3202 | 77624 1 | | CALL | | |
| 1319 | REP 3 | LAST 712 | 14,3203 | 32363 0 | | | PLANET | |
| 1320 | REP 4 | LAST 713 | 14,3204 | 02601 1 | | STORE | PLANVEC | |
| 1321 | | | 14,3205 | 77776 1 | P51E | EXIT | | |
| 1322 | REP 72 | LAST 723 | 14,3206 | 0 5301 0 | | TC | PHASCHNG | |
| 1323 | | | 14,3207 | 05024 1 | | OCT | 05024 | |
| 1324 | | | 14,3210 | 13000 0 | | OCT | 13000 | |
| 1325 | REP 209 | LAST 722 | 14,3211 | 0 4555 0 | | TC | RANKCALL | |
| 1326 | REP 6 | LAST 712 | 14,3212 | 16063 0 | | CADR | MKRPLAS | ZERO MARKSTAT |

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| | | | | | | | | |
|------|-----|-----|------|-----|---------|----------|------------|-------------|
| 1327 | REP | 11 | LAST | 723 | 14,3213 | 10 304 1 | CCS | STARIND |
| 1328 | REP | 1 | | | 14,3214 | 1 3223 0 | TCP | P51P |
| 1329 | REP | 73 | LAST | 723 | 14,3215 | 0 5301 0 | TC | PHASCHNG |
| 1330 | | | | | 14,3216 | 05024 1 | OCT | 05024 |
| 1331 | | | | | 14,3217 | 13000 0 | OCT | 13000 |
| 1332 | REP | 57 | LAST | 723 | 14,3220 | 3 4712 1 | CAP | BIT1 |
| 1333 | REP | 12 | LAST | 724 | 14,3221 | 54 304 1 | TS | STARIND |
| 1334 | REP | 1 | | | 14,3222 | 1 3147 1 | TCP | P51C |
| 1335 | REP | 74 | LAST | 724 | 14,3223 | 0 5301 0 | TC | PHASCHNG |
| 1336 | | | | | 14,3224 | 05024 1 | OCT | 05024 |
| 1337 | | | | | 14,3225 | 13000 0 | OCT | 13000 |
| 1338 | REP | 165 | LAST | 723 | 14,3226 | 0 6006 1 | TC | INTPRST |
| 1339 | | | | | 14,3227 | 45145 0 | DLOAD | CALL |
| 1340 | REP | 11 | LAST | 723 | 14,3230 | 02607 1 | | TSIGHT |
| 1341 | REP | 4 | LAST | 723 | 14,3231 | 32363 0 | | PLANST |
| 1342 | | | | | 14,3232 | 24015 0 | STOVL | 12D |
| 1343 | REP | 5 | LAST | 723 | 14,3233 | 02601 1 | | PLANVEC |
| 1344 | | | | | 14,3234 | 24007 0 | STOVL | 6D |
| 1345 | REP | 6 | LAST | 723 | 14,3235 | 02611 0 | | STARSAV1 |
| 1346 | REP | 6 | LAST | 715 | 14,3236 | 26736 1 | STOVL | STARAD |
| 1347 | REP | 8 | LAST | 723 | 14,3237 | 02617 0 | | STARSAV2 |
| 1348 | REP | 9 | LAST | 724 | 14,3240 | 36744 0 | STCALL | STARAD *6 |
| 1349 | REP | 2 | LAST | 714 | 14,3241 | 30702 1 | | CHKSDATA |
| 1350 | | | | | 14,3242 | 77414 0 | BCN | EXIT |
| 1351 | REP | 7 | LAST | 716 | 14,3243 | 00314 1 | | PRESELAG |
| 1352 | REP | 1 | | | 14,3244 | 31246 0 | | P51G |
| 1353 | REP | 2 | LAST | 722 | 14,3245 | 0 3065 1 | TC | P51AA |
| 1354 | | | | | 14,3246 | 77624 1 | CALL | |
| 1355 | REP | 3 | LAST | 712 | 14,3247 | 47334 0 | | AXISGEN |
| 1356 | | | | | 14,3250 | 75160 1 | AXC,1 | AXC,2 |
| 1357 | REP | 4 | LAST | 534 | 14,3251 | 02713 0 | | XDC |
| 1358 | REP | 25 | LAST | 717 | 14,3252 | 01735 1 | | REFSMAT |
| 1359 | | | | | 14,3253 | 45014 0 | CLEAR | CALL |
| 1360 | REP | 6 | LAST | 696 | 14,3254 | 01662 1 | | REFSMPLG |
| 1361 | REP | 2 | LAST | 717 | 14,3255 | 31040 1 | | MATMOVE |
| 1362 | | | | | 14,3256 | 52014 0 | SET | GOTO |
| 1363 | REP | 7 | LAST | 724 | 14,3257 | 01462 0 | | REFSMPLG |
| 1364 | REP | 2 | LAST | 712 | 14,3260 | 32143 0 | | ENDP505 |
| 1365 | REP | 3 | LAST | 697 | 4720 | | PRFMSTAO = | OCT15 |
| 1366 | REP | 145 | LAST | 715 | 4714 | | P51ZPRO = | ZERO |
| 1367 | REP | 16 | LAST | 652 | 4715 | | P51FIVE = | FIVE |
| 1368 | | | | | 14,3261 | 01426 0 | V6N22 = | VN 0622 |
| 1369 | | | | | 14,3262 | 12200 0 | V41K = | VN 4100 |
| 1370 | REP | 13 | LAST | 659 | 14,3263 | 3 0025 0 | SET1/PDT = | CA TIME1 |
| 1371 | REP | 10 | LAST | 529 | 14,3264 | 55=074 1 | | TS 1/PIPADT |
| 1372 | REP | 6 | LAST | 717 | 14,3265 | 1 6030 0 | TCP | DANZIG |

STAR 2

GO DO SECOND STAR

CHECK STAR ANGLES IN STARAD AND

COME BACK WITH REFSMAT IN XDC



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F1373 SKTSM COMPUTES AN LOS VECTOR IN SM COORD FROM OCU AND ICDU MARK DATA

| | | | | | | | | | |
|------|-----|-----|------|---------|---------|---------|--------|----------------|--------------------------------------|
| 1374 | | | | 14,3266 | 77620 0 | SKTSM | STO | | |
| 1375 | REP | 6 | LAST | 705 | 14,3267 | 00300 1 | | QMAJ | |
| 1376 | | | | 14,3270 | 70740 0 | | LXC,1 | DLOAD* | |
| 1377 | REP | 33 | LAST | 613 | 14,3271 | 01330 0 | | MARKSTAT | |
| 1378 | | | | 14,3272 | 00001 0 | | | OP,1 | |
| 1379 | REP | 12 | LAST | 724 | 14,3273 | 02807 1 | STORE | TSIGHT | |
| 1380 | | | | 14,3274 | 66744 0 | | LXC,2 | SLOAD* | |
| 1381 | REP | 13 | LAST | 724 | 14,3275 | 00304 0 | | STARIND | |
| 1382 | REP | 1 | | | 14,3276 | 46456 1 | | MCONDR,2 | |
| 1383 | | | | | 14,3277 | 76744 1 | LXC,2 | VLOAD* | |
| 1384 | REP | 274 | LAST | 700 | 14,3300 | 00154 1 | | MPAC | |
| 1385 | | | | | 14,3301 | 00001 0 | | 0,1 | |
| 1386 | | | | | 14,3302 | 10001 1 | STORE | 0,2 | |
| 1387 | | | | | 14,3303 | 77743 1 | DLOAD* | | |
| 1388 | | | | | 14,3304 | 00006 1 | | 5,1 | |
| 1389 | | | | | 14,3305 | 10006 0 | STORE | 5,2 | |
| 1390 | | | | | 14,3306 | 77624 1 | CALL | | |
| 1391 | REP | 4 | LAST | 568 | 14,3307 | 46000 0 | | SKTSM | COMPUTE LOS VECTOR FROM OCU IN MCVAC |
| 1392 | | | | | 14,3310 | 62150 1 | LXA,1 | INCR,1 | |
| 1393 | REP | 34 | LAST | 725 | 14,3311 | 01330 0 | | MARKSTAT | INCREMENT TO BASE ADR OF ICDU |
| 1394 | | | | | 14,3312 | 00002 0 | | 2 | |
| 1395 | | | | | 14,3313 | 45130 1 | SXA,1 | CALL | |
| 1396 | REP | 28 | LAST | 716 | 14,3314 | 00050 1 | | S1 | |
| 1397 | REP | 2 | LAST | 568 | 14,3315 | 47541 1 | | NBSM | TRANSFORM LOS TO SM |
| 1398 | | | | | 14,3316 | 77650 1 | GOTO | | |
| 1399 | REP | 7 | LAST | 725 | 14,3317 | 00300 1 | | QMAJ | |
| 1400 | REP | 9 | LAST | 568 | 14,3320 | 03674 1 | MCONDR | BCADR MARKDOWN | |
| 1401 | REP | 2 | LAST | 169 | 14,3321 | 03502 0 | BCADR | MARK2DWN | |

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R1402 PROGRAM DESCRIPTION - R53 - SIGHTING MARK ROUTINE
 R1403 MOD. NO. 2 21 DEC 66
 R1404 MOD BY STURLAUGSON

R1405 FUNCTIONAL DESCRIPTION
 R1406 TO PERFORM A SATISFACTORY NUMBER OF SIGHTING MARKS FOR THE REQUESTING PROGRAM (OR ROUTINE). SIGHTINGS
 R1408 CAN BE MADE ON A STAR OR LANDMARK. WHEN THE OMC ACCEPTS A MARK IT RECORDS AND STORES 5 ANGLES (3 ICDS AND 2
 R1410 OGDUS) AND THE TIME OF THE MARK.

R1411 CALLING SEQUENCE
 R1412 R53 IS CALLED AND RETURNS IN INTERPRETIVE CODE. RETURN IS VIA OPRST.
 R1413 THERE IS NO ERROR EXIT IN THIS ROUTINE ITSELF.

R1414 SUBROUTINES CALLED
 R1415 SKTMARK
 R1416 OPTSTALL
 R1417 GOFLASH

R1416 BRASABLE INITIALIZATION
 R1419 TARGET FLAG - STAR OR LANDMARK
 R1420 MARKINDX - NUMBER OF MARKS WANTED
 R1421 STARIND - INDEX TO BESTI OR BESTJ (STAR NUMBER)
 R1422 OUTPUT
 R1423 MARKSTAT CONTAINS INDEX TO VACANT AREA WHERE MARK DATA IS STORED
 R1424 BESTI (INDEXED BY STARIND) CONTAINS STAR NUMBER SIGHTED
 R1425 DEBRIS
 R1426 MARKINDX CONTAINS NUMBER OF MARKS DESIRED

| | | | | | | | | |
|------|---------|----------|---------|----------|------|----------------|-------------------------------|--|
| 1427 | REP 2 | LAST 622 | 14,2000 | | | SETLOC R53 | | |
| 1428 | | | 14,3322 | | | BANK | | |
| 1429 | REP 1 | | | | | COUNT 14/R53 | | |
| 1430 | | | 14,3322 | 43020 1 | R53 | STO SET | SET SIGHTING MARK FLAG | |
| 1431 | REP 2 | LAST 115 | 14,3323 | 03501 0 | | R53EXIT | | |
| 1432 | REP 2 | LAST 699 | 14,3324 | 00071 1 | | R53FLAG | | |
| 1433 | | | 14,3325 | 77776 1 | | EXIT | | |
| 1434 | REP 8 | LAST 723 | 14,3326 | 3 0301 0 | R53A | CA MARKINDX | NUMBER OF MARKS | |
| 1435 | REP 2 | LAST 198 | 14,3327 | 7 4716 1 | | MASK LOW3 | | |
| 1436 | REP 210 | LAST 723 | 14,3330 | 0 4555 0 | | TC BANKCALL | | |
| 1437 | REP 2 | LAST 446 | 14,3331 | 16002 1 | | CADR SKTMARK | | |
| 1438 | REP 211 | LAST 726 | 14,3332 | 0 4555 0 | | TC BANKCALL | | |
| 1439 | REP 2 | LAST 446 | 14,3333 | 17512 1 | | CADR OPTSTALL | | |
| 1440 | REP 6 | LAST 722 | 14,3334 | 0 5644 1 | | TC CURTAINS | | |
| 1441 | REP 35 | LAST 725 | 14,3335 | 51=330 0 | | INDEX MARKSTAT | | |
| 1442 | REP 15 | LAST 710 | 14,3336 | 10 052 1 | | CCS OPRST | NUMBER OF MARKS ACTUALLY DONE | |
| 1443 | REP 1 | | 14,3337 | 1 3350 0 | | TCP R53R | | |
| 1444 | | | 14,3340 | 1 3342 0 | | TCP +2 | ZERO | |
| 1445 | | | 14,3341 | 1 3342 0 | | TCP +1 | CCS HOLD | |
| 1446 | REP 146 | LAST 724 | 14,3342 | 3 4714 1 | | CAP ZERO | HOLSEKREP VAC AREA SAVE | |
| 1447 | REP 36 | LAST 726 | 14,3343 | 57=330 0 | | XCH MARKSTAT | AND MARKSTAT | |



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| | | | | | | | |
|-------|---------|----------|---------|----------|------------|----------|-----------|
| 1448 | REP 176 | LAST 721 | 14,3344 | 10 000 0 | | CCS | A |
| 1449 | REP 177 | LAST 727 | 14,3345 | 50 000 1 | | INDEX | A |
| 1450 | | | 14,3346 | 54 000 0 | | TS | 0 |
| 1451 | REP 1 | | 14,3347 | 1 3326 1 | | TCP | R53A |
| 1452 | REP 11 | LAST 723 | 14,3350 | 0 5253 0 | R53B | TC | CHECOOM |
| 1453 | | | 14,3351 | 00026 0 | | MM | 22 |
| 1454 | | | 14,3352 | 1 3354 1 | | TCP | +2 |
| 1455 | REP 1 | | 14,3353 | 1 3400 1 | | TCP | R53D |
| 14551 | REP 12 | LAST 727 | 14,3354 | 0 5253 0 | | TC | CHECOOM |
| 14882 | | | 14,3355 | 00027 1 | | MM | 23 |
| 14553 | REP 1 | | 14,3356 | 1 3360 0 | | TCP | R53C |
| 14554 | REP 2 | LAST 727 | 14,3357 | 1 3400 1 | | TCP | R53D |
| 1456 | REP 1 | | 14,3360 | 3 3404 1 | R53C | CAP | V01N71 |
| 1457 | REP 212 | LAST 726 | 14,3361 | 0 4555 0 | | TC | BANKCALL |
| 1488 | REP 16 | LAST 711 | 14,3362 | 20763 1 | | CADR | GOFLASH |
| 1459 | REP 56 | LAST 722 | 14,3363 | 0 4100 1 | | TC | OOTOPCH |
| 1460 | REP 1 | | 14,3364 | 1 3371 0 | | TCP | R53Z |
| 1461 | REP 2 | LAST 727 | 14,3365 | 0 3360 1 | | TC | R53C |
| 1462 | REP 25 | LAST 711 | 14,3366 | 3 6211 0 | | CAP | SIX |
| 1463 | REP 14 | LAST 711 | 14,3367 | 0 5415 1 | | TC | BLANKET |
| 1464 | REP 95 | LAST 711 | 14,3370 | 0 5112 0 | | TC | ENDOPJOP |
| 1465 | REP 2 | LAST 476 | 14,3371 | 4 7713 1 | R53Z | CS | HIGH9 |
| 1466 | REP 7 | LAST 711 | 14,3372 | 7 0735 1 | | MASK | STARCODE |
| 1467 | | | 14,3373 | 0 0006 1 | | EXTEND | |
| 1468 | REP 1 | | 14,3374 | 7 6211 1 | | MP | SIGHTSIX |
| 1469 | REP 68 | LAST 683 | 14,3375 | 56 001 0 | | XCH | L |
| 1470 | REP 14 | LAST 725 | 14,3376 | 50 304 0 | | INDEX | STARIND |
| 1471 | REP 12 | LAST 711 | 14,3377 | 54 302 1 | | TS | BESTI |
| 1472 | REP 166 | LAST 724 | 14,3400 | 0 6006 1 | R53D | TC | INTERPRET |
| 1473 | | | 14,3401 | 77614 1 | R53OUT | SETCOO | |
| 1474 | REP 2 | LAST 699 | 14,3402 | 03420 1 | | TERMIPLD | |
| 1475 | REP 3 | LAST 726 | 14,3403 | 03501 0 | | R53EXIT | |
| 1476 | REP 26 | LAST 727 | 8211 | | SIGHTSIX = | SIX | |
| 1477 | | | 14,3404 | 60307 0 | V01N71 | VN | 0171 |

TERM.

RECYCLE

SET TERMINATE FOR R52

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P1476 NAME-SS2.2
R1479 FUNCTION-COMPUTE GIMBAL ANGLES FOR DESIRED BN AND PRESENT VEHICLE
R1480 CALL- CALL SS2.2
R1481 INPUT- X,Y,ZSD
R1482 OUTPUT- OOC,IOC,MOC,THSTAD,+1,+2
R1483 SUBROUTINES-CDUTRIG,CALCSMSC,MATMOVE,CALOGA
1484 BOP 1 11,2000 SETLOC SS2/2
1485 11,2256 RANK

1486 BOP 1 COUNT 13/SS2.2
1487 11,2256 77620 0 SS2.2 STO QMAJ
1488 BOP 8 LAST 725 11,2257 00300 1 CALL QMAJ
1489 11,2260 77624 1 CALL CDUTRIG
1490 BOP 7 LAST 707 11,2261 47432 1 CALL CDUTRIG
1491 11,2262 77624 1 CALL CALCSMSC
1492 BOP 2 LAST 707 11,2263 34567 1 AXT,1 SSP
1493 11,2264 66370 0 18D
1494 11,2265 00022 1 S1
1495 BOP 29 LAST 725 11,2266 00051 0 S1
1496 11,2267 00006 1 6D
1497 11,2270 61373 1 SS2.2A VLOAD* VOM
1498 BOP 7 LAST 716 11,2271 02736 1 XNR +18D,1
1499 BOP 26 LAST 724 11,2272 01736 1 REFSMAT
1500 11,2273 77656 1 UNIT
1501 BOP 8 LAST 728 11,2274 06736 0 STORE XNR +18D,1
1502 11,2275 77700 0 TIX,1
1503 BOP 1 11,2276 22270 1 SS2.2A
1504 11,2277 75160 1 SS2.2.1 AXC,1
1505 BOP 6 LAST 698 11,2300 00306 1 AXC,2
1506 BOP 32 LAST 717 11,2301 02871 0 XSD
1507 11,2302 77624 1 XSM
1508 BOP 3 LAST 724 11,2303 31040 1 CALL MATMOVE
1509 11,2304 77624 1 CALL CALOGA
1510 BOP 2 LAST 417 11,2305 47244 0 GOTO
1511 11,2306 77650 1 QMAJ
1512 BOP 9 LAST 726 11,2307 00300 1
    
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R1513 PROGRAM NAME - SRS2.1          DATE DEC 20 68
R1514 MOD 1                          LOG SEC P51-P53
R1515 BY KEN VINCENT                 ASSEMBLY SUNDISK REV 40
R1516
R1517 FUNCTION
R1518 TARG1 AND TARG2 FLAGS ARE LOOKED AT TO DETERMINE IF THE TARGET IS THE
R1519 LEM, STAR OR LANDMARK. IN CASE OF LEM OR LXC, THE PRESENT TIME PLUS
R1520 2 SECONDS IS SAVED IN AOPTIME (ALIAS STARAD ,+1 ). IF THE LEM IS
R1521 THE TARGET THEN CONIC UPDATES OF THE CSM AND LEM ARE MADE TO
R1522 THE TIME IN AOPTIME. THE UNIT OF THE DIFFERENCE OF LEM AND CSM
R1523 POSITION VECTORS BECOMES THE REFERENCE SIGHTING VECTOR USED IN THE
R1524 COMMON PART OF THIS PROGRAM.
R1525 IN THE CASE OF LANDMARK, THE CSM IS UPDATED CONICALLY. THE RADIUS
R1526 VECTOR FOR THE LANDMARK IS OBTAINED FROM LALOTRV. BOTH OF THESE ARE
R1527 FOUND FOR THE TIME IN AOPTIME. THE UNIT OF THE DIFFERENCE BETWEEN
R1528 THE LANDMARK AND CSM RADIUS VECTORS BECOMES THE REFERENCE SIGHTING
R1529 VECTOR FOR THE COMMON PART OF THIS ROUTINE.
R1530 IF A STAR IS THE TARGET, THE PROPER STAR IS OBTAINED FROM THE CATALOG
R1531 AND THIS VECTOR BECOMES THE REFERENCE SIGHTING VECTOR.
R1532 THE COMMON PART OF THIS PROGRAM TRANSFORMS THE REFERENCE SIGHTING
R1533 VECTOR INTO STABLE MEMBER COORDINATES. IT READS THE IMU-CDSU AND USES
R1534 THIS DATA IN A CALL TO CALCSVA. ON RETURN FROM CALCSVA A TEST IS
R1535 MADE TO SEE IF THE TRUNNION ANGLE IS GREATER THAN 90DEG OR 30DEG.
R1536 MADE TO SEE IF THE TRUNNION ANGLE IS GREATER THAN 90DEG. OR 50DEG.

R1537 CALLING SEQUENCE
R1538 L+4 RETURN WHEN SHAPT OR TRUNION NOT WITHIN 50EG OF DESIRED
R1539 L TO BANKCALL
R1540 L+1 CADR SRS2.1
R1541 L+2 ERROR RETURN TRUNNION GREATER THAN 90DEG
R1542 L+3 ERROR RETURN TRUNNION GREATER THAN 50DEG
R1543 L+4 NORMAL RETURN
R1544
R1545 OUTPUT
R1546 SAC - SINGLE PREC,25 COMP, SCALED AT HALF REVS- SHAPT ANGLE DESIRED
R1547 PAC - SINGLE PREC,25 COMP SCALED AT EIGHT REVS - TRUNNION ANGLE DESIRED
R1548
R1549 INITIALIZATION
R1550 IF TARG1FLG =1 THEN TARGET IS LEM -NO OTHER INPUT REQUIRED
R1551 IF TARG1FLG =0 AND TARG2FLG =0 THE TARGET IS STAR, STARIND SHOULD
R1552 0 OR 1 DENOTING BEST1 OR BEST2 RESPECTIVELY AS STAR CODE. STAR CODES
R1553 ARE 6 TIMES STAR NUMBER.
R1554 IF IMU1FLG=0 AND IMU2FLG=1 THEN TARGET IS LANDMARK. SEE ROUTINE
R1555 LALOTRV FOR INPUT REQUIREMENTS. HERE FIXRAD=1 FOR CONSTANT EARTH
R1556 RADIUS
R1557
R1558 DERRIS
R1559 WORK AREA
R1560 STARAD - STAR*6 (STAR IS DESIRED LOS IN STABLE MEMBER COORDINATES)
R1561 REP 1 COUNT# 88/SRS21

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| L | P51-P53 | | | | | | | | | |
|------|---------|----|------|-----|---------|--------|---|----------|-------|-----------|
| 1611 | REP | 2 | LAST | 730 | 13,2255 | 29280 | 1 | | | COM52 |
| 1612 | | | | | 13,2256 | 77775 | 1 | STS2ST | VLOAD | |
| 1613 | REP | 7 | LAST | 724 | 13,2257 | 92611 | 0 | | | STARSAV1 |
| 1614 | | | | | 13,2260 | 53521 | 1 | COM52 | MOV | UNIT |
| 1615 | REP | 27 | LAST | 728 | 13,2261 | 01738 | 1 | | | REP5MAT |
| 1616 | REP | 13 | LAST | 730 | 13,2262 | 02766 | 1 | | STORE | STAR |
| 1617 | | | | | 13,2263 | 45001 | 1 | | SETPD | CALL |
| 1618 | | | | | 13,2264 | 80001 | 0 | | | 0 |
| 1619 | REP | 8 | LAST | 728 | 13,2265 | 47432 | 1 | | | CDUTRIG |
| 1620 | | | | | 13,2266 | 77624 | 1 | | CALL | |
| 1621 | REP | 1 | | | 13,2267 | 46034 | 1 | | | CALCSXA |
| 1622 | | | | | 13,2270 | 77414 | 0 | BOFF | | EXIT |
| 1623 | REP | 8 | LAST | 710 | 13,2271 | 01750 | 1 | | | CULTPLAG |
| 1624 | REP | 1 | | | 13,2272 | 26274 | 1 | | | TRUN38 |
| 1625 | REP | 1 | | | 13,2273 | 0 2312 | 0 | | TC | SRS2B1 |
| 1626 | | | | | 13,2274 | 45345 | 1 | TRUN38 | DLOAD | DSU |
| 1627 | REP | 8 | LAST | 700 | 13,2275 | 02776 | 0 | | | PAC |
| 1628 | REP | 1 | | | 13,2276 | 26315 | 1 | | | 38TRDEG |
| 1629 | | | | | 13,2277 | 71244 | 0 | | BPL | DLOAD |
| 1630 | REP | 1 | | | 13,2300 | 26305 | 0 | | | SRS2B22 |
| 1631 | REP | 9 | LAST | 731 | 13,2301 | 02776 | 0 | | | PAC |
| 1632 | | | | | 13,2302 | 51025 | 1 | | DSU | BPL |
| 1633 | REP | 1 | | | 13,2303 | 26321 | 0 | | | 20DEGSMN |
| 1634 | REP | 1 | | | 13,2304 | 26307 | 1 | | | SRS2B3 |
| 1635 | | | | | 13,2305 | 77776 | 1 | SRS2B22 | EXIT | |
| 1636 | REP | 1 | | | 13,2306 | 0 2311 | 0 | | TC | SRS2B2 |
| 1637 | | | | | 13,2307 | 77776 | 1 | SRS2B3 | EXIT | |
| 1638 | REP | 12 | LAST | 730 | 13,2310 | 25-777 | 1 | | | CMIN |
| 1639 | REP | 13 | LAST | 731 | 13,2311 | 25-777 | 1 | SRS2B2 | INCR | CMIN |
| 1640 | REP | 14 | LAST | 731 | 13,2312 | 3 1777 | 1 | SRS2B1 | CA | CMIN |
| 1641 | REP | 4 | LAST | 710 | 13,2313 | 0 4561 | 1 | | TC | SWCALL |
| 1642 | | | | | 13,2314 | 25252 | 0 | 38TRDEG | 2DEC | .66666667 |
| 1643 | | | | | 13,2315 | 25254 | 0 | | | |
| 1644 | | | | | 13,2316 | 00000 | 1 | 1.3SECDP | 2DEC | 130 |
| 1645 | | | | | 13,2317 | 00202 | 1 | | | |
| 1646 | | | | | 13,2320 | 61740 | 0 | 20DEGSMN | DEC | -07199 |
| 1647 | | | | | 13,2321 | 77777 | 0 | | DEC | -0 |

COMPUTES SINES AND COSINES FOR CALCSXA
NOW EXPECT TO SEE THE CDU ANGLES.

CORRESPONDS TO 60 DEGS IN TRUNION

L P51-P53

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P1646 THE ADVTRACK ROUTINE IS USED TO COMPUTE AN OPTIC'S LOS VECTOR TO
 R1647 A POINT ON THE GROUND TRACK 60 DEGREES FORWARD OF THE LOCAL VERTICAL
 R1648 OF AN ADVANCED ORBIT A SPECIFIED NUMBER OF REVOLUTIONS FROM NOW

| | | | | | | | |
|------|-----|-----|------|---------|---------------|----------------|-------------------------|
| 1649 | REP | 1 | | 26,2000 | SETLOC 26P505 | | |
| 1650 | | | | 26,2000 | BANK | | |
| 1651 | | | | 26,2000 | 77601 0 | ADVTRACK SETPD | |
| 1652 | | | | 26,2001 | 00001 0 | | |
| 1653 | | | | 26,2002 | 41575 0 | VLOAD PUSH | INITIALIZES FOR RP-TO-R |
| 1654 | REP | 2 | LAST | 32 | 26,2003 | 15324 0 | UNITZ |
| 1655 | | | | | 26,2004 | 41434 1 | RTB PUSH |
| 1656 | REP | 22 | LAST | 730 | 26,2005 | 45505 0 | LOADTIME |
| 1657 | REP | 7 | LAST | 730 | 26,2006 | 36356 1 | STCALL AOPTIME |
| 1658 | REP | 4 | LAST | 687 | 26,2007 | 55341 1 | RP-TO-R |
| 1659 | REP | 14 | LAST | 731 | 26,2010 | 16766 1 | STODL STAR |
| 1660 | REP | 8 | LAST | 732 | 26,2011 | 02356 0 | AOPTIME |
| 1661 | REP | 42 | LAST | 730 | 26,2012 | 34041 0 | STCALL TDEC1 |
| 1662 | REP | 7 | LAST | 730 | 26,2013 | 27045 0 | CSMCONIC |
| 1663 | | | | | 26,2014 | 47375 0 | VLOAD VXV |
| 1664 | REP | 20 | LAST | 705 | 26,2015 | 00007 0 | VATT |
| 1665 | REP | 29 | LAST | 730 | 26,2016 | 00001 0 | RATT |
| 1666 | | | | | 26,2017 | 77656 1 | UNIT |
| 1667 | | | | | 26,2020 | 24031 0 | STODL 24D |
| 1668 | REP | 30 | LAST | 732 | 26,2021 | 00001 0 | RATT |
| 1669 | | | | | 26,2022 | 57456 1 | UNIT VCOMP |
| 1670 | | | | | 26,2023 | 41401 1 | SETPD PUSH |
| 1671 | | | | | 26,2024 | 00001 0 | |
| 1672 | | | | | 26,2026 | 77776 1 | EXIT |
| 1673 | REP | 23 | LAST | 614 | 26,2026 | 3 1751 0 | CA LANDMARK |
| 1674 | REP | 12 | LAST | 595 | 26,2027 | 7 4716 1 | MASK SEVEN |
| 1675 | | | | | 26,2030 | 0 0006 1 | EXTEND |
| 1676 | REP | 22 | LAST | 687 | 26,2031 | 7 4700 0 | MP BIT11 |
| 1677 | REP | 69 | LAST | 727 | 26,2032 | 56 001 0 | XCH L |
| 1678 | REP | 15 | LAST | 717 | 26,2033 | 50 120 1 | INDEX FIXLOC |
| 1679 | | | | | 26,2034 | 54 036 0 | TS 30D |
| 1680 | REP | 188 | LAST | 730 | 26,2035 | 0 6006 1 | TC INTPRET |
| 1681 | | | | | 26,2036 | 41335 1 | SLOAD DMP |
| 1682 | | | | | 26,2037 | 00037 0 | 30D |
| 1683 | REP | 1 | | | 26,2040 | 14107 1 | MPERIOD |
| 1684 | REP | 9 | LAST | 732 | 26,2041 | 36356 1 | STCALL AOPTIME |
| 1685 | REP | 1 | | | 26,2042 | 54057 1 | ROTA |
| 1686 | | | | | 26,2043 | 77775 1 | VLOAD |
| 1687 | | | | | 26,2044 | 00031 0 | 24D |
| 1688 | REP | 15 | LAST | 732 | 26,2045 | 16766 1 | STODL STAR |
| 1689 | REP | 1 | | | 26,2046 | 14105 0 | DP1/6 |
| 1690 | | | | | 26,2047 | 77625 0 | DSU |
| 1691 | REP | 10 | LAST | 732 | 26,2050 | 02356 0 | AOPTIME |
| 1692 | REP | 11 | LAST | 732 | 26,2051 | 36356 1 | STCALL AOPTIME |
| 1693 | REP | 2 | LAST | 732 | 26,2052 | 54057 1 | ROTA |
| 1694 | | | | | 26,2053 | 77775 1 | VLOAD |

INITIALIZES FOR RP-TO-R
 USE VEC IN PD 6-5
 TIME IN PD 6-7
 TIME ALSO IN AOPTIME FOR CSMCONIC
 GET MOON ROTATION VEC IN REP
 PICK UP TIME
 UPDATE STATE TO TIME
 SAVE -UNIT(V X R) FOR 2ND ROTATION
 PUSH LOS=-UNIT(V/VEC) PD 6-5
 GET NUMBER OF ADVANCE PERIODS
 GET N/16
 TEMP STORE N/16
 ROTATE ANG ARCUT UR
 PICK UP 2ND ROTATION AXIS
 2ND RAT ANGLE = 60 - A
 GO ROTATE 2ND TIME

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| | | | | | | | | |
|------|--------|----------|---------|---------|---------|-------|-----------|-----------------------------------|
| 1695 | | | 26,2054 | 00001 0 | | | | |
| 1696 | REP 16 | LAST 732 | 26,2055 | 36766 0 | STCALL | STAR | | STORE FINAL LOS IN STAR |
| 1697 | REP 3 | LAST 731 | 26,2056 | 26280 1 | | COM62 | | RETURN TO SRG2.1 |
| 1698 | | | 26,2057 | 73545 1 | NOTA | DLOAD | SIN | |
| 1699 | REP 12 | LAST 732 | 26,2060 | 02356 0 | | | AOPTIME | |
| 1700 | | | 26,2061 | 47315 0 | | FDVL | VXV | PUSH 1/2SIN(A) PD 6-7 |
| 1701 | REP 17 | LAST 733 | 26,2062 | 02766 1 | | | STAR | UR VEC |
| 1702 | | | 26,2063 | 00001 0 | | | 0 | LOS |
| 1703 | | | 26,2064 | 72561 0 | | VXSC | VSL2 | 1/2SIN(A)(UR)(LOS) PD 6-11. |
| 1704 | | | 26,2065 | 50315 0 | | FDVL | DOT | |
| 1705 | REP 18 | LAST 733 | 26,2066 | 02766 1 | | | STAR | |
| 1706 | | | 26,2067 | 00001 0 | | | 0 | |
| 1707 | | | 26,2070 | 72561 0 | | VXSC | VSL2 | |
| 1708 | REP 19 | LAST 733 | 26,2071 | 02766 1 | | | STAR | |
| 1709 | | | 26,2072 | 71525 0 | | FDVL | COS | 1/2(UR . LOS)UR 12-17 |
| 1710 | REP 13 | LAST 733 | 26,2073 | 02356 0 | | | AOPTIME | |
| 1711 | | | 26,2074 | 51315 1 | | FDVL | BVSU | PUSH 1/2COS(A) 18-19 |
| 1712 | | | 26,2075 | 00015 0 | | | 12D | |
| 1713 | | | 26,2076 | 00001 0 | | | 0 | |
| 1714 | | | 26,2077 | 76561 1 | | VXSC | VSL1 | UP 18-19 |
| 1715 | | | 26,2100 | 53255 0 | | | VAD | UP 12-17 UP 6-11 |
| 1716 | | | 26,2101 | 40256 1 | | UNIT | SETPD | |
| 1717 | | | 26,2102 | 00001 0 | | | 0 | |
| 1718 | | | 26,2103 | 43406 1 | | PUSH | RVO | |
| 1719 | | | 26,2104 | 05252 1 | DP1/6 | 2DEC | .16666666 | |
| 1719 | | | 26,2105 | 25251 0 | | | | |
| 1720 | | | 26,2106 | 01414 1 | MPERIOD | 2DEC | .047619 | APPROX LINAR ROT ANG IN 2HRS X 16 |
| 1720 | | | 26,2107 | 06044 1 | | | | |

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P1721 NAME-852.3
 R1722 FUNCTION- XZMD: UNITYZMD X ZSMD)
 R1723 YZMD: UNITYV X R)
 R1724 ZSMD: UNIT(-R)
 R1725 CALL DLOAD CALL
 R1726 DALIGN
 R1727 852.3
 R1728 INPUT- TIME OF ALIGNMENT IN MPAC
 R1729 OUTPUT- X,Y,ZSMD
 R1730 SUBROUTINES- CSMCONIC
 R1731 REP 3 LAST 718 16,2000
 R1732 16,2636

SETLOC P5052
 BANK

1733 REP 1
 1734 16,2636 77620 0 852.3
 1735 REP 10 LAST 728 16,2637 00300 1
 1736 REP 43 LAST 732 16,2640 34041 0
 1737 REP 8 LAST 732 16,2641 27045 0
 1738 16,2642 77601 0
 1739 16,2643 00001 0
 1740 16,2644 57575 1
 1741 REP 31 LAST 732 16,2645 00001 0
 1742 16,2646 77656 1
 1743 REP 3 LAST 698 16,2647 24323 0
 1744 REP 21 LAST 732 16,2650 00007 0
 1745 16,2651 53435 0
 1746 REP 32 LAST 734 16,2652 00001 0
 1747 REP 4 LAST 698 16,2653 00315 0
 1748 16,2654 53435 0
 1749 REP 4 LAST 734 16,2655 00323 0
 1750 REP 7 LAST 728 16,2656 34307 1
 1751 REP 11 LAST 734 16,2657 00300 1

COUNT 16/852.3
 STO QMAJ
 STCALL TDEC1
 CSMCONIC
 SETPD 0
 VLOAD VCOMP
 RATT
 UNIT
 STOVL ZSMD
 VATT
 VXV UNIT
 RATT
 STORE YSMD
 VXV UNIT
 ZSMD
 STCALL XZMD
 QMAJ

L P51-P53

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P1752 PROGRAM DESCRIPTION - R56 - ALTERNATE LOS SIGHTING MARK ROUTINE

R1753 FUNCTIONAL DESCRIPTION
 R1754 TO PERFORM SIGHTING MARKS FOR THE BACK-UP ALIGNMENT PROGRAMS (P53,P54). THE ASTRONAUT KNOWS THE
 R1755 COORDINATES (OPTICS) OF THE ALTERNATE LINE OF SIGHT HE MUST USE FOR THIS ROUTINE. WHEN THE ASTRONAUT KEYS IN
 R1756 ENTER IN RESPONSE TO THE FLASHING V50 N25 R1-XXXXX THE CMC STORES THE THREE ICDU ANGLES AND TWO ANGLES DISPLAYED
 R1760 IN N92.

R1761 CALLING SEQUENCE
 R1762 CALL
 R1763 R56

R1764 SUBROUTINES CALLED
 R1765 A PORTION OF SKTMARK (VAC,AREA SEARCH)
 R1766 GOFLASH
 R1767 GOPERP1

R1768 BRASABLE INITIALIZATION
 R1769 STARIND-INDEX TO STAR NUMBER

R1770 OUTPUT
 R1771 MARKSTAT-INDEX TO VAC,AREA WHERE OUTPUT IS STORED.
 R1772 BESTI (INDEXED BY STARIND) CONTAINS STAR NUMBER.
 R1773 ICDU AND ODDU ANGLES IN VAC, AREA AS FOLLOWS-
 R1774 VAC +2 CDUY
 R1775 VAC +3 CDUS
 R1776 VAC +4 CDUZ
 R1777 VAC +5 CDUT
 R1778 VAC +6 CDUX

| | | | | | | | | | | |
|-------|-----|-----|------|-----|---------|-------|------|------|----------------|------------|
| 1779 | REP | 1 | | | | | | | COLINT# 88/R56 | |
| 1780 | REP | 5 | LAST | T17 | 15,2000 | | | | SYTLOC P503 | |
| 1781 | | | | | 15,2252 | | | | BANK | |
| 1782 | | | | | 15,2252 | 77776 | 1 | R56 | EXIT | |
| 1783 | REP | 1 | | | 15,2253 | 3 | 2382 | 1 | CAP | V06N94B |
| 1784 | REP | 213 | LAST | T27 | 15,2254 | 0 | 4555 | 0 | TC | BANKCALL |
| 1785 | REP | 34 | LAST | T18 | 15,2255 | 20624 | 0 | | CADR | GOFLASH |
| 1786 | REP | 57 | LAST | T27 | 15,2256 | 0 | 4106 | 1 | TC | GOTOPOCH |
| 1787 | REP | 1 | | | 15,2257 | 0 | 2281 | 0 | TC | R56A |
| 1788 | | | | | 15,2260 | 0 | 2263 | 1 | TC | -5 |
| 1789 | REP | 214 | LAST | T35 | 15,2261 | 0 | 4555 | 0 | TC | BANKCALL |
| 1790 | REP | 3 | LAST | T26 | 15,2262 | 16004 | 1 | R56A | CADR | SKTMARK +2 |
| 17904 | REP | 147 | LAST | T26 | 15,2263 | 3 | 4714 | 1 | CAP | ZERO |
| 17905 | REP | 215 | LAST | T35 | 15,2264 | 0 | 4555 | 0 | TC | BANKCALL |
| 17906 | REP | 6 | LAST | T15 | 15,2265 | 20607 | 1 | | CADR | CLEANDSP |
| 1791 | REP | 1 | | | 15,2266 | 3 | 2360 | 0 | CAP | V853 |
| 1792 | REP | 216 | LAST | T35 | 15,2267 | 0 | 4555 | 0 | TC | BANKCALL |
| 1793 | REP | 3 | LAST | S63 | 15,2270 | 20470 | 0 | | CADR | COMARK2 |

TERM.
 PROCEED - ANGLES OK
 ENTER - NEW ANGLES
 INHIBIT EXT VR ACT AND FIND VAC AREA
 DISPLAY V53 REQUESTING ALTERNATE MARK

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| | | | | | | | | |
|------|-----|-----|------|-----|---------|----------|---------|--------------|
| 1834 | REP | 27 | LAST | 727 | 15,2352 | 7 6211 1 | MP | SIX |
| 1835 | REP | 70 | LAST | 732 | 15,2353 | 56 001 0 | XCH | L |
| 1838 | REP | 16 | LAST | 730 | 15,2354 | 50 304 0 | INDEX | STARIND |
| 1837 | REP | 13 | LAST | 727 | 15,2355 | 54 302 1 | TS | BESTI |
| 1838 | REP | 190 | LAST | 738 | 15,2356 | 0 6006 1 | TC | INTPRET |
| 1839 | | | | | 15,2357 | 77616 0 | RVO | |
| 1840 | | | | | 15,2360 | 15200 1 | VN | 05300 |
| 1841 | | | | | 15,2361 | 00307 0 | V01N71B | VN 00171 |
| 1842 | | | | | 15,2362 | 01536 0 | V06N94B | VN 00694 |
| 1843 | REP | 13 | LAST | 725 | 15,2363 | 02607 1 | PLANET | STORE TSIGHT |
| 1844 | | | | | 15,2364 | 45020 1 | STO | CALL |
| 1845 | REP | 15 | LAST | 731 | 15,2365 | 02777 1 | | QMIN |
| 1846 | REP | 2 | LAST | 696 | 15,2366 | 30216 1 | | LOC8AM |
| 1847 | | | | | 15,2367 | 77775 1 | VLOAD | |
| 1848 | REP | 5 | LAST | 704 | 15,2370 | 02736 1 | | VEARTH |
| 1849 | | | | | 15,2371 | 24001 0 | STOVL | QD |
| 1850 | REP | 8 | LAST | 705 | 15,2372 | 02744 1 | | VSUN |
| 1851 | REP | 8 | LAST | 737 | 15,2373 | 26736 1 | STOVL | VEARTH |
| 1852 | | | | | 15,2374 | 00001 0 | | QD |
| 1853 | REP | 9 | LAST | 737 | 15,2375 | 02744 1 | STORE | VSUN |
| 1854 | | | | | 15,2376 | 77776 1 | NOSAM | EXIT |
| 1855 | REP | 4 | LAST | 738 | 15,2377 | 4 7713 1 | CS | HIGH9 |
| 1856 | REP | 9 | LAST | 736 | 15,2400 | 7 0735 1 | MARK | STARCODE |
| 1857 | | | | | 15,2401 | 0 0006 1 | EXTEND | . |
| 1858 | REP | 2 | LAST | 727 | 15,2402 | 7 6211 1 | MP | SIGHTSIX |
| 1859 | REP | 71 | LAST | 737 | 15,2403 | 56 001 0 | XCH | L |
| 1860 | REP | 17 | LAST | 737 | 15,2404 | 50 304 0 | INDEX | STARIND |
| 1861 | REP | 14 | LAST | 737 | 15,2405 | 54 302 1 | TS | BESTI |
| 1862 | REP | 178 | LAST | 727 | 15,2406 | 10 000 0 | CCS | A |
| 1863 | REP | 1 | | | 15,2407 | 1 2423 1 | TOP | NOTPLAN |
| 1864 | REP | 1 | | | 15,2410 | 3 2453 1 | CAP | VNPLANV |
| 1865 | REP | 220 | LAST | 738 | 15,2411 | 0 4555 0 | TC | BANKCALL |
| 1866 | REP | 36 | LAST | 738 | 15,2412 | 20624 0 | CADR | GOFLASH |
| 1867 | REP | 61 | LAST | 738 | 15,2413 | 0 4106 1 | TC | GOTOPOGH |
| 1868 | | | | | 15,2414 | 0 2416 0 | TC | +2 |
| 1869 | | | | | 15,2415 | 0 2410 0 | TC | -5 |
| 1870 | REP | 191 | LAST | 737 | 15,2416 | 0 6006 1 | TC | INTPRET |
| 1871 | | | | | 15,2417 | 53575 0 | VLOAD | UNIT |
| 1872 | REP | 20 | LAST | 733 | 15,2420 | 02766 1 | | STAR |
| 1873 | | | | | 15,2421 | 77650 1 | GOTO | |
| 1874 | REP | 1 | | | 15,2422 | 32446 0 | | CORPLAN |
| 1875 | REP | 179 | LAST | 737 | 15,2423 | 4 0000 0 | NOTPLAN | CS A |
| 1876 | REP | 1 | | | 15,2424 | 6 2452 0 | AD | DEC227 |
| 1877 | | | | | 15,2425 | 0 0006 1 | EXTEND | |
| 1878 | REP | 1 | | | 15,2426 | 6 2437 0 | RZMP | CAL.SAM1 |
| 1879 | REP | 16 | LAST | 737 | 15,2427 | 50 304 0 | INDEX | STARIND |
| 1880 | REP | 15 | LAST | 737 | 15,2430 | 3 0302 0 | CA | BESTI |
| 1881 | REP | 16 | LAST | 732 | 15,2431 | 50 120 1 | INDEX | PIXLOC |
| 1882 | REP | 32 | LAST | 708 | 15,2432 | 54 046 1 | TS | X1 |
| 1883 | REP | 192 | LAST | 737 | 15,2433 | 0 6006 1 | TC | INTPRET |

ALTERNATE MARK VERB



L P01-P03

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| | | | | | | | | | |
|------|-----|-----|------|---------|---------|----------|---------|--------|----------------|
| 1884 | | | | 15,2434 | 52173 0 | | | VLOAD* | GOTO |
| 1885 | REP | 10 | LAST | 709 | 15,2435 | 31744 1 | | | CATLOO,1 |
| 1886 | REP | 2 | LAST | 737 | 15,2436 | 32446 0 | | | CORPLAN |
| 1887 | REP | 103 | LAST | 737 | 15,2437 | 0 6006 1 | CALSAM, | TC | INTPRST |
| 1888 | | | | 15,2440 | 70740 0 | | | LXC,1 | DLOAD* |
| 1889 | REP | 19 | LAST | 737 | 15,2441 | 00304 0 | | | STARIND |
| 1890 | REP | 16 | LAST | 737 | 15,2442 | 00303 1 | | | BESTI,1 |
| 1891 | | | | 15,2443 | 76740 0 | | | LXC,1 | VLOAD* |
| 1892 | REP | 275 | LAST | 725 | 15,2444 | 00154 1 | | | MPAC |
| 1893 | REP | 10 | LAST | 724 | 15,2445 | 02372 0 | | | STARAD -228D,1 |
| 1894 | | | | 15,2446 | 53455 0 | | CORPLAN | VAD | UNIT |
| 1895 | REP | 8 | LAST | 705 | 15,2447 | 03474 0 | | | VEL/C |
| 1896 | | | | 15,2450 | 77650 1 | | | GOTO | |
| 1897 | REP | 16 | LAST | 737 | 15,2451 | 02777 1 | | | GMIN |
| 1898 | | | | 15,2452 | 00343 0 | | DEC227 | DEC | 227 |
| 1899 | | | | 15,2453 | 01830 0 | | VNPLANN | VN | 0688 |

L LUNAR AND SOLAR EPHEMERIDES SUBROUTINES

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P0001 LUNAR AND SOLAR EPHEMERIDES SUBROUTINES

R0002 FUNCTIONAL DESCRIPTION

R0003 THESE SUBROUTINES ARE USED TO DETERMINE THE POSITION AND VELOCITY
R0004 VECTORS OF THE SUN AND THE MOON RELATIVE TO THE EARTH AT THE
R0005 SPECIFIED GROUND ELAPSED TIME INPUT BY THE USER.

R0006 THE POSITION OF THE MOON IS STORED IN THE COMPUTER IN THE FORM OF
R0007 A NINTH DEGREE POLYNOMIAL APPROXIMATION WHICH IS VALID OVER A 15
R0008 DAY INTERVAL BEGINNING SHORTLY BEFORE LAUNCH. THEREFORE THE TIME
R0009 INPUT BY THE USER SHOULD FALL WITHIN THIS 15 DAY INTERVAL.

R0010 LSPOS COMPUTES THE POSITION VECTORS OF THE SUN AND THE MOON.

R0011 LUNPOS COMPUTES THE POSITION VECTOR OF THE MOON.

R0012 LUNVEL COMPUTES THE VELOCITY VECTOR OF THE MOON.

R0013 SOLPOS COMPUTES THE POSITION VECTOR OF THE SUN.

R0014 CALLING SEQUENCE

| | | | |
|-------|-------|------------|-------------------------------------|
| R0015 | DLOAD | CALL | |
| R0016 | | TIME | GROUND ELAPSED TIME |
| R0017 | | SUBROUTINE | LSPOS OR LUNPOS OR LUNVEL OR SOLPOS |

R0018 INPUT

R0019 1) SPECIFIED GROUND ELAPSED TIME IN CS X B-28 LOADED IN MPAC.

R0020 2) TIMEMO - TIME AT THE CENTER OF THE RANGE OVER WHICH THE LUNAR
R0021 POSITION POLYNOMIAL IS VALID IN CS X B-42.

R0022 3) VECDEM - VECTOR COEFFICIENTS OF THE LUNAR POSITION POLYNOMIAL
R0023 LOADED IN DESCENDING SEQUENCE IN METERS/CS**N X B-2

R0024 4) RESO - POSITION VECTOR OF THE SUN RELATIVE TO THE EARTH AT
R0025 TIMEMO IN METERS X B-38.

R0026 5) VESO - VELOCITY VECTOR OF THE SUN RELATIVE TO THE EARTH AT
R0027 TIMEMO IN METERS/CS X B-9.

R0028 6) OMEGAS - ANGULAR VELOCITY OF THE VECTOR RESO AT TIMEMO IN
R0029 REV/CS X B-28.

R0030 ALL EXCEPT THE FIRST INPUT ARE INCLUDED IN THE PRE-LAUNCH
R0031 ERASABLE DATA LOAD.

R0032 OUTPUT - LSPOS



L LUNAR AND SOLAR EPHEMERIDES SUBROUTINES

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R0033 1) 2D OF VAC AREA CONTAINS THE POSITION VECTOR OF THE SUN RELATIVE
R0034 TO THE EARTH AT TIME INPUT BY THE USER IN METERS X B-38.

R0035 2) MPAC CONTAINS THE POSITION VECTOR OF THE MOON RELATIVE TO THE
R0038 EARTH AT TIME INPUT BY THE USER IN METERS X B-29.

R0037 OUTPUT - LUNPOS

R0038 MPAC CONTAINS THE POSITION VECTOR OF THE MOON RELATIVE TO THE
R0039 EARTH AT TIME INPUT BY THE USER IN METERS X B-29.

R0040 OUTPUT - LUNVEL

R0041 MPAC CONTAINS THE VELOCITY VECTOR OF THE MOON RELATIVE TO THE
R0042 EARTH AT TIME INPUT BY THE USER IN METERS/CS X B-7.

R0043 OUTPUT - SOLPOS

R0044 MPAC CONTAINS THE POSITION VECTOR OF THE SUN RELATIVE TO THE EARTH
R0045 AT TIME INPUT BY THE USER IN METERS X B-38.

R0046 SUBROUTINES USED

R0047 NONE

R0048 REMARKS

R0049 THE VAC AREA IS USED FOR STORAGE OF INTERMEDIATE AND FINAL RESULTS
R0050 OF COMPUTATIONS.

R0051 S1, X1 AND X2 ARE USED BY THESE SUBROUTINES.
R0052 PRELAUNCH ERASABLE DATA LOAD ARE ONLY ERASABLE STORAGE USED BY
R0053 THESE SUBROUTINES.
R0054 RESTARTS DURING OPERATION OF THESE SUBROUTINES MUST BE HANDLED BY
R0055 THE USER.

| | | | | | | | |
|------|-----|---|----------|---------|---------|--------|-----------------|
| 0056 | | | | | | | BANK 38 |
| 0057 | REP | 1 | | | | | SETUP: 20000 |
| 0058 | | | | | | | BANK |
| 0059 | REP | 1 | | | | | COUNT: 55/87878 |
| 0060 | REP | 2 | LAST 210 | 57,1777 | | | BRANK: END-57 |
| 0061 | | | | 28,2110 | 77774 0 | LSPOS | AXT,2 |
| 0062 | REP | 1 | | 28,2111 | 54161 0 | | RESA |
| 0063 | | | | 28,2112 | 52170 0 | | AXT,1 |
| 0064 | REP | 1 | | 28,2113 | 54143 0 | | RES |
| 0065 | REP | 1 | | 28,2114 | 54126 0 | | LSTIME |
| 0066 | | | | 28,2115 | 52170 0 | LINPOS | AXT,1 |
| 0067 | REP | 1 | | 28,2116 | 54162 0 | | REN |
| 0068 | REP | 2 | LAST 140 | 28,2117 | 54126 0 | | LSTIME |

COMPUTES POSITION VECTORS OF BOTH THE SUN AND THE MOON. THE POSITION VECTOR OF THE SUN IS STORED IN 2D OF THE VAC AREA. THE POSITION VECTOR OF THE MOON IS STORED IN MPAC. COMPUTES THE POSITION VECTOR OF THE MOON AND STORES IT IN MPAC.



L LUNAR AND SOLAR EPHEMERIDES SUBROUTINES

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| | | | | | | | | | | | |
|------|-----|----|---------|---------|--------|-------|--------|---------------|--|--|---|
| 0069 | | | 26,2120 | 52170 0 | LUNVEL | AXT,1 | GOTO | | | | |
| 0070 | REP | 1 | 26,2121 | 54173 0 | | | VEN | | | | COMPUTES THE VELOCITY VECTOR OF THE MOON AND STORES IT IN MPAC. |
| 0071 | REP | 3 | 26,2122 | 54126 0 | | | LSTIME | | | | |
| 0072 | | | 26,2123 | 78020 1 | SOLPOS | STQ | AXT,1 | | | | COMPUTES THE POSITION VECTOR OF THE SUN AND STORES IT IN MPAC. |
| 0073 | REP | 12 | 26,2124 | 00047 1 | | | X2 | | | | |
| 0074 | REP | 2 | 26,2125 | 54143 0 | | | RES | | | | |
| 0075 | | | 26,2126 | 54201 0 | LSTIME | SETPD | SR | | | | |
| 0076 | | | 26,2127 | 00001 0 | | | OD | | | | |
| 0077 | | | 26,2130 | 20617 0 | | | 14D | | | | |
| 0078 | | | 26,2131 | 57571 0 | | | TAD | DCOMP | | | |
| 0079 | REP | 12 | 26,2132 | 01707 0 | | | TAD | TERMEM | | | |
| 0080 | | | 26,2133 | 57571 0 | | | | DCOMP | | | |
| 0081 | REP | 2 | 26,2134 | 02034 1 | | | | TINEMO | | | |
| 0082 | | | 26,2135 | 66261 1 | | | SL | SSP | | | |
| 0083 | | | 26,2136 | 20221 1 | | | | 16D | | | |
| 0084 | REP | 31 | 26,2137 | 00051 0 | | | | S1 | | | |
| 0085 | | | 26,2140 | 00006 1 | | | | 6D | | | |
| 0086 | | | 26,2141 | 77650 1 | | | GOTO | | | | |
| 0087 | REP | 33 | 26,2142 | 00046 0 | | | | X1 | | | |
| 0088 | | | 26,2143 | 41206 0 | RES | | PUSH | DMP | | | PD- 2 |
| 0089 | REP | 1 | 26,2144 | 02147 1 | | | | QMBGAE5 | | | |
| 0090 | | | 26,2145 | 71406 0 | | | PUSH | COS | | | PD- 4 |
| 0091 | | | 26,2146 | 65361 0 | | | VXSC | PDDL | | | PD- 8 |
| 0092 | REP | 2 | 26,2147 | 02133 1 | | | | RESO | | | |
| 0093 | | | 26,2150 | 63356 1 | | | SIN | PDVL | | | PD-10 |
| 0094 | REP | 3 | 26,2151 | 02133 1 | | | | RESO | | | |
| 0095 | | | 26,2152 | 53406 0 | | | PUSH | UNIT | | | PD-16 |
| 0096 | | | 26,2153 | 53435 0 | | | VXV | UNIT | | | |
| 0097 | REP | 3 | 26,2154 | 02141 1 | | | | VE50 | | | |
| 0098 | | | 26,2155 | 76435 1 | | | VXV | VSL1 | | | PD-10 |
| 0099 | | | 26,2156 | 53361 0 | | | VXSC | VAD | | | PD-02 |
| 0100 | | | 26,2157 | 52172 1 | | | VSL1 | GOTO | | | |
| 0101 | REP | 13 | 26,2160 | 00047 1 | | | | X2 | | | RES IN METERS X B-38 IN MPAC. |
| 0102 | | | 26,2161 | 14003 1 | RESA | | STODL | ZD | | | RES IN METERS X B-38 IN 2D OF VAC. PD- 0 |
| 0103 | | | 26,2162 | 63370 0 | REM | | AXT,1 | PDVL | | | PD- 2 |
| 0104 | | | 26,2163 | 00066 1 | | | | 54D | | | |
| 0105 | REP | 2 | 26,2164 | 02037 1 | | | | VECOEM | | | |
| 0106 | | | 26,2165 | 52761 0 | REMA | | VXSC | VAD* | | | |
| 0107 | | | 26,2166 | 00001 0 | | | | OD | | | |
| 0108 | REP | 3 | 26,2167 | 02133 1 | | | | VECOEM +60D,1 | | | |
| 0109 | | | 26,2170 | 72500 1 | | | TIX,1 | VSL2 | | | REM IN METERS X B-29 IN MPAC. |
| 0110 | REP | 1 | 26,2171 | 54165 1 | | | | REMA | | | |
| 0111 | | | 26,2172 | 77616 0 | | | RVO | | | | |
| 0112 | | | 26,2173 | 65370 0 | VEN | | AXT,1 | PDDL | | | PD- 2 |
| 0113 | | | 26,2174 | 00060 1 | | | | 48D | | | |
| 0114 | REP | 1 | 26,2175 | 14214 0 | | | | NINER4 | | | |
| 0115 | | | 26,2176 | 74206 0 | | | PUSH | VXSC | | | PD- 4 |
| 0116 | REP | 4 | 26,2177 | 02037 1 | | | | VECOEM | | | |
| 0117 | | | 26,2200 | 77761 1 | VRMA | | VXSC | | | | |
| 0118 | | | 26,2201 | 00001 0 | | | | OD | | | |

L LUNAR AND SOLAR EPHEMERIDS SUBROUTINES

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| | | | | | | | |
|------|----------------|---------|---------|--------|---------------|---------------------------------|-------|
| 0119 | | 20,2202 | 14005 1 | STOOL | 4D | | FD- 2 |
| 0120 | | 20,2203 | 41425 1 | DSU | FUSH | | FD- 4 |
| 0121 | REP 1 | 20,2204 | 14218 1 | | QNER4 | | |
| 0122 | | 20,2205 | 53357 0 | VXSC* | VAD | | |
| 0123 | REP 5 LAST 741 | 20,2206 | 02125 0 | | VSCCEN +54D,1 | | |
| 0124 | | 20,2207 | 00005 1 | | 4D | | |
| 0125 | | 20,2210 | 72500 1 | TIK,1 | VSL2 | VEN IN METERS/CS X B-7 IN MPAC. | |
| 0126 | REP 1 | 20,2211 | 54200 1 | | VENA | | |
| 0127 | | 20,2212 | 77616 0 | RVO | | | |
| 0128 | | 20,2213 | 22000 1 | NINER4 | ZOSC | 9.0 B-4 | |
| 0128 | | 20,2214 | 00000 1 | | | | |
| 0129 | | 20,2215 | 02000 0 | QNER4 | ZOSC | 1.0 B-4 | |
| 0129 | | 20,2216 | 00000 1 | | | | |



L P61-P67

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| | | | | | | | | |
|-------|--------------------------|--|-----------------|-----|--|------------------------------|---|--|
| R0001 | PROGRAM' | P61 | | | | | | |
| R0002 | MOD NO.' | 0 | MAR. 13, 1967 | | | | | |
| R0003 | MOD BY' | R. HIRSCHKOP | | | | | | |
| R0004 | MOD NO' 1 | MOD BY' RR BAIKNSPATHER | DATE' 22 JUN 67 | | | RESTARTS. | | |
| R0006 | MOD NO' 2 | MOD BY' RR BAIKNSPATHER | DATE' 17 JAN 68 | | | COLOSSUS GSOP CHANGES. | | |
| R0008 | MOD NO' 3 | MOD BY' RR BAIKNSPATHER | DATE' 8 MAY 68 | | | DELETS CSM MANUEVER (PCR 50) | | |
| R0010 | FUNCTION' | TO CALCULATE AND DISPLAY EMS INITIALIZATION DATA | | | | | | |
| R0011 | CALLING SEQUENCE- | BY V37 | | | | | | |
| R0012 | EXIT- | TO P62 | | | | | | |
| R0013 | SUBROUTINE CALLS- | S61.1 , S61.3 , GOFLASH , FLAGUP , R02ROTH | | | | | | |
| R0014 | ERASABLE INITIALIZATION' | | | | | | | |
| R0015 | EMSALT (-29) M | .050 ALTITUDE ABOVE FISCHER ELLIPSOID | | | | PAD LOADED. | | |
| R0017 | ALFAPAD /180 | HYPERSONIC CM TRIM ANGLE OF ATTACK | | | | PAD LOADED | | |
| R0019 | OUTPUT' | THE FOLLOWING REGISTERS ARE WRITTEN IN FOR USE BY DISPLAYS | | | | | | |
| R0020 | GMAX 100 GMAX (-14) G,S | MAXIMUM ACCELERATION | | | | | | |
| R0021 | VPRED (-7) M/CS | PREDICTED VELOCITY AT 400K FT | | | | | | |
| R0022 | GAMMA1 GAMMA/360 | PREDICTED GAMMA AT 400K FT | | | | | | |
| R0023 | RTOO THETAH/360 | RANGE ANGLE TO SPLASH FROM EMSALT | | | | EMSALT IS PAD LOADED | | |
| R0025 | VIO (-7) M/CS | INERTIAL VELOCITY AT EMSALT | | | | EMSALT IS PAD LOADED | | |
| R0027 | TTS (-26) CS | TIME TO EMSALT | | | | EMSALT IS PAD LOADED | | |
| R0029 | LAT(SPL) /360 | TARGET LOCATION | | | | LEFT BY DSKY | | |
| R0031 | LNG(SPL) /360 | TARGET LOCATION | | | | LEFT BY DSKY | | |
| R0033 | HEADSUP (0) | +1 = LIPT DOWN, -1 = LIPT UP | | | | LEFT BY DSKY | | |
| R0035 | DERRIS' | SEE SUBROUTINES. | | | | | | |
| 0036 | | 26,2217 | | | | BANK 26 | | |
| 0037 | REP 1 | 26,2000 | | | | SETLOC P60S | | |
| 0038 | | 26,2217 | | | | BANK | | |
| 0039 | REP 15 LAST 530 | 26,1661 | | | | BRANK= AGC | | |
| 0040 | REP 1 | | | | | COUNT# 33/P61 | | |
| 0041 | REP 41 LAST 692 | 26,2217 | 3 4675 1 | P61 | | CA BIT14 | EXTENDED VERR SHOULD BE FREE THIS CLOSE | |
| 0042 | REP 18 LAST 560 | 26,2220 | 55=044 1 | | | TS EXTRACT | TO V37 | |
| A0043 | | | | | | | LOOK OUT EXTENDED VERRS SO CAN USE TYP | |
| A0044 | | | | | | | ROUTINES.EXT VERR BRASE IS USED | |
| 0045 | REP 89 LAST 689 | 26,2221 | 4 4712 0 | | | CS ONE | REMOVE IF HEADSUP EVER ON UPLINK DATA | |
| 0046 | REP 3 LAST 275 | 26,2222 | 55=728 1 | | | TS HEADSUP | PRELOAD | |
| 0047 | REP 1 | 26,2223 | 0 2543 1 | | | TC S61.1 | CHECK STATE VECTOR AND IMU ORIENTATION | |
| A0048 | | | | | | | BY 60GENRET. DOCS PHASCHNG, GROUP 4. | |
| 0049 | REP 1 | 26,2224 | 3 2424 1 | | | CA V06N61 | LAT(SPL) LNG(SPL) HEADSUP | |
| A0050 | | | | | | | XXX.XX DEG XXX.XX DEG XXXXX. | |
| 0051 | REP 221 LAST 737 | 26,2225 | 0 4555 0 | | | TC RANKCALL | | |
| 0052 | REP 17 LAST 727 | 26,2226 | 20763 1 | | | CADR GOFLASHR | | |
| 0053 | REP 62 LAST 737 | 26,2227 | 0 4106 1 | | | TC GOTOPOCH | | |

| L | P61-P67 | | | | | | | | |
|-------|------------------|--|---------|----------|---------|----------|----------|--|--|
| 0054 | REP 1 | | 26,2230 | 0 2235 1 | TC | P61.4 | | | |
| 0055 | | | 26,2231 | 0 2224 1 | TC | -5 | | | |
| 0056 | REP 75 LAST 724 | | 26,2232 | 0 5301 0 | P61.3 | TC | PHASCHNO | | |
| 0057 | | | 26,2233 | 00014 1 | OCY | 00014 | | | |
| 0058 | REP 96 LAST 727 | | 26,2234 | 0 5112 0 | TC | ENDOFJOB | | | |
| 0061 | | | 26,2235 | 22 007 0 | P61.4 | ZL | | | |
| 0062 | REP 4 LAST 743 | | 26,2236 | 11-726 1 | CCS | HEADSUP | | | |
| 0063 | REP 42 LAST 743 | | 26,2237 | 3 4675 1 | CA | BIT14 | | | |
| 0064 | | | 26,2240 | 12 241 0 | NOOP | | | | |
| 0065 | REP 5 LAST 276 | | 26,2241 | 53-716 1 | DXCH | ROLLC | | | |
| 0066 | REP 194 LAST 738 | | 26,2242 | 0 6006 1 | TC | INTPRET | | | |
| 0067 | | | 26,2243 | 77745 1 | NEWTRVN | DLOAD | | | |
| 0068 | REP 9 LAST 680 | | 26,2244 | 01205 1 | | PIPTIME | | | |
| 0069 | REP 2 LAST 116 | | 26,2245 | 37651 1 | STCALL | MM | | | |
| 0070 | REP 1 | | 26,2246 | 52063 0 | | STARTEN1 | | | |
| 0071 | | | 26,2247 | 77776 1 | VLOAD | | | | |
| 0072 | REP 11 LAST 680 | | 26,2250 | 01171 1 | | RN | | | |
| 0073 | REP 15 LAST 635 | | 26,2251 | 02327 0 | STORE | RONE | | | |
| 0074 | | | 26,2252 | 77656 1 | UNIT | | | | |
| 0075 | REP 1 | | 26,2253 | 26343 1 | STOVL | URONE | | | |
| 0076 | REP 10 LAST 656 | | 26,2254 | 01177 1 | | VN | | | |
| 0077 | REP 10 LAST 513 | | 26,2255 | 02335 0 | STORE | VONE | | | |
| 0078 | | | 26,2256 | 53435 0 | VXV | UNIT | | | |
| 0079 | REP 2 LAST 744 | | 26,2257 | 02343 1 | | URONE | | | |
| 0080 | REP 2 LAST 116 | | 26,2260 | 03502 0 | STORE | UNI | | | |
| 0081 | | | 26,2261 | 45345 1 | DUMPP61 | DLOAD | DSU | | |
| 0082 | REP 3 LAST 744 | | 26,2262 | 03651 0 | | MM | | | |
| 0083 | REP 10 LAST 744 | | 26,2263 | 01205 1 | | PIPTIME | | | |
| 0084 | | | 26,2264 | 45040 1 | RMN | CALRR | | | |
| 0085 | REP 1 | | 26,2265 | 54243 0 | | NEWTRVN | | | |
| 0086 | REP 1 | | 26,2266 | 54650 0 | | S61.2 | | | |
| A0087 | | | | | | | | | |
| 0089 | REP 5 LAST 736 | | 26,2267 | 0 5425 1 | P61.1 | TC | CLEARMRK | | |
| 0090 | REP 1 | | 26,2270 | 3 2423 0 | CA | V06N60 | | | |
| A0091 | | | | | | | | | |
| 0092 | REP 222 LAST 743 | | 26,2271 | 0 4555 0 | TC | BANKCALL | | | |
| 0093 | REP 37 LAST 737 | | 26,2272 | 20624 0 | CADR | GOPLASH | | | |
| 0094 | REP 63 LAST 743 | | 26,2273 | 0 4106 1 | TC | GOTOPOOH | | | |
| 0095 | REP 1 | | 26,2274 | 0 2270 0 | TC | P61.2 | | | |
| 0096 | | | 26,2275 | 0 2270 0 | TC | -5 | | | |
| 0097 | REP 195 LAST 744 | | 26,2276 | 0 6006 1 | P61.2 | TC | INTPRET | | |
| A0098 | | | | | | | | | |
| 0099 | | | 26,2277 | 45234 0 | RTB | DSJ | | | |
| 0100 | REP 23 LAST 732 | | 26,2300 | 45505 0 | | LOADTIME | | | |

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C(HEADSUP)= 41/-1
 IF HEADSUP POS,ROLLC =180 DEG.(LIPT DWN)
 IF HEADSUP NEG,ROLLC=0 (LIPT UP)
 ROLLC IS USED BY S62.3' GIM ANG AT .05G

SAVE TIME OF RN,VN TO DETERMINE IF AN
 UPDATE HAS OCCURRED
 INITIALIZE

INITIAL VALUE OF PIPTIME

UPDATED... GO TRY AGAIN
 GET DISPLAY DATA FOR N60 AND N63
 AND RETURN IN BASIC, BELOW.

GMAX VPRD GAMMA1
 XXX.XX G XXXXX. PPS XXX.XX DEG

PROCEED

CORRECT TIE FOR TIME LAPSE DURING
 ABOVE DISPLAY.
 CURRENT TIME.



L P61-P67

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| | | | | | | | |
|-------|-----|-----|------|-----|---------|--------|---|
| 0101 | REP | 4 | LAST | 744 | 26,2301 | 03851 | 0 |
| 0102 | | | | | 26,2302 | 77615 | 0 |
| 0103 | REP | 2 | LAST | 118 | 26,2303 | 03733 | 0 |
| 0104 | REP | 5 | LAST | 275 | 26,2304 | 03727 | 0 |
| 0105 | | | | | 26,2305 | 77776 | 1 |
| 0106 | REP | 1 | | | 26,2306 | 3 2425 | 0 |
| A0107 | | | | | | | |
| 0108 | REP | 223 | LAST | 744 | 26,2307 | 0 4555 | 0 |
| 0109 | REP | 38 | LAST | 744 | 26,2310 | 20824 | 0 |
| 0110 | REP | 64 | LAST | 744 | 26,2311 | 0 4106 | 1 |
| 0111 | | | | | 26,2312 | 0 2314 | 0 |
| 0112 | REP | 2 | LAST | 744 | 26,2313 | 0 2276 | 0 |

| | |
|-------|----------|
| | MM |
| DAD | |
| TIB1 | |
| STORE | TIB |
| EXIT | |
| CA | V06N63 |
| TC | BANKCALL |
| CADR | GOFLASH |
| TC | GOPOOH |
| TC | +2 |
| TC | P61.2 |

PIPTIME FOR RONE d VONE.

NEGATIVE OF FREE FALL TIME.
DECREMENTED

| | | |
|-----------|------------|-----------|
| RTGO | VIO | TIB |
| X000.X MM | X0000. PPS | X000X M,S |

REDO

R0113

.... THEN FALL INTO P62

L P61-P67

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P6227 PROGRAM- P63
 P6228 MOD NO.- 0 MAR. 13, 1967
 P6230 MOD BY- R. HIRSCHKOP
 P6231 MOD NO' 1 MOD BY' RR BAIRNSPATHER DATE' 22 JUN 67 RESTARTS.
 P6233 MOD NO' 2 MOD BY' RR BAIRNSPATHER DATE' 14 JUL 67 REVISED RESTARTS
 P6235 FUNCTION- 1) TO INITIALIZE THE ENTRY EQUATIONS
 P6236 2) TO CONTINUE TO HOLD THE CM TO THE CORRECT ATTITUDE WITH RESPECT TO THE ATMOSPHERE FOR
 P6238 THE ONSET OF ENTRY DECELERATION. ROLL ANGLE IS LEFT UP/DOWN AS SPECIFIED BY HEADSUP.
 P6240 3) TO SENSE .05 G
 P6241 CALLING SEQUENCE- DIRECTLY FROM P62
 P6242 EXIT- TO ENDPJOB
 P6243 SUBROUTINE CALLS- NEWMODEX , GDSR

| Address | Label | Count | Address | Label | Count | Address | Label | Count | Address | Label | Count | Notes |
|---------|-------|-------|----------|---------|-------|---------|---------|-------|----------|----------|-------|--|
| 0244 | REF | 1 | | | | | | | | | | |
| 0245 | REF | 8 | LAST 746 | 26,2406 | 0 | 5243 | 1 | P63 | TC | NEWMODEX | | |
| 0246 | | | | 26,2407 | 00077 | 1 | | | MM | 63 | | |
| 02461 | REF | 225 | LAST 747 | 26,2410 | 0 | 4555 | 0 | | TC | BANKCALL | | FLUSH N22 DISPLAY, IF ON. (ONIT DISP DURING STARTENT PASS.) |
| 02462 | REF | 8 | LAST 736 | 26,2411 | 20607 | 1 | | | CADR | CLEANDSP | | |
| A0247 | | | | | | | | | | | | ARRIVE WITH BRANK = AGC. |
| 0246 | REF | 1 | | 26,2412 | 3 | 2427 | 1 | | CA | ENTCADR | | CONTINUE AT STARTENT AFTER CM/POSE . |
| A0249 | | | | | | | | | | | | AT END OF STARTENT, CHANGE ADDRESS IN GOTOADDR TO CONTINUE AT SCALEPOP THEREAFTER. |
| A0250 | | | | | | | | | | | | |
| 0251 | REF | 3 | LAST 746 | 26,2413 | 55 | 724 | 0 | | TS | POSEXIT | | |
| 0252 | REF | 1 | | 26,2414 | 3 | 2426 | 0 | | CA | V06N64 | | G VI R TO SPLSH XXX.XX G XXXXX. FPS XXXX.X NM FOR DISPLAY CALL 'IN OVRNOUT. |
| A0253 | | | | | | | | | | | | |
| 0254 | REF | 3 | LAST 747 | 26,2415 | 55 | 263 | 0 | | TS | ENTRYVN | | |
| 02541 | REF | 93 | LAST 746 | 26,2416 | 4 | 4712 | 0 | | CS | ONE | | IN CASE FLAG IS LEFT AT +1 BY DAP, THE |
| 02542 | REF | 2 | LAST 747 | 26,2417 | 55 | 727 | 0 | | TS | P63FLAG | | -1 ASSURES THAT EXO-ATM DAP WILL NOT CALL P63 OUT OF SEQUENCE IN P66 . |
| A02543 | | | | | | | | | | | | |
| 0255 | REF | 77 | LAST 747 | 26,2420 | 0 | 5301 | 0 | P63.1 | TC | PHASCHNG | | |
| 0256 | | | | 26,2421 | 00004 | 0 | | | OCT | 00004 | | DISABLE. DISPLAY RESTARTED VIA ENTRY. |
| 0257 | REF | 97 | LAST 744 | 26,2422 | 0 | 5112 | 0 | | TC | ENDPJOB | | |
| 0258 | | | | 26,2423 | 01474 | 1 | V06N60 | VN | 0660 | | | |
| 0259 | | | | 26,2424 | 01475 | 0 | V06N61 | VN | 0661 | | | |
| 0260 | | | | 26,2425 | 01477 | 1 | V06N63 | VN | 0663 | | | |
| 0261 | | | | 26,2426 | 01500 | 0 | V06N64 | VN | 0664 | | | |
| 0262 | REF | 1 | | 26,2427 | 52000 | 0 | ENTCADR | CADR | STARTENT | | | |



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| | | | | | | | | | |
|------|-----|---|------|-----|---------|-------|---|----------|---------------|
| 0263 | REP | 6 | LAST | 289 | 57,1451 | | | | BRANK= RTINIT |
| 0264 | REP | 1 | | | 28,2430 | 03373 | 0 | POSSCADR | 2CADR ON/POSS |
| 0264 | REP | 1 | | | 28,2431 | 76067 | 1 | | |

TO CARY OVER INTO ENTRY STEERING.

L P81-P87 USER=8 PAGE NO. 9 R8 83

P0265 PROGRAM- P84
 R0266 MOD NO.- 1 SEPT. 19, 1967
 R0267 MOD BY- R. HIRSCHKOPF
 R0268 MOD NO' 2 MOD BY' RR BAIRNSPATER DATE' 8 MAY 68 REVISED COMMENTS FOR COLOSSUS
 R0270 FUNCTION- 1. TO START ENTRY GUIDANCE AT .05G SELECTING ROLL ATTITUDE, CONSTANT DRAG LEVEL, AND
 R0272 DRAG THRESHOLD, KA, WHICH ARE KEYED TO THE .05G POINT.
 R0274 2. SELECT FINAL PHASE P87 IF V ± 27000 FPS WHEN .2G OCCURS.
 R0276 3. ITERATE FOR UP-CONTROL SOLUTION P85 IF V ± 27000 FPS AND IF ALTITUDE RATE AND DRAG
 R0278 LEVEL CONDITIONS ARE SATISFIED. ENTER P85 WHEN CONSTANT DRAG CONTROLLER HAS BROUGHT RANGE
 R0280 AS PREDICTED TO WITHIN 25 NM OF DESIRED RANGE.
 R0281 4. SELECT FINAL PHASE P87 IF NO UP-CONTROL SOLUTION EXISTS WITH VL ± 10000 FTS.
 R0283 CALLING SEQUENCE- BY RTB FROM REENTRY CONTROL.
 R0284 EXIT- BACK TO REENTRY CONTROL
 R0285 SUBROUTINE CALLS- NEWINDEX
 0286 26,2432 BANK 26
 0287 REP 1 26,2000 SETLOC P8081
 0288 26,2432 BANK

R0289 THIS DISPLAY IS CALLED EACH PASS THROUGH STEERING. RESTART PROTECTION IS VIA STEERING.

| | | | | | | | | | |
|-------|-----|---|----------|---------|----------|--------|----|---------------|--------------------------------------|
| 0291 | REP | 1 | | | | | | COUNT# 55/P84 | |
| 0292 | REP | 9 | LAST 749 | 26,2432 | 0 5243 1 | P84 | TC | NEWINDEX | ENTER VIA RTB WHEN .05G IS EXCEEDED. |
| 0293 | | | | 26,2433 | 00100 0 | | MM | 84 | |
| 0294 | REP | 1 | | 26,2434 | 3 2437 0 | | CA | V08N68 | ROLLC VI HDOT |
| A0295 | | | | | | | | | XXX.XX DRG XXXXX. FPS XXXXX. FPS |
| 0296 | REP | 4 | LAST 749 | 26,2435 | 55-263 0 | | TS | ENTROVN | DISPLAY VIA OVERFLUT. |
| 0297 | REP | 7 | LAST 724 | 26,2436 | 0 6030 1 | | TC | DANZIG | ... AND CONTINUE IN INTROLL ... |
| 0298 | | | | 26,2437 | 01504 1 | V08N68 | VN | 0668 | |

L P61-P67

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P0299 PROGRAM' P65
P0300 MOD NO' 0 MOD BY' RR BAINSPATHER DATE' 17 JAN 68 COLOSSUS GSOP ADDITION.
P0302 FUNCTION' TO CONTINUE ENTRY GUIDANCE, USING THE UP-CONTROL PHASE TO STEER TO A CONTROLLED EXIT
P0304 CONDITION. THIS PHASE TERMINATES A) IF D ≠ 07 PPS, GO TO P66
P0306 B) IF RDOT NEG, AND IF V ≠ VL +800PPS, GO TO P67.
P0308
P0309 CALLING SEQUENCE' BY RTB FROM REENTRY CONTROL
P0310 EXIT' BACK TO REENTRY CONTROL, OR TO ENDOPJOB.
P0311 SUBROUTINE CALLS' NBRMODEX

0312 REF 1 COUNT# 88/P65
0313 REF 10 LAST 751 26,2440 0 5243 1 P65 TC NBRMODEX ENTER VIA RTB WHEN RANGE ± 25 N M OF
0314 26,2441 00101 1 MM 65 TARGET.

0315 REF 3 LAST 748 26,2442 3 4760 1 CA PRIO13
0316 REF 25 LAST 748 26,2443 0 5027 1 TC NOVAC
0317 REF 5 LAST 751 1283 EBANK ENRYOYN
0318 REF 2 LAST 210 26,2444 02456 1 2CADR P65.1
0319 26,2445 54062 1
0319 REF 24 LAST 685 26,2446 0 5261 1 TC 2PHSCHNG
0320 26,2447 00554 0 OCT 00554 2 PHASE CHG REQUIRED TO PREVENT RE-
0321 26,2450 10035 0 OCT 10035 STARTING FLASHING DISPLAY TWICE.
0322 REF 197 LAST 746 26,2451 0 6006 1 TC INTRPT 4.55 SPOT AND SERVICR, HERE.
0323 26,2452 47131 1 SSP RTB
0324 REF 2 LAST 116 26,2453 03648 0 GOTOADR CHANGE ENTRY MODE TO UPCTRL.
0325 REF 1 26,2454 53027 1 UPCTRL
0326 REF 1 26,2455 52120 0 REPAZR10 GO HERE TO REESTABLISH ENTRY SEQUENCER.
A0327 AND CONTINUE AT UPCTRL...

0328 REF 49 LAST 700 26,2456 0 5447 0 P65.1 TC DOWNFLAG
0329 REF 2 LAST 747 26,2457 00134 1 ADRES ENRYDSP ENRYDSP = 92D BIT 13 FLAG 6

A0330 REF 1 26,2460 3 2472 1 CA V16N69
0331 REF 227 LAST 749 26,2461 0 4555 0 TC BANKCALL ROLLC DL (07) VL
0332 REF 18 LAST 743 26,2462 20763 1 CADR GOFLASHR XXX.XX DEG XXX.XX G XXXXX. PPS
0333 26,2463 0 2460 1 TC -3 NODOFLAG IS SET..
0334 26,2464 0 2467 0 TC +3
0335 26,2465 0 2460 1 TC -5
0336 REF 2 LAST 747 26,2466 0 2232 0 TC P61.3 EST. GRP 4 FOR DSPLAY AND DO ENDOPJOB
A0337 IF PROCEED, CONTINUE.

0338 REF 45 LAST 747 26,2467 0 5435 0 TC UPFLAG ENRYDSP = 92D BIT13 FLAG 6
0339 REF 3 LAST 752 26,2470 00134 1 ADRES
A03391 0340 REF 2 LAST 746 26,2471 0 2420 0 TC P63.1 DISABLE GRP 4, START UP ENTRY DISPLAY
A0341
0342 26,2472 04105 1 V16N69 VN 1669
    
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L P61-P67

P0343 PROGRAM' P66
 P0344 MOD NO' 0 MOD BY' RR BAIRNSPATER DATE' 17 JAN 68 COLOSSUS GSOP ADDITIONS.
 P0346 FUNCTION' KEEP CM ATTITUDE IN TRIM TO THE RELATIVE VELOCITY VECTOR. ENTRY GUIDANCE STOPS GENERATING
 P0348 ROLL COMMANDS UNTIL DRAG BUILDS UP TO 07+0.5 FPSS.
 P0349
 P0350 CALLING SEQUENCE' VIA RTB FROM REENTRY CONTROL.
 P0351 EXIT' BACK TO REENTRY CONTROL.
 P0352 SUBROUTINE CALLS' NEWMODEX

| | REP | | | | COUNT# | SS/P66 | | |
|-------|-----|----|----------|---------|--------|--------|---|-----|
| 0353 | REP | 1 | | | | | | |
| 0354 | REP | 11 | LAST 752 | 26,2473 | 0 | 5243 | 1 | P66 |
| 0355 | | | | 26,2474 | 00102 | 1 | | |
| 0356 | REP | 3 | LAST 747 | 26,2475 | 3 | 4745 | 0 | |
| A0357 | | | | | | | | |
| 0358 | REP | 1 | | 26,2476 | 0 | 2502 | 1 | |
| A0359 | | | | | | | | |
| A0360 | | | | | | | | |
| A0361 | | | | | | | | |

ENTER VIA RTB WHEN D ± 07 FPSS

TC NEWMODEX
MM 66

CA V08N22

TC P66END

CGA IGA MGA
 XXX.XX DEG XXX.XX DEG XXX.XX DEG
 IN CASE CAME FROM P65, GO DISABLE GRP4,
 AND SET ENTRYDSP TO DO DISPLAY VIA
 OVERCUT.
 ... AND CONTINUE AT KSP2



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0402 REP 0 LAST 746 28,2526 53-223 1

DJCH AVORXIT

0403 REP 68 LAST 746 28,2527 1 4106 0

TCP OOTOPOCH



L P61-P67

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| | | | | | | | | | |
|------|-----|----|------|---------|---------|----------|-------|----------|----------|
| 0404 | | | | 26,2530 | 43175 0 | P67.2 | VLOAD | CLEAR | |
| 0405 | REP | 12 | LAST | 744 | 26,2531 | 01171 1 | | IN | |
| 0406 | REP | 9 | LAST | 702 | 26,2532 | 00662 0 | | BRADFLAG | |
| 0407 | REP | 11 | LAST | 730 | 26,2533 | 16152 0 | | STODL | ALPHAV |
| 0408 | REP | 11 | LAST | 744 | 26,2534 | 01205 1 | | | PIPTIME |
| 0409 | | | | 26,2535 | 45014 0 | | | CLEAR | CALL |
| 0410 | REP | 10 | LAST | 702 | 26,2536 | 01663 0 | | | LINAPLAG |
| 0411 | REP | 5 | LAST | 698 | 26,2537 | 26322 0 | | | LAT-LONG |
| 0412 | | | | 26,2540 | 77834 0 | P67.3 | RTS | | |
| 0413 | REP | 1 | | 26,2541 | 53603 1 | | | SERWOUT | |
| 0414 | | | | 26,2542 | 04103 1 | V16N6T | VN | 1667 | |
| 0415 | REP | 2 | LAST | 368 | 4270 | OCT41 | = | 33DEC | |
| 0416 | REP | 1 | | 26,2641 | | SERWCAD2 | = | SERWCAD1 | |

CALC PRESENT LAT, LONG, ALT.

USE PAD RAD FOR ALT. (NOT SEEN ANYWAY)

USE TIME OF IN

ENTRY EXIT THAT OMITS DISPLAY.

L P61-P67 USER'S PAGE NO. 15 Pg 53

R0417 SUBROUTINE NAME' S61.1
R0418 MOD NO' 0 DATE' 21 FEB 67
R0420 MOD BY' RR BAINSPATHER LOG SECTION' P61-P67
R0422 MOD NO' 1 MOD BY' RR BAINSPATHER DATE' 22 JUN 67 RESTARTS.
R0424 FUNCTIONAL DESCRIPTION' CALLED BY BOTH P61 AND P62
R0425 FIRST, TEST TO SEE IF AVERAGED IS ON. IF NOT, UPDATE THE STATE VECTOR TO PRESENT TIME + TOLERANCE
R0427 AND TURN ON AVERAGED AT THAT TIME, AND CONTINUE. OTHERWISE CONTINUE' SEE IF IMU Y AXIS IS
R0429 WITHIN 30 DEG OF V4R. IF YES, EXIT SUBROUTINE S61.1. IF NO, SEE IF -Y AXIS OF IMU IS WITHIN
R0431 30 DEG OF V4R. IF YES, DISPLAY ALARM' 01427 IMU REVERSED.
R0432 IF NO, DISPLAY ALARM' 01426 IMU UNSATISFACTORY.
R0434 IN EITHER OF THESE LAST 2 CASES, WAIT 10 SEC AND THEN EXIT SUBROUTINE S61.1.

R0436 REMARK' THERE WILL BE A SHORT 10 SEC DELAY IF AN ALARM EXIT IS TAKEN. THE DELAY FOR INTEGRATION IS
R0438 AS SHORT AS CAN BE MADE, BUT IS ARBITRARY SINCE IT DEPENDS ON THE AGE OF THE STATE VECTOR.

R0440 CALLING SEQUENCE' CALL
R0441 S61.1
R0442 C(MPAC) UNSPECIFIED
R0443 PUSHLOC UNSPECIFIED

R0444 SUBROUTINES CALLED' LOADTIME, CSMPREC, TPAGRES,
R0445 WAITLIST, JOBSLEEP, JOBWAKE, PREREAD, ALARM, GDSR, BANKCALL, DELAYJOB
R0447 NORMAL EXIT MODES' RVO
R0448 ALARMS' 01426 IMU UNSATISFACTORY
R0449 01427 IMU REVERSED
R0450 OUTPUT' POSSIBLE ALARMS
R0451 POSSIBLY TDEC1, RATT, VATT, RN, VN
R0452 ERASABLE INITIALIZATION REQUIRED'
R0453 AVEOFLAG AVERAGED ON OR OFF LEFT BY SERVICER
R0455 PIPTIME (-28) Cs TIME OF PIPA UPDATE LEFT BY READACCS
R0457 RN (-29) M STATE VECTOR LEFT BY AVERAGED
R0459 VN (-7) M/Cs STATE VECTOR LEFT BY AVERAGED
R0461 REFSMAT (-1) .5 REF TO SM MATRIX LEFT BY LAST IMU ALIGNMENT
R0463 DEPRIS' QPRET
R0464 POSSIBLY PIPTIME1, RATT, VATT, TDEC1, RN1, VN1, QTEMP, X1 IF UPDATED
R0466 PUSH LIST LOCs USED BY CSMPREC

0467 REP 17 LAST 748 26,1661 BRANK= AGC FOR 60GENRET , S61DT
0468 26,2543 BANK 26
0469 REP 1 26,2000 SETLOC P60S3
0470 26,2543 BANK

0471 REP 1 COUNT# 55/S61.1

0472 26,2543 0 0006 1 S61.1 EXTEND
0473 REP 2 LAST 114 26,2544 23-773 0 QKCH 60GENRET SAVE RET ADDR IN BR 6
0474 REP 220 LAST 754 26,2545 0 4555 0 TC BANKCALL
0475 REP 7 LAST 695 26,2546 17573 0 CADR R02R0TH
0476 REP 106 LAST 752 26,2547 0 6006 1 TC INTRPT



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| | | | | | |
|-------|-----|-----|------|---------|------------------|
| 0477 | | | | 26,2550 | 45014 0 |
| 0478 | REP | 2 | LAST | 506 | 26,2551 00718 1 |
| 0479 | REP | 2 | LAST | 210 | 26,2552 54803 0 |
| 0480 | REP | 2 | LAST | 647 | 26,2553 27573 0 |
| 0481 | REP | 278 | LAST | 738 | 26,2554 3 0155 0 |
| 0482 | REP | 3 | LAST | 209 | 26,2555 55-774 0 |
| 0483 | REP | 38 | LAST | 684 | 26,2556 0 5140 1 |
| 0484 | REP | 11 | LAST | 527 | 57,1431 |
| 0485 | REP | 2 | LAST | 209 | 26,2557 02584 1 |
| 0486 | | | | 26,2558 | 54087 1 |
| 0486 | REP | 79 | LAST | 754 | 26,2559 0 5301 0 |
| 0487 | | | | 26,2562 | 40434 0 |
| 0488 | REP | 98 | LAST | 749 | 26,2563 0 5112 0 |
| 0489 | REP | 4 | LAST | 752 | 26,2564 3 4760 1 |
| 0490 | REP | 27 | LAST | 701 | 26,2565 0 5042 1 |
| 0491 | REP | 18 | LAST | 757 | 56,1861 |
| 0492 | REP | 3 | LAST | 758 | 26,2566 02602 1 |
| 0492 | | | | 26,2567 | 54066 0 |
| 0493 | | | | 26,2570 | 0 0006 1 |
| 0494 | REP | 2 | LAST | 756 | 26,2571 3 2642 0 |
| 0495 | REP | 10 | LAST | 755 | 26,2572 53-223 1 |
| 0496 | REP | 25 | LAST | 752 | 26,2573 0 5281 1 |
| 0497 | | | | 26,2574 | 00454 1 |
| 0498 | | | | 26,2575 | 00415 1 |
| 04981 | REP | 1 | | 26,2576 | 3 4753 1 |
| 04982 | REP | 33 | LAST | 661 | 26,2577 54 003 0 |
| 0499 | REP | 45 | LAST | 747 | 26,2600 0 4574 0 |
| 0500 | REP | 3 | LAST | 649 | 26,2601 76804 1 |
| 0501 | REP | 199 | LAST | 757 | 26,2602 0 6006 1 |
| 0502 | | | | 26,2603 | 77204 1 |
| 0503 | REP | 2 | LAST | 289 | 26,2604 57343 1 |
| 0504 | REP | 11 | LAST | 744 | 26,2605 01177 1 |
| 0505 | | | | 26,2606 | 84235 1 |
| 0506 | REP | 13 | LAST | 756 | 26,2607 01171 1 |
| 0507 | REP | 28 | LAST | 731 | 26,2610 01736 1 |
| 0508 | | | | 26,2611 | 71256 0 |
| 0509 | REP | 277 | LAST | 756 | 26,2612 00160 0 |
| 0510 | | | | 26,2613 | 43240 0 |
| 0511 | REP | 1 | | 26,2614 | 54821 0 |
| 0512 | REP | 1 | | 26,2615 | 14644 1 |
| 0513 | | | | 26,2616 | 47004 0 |
| 0514 | REP | 1 | | 26,2617 | 54640 1 |
| 0515 | REP | 1 | | 26,2620 | 54625 1 |

| | |
|--------|-----------|
| BON | CALRS |
| | AVSOPLAG |
| | S61.1A |
| | MIDTOAV2 |
| CA | MPAC +1 |
| TS | S61DT |
| TC | WAITLIST |
| EBANK | DVCNTR |
| ZCADR | S61.1C |
| TC | PHASCHNO |
| OCT | 40434 |
| TC | ENDOPJOB |
| CA | PRI013 |
| TC | FINDVAC |
| EBANK | AGC |
| ZCADR | S61.1A -1 |
| EXTEND | |
| DCA | SERVCAD1 |
| DYCH | AVSOPXIT |
| TC | ZPHSCHNO |
| OCT | 00454 |
| OCT | 00415 |
| CA | BRNTRY |
| TS | EBANK |
| TC | POSTJUMP |
| CADR | PREPREAD |
| TC | INTPRET |
| BOVB | VLOAD |
| | TC DANZIG |
| | VN |
| VXV | MV |
| | RN |
| | REPMMAT |
| UNIT | DLOAD |
| | MPAC +3 |
| RN | DAD |
| | S61.1B |
| | C(30).L.M |
| BOVB | RTP |
| | RETRN1 |
| | RETRN3 |

IS AVERAGED ON YES
GET FUTURE STATE VECTOR SOON AS CAN

RETURN INITIATED ***
FOR RESTART.

HE WHO STARTS AVERAGED MUST SERVICE THE EXIT.

SET BR= 7 FOR PREPREAD.

PREPREAD DOES TC TAKEOVER.

TURN OFF OVPIND, IF ON
VN (-7) M/CS

RN (-29) M
.5 UNIT MATRIX

GET COS(THETA)/2

DO TEST ON -YSM
= 1.0 -.5 COS(30)

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| | | | | | | | | | | |
|------|-----|-----|------|---------|---------|----------|-----------|----------|-------------------|--------------------|
| 0516 | | | | 26,2621 | 43276 0 | 861.1B | DCOMP | DAD | | |
| 0517 | REP | 2 | LAST | 758 | 26,2622 | 14644 1 | | C(30)LIM | = 1.0- .5 COS(30) | |
| 0518 | | | | | 26,2623 | 77404 1 | | BOVS | EXIT | |
| 0519 | REP | 1 | | | 26,2624 | 54630 0 | | | RETRN2 | |
| 0520 | REP | 30 | LAST | 722 | 26,2625 | 0 5537 0 | RETRN3 | TC | ALARM | |
| 0521 | | | | | 26,2626 | 01426 0 | | OCT | 01426 | IMJ UNSATISFACTORY |
| 0522 | REP | 2 | LAST | 759 | 26,2627 | 0 2632 1 | | TC | RETRN2 +2 | |
| 0523 | REP | 31 | LAST | 759 | 26,2630 | 0 5537 0 | RETRN2 | TC | ALARM | |
| 0524 | | | | | 26,2631 | 01427 1 | | OCT | 01427 | IMJ REVERSED |
| 0525 | REP | 4 | LAST | 697 | 26,2632 | 3 4743 0 | +2 | CAP | V05N09 | |
| 0526 | REP | 230 | LAST | 757 | 26,2633 | 0 4555 0 | | TC | BANKCALL | |
| 0527 | REP | 3 | LAST | 699 | 26,2634 | 20602 1 | | CADR | G0DSPR | DO DISPLAY |
| 0528 | REP | 1 | | | 26,2635 | 3 2645 1 | | CA | 10SECS | |
| 0529 | REP | 231 | LAST | 759 | 26,2636 | 0 4555 0 | | TC | BANKCALL | |
| 0530 | REP | 11 | LAST | 700 | 26,2637 | 01732 0 | | CADR | DELAYJOB | |
| 0531 | REP | 3 | LAST | 757 | 26,2640 | 0 1773 0 | RETRN1 | TC | 60GENRET | |
| 0532 | REP | 12 | LAST | 758 | 57,1431 | | | BRANK= | DVCNTR | |
| 0533 | REP | 4 | LAST | 657 | 26,2641 | 03132 1 | SERV/CAD1 | 2CADR | SERVEXIT | |
| 0534 | | | | | 26,2642 | 76087 1 | | | | |
| 0534 | | | | | 26,2643 | 22111 0 | | C(30)LIM | 2DEC | = 1.0 -.5 COS(30) |
| 0534 | | | | | 26,2644 | 17335 1 | | | | |
| 0535 | | | | | 26,2645 | 01750 1 | 10SECS | DEC | 1000 | 1000 Cs |
| 0536 | | | | | 26,2646 | 00000 1 | 80SECDP | 2DEC | 6000 R-28 | 6000 Cs |
| 0536 | | | | | 26,2647 | 13560 0 | | | | |

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P6637

R0536 PROGRAM NAME' 861.2 DATE' 14 FEB 67
 R0540 MOD NO' 1 LOG SECTION' P61-P67
 R0542 MOD BY' MORTH / BAIRNSPATER
 R0543 MOD NO' 2 MOD BY' MORTH/BAIRNSPATER DATE' 11 MAY 67 ADD 2ND ITER FOR BRAD AT 400K FT.
 R0545 MOD NO' 3 MOD BY' RR BAIRNSPATER DATE' 21 NOV 67 VARIABLE MU ADDED.
 R0547 MOD NO' 4 MOD BY' RR BAIRNSPATER DATE' 21 MAR 68 DIFFERENT EARTH/MOON SCALES IN TFF-S
 R0549 FUNCTIONAL DESCRIPTION' CALLED BY P61. PROVIDES DISPLAYS FOR NOLNS N60 AND N63 .
 R0551 PROGRAM CALCULATES ENTRY DISPLAY OF MAXIMUM ACCELERATION EXPECTED (GMAX) AND ALSO THE EXPECTED
 R0553 INERTIAL VELOCITY (VPRED) AND ENTRY ANGLE (GAMMAI) THAT WILL OBTAIN AT 400K FT ABOVE THE FISCHER
 R0555 ELLIPSOID. PROGRAM ALSO CALCULATES A SECOND DISPLAY RELATIVE TO THE EMSALT ABOVE FISCHER ELLIPSOID
 R0557 AND CONSISTS OF RANGE TO SPLASH FROM NOW (RTGO) , PREDICTED INERTIAL VELOCITY (VIO) , AND THE TIME TO
 R0559 GO FROM NOW (TIB) .
 R0560 CALLING SEQUENCE' CALL
 R0561 861.2
 R0562 (IMPAC) UNSPECIFIED
 R0563 PUSHLOC WILL BE SET TO ZERO.

 R0564 SUBROUTINES CALLED' TFFCONIC, CALCTFF, TFF/TRIG, FISHCALC, GETERAD, VGMALC
 R0566 NORMAL EXIT MODES, RTB P61.1
 R0567 ALARMS' NONE
 R0568 OUTPUT' THE FOLLOWING REGISTERS ARE WRITTEN IN FOR USE BY DISPLAYS
 R0569 GMAX 100 GMAX (-14) G,S MAXIMUM ACCELERATION
 R0570 VPRED (-7) M/CS PREDICTED VELOCITY AT 400K FT
 R0571 GAMMAI GAMMA/360 PREDICTED GAMMA AT 400K FT
 R0572 FOR TM, DP(GAMMAI) = (GAMMAI, RTGO) / 360
 R0574 RTGO THETAH/360 RANGE ANGLE TO SPLASH FROM EMSALT EMSALT IS PAD LOADED
 R0576 VIO (-7) M/CS INERTIAL VELOCITY AT EMSALT EMSALT IS PAD LOADED
 R0578 TIB (-26) CS TIME TO EMSALT EMSALT IS PAD LOADED

 R0580 PUSHLOC = 0
 R0581 CONIC PARAMETERS STORED IN VAC AREA (SEE TFF SUBROUTINES)
 R0582 ERASABLE INITIALIZATION REQUIRED'
 R0583 RONE (-29) M STATE VECTOR LEFT BY USER
 R0585 VONE (-7) M/CS STATE VECTOR LEFT BY USER
 R0587 URONE UR/2 LEFT BY USER
 R0589 UNI (-1) UNIT NORMAL V*H LEFT BY ENTRY / P61
 R0591 THETAH THETAH/360 RANGE ANGLE LEFT BY ENTRY / P61
 R0593 UNITH (0) UNIT POLAR VECTOR LEFT BY PAD LOAD
 R0595 EMSALT (-29) M EMS INTERFACE ALTITUDE LEFT BY PAD LOAD
 R0597 ORBITAL REENTRY' 284843 FT, LUNAR REENTRY' 297431 FT.
 R0599 DEBRIS' QPRET,
 R0600 ALL PDL LOCATIONS ABOVE 12D, INCLUDING X1,X2,S1,S2
 R0601 ALSO PDL+0 ... PDL+5, WHERE INITIAL PUSHLOC = PDL



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P0602

R0603 THE FOLLOWING PUSH LIST LOCATIONS HAVE BEEN RESERVED FOR TFF ROUTINES AND ARE REPEATED HERE FOR CONVENIENCE.

R0605 OF COURSE FOR 861.2 USAGE, EARTH ORIGIN SCALING IS USED.

| | | BELOW | B' IS USED FOR EARTH ORIGIN SCALE | M' IS USED FOR MOON ORIGIN SCALE |
|-------|------------|-------|-------------------------------------|----------------------------------|
| A0606 | | | | |
| A0607 | | | | |
| A0608 | RTRM = | 16D | TERMINAL RADIUS M | B' (-29) M' (-27) |
| A0609 | NRTRM = | 16D | TERMINAL RADIUS M | B' (-29+NR) M' (-27+NR) |
| A0610 | | | | |
| A0611 | RMAG1 = | 12D | PRESENT RADIUS M | B' (-29) M' (-27) |
| A0612 | NRMAG = | 32D | PRESENT RADIUS M | B' (-29+NR) M' (-27+NR) |
| A0613 | | | | |
| A0614 | SDEL/2 | | SIN(THETA) /2 | |
| A0615 | COELP/2 = | 14D | COS(THETA) /2 | |
| A0616 | TFFX = | 34D | X, ARGUMENT OF SERIES T(X). | |
| A0617 | TFFTEM = | 36D | ARG FOR TRANSFER ANGLE CALCULATION. | |
| A0618 | TFFNP = | 28D | LC P M B' (-38+2NR) M' (-38+2NR) | |
| A0619 | TFF/RIMU = | 30D | 1/SQRT(MU) B' (17) M' (14) | |
| A0620 | TFFVSO = | 20D | -(VN.VN/MU) 1/M B' (20) M' (18) | |



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P0621

| | | | | | | | | | | |
|------|-----|---|----------|---------|--|--|--|--|--|--------------|
| 0622 | | | 34,3652 | | | | | | | BANK 34 |
| 0623 | REP | 2 | LAST 754 | 26,2600 | | | | | | SETLOC P0622 |
| 0624 | | | | 26,2650 | | | | | | BANK |

| | | | | | | | | | | |
|------|-----|---|--|--|--|--|--|--|--|-----------------|
| 0625 | REP | 1 | | | | | | | | COUNT= 88/261.2 |
|------|-----|---|--|--|--|--|--|--|--|-----------------|

A0626

| | | | | | | | | | |
|-------|-----|---|--|---------|-------|---|-------|---------|----------|
| 0627 | | | | 26,2650 | 45345 | 1 | 261.2 | DLOAD | DSU |
| 06271 | REP | 1 | | 26,2651 | 02020 | 1 | | | ENSALT |
| 06272 | REP | 1 | | 26,2652 | 15000 | 0 | | | 290KFT |
| 06273 | | | | 26,2653 | 71244 | 0 | | BPL | DLOAD |
| 06274 | REP | 1 | | 26,2654 | 84774 | 1 | | | LINENT |
| 0628 | REP | 1 | | 26,2655 | 17345 | 0 | | | 1/RIMU |
| 06281 | | | | 26,2656 | 77624 | 1 | | CALLCON | CALL |
| 0629 | REP | 1 | | 26,2657 | 56750 | 0 | | | TFPCONIC |

| | | | | | | | | | |
|------|-----|---|----------|---------|-------|---|--|-------|---------|
| 0630 | | | | 26,2660 | 45145 | 0 | | DLOAD | CALL |
| 0631 | REP | 1 | | 26,2661 | 15020 | 1 | | | RTRIAL |
| 0632 | REP | 2 | LAST 514 | 26,2662 | 57060 | 0 | | | CALCTPF |

| | | | | | | | | | |
|------|-----|---|----------|---------|-------|---|--|------|----------|
| 0633 | | | | 26,2663 | 77624 | 1 | | CALL | |
| 0634 | REP | 2 | LAST 634 | 26,2664 | 56573 | 0 | | | TFP/TRIG |

| | | | | | | | | | |
|------|-----|---|--|---------|-------|---|--|------|----------|
| 0635 | | | | 26,2665 | 77624 | 1 | | CALL | |
| 0636 | REP | 1 | | 26,2666 | 55027 | 1 | | | FISHCALC |

| | | | | | | | | | |
|------|-----|---|----------|---------|-------|---|--|-----|---------|
| 0637 | | | | 26,2667 | 45015 | 1 | | DAD | CALL |
| 0638 | REP | 2 | LAST 762 | 26,2670 | 02020 | 1 | | | ENSALT |
| 0639 | REP | 3 | LAST 762 | 26,2671 | 57060 | 0 | | | CALCTPF |

| | | | | | | | | | |
|------|-----|---|----------|---------|-------|---|--|-------|------|
| 0640 | | | | 26,2672 | 77676 | 0 | | DCOMP | |
| 0641 | REP | 3 | LAST 745 | 26,2673 | 03733 | 0 | | STORE | TTE1 |

| | | | | | | | | | |
|-------|-----|---|----------|---------|-------|---|--|--------|-----|
| A0642 | | | | | | | | STCALL | TTE |
| 0643 | REP | 6 | LAST 745 | 26,2674 | 37727 | 1 | | | |

| | | | | | | | | | |
|-------|-----|---|----------|---------|-------|---|--|--|----------|
| A0644 | | | | | | | | | |
| 0645 | REP | 3 | LAST 762 | 26,2675 | 56573 | 0 | | | TFP/TRIG |

| | | | | | | | | | |
|-------|--|--|--|---------|-------|---|--|------|----------|
| A0646 | | | | | | | | CALL | |
| 0647 | | | | 26,2676 | 77624 | 1 | | | FISHCALC |

| | | | | | | | | | |
|------|-----|---|----------|---------|-------|---|--|------|--------|
| 0648 | REP | 2 | LAST 762 | 26,2677 | 55027 | 1 | | CALL | |
| 0649 | | | | 26,2700 | 77624 | 1 | | | VRCALC |

| | | | | | | | | | |
|------|-----|---|--|---------|-------|---|--|------|----------|
| 0650 | REP | 1 | | 26,2701 | 56626 | 0 | | CALL | |
| 0651 | | | | 26,2702 | 77624 | 1 | | CALL | DISPTARG |

| | | | | | | | | | |
|-------|-----|---|--|---------|-------|---|--|------|----------|
| 06511 | REP | 1 | | 26,2703 | 56613 | 0 | | CALL | |
| 06512 | | | | 26,2704 | 77624 | 1 | | | DISPTARG |

| | | | | | | | | | |
|-------|-----|---|----------|---------|-------|---|--|--------|------|
| 06513 | REP | 2 | LAST 762 | 26,2705 | 56613 | 0 | | STCALL | RTGO |
| 06514 | REP | 5 | LAST 275 | 26,2706 | 37714 | 1 | | | |

FDL LEFT AT ZERO BY TARGETING

ESTABLISH MU FOR ORBITAL ENTRIES

FILL VAC AREA WITH CONIC PARAMETERS

1 ST GUESS AT TERMINAL RADIUS (-29)
SAVES MPAC IN RTERM (18D)

CALC SDELTA/2, CDELTA/2
RETURN WITH S(THETA) IN MPAC

GET FISCHER RADIUS (-29) M
ANS IN MPAC AND IN ERADM.

SAVES MPAC IN RTERM (18D)

NEGATIVE AS IN COUNTDOWN.
DECR TTE FROM BASE TTE1. (RESTART)
ENLIST AND DSKY WILL USE TTE.
LET MISS CONTRL DECR BY ELAPSED TIME
TTE= TIME FROM NOW TO ENSALT + FISCHER

S(THETA) IN MPAC ON RETURNING
AND THETA= RANGE FROM NOW TO ENSALT



L P61-P67

A0726
 0727
 0727
 A0728
 0729
 0729

 R0730 300KFT 20BC 91440 B-29 (-29) M
 R0731 ENSALT 20BC 88759.2 B-29 284843 FT (-29) M (ORBITAL REENTRY)
 R0732 ENSALT 20BC 90857 B-29 297431 FT (-29) M (LUNAR REENTRY)

 0733 26,3023 32525 1 KRA 20BC .833333333
 0733 26,3024 12525 0
 0734 REF 3 LAST 510 23,2461 300KFT EQUALS MINPERB
 0735 26,3025 77777 0 VEMSCON 20BC -.0388876 B-14 = -HS D /2 PI (-14) M SQ/ CS SQ
 0735 26,3026 76601 1
 A0736 =- 16389 .050 32.2 .3048 .3048/2 PI (-14)

ASSUMES L/D = 0.3, BANK = 0.

6480097.18 B-29 RPAD +284843 FT =21 194 545 FT

RPAD DEFINED AS 20 909 901.57 FT =6 373 336 M METERS

26,3017 00305 1 RTRIAL 20BC

26,3020 04541 0

26,3021 00003 1 400KFT 20BC

26,3022 27040 0

R0730 300KFT 20BC 91440 B-29 (-29) M

R0731 ENSALT 20BC 88759.2 B-29 284843 FT (-29) M (ORBITAL REENTRY)

R0732 ENSALT 20BC 90857 B-29 297431 FT (-29) M (LUNAR REENTRY)

0733 26,3023 32525 1 KRA 20BC .833333333

0733 26,3024 12525 0

0734 REF 3 LAST 510 23,2461 300KFT EQUALS MINPERB

0735 26,3025 77777 0 VEMSCON 20BC -.0388876 B-14 = -HS D /2 PI (-14) M SQ/ CS SQ

0735 26,3026 76601 1 =- 16389 .050 32.2 .3048 .3048/2 PI (-14)

A0736

L P61-P67 SUBROUTINE PAGE NO. 24 Pg 53

R0737 SUBROUTINE NAME' FISHCALC (USED BY 861.2) DATE' 01.21.67
R0739 MOD NO' 0 LOG SECTION' P61-P67
R0741 MOD BY' MORTH / BAINSPATHER
R0742 MOD NO' 1 MOD BY' RR BAINSPATHER DATE' 11 MAY 67 INCLUDE GETRAD CALL
R0744 FUNCTIONAL DESCRIPTION' GIVEN THE PRESENT POSITION, UNITR, CALCULATE A NEW UNITR THAT IS ROTATED THROUGH
R0746 TRANSFER ANGLE, THETA, ALONG TRAJECTORY. THEN CALCULATE SIN(LAT) AND USE TO OBTAIN FISCHER RADIUS.

R0748 SINCE FISHCALC USES UNI (LEFT BY ENTRY) BATH SCALING IS ASSUMED. (WILL IMPROVE FOR SUITABLE TENANT)

R0750 CALLING SEQUENCE' CALL
R0751 FISHCALC
R0752 ENTER WITH .5 SIN(THETA) IN MPAC.
R0753 PUSHLOC IS AT PDL+0, AN ARBITRARY BASE VALUE IF LEO 8D

R0754 SUBROUTINES CALLED' GETRAD
R0755 NORMAL EXIT MODE' RVO
R0756 EXIT MODES' NONE
R0757 OUTPUT' BRADM (-29) M IN MPAC ON RETURNING
R0758 NEW UNIT VECTOR NOT SAVED.
R0759 SIN(LAT) NOT SAVED.
R0760 PUSHLOC AT PDL+0
R0761 ERASABLE INITIALIZATION REQUIRED'
R0762 SDEL/2 =SIN(THETA) /2, IN MPAC
R0764 CDEL/2 =COS(THETA) /2, STORED IN PDL 14D
R0766 RONE (-29) M
R0768 VONE (-7) M/CS
R0770 URONE UR/2
R0772 UNI .5 UNIT V*
R0774 UNITW UNIT NORTH POLE
R0776 DERRIS' QPRRT, PDL+0 ... PDL+5
R0777

LEFT BY THW/TRIG
LEFT BY THW/TRIG
LEFT BY USER
LEFT BY USER
LEFT BY USER
LEFT BY USER / P61
LEFT BY END LOAD

A0778
0779 26,3027 41315 0 FISHCALC PDVL VAV
0780 REP 3 LAST 144 26,3030 02343 1 URONE
0781 REP 3 LAST 144 26,3031 03502 0 UNI
0782 26,3032 78561 1 VXSC VSL1
A0783
0784 26,3033 14315 0 PDVL VXSC
0785 REP 4 LAST 766 26,3034 02343 1 URONE
0786 REP 2 LAST 634 26,3035 00011 1 CDEL/2
0787 26,3036 45456 1 VAD STADR
07871 REP 1 26,3037 74235 0 STORE URH
0788 26,3040 12441 0 DOT S.1
0789 REP 1 LAST 529 26,3041 01714 1 UNITW
0790 REP 12 LAST 186 26,3042 02156 1 STORE ALPHAV +4
0791 26,3043 77650 1 DUMPFISH GOTO
0792 REP 2 LAST 618 26,3044 26437 0 GETRAD

URPR = UR CDEL/2 + UROR SDEL/2
SIN(THETA) /2 FROM PDL+0
TO PDL+0, +6
COS(THETA) /2
FOR USE IN BRSD FROM EMS DISPLAY
PULL UNIT VECTOR UNIT NORTH
= .5 SIN(LAT)

SAVES FISCHER RAD (-29) M IN BRADM AND
IN MPAC. RETURNS TO CALLR VIO QPRRT.

L P61-P67 USER=5 PAGE NO. 25 B8 83

P0794 SUBROUTINE NAME' VGMALC (USED BY 861.2) DATE' 01.21.67
R0796 MOD NO' 0 LOG SECTION' P61-P67
R0798 MOD BY' NORTH / BAINSPATHER
R0799 MOD NO' 1 MOD BY' RR BAINSPATHER DATE' 11 APR 67
R0800 MOD NO' 2 MOD BY' RR BAINSPATHER DATE' 21 NOV 67 VARIABLE MU ADDED.
R0802 MOD NO' 3 MOD BY' RR BAINSPATHER DATE' 21 MAR 68 ACCEPT DIFFERENT EARTH/MOON SCALE
R0804 FUNCTIONAL DESCRIPTION' EARTH CENTERED VIS VIVA CALCULATION OF TERMINAL VELOCITY AND GAMMA (REL TO
R0806 HORIZONTAL) GIVEN THE SCALAR QUANTITIES' PRESENT RADIUS AND VELOCITY AND THE TERMINAL RADIUS.
R0808 THE USER MUST APPEND PROPER SIGN TO GAMMA, SINCE IT IS CALCULATED AS A POSITIVE NUMBER.
R0810 THE EQUATIONS ARE
R0811 $VGAM = \sqrt{VN^2 + 2(RN - RTERM) / (RN + RTERM)} \cdot RNMU$
R0812 $COSGM = H / RTERM \cdot VGAM = \sqrt{LCP} / (RTERM \cdot VGAM / RNMU)$
R0813 VGMALC ASSUMES THAT THE TERMINAL RADIUS IS LESS THAN THE PRESENT RADIUS. BOTH CALCTPF AND CALCTPR
R0815 MAKE THIS ASSUMPTION.
R0816 CALLING SEQUENCE' CALL STCALL RTERM
R0817 VGMALC PREVGAM
R0818 PUSHLOC AT PDL+0, ARBITRARY IF LEO 12D
R0819 C(MPAC) UNSPECIFIED C(MPAC)=NEW RTERM
R0820 SUBROUTINES CALLED' NONE
R0821 NORMAL EXIT MODE' RVO
R0822 ALARMS' NONE
R0823 OUTPUT' GAMMA / 360 IN MPAC, POSITIVE NUMBER
R0824 VGAM E'(-7) M'(-5) M/CS IN PDL+0
R0825 PUSHLOC AT PDL+2
R0826 ERASABLE INITIALIZATION RECD'
R0827 TPF/RNMU E'(17) M'(14) 1/SQRT(MU) LEFT BY TPFCONIC.
R0829 RMA01 E'(-29) M'(-27) M PRESENT RADIUS LENGTH LEFT BY TPFCONIC
R0831 RMA0 E'(-29+NR) M'(-27) M NORM LENGTH OF PRESENT POSITION LEFT BY TPFCONIC
R0833 M'(-27+NR)
R0834 RTERM E'(-29) M'(-27) M TERMINAL RADIUS LENGTH LEFT BY CALCTPF
R0836 NRTERM E'(-29+NR) M'(-27) M NORM LENGTH OF TERMINAL RADIUS LEFT BY CALCTPF
R0838 M'(-27+NR)
R0839 TPFV80 E'(20) M'(18) 1/M -(V SQ/MU)' PRESENT VELOCITY, NORM LEFT BY TPFCONIC
R0841 TPFNP E'(-38+2NR) M'(-36+2NR) M LCP, SEMI-LATUS RECTUM, WEIGHT NR LEFT BY TPFCONIC
R0843 M'(-38+2NR)
R0844 DEBRIS' QPRST, PDL+0 ... PDL+3
R0845 RTERM, NRTERM IF PREVGAM ENTERED.



L P61-P67

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| | | | | | | | | | |
|--------|----------------|---------|---------|----------|-------|----------|--|--|---|
| P0846 | | | | | | | | | |
| 0847 | | 26,3045 | 77657 0 | PREVGAM | SL* | | | | ENTER WITH NEW RTERM IN MPAC |
| A0848 | | | | | | | | | E'(-29) M'(-27) |
| 0849 | | 26,3046 | 20201 0 | | | 0,1 | | | X1 = -NR |
| 0850 | REP 1 | 26,3047 | 00021 1 | STORE | | NRTERM | | | RTERM M E'(-29+NR) M'(-27+NR) |
| 0851 | | 26,3050 | 41345 0 | VOANCALC | DLOAD | DMP | | | |
| 0852 | REP 1 | 26,3051 | 00041 1 | | | NRMAG | | | RMAG M E'(-29+NR) M'(-27+NR) |
| 0853 | REP 2 LAST 788 | 26,3052 | 00021 1 | | | NRTERM | | | RTERM M E'(-29+NR) M'(-27+NR) |
| 0854 | | 26,3053 | 45325 1 | FDDL | | DSU | | | RMAG RTERM M E'(-58+2NR) M'(-54+2NR) |
| 0855 | REP 2 LAST 788 | 26,3054 | 00041 1 | | | NRMAG | | | RMAG M E'(-29+NR) M'(-27+NR) |
| 0856 | REP 3 LAST 788 | 26,3055 | 00021 1 | | | NRTERM | | | RTERM M E'(-29+NR) M'(-27+NR) |
| 0857 | | 26,3056 | 56257 1 | SL* | | DDV | | | 2(RV-RTERM) E'(-30+NR) M'(-28+NR) |
| 0858 | | 26,3057 | 20171 1 | | | 0 -SD,1 | | | (-8+NR) M'(-28+NR) |
| A0859 | | | | | | | | | PUSH UP PRODUCT. |
| 0860 | | 26,3060 | 77625 0 | DSU | | | | | |
| 0861 | REP 1 | 26,3061 | 00025 0 | | | TPPVSO | | | -(V SQ/MJ) E' (20) M' (18) |
| 0862 | | 26,3062 | 41566 1 | SRRT | | PUSH | | | SAVE VGAM/RT(MJ) FOR NOW. E'(10) M'(9) |
| 0863 | | 26,3063 | 65271 0 | DDV | | FDDL | | | XCH PDL+0, LEAVING VGAM FOR OUTPUT. |
| A0864 | | | | | | | | | VGAM TO PDL M/CS E' (-7) M' (-2) |
| 0865 | REP 4 LAST 510 | 26,3064 | 00037 0 | | | TPP/RIMJ | | | E' (17) M' (14) |
| 0866 | | 26,3065 | 65205 0 | | | FDDL | | | RTERM VGAM/RT(MJ) E'(-19+NR) M'(-18+NR) |
| 0867 | REP 4 LAST 788 | 26,3066 | 00021 1 | DMP | | NRTERM | | | RTERM M E'(-29+NR) M'(-27+NR) |
| 0868 | REP 1 | 26,3067 | 00035 1 | | | TPPNP | | | LC P =H,H/MJ M E'(-38+2NR) M'(-36+2NR) |
| 0869 | | 26,3070 | 56386 1 | SRRT | | DDV | | | E'(-19+NR) M'(-18+NR) |
| A0870 | | | | | | | | | PUSH UP DEN E'(-19+NR) M'(-18+NR) |
| A08701 | | | | | | | | | USE DDV OVFL AS LIMITER (YCOSY ±1.0) |
| 0871 | | 26,3071 | 65542 1 | SR1 | | ACOS | | | |
| 0872 | | 26,3072 | 77616 0 | DUMPGAM | | RVO | | | |

A08721

CALLER MUST SUPPLY OWN SIGN ...

A0873

22# 27MS

L P81-P87 USER=8 PAGE NO. 27 Pg 53

R0874 SUBROUTINE NAME' TFF/TRIG (USED BY 861.2) DATE 01.17.67
 R0876 MOD NO' 0 LOG SECTION' P81-P87
 R0878 MOD BY' RR BAINSPATHER
 R0879 MOD NO' 1 MOD BY' RR BAINSPATHER DATE' 14 APR 67
 R0880 MOD NO' 2 MOD BY' RR BAINSPATHER DATE' 21 MAR 68 ACCEPT DIFFERENT EARTH/MOON SCALE
 R0882 FUNCTIONAL DESCRIPTION' USED BY ENTRY DISPLAY TO CALCULATE SIN(THETA), COS(THETA) FROM DATA LEFT IN
 R0884 PDL BY TFF SUBROUTINES. THE EQNS ARE
 R0885 $COS(THETA) = 1 - 2 \frac{ABS(ARG)}{(RN RTERM (1+X))}$
 R0886 $SIN(THETA) = SON(ARG) SORTN 1 - COS(THETA)$
 R0887 WHERE THETA = TRANSFER ANGLE
 R0888 AND ARG = P Z ABS(Z) IF ALFA ZZ LEO 1
 R0889 ARG = (P / ALFA) SON(Q1 + R 1/2) IF ALFA Z Z G 1
 R0891 AND ARG HAS BEEN APPRIED WITH THE SIGN OF SIN(THETA).
 R0893 CALLING SEQUENCE' CALL TFF/TRIG
 R0895 PUSHLOC AT PDL+0, ARBITRARY IF NOT EQ 14D
 R0896 C(MPAC) UNSPECIFIED

R0898 SUBROUTINES CALLED' NONE
 R0899 NORMAL EXIT MODES' RVD
 R0900 ALARMS' NONE
 R0901 OUTPUT' C(MPAC) = .5 SIN(THETA)
 R0902 CDLFP/2 = .5 COS(THETA) (IN PDL 14D)
 R0903 PUSHLOC AT PDL+0
 R0904 ERASABLE INITIALIZATION REQUIRED'
 R0905 TFFX X LEFT BY CALCTFF OR CALCTPR
 R0907 TFFTEM E' (-59+2NR) ARG LEFT BY CALCTFF OR CALCTPR
 R0909 M' (-55+2NR) WHERE ARG = LCP ZZ SON(DLFP) OR ARG = LCP/ALFA SON(DLFP)
 R0911 NRTERM M' (-29+NR) M NORM LENGTH OF TERMINAL RADIUS LEFT BY CALCTFF OR CALCTPR
 R0913 M' (-27+NR)
 R0914 NRMOG M' (-29+NR) M NORM LENGTH OF PRESENT POSITION LEFT BY TFFCONIC
 R0916 M' (-27+NR)
 R0917 DEPRIS' QPRST, CDLFP/2

| | | | | | | | |
|-------|-----|---|----------|---------|----------|-------|----------|
| 09172 | | | 27,2573 | | BANK | 27 | |
| 09173 | REP | 1 | 27,2000 | | SETLOC | P8055 | |
| 09175 | | | 27,2573 | | BANK | | |
| 0918 | | | 27,2573 | 70545 1 | TFF/TRIG | DLOAD | SR1 |
| 0919 | REP | 1 | 27,2574 | 00043 0 | | | TFFX |
| 0920 | | | 27,2575 | 41215 1 | DAD | | DMP |
| 0921 | REP | 8 | LAST 635 | 27,2576 | | | HIDPHALP |
| 0922 | REP | 3 | LAST 766 | 27,2577 | | | NRMOG |
| 0923 | | | 27,2600 | 55205 0 | DMP | | RDDV |
| 0924 | REP | 5 | LAST 766 | 27,2601 | | | NRTERM |
| 0925 | REP | 1 | 27,2602 | 00045 0 | | | TFFTEM |
| 0926 | | | 27,2603 | 44246 1 | ARS | | RDSJ |
| 0927 | REP | 9 | LAST 769 | 27,2604 | | | HIDPHALP |
| 0928 | REP | 3 | LAST 766 | 27,2605 | STORE | | CDLFP/2 |
| 0929 | | | 27,2606 | 57516 1 | DSQ | | DCOMP |

RMAG M E'(-29+NR) M'(-27+NR)
 RTERM M E'(-29+NR) M'(-27+NR)
 P ZSQ OR P/ALFA E'(-59+2NR) M'(-55+2NR)
 THE SIGN IS FOR SDRLP.
 .5 COS(THETA)
 KREP HONRST FOR SORT.



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| | | | | | | |
|------|-----|--------|---------|---------|----------|---------|
| 0930 | | | 27,2607 | 75415 0 | DAD | SCRT |
| 0931 | REP | 1 | 27,2610 | 15322 0 | | HIDP1/4 |
| 0932 | | | 27,2611 | 43565 0 | DUMPTRIG | RVO |
| 0933 | REP | 2 LAST | 27,2612 | 00045 0 | | TPPTM |

APPIX SIGN(DELE/2)
RETURN WITH .5 SIN(THETA) IN MPAC

A0935

16W 15 MS

| | | | | | | |
|------|-----|--------|---------|---------|----------|----------|
| 0936 | | | 27,2613 | 77620 0 | DISPTARG | STO |
| 0937 | REP | 4 LAST | 27,2614 | 03373 0 | | |
| 0939 | | | 27,2615 | 45205 1 | DMP | 60GENRET |
| 0940 | REP | 1 | 27,2616 | 15002 1 | | DSU |
| 0044 | REP | 4 LAST | 27,2617 | 03733 0 | | KTSTA1 |
| 0945 | REP | 6 LAST | 27,2620 | 37606 0 | STCALL | TTS1 |
| 0946 | REP | 2 LAST | 27,2621 | 48225 0 | | DTEAROT |
| 0947 | | | 27,2622 | 77624 1 | CALL | BARROT2 |
| 0040 | REP | 2 LAST | 27,2623 | 56626 0 | | VRCALC |
| 0949 | | | 27,2624 | 77650 1 | GOTO | |
| 0950 | REP | 5 LAST | 27,2625 | 03373 0 | | 60GENRET |
| 0951 | | | 27,2626 | 50375 0 | VRCALC | DOT |
| 0952 | REP | 2 LAST | 27,2627 | 03542 1 | VLOAD | URH |
| 0953 | REP | 3 LAST | 27,2630 | 03474 0 | | RT |
| 0954 | | | 27,2631 | 05512 1 | SL2 | ACOS |
| 0956 | | | 27,2632 | 77616 0 | RVO | |

C(MPAC) = TROO ESTIMATE

R0957 END OF PROGRAM 561.2

PROGRAM DESCRIPTION 262.3 DATE 10JAN67

MOD NO 1 L00 SECTION P80-P87

MOD BY ZELDIS

MOD NO 2 MOD BY RR BAIRNSPATER

MOD NO 3 MOD BY RR BAIRNSPATER

CHANGED TO REF COORDS. DATE 15 MAY 67

ALPAPAD CHANGES MADE. DATE 17 JAN 68

FUNCTIONAL DESCRIPTION COMPUTES DESIRED GIMBAL ANGLES FOR ENTRY ATTITUDE

THE FOLLOWING TRAJECTORY TRIAD IS AVAILABLE IN MEMORY AND IS COMPUTED EACH 2 SECONDS BY CM/POSE IN

REFERENCE COORDINATES (V = VELOCITY RELATIVE TO EARTH)

UVA = UNIT(V*H)

UVA = UNIT(V*H)

UVA = UNIT(V*H)

GENERATE A DESIRED BODY TRIAD FOR TRIMMED FLIGHT WITH RESPECT TO THE RELATIVE VELOCITY VECTOR, USING

ROLL COMMAND AND TRIM ANGLE OF ATTACK

UVD = UNIT(U*DKUKA) SIN(ALPATRIM) + UVA COS(ALPATRIM)

UVD = UVA COS(ROLLC) + UZA SIN(ROLLC)

UVD = UVD + UVD

USE THE DESIRED SET (IN REFERENCE COORDS) AND REFORMAT TO CALL CALCOA AND OBTAIN GIMBAL ANGLES

IN 25.0 IN MPAC, +2 AND TRIMAD, +2.

CALLING SEQUENCE

L CALL

L-1

262.3

NORMAL EXIT MODE RETURN VIA GPRST DIRECTLY FROM CALCOA.

SUBROUTINES CALLED

CALCOA

ALARM OR ABORT MODES

NONE

BRAGABLES INITIALIZATION REQUIRED

ROLLC ROLL COMMAND

ALPAPAD SP 15.0 /180

UVA/2 REF COORDS

UVA/2 REF COORDS

UVA/2 REF COORDS

LEFT BY CM/POSE

LEFT BY CM/POSE

LEFT BY CM/POSE

OUTPUT OWHI GIMBAL ANGLES (O, I, M) 2'S COMP TP (O, I, M)/180

DEBRIS

QTRM, GPRST, PUSHLIST

1004

REF 1 10,2302

BANK 10

1005

10,2000

SETLOC P8054

1006

10,2302

BANK 10

L SERVICER207

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R0001 PROGRAM NAME - PREREAD, READACCS, SERVICER, AVERAGE G.
R0002 MOD NO. 00 BY M.HAMILTON DEC.12, 1966
R0003 FUNCTIONAL DESCRIPTION

R0004 THE ROUTINES DESCRIBED BELOW ARE USED TO CALCULATE VALUES OF RN, VN, AND GDT/2 DURING ACCELERATED FLIGHT.
R0006 THE SEVERAL ROUTINES COMPRISE A PACKAGE AND ARE NOT MEANT TO BE USED AS SEPARATE SUBROUTINES.

R0008 GENERAL REFERENCES TO SERVICER OR AVERAGE G ARE UNDERSTOOD TO REFER TO THE ENTIRE SET OF ROUTINES INCLUDING
R0010 READACCS, SERVICER, AVERAGE G, INTERREAD, SMOOTHER, AND ANY ADDITIONAL ROUTINES ATTACHED AT AVGEEXIT (SEE BELOW).

R0012 PROGRAMS INITIATING SERVICER ARE REQUIRED TO MAKE A WAITLIST CALL FOR PREREAD (OR, IF LIPTOFF, FOR BIBIBIAS)
R0014 AT 2 SECONDS BEFORE THE FIRST AVERAGE G UPDATE IN ORDER TO INITIALIZE THE SEQUENCE, WHICH WILL RECUR EVERY
R0016 2 SECONDS FROM THAT TIME ON AS LONG AS AVEGFLAG REMAINS SET.

R0017 THE USE OF ERASABLE AVGEEXIT ALLOWS VARIOUS ROUTINES TO BE PERFORMED AS PART OF THE NORMAL CYCLE (SEE
R0019 EXPLANATION OF AVGEEXIT BELOW).

R0020 DESCRIPTIONS OF INDIVIDUAL ROUTINES FOLLOW.
R0021 PREREAD

R0022 PREVIOUSLY EXTRAPOLATED VALUES COPIED FROM RN1, VN1, AND PIPTIME1 INTO RN, VN, AND PIPTIME.
R0024 LASTBIAS JOB SCHEDULED.

R0025 PIPS READ AND CLEARED VIA PIPASR SUBROUTINE.

R0026 AVERAGE G FLAG SET ON.

R0027 DRIFT FLAG SET OFF.

R0028 V37 FLAG SET ON.

R0029 INITIALIZATION OF 1) THRUST MONITOR (DMON) - DMCNTR SET TO ONE.
R0031 2) TOTAL ACCUMULATED DELAY VALUE (DVTOTAL) - SET TO ZERO.
R0033 3) AXIS VECTOR (AXIS) - SET TO (.5,0,0).

R0034 NORMALIZE JOB SCHEDULED.

R0035 READACCS TASK CALLED IN 2 SECONDS.

R0036 NORMALIZE

R0037 GDT/2 INITIALIZED VIA CALCORAV SUBROUTINE.

R0038 READACCS

R0039 IF QMON FLAG SET QUIKREAD ROUTINE IS PERFORMED BEFORE PIPASR ZEROS THE PIPA REGISTERS, AND THE 1/2 SEC
R0041 QMONITOR LOOP IS INITIATED TO PROVIDE DOWNLINK INFORMATION DURING ENTRY.

R0043 PIPS READ AND CLEARED BY PIPASR SUBROUTINE.

R0044 IF QM/DSBY IS ON, ENTRY VARIABLES INITIALIZED AND SETJTAG TASK CALLED.



L. SERVICER207

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00047 IF AVERAGEG FLAG ON READACCS CALLED TO RECYCLE IN 2 SECONDS.
00048 IF AVERAGEG FLAG OFF AVERAGE G EXIT (AVGEXIT) SET TO 2CADR AVGRND FOR FINAL PASS.
00050 SERVICER JOB SCHEDULED.
00051 TEST CONNECTOR OUTBIT TURNED ON.
00052 QMONTOR

00053 A SEQUENCE OF THREE PASSES THROUGH QUICKREAD FOLLOWING A CALL TO READACCS WITH QMONTPLG SET AT 1/2
00055 SEC INTERVALS. INTERVALS ARE COUNTED OUT BY PIPCTR, INITIALISED AT 3 BY READACCS

00057 QUICKREAD

00058 READS CURRENT PIPS INTO X,Y,ZPIPRUF. READS OLD X,Y,ZPIPRUF INTO X,Y,ZOLDRUF. VALUES ARE SENT TO
00060 DOWNLIST DURING ENTRY.

00061 SERVICER

00062 DELV VALUES CHECKED TO DETECT RUNAWAY PIP -
00063 IF BAD PIP 1) ALARM SENT.
00064 2) COMPENSATION, DVTOTAL ACCUMULATION, AND DVMON BYPASSED. CONTROL
00066 TRANSFERRED TO AVERAGE G.
00067 PIPS COMPENSATED VIA 1/PIPA SUBROUTINE.
00068 DVTOTAL INCREMENTED BY ABSOLUTE VALUE OF DELV.
00069 THRUST MONITOR (DVMON) PERFORMED UNLESS IDLE FLAG IS ON.
00070 CONTROL TRANSFERRED TO AVERAGE G.
00071 DVMON

00072 THRESHOLD VALUE (PLACED IN DVTHRUSH BY USER) CHECKED AGAINST ABSOLUTE VALUE OF DELV TO CHECK
00074 THRUST LEVEL.
00075 IF THRUST 1) ULLAGE OFF ROUTINE PERFORMED.
00076 2) STEERING FLAG TURNED ON AT FIRST DETECTION OF THRUST.
00078 3) CONTROL TRANSFERRED TO AVERAGE G.
00079 IF NO THRUST 1) ON FIRST PASS THROUGH MONITOR, CONTROL TRANSFERRED TO AVERAGE G.
00081 2) ON SUBSEQUENT PASSES, CONTROL TRANSFERRED TO ENGINE FAIL ROUTINE IF THRUST
00083 HAS FAILED FOR 3 CONSECUTIVE PASSES.
00084 ENGINE FAIL

00085 ENCFAIL1 TASK CALLED IN 2.5 SECONDS. THIS WILL RETURN CONTROL TO TIG-5 SO THAT THE IGNITION
00087 SEQUENCE MAY BE REPEATED.
00088 ENGINOP3 PERFORMED.
00089 DAP SET UP FOR RCS.
00090 AVERAGE G

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R0091 RN1, VN1, GDT1/2 CALCULATED VIA CALCRVG ROUTINE BY UPDATING RN, VN WITH DELV AND AN AVERAGED VALUE
 R0092 OF GDT/2.
 R0093 RN1, VN1, GDT1/2, PIPTIME1 COPIED INTO RN, VN, GDT/2, PIPTIME FOR RESTART PROTECTION.
 R0094 CONTROL TRANSFERRED TO ADDRESS SPECIFIED BY USER (OR BY READACC FOR LAST PASS) IN AVGXIT.
 R0095 LAST PASS (AVGEND) 1) PRESS FALL GYRO COMPENSATION SET UP.
 R0096 2) DRIFT FLAG TURNED ON.
 R0100 3) STATE VECTOR TRANSFERRED VIA AVSTOMID ROUTINE.
 R0102 4) ONMONITOR FLAG RESET.
 R0103 5) V37 FLAG RESET.
 R0104 6) TEST CONNECTOR OUTBIT RESET.
 R0105 7) CONTROL TRANSFERRED TO CANV37 TO CONTINUE MM CHANGE ROUTINE (ROO).
 R0106 CALLING SEQUENCE

R0109 PREREAD ENTERED DIRECTLY FROM TIO-30 VIA POSTJUMP.
 R0110 READACC8 CALLED AS WAITLIST TASK.
 R0112 SUBROUTINES CALLED

R0113 UTILITY ROUTINES - PHASCHNG FLAGUP FLAGDOWN NOVAC FINDVAC WAITLIST ALARM NEWPHASE 2PHSCHNG

R0115 OTHER - PIPASR 1/PIPA CALCRVAV CALCRVG AVSTOMID
 R0116 NORMAL EXIT MODES

R0117 ENDOPJOB TAKEOVER CANV37

R0118 AVGXIT - THIS IS A DOUBLE PRECISION ERASABLE LOCATION BY WHICH CONTROL IS TRANSFERRED AT THE END
 R0120 OF EACH CYCLE OF AVERAGE G.
 R0121 THE 2CADR OF A ROUTINE TO BE PERFORMED AT THAT TIME (E.G., STEERING EQUATIONS TO BE PERFORMED
 R0122 AT 2 SECOND INTERVALS) MAY BE SET BY THE USER INTO AVGXIT.
 R0125 ALL SUCH ROUTINES SHOULD RETURN TO SERVEKIT, WHICH IS THE NORMAL EXIT FROM AVERAGE G.

R0127 SERVEKIT - DOES A PHASE CHANGE FOR RESTART PROTECTION AND GOES TO ENDOPJOB.
 R0129 THE 2CADR OF SERVEKIT IS SET INTO AVGXIT BY THE USER IF NO OTHER ROUTINE (SEE ABOVE).

R0131 AVGEND - LAST PASS OF AVERAGE G EXITS HERE, BYPASSING SPECIAL ROUTINE (SEE ABOVE UNDER READACC8).
 R0133 FINAL EXIT IS TO CANV37. P AVERAGE G).
 R0135 OUTPUT

R0136 DV/TOTAL(2) PIPTIME(2) XPIPRUP(2) YPIPRUP(2) ZPIPRUP(2)
 R0137 RN(6) REFERENCE COORD. SCALED AT 2(+29)M/CS
 R0138 VN(6) REFERENCE COORD. SCALED AT 2(+7)M/CS
 R0139 GDT/2(6) REFERENCE COORD. SCALED AT 2(+7)M/CS
 R0140 DELV(6) STARLE MEMB. COORD. SCALED AT 2(+14)*5.85*10(-4)M/CS (KPIP1 USED TO GET DV/2 AT 2(+7))

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R0142 DEL/REP(6) REFERENCE COORD. SCALED AT 2(+1)M/CS

R0143 INITIALIZATION

R0144 ONMONITOR FLAG SET BY ENTRY TO SHOW PIPBUF VALUES REQUIRED.
 R0145 IDLE FLAG ON IP DVMON TO BE BYPASSED.
 R0146 DVMONUSH SET TO APPROPRIATE VALUE FOR DVMON.
 R0147 AVGEKIT SET TO 2CADR OF ROUTINE, IF ANY, TO BE PERFORMED AFTER EACH CYCLE OF AVERAGE G. IF NO ROUTINE
 R0149 TO BE DONE, AVGEKIT SET TO SERVEKIT.

R0150 VALUES NEEDED
 R0151 REFPMAT
 R0152 UNITW - FULL UNIT VECTOR, IN REFERENCE COORD., OF EARTH'S ROTATIONAL VECTOR
 R0154 RN1, VN1, PIPTIME1 - IN REFERENCE COORD., CONSISTENT WITH TIME OF EXECUTION OF PREREAD

R0154 DEBRIS

R0157 CENTRALS A, L, Q
 R0158 OTHER INTERNAL - DVCNTR(1) PIPAGE(1) PIPCTR(1) AVGEKIT(2)
 R0159 EXTERNAL - ITEMP1(1) ITEMP2(1) RUPTRSG1(1) TEMX(1) TEMY(1) TEMZ(1)
 R0161 USEFUL DEBRIS

R0162 THESE LOCATIONS USED AS BUFFER STORAGE FOR NEWLY CALCULATED VALUES OF RN, VN, GDT/2,
 R0165 AND PIPTIME DURING PERFORMANCE OF SERVICER ROUTINES.

R0167 UNITR - HALF UNIT VECTOR OF RN, REFERENCE COORD.

R0168 RMAG SCALED AT 2(+58) IN 32D.
 R0169 RMAG80 SCALED AT 2(+58) IN 34D.
 R0170 (RS/RMAG)80 IN 32D.

R0171 27,2633 BANK 27
 R0172 REP 1 37,2000 SETLOC SERVICES
 R0173 37,2604 BANK

R0174 REP 13 LAST 759 BY,1431 EBANK= DVCNTR

R0175 ***** PREREAD *****

R0177

R0178 REP 1 COUNT 37/SERV

R0185 REP 1 37,2604 3 4788 1 PREREAD CAF PRIO21 CALLER MUST PROTECT PREREAD

R0186 REP 28 LAST 752 37,2605 0 5027 1 TC NOVAC

R0187 REP 6 LAST 299 E3,1460 EBANK= NRDK

R0188 REP 1 37,2606 03638 1 2CADR LASTBIAS DO LAST GYRO COMPENSATION IN FREE FALL

R0189 REP 1 37,2607 14063 1

A01882

A01883

A01884

A01885

CALL-TO AND LASTBIAS ITSELF ARE NOT PROTECTED. RERRADAC SETS 1/PIPADT TO 2.0 SECS IN CASE LASTBIAS LOST. (REDUNDANT IF LASTBIAS IS ACK)



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| | | | | | | | | | | | |
|-------|-----|-----|------|-----|---------|----|-------|---|----------|--------|------------|
| 0188 | REP | 2 | LAST | 527 | 37,2610 | 0 | 2825 | 1 | REDO5.31 | TC | PREREAD1 |
| 0190 | REP | 4 | LAST | 225 | 37,2611 | 3 | 7867 | 1 | | CAP | PRIO32 |
| 0191 | REP | 28 | LAST | 758 | 37,2612 | 0 | 5042 | 1 | | TC | PINDVAC |
| 0192 | REP | 14 | LAST | 776 | 37,1431 | | | | | EBANK= | DVCONTR |
| 0193 | REP | 3 | LAST | 530 | 37,2613 | 0 | 3141 | 0 | | 2CADR | NORMLIZE |
| 0193 | | | | | 37,2614 | | 78067 | 1 | | | |
| 0194 | REP | 3 | LAST | 642 | 37,2615 | 3 | 4735 | 1 | | CAP | 2SECS |
| 0195 | REP | 37 | LAST | 758 | 37,2616 | 0 | 5140 | 1 | | TC | WAITLIST |
| 0196 | REP | 19 | LAST | 758 | 36,1661 | | | | | EBANK= | ACQ |
| 0197 | REP | 2 | LAST | 530 | 37,2617 | 0 | 2847 | 0 | | 2CADR | READACCS |
| 0197 | | | | | 37,2620 | | 76066 | 0 | | | |
| 0198 | REP | 33 | LAST | 583 | 37,2621 | 4 | 4711 | 0 | | CS | TWO |
| 0199 | REP | 7 | LAST | 654 | 37,2622 | 0 | 4114 | 1 | | TC | NEWPHASE |
| 0200 | | | | | 37,2623 | | 00005 | 1 | | OCT | 5 |
| 0201 | REP | 41 | LAST | 748 | 37,2624 | 1 | 5213 | 0 | | TC | TASKOVER |
| 0202 | | | | | 37,2625 | 0 | 0006 | 1 | PREREAD1 | EXTEND | |
| 0203 | REP | 17 | LAST | 217 | 37,2626 | 22 | 070 | 0 | | QXCH | RUPTRG1 |
| 0204 | REP | 1 | | | 37,2627 | 0 | 3157 | 1 | | TC | PIPASR |
| 02042 | REP | 94 | LAST | 749 | 37,2630 | 3 | 4712 | 1 | | CAP | ONE |
| 02043 | REP | 2 | LAST | 77 | 37,2631 | 55 | 230 | 0 | | TS | PIPAGE |
| 0205 | REP | 19 | LAST | 689 | 37,2632 | 4 | 0075 | 1 | | CS | FLAGRD1 |
| 0206 | REP | 58 | LAST | 724 | 37,2633 | 7 | 4712 | 0 | | MASK | BIT1 |
| 0207 | REP | 29 | LAST | 777 | 37,2634 | 28 | 075 | 1 | | ADS | FLAGRD1 |
| 0208 | REP | 16 | LAST | 677 | 37,2635 | 3 | 4672 | 0 | | CA | POSMAX |
| 0209 | REP | 14 | LAST | 657 | 37,2636 | 7 | 0076 | 1 | | MASK | FLAGRD2 |
| 0210 | REP | 15 | LAST | 777 | 37,2637 | 54 | 076 | 1 | | TS | FLAGRD2 |
| 0211 | REP | 17 | LAST | 688 | 37,2640 | 4 | 0103 | 1 | | CS | FLAGRD7 |
| 0212 | REP | 35 | LAST | 700 | 37,2641 | 7 | 4705 | 0 | | MASK | BIT6 |
| 0213 | REP | 18 | LAST | 777 | 37,2642 | 28 | 103 | 1 | | ADS | FLAGRD7 |
| 0216 | REP | 148 | LAST | 736 | 37,2643 | 3 | 4714 | 1 | | CAP | ZERO |
| 0224 | REP | 5 | LAST | 641 | 37,2644 | 55 | 425 | 1 | | TS | DVTOTAL |
| 0225 | REP | 6 | LAST | 777 | 37,2645 | 55 | 426 | 1 | | TS | DVTOTAL +1 |
| 0226 | REP | 18 | LAST | 777 | 37,2646 | 0 | 0070 | 0 | | TC | RUPTRG1 |

SET UP NORMLIZE JOB REQUIRED PRIOR TO FIRST AVERAGE G PASS

CLEAR + READ PIPS LAST TIME IN FREE FALL

SET UP PIPAGE FOR REREADAC IN CASE A RESTART OCCURS BEFORE READACCS

SET AVEG FLAG

KNOCK DOWN DRIPT FLAG

SET V37 FLAG

CLEAR DVTOTAL

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| | | | | | | | | | |
|------|-----|-----|------|-----|---------|--------|---|----------|------------|
| 0285 | REP | 4 | LAST | 430 | 37,2716 | 3 1166 | 1 | CA | DELVE |
| 0286 | REP | 2 | LAST | 114 | 37,2717 | 57=535 | 0 | XCH | ZPIBUP |
| 0287 | REP | 1 | | | 37,2720 | 55=540 | 0 | TS | ZOLDBUP |
| 0288 | REP | 18 | LAST | 778 | 37,2721 | 3 4715 | 0 | NOSAVPIP | CA FIVE |
| 0289 | REP | 4 | LAST | 213 | 37,2722 | 55=725 | 1 | TS | CM/DMDT |
| 0290 | REP | 1 | | | 37,2723 | 3 3136 | 0 | CA | JTAGTIME |
| 0291 | REP | 39 | LAST | 778 | 37,2724 | 0 5140 | 1 | TC | WAITLIST |
| 0292 | REP | 22 | LAST | 778 | E6,1661 | | | EBANK= | AOC |
| 0293 | REP | 2 | LAST | 206 | 37,2725 | 03227 | 0 | 2CADR | SETJTAG |
| 0294 | REP | | | | 37,2726 | 32066 | 0 | | |
| 0295 | REP | 26 | LAST | 754 | 37,2727 | 4 6214 | 1 | CS | THREE |
| 0296 | REP | 8 | LAST | 777 | 37,2730 | 0 4114 | 1 | TC | NEWPHASE |
| 0297 | REP | | | | 37,2731 | 00001 | 0 | OCT | 1 |
| 0298 | REP | 4 | LAST | 646 | 37,2732 | 3 4382 | 1 | CAP | OCT37 |
| 0299 | REP | 73 | LAST | 778 | 37,2733 | 54 001 | 1 | TS | L |
| 0300 | REP | | | | 37,2734 | 4 0000 | 0 | CCM | |
| 0301 | REP | 4 | LAST | 778 | 37,2735 | 52 763 | 1 | D2CH | -PHASE5 |
| 0302 | REP | 21 | LAST | 777 | 37,2736 | 4 0075 | 1 | CHEKAVEO | CS FLAGRD1 |
| 0303 | REP | 59 | LAST | 777 | 37,2737 | 7 4712 | 0 | MASK | BIT1 |
| 0304 | REP | 181 | LAST | 778 | 37,2740 | 10 000 | 0 | CCS | A |
| 0305 | REP | 1 | | | 37,2741 | 0 2761 | 0 | TC | AVEGOUT |
| 0306 | REP | 4 | LAST | 777 | 37,2742 | 3 4735 | 1 | CAP | 2SECS |
| 0307 | REP | 40 | LAST | 779 | 37,2743 | 0 5140 | 1 | TC | WAITLIST |
| 0308 | REP | 23 | LAST | 779 | E6,1661 | | | EBANK= | AOC |
| 0309 | REP | 3 | LAST | 777 | 37,2744 | 02647 | 0 | 2CADR | READACCS |
| 0309 | REP | | | | 37,2745 | 76066 | 0 | | |
| 0310 | REP | 7 | LAST | 665 | 37,2746 | 3 4675 | 1 | MAKESERV | CAP PRIO20 |
| 0311 | REP | 29 | LAST | 777 | 37,2747 | 0 5042 | 1 | TC | PINDVAC |
| 0312 | REP | 15 | LAST | 777 | E7,1431 | | | EBANK= | DVCNTR |
| 0313 | REP | 2 | LAST | 211 | 37,2750 | 03007 | 0 | 2CADR | SERVICER |
| 0313 | REP | | | | 37,2751 | 76067 | 1 | | |
| 0314 | REP | 8 | LAST | 429 | 37,2752 | 4 4710 | 1 | CS | FOUR |
| 0315 | REP | 9 | LAST | 779 | 37,2753 | 0 4114 | 1 | TC | NEWPHASE |
| 0316 | REP | | | | 37,2754 | 00005 | 1 | OCT | 5 |
| 0317 | REP | 27 | LAST | 721 | 37,2755 | 3 4702 | 0 | CAP | BIT9 |
| 0318 | REP | | | | 37,2756 | 0 0006 | 1 | EXTEND | |
| 0319 | REP | 25 | LAST | 657 | 37,2757 | 05 011 | 1 | WOR | DSALMOUT |
| 0320 | REP | 42 | LAST | 777 | 37,2760 | 1 5213 | 0 | TCP | TASKOVER |

ACTIVATE CM/RCS AFTER PIPUP TO GO IN JTAGTIME +5 CS.

1.3SPOT FOR SETJTAG

IF AVEO FLAG DOWN SET FINAL EXIT AVEO

ESTABLISH SERVICER ROUTINE

RESTART SERVICER AND READACCS

TURN TEST CONNECTOR OUTRIT ON

END PREVIOUS READACCS WAITLIST TASK



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| | | | | | | | | | |
|------|-----|----|----------|---------|--------|---|----------|----------|--------|
| 0321 | REP | 1 | | 37,2761 | 0 0008 | 1 | AVGOUT | EXTEND | |
| 0322 | REP | 2 | LAST 529 | 37,2762 | 3 2766 | 1 | DCA | AVOUTCAD | |
| 0323 | REP | 1 | | 37,2763 | 53-223 | 1 | DKCH | AVGKIT | |
| 0324 | REP | 1 | | 37,2764 | 1 2746 | 1 | TCP | MAKSERW | |
| 0325 | REP | 16 | LAST 779 | BY,1431 | | | BRANK | DVCHTR | |
| 0326 | REP | 1 | | 37,2765 | 03070 | 0 | AVOUTCAD | 2CADR | AVGEND |
| 0328 | REP | 1 | | 37,2766 | 76067 | 1 | | | |



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R0327 ROUTINE NAME: QNNITOR
 R0328 MOD 04 BY BAINSPATCHER 30 APR 1968 NEDD QNNITOR TO SAVE PIPAS EACH 0.5 SEC FOR TM ENTRY.
 R0330 MOD 03 BY FISHER DECEMBER 1967
 R0331 MOD 02 BY RYE SEPT 1967
 R0332 MOD 01 BY KOSMALA 23 MAR 1967
 R0333 MOD 00 BY KOSMALA 27 FEB 1967

R0334 FUNCTIONAL DESCRIPTION

R0335 THE PURPOSE OF QNNITOR IS TO PROVIDE 1/2 SEC. READING OF PIPAS FOR DOWNLIST DURING ENTRY.
 R0337 X,Y,ZPIPRUF CONTAIN PRESENT VALUES X,Y,ZOLDRUF CONTAIN VALUES FROM PREVIOUS READING.

R0339 CALLING SEQUENCE

R0340 CALL AS WAITLIST TASK. TERMINATES ITSELF IN TASKOVER

R0341 INITIALISATION

R0342 PIPCTR = 2 (FOR DT = 0.5 SEC)
 R0343 X,Y,ZPIPRUF SET TO PREVIOUS PIPAX,Y,Z

R0344 OUTPUT

R0345 X,Y,ZPIPRUF, X,Y,ZOLDRUF
 R0346 DERRIS

R0347 X,Y,ZPIPRUF CONTAIN LAST PIPAX,Y,Z VALUES
 R0348 X,Y,ZOLDRUF CONTAIN LAST-BUT-ONE PIPAX,Y,Z VALUES
 R0349 RUPTREG1
 R0350 PIPCTR

| | | | | | | | | | | | |
|------|-----|-----|------|-----|---------|--------|------|---------|-----------|-----------|---------------------------|
| 0351 | REP | 3 | LAST | 776 | 37,2767 | 55=227 | 0 | QNNITOR | TS | PIPCTR | |
| 0352 | REP | 12 | LAST | 687 | 37,2770 | 0 | 5156 | 0 | TC | FIXDELAY | WAIT |
| 0353 | | | | | 37,2771 | 00062 | 0 | 0.5SEC | DEC | 50 | |
| 0354 | REP | 35 | LAST | 778 | 37,2772 | 3 | 4711 | 1 | QUICKREAD | CAP | TWO |
| 0355 | REP | 19 | LAST | 777 | 37,2773 | 54 | 070 | 1 | TS | RUPTREG1 | |
| 0356 | REP | 182 | LAST | 779 | 37,2774 | 50 | 000 | 1 | INDEX | A | |
| 0357 | REP | 8 | LAST | 430 | 37,2775 | 3 | 0037 | 0 | CA | PIPAX | SAVE ACTUAL PIPAS FOR TM. |
| 0358 | REP | 20 | LAST | 781 | 37,2776 | 50 | 070 | 0 | INDEX | RUPTREG1 | |
| 0359 | REP | 4 | LAST | 778 | 37,2777 | 57=533 | 0 | | XCH | XPIPRUF | UPDATE X,Y,ZPIPRUF |
| 0360 | REP | 21 | LAST | 781 | 37,3000 | 50 | 070 | 0 | INDEX | RUPTREG1 | |
| 0361 | REP | 3 | LAST | 778 | 37,3001 | 55=536 | 1 | | TS | XOLDRUF | AND X,Y,ZOLDRUF |
| 0362 | REP | 22 | LAST | 781 | 37,3002 | 10 | 070 | 1 | CHKCTR | CCS | RUPTREG1 |
| 0363 | REP | 2 | LAST | 778 | 37,3003 | 1 | 2773 | 1 | TCP | QUICKREAD | +1 |
| 0364 | REP | 4 | LAST | 781 | 37,3004 | 11=227 | 0 | | CCS | PIPCTR | |
| 0365 | REP | 1 | | | 37,3005 | 1 | 2767 | 1 | TCP | QNNITOR | |
| 0366 | REP | 43 | LAST | 779 | 37,3006 | 0 | 5213 | 1 | TC | TASKOVER | |

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P0367 ***** SERVICER *****
 R0368

| | | | | | | | | |
|------|-----|-----|------|-----|---------|----------|-----------|---------------|
| 0370 | REP | 17 | LAST | 780 | 57,1431 | | EBANK= | DVONTR |
| 0371 | REP | 36 | LAST | 781 | 37,3007 | 3 4711 1 | SERVICER | CAP TWO |
| 0372 | | | | | 37,3010 | 0 0004 0 | | INHINT |
| 0373 | REP | 23 | LAST | 781 | 37,3011 | 54 070 1 | PIP CHECK | TS RUPTR001 |
| 0374 | | | | | 37,3012 | 6 0000 1 | | DOUBLE |
| 0375 | REP | 163 | LAST | 781 | 37,3013 | 50 000 1 | | INDEX A |
| 0376 | REP | 10 | LAST | 778 | 37,3014 | 11=162 1 | | CCS DELVX |
| 0377 | | | | | 37,3015 | 0 3017 1 | | TC +2 |
| 0378 | REP | 1 | | | 37,3016 | 0 3025 0 | | TC PIPLOOP |
| 0379 | REP | 1 | | | 37,3017 | 6 3135 0 | | AD -MAXDELV |
| 0380 | | | | | 37,3020 | 0 0006 1 | | EXTEND |
| 0381 | REP | 2 | LAST | 782 | 37,3021 | 6 3025 0 | | BZMP PIPLOOP |
| 0382 | REP | 32 | LAST | 759 | 37,3022 | 0 5537 0 | | TC ALARM |
| 0383 | | | | | 37,3023 | 00205 0 | | OCT 00205 |
| 0384 | REP | 1 | | | 37,3024 | 0 3046 0 | | TC AVERAGE0 |
| 0385 | REP | 24 | LAST | 782 | 37,3025 | 10 070 1 | PIPLOOP | CCS RUPTR001 |
| 0386 | REP | 1 | | | 37,3026 | 1 3011 0 | | TCF PIPCHECK |
| 0387 | REP | 80 | LAST | 758 | 37,3027 | 0 5301 0 | | TC PHASCHNG |
| 0388 | | | | | 37,3030 | 16035 0 | | OCT 16035 |
| 0389 | | | | | 37,3031 | 20000 0 | | OCT 20000 |
| 0390 | REP | 18 | LAST | 782 | 57,1431 | | | EBANK= DVONTR |
| 0391 | REP | 1 | | | 37,3032 | 03036 1 | | 2CADR DVTOTUP |
| 0391 | REP | 1 | | | 37,3033 | 76067 1 | | |
| 0392 | REP | 232 | LAST | 759 | 37,3034 | 0 4555 0 | | TC BANKCALL |
| 0393 | REP | 2 | LAST | 431 | 37,3035 | 15262 0 | | CADR 1/PIPA |
| 0394 | REP | 200 | LAST | 758 | 37,3036 | 0 6006 1 | DVTOTUP | TC INTPRET |
| 0395 | | | | | 37,3037 | 51575 1 | | VLOAD ARVAL |
| 0396 | REP | 8 | LAST | 174 | 37,3040 | 01183 1 | | DELV |
| 0397 | | | | | 37,3041 | 77405 0 | | DMP EXIT |
| 0398 | REP | 1 | | | 37,3042 | 37354 1 | | KPIP1 |
| 0399 | | | | | 37,3043 | 0 6006 1 | | EXTEND |
| 0400 | REP | 279 | LAST | 764 | 37,3044 | 3 0155 0 | | DCA MPAC |
| 0401 | REP | 7 | LAST | 777 | 37,3045 | 21=426 1 | | DAS DVTOTAL |
| 0402 | REP | 81 | LAST | 782 | 37,3046 | 0 5301 0 | AVERAGE0 | TC PHASCHNG |
| 0403 | | | | | 37,3047 | 16035 0 | | OCT 16035 |
| 0404 | REP | 201 | LAST | 782 | 37,3050 | 0 6006 1 | | TC INTPRET |
| 0405 | | | | | 37,3051 | 77624 1 | | CALL |

DO PIPA-SATURATION TEST BEFORE
 COMPENSATION.

SATURATED-PIPA ALARM ***CHANGE LATER

RESTART REREADAC + SERVICER

PIPA COMPENSATION CALL

GET ABS VALUE OF DELV

SCALE AT 2(+7)

ACCUMULATE DVTOTAL



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| | | | | | | | | | | |
|--------|-----|-----|------|---------|---------|-------|-------|---|---------|----------------------|
| 0406 | REP | 1 | | 37,3052 | 77323 | 0 | | | CALCRWD | |
| 0407 | | | | 37,3053 | 77776 | 1 | | | EXIT | |
| 0408 | REP | 62 | LAST | 782 | 37,3054 | 0 | 5301 | 0 | TC | PHASCHNG |
| 0409 | | | | | 37,3055 | 10035 | 0 | | OCT | 10035 |
| 0410 | REP | 3 | LAST | 536 | 37,3056 | 3 | 4113 | 0 | CAP | OCT31 |
| 0411 | REP | 11 | LAST | 648 | 37,3057 | 0 | 5475 | 1 | TC | GENTRAN |
| 0412 | REP | 6 | LAST | 528 | 37,3060 | 0 | 91231 | 0 | ADRES | RN1 |
| 0413 | REP | 14 | LAST | 758 | 37,3061 | 0 | 91170 | 0 | ADRES | RN |
| 04131 | | | | | 37,3062 | 0 | 0003 | 1 | RELINT | |
| 0414 | REP | 83 | LAST | 783 | 37,3063 | 0 | 5301 | 0 | TC | PHASCHNG |
| 0415 | | | | | 37,3064 | 10035 | 0 | | OCT | 10035 |
| 0416 | | | | | 37,3065 | 0 | 0006 | 1 | EXTEND | |
| 0417 | REP | 3 | LAST | 780 | 37,3066 | 3 | 1223 | 0 | DCA | AVGEXIT |
| 0418 | REP | 15 | LAST | 474 | 37,3067 | 52 | 006 | 0 | DXCH | Z |
| 0419 | REP | 12 | LAST | 758 | 37,3070 | 3 | 1205 | 1 | AVGEND | CA |
| 0420 | REP | 1 | | | 37,3071 | 55 | 974 | 1 | TS | PIPTIME +1 OLDST1 |
| 0421 | REP | 47 | LAST | 754 | 37,3072 | 0 | 5435 | 0 | TC | UPFLAG |
| 0422 | REP | 3 | LAST | 722 | 37,3073 | 0 | 0036 | 1 | ADRES | DRIFTFLG |
| 0425 | REP | 26 | LAST | 758 | 37,3074 | 0 | 5261 | 1 | TC | 2PHSCHNG |
| 0426 | | | | | 37,3075 | 0 | 0005 | 1 | OCT | 5 |
| 0427 | | | | | 37,3076 | 0 | 5022 | 1 | OCT | 05022 |
| 0428 | | | | | 37,3077 | 20000 | 0 | | OCT | 20000 |
| 0429 | REP | 202 | LAST | 782 | 37,3100 | 0 | 6006 | 1 | TC | INTPRET |
| 0430 | | | | | 37,3101 | 77624 | 1 | | CALL | |
| 0431 | REP | 1 | | | 37,3102 | 27472 | 0 | | | AVSTMID |
| 0432 | | | | | 37,3103 | 77776 | 1 | | EXIT | |
| 043201 | REP | 150 | LAST | 777 | 37,3104 | 3 | 4714 | 1 | CAP | ZERO |
| 043202 | REP | 9 | LAST | 574 | 37,3105 | 55 | 125 | 1 | TS | VHFCONT |
| 043203 | REP | 6 | LAST | 574 | 37,3106 | 55 | 126 | 1 | TS | TRKRCNT |
| 04321 | REP | 233 | LAST | 782 | 37,3107 | 0 | 4555 | 0 | TC | BANKCALL |
| 04322 | REP | 1 | | | 37,3110 | 17112 | 0 | | CADR | PIPPRE |
| 04323 | REP | 28 | LAST | 779 | 37,3111 | 4 | 4702 | 1 | CS | BIT9 |
| 043235 | REP | 16 | LAST | 575 | 37,3112 | 55 | 734 | 1 | TS | MRKFLP2 |
| 04324 | | | | | 37,3113 | 0 | 0006 | 1 | EXTEND | |
| 04325 | REP | 26 | LAST | 779 | 37,3114 | 03 | 011 | 1 | WAND | DSALMOUT |
| 043255 | REP | 50 | LAST | 752 | 37,3115 | 0 | 5447 | 0 | TC | DOWNFLAG |
| 043256 | REP | 1 | | | 37,3116 | 0 | 0147 | 0 | ADRES | CM/DSTBY |
| 04326 | REP | 51 | LAST | 783 | 37,3117 | 0 | 5447 | 0 | TC | DOWNFLAG |
| 04327 | REP | 3 | LAST | 635 | 37,3120 | 0 | 0162 | 1 | ADRES | V37FLAG |

COPY RN1, VN1, OCT102, COBL1/2, PIPTIME1
INTO RN ,VN ,OCT/12 ,COBL/2 ,PIPTIME

GENTRAN DOES AN INHINT

AVERAGED EXIT

FINAL AVERAGE G EXIT
SET UP FREE FALL GYRO COMPENSATION

SET DRIFTFLG
BIT 15 - FLAG 2

GROUP 5 OFF
GROUP 2 ON FOR AVETOMID

CONVERT STATE VECTOR TO REFERENCE SCALE.

ZERO MARK COUNTERS.

INVALIDATE MARK RUPFR

L SERVICER207

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| | | | | | | | | |
|-------|-----|----|------|-----|---------|----------|----------|----------------|
| 0433 | REP | 42 | LAST | 700 | 37,3121 | 3 4704 0 | CAP | BITT |
| 0434 | REP | 10 | LAST | 253 | 37,3122 | 7 0074 0 | MARK | FLAGWDO |
| 0435 | | | | | 37,3123 | 0 0000 1 | EXTEND | |
| 0436 | | | | | 37,3124 | 1 3130 1 | BZF | ++ |
| 0437 | REP | 27 | LAST | 703 | 37,3125 | 0 5261 1 | TC | 2PHSCHK |
| 0438 | | | | | 37,3126 | 00111 0 | OCT | 111 |
| 0439 | | | | | 37,3127 | 00132 1 | OCT | 132 |
| 0445 | REP | 46 | LAST | 756 | 37,3130 | 0 4574 0 | TC | POSTLMP |
| 0446 | REP | 2 | LAST | 185 | 37,3131 | 10123 0 | CADR | CANV37 |
| 0447 | REP | 64 | LAST | 763 | 37,3132 | 0 5301 0 | SERVEXIT | TC PHASCHK |
| 0448 | | | | | 37,3133 | 00035 1 | OCT | 00035 |
| 0449 | REP | 99 | LAST | 758 | 37,3134 | 1 5112 1 | TOP | ENDOPJOB |
| 0450 | REP | 4 | LAST | 379 | 4717 | | DVTHRUSH | EQUALS ELEVEN |
| A0451 | | | | | | | | |
| A0452 | | | | | | | | |
| 0453 | | | | | 37,3135 | 63401 1 | -MAXDELV | DEC -6398 |
| 0454 | | | | | 37,3136 | 00170 1 | JTAGTIME | DEC 120 |
| 0455 | | | | | 37,3137 | 00372 1 | 2.5SEC | DEC 250 |
| 0456 | | | | | 37,3140 | 00044 1 | MDOTFAIL | DEC 144.0 B-16 |
| A0457 | | | | | | | | |
| A0458 | | | | | | | | |

RESTORE GROUP 1 + 2 IF P20 IS RUNNING.

1.118POT
2.138POT

A, 5.3 = REBRADAC (ONLY)

15 PERCENT OF 2SEC PIPA ACCUMULATION,
FOR 503-FULL CSM/LEM...DELV SC, AT
5.85 CM/SEC.

3200 PPS FOR 2 SEC CCS TAKES 1
= 1 SEC + T CDU, T CDU = .1 SEC

5 SEC MASS LOSS AT 28.8 KG/SEC
SHOULD BE 2-4 SECS FOR NO START
6-8 SECS FOR FAILURE

L SERVICER207

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P0459      NORMALIZE PERFORMS THE INITIALIZATION REQUIRED PRIOR TO THE FIRST ENTRY TO AVERAGE, AND SCALES RN SO THAT IT
R0461      HAS 1 LEADING BINARY ZERO. IN MOST MISSIONS, RN WILL BE SCALED AT 2(+29), BUT IN THE 206 MISSION, RN WILL BE
R0463      SCALED AT 2(+24)M.
0464      REP      1          37,3141  3 4720 0  NORMALIZE CAP  THIRTEEN      SET UP TO COPY 14 RECS- RN1,VN1,PIPTIME1
0465      REP 12 LAST 783    37,3142  0 5475 1          TO      GENTMAN      INTO RN,VN, PIPTIME
0466      REP  7 LAST 783    37,3143  01231 0          ADRES  RN1        FROM HERE
0467      REP 16 LAST 783    37,3144  01170 0          ADRES  RN         TO HERE

0468      REP 203 LAST 783    37,3146  0 6003 1          RELINT
0469      REP 203 LAST 783    37,3146  0 6006 1          TO      INTPRET
0470      REP 16 LAST 785    37,3147  45175 0          VLOAD  CALL        LOAD RN FOR CALCGRAV
0471      REP  3 LAST 689    37,3150  01171 1          RN
0472      REP  3 LAST 689    37,3151  77256 0          CALCGRAV      INITIALISE UNITR RMAG GDT1

0473      REP  3 LAST 680    37,3152  25207 0          STOVL  GDT/2
0474      REP  2 LAST  78    37,3153  01256 1          GCBL1/2
0475      REP  3 LAST 680    37,3154  01215 0          STORE  GCBL/2
0476      REP 100 LAST 784    37,3155  77776 1          EXIT
0477      REP 100 LAST 784    37,3156  1 5112 1          TCP     ENDOFJOB
    
```



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R0478 ***** PIPA READER *****
R0479 MOD NO. 00 BY D. LICKLY DEC. 9 1966
R0480 FUNCTIONAL DESCRIPTION

R0481 SUBROUTINE TO READ PIPA COUNTERS, TRYING TO BE VERY CAREFUL SO THAT IT WILL BE RESTARTABLE.
R0482 PIPA READINGS ARE STORED IN THE VECTOR DELV. THE HIGH ORDER PART OF EACH COMPONENT CONTAINS THE PIPA READING,
R0483 RESTARTS BEGIN AT REREADAC.
R0484 AT THE END OF THE PIPA READER THE CDUS ARE READ AND STORED AS A
R0485 VECTOR IN COUTEMP. THE HIGH ORDER PART OF EACH COMPONENT CONTAINS
R0486 THE CDU READING IN 25 COMP IN THE ORDER CDUX,Y,Z. THE THRUST
R0487 VECTOR ESTIMATOR IN FINDCOLD REQUIRES THE CDUS BE READ AT PIPTIME.

R0490 CALLING SEQUENCE AND EXIT

R0491 CALL VIA TC, ISCALL, ETC.

R0492 EXIT IS VIA Q.
R0493 INPUT

R0494 INPUT IS THROUGH THE COUNTERS PIPAX, PIPAY, PIPAZ, AND TIME2.
R0495 OUTPUT

R0496 HIGH ORDER COMPONENTS OF THE VECTOR DELV CONTAIN THE PIPA READINGS.
R0497 PIPTIME CONTAINS TIME OF PIPA READING.
R0498 DEBRIS (ERASABLE LOCATIONS DESTROYED BY PROGRAM)

R0499 LOW ORDER DELV-S ARE ZEROED FOR TM INDICATION.

| TEMP | TEMP | TEMP | PIPAX | PIPASR | EXTEND |
|------|------------------|---------|----------|--------|---------------|
| 0501 | | 37,3157 | 0 0006 1 | PIPASR | EXTEND |
| 0502 | REP 26 LAST 736 | 37,3160 | 3 0025 0 | | DCA TIME2 |
| 0503 | REP 7 LAST 778 | 37,3161 | 53=246 1 | | DXCH PIPTIME1 |
| 0504 | REP 151 LAST 783 | 37,3162 | 4 4714 0 | | CS ZERO |
| 0505 | REP 2 LAST 77 | 37,3163 | 55=224 0 | | TS TEMP |
| 0506 | REP 2 LAST 77 | 37,3164 | 55=225 1 | | TS TEMP |
| 0507 | REP 2 LAST 77 | 37,3165 | 55=226 1 | | TS TEMP |

CURRENT TIME POSITIVE VALUE
INITIALIZE THESE AT NEG ZERO.

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| | | | | | | | | | |
|--------|-----|-----|------|-----|---------|--------|---|----------|-----------|
| 0508 | REP | 152 | LAST | 786 | 37,3168 | 3 4714 | 1 | CA | ZERO |
| 0509 | REP | 5 | LAST | 779 | 37,3167 | 55=166 | 0 | TS | DELAVZ |
| 0510 | REP | 6 | LAST | 778 | 37,3170 | 55=164 | 1 | TS | DELAVZ |
| 0511 | REP | 11 | LAST | 782 | 37,3171 | 55=163 | 0 | TS | DELAVZ +1 |
| 0512 | REP | 7 | LAST | 787 | 37,3172 | 55=165 | 0 | TS | DELAVZ +1 |
| 0513 | REP | 6 | LAST | 787 | 37,3173 | 55=167 | 1 | TS | DELAVZ +1 |
| A0514 | | | | | | | | | |
| 0515 | REP | 4 | LAST | 778 | 37,3174 | 55=230 | 0 | TS | PIPAGE |
| 0516 | | | | | 37,3175 | 0 0008 | 1 | REPIP1 | EXTEND |
| 0517 | REP | 9 | LAST | 781 | 37,3176 | 4 0040 | 1 | DCS | PIPAX |
| 0518 | REP | 3 | LAST | 786 | 37,3177 | 53=225 | 1 | DXCH | TENK |
| 0519 | REP | 10 | LAST | 787 | 37,3200 | 52 040 | 1 | DXCH | PIPAX |
| 0520 | REP | 12 | LAST | 787 | 37,3201 | 55=162 | 1 | TS | DELAVZ |
| 0521 | REP | 8 | LAST | 787 | 37,3202 | 23=164 | 0 | LXCH | DELAVZ |
| 0522 | REP | 3 | LAST | 430 | 37,3203 | 4 0041 | 0 | REPIP3 | CS |
| 0523 | REP | 3 | LAST | 786 | 37,3204 | 57=226 | 0 | XCH | TENZ |
| 0524 | REP | 4 | LAST | 787 | 37,3205 | 56 041 | 1 | XCH | PIPAX |
| 0525 | REP | 7 | LAST | 787 | 37,3206 | 55=166 | 0 | DCDELAVZ | TS |
| 0526 | REP | 170 | LAST | 692 | 37,3207 | 0 0002 | 0 | TC | 0 |
| 0527 | REP | 24 | LAST | 779 | Eq,1661 | | | BRANK= | ACC |
| 0528 | REP | 3 | LAST | 649 | 37,3210 | 10 763 | 1 | REREADAC | CCS |
| 0529 | REP | 3 | LAST | 786 | 37,3211 | 1 3213 | 0 | TCP | +2 |
| 0530 | REP | 44 | LAST | 781 | 37,3212 | 1 5213 | 0 | TCP | TASKOVER |
| 05302 | REP | 3 | LAST | 529 | 37,3213 | 3 7665 | 0 | CAP | PRI031 |
| 05303 | REP | 11 | LAST | 724 | 37,3214 | 55=074 | 1 | TS | 1/PIPADT |
| A05304 | | | | | | | | | |
| A05305 | | | | | | | | | |
| A05306 | | | | | | | | | |
| A05307 | | | | | | | | | |
| 0531 | REP | 5 | LAST | 787 | 37,3215 | 11=230 | 0 | CCS | PIPAGE |
| 0532 | REP | 4 | LAST | 779 | 37,3216 | 1 2647 | 1 | TCP | READACCS |
| 0533 | REP | 1 | | | 37,3217 | 3 3255 | 0 | CAP | DONEADR |
| 0534 | REP | 171 | LAST | 787 | 37,3220 | 54 002 | 1 | TS | 0 |
| 0535 | REP | 8 | LAST | 787 | 37,3221 | 11=166 | 0 | CCS | DELAVZ |
| 0536 | REP | 172 | LAST | 787 | 37,3222 | 0 0002 | 0 | TC | 0 |
| 0537 | | | | | 37,3223 | 1 3226 | 0 | TCP | +3 |
| 0538 | REP | 173 | LAST | 787 | 37,3224 | 0 0002 | 0 | TC | 0 |
| 0539 | REP | 174 | LAST | 787 | 37,3225 | 0 0002 | 0 | TC | 0 |

OTHER DELAVS OK INCLUDING LOW ORDER

LOW ORDER DELAVS ARE ZEROED FOR TM' THIS IF DNLNK=0 LOW ORDER DELAVS ARE NZ, THEY CONTAIN PROPER COMPENSATION. IF=0, THEN THE TM VALUES ARE BEFORE COMPENSATION.

SHOW PIPA READING IN PROGRESS

X AND Y PIPS READ

PIPAS SET TO NEG ZERO AS READ.

REPEAT PROCESS FOR Z PIP

LAST PASS CHECK

RESTART MAY HAVE WIPED OUT LASTPASS, AN UNPROTECTED NOVAC FROM PREREAD, WHICH SET(S) UP 1/PIPADT (TRUSLY) FOR NON-COASTING COMPENSATION....BE SURE 1/PIPADT IS AOK. (PRI031 IS 2.0SEC SC.AT R+8CS)

PIP READING NOT STARTED. GO TO BEGINNING

SET UP RETURN FROM PIPASR

Z DONE, GO DO CDUS
Z NOT DONE, CHECK Y.

L SWTCR207

| REP | NO | LAST | 787 | 37,3226 | 22 007 0 | EL | |
|------|-----|------|------|---------|-----------|-------------------------|---------------|
| 0540 | | | | 37,3227 | 11=184 1 | CCS DELAY | |
| 0541 | REP | 9 | LAST | 787 | 37,3230 | 1 3233 1 | TCP +3 |
| 0542 | | | | 37,3231 | 1 3242 1 | TCP QKTRM | |
| 0543 | REP | 1 | | 37,3232 | 1 3233 1 | TCP +1 | |
| 0544 | | | | 37,3233 | 22 041 1 | LXCH PIPAZ | |
| 0545 | REP | 5 | LAST | 787 | 37,3234 | 11=226 1 | CCS TRMZ |
| 0546 | REP | 4 | LAST | 787 | 37,3235 | 4 1226 1 | CS TRMZ |
| 0547 | REP | 5 | LAST | 788 | 37,3236 | 1 3208 1 | CS TRMZ |
| 0548 | REP | 1 | | 37,3237 | 1 3235 -1 | TCP DDELVZ | |
| 0549 | | | | 37,3240 | 23=186 1 | TCP -2 | |
| 0550 | REP | 9 | LAST | 787 | 37,3241 | 0 0002 0 | LXCH DELVZ |
| 0551 | REP | 175 | LAST | 787 | 37,3242 | 11=224 0 | TC 0 |
| 0552 | REP | 4 | LAST | 787 | 37,3243 | 4 1224 0 | QKTRM CCS TRM |
| 0553 | REP | 5 | LAST | 788 | 37,3244 | 1 3247 1 | CS TRM |
| 0554 | | | | 37,3245 | 1 3243 0 | TCP +3 | |
| 0555 | | | | 37,3246 | 1 3175 0 | TCP -2 | |
| 0556 | REP | 1 | | 37,3247 | 55=162 1 | TCP REP1P1 | |
| 0557 | REP | 13 | LAST | 787 | 37,3250 | 4 1225 1 | TS DELVZ |
| 0558 | REP | 3 | LAST | 788 | 37,3251 | 55=164 1 | CS TRM |
| 0559 | REP | 10 | LAST | 788 | 37,3252 | 4 4714 0 | TS DELVZ |
| 0560 | REP | 153 | LAST | 787 | 37,3253 | 52 040 1 | CS ZERO |
| 0561 | REP | 11 | LAST | 787 | 37,3254 | 1 3203 1 | LXCH PIPAZ |
| 0562 | REP | 1 | | 37,3255 | 02850 0 | TCP REP1P3 | |
| 0563 | REP | 1 | | | | DONEADR GRNADR PIPSDONE | |

Y NOT DONE, CHECK X.

Y DONE, ZERO Z PIP.

TRMZ NOT = -0, CONTAINS -PIPAZ VALUE.

TRMZ = -0, L HAS ZPIP VALUE.

HAS THIS CHANGED

YES
 YES
 YES
 NO

ZERO X AND Y PIPS
 L STILL ZERO FROM ABOVE

L SERVICER207

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R0564 *****

R0566 ROUTINE CALCRVQ INTEGRATES THE EQUATIONS OF MOTION BY AVERAGING THE THRUST AND GRAVITATIONAL
R0568 ACCELERATIONS OVER A TIME INTERVAL OF 2 SECONDS.

R0569 FOR THE EARTH-CENTERED GRAVITATIONAL FIELD, THE PERTURBATION DUE TO OBLATENESS IS COMPUTED TO THE FIRST
R0571 HARMONIC COEFFICIENT J.

R0572 ROUTINE CALCRVQ REQUIRES...
R0573 1) THRUST ACCELERATION INCREMENTS IN DELTA SCALED SAME AS PIPAX,Y,Z IN STABLE MEMBER COORDS.
R0575 2) VN SCALED 2(+7)M/CS IN REFERENCE COORDS.
R0576 3) RN SCALED AT 2(+29) METERS IN REFERENCE COORDS.
R0577 4) UNITW THE EARTH'S UNIT ROTATIONAL VECTOR (SCALED AS A FULL UNIT VECTOR) IN REFERENCE COORDS.

R0579 IT LEAVES RN1 UPDATED (SCALED AT 2(+29)M), VN1 (SCALED AT 2(+7)M/CS), AND GDT1/2 (SCALED AT 2(+7)M/CS). ALSO HALF
R0581 UNIT VECTOR UNTR, RMAG IN 36D SCALED AT 2(+29)M, R MAG SQ. IN 34D SCALED AT 2(+58) M SQ.
R0583

| Address | Operation | Operand 1 | Operand 2 | Operand 3 | Operand 4 | Comment |
|---------|-----------------|-----------|-----------|-----------|-----------|-----------------------|
| 0584 | | 37,3256 | 41456 0 | CALCRVQ | UNIT | PUSH |
| 0585 | REP 1 | 37,3257 | 01760 1 | STORE | UNTR | ENTER WITH RN IN MPAC |
| 0586 | | 37,3260 | 67340 1 | LXC,1 | SLOAD | |
| 0587 | REP 14 LAST 680 | 37,3261 | 03746 1 | | RDX2 | |
| 05871 | REP 34 LAST 741 | 37,3262 | 00047 1 | | X1 | |
| 0588 | | 37,3263 | 77240 1 | BNV | VLOAD | |
| 05881 | REP 1 | 37,3264 | 77312 1 | | ITISMOON | |
| 0589 | | 37,3265 | 41441 0 | DOT | PUSH | |
| 0589 | REP 8 LAST 766 | 37,3266 | 01714 1 | | UNITW | |
| 0591 | | 37,3267 | 44316 0 | DSQ | BDSJ | |
| 0592 | REP 1 | 37,3270 | 37384 1 | | DP1/20 | |
| 0593 | | 37,3271 | 56325 0 | PDDL | DDV | |
| 0594 | REP 1 | 37,3272 | 37386 0 | | RESQ | |
| 0595 | | 37,3273 | 00043 0 | | 34D | (RN)SQ |
| 0596 | | 37,3274 | 00041 1 | STORE | 32D | TEMP FOR (RE/RN)SQ |
| 0591 | | 37,3275 | 41205 0 | DMP | DMP | |
| 0598 | REP 1 | 37,3276 | 37370 1 | | 20J | |
| 0599 | | 37,3277 | 65361 0 | VXSC | PDDL | |
| 0800 | REP 2 LAST 769 | 37,3300 | 01760 1 | | UNTR | |
| 0801 | | 37,3301 | 41205 0 | DMP | DMP | |
| 0801 | REP 1 | 37,3302 | 37372 0 | | 2J | |
| 0803 | | 37,3303 | 00041 1 | | 32D | |
| 0804 | | 37,3304 | 53361 0 | VXSC | VAD | |
| 0805 | REP 9 LAST 789 | 37,3305 | 01714 1 | | UNITW | |
| H06 | | 37,3306 | 77626 0 | STADR | | |
| 0807 | REP 3 LAST 785 | 37,3307 | 76521 0 | STORE | GORL1/2 | |
| H08 | | 37,3310 | 41455 0 | VAD | PUSH | |
| H09 | REP 3 LAST 789 | 37,3311 | 01760 1 | | UNTR | |
| H10 | | 37,3312 | 60345 0 | ITISMOON | DLOAD | NORM |
| H11 | | 37,3313 | 00043 0 | | 34D | |
| H12 | REP 14 LAST 741 | 37,3314 | 00050 1 | | X2 | |
| 08121 | | 37,3315 | 53663 1 | RDDV* | SR* | |

| ADDRESS | OPERATION | DATA | ADDRESS | OPERATION | DATA | OPERATION | DATA | OPERATION | DATA | OPERATION | DATA |
|---------|-----------|-------------|---------|-----------|---------|-----------|-------|------------|------|-----------|--|
| 00127 | REP | 1 | 37,3316 | | 37356 0 | | | | | | |
| 00128 | | | 37,3317 | | 56623 0 | | | | | | |
| 00129 | | | 37,3320 | | 45561 1 | | | | | | |
| 00130 | REP | 2 LAST 77 | 37,3321 | | 76527 0 | | | | | | |
| 00131 | | | 37,3322 | | 77616 0 | | | | | | |
| 00222 | | | 37,3323 | | 74375 0 | CALCRWG | VLOAD | VXSC | | | |
| 00223 | REP | 0 LAST 782 | 37,3324 | | 01163 1 | | | | | | |
| 00224 | REP | 2 LAST 782 | 37,3325 | | 37354 1 | | | | | | |
| 00225 | | | 37,3326 | | 76505 0 | | | | | | |
| 00226 | REP | 32 LAST 772 | 37,3327 | | 01736 1 | | | | | | |
| 00227 | REP | 7 LAST 877 | 37,3330 | | 03433 0 | | | | | | |
| 00228 | | | 37,3331 | | 41562 0 | | | | | | |
| 00229 | | | 37,3332 | | 41455 0 | | | | | | |
| 00230 | REP | 4 LAST 785 | 37,3333 | | 01207 0 | | | | | | |
| 00231 | | | 37,3334 | | 74255 0 | | | | | | |
| 00232 | REP | 12 LAST 756 | 37,3335 | | 01177 1 | | | | | | |
| 00233 | REP | 1 | 37,3336 | | 37362 1 | | | | | | |
| 00234 | | | 37,3337 | | 44055 1 | | | | | | |
| 00235 | REP | 17 LAST 785 | 37,3340 | | 01171 1 | | | | | | |
| 00236 | | | 37,3341 | | 00037 0 | | | | | | |
| 00237 | REP | 0 LAST 785 | 37,3342 | | 35232 1 | | | | | | |
| 00238 | REP | 4 LAST 785 | 37,3343 | | 77256 0 | | | | | | |
| 00239 | | | 37,3344 | | 53255 0 | | | | | | |
| 00240 | | | 37,3345 | | 77655 1 | | | | | | |
| 00421 | REP | 13 LAST 780 | 37,3346 | | 01177 1 | | | | | | |
| 00422 | REP | 3 LAST 529 | 37,3347 | | 35240 1 | | | | | | |
| 00423 | | | 37,3350 | | 00037 0 | | | | | | |
| 00444 | | | 37,3351 | | 03215 1 | KPIP | 2DEC | .1024 | | | SCALES DELV TO 2(+4) |
| 00445 | | | 37,3352 | | 27057 0 | | | | | | |
| 00446 | | | 37,3353 | | 02312 0 | KPIP1 | 2DEC | 0.074880 | | | 207 DELV SCALING. 1 PULSE = 5.85 CM/SEC. |
| 00447 | | | 37,3354 | | 32537 1 | | | | | | |
| 00448 | | | 37,3355 | | 01377 0 | | | | | | |
| 00449 | | | 37,3356 | | 88754 1 | | | | | | |
| 00450 | | | 37,3357 | | 77644 1 | | | | | | |
| 00451 | | | 37,3358 | | 65556 1 | | | | | | |
| 00452 | | | 37,3359 | | 00000 1 | | | | | | |
| 00453 | | | 37,3362 | | 31060 0 | | | | | | |
| 00460 | | | 37,3363 | | 01463 1 | DP1/20 | 2DEC | 0.05 | | | |
| 00461 | | | 37,3364 | | 06315 0 | | | | | | |
| 00462 | | | 37,3365 | | 00001 0 | RESO | 2DEC* | 40.6809913 | R12 | R-59* | |
| 00463 | | | 37,3368 | | 05000 1 | | | | | | |
| 00511 | | | 37,3367 | | 02047 0 | 20J | 2DEC* | 3.24692010 | E-2 | R1* | |
| 00512 | | | 37,3370 | | 36332 0 | | | | | | |
| 00513 | | | 37,3371 | | 00152 1 | 2J | 2DEC* | 3.24692010 | E-3 | R1* | |
| 00514 | | | 37,3372 | | 14611 1 | | | | | | |

| L ENTRY LEXICON | | USER'S PAGE NO. 1 E0 83 | | |
|-----------------|----------|----------------------------------|-----------------|--------------------|
| R0001 | VARIABLE | DESCRIPTION | MAXIMUM VALUE * | COMPUTER NAME |
| R0003 | ----- | ----- | ----- | ----- |
| R0005 | - | | | |
| R0006 | URTO | INITIAL TARGET VECTOR | 2 (UNIT VECTOR) | = RTINIT |
| R0008 | - | | | |
| R0009 | UZ | UNIT VECTOR NORTH | 1 | = UNITW |
| R0011 | - | | | |
| R0012 | V | VELOCITY VECTOR | 2 VSAT | = VEL |
| R0014 | - | | | |
| R0015 | R | POSITION VECTOR | 2 EXP 29 METERS | = RN |
| R0017 | - | | | |
| R0018 | VI | INERTIAL VELOCITY | 128 M/CENTISEC | = VN |
| R0020 | - | | | |
| R0021 | RTE | VECTOR EAST AT INITIAL TARGET | 2 | = RTEAST |
| R0023 | - | | | |
| R0024 | UTR | NORMAL TO RTE AND UZ | 2 | = RINORM |
| R0026 | - | | | |
| R0027 | URT | TARGET VECTOR | 2 | = RT |
| R0029 | - | | | |
| R0030 | UNI | UNIT NORMAL TO TRAJECTORY PLANE | 2 | |
| R0031 | - | | | |
| R0032 | DELV | INTEGRATED ACCEL. FROM PIPAS | 5.85 16384 CM/S | |
| R0033 | - | | | |
| R0034 | G | GRAVITY VECTOR | 128 M/CENTISEC | = GDT/2 |
| R0036 | A0 | INITIAL DRAG FOR UPCTRL | 805 FPSS | FPSS=FT/SEC/SEC |
| R0038 | AHOOKDV | TERM IN GAMMAL CALC. = AHOOK DVL | 16 | |
| R0039 | A1 | DRAG VALUE IN FACTOR CALCULATION | 805 FPSS | |
| R0040 | ALP | CONST FOR UPCTRL | 1 | |
| R0041 | ASKEP | KEPLER RANGE | 21600 NM | NM = NAUTICAL MILE |
| R0043 | ASP1 | FINAL PHASE RANGE | 21600 NM | |
| R0044 | ASPUP | UP-RANGE | 21600 NM | |
| R0045 | ASP3 | GAMMA CORRECTION | 21600 NM | |
| R0046 | ASPDWN | RANGE DOWN TO PULL-UP | 21600 NM | |
| R0047 | ASP | PREDICTED RANGE | 21600 NM | NOT STORED |
| R0048 | COSG | COSINE(GAMMAL) | 2 | = COSG/2 |
| R0051 | C/D0 | RECIPROCAL DRAG, -4/D0 B-8 | 64/FPSS | |
| R0052 | D | TOTAL ACCELERATION | 805 FPSS | |
| R0053 | D0 | CONTROLLED CONSTANT D | 805 FPSS | |
| R0054 | DHOOK | TERM IN GAMMAL COMPUTATION | 805 FPSS | |
| R0055 | DIPP | THETNM-ASP (RANGE DIFFERENCE) | 21600 NM | |
| R0056 | DIPFOLD | PREVIOUS VALUE OF DIPP | 21600 NM | |
| R0057 | DLEWD | CHANGE IN LEWD | 1 | |
| R0058 | DR | REFERENCE DRAG FOR DOWNCONTROL | 805 FPSS | NOT STORED |
| R0060 | DREPR | REFERENCE DRAG | 805 FPSS | NOT STORED |
| R0062 | DVL | VS1-VL | 2 VSAT | |
| R0063 | E | ECCENTRICITY | 4 | NOT STORED |
| R0065 | F1 | DRANGE/D DRAG (FINAL PHASE) | 2700/805 | = FX +5 |
| R0067 | F2 | DRANGE/D RDOT (FINAL PHASE) | 2700/2VS NM/PPS | = FX +4 |



L ENTRY LEXICON

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| | | | |
|-------|---------|-------------------------|------------|
| R0069 | F3 | DRANCE/D (L/D) | 2700 NM |
| R0071 | FACT1 | CONST FOR UPCTRL | 805 FPSS |
| R0072 | FACT2 | CONST FOR UPCTRL | 1/805 FPSS |
| R0073 | FACTOR | USED IN UPCTRL | 1 |
| R0075 | GAMMAL | FLIGHT PATH ANGLE AT VL | 1 RADIAN |
| R0077 | GAMMAL1 | SIMPLE FORM OF GAMMAL | 1 RADIAN |

= FX

* MAXIMUM VALUE DENOTES UNSCALED VARIABLE VALUE WHEN SCALED VARIABLE HAS MAXIMUM VALUE OF ONE.



L ENTRY LEXICON

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| PO079 R0081 | VARIABLE ----- | DESCRIPTION ----- | MAXIMUM VALUE ----- | COMPUTER NAME ----- |
|----------------|-------------------|--------------------------------------|------------------------|------------------------|
| R0083 | HEADSUP | INDICATOR FOR INITIAL ROLL | 1 | |
| R0084 | KA | DRAG TO LIFT UP IF DOWN | 805 FPSS | = KAT |
| R0086 | KLAT | LATERAL SWITCH GAIN | 1 | (NCM = .0125) |
| R0088 | K2ROLL | INDICATOR FOR ROLL SWITCH | | |
| R0089 | LAD | MAX L/D (MIN ACTUAL VEHICLE L/D) | 1 | |
| R0090 | LADPAD | NOMINAL VEHICLE L/D, SP PAD LOAD | 1 | (NCM = 0.3) |
| R0092 | LATANG | LATERAL RANGE | 4 RADIANS | |
| R0093 | LEO | EXCESS C.P. OVER GRAV-(VSO-1)GS | 128.8 FPSS | |
| R0094 | LEWD | UPCONTROL REFERENCE L/D | 1 | |
| R0095 | LOD | FINAL PHASE L/D | 1 | (NCM = 0.18) |
| R0097 | LODPAD | FINAL PHASE L/D, SP PAD LOAD | 1 | |
| R0098 | L/D | DESIRED LIFT TO DRAG RATIO | 1 | |
| R0099 | | (VERTICAL PLANE) | | |
| R0100 | L/D1 | TEMP STORAGE FOR L/D IN LATERAL | 1 | |
| R0101 | L/DCMINR | LAD COS(15DEG) | 1 | (NCM = 0.2895) |
| R0103 | PREDANGL | PREDICTED RANGE (FINAL PHASE) | 2700 NM | = PREDANG |
| R0105 | Q2 | FINAL PHASE RANGE -23500 Q3 | 21600 NM | |
| R0106 | | Q2 = FCN(LAD) | | |
| R0107 | Q7 | MINIMUM DRAG FOR UPCONTROL | 805 FPSS | |
| R0108 | RDOT | ALTITUDE RATE | 2 VSAT | |
| R0109 | RDOTREF | REFERENCE RDOT FOR UPCONTROL | 2 VSAT | |
| R0110 | RDTR | REFERENCE RDOT FOR DOWNCONT | 2 VSAT | NOT SAVED |
| R0112 | ROLLC | ROLL COMMAND | 1 REVOLUTION | |
| R0113 | RTOOO | RANGE TO GO (FINAL PHASE) | 2700 NM | = FX +2 |
| R0115 | SL | SINE OF LATITUDE | 1 | NOT SAVED |
| R0117 | T | TIME | 8 28 CENTISEC | = TIME2, TIME1 |
| R0119 | THETA | DESIRED RANGE (RADIANS) | 2 PI RADIANS | = THETAH |
| R0121 | THETNM | DESIRED RANGE (NM) | 21600 NM | NON EXISTENT |
| R0123 | V | VELOCITY MAGNITUDE | 2 VSAT | |
| R0124 | V1 | INITIAL VELOCITY FOR UPCONTROL | 2 VSAT | |
| R0125 | VL | EXIT VELOCITY FOR UPCONTROL | 2 VSAT | |
| R0126 | VREF | REFERENCE VELOCITY FOR UPCONTROL | 2 VSAT | |
| R0127 | VS1 | VSAT OR V1, WHICHEVER IS SMALLER | 2 VSAT | |
| R0128 | | $2 \quad 2$ | | |
| R0129 | VBAR5 | $VL / VSAT$ | 4 | |
| R0130 | | $2 \quad 2$ | | |
| R0131 | VSO | NORMALISED VEL. SQUARED = $V / VSAT$ | 4 | = VSQUARE |
| R0133 | WT | EARTH RATE TIMES TIME | 1 REVOLUTION | NOT SAVED |
| R0135 | | | | = WIE (DTEAROT) |
| R0137 | X | INTERMEDIATE VARIABLE IN G-LIMITER | 2 VSAT | NOT SAVED |
| R0139 | Y | LATERAL MISS LIMIT | 4 RADIANS | NOT SAVED |

L ENTRY LEXICON

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R0141 EXTRA COMPUTER ERASABLE LOCATIONS NOT SHOWN ON FLOW CHARTS
R0142 -----

| R0143 | VARIABLE | DESCRIPTION | MAXIMUM VALUE |
|-------|----------|--------------------------------------|-------------------|
| R0144 | | | |
| R0145 | GOTOADDR | ADDRESS SELECTED BY SEQUENCER | |
| R0146 | XPIPRUF | BUFFER TO STORE X PIPA COUNTS | |
| R0147 | YPIPRUF | BUFFER TO STORE Y PIPA COUNTS | |
| R0148 | ZPIPRUF | BUFFER TO STORE Z PIPA COUNTS | |
| R0149 | PIPCTR | COUNTS PASSED THRU PIPA READ ROUTINE | |
| R0150 | JJ | INDEX IN FINAL PHASE TABLE LOOK-UP | |
| R0151 | MM | INDEX IN FINAL PHASE TABLE LOOK-UP | |
| R0152 | GRAD | INTERPOLATION FACTOR IN FINAL PHASE | |
| R0153 | FX | DRANGE/D L/D = F3 | 2700 NM |
| R0154 | FX + 1 | AREP | 805 FPSS |
| R0155 | FX + 2 | RTOOO | 2700 NM |
| R0156 | FX + 3 | RDOTREP | VSAT/4 |
| R0157 | FX + 4 | DRANGE/D RDOT = F2 | 21600/2VS NM/FPSS |
| R0158 | FX + 5 | DRANGE/D DRAG = F1 | 2700/805 NM/FPSS |
| R0159 | TEM1B | TEMPORARY LOCATION | |
| R0160 | TIME/RT0 | TIME OF INITIAL TARGET RTINIT | B 28 CENTISEC |
| R0161 | DTBAROT | BST TIME BETWEEN RTINIT AND RT | B 28 CENTISEC |

| | | | |
|-------|-------|----------------------------------|--------|
| R0162 | - | | |
| R0163 | UNITV | UNIT V VECTOR | 2 |
| R0164 | - | | |
| R0165 | UNITR | UNIT R VECTOR | 2 |
| R0166 | - | | |
| R0167 | -VREL | NEGATIVE VELOCITY REL. TO ATMOSP | 2 VSAT |

| R0168 | COMPUTER SWITCHES | INITIAL STATE | CM/FLAGS = STATE +6 |
|-------|-------------------|------------------------------------|---------------------|
| R0170 | | | |
| R0172 | ENTRYDSP | DO ENTRY DISPLAY, IF SET | NON-BRANCH (1) |
| R0174 | ONEPAST | INDICATES OVERTHOOT OF TARGET | NON-BRANCH (0) |
| R0176 | RELVELSW | RELATIVE VELOCITY SWITCH | NON-BRANCH (0) |
| R0178 | EGSW | FINAL PHASE SWITCH | NON-BRANCH (0) |
| R0180 | FIRSTPAS | INITIAL PASS THRU HUNTEST | NON-BRANCH (0) |
| R0182 | HIND | INDICATES ITERATION IN HUNTEST | NON-BRANCH (0) |
| R0184 | INRLSW | INDICATES INIT ROLL ATTITUDE SET | NON-BRANCH (0) |
| R0186 | LATSW | INHIBIT DOWNLIFT SWITCH IF NOT SET | BRANCH (1) |
| R0188 | .05GSW | INDICATES DRAG EXCEEDS .05 GS | BRANCH (0) |
| R0190 | ONEBY | INDICATES ONE PAST TARGET (SET) | SELF-INITIALIZING |

92D, BIT 13

95D, BIT 10

96D, BIT 9

97D, BIT 8

98D, BIT 7

99D, BIT 6

100D, BIT 5

101D, BIT 4

102D, BIT 3

112D, BIT 8



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| PO192 R0194 | CONSTANTS AND GAINS ----- | VALUE ----- |
|----------------|--|-------------------|
| R0196 | C1 FACTOR IN ALP COMPUTATION | 1.25 |
| R0198 | C16 CONSTD GAIN ON DRAG | .01 |
| R0200 | C17 CONSTD GAIN ON RDOT | .001 |
| R0202 | C18 BIAS VEL. FOR FINAL PHASE START | 500 PPS |
| R0204 | C20 MAX DRAG FOR DOWN-LIFT | 175 PPS |
| R0206 | CHOOK FACTOR IN AHOOK COMPUTATION | .25 |
| R0208 | CH1 FACTOR IN GAMMAL COMPUTATION | 1.0 |
| R0210 | COO10 COO1 10 PPS | .005 |
| R0212 | DLEWD0 INITIAL VARIATION IN LEWD | -.05 |
| R0214 | D2 DRAG TO CHANGE LEWD | 175 PPS |
| R0216 | DT COMPUTATION CYCLE TIME INTERVAL | 2 SEC. |
| R0218 | QMAX MAXIMUM ACCELERATION | 257.6 PPS (8 G-S) |
| R0220 | KA1 FACTOR IN KA CALC | 1.3 GS |
| R0222 | KA2 FACTOR IN KA CALC | .2 GS |
| R0224 | KA3 FACTOR IN D0 CALC | 90 PPS |
| R0226 | KA4 FACTOR IN D0 CALC | 40 PPS |
| R0228 | KB1 OPTIMIZED UPCONTROL GAIN | 3.4 |
| R0230 | KB2 OPTIMIZED UPCONTROL GAIN | .0034 |
| R0232 | KDMIN INCREMENT ON Q7 TO DETECT END OF KEPLER PHASE | .5 PPS |
| R0234 | KTETA TIME OF FLIGHT CONSTANT | 1000 |
| R0236 | KLAT1 FACTOR IN KLAT CALC | 1/24 |
| R0238 | K44 GAIN USED IN INITIAL ROLL SECTION | 19749550 PPS |
| R0240 | LATBIAS LATERAL SWITCH BIAS TERM | .41252961 NM |
| R0242 | LEWD1 NOMINAL UPCONTROL L/D | .15 |
| R0244 | POINT1 FACTOR TO REDUCE UPCONTROL GAIN | .1 |
| R0246 | Q2 FINAL PHASE RANGE - 23500 Q3 | -1002 NM |
| R0248 | Q3 FINAL PHASE DRANGE/D V | .07 NM/PPS |
| R0250 | Q5 FINAL PHASE DRANGE/ D GAMMA | 7050 NM/RAD |
| R0252 | Q6 FINAL PHASE INITIAL FLIGHT PATH ANGLE | .0349 RAD |
| R0254 | Q7F MIN DRAG FOR UPCONTROL | 0 PPS |
| R0256 | Q7MIN MIN VALUE FOR Q7 IN FACTOR CALCULATION | 40 PPS |
| R0258 | Q19 FACTOR IN GAMMAL1 CALCULATION | .5 |
| R0260 | Q21 FACTOR IN Q2 CALCULATION | 1000 NM |
| R0262 | Q22 FACTOR IN Q2 CALCULATION | -1302 NM |
| R0264 | VPINAL1 VELOCITY TO START FINAL PHASE ON INITIAL ENTRY | 27000 PPS |
| R0266 | VPINAL FACTOR IN INITIAL UP-DOWN CALC | 26800 PPS |
| R0268 | VLMIN MINIMUM VL | 18000 PPS |
| R0270 | VMIN VELOCITY TO SWITCH TO RELATIVE VEL | VSAT/2 |
| R0272 | VRCONTR1 RDOT TO START INTO HUNTEST | 700 PPS |
| R0274 | VRCONT = COMPUTER NAME | |
| R0276 | 25NM TOLERANCE TO STOP RANGE ITERATION | 25 NM |
| R0277 | VQUIT VELOCITY TO STOP SIGHTING | 1000 PPS |



L ENTRY LESKON

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P0279 CONVERSION FACTORS AND SCALING CONSTANTS
R0280

| | | | | |
|-------|------|------------------------------|----------------|-----------------------|
| R0281 | ATK | ANGLE IN RAD TO NM | 3437.7468 | NM/RAD |
| R0283 | GS | NOMINAL G VALUE FOR SCALING | 11.2 | PPSS |
| R0285 | RS | ATMOSPHERE SCALE HEIGHT | 28500 | FT |
| R0287 | J | GRAVITY HARMONIC COEFFICIENT | .00162348 | |
| R0289 | OME | EQUATORIAL EARTH RATE | 1546.10168 | PPS |
| R0291 | MUS | EARTH GRAVITATIONAL CONSTANT | 3.986032233 | E 14 CUBIC M/ SEC SEC |
| R0293 | RE | EARTH RADIUS | 21202000 | FT |
| R0295 | REQ | EARTH EQUATORIAL RADIUS | 20925738.2 | FT |
| R0297 | VSAT | SATELLITE VELOCITY AT RE | 25766.1973 | PPS |
| R0299 | WIE | EARTH RATE | .0000729211505 | RAD/SEC |

A0301
R0302
R0303

(END GSOP AS-278, VOL 1, FIG. 5.6-3 CONSTANTS, GAINS, ETC.)

DISPLAY QUANTITIES

(SEE SECTION 4 OF THE GSOP FOR SIGN CONVENTIONS.)

| R0305 | VARIABLE | DESCRIPTION | MAXIMUM VALUE |
|-------|----------|---|-------------------------------|
| R0306 | | | |
| R0307 | GMK | PREDICTED MAXIMUM ENTRY ACCEL | 163.84 GS N 60 |
| R0309 | VPRED | PREDICTED VELOCITY AT ALTITUDE | 128 M/CENTISEC N 60 |
| R0311 | | 400K FT ABOVE FISCHER RADIUS. | |
| R0312 | GAMMA | PREDICTED GAMMA AT ALTITUDE | 1 REVOLUTION N 60 |
| R0314 | | 400K FT ABOVE FISCHER RADIUS. | |
| R0315 | D | DRAW ACCELERATION | 805 PPSS N 64 |
| R0317 | WVROI | INERTIAL VELOCITY MAGNITUDE | 128 M/CENTISEC N 64, N 68 |
| R0319 | THETAH | DESIRED RANGE ANGLE NM | 1 REVOLUTION N 64, N 67 |
| R0321 | LAT | PRESENT LATITUDE | 1 REVOLUTION N 67 |
| R0323 | LONG | PRESENT LONGITUDE | 1 REVOLUTION N 67 |
| R0325 | RTODD | RANGE ANGLE TO SPLASH FROM | 1 REVOLUTION N 63 |
| R0327 | | ENSALT FT ABOVE FISCHER RADIUS. (IN NM) | |
| R0328 | VIO | PREDICTED VELOCITY AT ALTITUDE | 128 M/CENTISEC N 63 |
| R0330 | | ENSALT FT ABOVE FISCHER RADIUS. | |
| R0331 | TIB | TIME OF FREE FALL TO ALT | 8 28 CENTISEC N 63 |
| R0333 | | ENSALT FT ABOVE FISCHER RADIUS. | |
| R0334 | ROLLC | ROLL COMMAND | 1 REVOLUTION N 66, N 68, N 69 |
| R0336 | LATANG | CROSS-RANGE ERROR (XRNGERR) | 4 RADIANS N 66 |
| R0338 | DRNGERR | DOWN RANGE ERROR | 1 REVOLUTION N 66 |
| R0340 | | (PRELANG - THETAH IN NM) | |
| R0341 | HDOT | ALTITUDE RATE | 128 M/CENTISEC N 68 |
| R0343 | DT | MINIMUM DRAG FOR UP-CONTROL | 805 PPSS N 69 |
| R0345 | VL | EXIT VELOCITY FOR UP-CONTROL | 2 VSAT N 69 |

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| BODY ATTITUDE QUANTITIES (CM/POSE) | | | |
|------------------------------------|----------|---------------------------------|---------------|
| P0347 | | | |
| R0348 | | | |
| R0349 | VARIABLE | DESCRIPTION | MAXIMUM VALUE |
| R0350 | ----- | ----- | ----- |
| R0351 | - | | |
| R0352 | -VRSL | NEGATIVE VELOCITY REL TO ATMOS. | 2 VSAT |
| R0353 | - | | |
| R0354 | OLDUYA | USED FOR UYA BELOW 1000 PPS | 2 |
| R0355 | - | | |
| R0356 | UYA/2 | UNIT VECTOR TRIAD | 2 |
| R0357 | - | | |
| R0358 | UYA/2 | BASED ON | 2 |
| R0359 | - | | |
| R0360 | UZA/2 | THE TRAJECTORY. | 2 |
| R0361 | - | | |
| R0362 | URX/2 | UNIT VECTOR | 2 |
| R0363 | - | | |
| R0364 | URY/2 | BODY TRIAD | 2 |
| R0365 | - | | |
| R0366 | URZ/2 | FOR CM. | 2 |



L REENTRY CONTROL

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R0001 ENTRY INITIALIZATION ROUTINE
R0002 -----

| | | | | | | | |
|-------|---------|----------|---------|----------|----------------|--------------------------|--|
| 0003 | | | 25,2000 | | | BANK 25 | |
| 0004 | REP 1 | | 25,2000 | | | SETLOC REENTRY | |
| 0005 | | | 25,2000 | | | BANK | |
| 0006 | REP 1 | | | | | COUNT# 88/ENTRY | |
| 0007 | REP 7 | LAST 750 | 87,1451 | | | EBANK= RTINIT | |
| 0008 | REP 6 | LAST 661 | 4753 | | | ERENTRY = EBANK7 | |
| 0009 | REP 11 | LAST 661 | 4752 | | | ERAC0 EQUALS EBANK8 | |
| 0010 | REP 8 | LAST 779 | 4875 | | | ENTRYPRIO EQUALS PRIO20 | (SERVICER) |
| 0011 | REP 48 | LAST 701 | 0102 | | | CM/FLAGS EQUALS STATE +8 | |
| 0012 | | | 25,2000 | 77776 1 | STARTENT EXIT | | MM = 63 |
| A0013 | | | | | | | COME HERE FROM CM/POSE . RESTARTED IN CM/POSE. |
| 0014 | REP 1 | | 25,2001 | 4 2113 1 | CS ENTMASK | | INITIALIZE ALL SWITCHES TO ZERO |
| A0015 | | | | | | | EXCEPT LATSW, ENTRYDSP AND GONEPAST. |
| A0016 | | | | | | | GONERY 112D BITS FLAG7, SELF INITIALIZING |
| 0017 | | | 25,2002 | 0 0004 0 | INHINT | | |
| 0018 | REP 5 | LAST 778 | 25,2003 | 7 0102 0 | MASK CM/FLAGS | | |
| A0019 | | | | | | | ENTRYDSP = 92D B13 |
| A0020 | | | | | | | GONEPAST=95D B10, RELVELSW=98D B9 |
| A0021 | | | | | | | EGSW = 97D B8 |
| A0022 | | | | | | | HIND=99D B6 INRLSW=100D B5 |
| A0023 | | | | | | | LATSW=101D B4 .05GWSW=102D B3 |
| 0024 | REP 1 | | 25,2004 | 6 2114 1 | AD ENTRYSW | | SET ENTRYDSP, LATSW, GONEPAST. |
| 0025 | REP 6 | LAST 798 | 25,2005 | 54 102 0 | TS CM/FLAGS | | |
| 0026 | | | 25,2006 | 0 0003 1 | RELINT | | |
| 0027 | REP 204 | LAST 785 | 25,2007 | 0 6006 1 | TC INTPRET | | |
| 0028 | | | 25,2010 | 77735 0 | SLOAD | | |
| 0029 | REP 1 | | 25,2011 | 03011 1 | LADPAD | | |
| 0030 | REP 2 | LAST 116 | 25,2012 | 03626 0 | STORE LOD | | |
| 0031 | | | 25,2013 | 77735 0 | SLOAD | | |
| 0032 | REP 1 | | 25,2014 | 03010 0 | LADPAD | | |
| 0033 | REP 2 | LAST 116 | 25,2015 | 03624 1 | STORE LAD | | |
| 0034 | | | 25,2016 | 77605 1 | DMP | | L/DCMINR = LAD COS(15) |
| 0035 | REP 1 | | 25,2017 | 15320 1 | COS15 | | |
| 0036 | REP 2 | LAST 116 | 25,2020 | 17630 1 | STODL L/DCMINR | | |
| 0037 | REP 1 | | 25,2021 | 15145 0 | LATSLOPE | | |
| 0038 | | | 25,2022 | 70405 1 | DMP SR1 | | KLAT = LAD/24 |
| 0039 | REP 3 | LAST 798 | 25,2023 | 03624 1 | LAD | | |

L REENTRY CONTROL

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0040 RESP 2 LAST 116 25,2024 17632 0
0041 RESP 1 25,2025 15176 0
0042 RESP 2 LAST 276 25,2026 17175 1
0043 RESP 1 25,2027 17363 1
0044 RESP 2 LAST 116 25,2030 17614 1
0045 RESP 4 LAST 798 25,2031 03624 1
0046 RESP 25,2032 57565 0
0047 RESP 6 LAST 747 25,2033 03327 1
0048 RESP 2 LAST 116 25,2034 37634 1

0049 RESP 2 LAST 744 25,2035 52063 0
0050 25,2036 47375 0
0051 RESP 14 LAST 790 25,2037 01177 1
0052 RESP 4 LAST 789 25,2040 01760 1
0053 25,2041 50256 0
0054 RESP 4 LAST 770 25,2042 03474 0
0055 RESP 4 LAST 173 25,2043 03676 0
0056 25,2044 47076 0
0057 RESP 13 LAST 403 25,2045 45707 0
0058 RESP 2 LAST 116 25,2046 17644 1

0059 RESP 5 LAST 799 25,2047 03624 1
0060 25,2050 43205 1
0061 RESP 1 25,2051 15200 1
0062 RESP 1 25,2052 15202 0
0063 RESP 2 LAST 117 25,2053 03712 0

0064 25,2054 86331 0
0065 RESP 3 LAST 752 25,2055 03646 0
0066 RESP 1 25,2056 52280 1
0067 RESP 4 LAST 749 25,2057 03325 0
0068 RESP 1 25,2060 52115 0

0069 25,2061 77634 0
0070 RESP 2 LAST 756 25,2062 53803 1

R0071 CALCULATE THE INITIAL TARGET VECTOR' RTINIT, ALSO RTEAST, RTNORM AND RT. ALL ARE .5 UNIT AND IN
R0073 REFERENCE COORDINATES.

0074 25,2063 77220 1
0075 RESP 4 LAST 799 25,2064 03645 0
0076 RESP 8 LAST 634 25,2065 03401 1
0077 25,2066 43014 0
0078 RESP 10 LAST 756 25,2067 00662 0
0079 RESP 19 LAST 756 25,2070 01663 0
0080 RESP 10 LAST 634 25,2071 15104 0
0081 RESP 1 25,2072 15332 1

0082 RESP 11 LAST 799 25,2073 15110 0
0083 RESP 13 LAST 783 25,2074 01205 1
    
```

```

STODL KLAT
Q7P
STODL Q7 Q7 = Q7P
NEARONE 1.0 -1BIT
STODL FACTOR
LAD
SIGN DCOMP
HEADSUP MAY BE NOISE FOR DISPLAY P61
L/D = - LAD SQN(HEADSUP)
STCALL L/D

STARTEN1 RETURN VIA GOTOADDR
VXV
VN (-) M/CS
UNITR .5 UNIT REF COORDS
UNIT DOT
RT RT/2 TARGET VECTOR REF COORDS
STORE LATANG LATANG = UNI.RT /4
DCOMP RTB
STODL SIGNMPAC
K2ROLL K2ROLL = -SQN(LATANG)

LAD
DMP DAD
Q21
Q22
STORE Q2 Q2 = -1152 + 500 LAD

SSP SSP
GOTOADDR SET SELECTOR FOR INITIAL PASS
INITROLL
POSEXIT SET CM/POSE TO CONTINUE AT SCALEPOP
SCALEPOP

RTB
SERVQUT OMIT INITIAL DISPLAY, SINCE 1ST QJESSRAE

STARTEN1 STO VLOAD
GOTOADDR
LAT(SPL) TARGET COORDINATES
CLEAR CLEAR DO CALL USING PAD RADIUS. WILL UNIT IT.
ERADFLAG ANYWAY.
LINADFLAG
STODL LAT
JZEROS

STODL LAT +4 SET ALT=0.
PIPTIME ESTABLISH RTINIT AT TIME OF PRESENT
    
```

L REENTRY CONTROL

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| | | | | | | | | | | | |
|-------|-----|---|------|-----|---------|-------|---|---------|----------|------------|-------------------------------------|
| A0084 | | | | | | | | | | | |
| 0085 | REP | 2 | LAST | 116 | 25,2075 | 37524 | 0 | STCALL | TIME/RTO | | IN AND VN. |
| 0086 | REP | 7 | LAST | 730 | 25,2076 | 26373 | 1 | | LALOTORV | | SAVE TIME BASE OF RTINIT. |
| 0087 | | | | | 25,2077 | 77658 | 1 | UNIT | | | C(MPAC) = TIME (PIPTIME) |
| 0088 | REP | 8 | LAST | 798 | 25,2100 | 17452 | 1 | STODL | RTINIT | | ANSWER IN ALPHA V ALSO |
| 0089 | REP | 1 | | | 25,2101 | 12112 | 0 | | 500SEC | | .5 UNIT TARGET REP COORDS |
| A0090 | | | | | | | | | | | NOMINAL ENTRY TIME FOR P63 |
| 0091 | REP | 7 | LAST | 770 | 25,2102 | 37608 | 0 | STCALL | DTEAROT | | TIME/RTO = PIPTIME, STILL. |
| 0092 | REP | 1 | | | 25,2103 | 46215 | 0 | | BARROT1 | | INITIALIZE BARROT |
| 0093 | | | | | 25,2104 | 72441 | 0 | DOT | SL1 | | GET RT |
| 0094 | REP | 5 | LAST | 799 | 25,2105 | 01760 | 1 | | UNITR | | RT/2 IN MPAC |
| 0095 | | | | | 25,2106 | 77726 | 1 | ACOS | | | |
| 0096 | REP | 2 | LAST | 117 | 25,2107 | 37702 | 0 | STCALL | THEDAH | | RANGE ANGLE /360 |
| 0097 | REP | 5 | LAST | 799 | 25,2110 | 03645 | 0 | | GOTOADDR | | RETURN TO CALLER |
| 0098 | | | | | 25,2111 | 00993 | 1 | 500SEC | 2DEC | 50000 R-28 | CS |
| 0098 | | | | | 25,2112 | 01520 | 1 | | | | |
| 0099 | | | | | 25,2113 | 11774 | 0 | ENTMASK | OCT | 11774 | |
| 0100 | | | | | 25,2114 | 11010 | 0 | ENTRYSW | OCT | 11010 | ENTRYSW B13, GONEPAST B10, LATSW B4 |



L REENTRY CONTROL

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P0101
 0102 25,2115 77624 1 SCALEPOP CALL
 0103 REP 1 25,2116 52125 0 TARGETING
 0104 25,2117 77776 1 EXIT
 0105 REP 85 LAST 784 25,2120 0 5301 0 REFAZE10 TC FLASHING
 0106 25,2121 10035 0 OCT 10035 SERVICER 5.3 RESTART AT REFAZE10
 0107 REP 205 LAST 798 25,2122 0 6006 1 TC INTPRET
 R0108 JUMP TO PARTICULAR RE-ENTRY PHASE'
 A0109 SEQUENCE
 0110 GOTO
 0111 REP 6 LAST 800 25,2123 77650 1 GOTOADDR
 0112 25,2124 03645 0
 R0112
 R0113 GOTOADDR CONTAINS THE ADDRESS OF THE ROLL COMMAND EQUATIONS APPROPRIATE TO THE CURRENT PHASE OF
 R0115 RE-ENTRY. SEQUENCING IS AS FOLLOWS'
 R0116 INITROLL ADDRESS IS SET HERE INITIALLY. HOLDS INITIAL ROLL ATTITUDE UNTIL KAT IS EXCEEDED. THEN HOLDS NEW ROLL
 R0118 ATTITUDE UNTIL VRTHRESH IS EXCEEDED. THEN BRANCHES TO
 R0119 HUNTEST THIS SECTION CHECKS TO SEE IF THE PREDICTED RANGE AT NOMINAL L/D FROM PRESENT CONDITIONS IS LESS
 R0121 THAN THE DESIRED RANGE.
 R0122 IF NOT - A ROLL COMMAND IS GENERATED BY THE CONSTANT DRAG CONTROLLER.
 R0124 IF SO - CONTROL AND GOTOADDR ARE SET TO UPCONTRL.
 R0125 USUALLY NO ITERATION IS INVOLVED EXCEPT IF THE RANGE DESIRED IS TOO LONG ON THE FIRST PASS THROUGH
 R0127 HUNTEST.
 R0128 UPCONTRL CONTROLS ROLL DURING THE SUPER-CIRCULAR PHASE. UPCONTRL IS TERMINATED EITHER
 R0130 (A) WHEN THE DRAG (AS MEASURED BY THE PIPAS) FALLS BELOW Q7, OR
 R0132 (B) IF ROOT IS NEGATIVE AND REFERENCE VL EXCEEDS V.
 R0133 IN CASE (A), GOTOADDR IS SET TO KEP2 AND IN CASE (B), TO PREDICT3 SKIPPING THE KEPLER PHASE OF
 R0135 ENTRY.
 R0136 KEP2 GOTOADDR IS SET HERE DURING THE KEPLER PHASE TO MONITOR DRAG. THE SPACECRAFT IS INSTANTANEOUSLY
 R0138 TRIMMED IN PITCH AND YAW TO THE COMPUTED RELATIVE VELOCITY. THE LAST COMPUTED ROLL ANGLE IS MAINTAINED.
 R0140 WHEN THE MEASURED DRAG EXCEEDS Q7 +0.5, GOTOADDR IS SET TO
 R0141 PREDICT3 THIS CONTROLS THE FINAL SUB-ORBITAL PHASE. ROLL COMMANDS CEASE
 R0142 WHEN V IS LESS THAN VQUIT. AN EXIT IS MADE TO
 R0143 P67.1 THE LAST COMPUTED ROLL ANGLE IS MAINTAINED. RATE DAMPING IS DONE IN PITCH AND YAW. PRESENT LATITUDE
 R0145 AND LONGITUDE ARE COMPUTED FOR DISPLAY.
 R0146 ENTRY IS TERMINATED WHEN DISKY RESPONSE IS MADE TO THIS FINAL FLASHING DISPLAY.

L REENTRY CONTROL

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P0148 PROCESS AVERAGE O OUTPUT...SCALE IT AND GET INPUT DATA
R0149

R0150 * START TARGETING ...

0151 REP 9 LAST 800 57,1451

EBANK= RINIT

A0152
A0153

TARGETING IS CALLED BY P61, FROM GROUP 4.
TARGETING IS CALLED BY ENTRY, FROM GROUP 5.

A0154

0155 25,2125 77214 0
0156 REP 1 25,2126 03346 0
0157 REP 1 25,2127 52133 1
0158 REP 2 LAST 116 25,2130 03526 0

TARGETING BOFF
RELVELSW
GETVEL
-VREL

VLOAD
RELVELSW
GETVEL
-VREL

ALL MM COME HERE.
ENTER WITH PROPER EB FROM CM/POSE(TEST)
RELVELSW = 96D BITS
WANT INERTIAL VEL, GO GET IT.
NEW V IS RELATIVE, CONTINUE

0159 25,2131 52076 1
0160 REP 1 25,2132 52136 1

VCOMP
GOTO
GETUNITV -1

(VREL) = (V) + KWE UNITRUNITW
- VREL WAS LEFT BY CM/POSE

0161 25,2133 74375 0
0162 REP 15 LAST 799 25,2134 01177 1
0163 REP 1 25,2135 15230 1
0164 REP 2 LAST 116 25,2136 03516 0

GETVEL
VLOAD
VXSC
VN
KVSCALE
STORE
VREL

VLOAD
VXSC
VN
KVSCALE
STORE
VREL

INERTIAL V WANTED
KVSCALE = (12800 / .3048) / 2VS
KVSCALE = .81491944
V/2 VS

0165 25,2137 44056 1
0166 REP 6 LAST 770 25,2140 03373 0
0167 REP 2 LAST 116 25,2141 17510 0
0168 25,2142 00043 0
0169 REP 2 LAST 116 25,2143 03622 1

GETUNITV UNIT
STO
60GENRET
STOVL
UNITV
34D
STORE
VSQUARE

STO
60GENRET
STOVL
UNITV
34D
STORE
VSQUARE

VSQ/4

0170 25,2144 77625 0
0171 REP 1 25,2145 15322 0
0172 REP 2 LAST 116 25,2146 17654 0

DSU
FOURTH
LEQ

DSU
FOURTH
LEQ

LEQ = VSQUARE - 1
4 G-S FULL SCALE
LEQ/4

0173 25,2147 00045 0
0174 REP 2 LAST 117 25,2150 27674 1

STOVL
V

36D
V

V/2 VS = VEL/2 VS

0175 REP 3 LAST 802 25,2151 03516 0
0176 25,2152 72441 0
0177 REP 6 LAST 800 25,2153 01760 1
0178 REP 3 LAST 276 25,2154 27700 0

VEL
DOT
SL1
UNITR
STOVL
RDOT

VEL
SL1
UNITR
RDOT

RDOT = V.UNITR
RDOT / 2 VS

0179 REP 10 LAST 790 25,2155 01163 1
0180 25,2156 41246 1
0181 REP 1 25,2157 15232 0
0182 25,2160 53152 1
0183 REP 1 25,2161 55132 1
0184 REP 3 LAST 275 25,2162 27640 0
0185 REP 4 LAST 802 25,2163 03516 0
0186 25,2164 53435 0

DELV
DMP
KASCALE
SL1
RZR
SETMIND
DSTORE
STOVL
D
VEL
VXV
UNIT

DELV
DMP
KASCALE
SL1
RZR
SETMIND
DSTORE
STOVL
D
VEL
VXV
UNIT

PIPA COUNTS IN PLATFORM COORDS.
ACCELERATION USED TO APPROX DRAG
UNI = UNITV*(R)



L REENTRY CONTROL

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| Address | Operation | Count | Address | Value 1 | Value 2 | Operation | Value 3 | Value 4 | Comments |
|---------|-----------|-------|----------|---------|---------|-----------------|-------------|---------|---|
| 0187 | RESP | 7 | LAST 802 | 25,2165 | 01760 1 | | | | |
| 0188 | RESP | 4 | LAST 766 | 25,2166 | 03502 0 | STORE | UNTR UNI | .5 UNI | REF COORDS. |
| 0189 | | | | 25,2167 | 71214 0 | BOFF | DLOAD | | |
| 0190 | RESP | 2 | LAST 802 | 25,2170 | 03346 0 | | REL/BLSW | | |
| 0191 | RESP | 1 | | 25,2171 | 55073 0 | | GE15TA | | |
| 0192 | RESP | 2 | LAST 799 | 25,2172 | 15332 1 | | 3ZEROS | | |
| 0193 | | | | 25,2173 | 43225 0 | UPDATERT DSU | DAD | | PIPTIME-TIME/RT0 = ELAPSED TIME SINCE RTINIT WAS ESTABLISHED. |
| A0194 | | | | | | | | | |
| 0195 | RESP | 3 | LAST 800 | 25,2174 | 03524 1 | | TIME/RT0 | | |
| 0196 | RESP | 14 | LAST 799 | 25,2175 | 01205 1 | | PIPTIME | | |
| 0197 | RESP | 8 | LAST 800 | 25,2176 | 37606 0 | STCALL | DTEAROT | | GET PREDICTED TARGET VECTOR RT |
| 0198 | RESP | 3 | LAST 770 | 25,2177 | 46225 0 | | BARROT2 | | |
| 0199 | | | | 25,2200 | 40241 1 | DOT | SETPD | | SINCE (RT) UNIT VECT, THIS IS 1/4 MAX LATANG = RT.UNI |
| 0200 | RESP | 5 | LAST 803 | 25,2201 | 03502 0 | | UNI | | |
| 0201 | | | | 25,2202 | 00001 0 | | 0 | | |
| 0202 | RESP | 5 | LAST 799 | 25,2203 | 27676 0 | STOVL | LATANG | | LATANG = MAC LATANG / 4 |
| 0203 | RESP | 5 | LAST 799 | 25,2204 | 03474 0 | | RT | | |
| 0204 | | | | 25,2205 | 77614 1 | CLEAR | | | |
| 0205 | RESP | 1 | | 25,2206 | 03667 0 | | GONERY | | SHOW HAVE NOT GONE PAST TARGET. |
| 0206 | | | | 25,2207 | 50235 0 | VXV | DOT | | IF RT*UNITR.UNI NEG, GONERY=1 |
| 0207 | RESP | 8 | LAST 803 | 25,2210 | 01760 1 | | UNTR | | GONEPAST IS CONDITIONAL SW SET IN FINAL PHASE. |
| 0208 | RESP | 6 | LAST 803 | 25,2211 | 03502 0 | | UNI | | |
| 0209 | | | | 25,2212 | 43044 0 | BPL | SET | | |
| 0210 | | | | 25,2213 | 52215 0 | | +2 | | |
| 0211 | RESP | 2 | LAST 803 | 25,2214 | 03467 1 | | GONERY | | SHOW HAVE GONE PAST TARGET. |
| 0212 | | | | 25,2215 | 77775 1 | VLOAD | | | |
| 0213 | RESP | 6 | LAST 803 | 25,2216 | 03474 0 | | RT | | |
| 0214 | | | | 25,2217 | 45241 1 | GETANGLE DOT | DSU | | THETA = ARCCOS(RT.UNTR) |
| 0215 | RESP | 9 | LAST 803 | 25,2220 | 01760 1 | | UNTR | | TO IMPROVE ACCURACY, CALC RANGE BY TINYTHET IF HIGH ORDER PART OF ARCCOS ARGUMENT IS ZERO |
| 0216 | RESP | 1 | | 25,2221 | 15162 0 | | NEAR1/4 | | |
| 0217 | | | | 25,2222 | 43244 1 | BPL | DAD | | |
| 0218 | RESP | 1 | | 25,2223 | 55135 0 | | TINYTHET | | |
| 0219 | RESP | 2 | LAST 803 | 25,2224 | 15162 0 | | NEAR1/4 | | |
| 0220 | | | | 25,2225 | 65552 0 | SL1 | ACOS | | |
| 0221 | RESP | 3 | LAST 800 | 25,2226 | 03702 1 | THETADONE STORE | THETAH | | THETAH/360 HI WORD, LO BIT = 1.32 NM=360 60/16384 |
| A0222 | | | | | | | | | |
| 0223 | | | | 25,2227 | 57414 1 | RON | DCOMP | | |
| 0224 | RESP | 3 | LAST 803 | 25,2230 | 03707 1 | | GONERY | | =1 IF HAVE GONE PAST TARGET. (SIGN MAY BECOME ERRATIC VERY NEAR TARGET DUE TO LOSS OF PRECISION.) |
| A0225 | | | | | | | | | |
| A0226 | | | | | | | | | |
| 0227 | | | | 25,2231 | 52232 0 | | +1 | | |
| 0228 | RESP | 2 | LAST 276 | 25,2232 | 17714 0 | STOVL | RTGON67 | | RANGE ERROR! NEG IF WILL FALL SHORT. |
| 0229 | RESP | 4 | LAST 802 | 25,2233 | 03640 0 | | D | | |
| 0230 | | | | 25,2234 | 50025 0 | DSU | RAN | | |



L REENTRY CONTROL

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| | | | | | | | | | |
|------|-----|---|---------|-------|---|----------|-------|------|--|
| 0231 | REP | 1 | 25,2235 | 15240 | 0 | | | | |
| 0232 | REP | 1 | 25,2236 | 52255 | 1 | | | | |
| 0233 | | | 25,2237 | 77214 | 0 | | | | |
| 0234 | REP | 1 | 25,2240 | 03074 | 1 | | | | |
| 0235 | REP | 6 | LAST | 790 | | | | | |
| 0236 | | | 25,2241 | 03433 | 0 | | | | |
| 0237 | REP | 5 | LAST | 772 | | | | | |
| 0238 | | | 25,2242 | 50206 | 0 | | | | |
| 0239 | | | 25,2243 | 03542 | 1 | | | | |
| 0240 | | | 25,2244 | 63552 | 0 | | | | |
| 0241 | | | 25,2245 | 47515 | 0 | | | | |
| 0242 | | | 25,2246 | 58225 | 1 | | | | |
| 0243 | REP | 1 | 25,2247 | 00001 | 0 | | | | |
| 0244 | REP | 1 | 25,2250 | 75400 | 1 | | | | |
| | | | 25,2251 | 52253 | 1 | | | | |
| | | | 25,2252 | 03727 | 0 | | | | |
| 0245 | | | 25,2253 | 77650 | 1 | NOLDCALC | GOTO | | |
| 0246 | REP | 7 | LAST | 802 | | | | | |
| | | | 25,2254 | 03373 | 0 | | | | |
| 0247 | | | 25,2255 | 52014 | 0 | NO.05G | CLEAR | GOTO | |
| 0248 | REP | 2 | LAST | 804 | | | | | |
| | | | 25,2256 | 03274 | 0 | | | | |
| 0249 | REP | 2 | LAST | 804 | | | | | |
| | | | 25,2257 | 52253 | 1 | | | | |

.05G
NO.05G
VLOAD
SET
.05GSW
DELA/REP
PUSH
DOT
UXA/2
SL1
DSQ
FDVL
VSO
DSU
DDV
BOV
SQRT
NOLDCALC
STORE
L/DCALC

EXCHANGE WITH PDL.

OVPL LAST CLEARED IN EARROT2 ABOVE.

THIS WAY FOR DAP. (MAY INTERRUPT)
.05GSW = 102D B3
KEEP SINGLE EXIT FOR TARGETING



L REENTRY CONTROL

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P0250 SUBROUTINES CALLED BY SCALEPOP (TARGETING)

| | | | | | | | | | |
|-------|-----|---|------|---------|---------|-----------------|---------|----------|---|
| 0251 | | | | 26,3073 | | BANK 26 | | | |
| 0252 | REP | 1 | | 26,2000 | | SETLOC REENTRY1 | | | |
| 0253 | | | | 26,3073 | | BANK | | | |
| 0254 | REP | 1 | | | | COUNT# 88/ENTRY | | | |
| 0255 | | | | 26,3073 | 56345 0 | GETETA | DLOAD | DDV | $D = D + D(-RDOT/HS - 2D/V) DT/2$ |
| A0256 | | | | | | | | | $DT/2 = 2/2 = 1$ |
| 0257 | REP | 4 | LAST | 802 | 26,3074 | 03700 0 | | RDOT | |
| 0258 | REP | 1 | | | 26,3075 | 15314 0 | | -HSCALED | |
| 0259 | | | | | 26,3076 | 41325 0 | FDOL | DMP | |
| 0260 | REP | 5 | LAST | 803 | 26,3077 | 03840 0 | | D | |
| 0261 | REP | 1 | | | 26,3100 | 15316 1 | | -KSCALE | |
| 0262 | | | | | 26,3101 | 43271 1 | DDV | DAD | |
| 0263 | REP | 3 | LAST | 802 | 26,3102 | 03874 1 | | V | |
| A0264 | | | | | | | | | -RDOT/HS FROM PDL. |
| 0265 | | | | | 26,3103 | 43205 1 | DMP | DAD | |
| 0266 | REP | 6 | LAST | 805 | 26,3104 | 03840 0 | | D | |
| 0267 | REP | 7 | LAST | 805 | 26,3105 | 03840 0 | | D | |
| 0268 | REP | 8 | LAST | 805 | 26,3106 | 03840 0 | STORE | D | |
| 0269 | | | | | 26,3107 | 71214 0 | BON | DLOAD | BGSW INDICATES FINAL PHASE. |
| 0270 | REP | 2 | LAST | 56 | 26,3110 | 03307 0 | | BGSW | |
| 0271 | REP | 1 | | | 26,3111 | 55116 1 | | SURETA | |
| 0272 | REP | 4 | LAST | 803 | 26,3112 | 03702 1 | | THETAH | |
| 0273 | | | | | 26,3113 | 52005 0 | DMP | GOTO | $= 1000X2PI/(2)E14 163.84$ |
| 0274 | REP | 1 | | | 26,3114 | 15234 0 | | KTETA | |
| 0275 | REP | 1 | | | 26,3115 | 52173 0 | | UPDATERT | |
| 0276 | | | | | 26,3116 | 45345 1 | SURETA | DLOAD | DSJ |
| 0277 | REP | 4 | LAST | 805 | 26,3117 | 03874 1 | | V | SWITCH FROM INERTIAL TO RELATIVE VEL. |
| 0278 | REP | 1 | | | 26,3120 | 15322 0 | | VMIN | |
| 0279 | | | | | 26,3121 | 43044 0 | BPL | SET | |
| 0280 | REP | 1 | | | 26,3122 | 55124 0 | | SURETA2 | |
| 0281 | REP | 3 | LAST | 803 | 26,3123 | 03068 1 | | RELVELSW | |
| 0282 | | | | | 26,3124 | 41345 0 | SURETA2 | DLOAD | DMP |
| 0283 | REP | 5 | LAST | 805 | 26,3125 | 03702 1 | | THETAH | |
| 0284 | REP | 1 | | | 26,3126 | 15236 1 | | KT1 | KT1 = KT |
| 0285 | | | | | 26,3127 | 52071 0 | DDV | GOTO | |
| 0286 | REP | 5 | LAST | 805 | 26,3130 | 03874 1 | | V | KT = RE(2 PI)/2 VS 16384 163.84/ 2 VSAT |
| 0287 | REP | 2 | LAST | 805 | 26,3131 | 52173 0 | | UPDATERT | |
| 0288 | | | | | 26,3132 | 52145 0 | SETMIND | DLOAD | GOTO |
| 0289 | REP | 2 | LAST | 834 | 26,3133 | 16328 1 | | 1RITDP | |
| 0290 | REP | 1 | | | 26,3134 | 52162 0 | | DSTORR | |



L REENTRY CONTROL

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| | | | | | | | |
|------|-----|------------|---------|---------|-------------|------------|---------------------------|
| 0291 | | | 26,3135 | 51425 0 | TINYHST DSU | ABS | ENTER WITH X-.249 |
| 0292 | REP | 3 LAST 805 | 26,3136 | 16327 0 | | 18ITDP + 1 | GET 1/4 - MPAC |
| 0293 | | | 26,3137 | 75461 0 | SL | SORT | SCALE UP BEFORE SORT |
| 0294 | | | 26,3140 | 20216 0 | | 13D | HAS FACTOR FOR UP SCALING |
| 0295 | | | 26,3141 | 52005 0 | DMP | GOTO | |
| 0296 | REP | 1 | 26,3142 | 15246 0 | | KACOS | |
| 0297 | REP | 1 | 26,3143 | 52226 0 | | THEIDONE | |



L REENTRY CONTROL

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P0298 * START INITIAL ROLL ...

| | | | | | |
|-------|-------|------------------|---------|---------|-------------------|
| 0299 | | | 25,2260 | | BANK 25 |
| 0300 | REP 2 | LAST 798 | 25,2000 | | SETLOC REENTRY |
| 0301 | | | 25,2260 | | BANK |
| 0302 | REP 2 | LAST 798 TO 805' | 176 | 176* | COUNT* \$\$/ENTRY |
| A0303 | | | | | |
| 0304 | | | 25,2260 | 43014 0 | INITROLL BON |
| 0305 | REP 1 | | 25,2261 | 03312 1 | BOFF |
| 0306 | REP 1 | | 25,2262 | 52354 1 | INRLSW |
| 0307 | REP 3 | LAST 804 | 25,2263 | 03354 0 | INITRL1 |
| 0308 | REP 1 | | 25,2264 | 53520 0 | .05GSW |
| | | | | | LIMITL/D |
| A0309 | | | | | |
| A0310 | | | | | |
| A0311 | | | | | |
| 0312 | | | 25,2265 | 63545 0 | DLOAD DSO |
| 0313 | REP 3 | LAST 802 | 25,2266 | 03654 0 | LEO |
| 0314 | | | 25,2267 | 56205 0 | DMP DDV |
| 0315 | REP 4 | LAST 807 | 25,2270 | 03654 0 | LEO |
| 0316 | REP 1 | | 25,2271 | 15304 1 | 1/KA1 |
| 0317 | | | 25,2272 | 47015 0 | DAD RTB |
| 0318 | REP 1 | | 25,2273 | 15308 0 | KA2 |
| 0319 | REP 1 | | 25,2274 | 54432 0 | P64 |
| A0320 | | | | | |
| 0321 | REP 2 | LAST 117 | 25,2275 | 03720 1 | STORE KAT |
| 0322 | | | 25,2276 | 45345 1 | DLOAD DSU |
| 0323 | REP 6 | LAST 805 | 25,2277 | 03674 1 | V |
| 0324 | REP 1 | | 25,2300 | 15302 1 | VPINAL1 |
| 0325 | | | 25,2301 | 51014 0 | CLEAR RPL |
| 0326 | REP 1 | | 25,2302 | 03265 0 | GONEPAST |
| A0327 | | | | | |
| A0328 | | | | | |
| 0329 | REP 1 | | 25,2303 | 52310 1 | D0EQ |
| 0330 | | | 25,2304 | 52131 0 | GOTO |
| 0331 | REP 7 | LAST 801 | 25,2305 | 03646 0 | GOTOADDR |
| 0332 | REP 1 | | 25,2306 | 53311 1 | KEP2 |
| 0333 | REP 1 | | 25,2307 | 52343 1 | INROLUT |
| 0334 | | | 25,2310 | 41345 0 | D0EQ |
| 0335 | REP 5 | LAST 807 | 25,2311 | 03654 0 | DLOAD DMP |
| 0336 | REP 1 | | 25,2312 | 15310 1 | LEO |
| 0337 | | | 25,2313 | 77615 0 | KA3 |
| 0338 | REP 1 | | 25,2314 | 15312 0 | DAD |
| 0339 | REP 2 | LAST 117 | 25,2315 | 03710 1 | STORE KA4 |
| 0340 | | | 25,2316 | 40065 0 | D0 D0 RDDV ROV |

MM = 63, 64 ..
IF D- .05G NEG, GO TO LIMITL/D

MM = 64, NOW

$$KA = KA_1 LEO^3 + KA_2$$

$$= 25 / (64 \cdot 1.8)$$

= .2
ROLLC VI ROOT
XXX.XX DEG XXXXX. PPS XXXXX. PPS

IF V-VPINAL1 NEG, GO TO FINAL PHASE.

(CAN'T CLEAR INRLSW AFTER HERE'RESTARTS) -
GONEPAST WAS INITIALLY SET=1 TO FORCE
ROLLC TO REMAIN AS DEFINED BY HEADSUP
UNTIL START OF P64. (UNTIL D 5 .05G)

AND IDLE UNTIL D50.2 G. (NO P66 HERE)
GO TO LIMITL/D AFTER SETTING INRLSW.

$$D0 = KA_3 LEO + KA_4$$

D0/805

L REENTRY CONTROL

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0341 REP 1 25,2317 15286 1
 0342 25,2320 52321 0
 0343 REP 2 LAST 117 25,2321 17708 0
 0344 REP 6 LAST 799 25,2322 03824 1
 0345 REP 3 LAST 799 25,2323 17634 0
 0346 REP 5 LAST 805 25,2324 03700 0
 0347 25,2325 41471 0
 0348 REP 7 LAST 807 25,2326 03874 1
 0349 25,2327 41318 0
 0350 25,2330 45271 1
 0351 REP 1 25,2331 15276 0
 0352 REP 1 25,2332 15300 0

C001
 +1
 STODL C/D0
 LAD
 STODL L/D
 RDOT
 DDV PUSH
 V
 DSO DMP
 DDV DSJ
 1/K44
 VFINAL

(-4/25 G) B-8
 CLEAR OVFLND, IF ON.
 (-4/D0) B-8
 IF V-VFINAL +K(RDOT/V)CUBED POS,L/D=-LAD

A0353
 A0354

³
 V-VFINAL + (RDOT/V) / K44 OVFL 3

0355 25,2333 40015 1
 0356 REP 6 LAST 808 25,2334 03874 1
 0357 REP 2 LAST 807 25,2335 52343 1
 0358 25,2336 71240 1
 0359 REP 3 LAST 808 25,2337 52343 1
 0360 REP 7 LAST 808 25,2340 03824 1
 0361 25,2341 77878 0
 0362 REP 4 LAST 808 25,2342 03834 0

DAD BOV
 V
 INROLUT
 RNN DLOAD
 INROLUT
 LAD
 DCOMP
 STORE L/D

GO TO LIMIT/D AFTER SETTING INRLSW.
 GO TO LIMIT/D AFTER SETTING INRLSW.

A0363

0364 25,2343 77814 1
 0365 REP 2 LAST 807 25,2344 03052 0
 0366 REP 2 LAST 807 25,2345 53520 0

INROLUT ROPSET
 INRLSW
 LIMIT/D

SET INRLSW AT END FOR RESTART PROTECTION
 END OF PRE .05G PATH OF INITROLL.
 SWITCH IS ZERO INITIALLY.
 (GO TO)

0367 25,2346 45345 1
 0368 REP 3 LAST 807 25,2347 03720 1
 0369 REP 9 LAST 805 25,2350 03840 0
 0370 25,2351 52044 0
 0371 REP 3 LAST 808 25,2352 53520 0
 0372 REP 1 25,2353 53224 0

KATEST DLOAD DSJ
 KAT
 D
 BPL GOTO
 LIMIT/D
 CONSTD

IF KAT - D POS, GO TO CONSTD
 IF POS, OUT WITH COMMAND VIA LIMIT/D

0373 25,2354 43345 1
 0374 REP 6 LAST 808 25,2355 03700 0
 0375 REP 1 25,2356 15280 1
 0376 25,2357 45040 1
 0377 REP 1 25,2360 52346 1

INITRL1 DLOAD DAD
 RDOT
 VRCQNT
 CALL
 RNN
 KATEST

IF RDOT + VRCQNT POS, GO TO HUNTEST
 IF POSITIVE, FALL INTO HUNTEST.

03771 REP 1 25,2361 53014 1

FORHUNT

INITIALIZE HUNTEST.

L. ENTRY CONTROL

USER'S PAGE NO. 12 87 53

PC378 * START HUNT TEST ..

| PC378 | * START | HUNT TEST | .. | | | | | | |
|-------|---------|-----------|----------|---------|---------|---------|-------|----------|--|
| A0379 | | | | | | | | | |
| 0380 | | | | 25,2362 | 77731 1 | | SSP | | |
| 0381 | REP | 8 | LAST 807 | 25,2363 | 03646 0 | | | GOTOADDR | |
| 0382 | REP | 1 | | 25,2364 | 52365 0 | | | HUNTEST | |
| 0389 | | | | 25,2365 | 77745 1 | HUNTEST | DLOAD | | |
| 0390 | REP | 10 | LAST 808 | 25,2366 | 03640 0 | | | D | |
| 0391 | REP | 2 | LAST 117 | 25,2367 | 17664 0 | | STOCL | A1 | |
| 0392 | REP | 6 | LAST 808 | 25,2370 | 03624 1 | | | LAD | |
| 0393 | REP | 2 | LAST 116 | 25,2371 | 17647 1 | | STOCL | TEM1B | |
| 0394 | REP | 7 | LAST 808 | 25,2372 | 03700 0 | | | RDOT | |
| 0395 | | | | 25,2373 | 71240 1 | | RNN | DLOAD | |
| 0396 | REP | 1 | | 25,2374 | 52400 1 | | | A0CALC | |
| 0397 | REP | 1 | | 25,2375 | 03725 1 | | | LEWD | |
| 0398 | REP | 3 | LAST 809 | 25,2376 | 17647 1 | | STOCL | TEM1B | |
| 0399 | REP | 6 | LAST 809 | 25,2377 | 03700 0 | | | RDOT | |
| 0400 | | | | 25,2400 | 43271 1 | A0CALC | DDV | DAD | |
| 0401 | REP | 4 | LAST 809 | 25,2401 | 03647 1 | | | TEM1B | |
| 0402 | REP | 9 | LAST 808 | 25,2402 | 03674 1 | | | V | |
| 0403 | REP | 2 | LAST 70 | 25,2403 | 14328 0 | | STOCL | V1 | |
| 0404 | REP | 9 | LAST 809 | 25,2404 | 03700 0 | | | RDOT | |
| 0405 | | | | 25,2405 | 56316 0 | | DSO | DDV | |
| 0406 | REP | 5 | LAST 809 | 25,2406 | 03647 1 | | | TEM1B | |
| 0407 | | | | 25,2407 | 43271 1 | | DDV | DAD | |
| 0408 | REP | 1 | | 25,2410 | 15272 1 | | | ZC1HS | |
| 0409 | REP | 11 | LAST 809 | 25,2411 | 03640 0 | | | D | |
| 0410 | | | | 25,2412 | 41205 0 | | DMP | DMP | |
| 0411 | REP | 3 | LAST 809 | 25,2413 | 00326 0 | | | V1 | |
| 0412 | REP | 4 | LAST 809 | 25,2414 | 00326 0 | | | V1 | |
| 0413 | | | | 25,2415 | 77671 1 | | DDV | | |
| 0414 | REP | 3 | LAST 802 | 25,2416 | 03622 1 | | | V SQUARE | |
| 0415 | REP | 1 | | 25,2417 | 14330 1 | | STOCL | A0 | |
| 0416 | REP | 10 | LAST 809 | 25,2420 | 03700 0 | | | RDOT | |
| 0417 | | | | 25,2421 | 71244 0 | | BPL | DLOAD | |
| 0418 | REP | 1 | | 25,2422 | 52425 0 | | | V1 LEAD | |
| 0419 | REP | 2 | LAST 809 | 25,2423 | 00330 1 | | | A0 | |
| 0420 | REP | 3 | LAST 809 | 25,2424 | 03664 0 | | STORE | A1 | |
| 04202 | | | | 25,2425 | 51145 0 | V1 LEAD | DLOAD | BPL | |
| 04203 | REP | 5 | LAST 808 | 25,2426 | 03634 0 | | | L/D | |
| 04204 | REP | 1 | | 25,2427 | 52434 0 | | | HUNTEST1 | |
| 04205 | | | | 25,2430 | 45345 1 | | DLOAD | DSU | |
| 04206 | REP | 5 | LAST 809 | 25,2431 | 00326 0 | | | V1 | |

MM = 64
INITIALIZE HUNTEST ON FIRST PASS
MUST GO AFTER FORHUNT FOR RESTARTS.

$$A1/805 = A1/250$$

IF RDOT NEG, TEM1B=LAD, OTHERWISE = LEWD

$$V1 = V + RDOT/TEM1B$$

$$V1/2 VS$$

$$A0 = (V1/V) SQ(D+RDOT SQ/(TEM1B 2 C1 HS))$$

$$A0/805 = A0/250$$

$$A1/250$$

IF L/D NEG, V1=V1 - 1000

L REENTRY CONTROL

| | | | | | | |
|-------|-----|----|------|---------|---------|---------|
| 04207 | REP | 1 | | 25,2432 | 15214 | 1 |
| 04208 | REP | 6 | LAST | 809 | 25,2433 | 00328 0 |
| 0421 | | | | 25,2434 | 41345 | 0 |
| 0422 | REP | 3 | LAST | 809 | 25,2435 | 00330 1 |
| 0423 | REP | 2 | LAST | 809 | 25,2436 | 15272 1 |
| 0424 | | | | 25,2437 | 40271 | 1 |
| 0425 | REP | 7 | LAST | 810 | 25,2440 | 00328 0 |
| 0426 | | | | 25,2441 | 00001 | 0 |
| 0427 | | | | 25,2442 | 58271 | 0 |
| 0428 | REP | 8 | LAST | 810 | 25,2443 | 00328 0 |
| 0429 | REP | 2 | LAST | 809 | 25,2444 | 03725 1 |
| 0430 | REP | 2 | LAST | 117 | 25,2445 | 03704 1 |
| 0431 | | | | 25,2446 | 55221 | 0 |
| 0432 | REP | 1 | | 25,2447 | 17363 | 1 |
| 0433 | REP | 9 | LAST | 810 | 25,2450 | 00328 0 |
| 0434 | REP | 2 | LAST | 118 | 25,2451 | 17616 0 |
| 0435 | REP | 3 | LAST | 810 | 25,2452 | 03704 1 |
| 0436 | | | | 25,2453 | 41225 | 1 |
| 0437 | REP | 2 | LAST | 810 | 25,2454 | 17363 1 |
| 0438 | REP | 4 | LAST | 810 | 25,2455 | 03704 1 |
| 0439 | | | | 25,2456 | 77671 | 1 |
| 0440 | REP | 4 | LAST | 810 | 25,2457 | 00330 1 |
| 0441 | REP | 2 | LAST | 118 | 25,2460 | 03620 0 |
| 0442 | | | | 25,2461 | 43205 | 1 |
| 0443 | REP | 3 | LAST | 799 | 25,2462 | 03175 1 |
| 0444 | REP | 5 | LAST | 810 | 25,2463 | 03704 1 |
| 0445 | | | | 25,2464 | 44366 | 1 |
| 0446 | REP | 3 | LAST | 810 | 25,2465 | 17363 1 |
| 0447 | | | | 25,2466 | 77605 | 1 |
| 0448 | REP | 3 | LAST | 810 | 25,2467 | 03616 0 |
| 0449 | REP | 2 | LAST | 276 | 25,2470 | 03767 1 |
| 0450 | | | | 25,2471 | 41221 | 0 |
| 0451 | REP | 10 | LAST | 810 | 25,2472 | 00328 0 |
| 0452 | REP | 3 | LAST | 810 | 25,2473 | 03725 1 |
| 0453 | | | | 25,2474 | 77671 | 1 |
| 0454 | REP | 3 | LAST | 810 | 25,2475 | 03767 1 |
| 0455 | REP | 1 | | 25,2476 | 14027 | 1 |
| A0456 | | | | | | |
| 0457 | REP | 4 | LAST | 810 | 25,2477 | 03767 1 |
| 0458 | | | | 25,2500 | 50025 | 0 |
| 0459 | REP | 1 | | 25,2501 | 15204 | 0 |
| 0460 | REP | 1 | | 25,2502 | 53325 | 0 |
| 0461 | | | | 25,2503 | 63545 | 0 |

VQUIT
 STORE V1
 HUNTEST1 DLOAD DMP
 A0
 2C1HS
 DDV SETPD
 V1
 0
 DDV DDV
 V1
 LEWD
 STORE ALP
 BDSU BDDV
 BARELY1
 V1
 STODL FACT1
 ALP
 DSU DMP
 BARELY1
 ALP
 DDV
 A0
 STORE FACT2
 DMP DAD
 Q7
 ALP
 SORT BDSU
 BARELY1
 DMP
 FACT1
 STORE VL
 BDSU DMP
 V1
 LEWD
 DDV
 VL
 STODL GAMMAL1
 VL
 DSU RNN
 VLMIN
 PREPINAL.
 DLOAD DSO

$ALP = 2 C_1 HS A_0 / LEWD V_1 V_1$

$FACT1 = V_1 / (1 - ALP)$

$FACT1 / 2VS$

$FACT2 = ALP(ALP - 1) / A_0$

$FACT2 (25G)$

$Q7 / 805 = Q7 / 25G$
 $VL = FACT1 (1 - SORT(Q7 FACT2 + ALP))$

$VL / 2 VS$

$GAMMAL1 = LEWD (V_1 - VL) / VL$

GAMMAL1 USED IN UPCONTROL.

$GAMMAL1 = PDL 22D.$

IF VL-VLMIN NEG, GO TO PRFPINAL.

L MESSY CONTROL

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| | | | | | | | | | | | | |
|------|-----|----|------|-----|---------|-------|---|----------|-----------|--------|---|--|
| 0462 | REP | 5 | LAST | 810 | 25,2504 | 03767 | 1 | | | | | |
| 0463 | REP | 2 | LAST | 117 | 25,2505 | 17666 | 1 | STOCL | VL | | | |
| | | | | | | | | | VBARS | | VBARS / 4 VS VS | |
| 0464 | REP | 1 | | | 25,2506 | 15330 | 0 | | | | | |
| 0465 | REP | 1 | | | 25,2507 | 50025 | 0 | DSU | BRVLS | | IF VSAT-VL NEG, GO TO CONSTD | |
| 0466 | REP | 6 | LAST | 811 | 25,2510 | 03767 | 1 | | VL | | | |
| 0467 | REP | 1 | | | 25,2511 | 53220 | 1 | | BRCONSTD | | SST MODE=HUNTEST, CONTINUE IN CONSTD | |
| 0468 | REP | 2 | LAST | 117 | 25,2512 | 17662 | 0 | STOCL | DVL | | DVL / 2VS | |
| 0469 | REP | 2 | LAST | 811 | 25,2513 | 15330 | 0 | | | | | |
| 0470 | REP | 2 | LAST | 117 | 25,2514 | 03672 | 1 | STORE | VS1 | | VS1 = VSAT | |
| 0471 | | | | | 25,2515 | 50025 | 0 | DSU | BRV | | IF V1 GREATER THAN VSAT, GO ON | |
| 0472 | REP | 11 | LAST | 810 | 25,2516 | 00326 | 0 | | VL | | | |
| 0473 | REP | 1 | | | 25,2517 | 52525 | 1 | | GETDHOOK | | | |
| 0474 | | | | | 25,2520 | 77621 | 1 | RDSU | | | | |
| 0475 | REP | 3 | LAST | 811 | 25,2521 | 03662 | 0 | | DVL | | | |
| 0476 | REP | 4 | LAST | 811 | 25,2522 | 17662 | 0 | STOCL | DVL | | DVL = DVL - (VSAT-V1) = V1 - VL | |
| 0477 | REP | 12 | LAST | 811 | 25,2523 | 00326 | 0 | | V1 | | | |
| 0478 | REP | 3 | LAST | 811 | 25,2524 | 03672 | 1 | STORE | VS1 | | VS1 = V1, IN THIS CASE | |
| 0479 | | | | | 25,2525 | 45145 | 0 | GETDHOOK | DLOAD | CALL | DHOOK=((1-VS1/FACT1) SQ -ALP)/FACT2 | |
| 0480 | REP | 4 | LAST | 811 | 25,2526 | 03672 | 1 | | VS1 | | VS1 / 2 VS | |
| 0481 | REP | 1 | | | 25,2527 | 52776 | 0 | | BRDCKCYO7 | | GO CALC DHOOK | |
| 0482 | REP | 2 | LAST | 116 | 25,2530 | 03656 | 1 | STORE | DHOOK | | DHOOK / 250 | |
| 0483 | | | | | 25,2531 | 56261 | 1 | SR | BRV | | | |
| 0484 | | | | | 25,2532 | 20807 | 1 | | 6 | | DHOOK | |
| 0485 | REP | 4 | LAST | 810 | 25,2533 | 03175 | 1 | | ON | | | |
| 0486 | | | | | 25,2534 | 77625 | 0 | DSU | | | | |
| 0487 | REP | 1 | | | 25,2535 | 15250 | 1 | | CHOOK | | = .25/16 = (-6) | |
| 0488 | REP | 2 | LAST | 117 | 25,2536 | 03660 | 1 | STORE | ANDCKDV | | | |
| 0489 | | | | | 25,2537 | 41215 | 1 | DAD | DMP | | GAMMAL = GAMMAL1 - CH1 DVL SQ(1+AHOCK DVL) | |
| 0490 | REP | 1 | | | 25,2540 | 17357 | 0 | | 1/16TH | | | |
| 0491 | REP | 1 | | | 25,2541 | 15254 | 0 | | CH1 | | | |
| 0492 | | | | | 25,2542 | 41205 | 0 | DMP | DMP | | | |
| 0493 | REP | 5 | LAST | 811 | 25,2543 | 03662 | 0 | | DVL | | | |
| 0494 | REP | 6 | LAST | 811 | 25,2544 | 03662 | 0 | | DVL | | | |
| 0495 | | | | | 25,2545 | 56271 | 0 | DDV | DDV | | | |
| 0496 | REP | 3 | LAST | 811 | 25,2546 | 03656 | 1 | | BRDCK | | | |
| 0497 | REP | 3 | LAST | 811 | 25,2547 | 03666 | 1 | | VBARS | | | |
| 0498 | | | | | 25,2550 | 50021 | 1 | RDSU | | | | |
| 0499 | REP | 2 | LAST | 810 | 25,2551 | 00027 | 1 | | GAMMAL1 | | | |
| 0500 | REP | 1 | | | 25,2552 | 52743 | 0 | | BRDCK | | | |
| 0501 | REP | 1 | | | 25,2553 | 03771 | 0 | HUNTEST3 | STORE | GAMMAL | | |
| 0502 | | | | | 25,2554 | 77625 | 0 | DSU | | | GAMMAL1 = GAMMAL1 + Q19 (GAMMAL1 - GAMMAL1) | |
| 0503 | REP | 3 | LAST | 811 | 25,2555 | 00027 | 1 | | GAMMAL1 | | | |
| 0504 | | | | | 25,2556 | 43205 | 1 | DMP | END | | | |



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L ENTRY CONTROL

USER'S PAGE NO. 15 BY 53

| | | | | | |
|------|-----|---|----------|---------|---------|
| 0505 | REP | 1 | | 25,2557 | 15330 0 |
| 0506 | REP | 4 | LAST 811 | 25,2560 | 00027 1 |
| 0507 | REP | 5 | LAST 812 | 25,2561 | 14027 1 |
| 0508 | REP | 2 | LAST 811 | 25,2562 | 03771 0 |

019
GAMMAL1
STODL GAMMAL1
GAMMAL

L REENTRY CONTROL

USBR#8 PAGE NO. 16 E7 53

P0509 *START RANGE PREDICTION ...

| Address | Operation | Count | Label | Start | End | Value 1 | Value 2 | Code | Code | Code | Code | Code | Code | Code |
|---------|-----------|-------|-------|-------|-----|---------|---------|--------|-------|---------|------|------|------|------|
| A0510 | | | | | | | | | | | | | | |
| 0511 | | | | | | 25,2563 | 60516 0 | RANGER | DSQ | SR2 | | | | |
| 0512 | | | | | | 25,2564 | 77621 1 | | DSU | | | | | |
| 0513 | REP | 3 | LAST | 811 | | 25,2565 | 15330 0 | | | HALVE | | | | |
| 0514 | REP | 2 | LAST | 117 | | 25,2566 | 17670 0 | | STODL | COSG/2 | | | | |
| 0515 | REP | 4 | LAST | 811 | | 25,2567 | 03666 1 | | | VBARS | | | | |
| 0516 | | | | | | 25,2570 | 41225 1 | | DSU | DMP | | | | |
| 0517 | REP | 4 | LAST | 813 | | 25,2571 | 15330 0 | | | HALVE | | | | |
| 0518 | REP | 5 | LAST | 813 | | 25,2572 | 03666 1 | | | VBARS | | | | |
| 0519 | | | | | | 25,2573 | 41205 0 | | DMP | DMP | | | | |
| 0520 | REP | 3 | LAST | 813 | | 25,2574 | 03670 0 | | | COSG/2 | | | | |
| 0521 | REP | 4 | LAST | 813 | | 25,2575 | 03670 0 | | | COSG/2 | | | | |
| 0522 | | | | | | 25,2576 | 43312 0 | | SL2 | DAD | | | | |
| 0523 | REP | 1 | | | | 25,2577 | 17357 0 | | | C1/16 | | | | |
| 0524 | | | | | | 25,2600 | 65366 1 | | SQRT | PDDL | | | | |
| 0525 | REP | 6 | LAST | 813 | | 25,2601 | 03666 1 | | | VBARS | | | | |
| 0526 | | | | | | 25,2602 | 41205 0 | | DMP | DMP | | | | |
| 0527 | REP | 5 | LAST | 813 | | 25,2603 | 03670 0 | | | COSG/2 | | | | |
| 0528 | REP | 3 | LAST | 812 | | 25,2604 | 03771 0 | | | GAMMAL | | | | |
| 0529 | | | | | | 25,2605 | 67471 1 | | DDV | ASIN | | | | |
| 0530 | | | | | | 25,2606 | 41552 0 | | SL1 | PUSH | | | | |
| 0531 | REP | 1 | | | | 25,2607 | 17731 1 | | STODL | ASKEP | | | | |
| A0532 | | | | | | | | | | | | | | |
| 0533 | REP | 7 | LAST | 811 | | 25,2610 | 03767 1 | | | VL | | | | |
| 0534 | | | | | | 25,2611 | 43205 1 | | DMP | DAD | | | | |
| 0535 | REP | 1 | | | | 25,2612 | 15170 0 | | | Q3 | | | | |
| 0536 | REP | 3 | LAST | 799 | | 25,2613 | 03712 0 | | | Q2 | | | | |
| 0537 | REP | 1 | | | | 25,2614 | 03732 1 | | STORE | ASP1 | | | | |
| 0538 | | | | | | 25,2615 | 63525 0 | | PDDL | DSQ | | | | |
| 0539 | REP | 13 | LAST | 811 | | 25,2616 | 00326 0 | | | V1 | | | | |
| A0540 | | | | | | | | | | | | | | |
| A0541 | | | | | | | | | | | | | | |
| 0542 | | | | | | 25,2617 | 56205 0 | | DMP | DDV | | | | |
| 0543 | REP | 5 | LAST | 811 | | 25,2620 | 03175 1 | | | Q7 | | | | |
| 0544 | REP | 7 | LAST | 813 | | 25,2621 | 03666 1 | | | VBARS | | | | |
| 0545 | | | | | | 25,2622 | 45071 0 | | DDV | CALL | | | | |
| 0546 | REP | 5 | LAST | 810 | | 25,2623 | 00330 1 | | | A0 | | | | |
| 0547 | REP | 1 | | | | 25,2624 | 46155 1 | | | LOG | | | | |
| 0548 | | | | | | 25,2625 | 56205 0 | | DMP | DDV | | | | |
| 0549 | REP | 1 | | | | 25,2626 | 15206 1 | | | C12 | | | | |
| 0550 | REP | 6 | LAST | 812 | | 25,2627 | 00027 1 | | | GAMMAL1 | | | | |
| 0551 | REP | 1 | | | | 25,2630 | 03733 0 | | STORE | ASPUP | | | | |

C(MPAC) = GAMMAL
 COSG = 1-GAMMAL SQ/2, TRUNCATED SERIES

E=SQRT(1+VBARS.....)

C1/16 = 1/16
 E/4 INTO PDL

ASKEP/2 = ARCSIN(VBARS COSG SING/E)

ASKEP TO PDL 0.
 BALLISTIC RANGE ASKEP/2PI

FOR TM, STORE RANGE COMPONENTS OVERLAPPING (SP)

ASP1 = Q2 + Q3 VL

FINAL PHASE RANGE ASP1/2 PI

ASP1 TO PDL 2.

ASPUP = -C12 LOG(V1 Q7/VBARS A0)/GAMMAL1

RETURN WITH -LOG IN MPAC

UP PHASE RANGE ASPUP / 2 PI

L REENTRY CONTROL

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0552 25,2631 41325 0
 0553 REP 1 25,2632 15256 1
 A0554
 0555 REP 11 LAST 809 25,2633 03100 0
 0556 25,2634 56205 0
 0557 REP 10 LAST 809 15,2635 03674 1
 0558 REP 6 LAST 813 25,2636 00330 1
 0559 25,2637 41411 0
 0560 REP 9 LAST 809 25,2640 03024 1
 0561 REP 1 25,2641 17734 1

 6562 REP 1 25,2642 15114 1
 0563 25,2643 41225 1
 0564 REP 4 LAST 813 25,2644 03711 0
 0565 REP 1 25,2645 15172 1
 0566 REP 1 25,2646 27735 0

 0561 REP 2 LAST 813 25,2647 03731 1
 0568 REP 1 25,2650 11126 1

 0569 REP 2 LAST 814 25,2651 03735 0
 0570 25,2652 43215 0
 A0571
 A0572
 0573 25,2653 43215 0
 A0574
 A0575
 0576 25,2654 41025 0
 0577 REP 8 LAST 805 25,2655 03702 1
 0578 REP 3 LAST 758 25,2656 57343 1
 0579 REP 2 LAST 116 25,2657 03610 0
 A0580

 0581 25,2660 45246 0
 0582 REP 1 25,2661 15222 1
 0583 25,2662 43040 1
 0584 REP 1 25,2663 53025 0
 0585 REP 1 25,2664 03311 1
 0586 REP 1 25,2665 52811 0

 0587 25,2666 51145 0
 0588 REP 3 LAST 814 25,2667 03610 0
 0589 REP 1 25,2670 53213 1
 0590 25,2671 41345 0
 A0591
 0592 REP 2 LAST 116 25,2672 03642 1
 0593 REP 4 LAST 814 25,2673 03610 0
 0594 25,2674 45325 1
 0595 REP 2 LAST 116 25,2675 03612 1
 0596 REP 5 LAST 814 25,2676 03810 0

PDDL DMP
 KC3

 ROOT
 DDV
 V
 A0
 DDV PUSH
 LAD
 STODL ASPDWN

 DSU
 DMP
 GAMMAL
 G
 STODL ASP3

 ASKEP
 STODL ASP3(TM)

 ASP3
 DAD

 DAD

 DSU BOVR
 THETAH
 TCDANZIG
 STORE DIFF

 ARS DSU
 25NM
 RNN RCN
 GOTOUPSY
 HIND
 GETDLEWD

 DLOAD RPL
 DIFF
 DCONSTD
 DMP
 GETDLEWD DLOAD

 DLEWD
 DIFF
 DSU
 DIFPCOLD
 DIFF

ASPUP TO PDL 4.
 KC3 = -4 VS VS/ 2 PI 805 RE
 ASPDWN = KC3 ROOT V / A0

 ASPDWN TO PDL 6.
 RANGE TO PULL OUT ASPDWN / 2 PI

 ASP3 = G5(G5-GAMMAL)

 GAMMA CORRECTION - ASP3/2PI

 GET HI-WORD AND
 SAVE HI-WORD OF ASP=5 FOR TM.

 ASPDWN FROM PDL 6.
 ASPUP FROM PDL 4.

 ASP1 FROM PDL 2.
 ASKEP FROM PDL 0.
 CLEAR OVPIND.

 DIFF = (ASP-THETAH) / 2 PI
 ASP=ASKEP+ASP1+ASPUP+ASP3+ASPDWN = TOTAL RANGE

 IF ARS(THETAH-ASP) -25NM NEG, GO TO UPSY

 EVENTUALLY SETS MODE = HUNTEST.
 DLEWD = DLEWD (DIFF/(DIFPCOLD-DIFF))



L ENTRY CONTROL

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| | | | | | | | | |
|--------|-----|-----|------|---------|---------|-----------|--------|----------|
| 0597 | | | | 25,2677 | 77665 1 | | BDDV | |
| 05971 | | | | 25,2700 | 77626 0 | LWDSTORE | STADR | |
| 0598 | REP | 3 | LAST | 814 | 25,2701 | 74135 0 | STORE | DLEWD |
| 0599 | | | | 25,2702 | 50015 0 | | DAD | EMN |
| 0600 | REP | 4 | LAST | 810 | 25,2703 | 03725 1 | | LEWD |
| 06002 | REP | 1 | | | 25,2704 | 52737 0 | | LEWDPTR |
| 06004 | | | | 25,2705 | 77600 1 | | BOV | |
| 0601 | REP | 1 | | | 25,2706 | 52733 1 | | LEWDOVPL |
| 0602 | REP | 5 | LAST | 815 | 25,2707 | 03725 1 | STORE | LEWD |
| 0603 | | | | 25,2710 | 77776 1 | SIDETRACK | EXIT | |
| 0604 | REP | 2 | LAST | 758 | 25,2711 | 3 4753 1 | CA | ERENTRY |
| 0605 | REP | 34 | LAST | 758 | 25,2712 | 54 003 0 | TS | ERANK |
| 06051 | REP | 10 | LAST | 381 | 25,2713 | 3 4763 1 | CA | PRI016 |
| 06052 | REP | 1 | | | 25,2714 | 55=064 0 | TS | PHSPRDT5 |
| 0606 | REP | 06 | LAST | 801 | 25,2715 | 0 5301 0 | TC | PHASCHNG |
| 0607 | | | | 25,2716 | 00474 0 | | OC | 00474 |
| A06071 | | | | | | | | |
| A06072 | | | | | | | | |
| 0608 | REP | 11 | LAST | 815 | 25,2717 | 3 4763 1 | CA | PRI016 |
| A06081 | | | | | | | | |
| 0609 | REP | 9 | LAST | 848 | 25,2720 | 0 5103 0 | TC | PRI0CHNG |
| 0610 | REP | 1 | | | 25,2721 | 3 3024 1 | CAP | ADENEXT |
| 0611 | REP | 9 | LAST | 809 | 25,2722 | 55=645 0 | TS | GOTOADDR |
| 0612 | REP | 206 | LAST | 801 | 25,2723 | 0 6008 1 | TC | INTPRET |
| 0613 | | | | 25,2724 | 43145 0 | | DLOAD | SET |
| 0614 | REP | 6 | LAST | 814 | 25,2725 | 03610 0 | | DIFP |
| 0615 | REP | 2 | LAST | 814 | 25,2726 | 03071 1 | | HIND |
| 0616 | REP | 3 | LAST | 814 | 25,2727 | 17612 1 | STOOL | DIFPOLD |
| 0617 | REP | 2 | LAST | 799 | 25,2730 | 15176 0 | | OTF |
| 0621 | REP | 6 | LAST | 813 | 25,2731 | 37175 0 | STCALL | OT |
| 0622 | REP | 2 | LAST | 809 | 25,2732 | 52365 0 | | HUNTEST |
| 0623 | | | | 25,2733 | 77745 1 | LEWDOVPL | DLOAD | |
| 0624 | REP | 2 | LAST | 799 | 25,2734 | 17363 1 | | NEARONE |
| 0625 | REP | 6 | LAST | 815 | 25,2735 | 37725 0 | STCALL | LEWD |
| 0626 | REP | 2 | LAST | 814 | 25,2736 | 53213 1 | | DCONSTD |
| 06262 | | | | 25,2737 | 70545 1 | LEWDPTR | DLOAD | SR1 |
| 06264 | REP | 7 | LAST | 815 | 25,2740 | 03725 1 | | LEWD |
| 06266 | | | | 25,2741 | 52076 1 | | DCOMP | GOTO |
| 06268 | REP | 1 | | | 25,2742 | 52700 1 | | LWDSTORE |

IF LEWD+DLWD NEG, DLWD=-LEWD/2

DROP GRP 5 RESTART PRIO TO 1 LESS THAN GRP 4.

RESTART GRP 4 AT PRE-HUNT.
FORCE RESTART TO PICK UP IN GRP 4
USE PRIO 17 FOR GRP 4 (± SERVICER PRIO)
CONTINUE GRP 5 AT LOWER PRIO THAN EITHER
GRP 4 OR SERVICER.

SIDETRACK NEXT PASS UNTIL THIS ONE DONE.
ONLY AFTER RESTART IS LEFT AFTER DETOUR.

DIFPOLD / 2 PI

OT / 805 PPSS
(GO TO)

(GO TO) ALSO WILL. SET MODE = HUNTEST

L REENTRY CONTROL

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R0627 NEGAMA IS PART OF HUNTEST ...

| | | | | | | | | | |
|-------|-----|----|------|---------|---------|---------|----------|------------------|------------------------------------|
| 0628 | | | | 15,2743 | 41205 0 | NEGAMA | DMP | DMP | ENTER WITH GAMMAL IN MPAC |
| 0629 | REP | 8 | LAST | 813 | 25,2744 | 03787 1 | | | |
| 0630 | REP | 1 | | | 25,2745 | 15148 0 | | V _{3RD} | |
| 0631 | | | | | 25,2746 | 41325 0 | PDDL | DMP | PUSH GAMMAL VL/3 |
| 0632 | REP | 8 | LAST | 815 | 25,2747 | 03725 1 | | LEWD | |
| 0633 | REP | 2 | LAST | 816 | 25,2750 | 15146 0 | | 1/3RD | |
| 0634 | | | | | 25,2751 | 43325 1 | PDDL | DAD | PUSH LEWD/3 |
| 0635 | REP | 3 | LAST | 811 | 25,2752 | 03660 1 | | AHOCKDV | |
| 0636 | REP | 1 | | | 25,2753 | 15252 0 | | 1/24TH | |
| 0637 | | | | | 25,2754 | 41205 0 | DMP | DMP | DEL VL = (GAMMAL VL/3)/(LEWD/3-DVL |
| 0638 | REP | 7 | LAST | 811 | 25,2755 | 03662 0 | | DVL | (2/3 + AHOCKDV)(CH1 GS/DHOCK VL)) |
| 0639 | REP | 2 | LAST | 811 | 25,2756 | 15254 0 | | CH1 | |
| 0640 | | | | | 25,2757 | 56271 0 | DDV | DDV | |
| 0641 | REP | 4 | LAST | 811 | 25,2760 | 03656 1 | | DHOCK | |
| 0642 | REP | 9 | LAST | 816 | 25,2761 | 03787 1 | | VL | |
| 0643 | | | | | 25,2762 | 55221 0 | BDSU | RDDV | |
| A0644 | | | | | | | | | LEWD/3 |
| A0645 | | | | | | | | | GAMMAL VL /3 |
| 0646 | | | | | 25,2763 | 77615 0 | DAD | | |
| 0647 | REP | 10 | LAST | 816 | 25,2764 | 03787 1 | | VL | |
| 0648 | REP | 11 | LAST | 816 | 25,2765 | 37767 0 | STCALL | VL | VL/2 VS |
| 0649 | REP | 2 | LAST | 811 | 25,2766 | 52776 0 | | DHOCKYQ7 | GO CALC Q7 |
| A0650 | | | | | | | | | Q7 = ((1-VL/FACT1)SQ - ALP)/FACT2 |
| 0651 | REP | 7 | LAST | 815 | 25,2767 | 17175 1 | STODL | Q7 | Q7 / 25G |
| 0652 | REP | 12 | LAST | 816 | 25,2770 | 03767 1 | | VL | |
| 0653 | | | | | 25,2771 | 77716 1 | DSQ | | |
| 0654 | REP | 8 | LAST | 813 | 25,2772 | 17666 1 | STODL | VRARS | VRARS / 4 VS VS |
| 0655 | REP | 3 | LAST | 803 | 25,2773 | 15332 1 | | 3ZPROS | |
| 0658 | | | | | 25,2774 | 77650 1 | GOTO | | SET GAMMAL = 0 |
| 0657 | REP | 1 | | | 25,2775 | 52553 0 | | HUNTEST3 | |
| 0658 | | | | | 25,2776 | 56342 1 | DHOCKYQ7 | SR1 | DDV |
| 0659 | REP | 4 | LAST | 810 | 25,2777 | 03616 0 | | FACT1 | SUBROUTINE TO CALC DHOCK OR Q7) |
| 0680 | | | | | 25,3000 | 72421 0 | BDSU | SL1 | |
| 0661 | REP | 5 | LAST | 813 | 25,3001 | 15330 0 | | HALVE | |
| 0662 | | | | | 25,3002 | 45316 1 | DSQ | DSU | |
| 0663 | REP | 6 | LAST | 810 | 25,3003 | 03704 1 | | ALP | |
| 0664 | | | | | 15,3004 | 43471 1 | DDV | SVO | |
| 0665 | | 3 | LAST | 810 | 25,3005 | 03820 0 | | FACT2 | |



L REENTRY CONTROL

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P08651
A0866
A0867
A0868

COME TO PRE-HUNT WHEN RESTART OCCURS AFTER
HUNTEST IS SIDE-TRACKED AT SIDETRAK.
PICK UP IN GROUP 4.

| | | | | | | | | | |
|-------|-----|-----|------|-----|---------|----------|---------------|---------|---------------------------------------|
| 0669 | REP | 207 | LAST | 815 | 25,3006 | 0 6006 1 | PRE-HUNT TC | INTPRET | |
| 0670 | | | | | 25,3007 | 45014 0 | CLEAR | CALL | |
| 0671 | REP | 3 | LAST | 815 | 25,3010 | 03271 0 | | HIND | HIND 99D BIT 6 FLAG 6 |
| 0672 | REP | 2 | LAST | 808 | 25,3011 | 53014 1 | | FORHUNT | RE-INITIALIZE HUNTEST AFTER RE-START. |
| 0673 | | | | | 25,3012 | 77650 1 | GOTO | | |
| 0675 | REP | 3 | LAST | 815 | 25,3013 | 52385 0 | | HUNTEST | |
| 0676 | | | | | 25,3014 | 77745 1 | FORHUNT DLOAD | | INITIALIZE HUNTEST. |
| 0677 | REP | 4 | LAST | 816 | 25,3015 | 15332 1 | | 3ZEROS | |
| 0678 | REP | 4 | LAST | 815 | 25,3016 | 17612 1 | STOCL | DIFPOLD | |
| 0679 | REP | 1 | | | 25,3017 | 15156 1 | | DLEWD0 | |
| 0680 | REP | 4 | LAST | 815 | 25,3020 | 17642 1 | STOCL | DLEWD | |
| 0681 | REP | 1 | | | 25,3021 | 15150 1 | | LWD1 | |
| 0682 | REP | 9 | LAST | 816 | 25,3022 | 03725 1 | STORE | LWD | |
| 0683 | | | | | 25,3023 | 77616 0 | RVO | | |
| A0884 | | | | | | | | | |
| 0685 | REP | 2 | LAST | 748 | 25,3024 | 53570 0 | ADENDEXT CADR | ENDEXIT | |

L REENTRY CONTROL

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P0888 * START UP CONTROL ...

```

A0687
0688
0689 REP 1          25,3025 77634 0 GOTOUPSY RTB
A0690
A0691
A0692
A0693

0694          25,3027 45345 1 UPCTRL DLOAD DSU
06941 REP 12 LAST 809 25,3030 03640 0
06942 REP 1          25,3031 15220 0
06943          25,3032 43040 1 RMN SET
06944          25,3033 53035 1
06945 REP 1          25,3034 03070 0 NOSWITCH

06946          25,3035 45345 1 DLOAD DSU
0695 REP 11 LAST 814 25,3036 03674 1
0696 REP 14 LAST 813 25,3037 00326 0
0697          25,3040 71244 0 BPL DLOAD
0698 REP 1          25,3041 53252 1 DOWNCNTL
0699 REP 13 LAST 818 25,3042 03640 0 D
0700          25,3043 50025 0 DSU RMN
0701 REP 8 LAST 816 25,3044 03175 1
0702 REP 1          25,3045 53305 1
0703          25,3046 51145 0 DLOAD BPL
0704 REP 12 LAST 814 25,3047 03700 0
0705 REP 1          25,3050 53057 0
CONT1

0706          25,3051 45345 1 VLTEST DLOAD DSU
0707 REP 12 LAST 818 25,3052 03674 1
0708 REP 13 LAST 816 25,3053 03767 1
0709          25,3054 50025 0 DSU
0710 REP 1          25,3055 15164 0
0711 REP 2 LAST 810 25,3056 53325 0
PREFINAL

0712          25,3057 77745 1 CNT1 DLOAD
0713 REP 14 LAST 818 25,3060 03640 0
0714          25,3061 50025 0 DSU RMN
0715 REP 7 LAST 814 25,3062 00330 1
0716 REP 1          25,3063 53067 0
0717          25,3064 52145 0 DLOAD GOTO
0718 REP 10 LAST 814 25,3065 03624 1
0719 REP 1          25,3066 53517 1
STOREL/D
A0720

0721          25,3067 41345 0 CNT3 DLOAD DMP
0722 REP 15 LAST 818 25,3070 03640 0
0723 REP 4 LAST 816 25,3071 03620 0
FACT2
    
```

MM = 85
 END OF HUNTEST
 HUNTEST USE OF GRP4 IS DISABLED BY P65
 USE FOR DISPLAY.
 SET MODE = UPCTRL.
 RETURN FROM P65 DIRECTLY TO UPCTRL.
 VIA THE GOTOADDR AT REPAZE10.

IF D-140 POS, NOSWITCH =1
 (SUPPRESS LATERAL SWITCH)

IF V-V1 POS, GO TO DOWN CONTROL.

IF D-07 NEG, GO TO KEP

IF RDOT NEG, DO VLTEST

IF V-V1-C18 NEG, RDSW=1, MODE=PRFDICT3

IF D-A0 POS, L/D = IAD, GO TO LIMIT/D

VRRP=FACT1(1-SORT(FACT2 D + ALP1))

L REENTRY CONTROL

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| | | | | | | | | |
|-------|-----|----|------|---------|---------|----------|-----------|-------------------------------------|
| 0724 | | | | 25,3072 | 75415 0 | DAD | SCRT | |
| 0725 | REP | 7 | LAST | 016 | 25,3073 | 03704 1 | ALP | |
| 0726 | | | | 25,3074 | 41221 0 | BDSU | DMP | |
| 0727 | REP | 4 | LAST | 010 | 25,3075 | 17363 1 | BARELY1 | |
| 0728 | REP | 5 | LAST | 016 | 25,3076 | 03616 0 | FACT1 | |
| 0729 | REP | 1 | | | 25,3077 | 01160 1 | STORE | VREP / 2VS |
| 0730 | | | | 25,3100 | 41221 0 | BDSU | DMP | RDOTREP = LEWD(V1-VREP) |
| 0731 | REP | 15 | LAST | 016 | 25,3101 | 00326 0 | V1 | |
| 0732 | REP | 10 | LAST | 017 | 25,3102 | 03725 1 | LEWD | |
| 0733 | REP | 2 | LAST | 77 | 25,3103 | 15156 1 | STODL | RDOTREP / 2VS |
| 0734 | REP | 5 | LAST | 011 | 25,3104 | 03672 1 | VS1 | |
| 0735 | | | | 25,3105 | 50025 0 | DSU | BN | IF VSAT-VREP NEG, GO TO CONTINU2 |
| 0736 | REP | 2 | LAST | 019 | 25,3106 | 01160 1 | VREP | |
| 0737 | REP | 1 | | | 25,3107 | 53126 1 | CONTINU2 | |
| 0738 | | | | 25,3110 | 41406 0 | PUSH | PUSH | VS1-VREP TO PDL TWICE |
| 0739 | | | | 25,3111 | 56205 0 | DMP | DDV | RDHOOK=CH1(1+DV AHOCK/DV/DVL) DV DV |
| 0740 | REP | 4 | LAST | 016 | 25,3112 | 03660 1 | AHOCKDV | /DHOCK VREP |
| 0741 | REP | 8 | LAST | 016 | 25,3113 | 03662 0 | DVL | WHERE DV = (VS1-VREP) |
| 0742 | | | | 25,3114 | 41215 1 | DAD | DMP | |
| 0743 | REP | 2 | LAST | 011 | 25,3115 | 17357 0 | 1/16TH | |
| 0744 | REP | 3 | LAST | 016 | 25,3116 | 15254 0 | CH1 | |
| 0745 | | | | 25,3117 | 41205 0 | DMP | DMP | |
| A0746 | | | | | | | | VS1-VREP FROM PDL TWICE. |
| 0747 | | | | 25,3120 | 77671 1 | DDV | | |
| 0748 | REP | 5 | LAST | 016 | 25,3121 | 03656 1 | DHOOK | |
| 0749 | | | | 25,3122 | 44271 0 | DDV | BDSU | |
| 0750 | REP | 3 | LAST | 019 | 25,3123 | 01160 1 | VREP | |
| 0751 | REP | 3 | LAST | 019 | 25,3124 | 01156 1 | RDOTREP | C(RDOTREP)= LEWD (V1-VREP) |
| 0752 | REP | 4 | LAST | 019 | 25,3125 | 01156 1 | STORE | RDOTREP = RDOTREP - RDHOOK |
| 0753 | | | | 25,3126 | 45345 1 | CONTINU2 | DLOAD | |
| 0754 | REP | 16 | LAST | 018 | 25,3127 | 03640 0 | DSU | |
| 0755 | REP | 1 | | | 25,3130 | 15312 0 | D | |
| 0756 | | | | 25,3131 | 50004 0 | BOVB | Q7MIN | |
| 0757 | REP | 4 | LAST | 014 | 25,3132 | 57343 1 | RMN | |
| 0758 | REP | 1 | | | 25,3133 | 53144 0 | TCDANZIG | CLEAR OVPL IND, IF ON. |
| 0759 | | | | 25,3134 | 45345 1 | DLOAD | UPCNTR1.3 | |
| 0760 | REP | 4 | LAST | 009 | 25,3135 | 03664 0 | DSU | |
| 0761 | REP | 9 | LAST | 018 | 25,3136 | 03175 1 | A1 | |
| 0762 | | | | 25,3137 | 45325 1 | PDDL | Q7 | |
| 0763 | REP | 17 | LAST | 019 | 25,3140 | 03640 0 | DSU | |
| 0764 | REP | 10 | LAST | 019 | 25,3141 | 03175 1 | D | |
| 0765 | | | | 25,3142 | 45471 1 | DDV | Q7 | |
| 0766 | REP | 3 | LAST | 799 | 25,3143 | 74163 0 | STADR | |
| | | | | | | STORE | FACTOR | FACTOR / 25G |



L REENTRY CONTROL

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P0167 SKIPPER

A0168
A0169

DELTA L/D = $-\frac{((RDOT-RDOTREP)F_1 KB_1 + V-VREP)F_1 KB_2}{F_1}$
WHERE F₁ = FACTOR

| Address | Operation | Address | Value | Operation | Value | Notes |
|---------|-----------------|---------|---------|-----------------|-------|--|
| 0770 | | 25,3144 | 77745 1 | UPCNTRL3 DLOAD | | |
| 0771 | REP 13 LAST 818 | 25,3145 | 03700 0 | RDOT | | |
| 0772 | | 25,3146 | 41225 1 | DSU DMP | | L/D = LEWD |
| 0773 | REP 5 LAST 819 | 25,3147 | 01156 1 | RDOTREP | | $-\frac{((RDOT-RDOTREP)F_1 KB_1 + V-VREP)F_1 KB_2}{F_1}$ |
| 0774 | REP 4 LAST 819 | 25,3150 | 03814 1 | FACTOR | | |
| 0775 | | 25,3151 | 43271 1 | DDV DAD | | |
| 0776 | REP 1 | 25,3152 | 15210 0 | 1/KR1 | | |
| 0777 | REP 13 LAST 818 | 25,3153 | 03874 1 | V | | |
| 0778 | | 25,3154 | 41225 1 | DSU DMP | | |
| 0779 | REP 4 LAST 819 | 25,3155 | 01160 1 | VREP | | |
| 0780 | REP 5 LAST 820 | 25,3156 | 03814 1 | FACTOR | | |
| 0781 | | 25,3157 | 41471 0 | DDV PUSH | | |
| 0782 | REP 1 | 25,3160 | 15212 1 | -1/KR2 | | DELTA L/D INTO PDL |
| 0783 | | 25,3161 | 51400 1 | ROV ARS | | NONLINEAR CIRCUIT FOR REDUCING HIGH GAIN |
| 0784 | REP 1 | 25,3162 | 53464 1 | GOMAXL/D | | |
| 0785 | | 25,3163 | 50025 0 | DSU RNN | | |
| 0786 | REP 1 | 25,3164 | 15274 1 | PT1/16 | | |
| 0787 | REP 1 | 25,3165 | 53172 0 | NEXT1 | | |
| 0788 | | 25,3166 | 43205 1 | DMP DAD | | |
| 0789 | REP 1 | 25,3167 | 15152 0 | POINT1 | | |
| 0790 | REP 2 LAST 820 | 25,3170 | 15274 1 | PT1/16 | | |
| 0791 | | 25,3171 | 41565 1 | SIGN PUSH | | ATTACH SIGN OF PUSH TO MPAC THEN PUSH |
| 0792 | | 25,3172 | 42545 0 | NEXT1 DLOAD SL4 | | |
| A0793 | | | | | | DELTA L/D FROM PDL. |
| 0794 | | 25,3173 | 77615 0 | DAD | | |
| 0795 | REP 11 LAST 819 | 25,3174 | 03725 1 | LEWD | | |
| 0796 | | 25,3175 | 41400 0 | NEOTESTS ROV | | L/D TO PDL FOR USE IN NEOTESTS. |
| 0797 | REP 2 LAST 820 | 25,3176 | 53464 1 | GOMAXL/D | | |
| 0798 | REP 6 LAST 809 | 25,3177 | 17634 0 | STODL L/D | | |
| A0799 | | | | | | IF D-C20 POS, IATSW = 0 |
| A0800 | | | | | | AND IF L/D NEG, L/D = 0. |
| 0801 | REP 18 LAST 819 | 25,3200 | 03840 0 | D | | |
| 0802 | | 25,3201 | 50025 0 | DSU RNN | | |
| 0803 | REP 1 | 25,3202 | 15216 0 | C20 | | |
| 0804 | REP 4 LAST 808 | 25,3203 | 53520 0 | LIMITL/D | | |
| 0805 | | 25,3204 | 71214 0 | CLEAR DLOAD | | |
| 0806 | REP 1 | 25,3205 | 03273 1 | LATSW | | =21D. ROI. OVER TOP, REGARDLESS. |
| A0807 | | | | | | L/D FROM PDL. |
| 0808 | | 25,3206 | 71244 0 | RPL DLOAD | | |
| 0809 | REP 5 LAST 820 | 25,3207 | 53520 0 | LIMITL/D | | |
| 0810 | REP 5 LAST 817 | 25,3210 | 15332 1 | 3ZPROS | | |
| 0811 | REP 7 LAST 820 | 25,3211 | 37634 1 | STCALL L/D | | |
| 0812 | REP 6 LAST 820 | 25,3212 | 53520 0 | LIMITL/D | | (GO TO) |

L REENTRY CONTROL

| | | | | | | |
|-------|-----|----|------|-----|---------|---------|
| 0856 | REP | 15 | LAST | 821 | 25,3264 | 03700 0 |
| 0857 | | | | | 25,3265 | 43205 1 |
| 0858 | REP | 2 | LAST | 821 | 25,3266 | 15226 0 |
| A0859 | | | | | | |
| 0860 | | | | | 25,3267 | 45325 1 |
| 0861 | REP | 17 | LAST | 821 | 25,3270 | 00326 0 |
| 0862 | REP | 16 | LAST | 821 | 25,3271 | 03674 1 |
| 0863 | | | | | 25,3272 | 41316 0 |
| 0864 | REP | 13 | LAST | 821 | 25,3273 | 03624 1 |
| 0865 | | | | | 25,3274 | 65271 0 |
| 0866 | REP | 3 | LAST | 810 | 25,3275 | 15272 1 |
| 0867 | REP | 18 | LAST | 822 | 25,3276 | 00326 0 |
| 0868 | | | | | 25,3277 | 56316 0 |
| 0869 | REP | 4 | LAST | 809 | 25,3300 | 03622 1 |
| 0870 | | | | | 25,3301 | 45265 1 |
| 0871 | REP | 8 | LAST | 818 | 25,3302 | 00330 1 |
| A0872 | | | | | | |
| 0873 | | | | | 25,3303 | 77650 1 |
| 0874 | REP | 1 | | | 25,3304 | 53243 1 |

A0875
A0876

DMP RDOT
DAD
K2D

FDDL DSU
V1
V

DSQ DMP
LAD

DDV FDDL
2C1HS
V1

DSQ DDV
VSQUARE

RDDV DSU
A0

GOTO
CONSTD1

PUSH UP LAD,
LAD + K2D(RDOT-RDTR) INTO PD

(V1-V)SQ LAD/(2 C1 HS) INTO PD

DREP = (V/V1)SQ A0 - PD

PUSH UP HERE
C(MPAC) = DREP

$DREP = (V/V1)^2 A0 - (V-V1)^2 LAD/2 C1 HS$

L. REENTRY CONTROL

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POSTT * START BALLISTIC PHASE ...

A0876
 0878 25,3305 66234 1 KEP
 0880 REP 1 25,3308 54473 0
 0881 REP 11 LAST 821 25,3307 03846 0
 0882 REP 2 LAST 807 25,3310 53311 1

RTB SSP
 P66
 GOTOADR
 KEP2

MM = 66 UPCTRL ENTRY INTO KEP2.

DISPLAY TRIM GIMBAL ANGLE VALUES.
 SET GOTOADR TO KEPLER PHASE.

A0883
 A0884
 A0885

KEP2 CAN ALSO BE STARTED UP DIRECTLY FROM INITROLL
 IN P64. PROGRAM WILL IDLE IN P64 UNTIL D EXCEEDS
 .2 G BEFORE GOING ON TO P67.

0886 25,3311 45345 1 KEP2
 0887 REP 1 25,3312 15166 1
 0888 REP 20 LAST 821 25,3313 03640 0
 0889 25,3314 72240 1
 0891 REP 3 LAST 818 25,3315 53325 0
 A0892
 0893 REP 9 LAST 772 25,3316 03316 0
 0895 25,3317 72214 0
 0896 REP 4 LAST 807 25,3320 03314 1
 0897 25,3321 53323 0
 0898 REP 6 LAST 820 25,3322 15332 1
 0899 REP 10 LAST 823 25,3323 37316 1 +2
 0900 REP 3 LAST 748 25,3324 54402 0
 A0901
 A0902

DLOAD DSU
 Q7PKMIN
 D
 RMN TLOAD
 PREPINAL
 ROLLC
 RQN TLOAD
 .05QSW
 +2
 3ZEROS
 STCALL ROLLC
 P62.3

IF Q7P+KMIN -D NEG, GO TO FINAL PHASE.
 (Q7P + KMIN)/805

SET ROLLHOLD = ROLLC, IN CASE CMDPRMOD
 = +1 EVER ENTERED.
 IF D \leq .05G, KEEP PRESENT ROLL COMMAND.
 IF D \geq .05G, SET ROLL COMMAND = 0.

SET ROLLC d ROLLHOLD = 0.
 (SP ROLLHOLD FOLLOWS DP ROLLC)
 CALC DESIRED GIMBAL ANGLES AT PRESENT
 RN, VN TO YIELD TRIM ATTITUDE.
 AVAILABLE IN CPHI=8 FOR N22.



L REENTRY CONTROL

USER'S PAGE NO. 27 E7 53

P0903 START FINAL PHASE ..

| Address | REP | START | FINAL | PHASE | ... | ... | ... | ... | ... | ... |
|---------|-----|-------|-------|-------|-----|---------|--------|-----|----------|------------|
| A0904 | | | | | | | | | | |
| 0905 | | | | | | 25,3325 | 47131 | 1 | PREFINAL | SSP |
| 0906 | REP | 12 | LAST | 823 | | 25,3326 | 03646 | 0 | | RTB |
| 0907 | REP | 4 | LAST | 823 | | 25,3327 | 53325 | 0 | | GOTOADDR |
| 0908 | REP | 1 | | | | 25,3330 | 54477 | 1 | | PREFINAL |
| A0909 | | | | | | | | | | P67 |
| A0910 | | | | | | | | | | |
| A0911 | | | | | | | | | | |
| A0912 | | | | | | | | | | |
| 0913 | | | | | | 25,3331 | 86214 | 0 | SET | SSP |
| 0914 | REP | 3 | LAST | 805 | | 25,3332 | 03067 | 0 | | BSW |
| 0915 | REP | 13 | LAST | 824 | | 25,3333 | 03646 | 0 | | GOTOADDR |
| 0916 | REP | 1 | | | | 25,3334 | 53335 | 1 | | PREDICT3 |
| 0917 | | | | | | 25,3335 | 45345 | 1 | PREDICT3 | DLOAD |
| 0918 | REP | 17 | LAST | 822 | | 25,3336 | 03874 | 1 | | DSU |
| 0919 | REP | 2 | LAST | 810 | | 25,3337 | 15214 | 1 | | V |
| 0920 | | | | | | 25,3340 | 77440 | 1 | RNN | VQUIT |
| 0921 | REP | 1 | | | | 25,3341 | 53605 | 1 | | EXIT |
| | | | | | | | | | | STEROPP |
| 0922 | REP | 3 | LAST | 815 | | 25,3342 | 3 4753 | 1 | CA | REENTRY |
| 0923 | REP | 35 | LAST | 815 | | 25,3343 | 54 003 | 0 | TS | ERANK |
| 0924 | REP | 1 | | | | 25,3344 | 3 5656 | 1 | CA | TWELVE |
| 0925 | REP | 1 | | | | 25,3345 | 55=771 | 0 | TS | JJ |
| | | | | | | | | | RACK | |
| 0926 | REP | 18 | LAST | 824 | | 25,3346 | 4 1873 | 0 | CS | V |
| 0927 | REP | 2 | LAST | 824 | | 25,3347 | 51=771 | 1 | INDEX | JJ |
| 0928 | REP | 1 | | | | 25,3350 | 6 3631 | 0 | AD | VREPER |
| 0929 | REP | 184 | LAST | 782 | | 25,3351 | 10 000 | 0 | CCS | A |
| 0930 | REP | 3 | LAST | 824 | | 25,3352 | 11=771 | 0 | CCS | JJ |
| 0931 | REP | 1 | | | | 25,3353 | 1 3345 | 1 | TCP | RACK |
| 0932 | REP | 96 | LAST | 776 | | 25,3354 | 6 4712 | 1 | AD | ONE |
| 0933 | REP | 6 | LAST | 809 | | 25,3355 | 55=846 | 0 | TS | TEM1B |
| 0934 | REP | 4 | LAST | 824 | | 25,3356 | 51=771 | 1 | INDEX | JJ |
| 0935 | REP | 2 | LAST | 824 | | 25,3357 | 4 3631 | 1 | CS | VREPER |
| 0936 | REP | 5 | LAST | 824 | | 25,3360 | 51=771 | 1 | INDEX | JJ |
| 0937 | REP | 3 | LAST | 824 | | 25,3361 | 6 3632 | 0 | AD | VREPER + 1 |
| 0938 | REP | 7 | LAST | 824 | | 25,3362 | 57=846 | 1 | XCH | TEM1B |
| 0939 | | | | | | 25,3363 | 22 007 | 0 | ZL | |
| 0940 | | | | | | 25,3364 | 0 0008 | 1 | EXTEND | |
| 0941 | REP | 8 | LAST | 824 | | 25,3365 | 11=646 | 0 | DV | TEM1B |
| 0942 | REP | 2 | LAST | 116 | | 25,3366 | 55=651 | 0 | TS | GRAD |
| 0943 | REP | 19 | LAST | 779 | | 25,3367 | 3 4715 | 0 | CAF | FIVE |

MM = 67

RESTART PROTECT' RESET GOTOADDR IF CAME FROM HUNTEST. DISABLES CRP4. PINS IF FROM HUNTEST. BUT MAY ALSO REMOVE RESTART PROTECTION OF M69 (P65).
 ROLLC XINCERR DINCERR
 XXX.XX DEG XXX.X NM XXX.X NM

IF V-VQUIT NEG, STOP STEERING

PRECAUTIONARY.

VREP - V, HIGHEST VREP AT END OF TABLE. IF VREP-V POS LOOP RACK DECREMENT JJ, JJ CANNOT BE ZERO

V-VREP IN TEM1B (MUST BE POSITIVE NUM)

V(K+1) - V(K) (POS NUM)

GRAD = (V-VREP)/(VK+1 - VK) (POS NUM)



L REENTRY CONTROL

USER=5 PAGE NO. 28 B7 83

| | | | | | | | | | | | |
|------|-----|-----|------|-----|---------|--------|---|---------------|----------|------------|--|
| 0944 | REP | 5 | LAST | 745 | 25,3370 | 55=850 | 1 | BACK2 | TS | MM | |
| 0945 | REP | 2 | LAST | 785 | 25,3371 | 3 4720 | 0 | | CAP | THIRTEEN | |
| 0946 | REP | 6 | LAST | 824 | 25,3372 | 27=771 | 0 | | ADS | JJ | |
| 0947 | REP | 185 | LAST | 824 | 25,3373 | 50 000 | 1 | | INDEX | A | |
| 0948 | REP | 4 | LAST | 824 | 25,3374 | 4 3831 | 1 | | CS | VREPER | |
| 0949 | REP | 7 | LAST | 825 | 25,3375 | 51=771 | 1 | | INDEX | JJ | |
| 0950 | REP | 5 | LAST | 825 | 25,3376 | 6 3832 | 0 | | AD | VREPER + 1 | X(K+1) - X(K) |
| 0951 | | | | | 25,3377 | 0 0006 | 1 | | EXTEND | | |
| 0952 | REP | 3 | LAST | 824 | 25,3400 | 7 1851 | 0 | | MP | GRAD | |
| 0953 | REP | 8 | LAST | 825 | 25,3401 | 51=771 | 1 | | INDEX | JJ | |
| 0954 | REP | 6 | LAST | 825 | 25,3402 | 6 3831 | 0 | | AD | VREPER | |
| 0955 | REP | 8 | LAST | 825 | 25,3403 | 51=850 | 0 | | INDEX | MM | |
| 0956 | REP | 2 | LAST | 118 | 25,3404 | 55=852 | 0 | | TS | FX | FX = AK + GRAD (AK+1 - AK) |
| 0957 | REP | 7 | LAST | 825 | 25,3405 | 11=850 | 1 | | CCS | MM | |
| 0958 | REP | 1 | | | 25,3406 | 1 3370 | 1 | | TCP | BACK2 | |
| 0959 | REP | 3 | LAST | 825 | 25,3407 | 57=853 | 0 | | XCH | FX +1 | ZERO FX +1 AND GET DREPR |
| 0960 | REP | 21 | LAST | 823 | 25,3410 | 6 1837 | 1 | | AD | D | |
| 0961 | | | | | 25,3411 | 0 0006 | 1 | | EXTEND | | |
| 0962 | REP | 4 | LAST | 825 | 25,3412 | 7 1657 | 0 | | MP | FX + 5 | F1 |
| 0963 | REP | 280 | LAST | 782 | 25,3413 | 52 155 | 1 | | D\CH | MPAC | MPAC = F1(D-DREF) |
| 0964 | | | | | 25,3414 | 0 0008 | 1 | | EXTEND | | |
| 0965 | REP | 16 | LAST | 822 | 25,3415 | 4 1700 | 0 | | DCS | RDOT | FORM RDOTREP - RDOT |
| 0966 | | | | | 25,3416 | 20 001 | 1 | | DDQLRL | | |
| 0967 | | | | | 25,3417 | 20 001 | 1 | | DDQLRL | | |
| 0968 | | | | | 25,3420 | 20 001 | 1 | | DDQLRL | | |
| 0969 | REP | 5 | LAST | 825 | 25,3421 | 6 1655 | 0 | | AD | FX + 3 | SCALE UP BY 8 FOR THIS PHASE. RDOTREP |
| 0970 | | | | | 25,3422 | 0 0008 | 1 | | EXTEND | | |
| 0971 | REP | 6 | LAST | 825 | 25,3423 | 7 1656 | 1 | | MP | FX + 4 | F2 |
| 0972 | REP | 7 | LAST | 825 | 25,3424 | 6 1854 | 1 | | AD | FX +2 | RTOGO |
| 0973 | REP | 281 | LAST | 825 | 25,3425 | 20 155 | 1 | | DAS | MPAC | ADD F2(DADV1-DADV2) |
| 0974 | REP | 282 | LAST | 825 | 25,3426 | 3 0154 | 1 | | CA | MPAC | |
| 0975 | REP | 2 | LAST | 117 | 25,3427 | 55=770 | 1 | | TS | PREDANG | |
| 0976 | | | | | | | | | | | L/D = LOD + (THETA - PREDANG) / Y |
| 0977 | REP | 208 | LAST | 817 | 25,3430 | 0 6006 | 1 | | TC | INTPRET | |
| 0978 | | | | | 25,3431 | 45242 | 1 | | SR3 | DSU | |
| 0979 | REP | 7 | LAST | 814 | 25,3432 | 03702 | 1 | | | THETAH | |
| 0980 | | | | | 25,3433 | 43014 | 0 | | BCN | ROFF | |
| 0981 | REP | 2 | LAST | 807 | 25,3434 | 03305 | 1 | | | GONEPAST | |
| 0982 | REP | 1 | | | 25,3435 | 53462 | 1 | | | GONEBLAD | |
| 0983 | REP | 4 | LAST | 803 | 25,3436 | 03747 | 0 | | | GONERY | |
| 0984 | REP | 1 | | | 25,3437 | 53445 | 1 | | | HAVDNNG | |
| 0985 | | | | | 25,3440 | 43145 | 0 | | DLOAD | SET | SET GONRPAST IF GONERY SET d LATCH IN - |
| 0986 | REP | 1 | | | 25,3441 | 13785 | 1 | | | MAXRNG | DISPLAY = 9999.9 IF GONERY PLACE |
| 0987 | REP | 3 | LAST | 825 | 25,3442 | 03065 | 1 | | | GONEPAST | |
| 0988 | REP | 3 | LAST | 276 | 25,3443 | 37718 | 0 | | STCALL | DNRNGERR | |
| 0989 | REP | 2 | LAST | 825 | 25,3444 | 53462 | 1 | | | GONEBLAD | |
| 0990 | REP | 4 | LAST | 825 | 25,3445 | 03718 | 1 | HAVDNNG STORE | DNRNGERR | | = (PRDANG - THETA) / 360 |

L ENTRY CONTROL

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| | | | | | | | | | |
|------|-----|---|------|---------|---------|-------|---|--|------------|
| 0991 | | | | 25,3446 | 77676 | 0 | | | DCOMP |
| 0993 | | | | 25,3447 | 56204 | 1 | | | BOVB DDV |
| 0994 | REP | 7 | LAST | 821 | 25,3450 | 57343 | 1 | | TCDANZIG |
| 0995 | REP | 8 | LAST | 825 | 25,3451 | 03653 | 1 | | PX |
| 0996 | | | | | 25,3452 | 40061 | 1 | | SL BOV |
| 0997 | | | | | 25,3453 | 20206 | 1 | | 5 |
| 0998 | REP | 3 | LAST | 820 | 25,3454 | 53464 | 1 | | GOMAXL/D |
| 0999 | | | | | 25,3455 | 40015 | 1 | | BOV |
| 1000 | REP | 3 | LAST | 798 | 25,3456 | 03626 | 0 | | L/D |
| 1001 | REP | 4 | LAST | 826 | 25,3457 | 53464 | 1 | | GOMAXL/D |
| 1002 | REP | 8 | LAST | 820 | 25,3460 | 37634 | 1 | | STCALL L/D |
| 1003 | REP | 1 | | | 25,3461 | 53470 | 1 | | GLIMITER |

FALL SHORT IF NEG, OVERSHOOT IF POS

CLEAR OVPIND IF ON.
PX= DRANGE/D L/D = Y

(GO TO)

R1004 GONECLAD AND GOPOSPAK ENTRY POINTS FOR GLIMITER ...

| | | | | | | | | | |
|------|-----|----|------|-----|---------|-------|---|----------------|----------|
| 1005 | | | | | 25,3462 | 77745 | 1 | GONECLAD DLOAD | |
| 1006 | REP | 3 | LAST | 825 | 25,3463 | 13463 | 1 | | GONECLAD |
| 1007 | | | | | 25,3464 | 41234 | 1 | GOMAXL/D RTB | DMP |
| 1008 | REP | 14 | LAST | 799 | 25,3465 | 45707 | 0 | | SIGNMPAC |
| 1009 | REP | 14 | LAST | 822 | 25,3466 | 03624 | 1 | | LAD |
| 1010 | REP | 9 | LAST | 826 | 25,3467 | 03634 | 0 | STORE | L/D |
| 1011 | | | | | 25,3470 | 45345 | 1 | GLIMITER DLOAD | DSU |
| 1012 | REP | 1 | | | 25,3471 | 15160 | 1 | | GMAX/2 |
| 1013 | REP | 22 | LAST | 825 | 25,3472 | 03640 | 0 | | D |
| 1014 | | | | | 25,3473 | 43244 | 1 | BPL | DAD |
| 1015 | REP | 7 | LAST | 820 | 25,3474 | 53520 | 0 | | LIMITL/D |
| 1016 | REP | 2 | LAST | 826 | 25,3475 | 15160 | 1 | | GMAX/2 |
| 1017 | | | | | 25,3476 | 41240 | 1 | BVN | DMP |
| 1018 | REP | 1 | | | 25,3477 | 53515 | 0 | | GOPOSLAD |
| 1019 | REP | 2 | LAST | 821 | 25,3500 | 15262 | 0 | | ZHS |
| 1020 | | | | | 25,3501 | 41325 | 0 | PDDL | DMP |
| 1021 | REP | 7 | LAST | 821 | 25,3502 | 03654 | 0 | | LEQ |
| 1022 | REP | 1 | | | 25,3503 | 15330 | 0 | | 1/GMAX |
| 1023 | | | | | 25,3504 | 41215 | 1 | DAD | DMP |
| 1024 | REP | 15 | LAST | 826 | 25,3505 | 03624 | 1 | | LAD |
| 1025 | | | | | 25,3506 | 56325 | 0 | PDDL | DDV |
| 1026 | REP | 1 | | | 25,3507 | 15264 | 0 | | ZHSQ(SQ |
| 1027 | REP | 5 | LAST | 822 | 25,3510 | 03622 | 1 | | V SQUARE |
| 1028 | | | | | 25,3511 | 75415 | 0 | DAD | SDRT |
| 1029 | | | | | 25,3512 | 51015 | 1 | DAD | BPL |
| 1030 | REP | 17 | LAST | 825 | 25,3513 | 03700 | 0 | | ROOT |
| 1031 | REP | 8 | LAST | 826 | 25,3514 | 53520 | 0 | | LIMITL/D |
| 1032 | | | | | 25,3515 | 77745 | 1 | GOPOSLAD DLOAD | |
| 1033 | REP | 16 | LAST | 826 | 25,3516 | 03624 | 1 | | LAD |
| 1034 | REP | 10 | LAST | 826 | 25,3517 | 03634 | 0 | STOREL/D STORE | L/D |

SET L/D = -LAD
(ANY NEGATIVE NUMBER WILL DO)

L/D = LAD SIGN(MPAC)

AND FALL INTO GLIMITER SECTION

IF GMAX/2-D POS, GO TO LIMITL/D

IF GMAX -D NEG, GO TO GOPOSLAD

ZHS(GMAX-D) INTO PD

ZHS(GMAX-D) (LEQ/GMAX+LAD) INTO PD

XLIM = SORT(PD+(ZHSQMAX/V)SQ)
IF ROOT+XLIM POS, GO TO LIMITL/D

L REENTRY CONTROL

USER=8 PAGE NO. 30 BT 53

| | | | | | | | | |
|-------|--------|----------|--|---------|----------|-----------------|------------|--------------------------------------|
| 1035 | | | | 25,3520 | 77745 1 | LIMIT/L/D DLOAD | | |
| 1036 | REP 11 | LAST 826 | | 25,3521 | 03834 0 | | L/D | |
| 1037 | REP 3 | LAST 173 | | 25,3522 | 17636 1 | | STOOL L/D1 | |
| 1038 | REP 6 | LAST 826 | | 25,3523 | 03822 1 | | V SQUARE | |
| 1039 | | | | 25,3524 | 77614 1 | BON | | NO LATERAL CONTROL IF PAST TARGET |
| 1040 | REP 4 | LAST 825 | | 25,3525 | 03305 1 | | GONEPAST | |
| 1041 | REP 1 | | | 25,3526 | 53560 1 | | L355 | |
| 1042 | | | | 25,3527 | 43205 1 | DMP | DAD | Y = KLAT VSQUARE + LATBIAS |
| 1043 | REP 3 | LAST 799 | | 25,3530 | 03632 0 | | KLAT | Y INTO PD |
| 1044 | REP 1 | | | 25,3531 | 15242 1 | | LATBIAS | IF ABS(L/D)-L/DCMINR NEG, GO TO L353 |
| 1045 | | | | 25,3532 | 51525 1 | L350 | PDDL | |
| 1046 | REP 12 | LAST 827 | | 25,3533 | 03834 0 | | ABS | |
| 1047 | | | | 25,3534 | 50025 0 | | L/D | |
| 1048 | REP 3 | LAST 798 | | 25,3535 | 03630 1 | DSU | RNN | |
| 1049 | REP 1 | | | 25,3536 | 53545 0 | | L/DCMINR | |
| 1050 | | | | 25,3537 | 75345 1 | DLOAD | SIGN | IF K2ROLL LATANG NEG, GO TO L357 |
| 1051 | REP 6 | LAST 803 | | 25,3540 | 03876 0 | | LATANG | |
| 1052 | REP 3 | LAST 799 | | 25,3541 | 03844 1 | | K2ROLL | |
| 1053 | | | | 25,3542 | 71240 1 | RNN | DLOAD | |
| 1054 | REP 1 | | | 25,3543 | 53824 1 | | L357 | |
| 1055 | | | | 25,3544 | 41542 1 | SR1 | PUSH | Y = Y/2 |
| 1056 | | | | 25,3545 | 75345 1 | L353 | DLOAD | IF LATANG SIGN(K2ROLL)-Y POS, SWITCH |
| 1057 | REP 7 | LAST 827 | | 25,3546 | 03876 0 | | LATANG | |
| 1058 | REP 4 | LAST 827 | | 25,3547 | 03844 1 | | K2ROLL | |
| 1059 | | | | 25,3550 | 77625 0 | DSU | | |
| 1060 | | | | 25,3551 | 71240 1 | RNN | DLOAD | |
| 1061 | REP 2 | LAST 827 | | 25,3552 | 53580 1 | | L355 | |
| 1062 | REP 5 | LAST 827 | | 25,3553 | 03844 1 | | K2ROLL | |
| 1063 | | | | 25,3554 | 57414 1 | BONCLR | DCOMP | IF NOSWITCH =1, K2ROLL= K2ROLL |
| 10631 | REP 2 | LAST 818 | | 25,3555 | 03210 1 | | NOSWITCH | |
| 10632 | REP 3 | LAST 827 | | 25,3556 | 53580 1 | | L355 | |
| 1064 | REP 6 | LAST 827 | | 25,3557 | 03844 1 | STORE | K2ROLL | K2ROLL = - K2ROLL |
| 1065 | | | | 25,3560 | 58345 0 | L355 | DLOAD | ROLLC = ACOS((L/D1) / LAD) |
| 1066 | REP 4 | LAST 827 | | 25,3561 | 03836 1 | | L/D1 | |
| 1067 | REP 17 | LAST 826 | | 25,3562 | 03824 1 | | LAD | MPAC SET TO +-1 IF OVERFLOW*** |
| 1068 | | | | 25,3563 | 65542 1 | SR1 | ACOS | |
| 1069 | | | | 25,3564 | 43185 1 | SIGN | CLEAR | |
| 1070 | REP 7 | LAST 827 | | 25,3565 | 03844 1 | | K2ROLL | |
| 10701 | REP 3 | LAST 827 | | 25,3566 | 03270 1 | | NOSWITCH | |
| 1071 | REP 11 | LAST 823 | | 25,3567 | 03318 0 | STORE | ROLLC | |
| 1072 | | | | 25,3570 | 77776 1 | ENDEXIT | EXIT | |
| 1073 | REP 31 | LAST 689 | | 25,3571 | 3 4876 1 | OVERROUT | CA | ENTRYDSP =92D R13 |
| 1074 | REP 7 | LAST 798 | | 25,3572 | 7 0102 0 | | MASK | CM/PLAGS |
| 1075 | | | | 25,3573 | 0 0008 1 | | EXTEND | |
| 1076 | REP 1 | | | 25,3574 | 1 3600 0 | BZF | NODISKY | OMIT DISPLAY. |



L REENTRY CONTROL

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| | | | | | | | | | | |
|------|-----|-----|------|-----|---------|-------|------|---|----------|----------|
| 1077 | REP | 7 | LAST | 754 | 25,3575 | 3 | 1283 | 1 | CA | ENTRYVN |
| 1078 | REP | 234 | LAST | 783 | 25,3576 | 0 | 4555 | 0 | TC | BANKCALL |
| 1079 | REP | 2 | LAST | 531 | 25,3577 | 20621 | 0 | | CADR | RECDSPR |
| 1080 | | | | | 25,3600 | 0 | 0004 | 0 | NODISKY | INHINT |
| 1081 | REP | 4 | LAST | 510 | 25,3601 | 10 | 087 | 1 | CCS | NEWJOB |
| 1082 | REP | 3 | LAST | 510 | 25,3602 | 0 | 5057 | 0 | TC | CHANG1 |
| 1083 | REP | 47 | LAST | 784 | 25,3603 | 0 | 4574 | 0 | SERVNOUT | TC |
| 1084 | REP | 5 | LAST | 759 | 25,3604 | 77132 | 1 | | CADR | SERVEXIT |

ALL ENTRY DISPLAYS ARE DONE HERE.

NO ABORT IF DISKY IN USE

PROTECT READACCS GRP 5, IF SIDETRACKED.

(COME HERE FROM P67.3)
AND END AVERAGED JOB VIA ENDOPJOB.



L REENTRY CONTROL

USER'S PAGE NO. 32 E7 53

P1085 DISPLAY WHEN V IS LESS THAN VQUIT.

| | | | | | | | | | |
|-------|-----|-----|------|---------|---------|----------|----------|----------|------|
| 1086 | | | | 25,3605 | 77776 1 | STERROPP | EXIT | | |
| 1087 | REP | 4 | LAST | 824 | 25,3606 | 3 4753 1 | CA | REENTRY | |
| 1088 | REP | 36 | LAST | 824 | 25,3607 | 54 003 0 | TS | EBANK | |
| 1089 | REP | 12 | LAST | 815 | 25,3610 | 3 4783 1 | CA | PRI016 | |
| 1090 | REP | 27 | LAST | 776 | 25,3611 | 0 5027 1 | TC | NOVAC | |
| 1091 | REP | 25 | LAST | 787 | 25,3611 | 0 5027 1 | EBANK | AGC | |
| 1092 | REP | 3 | LAST | 754 | 25,3612 | 02511 0 | 2CADR | P87.1 | |
| 1092 | | | | | 25,3613 | 54086 0 | | | |
| A1093 | | | | | | | | | |
| A1094 | | | | | | | | | |
| 1095 | REP | 28 | LAST | 784 | 25,3614 | 0 5261 1 | TC | 2PHSCING | |
| 1096 | | | | | 25,3615 | 00414 0 | OCT | 00414 | |
| 1097 | | | | | 25,3616 | 10035 0 | OCT | 10035 | |
| 1098 | REP | 1 | | | 25,3617 | 3 3623 0 | CA | P87.2CAD | |
| 1099 | REP | 14 | LAST | 824 | 25,3620 | 55-645 0 | TS | GOTOADDR | |
| 1100 | REP | 209 | LAST | 825 | 25,3621 | 0 6008 1 | TC | INTPRET | |
| 1101 | | | | | 25,3622 | 77650 1 | GOTO | | |
| 1102 | REP | 1 | | | 25,3623 | 54530 0 | P87.2CAD | P87.2 | |
| 1103 | | | | | 25,3624 | 75345 1 | L357 | DLOAD | SIGN |
| 1104 | REP | 4 | LAST | 827 | 25,3625 | 03630 1 | | L/DOMINR | |
| 1105 | REP | 13 | LAST | 827 | 25,3626 | 03634 0 | | L/D | |
| 1106 | REP | 5 | LAST | 827 | 25,3627 | 37636 0 | STCALL | L/D1 | |
| 1107 | REP | 4 | LAST | 827 | 25,3630 | 53560 1 | | L355 | |

PRECAUTIONARY.

2 LESS THAN NTRYPRIO.

ANY EB HERE
START UP REMAINDER OF P87

RTOOO LAT LONG
XXXX.X NM XXX.XX DEG XXX.XX DEG

INHINT/RELINT DONE.
4.41 RESTART FOR P87.1 DISPLAY JOB.
SERVICER 5.3 RESTART.

HEREAFTER, DO LAT, LONG.

CONTINUE FOR LAT, LONG THIS TIME.

L/D = L/DOMINR SIGN(L/D)

(GO TO)



L REENTRY CONTROL

USR=5 PAGE NO. 33 BY 53

P1108 TABLE USED FOR SUB-ORBITAL REFERENCE TRAJECTORY CONTROL.

| Line No. | Code | Value | Unit | Label |
|----------|---------|---------|------|--------------------|
| 1109 | 25,3631 | 00474 0 | | VREFER DEC .019288 |
| 1110 | 25,3632 | 01235 1 | | DEC .040809 |
| 1111 | 25,3633 | 02337 1 | | DEC .078107 |
| 1112 | 25,3634 | 03721 0 | | DEC .122156 |
| 1113 | 25,3635 | 05230 0 | | DEC .165546 |
| 1114 | 25,3636 | 06213 1 | | DEC .198012 |
| 1115 | 25,3637 | 10550 0 | | DEC .271945 |
| 1116 | 25,3640 | 11717 0 | | DEC .309533 |
| 1118 | 25,3641 | 13314 0 | | DEC .356222 |
| 1119 | 25,3642 | 14738 0 | | DEC .404192 |
| 1120 | 25,3643 | 16255 1 | | DEC .448067 |
| 1121 | 25,3644 | 18457 0 | | DEC .496023 |
| | 25,3645 | 25570 1 | | DEC .67918 |
| 1122 | 25,3646 | 77528 0 | | DEC -.010337 |
| 1123 | 25,3647 | 77380 1 | | DEC -.016550 |
| 1124 | 25,3650 | 11106 0 | | DEC -.028935 |
| 1125 | 25,3651 | 16516 1 | | DEC -.042039 |
| 1126 | 25,3652 | 16071 0 | | DEC -.058974 |
| 1127 | 25,3653 | 15570 1 | | DEC -.070721 |
| 1128 | 25,3654 | 74681 0 | | DEC -.098538 |
| 1129 | 25,3655 | 14436 0 | | DEC -.107482 |
| 1130 | 25,3656 | 13212 1 | | DEC -.147762 |
| 1131 | 25,3657 | 11640 0 | | DEC -.193289 |
| 1132 | 25,3660 | 54557 1 | | DEC -.602557 |
| 1133 | 25,3661 | 40000 0 | | DEC -.99999 |
| 1134 | 25,3662 | 40000 0 | | DEC -.99999 |
| 1135 | 25,3663 | 77635 1 | | DEC -.0478599 R-3 |
| 1136 | 25,3664 | 17563 1 | | DEC -.0683863 R-3 |
| 1137 | 25,3665 | 77354 0 | | DEC -.1343468 R-3 |
| 1138 | 25,3666 | 16712 1 | | DEC -.2759846 R-3 |
| 1139 | 25,3667 | 16066 0 | | DEC -.4731437 R-3 |
| 1140 | 25,3670 | 15322 0 | | DEC -.6472087 R-3 |
| 1141 | 25,3671 | 13237 0 | | DEC -1.171693 R-3 |
| 1142 | 25,3672 | 12104 1 | | DEC -1.466382 R-3 |
| 1143 | 25,3673 | 10301 1 | | DEC -1.905171 R-3 |
| 1144 | 25,3674 | 65635 1 | | DEC -2.547990 R-3 |
| 1145 | 25,3675 | 51311 0 | | DEC -4.151220 R-3 |
| 1146 | 25,3676 | 50575 0 | | DEC -5.813617 R-3 |
| 1147 | 25,3677 | 50575 0 | | DEC -5.813617 R-3 |

REFERENCE VELOCITY SCALED V/51532.3946
13 POINTS ARE STORED AS THE INDEPENDENT
VARIABLE AND THEN SIX 13 POINT FUNCTIONS
OF V ARE STORED CONSECUTIVELY

HIGH VELOCITY FOR SAFETY
DRANCE/DA SCALED DRDA/(2700/805)

-DRANCE/DRDOT
SCALED((2VS/8 2700) DR/DRDOT)



L BENTRY CONTROL

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| Line No. | Address | Value | Mode | Label | Notes |
|----------|---------|---------|------|------------|-------------------------------|
| P1148 | | | | | |
| 1149 | 25,3700 | 74443 1 | DEC | -.0134001 | B3 ROOTREF SCALED (8 RDT/2VS) |
| 1150 | 25,3701 | 74333 1 | DEC | -.013947 | B3 |
| 1151 | 25,3702 | 74433 0 | DEC | -.013462 | B3 |
| 1152 | 25,3703 | 74763 0 | DEC | -.011813 | B3 |
| 1153 | 25,3704 | 75432 0 | DEC | -.0095831 | B3 |
| 1154 | 25,3705 | 75735 1 | DEC | -.00808946 | B3 |
| 1155 | 25,3706 | 76200 1 | DEC | -.006828 | B3 |
| 1156 | 25,3707 | 75735 1 | DEC | -.00808946 | B3 |
| 1157 | 25,3710 | 75140 0 | DEC | -.0109791 | B3 |
| 1158 | 25,3711 | 74075 0 | DEC | -.0151498 | B3 |
| 1159 | 25,3712 | 73312 0 | DEC | -.0179817 | B3 |
| 1160 | 25,3713 | 73732 0 | DEC | -.0159061 | B3 |
| 1161 | 25,3714 | 73732 0 | DEC | -.0159061 | B3 |
| 1162 | 25,3715 | 00015 0 | DEC | .0008067 | RANGE TO GO SCALED RTOGO/2700 |
| 1163 | 25,3716 | 00066 1 | DEC | .0032963 | 8.9 |
| 1164 | 25,3717 | 00206 0 | DEC | .0081852 | 22.1 |
| 1165 | 25,3720 | 00431 1 | DEC | .017148 | |
| 1166 | 25,3721 | 00712 0 | DEC | .027928 | |
| 1167 | 25,3722 | 01136 1 | DEC | .037 | |
| 1168 | 25,3723 | 02015 1 | DEC | .063298 | |
| 1169 | 25,3724 | 02374 0 | DEC | .077889 | |
| 1170 | 25,3725 | 03123 1 | DEC | .098815 | |
| 1171 | 25,3726 | 04051 1 | DEC | .127519 | |
| 1172 | 25,3727 | 05767 1 | DEC | .186963 | |
| 1173 | 25,3730 | 07476 0 | DEC | .238148 | |
| 1174 | 25,3731 | 11324 1 | DEC | .294185185 | |
| 1175 | 25,3732 | 76272 1 | DEC | -.051099 | -ARFP/805 |
| 1176 | 25,3733 | 75472 1 | DEC | -.074534 | |
| 1177 | 25,3734 | 74604 0 | DEC | -.101242 | |
| 1178 | 25,3735 | 74210 1 | DEC | -.116646 | |
| 1179 | 25,3736 | 74052 0 | DEC | -.122360 | |
| 1180 | 25,3737 | 73735 1 | DEC | -.127081 | |
| 1181 | 25,3740 | 73217 1 | DEC | -.147453 | |
| 1182 | 25,3741 | 73013 1 | DEC | -.155528 | |
| 1183 | 25,3742 | 73155 1 | DEC | -.149565 | |
| 1184 | 25,3743 | 74151 1 | DEC | -.118509 | |
| 1185 | 25,3744 | 76703 1 | DEC | -.034907 | |
| 1186 | 25,3745 | 77575 0 | DEC | -.007950 | |
| 1187 | 25,3746 | 77575 0 | DEC | -.007950 | |



L REENTRY CONTROL

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| | | | | |
|-------|---------|---------|-----|---------|
| P1188 | | | | |
| 1189 | 25,3747 | 00112 0 | DEC | .004491 |
| 1190 | 25,3750 | 00204 1 | DEC | .008081 |
| 1191 | 25,3751 | 00407 1 | DEC | .016030 |
| 1192 | 25,3752 | 01113 0 | DEC | .035815 |
| 1193 | 25,3753 | 02101 0 | DEC | .069422 |
| 1194 | 25,3754 | 03260 0 | DEC | .104519 |
| 1195 | 25,3755 | 03717 0 | DEC | .122 |
| 1196 | 25,3756 | 05411 0 | DEC | .172407 |
| 1197 | 35,3757 | 10051 1 | DEC | .252852 |
| 1198 | 25,3760 | 13476 0 | DEC | .383148 |
| 1199 | 25,3761 | 20324 0 | DEC | .512963 |
| 1200 | 25,3762 | 21077 1 | DEC | .558519 |
| 1201 | 25,3763 | 21677 1 | DEC | .558519 |

DRANCE/D L/D SCALED Y/2700

END OF STORED REFERENCE

L REENTRY CONTROL

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R1202 REENTRY CONSTANTS.

R1203 DEFINED BY EQUALS

| | | | | | | | |
|-------|--------|----|------------------|------------|----------|------------|---|
| 1204 | REP | 1 | 4721 | DEC15 | = | LOW4 | |
| A1205 | | | | GAMMAL1 | = | 22D | |
| 12055 | | | 25,3764 | 16631 1 | MAXRNG | 2OCT | 16631 06755 DNRNGERR = 9999.9 IF GONEPAST=1 |
| 12055 | | | 25,3765 | 06755 0 | | | |
| 1206 | | | 26,3144 | | | BANK | 26 |
| 1207 | REP | 2 | LAST 805 | 26,2000 | | SETLOC | REENTRY1 |
| 1208 | | | 26,3144 | | | BANK | |
| 1209 | REP | 2 | LAST 805 TO 807' | 41 41* | | COUNT* | 33/ENTRY |
| 1210 | REP | 3 | LAST 815 | 27,3382 | BARELY1 | = | NEARONE |
| A1211 | | | | 1BITDP | | | COMMON TO BOTH DISK,DANCE,DEPND IN TYP COMMON TO BOTH DISK AND DANCE, DEPND IN VECPOINT. |
| 1212 | | | 26,3144 | 02525 1 | 1/12TH | DEC | .083333 DP 1/12 USES HI WORD IN 1/3 BELOW |
| 1213 | | | 26,3145 | 12525 0 | 1/3RD | 2DEC | .3333333333 DP 1/3 |
| 1213 | | | 26,3146 | 12525 0 | | | |
| 12131 | REP | 2 | LAST 763 | 27,3356 | 1/16TH | = | DP2(-4) |
| R1214 | | | | | | | |
| R1215 | BELOW' | VS | = | VSAT | = | 25766.1973 | FT/SEC |
| R1216 | | RE | = | 21,202,900 | FEST | | |
| 1217 | | | 26,3147 | 04631 1 | LEWD1 | 2DEC | .15 |
| 1217 | | | 26,3150 | 23146 0 | | | |
| 1218 | | | 26,3151 | 03146 1 | POINT1 | 2DEC | .1 |
| 1218 | | | 26,3152 | 14632 0 | | | |
| 1219 | | | 26,3153 | 06314 1 | POINT2 | 2DEC | .2 .2 |
| 1219 | | | 26,3154 | 31463 1 | | | |
| 1220 | | | 26,3155 | 76314 0 | DLEWD0 | 2DEC | -.05 -.05 |
| 1220 | | | 26,3156 | 71462 1 | | | |
| 1221 | | | 26,3157 | 05075 0 | QMAX/2 | 2DEC | .16 8 GS / 2 |
| 1221 | | | 26,3160 | 16051 1 | | | |
| 1222 | REP | 23 | LAST 763 | 26,3331 | 3ZEROS | EQUALS | H16ZEROS |
| 1223 | | | 26,3161 | 07777 1 | NEAR1/4 | 2OCT | 07777 00000 1/4 LESS 1 BIT IN UPPER PART. |
| 1223 | | | 26,3162 | 00000 1 | | | |
| 1224 | | | 26,3163 | 00236 0 | C18 | 2DEC | .0097026346 500/2VS |
| 1224 | | | 26,3164 | 38763 0 | | | |
| 1225 | | | 26,3165 | 00204 1 | Q7PKDMIN | 2DEC | .0080745342 6.5/805 (Q7P +KDMIN) = 6 + .5) |
| 1225 | | | 26,3166 | 11303 1 | | | |
| 1226 | REP | 3 | LAST 833 | 27,3356 | C1/16 | = | DP2(-4) |
| 1227 | | | 26,3167 | 05280 0 | Q3 | 2DEC | .167003132 .07 2VS/21600 |
| 1227 | | | 26,3170 | 05572 1 | | | |

L ENTRY CONTROL

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| | | | | | | | |
|-------|----------------|---------|---------|---------|-------|--------------|--------------------------------------|
| 1228 | | 26,3171 | 12343 0 | Q5 | ZDEC | .326388889 | .3 23500/21600 |
| 1228 | | 26,3172 | 21618 0 | | | | |
| 1229 | | 26,3173 | 01073 1 | Q6 | ZDEC | .0349 | 2 DEG, APPROX 620/23500 |
| 1229 | | 26,3174 | 31515 1 | | | | |
| 1230 | | 26,3175 | 00172 0 | Q7P | ZDEC | .0074534161 | 6/805 (VALUE OF Q7 IN FIXED MEM.) |
| 1230 | | 26,3176 | 03571 1 | | | | |
| 1231 | REP 6 LAST 816 | 26,3327 | | Q19 | = | HALVE | Q19 = .5 |
| 1232 | | 26,3177 | 00573 0 | Q21 | ZDEC | .0231481481 | 500/21600 |
| 1232 | | 26,3200 | 10230 1 | | | | |
| 1233 | | 26,3201 | 76226 0 | Q22 | ZDEC | -.0533333333 | -1152/21600 |
| 1233 | | 26,3202 | 45761 0 | | | | |
| 1234 | | 26,3203 | 13132 0 | VLMIN | ZDEC | .34929485 | 18000/2 VS |
| 1234 | | 26,3204 | 33062 0 | | | | |
| 1235 | REP 2 LAST 802 | 26,3321 | | VMIN | = | FOURTH | (VS/2) / 2VS |
| 1236 | | 26,3205 | 00160 0 | C12 | ZDEC | .00684572901 | 32 28500/(21202900 2 PI) |
| 1236 | | 26,3206 | 05104 1 | | | | |
| 1237 | | 26,3207 | 11322 1 | 1/KR1 | ZDEC | .28411765 | 1 / 3.4 |
| 1237 | | 26,3210 | 32265 1 | | | | |
| 1238 | | 26,3211 | 75047 0 | -1/KR2 | ZDEC | -.0057074322 | R4 = -1/(.0034 2 VS) EXP +4 |
| 1238 | | 26,3212 | 72454 1 | | | | |
| 1239 | | 26,3213 | 00475 1 | VQUIT | ZDEC | .019405269 | 1000 /2VS |
| 1239 | | 26,3214 | 35746 1 | | | | |
| 1240 | | 26,3215 | 06751 1 | C20 | ZDEC | .21739130 | (175 PPS) LIFT UP IF ABOVE C20 |
| 1240 | | 26,3216 | 27515 0 | | | | |
| 12405 | | 26,3217 | 05441 0 | C21 | ZDEC | .17391304 | 140/805 |
| 12405 | | 26,3220 | 14412 0 | | | | |
| 1241 | | 26,3221 | 00022 1 | 25NM | ZDEC | .0011574074 | 25/21600 (25 NAUT MILES) |
| 1241 | | 26,3222 | 38641 1 | | | | |
| 1242 | | 26,3223 | 01003 0 | K1D | ZDEC | .0314453125 | =C16 805/256 = .01 805/256 |
| 1242 | | 26,3224 | 06315 0 | | | | |
| 1243 | | 26,3225 | 71435 0 | K2D | ZDEC | -.201298418 | =C17 2VS/256 = -.001 2VS/256 |
| 1243 | | 26,3226 | 75516 1 | | | | |
| 1244 | | 26,3227 | 32047 0 | KVSCALE | ZDEC | .81491944 | 12800/(2 VS .3048) |
| 1244 | | 26,3230 | 24387 0 | | | | |
| 1245 | | 26,3231 | 37200 1 | KASCALE | ZDEC | .97857358 | 5.85 16384/(4 .3048 100 805) |
| 1245 | | 26,3232 | 05636 1 | | | | |
| 1246 | | 26,3233 | 00046 0 | KTRIA | ZDEC* | .383495203 | E2 R-14* 1000 2PI/16384(163.84) |
| 1246 | | 26,3234 | 13137 0 | | | | |
| 1247 | | 26,3235 | 00017 1 | KT1 | ZDEC* | .157788327 | E 2 R-14* RE(2PI)/2 VS(16384) 163.84 |
| 1247 | | 26,3236 | 30730 0 | | | | |
| 1248 | | 26,3237 | 00040 0 | .05G | ZDEC | .002 | .05/25 |
| 1248 | | 26,3240 | 30447 0 | | | | |
| 1249 | | 26,3241 | 00000 1 | LATRIAS | ZDEC | .00003 | APPRX .5 NM/ 4(21600/2 PI) |
| 1249 | | 26,3242 | 17565 1 | | | | |
| 1250 | | 26,3243 | 01727 1 | KWR | ZDEC | .120056652 | R-1 |
| 1250 | | 26,3244 | 20103 1 | | | | |
| 1251 | | 26,3245 | 00121 0 | KACOS | ZDEC | .004973592 | 1/32(2PI) |
| 1251 | | 26,3246 | 17460 0 | | | | |
| 1252 | | 26,3247 | 00400 0 | CHOCK | ZDEC | 1 R-6 | .25/16 |
| 1252 | | 26,3250 | 00000 1 | | | | |

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| | | | | | | | | |
|-------|-----------------|-----------------------------------|---------|----------|--------|--------------|-----------------------------|--|
| 1253 | | 26,3251 | 01252 0 | 1/24TH | ZDEC | .0833333333 | B-1 | |
| 1253 | | 26,3252 | 25253 1 | | | | | |
| 1254 | | 26,3253 | 24365 1 | CH1 | ZDEC | .32 B1 | 16 CH1/25 = 16 (1) /25 | |
| 1254 | | 26,3254 | 30244 0 | | | | | |
| 1255 | | 26,3255 | 77152 1 | KC3 | ZDEC | -.0247622232 | -(4 VS VS/ 2 PI 805 RE) | |
| 1255 | | 26,3256 | 51354 1 | | | | | |
| 1256 | | 26,3257 | 00336 1 | VRCONT | ZDEC | .0135836886 | 700/2 VSAT | |
| 1256 | | 26,3260 | 21610 0 | | | | | |
| 1257 | REP 10 LAST 769 | 26,3327 | | HALVE | EQUALS | HIDPHALF | | |
| 1258 | REP 2 LAST 770 | 26,3321 | | FOURTH | EQUALS | HIDP1/4 | | |
| 1259 | REP 7 LAST 834 | 26,3327 | | 1/QMAX | EQUALS | HALVE | 4/QMAX = 4 / 8 | |
| 1260 | | 26,3261 | 00433 0 | ZHS | ZDEC | .0172788611 | 2 28500 25 32.2/(4 VS VS) | |
| 1260 | | 26,3262 | 02775 0 | | | | | |
| 1261 | | 26,3263 | 00000 1 | ZHSQXSQ | ZDEC | .0000305717 | (2 28500 8 32.2/ 4 VS VS)SQ | |
| 1261 | | 26,3264 | 20017 0 | | | | | |
| 1262 | | 26,3265 | 77765 0 | C001 | ZDEC | -.000625 | -(4/25)/256 LEQ/D0 CONST | |
| 1262 | | 26,3266 | 70243 0 | | | | | |
| 1263 | | 26,3267 | 31463 1 | POINTS | ZDEC | .8 | | |
| 1263 | | 26,3270 | 06315 0 | | | | | |
| 1264 | | 26,3271 | 00541 1 | ZCHS | ZDEC | .0215983284 | 2 1.25 28500 805/(2 VS)SQ | |
| 1264 | | 26,3272 | 33575 0 | | | | | |
| 1265 | | 26,3273 | 00146 1 | PT1/16 | ZDEC | .1 B-4 | | |
| 1265 | | 26,3274 | 14632 0 | | | | | |
| 1266 | | 26,3275 | 00052 0 | 1/K44 | ZDEC | .00260929464 | 2 VS/19749550 | |
| 1266 | | 26,3276 | 30013 0 | | | | | |
| 1267 | | 26,3277 | 20411 1 | VPINAL | ZDEC | .51618016 | 26600/2 VS | |
| 1267 | | 26,3300 | 03041 1 | | | | | |
| 1268 | | 26,3301 | 20610 1 | VPINAL1 | ZDEC | .523942273 | = 27000 / 2 VS | |
| 1268 | | 26,3302 | 10513 1 | | | | | |
| 1269 | | 26,3303 | 11473 1 | 1/KA1 | ZDEC | .30048077 | 25/(1.3 64) | |
| 1269 | | 26,3304 | 02355 0 | | | | | |
| 1270 | | 26,3305 | 00203 0 | KA2 | ZDEC | .008 | .2 / 25 | |
| 1270 | | 26,3306 | 02234 0 | | | | | |
| 1271 | | 26,3307 | 16237 0 | KA3 | ZDEC | .44720497 | = 90 4/805 | |
| 1271 | | 26,3310 | 00146 1 | | | | | |
| 1272 | | 26,3311 | 01456 1 | KA4 | ZDEC | .049689441 | 40/805 | |
| 1272 | | 26,3312 | 03450 0 | | | | | |
| 1273 | REP 2 LAST 807 | 26,3311 | | Q7MIN | = | KA4 | = 40/805 = .049689441 | |
| 1274 | | 26,3313 | 56232 1 | -HSCALED | ZDEC | -.55305018 | -28500/2 VS | |
| 1274 | | 26,3314 | 72332 0 | | | | | |
| 1275 | | 26,3315 | 77000 1 | -KSCALE | ZDEC | -.0312424837 | -805/VS | |
| 1275 | | 26,3316 | 43741 1 | | | | | |
| 1276 | | 26,3317 | 36702 1 | COS15 | ZDEC | .965 | | |
| 1276 | | 26,3320 | 21727 0 | | | | | |
| 1277 | REP 1 | 26,3144 | | LATSLOPE | EQUALS | 1/12TH | | |
| R1276 | | ... END OF RE-ENTRY CONSTANTS ... | | | | | | |

L CM BODY ATTITUDE

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P0001

0010 35,3755 BANK 35
 0011 REP 1 I,2000 SETLOC BODYATT
 0012 37,3373 BANK
 0013 REP 1 COUNT 37/CMRAT

A0014

PDL 12D - 15D SAFE.

R0015 VALUES OF GIMBAL AND BODY ANGLES VALID AT PIP TIME ARE SAVED DURING READACCS.

| | | | | | | | | | | | | | | | | | |
|------|-----|-----|------|-----|---------|----------|----------|----------|---------|-------------|-----------|---------------------|---------------|---------|--------|----------|--------|
| 0017 | REP | 10 | LAST | 802 | 87,1451 | | EBANK= | RTINIT | LET | INTERPRETER | SET | EB | | | | | |
| 0018 | REP | 210 | LAST | 829 | 37,3373 | 0 6006 1 | CM/POSE | TC | INTPRET | COME | HERE | VIA | AVEGEXIT. | | | | |
| 0019 | | | | | 37,3374 | 77201 1 | SETPD | VLOAD | | | | | | | | | |
| 0020 | | | | | 37,3375 | 00001 0 | | 0 | | | | | | | | | |
| 0021 | REP | 16 | LAST | 802 | 37,3376 | 01177 1 | | VN | | KVSCALE | = | (12800/ .3048) /2VS | | | | | |
| 0022 | | | | | 37,3377 | 63361 0 | VXSC | PDVL | | | | | | | | | |
| 0023 | REP | 1 | | | 37,3400 | 37672 0 | | -KVSCALE | | KVSCALE | = | .81491944 | | | | | |
| 0024 | REP | 10 | LAST | 789 | 37,3401 | 01714 1 | | UNITW | | PULL | UNIT | VECTOR | | | | | |
| 0025 | | | | | 37,3402 | 74235 0 | VXV | VXSC | | VREL | = | V - WE*R | | | | | |
| 0026 | REP | 10 | LAST | 803 | 37,3403 | 01760 1 | | UNITR | | | | | | | | | |
| 0027 | REP | 1 | | | 37,3404 | 15244 1 | | KWE | | | | | | | | | |
| 0028 | | | | | 37,3405 | 45455 1 | VAD | STADR | | | | | | | | | |
| 0029 | REP | 3 | LAST | 802 | 37,3406 | 74251 1 | STORE | -VREL | | SAVE | FOR | ENTRY | GUIDANCE. REF | COORDS | | | |
| 0030 | | | | | 37,3407 | 72056 1 | UNIT | LXA,1 | | | | | | | | | |
| 0031 | | | | | 37,3410 | 00044 1 | | 36D | | ABVAL | (-VREL) | TO | X1 | | | | |
| 0032 | REP | 6 | LAST | 804 | 37,3411 | 03542 1 | STORE | UYA/2 | | -UVREL | | | REF | COORDS | | | |
| 0033 | | | | | 37,3412 | 57435 1 | VXV | VCOMP | | | | | | | | | |
| 0034 | REP | 11 | LAST | 836 | 37,3413 | 01760 1 | | UNITR | | .5 | UNIT | | REF | COORDS | | | |
| 0035 | | | | | 37,3414 | 86256 0 | UNIT | SSP | | THE | FOLLOWING | IS | TO | PROVIDE | A | STARLE | |
| 0036 | REP | 32 | LAST | 741 | 37,3415 | 00051 0 | | S1 | | UN | FOR | THE | END | OF | THE | TERMINAL | PHASE. |
| 0037 | | | | | 37,3416 | 00476 1 | SPVQUIT | DEC | | .019405 | | | | | | | |
| 0038 | | | | | 37,3417 | 77300 1 | | TIX,1 | | VLOAD | | | | | | | |
| 0039 | REP | 1 | | | 37,3420 | 77422 0 | | CM/POSE2 | | IF | V-VQUIT | POS, | BRANCH. | | | | |
| 0040 | REP | 2 | LAST | 118 | 37,3421 | 03534 0 | | OLDUYA | | SAVE | UYA | IN | OLDUYA | | | | |
| 0041 | REP | 3 | LAST | 772 | 37,3422 | 03550 1 | CM/POSE2 | STORE | UYA/2 | OTHERWISE | CONTINUE | TO | USE | OLDUYA. | | | |
| | | | | | | | | | | | | | | REF | COORDS | | |
| 0042 | REP | 3 | LAST | 836 | 37,3423 | 03534 0 | STORE | OLDUYA | | RESTORE, | OR | SAVE | AS | CASE | MAY | RE. | |
| 0043 | | | | | 37,3424 | 57435 1 | VXV | VCOMP | | | | | | | | | |
| 0044 | REP | 7 | LAST | 836 | 37,3425 | 03542 1 | | UYA/2 | | FINISH | OBTAINING | TRAJECTORY | TRIAD. | | | | |
| 0045 | | | | | 37,3426 | 77772 0 | VSI,1 | | | | | | | | | | |
| 0046 | REP | 3 | LAST | 772 | 37,3427 | 03556 1 | STORE | UYA/2 | | | | | | REF | COORDS | | |

L ON BODY ATTITUDE

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| | | | | | | | |
|-------|-----|----|---------|---------|---------|----------|--|
| 0047 | | | 37,3430 | 77751 1 | TLOAD | | PICK UP CDUX, CDUY, CDUZ CORRESPONDING TO PIPUP TIME IN 25,C AND SAVE. |
| 0048 | REP | 3 | LAST | 778 | 37,3431 | 03270 1 | |
| 0049 | | | 37,3432 | 14031 0 | CM/TRIO | STODL | 24D |
| 0050 | | | 37,3433 | 00032 0 | | | 25D |
| 0051 | | | 37,3434 | 41434 1 | RTB | PUSH | TO PDL0 |
| 0052 | REP | 7 | LAST | 447 | 37,3435 | 45510 1 | |
| 0053 | | | 37,3436 | 77746 1 | COS | COULOGIC | |
| 0054 | REP | 2 | LAST | 116 | 37,3437 | 17564 0 | |
| A0055 | | | | | STODL | URX/2 | CI /2 |
| 0056 | | | 37,3440 | 57556 0 | | | AIG/PIP FROM PDL 0 |
| 0057 | REP | 3 | LAST | 837 | 37,3441 | 17570 0 | |
| 0058 | | | 37,3442 | 00033 1 | SIN | DCOMP | -SI /2 |
| 0059 | | | 37,3443 | 41434 1 | STODL | URX/2 +4 | AND/PIP |
| 0060 | REP | 8 | LAST | 837 | 37,3444 | 45510 1 | TO PDL 0 |
| 0061 | | | 37,3445 | 65356 1 | RTB | PUSH | |
| 0062 | | | 37,3446 | 65346 0 | | COULOGIC | |
| 0063 | | | 37,3447 | 00001 0 | SIN | PDDL | XCH PDL 0. SAVE SM /2 |
| 0064 | | | 37,3450 | 74276 1 | COS | PDDL | CM /2 TO PDL 2 |
| 0065 | REP | 4 | LAST | 837 | 37,3451 | 03564 0 | SM /2 |
| 0066 | | | 37,3452 | 77772 0 | DCOMP | VXSC | |
| 0067 | REP | 2 | LAST | 116 | 37,3453 | 17572 1 | |
| 0068 | | | 37,3454 | 00003 1 | VSL1 | URX/2 | NOISE WONT OVFL. |
| 0069 | REP | 3 | LAST | 837 | 37,3455 | 17574 1 | =(-SMCI, NOISE, SMSI) /2 |
| 0070 | | | 37,3456 | 00031 0 | STODL | URY/2 | CM /2 REPLACES NOISE |
| 0071 | | | 37,3457 | 41434 1 | | 2 | URY/2=(-SMCI, CM, SMSI)/2 |
| 0072 | REP | 9 | LAST | 837 | 37,3460 | 45510 1 | ACC/PIP |
| 0073 | | | 37,3461 | 65356 1 | STODL | URY/2 +2 | TO PDL 4 |
| 0074 | | | 37,3462 | 74346 0 | RTB | PUSH | |
| 0075 | REP | 4 | LAST | 837 | 37,3463 | 03572 1 | |
| 0076 | REP | 5 | LAST | 837 | 37,3464 | 17572 1 | XCH PDL 4. SAVE SO /2 |
| 0077 | | | 37,3465 | 00005 1 | COS | VXSC | CO /2 |
| 0078 | | | 37,3466 | 57405 1 | | URY/2 | |
| 0079 | REP | 5 | LAST | 837 | 37,3467 | 03570 0 | URY/2=(-COSMCI, COCM, COSMSI)/4 |
| 0080 | | | 37,3470 | 77615 0 | STODL | URY/2 | SO /2 |
| 0081 | REP | 6 | LAST | 837 | 37,3471 | 03572 1 | |
| 0082 | REP | 7 | LAST | 837 | 37,3472 | 17572 1 | -SI /2 |
| A0083 | | | | | DAD | URY/2 | INCREMENT BY (SOSI /4) |
| 0084 | | | 37,3473 | 43205 1 | STODL | URY/2 | SO /2 FROM PDL 4 |
| 0085 | REP | 8 | LAST | 837 | 37,3474 | 03564 0 | |
| 0086 | REP | 8 | LAST | 837 | 37,3475 | 03576 0 | CI /2 |
| 0087 | REP | 9 | LAST | 837 | 37,3476 | 27576 0 | YR/4 PLATFORM COORDS |
| A0088 | | | | | DMP | DAD | |
| 0089 | REP | 10 | LAST | 837 | 37,3477 | 03572 1 | |
| 0090 | | | 37,3500 | 72505 1 | STODL | URY/2 +4 | |
| 0091 | REP | 33 | LAST | 790 | 37,3501 | 01736 1 | |
| 0092 | REP | 11 | LAST | 837 | 37,3502 | 17572 1 | YR/2 .5 UNIT |
| | | | | | VCM | VSL2 | YR/2 DONE |
| | | | | | REFSMAT | | RFP COORDS |
| | | | | | STODL | URY/2 | |

$$YR = (-COSMCI + SOSI, COCM, COSMSI + SOCI)$$



L ON BODY ATTITUDE

USER=8 PAGE NO. 3 ET 83

A0093
 0094
 0095 REP 7 LAST 837 37,3503 76561 1
 0096 REP 8 LAST 838 37,3504 03564 0
 0097 37,3505 17564 0
 0098 REP 9 LAST 838 37,3506 77626 0
 0099 REP 10 LAST 838 37,3507 50211 0
 0099 REP 10 LAST 838 37,3510 03564 0

VXSC VSL1
 UBX/2
 STODL UBX/2
 STADR UBX/2
 STOVL UBX/2 +2
 UBX/2

ON /2 FROM PDL 2
 =(CMC1, NOISE, -CMS1)/2
 SM /2 FROM PDL 0
 SM /2 REPLACES NOISE
 XB/2 PLATFORM COORDS

A0100

$XB = (CMC1, SM, -CMS1)$

0101
 0102 REP 34 LAST 837 37,3511 76505 0
 0103 REP 11 LAST 838 37,3512 01738 1
 0103 REP 11 LAST 838 37,3513 03564 0

VOM VSL1
 REPSMAT
 STORE UBX/2

.5 UNIT
 XB/2 DONE REF COORDS

0104
 0105 REP 12 LAST 837 37,3514 76435 1
 0106 REP 2 LAST 116 37,3515 03572 1
 0106 REP 2 LAST 116 37,3516 27600 1

VXV VSL1
 UBZ/2
 STOVL UBZ/2

ZB/2 DONE REF COORDS

A0107

EQUIVALENT TO

A0108
 0109 REP 8 LAST 838 37,3517 03542 1
 0110 37,3520 53435 0
 0111 REP 13 LAST 838 37,3521 03572 1
 0112 37,3522 50208 0
 0113 REP 4 LAST 838 37,3523 03556 1
 0114 REP 3 LAST 544 37,3524 24021 1
 0115 37,3525 00001 0

VXV UVA/2
 UNIT
 URY/2
 PUSH DOT
 UZA/2
 STOVL COSTH
 0

$ZB = (SOSMC1 + COS1, -SOCM, -SOSMS1 + COCI)$
 -UVREL/2 = -UVA/2
 GET UNIT(-UVREL*URY)/2 = UL/2
 YB/2
 UL/2 TO PDL 0,5
 UVA/2
 COS(ROLL)/4
 UL/2

0118
 0117 REP 4 LAST 836 37,3526 77641 1
 0117 REP 4 LAST 836 37,3527 03550 1
 0118 REP 3 LAST 544 37,3530 34023 1
 0119 REP 3 LAST 544 37,3531 47211 0
 0120 37,3532 24007 0
 0121 REP 14 LAST 838 37,3533 03572 1
 0122 37,3534 72441 0
 0123 REP 9 LAST 838 37,3535 03542 1
 0124 37,3536 77736 0
 0125 37,3537 24010 0
 0126 REP 12 LAST 838 31,3540 03564 0
 0127 37,3541 77641 1
 0128 37,3542 00001 0
 0129 REP 4 LAST 838 31,3543 24023 0
 0130 37,3544 77641 1
 0131 REP 3 LAST 838 31,3545 03600 1
 0132 REP 4 LAST 838 37,3546 34021 0
 0133 REP 4 LAST 838 37,3547 47211 0
 0134 A,3550 24011 1
 0135 REP 12 LAST 838 37,3551 01760 1
 0136 37,3552 72441 0

DOT
 UVA/2
 STCALL SINTH
 ARCTRIG
 STOVL 6D
 UBZ/2
 DOT SL1
 UVA/2
 ARCSIN
 STOVL 7D
 UBZ/2
 DOT
 0
 STOVL SINTH
 DOT
 UBZ/2
 STCALL COSTH
 ARCTRIG
 STOVL 6D
 UNTR
 DOT SL1

-SIN(ROLL)/4
 -(ROLL/180) /2
 -UVA.URY = -SIN(BETA)
 -UVREL/2
 -(BETA/180) /2
 XB/2
 UL.UBX = -SIN(ALPHA)
 UL/2
 -SIN(ALPHA)/4
 UL/2 FROM PDL 0
 COS(ALPHA)/4
 -(ALPHA/180) /2
 UR/2

REF COORDS



L ON BODY ATTITUDE

USER'S PAGE NO. 4 ET 53

0137 RESP 5 LAST 838 37,3553 03556 1
0138 37,3554 77726 1
0139 37,3555 00013 0

0140 37,3556 77551 0
A0141
0142 37,3557 00007 0
R0143 SPACER

UZA/2
ARCCOS
STORE 10D
TLOAD EXIT
8D

MORE ACCURATE AT LARGE ARG.
(-GAMA/180)/2
ANGLES IN MPAC IN THE ORDER
-(ROLL, BETA, ALFA) /180)/2
THESE VALUES CORRECT AT PIPUP TIME.



L ON BODY ATTITUDE

USER=5 PAGE NO. 5 BT 53

P0144 BASIC SUBROUTINE TO UPDATE ATTITUDE ANGLES

| | | | | | | | | | |
|-------|-----|-----|------|-----|---------|----------|------------|--------|----------|
| 0145 | REP | 26 | LAST | 829 | E6,1661 | | EBANK= AGC | | |
| 0146 | REP | 1 | | | 31,3560 | 3 4752 0 | CM/ATUP | CA | EBACG |
| 0147 | REP | 37 | LAST | 829 | 31,3561 | 54 003 0 | | TS | EBANK |
| 0148 | REP | 17 | LAST | 737 | 31,3512 | 50 120 1 | CMTR1 | INDEX | FIXLOC |
| 0149 | | | | | 37,3563 | 4 0012 0 | | CS | 100 |
| 0150 | REP | 2 | LAST | 110 | 37,3564 | 57=722 1 | | XCH | GAMA |
| 0151 | REP | 74 | LAST | 779 | 37,3565 | 54 001 1 | | TS | L |
| 0152 | | | | | 37,3568 | 0 0004 0 | | INHINT | |
| A0153 | | | | | | | | | |
| A0154 | | | | | | | | | |
| A0155 | | | | | | | | | |
| 0156 | REP | 8 | LAST | 827 | 37,3567 | 4 0102 0 | | CS | CM/FLAGS |
| 0157 | REP | 23 | LAST | 732 | 37,3570 | 7 4700 0 | | MASK | BIT11 |
| 0158 | | | | | 37,3571 | 0 000A 1 | | EXTEND | |
| A0159 | | | | | | | | | |
| 0160 | REP | 1 | | | 37,3512 | 1 3515 1 | | BZF | DOGANDOT |
| 0161 | REP | 9 | LAST | 840 | 37,3573 | 28 102 0 | | ADS | CM/FLAGS |
| 0162 | REP | 1 | | | 37,3574 | 0 3610 0 | | TC | NOGANDOT |
| 0163 | REP | 75 | LAST | 840 | 37,3575 | 4 0001 1 | DOGANDOT | CS | L |
| 0164 | REP | 3 | LAST | 840 | 37,3576 | 2 1722 1 | | AD | GAMA |
| 0165 | | | | | 37,3577 | 0 0006 1 | | EXTEND | |
| 0166 | REP | 1 | | | 37,3600 | 7 3873 1 | | MP | TCDU |
| 0167 | REP | 2 | LAST | 110 | 37,3601 | 55=723 1 | | TS | GANDOT |
| 0168 | | | | | 37,3602 | 0 0006 1 | | EXTEND | |
| 0169 | | | | | 37,3603 | 6 3605 1 | | BZMP | +2 |
| 0170 | | | | | 37,3604 | 4 0000 0 | | COM | |
| 0171 | REP | 20 | LAST | 824 | 37,3605 | 6 4715 0 | | AD | FIVE |
| 0172 | | | | | 37,3606 | 0 000A 1 | | EXTEND | |
| 0173 | | | | | 37,3607 | 6 3612 1 | | BZMP | +3 |
| 0174 | REP | 154 | LAST | 788 | 37,3610 | 3 4714 1 | NOGANDOT | CA | ZERO |
| 0175 | REP | 3 | LAST | 840 | 37,3611 | 55-723 1 | | TS | GANDOT |
| A0176 | | | | | | | | | |
| A0177 | | | | | | | | | |
| A0178 | | | | | | | | | |
| A0179 | | | | | | | | | |
| 0180 | REP | 283 | LAST | 825 | 37,3612 | 4 0154 0 | | CS | MPAC |
| 0181 | | | | | 37,3613 | 6 0000 1 | | DOUBLE | |
| 0182 | REP | 1 | | | 37,3614 | 0 3663 1 | | TC | CORANGOV |
| 0183 | | | | | 37,3615 | 0 0006 1 | | EXTEND | |
| 0184 | REP | 3 | LAST | 778 | 37,3616 | 61=672 0 | | SU | ROLL/PIP |
| 0185 | REP | 3 | LAST | 778 | 37,3617 | 6 1664 1 | | AD | ROLL/180 |
| 0186 | REP | 2 | LAST | 840 | 37,3620 | 0 3663 1 | | TC | CORANGOV |

MUST REMAIN INHINTED UNTIL UPDATE OF BODY ANGLES, SO THAT GANDIPSW IS VALID FIRST PASS INDICATOR.

(GAMA/180)/2

GANDIPSW=94D BIT11 INITLY=0
DONT CALC GAMA DOT UNTIL HAVE FORMD ONE DIFFERENCE.
IS OK, GO ON.
KNOW BIT IS 0
SET GANDOT = 0

DEL GAMA/360= T GANDOT/360

TCDU = .1 SEC, T = 2 SEC.
GAMA DOT TCDU / 180

IGNORE GANDOT IF LEO .5 DEG/SEC

SET GANDOT=+0 AS TAG IF TOO SMALL.

COME HERE INHINTED.

FOR NOW LEAVE IN 2S,C
UPDATE ANGLES BY CORRECTING BUILER ANG
FOR ACCRUED INCREMENT SINCE PIPUP
R = R BUIL + R(NOW) -R(PIPUP)

GET (R BUIL/180) /2
POSSIBLE OVERFLOW
CORRECT FOR OVPL IF ANY

GET INCR SINCE PIPUP
ONLY SINCE OVPL POSSIBLE.
CORRECT FOR OVPL IF ANY

L ON BODY ATTITUDE

USER'S PAGE NO. 6 Pg 53

| | | | | | | | | | |
|-------|-----|-----|------|-----|---------|--------|---|----------|----------|
| 0187 | REP | 2 | LAST | 114 | 37,3621 | 55-770 | 1 | TS | TEMPROLL |
| 0188 | REP | 284 | LAST | 840 | 37,3622 | 4 0156 | 1 | CS | MPAC +2 |
| 0189 | | | | | 37,3623 | 6 0000 | 1 | DOUBLE | |
| 0190 | REP | 3 | LAST | 840 | 37,3624 | 0 3663 | 1 | TC | CORANGO |
| 0191 | | | | | 37,3625 | 0 0006 | 1 | EXTEND | |
| 0192 | REP | 2 | LAST | 109 | 37,3626 | 61-673 | 1 | SU | ALFA/PIP |
| 0193 | REP | 3 | LAST | 173 | 37,3627 | 6 1665 | 0 | AD | ALFA/180 |
| 0194 | REP | 4 | LAST | 841 | 37,3630 | 0 3663 | 1 | TC | CORANGO |
| 0195 | REP | 2 | LAST | 114 | 37,3631 | 55-771 | 0 | TS | TEMPALFA |
| 0196 | REP | 285 | LAST | 841 | 37,3632 | 4 0155 | 1 | CS | MPAC +1 |
| 0197 | | | | | 37,3633 | 6 0000 | 1 | CNTR2 | DOUBLE |
| 0198 | | | | | 37,3634 | 0 0006 | 1 | EXTEND | |
| 0199 | REP | 3 | LAST | 778 | 37,3635 | 61-674 | 0 | SU | BETA/PIP |
| 0200 | REP | 3 | LAST | 778 | 37,3636 | 6 1666 | 0 | AD | BETA/180 |
| 0201 | REP | 2 | LAST | 114 | 37,3637 | 57-772 | 1 | XCH | TEMPBETA |
| 0202 | REP | 3 | LAST | 526 | 37,3640 | 3 4744 | 1 | CA | ERANK3 |
| 0203 | REP | 38 | LAST | 840 | 37,3641 | 54 003 | 0 | TS | ERANK |
| 0204 | REP | 1 | | | E3,1446 | | | ERANK= | PHSNAME5 |
| 0205 | | | | | 37,3642 | 0 0006 | 1 | EXTEND | |
| 0206 | REP | 1 | | | 37,3643 | 3 3675 | 0 | DCA | REPOSADR |
| 0207 | REP | 2 | LAST | 841 | 37,3644 | 53-447 | 0 | DXCH | PHSNAME5 |
| A0208 | | | | | | | | | |
| 0209 | REP | 2 | LAST | 840 | 37,3645 | 3 4752 | 0 | CA | ERACG |
| 0210 | REP | 39 | LAST | 841 | 37,3646 | 54 003 | 0 | TS | ERANK |
| 0211 | REP | 27 | LAST | 840 | E6,1661 | | | ERANK= | AOC |
| 0212 | | | | | 37,3647 | 0 0006 | 1 | REDOPOSE | EXTEND |
| 0213 | REP | 3 | LAST | 841 | 37,3650 | 3 1771 | 1 | DCA | TEMPROLL |
| 0214 | REP | 4 | LAST | 840 | 37,3651 | 53-665 | 1 | DXCH | ROLL/180 |
| 0215 | REP | 3 | LAST | 841 | 37,3652 | 3 1772 | 1 | CA | TEMPBETA |
| 0216 | REP | 4 | LAST | 841 | 37,3653 | 55-666 | 1 | TS | BETA/180 |
| 0217 | | | | | 37,3654 | 0 0003 | 1 | RELINT | |
| 0218 | REP | 211 | LAST | 836 | 37,3655 | 0 6006 | 1 | TC | INTPRET |
| 0219 | | | | | 37,3656 | 51575 | 1 | CN/POSE3 | VLOAD |
| 0220 | REP | 17 | LAST | 836 | 37,3657 | 01177 | 1 | | ARVAL |
| 0221 | REP | 6 | LAST | 536 | 37,3660 | 03723 | 1 | STORE | VMAGI |
| 0222 | | | | | 37,3661 | 77650 | 1 | GOTO | |
| 0223 | REP | 5 | LAST | 799 | 37,3662 | 03324 | 1 | | POSEXIT |
| 0224 | REP | 76 | LAST | 840 | 37,3663 | 54 001 | 1 | CORANGO | TS L |
| 0225 | REP | 176 | LAST | 788 | 37,3664 | 0 0002 | 0 | TC | Q |
| 0226 | REP | 186 | LAST | 825 | 37,3665 | 50 000 | 1 | INDEX | A |

GET (ALFA EUL/180) /2
SAME AS FOR ROLL, NEEDED FOR EXT ATM DAP
CORRECT FOR OVFL IF ANY

CORRECT FOR OVFL IF ANY

GET (BETA EUL/180) /2

OVFL. NOT EXPECTED.

THIS ASSUMES THAT THE TC PHASCHNG
IS NOT CHANGED IN OCT 10035
SERVICER.

RE-STARTS COME HERE

CANT TC DANZIG AFTER PHASCHNG.
RETURN FROM CM/ATUP. (RESTART)
2(-7) M/CS
FOR DISPLAY ON CALL.

ENDEXIT, STARTENT, OR SCAL/POP.



L ON BODY ATTITUDE

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| | | | | | | | | | |
|------|-----|-----|------|-----|---------|--------|---|----------|----------|
| 0227 | REP | 1 | | | 37,3666 | 3 4873 | 1 | CA | LIMITS |
| 0228 | REP | 77 | LAST | 841 | 37,3667 | 26 001 | 1 | ADS | L |
| 0229 | REP | 177 | LAST | 841 | 37,3670 | 0 0002 | 0 | TC | 0 |
| 0230 | | | | | 37,3671 | 45730 | 1 | -KVSCALE | 2DEC |
| 0230 | | | | | 37,3672 | 53410 | 1 | | |
| 0231 | | | | | 37,3673 | 03146 | 1 | TCDU | DEC |
| 0232 | REP | 28 | LAST | 841 | E8,1661 | | | BRANK= | AGC |
| 0233 | REP | 1 | | | 37,3674 | 03647 | 1 | REPOSADR | 2CADR |
| 0233 | REP | 1 | | | 37,3675 | 76066 | 0 | | REDOPOSE |

COSTS 2 MCT TO USE. SEE ANGOVOR.

-12800/(2 VS .3046)

TCDU = .1 SEC.

L P37,P70

USER'S PAGE NO. 1 E0 53

| | | | |
|-------|----------------|---------|--------------|
| 0001 | | 31,3215 | BANK 31 |
| 00012 | REP 1 | 36,2000 | SETLOC RTE1 |
| 00014 | | 36,2502 | BANK |
| 0002 | REP 3 LAST 275 | E7,1631 | EBANK= RTEVD |
| 0003 | REP 1 | | COUNT 31/P37 |

R0050 PROGRAM DESCRIPTION - P37, RETURN TO EARTH

R0051 DESCRIPTION

R0052 A RETURN TO EARTH TRAJECTORY IS COMPUTED PROVIDED THE CSM IS OUTSIDE THE LUNAR SPHERE OF INFLUENCE AT THE
 R0054 TIME OF IGNITION. INITIALLY A CONIC TRAJECTORY IS DETERMINED AND RESULTING IGNITION AND REENTRY PARAMETERS ARE
 R0056 DISPLAYED TO THE ASTRONAUT. THEN IF THE ASTRONAUT SO DESIRES, A PRECISION TRAJECTORY IS DETERMINED WITH THE
 R0058 RESULTING IGNITION AND REENTRY PARAMETERS DISPLAYED. UPON FINAL ACCEPTANCE BY THE ASTRONAUT, THE PROGRAM
 R0060 COMPUTES AND STORES THE TARGET PARAMETERS FOR RETURN TO EARTH FOR USE BYSPS PROGRAM (P40) OR RCS PROGRAM (P41).

R0080 CALLING SEQUENCE

R0081 L TC P37

R0100 SUBROUTINES CALLED

R0101 PREC100
 R0102 V2T100
 R0103 RTENCK2
 R0104 RTENCK3
 R0105 TIMERAD
 R0106 PARAM
 R0107 V2T100
 R0108 GANDV10
 R0109 XT1LIM
 R0110 DVCALC
 R0111 RTENCK1
 R0112 INTSTALL
 R0113 INTEORVS
 R0114 RTEVN
 R0115 RTEDISP
 R0116 TMRAD100
 R0117 ALCKUCL
 R0118 LAT-LONG
 R0119 TMRAD100
 R0120 TIMERAD
 R0121 INVC100
 R0122 CSMPREC
 R0123 GETERAD
 R01235 TIMETHET
 R0124 P37CALRM
 R0125 VN1645
 R0126 POLY

R0150 ERASABLE INITIALIZATION REQUIRED

R0151 CSM STATE VECTOR

L P37,P70 USER'S PAGE NO. 2 Ev 53

| NO | NAME | DESCRIPTION | UNIT | SCALE | REMARKS |
|-------|---------------------------------------|---|------------|-------------------|-------------------------|
| R0152 | NJETSFLG | NUMBER OF JETS IF THE RCS PROPULSION SYSTEM SELECTED | STATE FLAG | 0=4 JETS 1=2 JETS | |
| R0160 | ASTRONAUT INPUT | | | | |
| R0161 | SPRTETIG | TIME OF IGNITION (OVERLAYS TIG) | DP | B28 | CS |
| R0163 | VPRED | DESIRED CHANGE IN VELOCITY AT TIG (PROGRAM COMPUTED IF 0) | DP | B7 | METERS/CS |
| R0165 | GAMMAE1 | DESIRED FLIGHT PATH ANGLE AT REENTRY (COMPUTED IF 0) | DP | B0 | REVS + ABOVE HORIZ. |
| R0167 | OPTION2 | PROPULSION SYSTEM OPTION | SP | B14 | 1=SPS, 2=RCS |
| R0180 | OUTPUT | | | | |
| R0181 | CONIC OR PRECISION TRAJECTORY DISPLAY | | | | |
| R0182 | VPRED | VELOCITY MAGNITUDE AT 400,000 FT. ENTRY ALTITUDE | DP | B7 | METERS/CS |
| R0184 | T3TOT4 | TRANSIT TIME TO 400,000 FT. ENTRY ALTITUDE | DP | B28 | CS |
| R0186 | GAMMAE1 | FLIGHT PATH ANGLE AT 400,000 FT. ENTRY ALTITUDE | DP | B0 | REVS + ABOVE HORIZON |
| R0188 | DELVLAC | INITIAL VELOCITY CHANGE VECTOR IN LOCAL VERTICAL COORD. | VECTOR | B7 | METERS/CS |
| R0190 | LAT(SPL) | LATITUDE OF THE LANDING SITE | DP | B0 | REVS |
| R0192 | LONG(SPL) | LONGITUDE OF THE LANDING SITE | DP | B0 | REVS |
| R0194 | TARGETING COMPUTATION DISPLAY | | | | |
| R0195 | TIG | RECOMPUTED TIG BASED ON THRUST OPTION | DP | B28 | CS |
| R0197 | TTCGO | TIME FROM TIG | DP | B28 | CS |
| R0199 | MGA | POSITIVE MIDDLE GIMBAL ANGLE | DP | B0 | REVS -.02 IF REFSMPLG=0 |
| R0201 | THRUST PROGRAM COMMUNICATION | | | | |
| R0202 | XDELVFLG | EXTERNAL DELTA V FLAG | STATE FLAG | | SET 0 FOR LAMBERT AIMPT |
| R0204 | NORMSW | LAMBERT AIMPT ROTATION SWITCH | STATE FLAG | | SET 0 FOR NO ROTATION |
| R0206 | ECSTEER | CROSS PRODUCT STEERING CONSTANT | SP | B2 | SET 1 |
| R0208 | RTARG | CONICALLY INTEGRATED REENTRY POSITION VECTOR | VECTOR | B29 | METERS |
| R0210 | TPASS4 | REENTRY TIME | DP | B28 | CS |
| 0243 | REP 07 LAST 815 | 36,2502 0 5301 0 | P37 | TC | PHASCHNG |
| 0244 | | 36,2503 00004 0 | | OCT | 4 |
| 0245 | REP 212 LAST 841 | 36,2504 0 6006 1 | | TC | INTPRET |
| 0246 | | 36,2505 66170 1 | | AXT,1 | SKA,1 |
| 0247 | | 36,2506 04000 0 | | OCT | 04000 |
| 0248 | REP 5 LAST 640 | 36,2507 03424 0 | | | ECSTEER |
| 0249 | | 36,2510 77776 1 | | EXIT | |
| 0250 | REP 1 | 36,2511 3 3242 0 | | CAP | V6N33RTE |
| 0251 | REP 1 | 36,2512 0 3231 1 | | TCR | P37GOF |
| 0252 | | 36,2513 1 2511 1 | | TCF | -2 |
| 0253 | REP 1 | 36,2514 3 3246 1 | | CAP | V6N60RTE |
| 0254 | REP 1 | 36,2515 0 3205 0 | | TCR | P37GPR1 |
| 0255 | | 36,2516 1 2514 1 | | TCF | -2 |
| 0500 | REP 213 LAST 844 | 36,2517 0 6006 1 | RTE299 | TC | INTPRET |
| 0501 | | 36,2520 71331 0 | | SSP | DLOAD |
| 0502 | REP 1 | 36,2521 00122 0 | | | OVFIND |
| 05025 | | 36,2522 00000 1 | | | 0 |
| 0503 | REP 7 LAST 764 | 36,2523 03767 1 | | | VPRED |
| 0504 | REP 4 LAST 843 | 36,2524 17632 0 | | STODL | RTEVD |
| 0505 | REP 6 LAST 764 | 36,2525 03771 0 | | | GAMMAE1 |
| 0506 | REP 3 LAST 275 | 36,2526 17634 0 | | STODL | RTEGAM2D |
| 0509 | REP 1 | 36,2527 31667 1 | | | INTPR13 |

P37 IS NOT RESTARTABLE.

INPUT TIG STORED IN SPRTETIG
OVERLAYED WITH TIG
DISPLAY NEW DATA
INPUT REENTRY ANGLE IN GAMMAE1
AND DESIRED DELTA V IN RTEVD
DISPLAY NEW DATA

L P37,P70

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| | | | | | | | | | |
|-------|------|-----|------|-----|---------|----------|--------|--------------------|---------------------------------------|
| 0510 | RESP | 2 | LAST | 125 | 36,2530 | 17735 0 | STOCL | CONICX1 | |
| 0511 | RESP | 1 | | | 36,2531 | 33756 0 | | C4RTE | |
| 0512 | RESP | 2 | LAST | 125 | 36,2532 | 37652 1 | STCALL | MAMAX1 | |
| 0513 | RESP | 1 | | | 36,2533 | 64427 1 | | INVC100 | GET R(T1)/,V(T1)/,UR1/,UH/ |
| 0514 | | | | | 36,2534 | 77545 0 | DLOAD | EXIT | |
| 05145 | RESP | 2 | LAST | 125 | 36,2535 | 03646 0 | | R(T1) | |
| 0515 | RESP | 2 | LAST | 286 | 36,2536 | 0 7171 1 | TC | PCLY | |
| 0516 | | | | | 36,2537 | 00002 0 | DEC | 2 | |
| 0517 | | | | | 36,2540 | 02544 0 | ZDEC | 181000434 .B-31 | |
| 0517 | | | | | 36,2541 | 35436 0 | | | |
| 0518 | | | | | 36,2542 | 14040 0 | ZDEC | 1.50785145B-2 | |
| 0518 | | | | | 36,2543 | 05066 1 | | | |
| 0519 | | | | | 36,2544 | 44052 0 | ZDEC* | -6.49993057E-9B27* | |
| 0519 | | | | | 36,2545 | 60030 1 | | | |
| 0520 | | | | | 36,2546 | 26415 0 | ZDEC* | 9.76938926E-16B56* | |
| 0520 | | | | | 36,2547 | 25057 1 | | | |
| 0521 | RESP | 214 | LAST | 844 | 36,2550 | 0 8006 1 | TC | INTPRET | |
| 0522 | | | | | 36,2551 | 77752 1 | SL1 | | |
| 0525 | RESP | 2 | LAST | 125 | 36,2552 | 17654 0 | STOCL | MAMAX2 | CO+C1*R+C2*R**2+C3*R**3=MAMAX2 B30 |
| 0526 | RESP | 1 | | | 36,2553 | 31717 1 | | M9RTER28 | |
| 0527 | RESP | 2 | LAST | 125 | 36,2554 | 17730 0 | STOCL | NN1A | |
| 0528 | RESP | 1 | | | 36,2555 | 33762 1 | | K2RTE | |
| 0529 | RESP | 2 | LAST | 125 | 36,2556 | 17836 1 | RTE320 | STOCL | RCON |
| 0530 | RESP | 4 | LAST | 844 | 36,2557 | 03634 0 | | RTEGAM2D | RCON=K2 |
| 0531 | | | | | 36,2560 | 44254 1 | BZE | BDSU | |
| 0532 | RESP | 1 | | | 36,2561 | 74570 0 | | RTE340 | GOTORTE340 IF REENTRY ANGLE NOT INPUT |
| 0533 | RESP | 1 | | | 36,2562 | 31655 0 | | 1RTEB2 | |
| 05335 | | | | | 36,2563 | 71406 0 | PUSH | COS | PL02D |
| 0534 | | | | | 36,2564 | 73525 1 | PODL | SIN | |
| 0535 | | | | | 36,2565 | 45465 1 | BDDV | STADR | PL00D |
| 0536 | RESP | 1 | | | 36,2566 | 40051 1 | STCALL | X(T2) | X(T2)=COT(GAM2D) B0 |
| 0537 | RESP | 1 | | | 36,2567 | 74603 1 | | RTE360 | |
| 0538 | | | | | 36,2570 | 45345 1 | RTE340 | DLOAD | DSU |
| 0539 | RESP | 3 | LAST | 845 | 36,2571 | 03646 0 | | R(T1) | |
| 0540 | RESP | 1 | | | 36,2572 | 33760 0 | | K1RTE | |
| 0541 | | | | | 36,2573 | 71240 1 | BNN | DLOAD | |
| 0542 | RESP | 1 | | | 36,2574 | 74600 1 | | RTE350 | |
| 0543 | RESP | 1 | | | 36,2575 | 33766 0 | | K4RTE | |
| 0544 | RESP | 2 | LAST | 845 | 36,2576 | 37726 0 | STCALL | X(T2) | X(T2)=K4 |
| 0545 | RESP | 2 | LAST | 845 | 36,2577 | 74603 1 | | RTE360 | |
| 0546 | | | | | 36,2600 | 77745 1 | RTE350 | DLOAD | |
| 0547 | RESP | 1 | | | 36,2601 | 33764 1 | | K3RTE | |
| 0548 | RESP | 3 | LAST | 845 | 36,2602 | 03726 1 | STORE | X(T2) | X(T2)=K3 |
| 0549 | | | | | 36,2603 | 77624 1 | RTE360 | CALL | |
| 0550 | RESP | 1 | | | 36,2604 | 65136 0 | | V2T100 | |
| 0551 | | | | | 36,2605 | 52054 1 | BZE | GOTO | |
| 0552 | RESP | 1 | | | 36,2606 | 74610 0 | | RTE367 | |
| 0553 | RESP | 1 | | | 36,2607 | 74772 0 | | RTEALRM | |
| 0554 | | | | | 36,2610 | 77775 1 | RTE367 | VLOAD | |
| 0555 | RESP | 2 | LAST | 125 | 36,2611 | 03640 0 | | R(T1)/ | |



| L | P3T,P70 | | | | | | | | |
|--------|---------|-----|------|-----|---------|-------|---|--------|------------------|
| 0556 | REP | 6 | LAST | 546 | 36,2612 | 16657 | 1 | STOVL | RVEC |
| 0557 | REP | 3 | LAST | 645 | 36,2613 | 03636 | 1 | | RCON |
| 0558 | REP | 2 | LAST | 94 | 36,2614 | 26760 | 1 | STOVL | RDESIR2D |
| 0559 | REP | 2 | LAST | 125 | 36,2615 | 03700 | 0 | | V2(T1)/ |
| 0560 | REP | 10 | LAST | 548 | 36,2616 | 36746 | 1 | STCALL | VVEC |
| 0561 | REP | 1 | | | 36,2617 | 64272 | 1 | | TRAD100 |
| 0562 | | | | | 36,2620 | 77615 | 0 | DAD | |
| 0563 | REP | 2 | LAST | 125 | 36,2621 | 03716 | 1 | | T1 |
| 0570 | REP | 2 | LAST | 125 | 36,2622 | 17736 | 0 | STOVL | T2 |
| 0571 | REP | 6 | LAST | 645 | 36,2623 | 03634 | 0 | | RTEGAM2D |
| 0572 | | | | | 36,2624 | 52054 | 1 | BZE | GOTO |
| 05725 | REP | 1 | | | 36,2625 | 74627 | 1 | | RTE369 |
| 057251 | REP | 1 | | | 36,2626 | 74651 | 0 | | RTE372 |
| 0573 | | | | | 36,2627 | 51575 | 1 | RTE369 | VLOAD |
| 0574 | REP | 2 | LAST | 125 | 36,2630 | 03710 | 1 | | ABVAL |
| 0575 | | | | | 36,2631 | 77776 | 1 | | V(T2)/ |
| 0576 | REP | 3 | LAST | 645 | 36,2632 | 07171 | 1 | EXIT | |
| 0577 | | | | | 36,2633 | 00002 | 0 | TC | POLY |
| 0578 | | | | | 36,2635 | 00000 | 1 | DEC | |
| 0579 | | | | | 36,2636 | 47021 | 1 | ZDEC | -4.8760771E-284 |
| 0579 | | | | | 36,2637 | 65002 | 0 | | |
| 0580 | | | | | 36,2640 | 35610 | 0 | ZDEC | 4.5419476E-4811 |
| 0580 | | | | | 36,2641 | 07722 | 1 | | |
| 0581 | | | | | 36,2642 | 63772 | 0 | ZDEC | -1.4317675E-6818 |
| 0581 | | | | | 36,2643 | 63276 | 1 | | |
| 0582 | REP | 215 | LAST | 645 | 36,2644 | 06006 | 1 | TC | INTPRPT |
| 05825 | | | | | 36,2645 | 77615 | 0 | DAD | |
| 058251 | REP | 1 | | | 36,2646 | 01352 | 1 | | RTE371 |
| 0583 | | | | | 36,2647 | 52052 | 1 | SL3 | GOTO |
| 0587 | REP | 1 | | | 36,2650 | 74653 | 1 | | RTE373 |
| 0588 | | | | | 36,2651 | 77745 | 1 | RTE372 | DLOAD |
| 0589 | REP | 4 | LAST | 645 | 36,2652 | 03726 | 1 | | X(T2) |
| 05895 | | | | | 36,2653 | 41425 | 1 | RTE373 | DSU |
| 058951 | REP | 5 | LAST | 646 | 36,2654 | 03726 | 1 | | PUSH |
| 0590 | | | | | 36,2655 | 53575 | 0 | | X(T2) |
| 0591 | REP | 2 | LAST | 125 | 36,2656 | 03656 | 1 | VLOAD | UNIT |
| 0592 | REP | 13 | LAST | 766 | 36,2657 | 36152 | 1 | | R(T2)/ |
| 0593 | REP | 3 | LAST | 766 | 36,2660 | 26437 | 0 | STCALL | ALPHAV |
| 0594 | | | | | 36,2661 | 77615 | 0 | | GETERAD |
| 0606 | REP | 1 | | | 36,2662 | 33772 | 0 | DAD | |
| 0607 | | | | | 36,2663 | 45206 | 1 | | E3RTE |
| 0608 | REP | 4 | LAST | 646 | 36,2664 | 03636 | 1 | PUSH | DSU |
| 0609 | | | | | 36,2665 | 45246 | 0 | | RCON |
| 0610 | REP | 1 | | | 36,2666 | 31754 | 0 | ARS | DSU |
| 0611 | | | | | 36,2667 | 52040 | 1 | | EPC2RTE |
| 0612 | REP | 1 | | | 36,2670 | 74672 | 1 | RAN | GOTO |
| 0613 | REP | 1 | | | 36,2671 | 74677 | 1 | | RTE374 |
| 0614 | | | | | 36,2672 | 51545 | 1 | RTE374 | DLOAD |
| 0615 | | | | | 36,2673 | 00001 | 0 | | ARS |
| | | | | | | | | | 00D |

$$X(T_2) = D1 + D2V2 + D3V2**2 + D4V2**3$$

$$X(T_2) = X(T_2)$$

$$X(T_2)ERR$$

B0 PL02D

R56

$$RCON = (E1 / (1 + E2BETA11))**5 + E3$$

B29 PL04D



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| | | | | | | | | |
|--------|-----|----|---------|---------|--------|----------|--------------------------|-------|
| 0617 | | | 36,2674 | 50025 0 | DSU | END | | |
| 0618 | REP | 1 | 36,2675 | 31756 1 | | EPC3RTE | | |
| 0620 | REP | 1 | 36,2676 | 74747 0 | | P37E | | |
| 0621 | | | 36,2677 | 43345 1 | RTE375 | DLOAD | DAD | |
| 0622 | REP | 3 | 36,2700 | 03730 0 | | NN1A | | |
| 0623 | REP | 1 | 36,2701 | 31675 1 | | 1RTER28 | | |
| 0624 | | | 36,2702 | 67240 0 | END | SLOAD | | |
| 0625 | REP | 1 | 36,2703 | 74707 1 | | RTE380 | | |
| 0626 | REP | 1 | 36,2704 | 31735 1 | | OCT605 | | |
| 0627 | | | 36,2705 | 77650 1 | GOTO | | | |
| 0628 | REP | 2 | 36,2706 | 74772 0 | | RTEALRM | TOO MANY ITERATIONS | |
| 0629 | REP | 4 | 36,2707 | 03730 0 | RTE380 | STORE | NN1A | |
| 0630 | | | 36,2710 | 53025 0 | DSU | BZE | | |
| 0631 | REP | 1 | 36,2711 | 31721 1 | | MORTER28 | | |
| 0632 | REP | 1 | 36,2712 | 74730 0 | | RTE385 | | |
| 0633 | | | 36,2713 | 45345 1 | DLOAD | DSU | | |
| 0634 | | | 36,2714 | 00001 0 | | 00D | | |
| 0635 | REP | 2 | 36,2715 | 03866 1 | | DRCON | | |
| 0636 | | | 36,2716 | 65301 0 | NORM | PODL | $X(T2)ERR-X(T2)ERR,=Z1$ | PL06D |
| 0637 | REP | 35 | 36,2717 | 00047 1 | | X1 | | |
| 0638 | REP | 2 | 36,2720 | 03670 0 | | RPRE, | | |
| 0639 | | | 36,2721 | 56225 1 | DSU | DDV | $X(T2)PRI-X(T2)=Z2$ | PL04D |
| 0640 | REP | 6 | 36,2722 | 03726 1 | | X(T2) | | |
| 06405 | | | 36,2723 | 53805 1 | DMP | SL* | $DX(T2)=X(T2)ERR(Z2/Z1)$ | |
| 0641 | | | 36,2724 | 00001 0 | | 00D | | |
| 06415 | | | 36,2725 | 20201 0 | | 0,1 | | |
| 0642 | | | 36,2726 | 77650 1 | GOTO | | | |
| 06425 | REP | 1 | 36,2727 | 74732 1 | | RTE390 | | |
| 0643 | | | 36,2730 | 77745 1 | RTE385 | DLOAD | $DX(T2)=X(T2)ERR$ | |
| 06435 | | | 36,2731 | 00001 0 | | 00D | | |
| 0644 | | | 36,2732 | 14021 1 | RTE390 | STOOL | $DX(T2)$ | PL02D |
| 06445 | | | 36,2733 | 77626 0 | | STADR | | |
| 06455 | | | 36,2735 | 77600 1 | | ROV | | |
| 064551 | REP | 3 | 36,2736 | 74603 1 | | RTE360 | | |
| 0646 | REP | 3 | 36,2737 | 17666 1 | | STOOL | | |
| 06465 | REP | 7 | 36,2740 | 03726 1 | | X(T2) | | |
| 0647 | REP | 3 | 36,2741 | 17670 0 | | STOOL | $X(T2)PRI=X(T2)$ | |
| 0648 | | | 36,2743 | 77615 0 | | DAD | | |
| 06485 | REP | 8 | 36,2744 | 03726 1 | | X(T2) | | |
| 0649 | REP | 9 | 36,2745 | 37726 0 | | STCALL | $X(T2)=X(T2)+DX(T2)$ | |
| 06495 | REP | 4 | 36,2746 | 74603 1 | | RTE360 | REITERATE | |
| 0651 | REP | 1 | 36,2750 | 74776 1 | | CALL | DISPLAY CONIC SOLUTION | |
| 0800 | | | 36,2751 | 41345 0 | RTE505 | DLOAD | RTEVN | |
| 0801 | REP | 2 | 36,2752 | 03720 1 | | DMP | | |
| 0802 | REP | 2 | 36,2753 | 03754 1 | | PCON | | |
| 0803 | | | 36,2754 | 53021 1 | DSU | RETA1 | | |
| 0804 | REP | 6 | 36,2755 | 03636 1 | | RZE | | |
| | | | | | | RCON | | |

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|------|-----|-----|------|-----|---------|----------|-------|----------|---------------------------|--------------------|---------------------|
| 0871 | REP | 11 | LAST | 895 | 36,3032 | 55 132 1 | TS | OPTION2 | | | |
| 0872 | REP | 1 | | | 36,3033 | 3 3243 1 | CAP | V4N06RTE | DISPLAY RCS OR SPS OPTION | SPS ASSUMED | |
| 0873 | REP | 4 | LAST | 848 | 36,3034 | 0 3231 1 | TCR | P370GOF | | | |
| 0874 | | | | | 36,3035 | 1 3033 0 | TCF | -2 | RECYCLE | | |
| 0875 | REP | 217 | LAST | 848 | 36,3036 | 0 6008 1 | TC | INTPRET | PROCEED | | |
| 0876 | | | | | 36,3037 | 87201 0 | SRTPD | SLOAD | | | |
| 0877 | | | | | 36,3040 | 00001 0 | | 90D | | | |
| 0878 | REP | 12 | LAST | 849 | 36,3041 | 01133 1 | | OPTION2 | | | |
| 0879 | | | | | 36,3042 | 53025 0 | DSU | BZE | | | |
| 0880 | REP | 2 | LAST | 844 | 36,3043 | 31687 1 | | 1RTEB13 | | | |
| 0881 | REP | 1 | | | 36,3044 | 75053 0 | | P370 | | | |
| 0882 | | | | | 36,3045 | 80335 1 | SLOAD | NORM | SPS | | |
| 0883 | REP | 3 | LAST | 883 | 36,3046 | 00111 0 | | EMDOT | | | |
| 0884 | REP | 36 | LAST | 847 | 36,3047 | 00047 1 | | X1 | | | |
| 0885 | | | | | 36,3050 | 52125 0 | POOL | GOTO | | | |
| 0886 | REP | 1 | | | 36,3051 | 31725 0 | | VCSPS | | | |
| 0887 | REP | 1 | | | 36,3052 | 75084 1 | | P37T | | | |
| 0888 | | | | | 36,3053 | 43145 0 | P370 | DLOAD | BCN | RCS | |
| 0889 | REP | 1 | | | 36,3054 | 31731 0 | | MDOTRCS | | | |
| 0890 | REP | 3 | LAST | 882 | 36,3055 | 00700 0 | | NJETSPLG | | | |
| 0891 | REP | 1 | | | 36,3056 | 75080 0 | | P37R | | | |
| 0892 | | | | | 36,3057 | 77752 1 | | SL1 | | | |
| 0893 | | | | | 36,3060 | 77752 1 | P37R | SL1 | | | |
| 0894 | | | | | 36,3061 | 65301 0 | | NORM | POOL | | |
| 0895 | REP | 37 | LAST | 849 | 36,3062 | 00047 1 | | X1 | | | |
| 0896 | REP | 1 | | | 36,3063 | 31727 1 | | VCRC5 | | | |
| 0897 | | | | | 36,3064 | 56325 0 | P37T | DDV | DV/VC | R7 -R5 = R2 PL02D | |
| 0898 | REP | 2 | LAST | 125 | 36,3065 | 03708 0 | | DV | | | |
| 0899 | | | | | 36,3066 | 77776 1 | | EXIT | | | |
| 0900 | REP | 4 | LAST | 846 | 36,3067 | 0 7171 1 | | TC | POLY | | |
| 0901 | | | | | 36,3070 | 00001 0 | | DEC | 1 | | |
| 0902 | | | | | 36,3071 | 00001 0 | | ZDEC | 5.68240507E-4R-3 | | |
| 0903 | | | | | 36,3072 | 05070 0 | | | | | |
| 0904 | | | | | 36,3073 | 17527 1 | | ZDEC | 9.79487897E-1R-1 | | |
| 0905 | | | | | 36,3074 | 36700 0 | | | | | |
| 0906 | | | | | 36,3075 | 47114 0 | | ZDEC | -.388281955R1 | | |
| 0907 | REP | 218 | LAST | 849 | 36,3077 | 0 6008 1 | | TC | INTPRET | | |
| 0908 | | | | | 36,3100 | 87208 1 | | RUSH | SLOAD | (1-E)*(-DV/VC)=A | R3 PL04D |
| 0909 | REP | 8 | LAST | 883 | 36,3101 | 03076 0 | | | WEIGHT/G | | |
| 0910 | | | | | 36,3102 | 56205 0 | | DMP | DDV | DTR=(M0/MDOT)A | R16+R3-R3=R16 PL00D |
| 0911 | | | | | 36,3103 | 41257 1 | | SL* | DMP | | |
| 0912 | | | | | 36,3104 | 20165 1 | | | 0 -12D,1 | | |
| 0913 | REP | 1 | | | 36,3105 | 31733 1 | | CSUBT | | | |
| 0914 | REP | 3 | LAST | 846 | 36,3106 | 77621 1 | | RDSU | | | |
| 0915 | REP | 65 | LAST | 877 | 36,3107 | 03718 1 | | T1 | | | |
| 0916 | REP | 2 | LAST | 844 | 36,3110 | 03413 1 | | STORE | TIG | TIG=T1-CTMDTR | R28 |
| 0917 | REP | 5 | LAST | 849 | 36,3111 | 77776 1 | | EXIT | | | |
| | | | | | 36,3112 | 3 3242 0 | | CAP | V6N33RTE | DISPLAY BIASED TIG | |
| | | | | | 36,3113 | 0 3231 1 | | TCR | P370GOF | | |



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0910          36,3114 1 3112 1
09184 RESP 155 LAST 840 36,3115 3 4714 1
09185 RESP 10 LAST 783 36,3116 55=125 1
09186 RESP 7 LAST 783 36,3117 55=128 1
0919 RESP 219 LAST 849 36,3120 0 6008 1
09195          36,3121 77624 1
091951 RESP 1          36,3122 85055 1
0920          36,3123 53575 0
092001 RESP 3 LAST 846 36,3124 03858 1
092005          36,3125 74315 0
09201 RESP 2 LAST 125 36,3126 03740 1
092015 RESP 1          36,3127 31740 0
09202          36,3130 74315 0
092025 RESP 1          36,3131 03746 1
09203 RESP 1          36,3132 31742 1
092035          36,3133 50255 0
09204          36,3134 50015 0
092045 RESP 1          36,3135 31744 1
09205 RESP 1          36,3136 75163 1
092055          36,3137 50375 0
09206 RESP 2 LAST 850 36,3140 03746 1
092065 RESP 4 LAST 850 36,3141 03858 1
09207          36,3142 71240 1
092075 RESP 1          36,3143 75147 1
09208 RESP 1          36,3144 31748 0
092085          36,3145 52008 0
09209 RESP 1          36,3146 75151 0
092095          36,3147 41545 0 P37U
0921 RESP 1          36,3150 31750 1
092105          36,3151 77756 0 P37V
09211 RESP 7 LAST 544 36,3152 18732 0
092115          36,3153 43146 0
09212 RESP 4 LAST 543 36,3154 03866 1
092125 RESP 7 LAST 544 36,3155 28734 0
09213 RESP 3 LAST 845 36,3156 03840 0
092135 RESP 7 LAST 846 36,3157 28857 1
09214 RESP 3 LAST 846 36,3160 03700 0
092145 RESP 11 LAST 846 36,3161 38748 1
09215 RESP 5 LAST 544 36,3162 24737 1
0922          36,3163 43014 0 P37W
0923 RESP 6 LAST 666 36,3164 01267 0
0924 RESP 6 LAST 679 36,3165 03885 1
0925          36,3168 77214 0
0926 RESP 7 LAST 520 36,3167 01071 0
0927          36,3170 77628 0
0928 RESP 10 LAST 545 36,3171 80382 0
0929 RESP 6 LAST 544 36,3172 00037 0
0933          36,3173 77615 0
0934 RESP 4 LAST 849 36,3174 03716 1
0938 RESP 12 LAST 688 36,3175 27656 1

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TCP -2
CAP ZBRO
TS VHFONT
TS TRMCKNT
TC INTPRET
CALL          CONICALLY INTEGRATE FROM R1,V1 OVER T12
              RTENCK1
VLOAD UNIT          PL00D
              R(T2)/
PDVL VXSC          UR2          B1 PL00D
              UR1/
              MCOS7.5
PDVL VXSC          -UR1(COS7.5)          B1 PL12D
              LH/
              MSINT.5
VAD DOT          K/=-UR1(COS7.5)-LH(SIN7.5)          B2 PL00D
DAD RMN
              MCOS22.5
VLOAD DOT          K/ . UR2 GR COS22.5
              LH/
              R(T2)/
RMN DLOAD
              P37U
              THETA165
PUSH GOTO
              P37V
DLOAD PUSH
              THETA210
SIN
STOVL SNTH
COS CLEAR
              R/5W
STOVL C5TH
              R(T1)/
STOVL RVEC
              V2(T1)/
STCALL VVEC
              TIMETHET
CLEAR CLEAR
              XDELVPLG
              NORMSW
SET VLOAD
              FINALPLG
STADR
STOVL RTARG
              T
DAD
              T1
STOVL TPASS4

```

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0937 REP 4 LAST 850 36,3176 03700 0 V2(T1)/
 0938 36,3177 77651 0 VSU
 0939 REP 2 LAST 125 36,3200 03872 1 V(T1)/
 0940 REP 11 LAST 867 36,3201 37846 1 STCALL DELVSIN
 0941 REP 5 LAST 520 36,3202 73005 0 VN1645
 0942 36,3203 77650 1 GOTO
 0943 REP 2 LAST 850 36,3204 75163 1 P37W

R0948
 R0949 SUBROUTINE TO GO TO GOPLASHR AND BLANK R1

0950 36,3205 0 0006 1 P37OPR1 EXTEND
 0951 REP 2 LAST 125 36,3206 23=762 0 QXCH SPRTEX
 0952 REP 2 LAST 848 36,3207 0 3215 1 TCR P37OOFR
 0953 REP 98 LAST 848 36,3210 3 4712 1 37BLANK CAP ONE
 0954 REP 15 LAST 727 36,3211 0 5415 1 TCR BLANKET
 0955 REP 101 LAST 785 36,3212 1 5112 1 TCP ENDOFJOB
 0956 REP 3 LAST 851 36,3213 0 1762 0 TC SPRTEX RECYCLE
 0957 REP 1 36,3214 1 3240 0 TCP P37PROC PROCEED

R0958
 R0959 SUBROUTINE TO GO TO GOPLASHR

0960 36,3215 0 0006 1 P37OOFR EXTEND
 0961 REP 2 LAST 125 36,3216 23=733 1 QXCH RTENCKEX
 0962 REP 235 LAST 828 36,3217 0 4555 0 TCR BANKCALL
 0963 REP 19 LAST 752 36,3220 20763 1 CADR GOPLASHR
 0964 REP 67 LAST 755 36,3221 1 4106 0 TCP GOTOPOCH TERMINATE
 0965 36,3222 1 3225 0 TCP +3
 0966 36,3223 1 3227 1 TCP +4
 0967 REP 3 LAST 851 36,3224 0 1733 1 TC RTENCKEX IMMEDIATE RETURN
 0968 REP 4 LAST 851 36,3225 51=733 1 INDEX RTENCKEX PROCEED
 0969 36,3226 1 0004 1 TCP 0 +4
 0970 REP 5 LAST 851 36,3227 51=733 1 INDEX RTENCKEX RECYCLE
 0971 36,3230 1 0003 0 TCP 0 +3

R0973
 R0974 SUBROUTINE TO GO TO GOPLASH

0975 36,3231 0 0006 1 P37OOFR EXTEND
 0976 REP 4 LAST 851 36,3232 23=762 0 QXCH SPRTEX
 0977 REP 236 LAST 851 36,3233 0 4555 0 TCR BANKCALL
 0978 REP 41 LAST 754 36,3234 20824 0 CADR GOPLASH
 0979 REP 68 LAST 851 36,3235 1 4106 0 TCP GOTOPOCH
 0980 36,3236 1 3240 0 TCP +2
 0981 REP 5 LAST 851 36,3237 0 1762 0 TC SPRTEX
 0982 REP 6 LAST 851 36,3240 51=762 0 P37PROC INDEX SPRTEX
 0983 36,3241 1 0001 1 TCP 0 +1
 0984 36,3242 01441 1 V6N33RTE VN 0633
 0985 36,3243 01006 0 V4N06RTE VN 0406
 0986 36,3244 01475 0 V6N61RTE VN 0661
 0987 36,3245 01447 1 V6N39RTE VN 0639
 0988 36,3246 01474 1 V6N60RTE VN 0660



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| | | | | | | |
|------|-----|---------|---------|----------|--------|--------|
| 0990 | | 36,3247 | 01521 0 | V8N81RTE | VN | 0681 |
| 0996 | | 32,2255 | | | BANK | 32 |
| 0997 | REP | 32,2000 | | | SETLOC | RTE |
| 0998 | | 32,2255 | | | BANK | |
| 0999 | REP | | | | COUNT | 32/RTE |



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| P1000 | ALARM DISPLAY SUBROUTINE | | | | | | |
|-------|--------------------------|--|---------|--------|---|--------------|----------|
| 1050 | | | 32,2255 | 77420 | 1 | F370ALRM STO | EXIT |
| 1051 | REP 7 LAST 851 | | 32,2256 | 03762 | 1 | | SPRTEX |
| 1055 | REP 288 LAST 841 | | 32,2257 | 3 0154 | 1 | CA | MPAC |
| 1056 | REP 2 LAST 154 | | 32,2260 | 0 5651 | 0 | TC | VARALARM |
| 1057 | REP 1 | | 32,2261 | 3 2271 | 1 | CAP | V5N09RTB |
| 1058 | REP 237 LAST 851 | | 32,2262 | 0 4555 | 0 | TC | BANKCALL |
| 1059 | REP 42 LAST 851 | | 32,2263 | 20624 | 0 | CADR | OOFLASH |
| 1060 | REP 69 LAST 851 | | 32,2264 | 1 4106 | 0 | TCP | GOTOPOCH |
| 1061 | | | 32,2265 | 1 2261 | 1 | TC | -4 |
| 1062 | REP 220 LAST 850 | | 32,2266 | 0 6006 | 1 | TC | INTPRET |
| 1063 | | | 32,2267 | 77650 | 1 | GOTO | |
| 1064 | REP 8 LAST 853 | | 32,2270 | 03762 | 1 | | SPRTEX |
| 1065 | | | 32,2271 | 01211 | 1 | V5N09RTB VN | 0509 |

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P2000 TIME RADIUS CALLING SUBROUTINE

| | | | | | | | |
|-------|----------|--|--|--|--------|-----|-----------|
| R2001 | INPUT | | | | | | |
| R2002 | RVEC | INITIAL POSITION VECTOR | | | VECTOR | B29 | METERS |
| R2004 | VVEC | INITIAL VELOCITY VECTOR | | | VECTOR | B7 | METERS/CS |
| R2006 | RDOSIRED | FINAL RADIUS FOR WHICH TRANSFER TIME IS TO BE COMPUTED | | | DP | B29 | METERS |
| R2008 | CONICX1 | X1 SETTING FOR CONIC SUBROUTINES -2 = EARTH | | | SP | B14 | |
| R2010 | OUTPUT | | | | | | |
| R2011 | R(T2)/ | FINAL POSITION VECTOR | | | VECTOR | B29 | METERS |
| R2013 | V(T2)/ | FINAL VELOCITY VECTOR | | | VECTOR | B7 | METERS/CS |
| R2015 | T12 | TRANSFER TIME TO FINAL RADIUS | | | DP | B28 | CS |

| | | | | | | | |
|------|-----|---|------|---------|---------|--------------|----------|
| 2100 | | | | 32,2272 | 43020 1 | TMRAD100 STO | CLEAR |
| 2101 | REP | 6 | LAST | 851 | 32,2273 | 03733 0 | RTENCKEX |
| 2102 | REP | 5 | LAST | 850 | 32,2274 | 03668 1 | RWSW |
| 2103 | | | | 32,2275 | 87184 0 | | AXC,2 |
| 2104 | | | | 32,2276 | 20000 0 | | OCT |
| 2105 | REP | 2 | LAST | 94 | 32,2277 | 02756 1 | SONRDOT |
| 2106 | | | | 32,2300 | 45140 0 | | LXC,1 |
| 2107 | REP | 3 | LAST | 845 | 32,2301 | 03734 1 | CONICX1 |
| 2108 | REP | 1 | | | 32,2302 | 25552 1 | TIMERAD |
| 2109 | REP | 3 | LAST | 846 | 32,2303 | 27710 1 | STOVL |
| 2110 | | | | 32,2304 | 77628 0 | | V(T2)/ |
| 2111 | REP | 5 | LAST | 850 | 32,2305 | 80121 0 | STADR |
| 2112 | REP | 7 | LAST | 850 | 32,2308 | 00037 0 | STOVL |
| 2113 | REP | 3 | LAST | 128 | 32,2307 | 37724 1 | T |
| 2114 | REP | 7 | LAST | 854 | 32,2310 | 03733 0 | STCALL |
| | | | | | | | T12 |
| | | | | | | | RTENCKEX |

FLOOD

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R2200 DISPLAY CALCULATION SUBROUTINE

R2201 DESCRIPTION
R2202 OUTPUT FOR DISPLAY IS CONVERTED TO PROPER UNITS AND PLACED IN OUTPUT STORAGE REGISTERS. LANDING SITE
R2204 COMPUTATION FOR DETERMINING LANDING SITE LATITUDE AND LONGITUDE IS INCLUDED IN THE ROUTINE.

R2206 CALLING SEQUENCE
R2207 L CALL
R2208 L+1 RTEDISP

R2209 SUBROUTINES CALLED
R2210 TMRAD100
R2211 AJCCKUOL
R2212 LAT-LONG

R2213 ERASABLE INITIALIZATION REQUIRED

R2214 PUSHLIST
R2215 NONE
R2216 MPAC
R2217 NONE
R2218 OTHER

| | | | | | |
|--------------|---------|--------------------------------------|--------|-----|-----------|
| R2219 | R(T2)/ | FINAL POSITION VECTOR | VECTOR | B29 | METERS |
| R2221 | V(T2)/ | FINAL VELOCITY VECTOR | VECTOR | B7 | METERS/CS |
| R2223 | T2 | FINAL TIME | DP | B28 | CS |
| R2225 | V2(T1)/ | POST IMPULSE INITIAL VELOCITY VECTOR | VECTOR | B7 | METERS/CS |
| R2227 | V(T1)/ | INITIAL VELOCITY VECTOR | VECTOR | B7 | METERS/CS |
| R2229 | UR1/ | UNIT INITIAL VECTOR | VECTOR | B1 | |
| R2231 | UH/ | UNIT HORIZONTAL VECTOR | VECTOR | B1 | |

R2233 OUTPUT

| | | | | | |
|--------------|----------|---|--------|-----|--------------------|
| R2234 | VPRED | VELOCITY MAGNITUDE AT 400,000 FT. ENTRY ALTITUDE | DP | B7 | METERS/CS |
| R2236 | T3TOT4 | TRANSIT TIME TO 400,000 FT. ENTRY ALTITUDE | DP | B28 | CS |
| R2238 | GAMMAB1 | FLIGHT PATH ANGLE AT 400,000 FT. ENTRY ALTITUDE | DP | B0 | REVS + ABOVE HORIZ |
| R2240 | DELVLWC | INITIAL VELOCITY CHANGE VECTOR IN LOCAL VERTICAL COORD. | VECTOR | B7 | METERS/CS. |
| R2242 | LAT(SPL) | LATITUDE OF THE LANDING SITE | DP | B0 | REVS |
| R2244 | LNG(SPL) | LONGITUDE OF THE LANDING SITE | DP | B0 | REVS |

| | | | | | | | | | |
|--------------|-----|---|------|---------|---------|---------|-------|----------|---------|
| 2275 | | | | 32,2311 | 77220 1 | RTEDISP | STQ | VLOAD | DISPLAY |
| 2276 | REP | 9 | LAST | 853 | 32,2312 | 03762 1 | | SPRTEX | |
| 2277 | REP | 4 | LAST | 854 | 32,2313 | 03710 1 | | V(T2)/ | |
| 2278 | | | | | 32,2314 | 65256 0 | UNIT | PDDL | |
| 2279 | | | | | 32,2315 | 00045 0 | | 36D | |
| 2280 | REP | 8 | LAST | 844 | 32,2316 | 17767 1 | STOVL | VPRED | V(T2) |
| 2281 | REP | 3 | LAST | 846 | 32,2317 | 03736 0 | | T2 | |
| 2282 | | | | | 32,2320 | 77625 0 | DSU | | |
| 2283 | REP | 1 | | | 32,2321 | 03413 1 | | SPRTEXIO | |
| 2284 | REP | 2 | LAST | 267 | 32,2322 | 26641 0 | STOVL | T3TOT4 | T21 |
| 2285 | REP | 6 | LAST | 854 | 32,2323 | 03656 1 | | R(T2)/ | |
| 2286 | | | | | 32,2324 | 50256 0 | UNIT | DOT | |
| 22865 | | | | | 32,2325 | 77752 1 | SL1 | | |

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| | | | | | |
|-------|------|----|------|---------|-----------------|
| 2287 | | | | 32,2326 | 44326 0 |
| 2288 | RESP | 4 | LAST | 848 | 32,2327 31855 0 |
| 2289 | RESP | 7 | LAST | 844 | 32,2330 27771 0 |
| 2290 | RESP | 5 | LAST | 851 | 32,2331 03700 0 |
| 2291 | | | | 32,2332 | 41451 1 |
| 2292 | RESP | 3 | LAST | 851 | 32,2333 03872 1 |
| 2293 | | | | 32,2334 | 57441 1 |
| 2294 | RESP | 3 | LAST | 850 | 32,2335 03740 1 |
| 2295 | | | | 32,2336 | 41515 0 |
| 2296 | | | | 32,2337 | 63345 0 |
| 2297 | RESP | 1 | | | 32,2340 31877 0 |
| 2298 | | | | 32,2341 | 55441 0 |
| 2299 | RESP | 3 | LAST | 850 | 32,2342 03746 1 |
| 22995 | | | | 32,2343 | 77772 0 |
| 2300 | RESP | 10 | LAST | 485 | 32,2344 27405 0 |
| 2301 | RESP | 7 | LAST | 855 | 32,2345 03858 1 |
| 2302 | RESP | 6 | LAST | 850 | 32,2346 02657 1 |
| 2303 | | | | 32,2347 | 45246 0 |
| 2304 | RESP | 1 | | | 32,2350 31723 0 |
| 2305 | RESP | 3 | LAST | 846 | 32,2351 28760 1 |
| 2306 | RESP | 5 | LAST | 855 | 32,2352 03710 1 |
| 2307 | RESP | 12 | LAST | 850 | 32,2353 38746 1 |
| 2308 | RESP | 2 | LAST | 846 | 32,2354 64272 1 |
| 2309 | | | | 32,2355 | 53575 0 |
| 2310 | RESP | 8 | LAST | 856 | 32,2356 03858 1 |
| 2311 | | | | 32,2357 | 53515 0 |
| 2312 | RESP | 6 | LAST | 856 | 32,2360 03710 1 |
| 2313 | | | | 32,2361 | 72441 0 |
| 2314 | | | | 32,2362 | 65336 1 |
| 2315 | | | | 32,2363 | 00045 0 |
| 2316 | | | | 32,2364 | 51525 1 |
| 2317 | | | | 32,2365 | 45008 0 |
| 2318 | RESP | 2 | LAST | 634 | 32,2366 64075 1 |
| 2319 | | | | 32,2367 | 43215 0 |
| 2320 | RESP | 4 | LAST | 854 | 32,2370 03724 0 |
| 2321 | RESP | 4 | LAST | 855 | 32,2371 03736 0 |
| 2322 | | | | 32,2372 | 14003 1 |
| 2323 | | | | 32,2373 | 00005 1 |
| 2324 | | | | 32,2374 | 77756 0 |
| 2325 | RESP | 3 | LAST | 275 | 32,2375 17403 0 |
| 2326 | | | | 32,2376 | 77746 1 |
| 2327 | RESP | 9 | LAST | 799 | 32,2377 03401 1 |
| 2328 | | | | 32,2400 | 53575 0 |
| 2329 | RESP | 9 | LAST | 856 | 32,2401 03858 1 |
| 2330 | | | | 32,2402 | 41408 0 |
| 2331 | | | | 32,2403 | 53515 0 |
| 2332 | RESP | 7 | LAST | 856 | 32,2404 03710 1 |
| 2333 | | | | 32,2405 | 47315 0 |
| 2334 | | | | 32,2406 | 53435 0 |
| 2335 | | | | 32,2407 | 63361 0 |

```

ARCCOS BDSU
1RTER2
STOVL GAMMAE1
V2(T1)/
V8U PUSH
V(T1)/
DOT DCOMP
UR1/
PDVL PUSH
DLOAD PDVL
ZRRORTR
DOT VDEP
UH/
VSL1
STOVL DELALVC
R(T2)/
STORE RVEC
ARVAL DSU
3048ORTE
STOVL RDESIREB
V(T2)/
STCALL WVEC
TMRAD100
VLOAD UNIT
R(T2)/
PDVL UNIT
V(T2)/
DOT SL1
ARCSIN PDDL
36D
PDDL ARS
PUSH CALL
AUGC(KUCL
DAD DAD
T12
T2
STOVL 02D
04D
SIN
STOVL LNG(SPL)
COS
STORE LAT(SPL)
VLOAD UNIT
R(T2)/
PUSH PUSH
PDVL UNIT
PDVL VXV
VXV UNIT
VXSC PDVL
    
```

FLIGHT PATH ANGLE T2

DV/ (LVC)

**** LANDING SITE COMPUTATION ****

R3,V3,T23 FROM TMRAD

UR3

PL06D

GAMMAE=ARCSIN(UR3 . UV3)
V(T3)

PL00D
PL02D

AGAMMAE/
PHIE

PL04D
PL06D

T23

T(LS)=T2+T23+TE

LNG(SPL)=SIN(PHIE)

PL04D

LAT(SPL)=COS(PHIE)

PL22D

UH3=UNIT(UR3 X UV3 X UR3)

PL10D



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| | | | | | | | | | | | | |
|-------|-----|----|------|------------|---------|-------|------|--------|----------|--|----------------------------------|-------|
| 2336 | REP | 4 | LAST | 856 | 32,2410 | 03403 | 0 | | | | | |
| 2337 | | | | | 32,2411 | 83361 | 0 | VXSC | LNQ(SPL) | | | |
| 2338 | REP | 10 | LAST | 856 | 32,2412 | 03401 | 1 | | VAD | | | PL04D |
| 2340 | | | | | 32,2413 | 43014 | 0 | CLEAR | LAT(SPL) | | | |
| 2341 | REP | 11 | LAST | 799 | 32,2414 | 00862 | 0 | | CLEAR | | (NLS) IN MPAC | |
| 2342 | REP | 20 | LAST | 799 | 32,2415 | 01863 | 0 | | ERADFLAG | | | |
| 2342S | REP | 14 | LAST | 846 | 32,2416 | 16152 | 0 | | LNAPLAG | | | |
| 2343 | | | | | 32,2417 | 77624 | 1 | STODL | ALPHAV | | ALPHAV=UR3(COSPHIB)+UH3(SINPHIB) | PL02D |
| 2344 | REP | 6 | LAST | 756 | 32,2420 | 26322 | 0 | CALL | | | | |
| 2345 | | | | | 32,2421 | 77745 | 1 | | LAT-LONG | | | |
| 2346 | REP | 12 | LAST | 799 | 32,2422 | 01104 | 0 | DLOAD | | | | |
| 2347 | REP | 11 | LAST | 857 | 32,2423 | 17401 | 1 | | LAT | | | |
| 2348 | REP | 7 | LAST | 601 | 32,2424 | 01106 | 1 | STODL | LAT(SPL) | | LATITUDE LANDING SITE | **** |
| 2349 | REP | 5 | LAST | 857 | 32,2425 | 37403 | 1 | | LONG | | | |
| 2350 | REP | 10 | LAST | 855 | 32,2426 | 03762 | 1 | STCALL | LNQ(SPL) | | LONGITUDE LANDING SITE | **** |
| 2400 | REP | 2 | LAST | 852 TO 857 | | 106 | 106* | COUNT* | SPRTEX | | | |
| | | | | | | | | | SS/RTE | | | |

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P2500 INITIAL VECTOR SUBROUTINE

R2501 DESCRIPTION

R2502 A PRECISION INTEGRATION OF THE STATE VECTOR TO THE TIME OF IGNITION IS PERFORMED. PRECOMPUTATIONS OCCUR.

R2504 CALLING SEQUENCE

R2505 L CALL

R2506 L+1 INVC100

R2507 NORMAL EXIT MODE

R2508 AT L+2 OF CALLING SEQUENCE WITH MPAC = 0

R2509 ALARM EXIT MODE

R2510 AT L+2 OF CALLING SEQUENCE WITH MPAC = OCTAL 612 FOR STATE VECTOR IN MOONS SPHERE OF INFLUENCE

R2512 SUBROUTINES CALLED

R2513 CSMPREC

R2514 ERASABLE INITIALIZATION REQUIRED

R2515 PUSHLIST

R2516 NONE

R2517 MPAC

R2518 NONE

R2519 OTHER

R2520 SPRTEIG TIME OF IGNITION

R2522 CSM STATE VECTOR

DP B28 CS

R2523 OUTPUT

R2524 R(T1)/ INITIAL POSITION VECTOR AT TIG

VECTOR B29 METERS

R2526 V(T1)/ INITIAL VELOCITY VECTOR AT TIG

VECTOR B7 METERS/CS

R2528 T1 INITIAL VECTOR TIME (TIG)

DP B28 CS

R2530 UR1/ UNIT INITIAL VECTOR

VECTOR B1

R2532 UR/ UNIT HORIZONTAL VECTOR

VECTOR B1

R2534 CPPA COSINE OF INITIAL FLIGHT PATH ANGLE

DP B1

```

2600                                32,2427  71220 1  INVC100  STO  DLOAD
2601  RESP 11  LAST 857  32,2430  03762 1          SPRTEX
2602  RESP  2  LAST 855  32,2431  03413 1          SPRTEIG
2603  RESP 44  LAST 734  32,2432  34041 0          STCALL  TDEC1
2604  RESP  6  LAST 698  32,2433  27022 1          CSMPREC
2605                                32,2434  67175 0          VLOAD  SA,2
2606  RESP 33  LAST 734  32,2435  00001 0          RATT
2607  RESP  2  LAST 125  32,2436  03755 0          P(T1)
2608  RESP  4  LAST 850  32,2437  27640 0          STOVL  R(T1)/
2609  RESP 22  LAST 734  32,2440  00007 0          VATT
2610  RESP  4  LAST 856  32,2441  17672 1          STODL  V(T1)/
2611  RESP  7  LAST 503  32,2442  00015 0          TAT
2612  RESP  5  LAST 850  32,2443  03716 1          STORF  T1
2613                                32,2444  53135 0          SLOAD  B2R
2614  RESP  3  LAST 858  32,2445  03758 0          P(T1)
    
```

PRECISION INTEGRATION R0,V0 TO R1,V1

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| | | | | | | | | | | | |
|------|-----|----|------|---------|---------|---------|-------|---------|-------|--------------|---|
| 2615 | REP | 1 | | 32,2446 | 64452 0 | | | INVC109 | | | |
| 2624 | | | | 32,2447 | 52135 1 | INVC107 | SLOAD | GOTO | | | |
| 2625 | REP | 1 | | 32,2450 | 31736 1 | | | OCT612 | | | |
| 2626 | REP | 3 | LAST | 847 | 32,2451 | 74772 0 | | RTEALRM | | | R1,V1 NOT IN PROPER SPHERE OF INFLUENCE |
| 2650 | | | | 32,2452 | 53575 0 | INVC109 | VLOAD | UNIT | | | |
| 2651 | REP | 5 | LAST | 858 | 32,2453 | 03640 0 | | R(T1)/ | | | |
| 2652 | REP | 4 | LAST | 858 | 32,2454 | 17740 1 | | STOVL | UR1/ | UR1/ | B1 |
| 2653 | | | | 32,2455 | 00045 0 | | | 3AD | | | |
| 2654 | REP | 4 | LAST | 845 | 32,2456 | 27646 0 | | STOVL | R(T1) | R(T1) | B29 |
| 2655 | REP | 5 | LAST | 858 | 32,2457 | 03672 1 | | V(T1)/ | | | |
| 2656 | | | | 32,2460 | 77656 1 | | | UNIT | | | |
| 2657 | REP | 3 | LAST | 126 | 32,2461 | 03746 1 | | STORE | UV1/ | | |
| 2658 | | | | 32,2462 | 72441 0 | | | DOT | SL1 | | |
| 2659 | REP | 5 | LAST | 859 | 32,2463 | 03740 1 | | UR1/ | | | |
| 2660 | REP | 2 | LAST | 125 | 32,2464 | 03757 1 | | STORE | CPPA | CPPA | B1 |
| 2661 | | | | 32,2465 | 45246 0 | | | ABS | DSJ | | |
| 2662 | REP | 1 | | 32,2466 | 31752 0 | | | EPC1RTE | | | |
| 2663 | | | | 32,2467 | 71240 1 | | | RVN | DLOAD | | |
| 2664 | REP | 1 | | 32,2470 | 64477 1 | | | INVC115 | | | NOT NEAR RECTILINEAR |
| 2665 | REP | 5 | LAST | 858 | 32,2471 | 31655 0 | | 1RTER2 | | | |
| 2666 | | | | 32,2472 | 41525 0 | | | PDDL | PUSH | | |
| 2668 | REP | 2 | LAST | 858 | 32,2473 | 31677 0 | | ZERORTE | | | |
| 2669 | | | | 32,2474 | 41466 0 | | | VDEF | PUSH | N/ = (0,0,1) | |
| 2670 | | | | 32,2475 | 77650 1 | | | GOTO | | | |
| 2671 | REP | 1 | | 32,2476 | 64503 0 | | | INVC120 | | | |
| 2672 | | | | 32,2477 | 47375 0 | INVC115 | VLOAD | VXV | | | |
| 2673 | REP | 6 | LAST | 859 | 32,2500 | 03740 1 | | UR1/ | | | |
| 2674 | REP | 4 | LAST | 859 | 32,2501 | 03746 1 | | UV1/ | | | |
| 2675 | | | | 32,2502 | 77606 1 | | | PUSH | | N/ = UR X UV | B2 |
| 2676 | | | | 32,2503 | 41545 0 | INVC120 | DLOAD | PUSH | | | |
| 2677 | | | | 32,2504 | 77244 0 | | BPL | VLOAD | | | |
| 2678 | REP | 1 | | 32,2505 | 64507 1 | | | INVC125 | | | |
| 2683 | | | | 32,2506 | 41476 1 | | | VCOMP | PUSH | | CORRECT N/ FOR RETROGRADE TRAJECTORY |
| 2684 | | | | 32,2507 | 77775 1 | INVC125 | VLOAD | | | | |
| 2685 | | | | 32,2510 | 53435 0 | | VXV | UNIT | | | |
| 2686 | REP | 7 | LAST | 859 | 32,2511 | 03740 1 | | UR1/ | | | |
| 2687 | REP | 4 | LAST | 858 | 32,2512 | 03746 1 | | STORE | UH/ | UH/ | B1 |
| 2688 | | | | 32,2513 | 77650 1 | | | GOTO | | | |
| 2689 | REP | 12 | LAST | 858 | 32,2514 | 03762 1 | | SPRTRX | | | |

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P3000 PRECISION TRAJECTORY COMPUTATION SUBROUTINE

R3001 DESCRIPTION

R3002 A NUMERICALLY INTEGRATED TRAJECTORY IS GENERATED WHICH FOR THE RETURN TO EARTH PROBLEM SATISFIES THE REENTRY
R3004 CONSTRAINTS (RCON AND X(T2)) ACHIEVED BY THE INITIAL CONIC TRAJECTORY AND MEETS THE DVD REQUIREMENT AS CLOSELY
R3006 AS POSSIBLE.

R3007 CALLING SEQUENCE

R3010 L CALL
R3011 L+1 PREC100

R3013 NORMAL EXIT MODE

R3014 AT L+2 OF CALLING SEQUENCE WITH MPAC = 0

R3015 ALARM EXIT MODE

R3016 AT L+2 OF CALLING SEQUENCE WITH MPAC =
R3017 OCTAL 605 FOR EXCESS ITERATIONS
R3018 OCTAL 613 FOR REENTRY ANGLE OUT OF LIMITS

R3019 SUBROUTINES CALLED

R3020 INSTALL
R3021 RTENCK2
R30215 RTENCK3
R3022 TIMERAD
R3023 PARAM
R3024 V2T100

R3025 ERASABLE INITIALIZATION REQUIRED

R3026 PUSHLIST

R3027 NONE

R3028 MPAC

R3029 NONE

R3030 OTHER

| | | | | | |
|-------|---------|--|--------|---------|-----------------------|
| R3031 | R(T1)/ | INITIAL POSITION VECTOR | VECTOR | B29/B27 | METERS |
| R3033 | V2(T1)/ | POST IMPULSE INITIAL VELOCITY VECTOR | VECTOR | B7/B5 | METERS/CS |
| R3035 | V(T1)/ | INITIAL VELOCITY VECTOR | VECTOR | B7/B5 | METERS/CS |
| R3039 | T1 | INITIAL VECTOR TIME | DP | B28 | CS |
| R3041 | T12 | INITIAL TO FINAL POSITION TIME | DP | B28 | CS |
| R3045 | RCON | CONIC FOCUS RADIUS | DP | B29/B27 | METERS |
| R3047 | R(T1) | MAGNITUDE OF INITIAL POSITION VECTOR | DP | B29/B27 | METERS |
| R3049 | X(T2) | COTANGENT OF FINAL FLIGHT PATH ANGLE | DP | B0 | |
| R3051 | X(T1) | COTANGENT OF INITIAL FLIGHT PATH ANGLE | DP | B5 | |
| R3057 | RTDVD | DELTA VELOCITY DESIRED | DP | B7/B5 | METERS/CS |
| R3059 | MAMAX1 | MAJOR AXIS LIMIT FOR LOWER ROUND ON GAMDV ITERATOR | DP | B30/B28 | METERS |
| R3061 | MAMAX2 | MAJOR AXIS LIMIT FOR UPPER ROUND ON GAMDV ITERATOR | DP | B30/B28 | METERS |
| R3063 | UR1/ | UNIT INITIAL VECTOR | VECTOR | B1 | |
| R3065 | UH/ | UNIT HORIZONTAL VECTOR | VECTOR | B1 | |
| R3067 | BETA1 | 1-X(T2)**2 | DP | B1 | |
| R3069 | PHI2 | PERIGEE OR APOGEE INDICATOR | DP | B2 | -1 PERIGEE, +1 APOGEE |
| R3071 | | | | | |



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| | | | | | | | | | | | |
|-------|----------|--------------------------------------|--|--|--|--------|---------|--------------|--|--|--|
| R3072 | OUTPUT | | | | | | | | | | |
| R3073 | V(T1)/ | POST IMPULSE INITIAL VELOCITY VECTOR | | | | VECTOR | B7 | METERS/CS | | | |
| R3075 | R(T2)/ | FINAL POSITION VECTOR | | | | VECTOR | B29 | METERS | | | |
| R3077 | V(T2)/ | FINAL VELOCITY VECTOR | | | | VECTOR | B7 | METERS/CS | | | |
| R3079 | T2 | FINAL TIME | | | | DP | B28 | CENTISECONDS | | | |
| R3081 | | | | | | | | | | | |
| R3100 | DEPRIS | | | | | | | | | | |
| R3101 | RD | FINAL R DESIRED | | | | DP | B29/B27 | METERS | | | |
| R3111 | R/APRE | R/A | | | | DP | B0 | | | | |
| R3113 | P/RPRE | P/R | | | | DP | B2 | | | | |
| R3115 | RPRE | MAGNITUDE OF R(T2)/ | | | | DP | B29/B27 | METERS | | | |
| R3117 | X(T2)PRE | COTANGENT OF GAMMA2 | | | | DP | B0 | | | | |
| R3119 | DT12 | CORRECTION TO FINAL TIME T2 | | | | DP | B28 | CENTISECONDS | | | |
| R3121 | RCON | FINAL RADIUS | | | | DP | B29/B27 | METERS | | | |
| R3123 | DELCON | DELTA RCON | | | | DP | B29/B27 | METERS | | | |
| R3125 | | | | | | | | | | | |

| | | | | | | | | | | | |
|-------|-----|----|------|---------|---------|---------|---------|--------|----------|-----------------|--|
| 3150 | | | | 32,2515 | 71220 1 | PREC100 | STO | DLOAD | | | |
| 3151 | REP | 13 | LAST | 859 | 32,2516 | 03762 1 | | SPRTEX | | | |
| 3156 | REP | 1 | | | 32,2517 | 31705 1 | | 10RTE | | | |
| 3157 | REP | 5 | LAST | 847 | 32,2520 | 17730 0 | | STODL | NN1A | | |
| 3158 | REP | 7 | LAST | 847 | 32,2521 | 03636 1 | | RCON | | | |
| 3159 | REP | 2 | LAST | 125 | 32,2522 | 03664 0 | | STORE | RD | | |
| 3164 | | | | | 32,2523 | 77745 1 | PREC120 | DLOAD | | | |
| 31645 | REP | 1 | | | 32,2524 | 31715 0 | | | 2RTER1 | | |
| 31646 | REP | 2 | LAST | 125 | 32,2525 | 17650 1 | | STODL | DT21PR | DT21PR = POSMAX | |
| 3165 | REP | 1 | | | 32,2526 | 31703 1 | | | M15RTE | | |
| 3166 | REP | 2 | LAST | 125 | 32,2527 | 37732 0 | | STCALL | NN2 | | |
| 3169 | REP | 1 | | | 32,2530 | 65103 0 | | | RTENCK3 | | |
| 3170 | | | | | 32,2531 | 77624 1 | PREC125 | CALL | | | |
| 3171 | REP | 1 | | | 32,2532 | 11527 1 | | | PARAM | | |
| 3172 | | | | | 32,2533 | 77745 1 | | DLOAD | | | |
| 3173 | REP | 2 | LAST | 94 | 32,2534 | 02742 1 | | | P | | |
| 3222 | REP | 1 | | | 32,2535 | 14033 1 | | STODL | P/RPRE | | |
| 3223 | REP | 2 | LAST | 94 | 32,2536 | 02744 1 | | | R1A | | |
| 3224 | REP | 1 | | | 32,2537 | 14035 1 | | STODL | R/APRE | | |
| 3225 | REP | 1 | | | 32,2540 | 00041 1 | | | R1 | | |
| 3226 | REP | 1 | | | 32,2541 | 14031 0 | | STODL | RPRE | | |
| 3227 | REP | 3 | LAST | 124 | 32,2542 | 03775 1 | | | COGA | | |
| 3228 | | | | | 32,2543 | 77661 0 | | SL | | | |
| 3229 | | | | | 32,2544 | 20208 1 | | | 5 | | |
| 3230 | REP | 1 | | | 32,2545 | 03724 0 | | STORE | X(T2)PRE | | |
| 3241 | | | | | 32,2546 | 43276 0 | | DCOMP | DAD | | |
| 3242 | REP | 10 | LAST | 847 | 32,2547 | 03726 1 | | | X(T2) | | |
| 3243 | | | | | 32,2550 | 45246 0 | | ARS | DSL | | |
| 3244 | REP | 1 | | | 32,2551 | 31760 1 | | | RPC4RTE | | |
| 3245 | | | | | 32,2552 | 50000 1 | | ROV | RVN | | |
| 32455 | REP | 1 | | | 32,2553 | 64555 0 | | | PREC130 | | |
| 3246 | REP | 1 | | | 32,2554 | 64736 1 | | | PREC175 | | |

R3247 DESIRED REENTRY ANGLE NOT ACHIEVED

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```

3248
3249 REP 3 LAST 861 32,2555 50145 1 PREC130 DLOAD RMN
3250 REP 1 32,2556 03732 1 NN2
3251 32,2557 64563 0 PREC140
3252 REP 2 LAST 847 32,2560 52135 1 PREC132 SLOAD GOTO
3253 REP 1 32,2561 31735 1 OCT005
32,2562 65053 1 PREC132
    
```

TOO MANY ITERATIONS
EXIT WITH ALARM

R3259 DETERMINE RADIUS AT WHICH THE DESIRED REENTRY ANGLE WILL BE ACHIEVED

```

3260
3261 REP 6 LAST 861 32,2563 53145 1 PREC140 DLOAD BZE
3264 REP 1 32,2564 03730 0 NN1A
3265 32,2565 64616 1 PREC162
3266 REP 2 LAST 861 32,2566 42545 0 PREC150 DLOAD SL4
32665 32,2567 00035 1 R/APRE
3267 REP 2 LAST 861 32,2570 52525 1 PDDL SL3
3268 32,2571 00033 1 P/RPRE
3269 REP 3 LAST 847 32,2572 41205 0 DMP DMP
3270 32,2573 03754 1 BETA1
3271 32,2574 57512 0 SL2 DCOMP
3272 REP 6 LAST 859 32,2575 50015 0 DAD RMN
3273 REP 1 32,2577 64602 1 1RTER2
3274 32,2600 52166 1 PREC155 GOTO
3275 REP 1 32,2601 64604 1 SQRD PREC160
3276 32,2602 77745 1 PREC155 DLOAD
3277 REP 3 LAST 859 32,2603 31677 0 ZERORTE
3278 32,2604 43205 1 PREC160 DMP DAD
3279 REP 3 LAST 848 32,2605 03761 1 PHI2
3280 REP 1 32,2606 31657 1 1RTER3
3281 32,2607 60325 0 PDDL NORM
3282 REP 3 LAST 862 32,2610 00035 1 R/APRE
3283 REP 38 LAST 849 32,2611 00047 1 X1
3284 32,2612 77665 1 RDDV
3285 32,2613 52057 1 SL* GOTO
3286 32,2614 20175 0 0 -4,1
3287 REP 1 32,2615 64624 0 PREC165 NORM
3288 32,2616 60345 0 PREC162 DLOAD RPRE
32885 REP 2 LAST 861 32,2617 00031 0 X1
3289 REP 39 LAST 862 32,2620 00047 1 SL*
32895 32,2621 53665 1 RDDV
3290 REP 3 LAST 861 32,2622 03664 0 RD
32905 32,2623 20200 1 0 -1,1
3291 32,2624 45206 1 PREC165 PUSH DSJ
3292 REP 1 32,2625 31653 0 1RTER1
32923 32,2626 77676 0 DCOMP
329235 REP 2 LAST 118 32,2627 03765 0 STORE BETA12
32924 32,2630 71240 1 RMN DLOAD
329243 REP 1 32,2631 64642 0 PREC168
329247 REP 2 LAST 861 32,2632 03724 0 X(T2)PRF
32925 32,2633 71240 1 RMN DLOAD
    
```

ELLIPTIC CASE

PL02D

(P/A)BETA1

B4 PL00D

1-(P/A)BETA1=BETA2

B2

BETA2**0.5=BETA3

B1

BETA3=0

1+(PHI2)(BETA3)

B3

(1+PHI2*BETA3)/(R/A)=BETA4

PL00D

B1

BETA4=RD/RPRE

B1



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| | | | | | | | | | |
|--------|-----|-----|------|---------|---------|-------|---|--|--------------|
| 329253 | REP | 1 | | 32,2634 | 64640 | 1 | | | PREC167 |
| 329257 | REP | 3 | LAST | 862 | 32,2635 | 03765 | 0 | | BETA12 |
| 32926 | | | | | 32,2636 | 77676 | 0 | | DCOMP |
| 329265 | REP | 4 | LAST | 863 | 32,2637 | 03765 | 0 | | STORE BETA12 |
| 32927 | | | | | 32,2640 | 77745 | 1 | | DLOAD |
| 329275 | REP | 5 | LAST | 863 | 32,2641 | 03765 | 0 | | PREC167 |
| 3293 | | | | | 32,2642 | 45246 | 0 | | PREC168 |
| 3294 | REP | 1 | | | 32,2643 | 31764 | 0 | | ABS |
| 3295 | | | | | 32,2644 | 71240 | 1 | | DSU |
| 3296 | REP | 2 | LAST | 861 | 32,2645 | 64736 | 1 | | BETA12 |
| 3297 | | | | | 32,2646 | 72405 | 0 | | EPCARTE |
| 3298 | REP | 3 | LAST | 862 | 32,2647 | 00031 | 0 | | DLOAD |
| 3299 | | | | | 32,2650 | 77606 | 1 | | PREC175 |
| 3300 | | | | | 32,2651 | 43345 | 1 | | SL1 |
| 3301 | REP | 4 | LAST | 862 | 32,2652 | 03732 | 1 | | RPRE |
| 3302 | REP | 2 | LAST | 847 | 32,2653 | 31675 | 1 | | PUSH |
| 3303 | REP | 5 | LAST | 863 | 32,2654 | 03732 | 1 | | DLOAD |
| 3304 | | | | | 32,2655 | 43175 | 0 | | DAD |
| 3305 | REP | 10 | LAST | 856 | 32,2656 | 03656 | 1 | | NN2 |
| 3306 | REP | 6 | LAST | 854 | 32,2657 | 03466 | 0 | | 1RTER28 |
| 3307 | REP | 9 | LAST | 856 | 32,2660 | 26657 | 1 | | STORE NN2 |
| 3308 | REP | 6 | LAST | 856 | 32,2661 | 03710 | 1 | | VLOAD SET |
| 3309 | | | | | 32,2662 | 77765 | 0 | | R(T2)/ |
| 3310 | REP | 6 | LAST | 863 | 32,2663 | 03765 | 0 | | R/SW |
| 3311 | REP | 13 | LAST | 856 | 32,2664 | 16746 | 0 | | STOVL |
| 3312 | REP | 2 | LAST | 862 | 32,2665 | 31653 | 0 | | RVEC |
| 3313 | | | | | 32,2666 | 57565 | 0 | | V(T2)/ |
| 3314 | REP | 7 | LAST | 863 | 32,2667 | 03765 | 0 | | SIGN |
| 3315 | | | | | 32,2670 | 71354 | 0 | | BETA12 |
| 3316 | REP | 287 | LAST | 853 | 32,2671 | 00154 | 1 | | VVEC |
| 3317 | | | | | 32,2672 | 67140 | 0 | | 1RTER1 |
| 3318 | REP | 4 | LAST | 854 | 32,2673 | 03734 | 1 | | DCOMP |
| 3320 | REP | 3 | LAST | 854 | 32,2674 | 02756 | 1 | | BETA12 |
| 3321 | REP | 4 | LAST | 856 | 32,2675 | 36760 | 0 | | DLOAD |
| 3322 | REP | 2 | LAST | 854 | 32,2676 | 25552 | 1 | | LXA,2 |
| 3323 | | | | | 32,2677 | 75345 | 1 | | MPAC |
| 3324 | REP | 8 | LAST | 854 | 32,2700 | 00037 | 0 | | LXC,1 |
| 3325 | REP | 8 | LAST | 863 | 32,2701 | 03765 | 0 | | SXA,2 |
| 3326 | | | | | 32,2702 | 60325 | 0 | | CONIX1 |
| 3327 | REP | 3 | LAST | 861 | 32,2703 | 03650 | 1 | | SONRDOT |
| 3328 | REP | 40 | LAST | 862 | 32,2704 | 00047 | 1 | | RDESTRFD |
| 3329 | | | | | 32,2705 | 53665 | 1 | | TIMERAD |
| 3330 | | | | | 32,2706 | 00001 | 0 | | DLOAD |
| 33305 | | | | | 32,2707 | 20176 | 0 | | SIGN |
| 3331 | | | | | 32,2710 | 50006 | 1 | | T |
| 33315 | REP | 1 | | | 32,2711 | 64716 | 0 | | BETA12 |
| 3332 | | | | | 32,2712 | 65345 | 0 | | NORM |
| 33325 | REP | 2 | LAST | 861 | 32,2713 | 31715 | 0 | | DT21PR |
| 3333 | | | | | 32,2714 | 77650 | 1 | | X1 |
| 33335 | REP | 1 | | | 32,2715 | 64720 | 0 | | SL* |

RF = NEW RADIUS

COMPUTE DT12 (CORRECTION TO TIME OF NEW RADIUS)

$$DT21 = (PHI4)DT21 \quad P4.02D$$

$$BETA13 = (DT21)/(DT21PR) \quad R3 P4.04D$$

$$BETA14 = 1 \quad R0 P4.04D$$

PREC173



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| | | | | | | | |
|-------|-----|---|---------|---------|---------|--------|---------|
| 3334 | | | 32,2716 | 85345 0 | PREC172 | DLOAD | PDDL |
| 33345 | REP | 1 | 32,2717 | 31707 0 | | | M.6RTS |
| 3335 | | | 32,2720 | 45271 1 | PREC173 | DOV | DSU |
| 33355 | | | 32,2721 | 00003 1 | | | Q2D |
| 3336 | REP | 2 | 32,2722 | 31657 1 | | | 1RTER3 |
| 33365 | | | 32,2723 | 71240 1 | | RNN | DLOAD |
| 3337 | REP | 1 | 32,2724 | 84130 1 | | | PREC174 |
| 33375 | | | 32,2725 | 71605 1 | | DMP | |
| 3338 | REP | 4 | 32,2726 | 03650 1 | | | DT21PR |
| 33385 | | | 32,2727 | 00001 0 | | STORE | 00D |
| 3339 | | | 32,2730 | 41545 0 | PREC174 | DLOAD | PUSH |
| 33395 | | | 32,2731 | 00001 0 | | | 00D |
| 3340 | REP | 5 | 32,2732 | 37650 0 | | STCALL | DT21PR |
| 3341 | REP | 1 | 32,2733 | 65065 1 | | | RTENCK2 |
| 3342 | | | 32,2734 | 71650 1 | | GOTO | |
| 3343 | REP | 1 | 32,2735 | 64531 1 | | | PREC125 |
| 3356 | | | 32,2736 | 45345 1 | PREC175 | DLOAD | DSU |
| 3357 | REP | 4 | 32,2731 | 00031 0 | | | RPRE |
| 3338 | REP | 4 | 32,2740 | 03664 0 | | | RD |
| 3359 | | | 32,2741 | 51406 1 | | PUSH | ABS |
| 3360 | | | 32,2742 | 50025 0 | | DSU | RNN |
| 3361 | REP | 1 | 32,2743 | 31766 1 | | | EPC7RTE |
| 3362 | REP | 1 | 32,2744 | 65031 0 | | | PREC220 |

BETA14=.6 B0 PLOAD

DT21=(BETA14)DT21PR B28

RPRE-RD = RERR

R3363 DESIRED RADIUS HAS NOT BEEN ACHIEVED

| | | | | | | | |
|-------|-----|----|---------|---------|----------|-------|----------|
| 3364 | | | 32,2745 | 53145 1 | | DLOAD | BZE |
| 3365 | REP | 7 | 32,2746 | 03130 0 | | | NN1A |
| 3366 | REP | 1 | 32,2741 | 84680 0 | | | PREC132 |
| 3367 | | | 32,2750 | 53025 0 | | DSU | BZE |
| 3368 | REP | 2 | 32,2151 | 31105 1 | | | 10RTE |
| 3369 | REP | 1 | 32,2752 | 65005 1 | | | PREC207 |
| 3370 | | | 32,2753 | 45345 1 | PREC205 | DLOAD | DSU |
| 3371 | REP | 4 | 32,2754 | 03610 0 | | | RPRE, |
| 3372 | REP | 5 | 32,2755 | 00031 0 | | | RPRE |
| 3373 | | | 32,2756 | 55301 0 | | NORM | RDOV |
| 3374 | REP | 15 | 32,2757 | 00050 1 | | | X2 |
| 3375 | REP | 4 | 32,2760 | 03666 1 | | | DRCN |
| 33755 | | | 32,2761 | 41451 1 | | SL* | PUSH |
| 3376 | | | 32,2762 | 57800 0 | | | 0 -2,2 |
| 33765 | | | 32,2763 | 40015 1 | | DAD | BOV |
| 3377 | REP | 3 | 32,2764 | 31653 0 | | | 1RTER1 |
| 33775 | REP | 1 | 32,2765 | 84712 1 | | | PREC205M |
| 3378 | | | 32,2766 | 45246 0 | | ABS | DSU |
| 33785 | REP | 4 | 32,2767 | 31653 0 | | | 1RTER1 |
| 3319 | | | 32,2770 | 71640 0 | | RNN | |
| 33795 | REP | 1 | 32,2111 | 64775 0 | | | PREC208 |
| 3380 | | | 32,2772 | 57545 1 | PREC205M | DLOAD | DCOMP |
| 33805 | REP | 3 | 32,2773 | 31715 0 | | | 2RTER1 |
| 3381 | | | 32,2774 | 77725 1 | | PDDL | |

TOO MANY ITERATIONS

NOT FIRST PASS OF ITERATION

RPRE,-RPRE B29/B27

DRCN/(RPRE,-RPRE)=S B2

S GR +4 OR LS -4

S GR 0 OR LS -4

S=-4 B2

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| | | | | | | | | | |
|-------|--------------------------------------|----|---------|---------|---------|--------|----------|--------------------------------|----------------------------|
| 33815 | | | 32,2775 | 41345 0 | PREC208 | DLOAD | DMP | | |
| 3382 | | | 32,2776 | 77712 0 | | SL2 | | | |
| 33825 | REP | 5 | LAST | 864 | | STORE | DRCON | DRCON=8(RERR) | B29 |
| 3383 | | | 32,3000 | 77615 0 | | DAD | | | |
| 3384 | REP | 8 | LAST | 861 | | | RCON | | |
| 3385 | REP | 9 | LAST | 865 | | STORE | RCON | RCON+DRCON=RCON | |
| 3386 | | | 32,3003 | 77650 1 | | GOTO | | | |
| 3387 | REP | 1 | | 32,3004 | 65024 1 | | | | |
| 3388 | | | 32,3005 | 63545 0 | PREC207 | DLOAD | PREC210 | | |
| 3389 | REP | 5 | LAST | 864 | | DSO | | FIRST PASS OF ITERATION | |
| 3390 | | | 32,3006 | 03664 0 | | RD | | | |
| 3391 | REP | 41 | LAST | 863 | | NORM | SR1 | | |
| 3392 | | | 32,3010 | 00047 1 | | | X1 | | |
| 3393 | REP | 6 | LAST | 864 | | PODL | NORM | | |
| 3394 | REP | 16 | LAST | 864 | | | RPRE | | |
| 3395 | | | 32,3012 | 00031 0 | | | X2 | | |
| 3396 | REP | 17 | LAST | 865 | | XSU,1 | RDDV | | |
| 3397 | | | 32,3013 | 00050 1 | | | X2 | | |
| 3398 | | | 32,3014 | 55280 0 | | SR* | | | |
| 3399 | REP | 10 | LAST | 865 | | | 0 -1,1 | | |
| 3400 | | | 32,3015 | 00047 1 | | STORE | RCON | RD**2/RPRE=RCON | |
| 3401 | REP | 6 | LAST | 865 | | DSU | | | |
| 3402 | REP | 6 | LAST | 865 | | | RD | | |
| 3403 | | | 32,3020 | 03636 1 | | STORE | DRCON | RCON-RD=DRCON | |
| 3404 | REP | 7 | LAST | 865 | | DLOAD | | PREC210 | PREPARE FOR NEXT ITERATION |
| 3405 | REP | 5 | LAST | 864 | | | RPRE | | |
| 3406 | REP | 8 | LAST | 864 | | STOOL | RPRE, | | |
| 3407 | | | 32,3022 | 03664 0 | | | NN1A | | |
| 3408 | REP | 3 | LAST | 863 | | DSU | | | |
| 3409 | REP | 9 | LAST | 865 | | | 1RTER28 | | |
| 3410 | REP | 2 | LAST | 845 | | STCALL | NN1A | | |
| 3411 | | | 32,3024 | 77745 1 | | | VZT100 | | |
| 3412 | REP | 1 | | 32,3025 | 00031 0 | | GOTO | | |
| 3413 | REP | 2 | LAST | 862 | | RHIZ | | | |
| | | | 32,3026 | 17670 0 | | | PREC120 | | |
| | | | 32,3027 | 03730 0 | | | PRECX | | |
| | | | 32,3028 | 17670 0 | | | | | |
| | | | 32,3029 | 03730 0 | | | | | |
| | | | 32,3030 | 77625 0 | | | | | |
| | | | 32,3031 | 31675 1 | | | | | |
| | | | 32,3032 | 37730 1 | | | | | |
| | | | 32,3033 | 65136 0 | | | | | |
| | | | 32,3034 | 52030 0 | | | | | |
| | | | 32,3035 | 64523 1 | | | | | |
| | | | 32,3036 | 65053 1 | | | | | |
| R3414 | DESIRED RADIUS ACHIEVED | | | | | | | | |
| 3415 | | | 32,3037 | 45345 1 | PREC220 | DLOAD | DSU | | |
| 3416 | REP | 11 | LAST | 861 | | | X(T2) | | |
| 3417 | REP | 3 | LAST | 862 | | | X(T2)PRE | | |
| 3418 | | | 32,3041 | 03724 0 | | ARS | DSU | | |
| 3419 | REP | 1 | | 32,3042 | 45246 0 | | EPC8RTE | | |
| 3420 | | | 32,3043 | 31770 0 | | RAN | SLDAD | | |
| 3421 | REP | 1 | | 32,3044 | 67240 0 | | PREC225 | | |
| 3422 | REP | 1 | | 32,3045 | 65051 0 | | OCT813 | | |
| 3423 | | | 32,3046 | 31737 0 | | GOTO | | | |
| 3424 | REP | 3 | LAST | 865 | | | PRECX | IF RPRENRY ANGLE OUT OF LIMITS | |
| | | | 32,3047 | 77650 1 | | | | | |
| | | | 32,3050 | 65053 1 | | | | | |
| R3425 | DESIRED FINAL ANGLE HAS BEEN REACHED | | | | | | | | |



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| | | | | | | | | | |
|------|-----|----|------|---------|---------|---------|-------|---------|--|
| 3429 | | | | 32,3051 | 77745 1 | PREC225 | DLOAD | | |
| 3430 | REP | 4 | LAST | 862 | 32,3052 | 31677 0 | | | |
| 3431 | | | | 32,3053 | 77650 1 | PRECX | OOTO | ZBRORTE | |
| 3432 | REP | 14 | LAST | 861 | 32,3054 | 03762 1 | | SPRTEX | |

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P3800 INTEGRATION CALLING SUBROUTINE

R3801 DESCRIPTION
 R3802 PERFORMS CONIC AND PRECISION INTEGRATIONS USING SUBROUTINE INTEORVS. THERE ARE THREE ENTRANCES (RTENCK1,
 R3804 RTENCK2 AND RTENCK3) FOR DIFFERENT SOURCES OF INPUT AND DIFFERENT OPTIONS. THERE IS A COMMON SET OF OUTPUT
 R3806 WHICH INCLUDES SET UP OF INPUT FOR THE PARAM SUBROUTINE

R3807 RTENCK1 (CONIC INTEGRATION)

R3808 CALLING SEQUENCE
 R3809 L CALL
 R3810 L+1 RTENCK1

R3811 ERASABLE INITIALIZATION REQUIRED
 R3812 SAME AS FOR THE RTENCK3 ENTRANCE

R3813 RTENCK2 (PRECISION INTEGRATION)

R3814 CALLING SEQUENCE
 R3815 L CALL
 R3816 L+1 RTENCK2

R3817 ERASABLE INITIALIZATION REQUIRED

R3818 PUSHLIST
 R3819 PUSHLOC-2 INTEGRATION TIME DT12 (CORRECTION TO T2) DP B28 CS
 R3821 OTHER
 R3822 R(T2)/ FINAL POSITION VECTOR VECTOR B29 METERS
 R3824 V(T2)/ FINAL VELOCITY VECTOR VECTOR B7 METERS/CS
 R3826 T2 FINAL TIME DP B28 CS

R3828 RTENCK3 (PRECISION INTEGRATION)

R3829 CALLING SEQUENCE
 R3830 L CALL
 R3831 L+1 RTENCK3

R3832 ERASABLE INITIALIZATION REQUIRED

R3834 R(T1)/ INITIAL POSITION VECTOR VECTOR B29 METERS
 R3836 V2(T1)/ POST IMPULSE INITIAL VELOCITY VECTOR VECTOR B7 M/CS
 R3838 T1 INITIAL VECTOR TIME DP B28 CS
 R3840 T2 FINAL TIME DP B28 CS

R3842 EXIT MODE
 R3843 AT L+2 OF CALLING SEQUENCE

R3844 SUBROUTINES CALLED

R3845 INTSTALL
 R3846 INTEORVS

R3847 OUTPUT
 R3848 PUSHLIST

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| | | | | | |
|-------|-----------|-------------------------------------|--------|-----|--------|
| R3849 | PUSHLOC-6 | FINAL POSITION VECTOR R(T2)/ | VECTOR | B29 | METERS |
| R3851 | X1 | CONICS MUTABLE ENTRY FOR EARTH (-2) | SP | B14 | |
| R3853 | MPAC | | | | |
| R3854 | | FINAL VELOCITY VECTOR V(T2)/ | VECTOR | B7 | M/CS |
| R3856 | OTHER | | | | |
| R3857 | R(T2)/ | AS IN FUSELIST | | | |
| R3858 | V(T2)/ | AS IN MPAC | | | |
| R3859 | T2 | FINAL TIME | DP | B28 | CS |
| R3861 | | | | | |

| | | | | | | | |
|-------|--------|----------|---------|---------|---------|-------|----------|
| 3897 | | | 32,3055 | 45020 1 | RTENCK1 | STO | CALL |
| 3898 | REP 8 | LAST 854 | 32,3056 | 03733 0 | | | RTENCKEX |
| 3899 | REP 18 | LAST 824 | 32,3057 | 27371 1 | | | INTSTALL |
| 3900 | | | 32,3060 | 43175 0 | | VLOAD | SET |
| 3901 | REP 8 | LAST 859 | 32,3061 | 03640 0 | | | R(T1)/ |
| 3902 | REP 10 | LAST 801 | 32,3062 | 01473 0 | | | INTYPFLG |
| 3903 | | | 32,3063 | 77650 1 | | GOTO | |
| 3904 | REP 1 | | 32,3064 | 65111 0 | | | RTENCK3B |
| R3905 | | | | | | | |

| | | | | | | | |
|------|--------|----------|---------|---------|---------|-------|----------|
| 3906 | | | 32,3065 | 45020 1 | RTENCK2 | STO | CALL |
| 3907 | REP 9 | LAST 868 | 32,3066 | 03733 0 | | | RTENCKEX |
| 3908 | REP 19 | LAST 868 | 32,3067 | 27371 1 | | | INTSTALL |
| 3909 | | | 32,3070 | 77214 0 | | CLEAR | VLOAD |
| 3910 | REP 11 | LAST 868 | 32,3071 | 01673 1 | | | INTYPFLG |
| 3911 | REP 11 | LAST 863 | 32,3072 | 03656 1 | | | R(T2)/ |
| 3912 | REP 10 | LAST 503 | 32,3073 | 25535 0 | | STOVL | RCV |
| 3913 | REP 9 | LAST 863 | 32,3074 | 03710 1 | | | V(T2)/ |
| 3914 | REP 9 | LAST 503 | 32,3075 | 15543 1 | | STODL | VCV |
| 3915 | REP 5 | LAST 856 | 32,3076 | 03736 0 | | | T2 |
| 3916 | REP 10 | LAST 503 | 32,3077 | 01517 0 | | STORE | TET |
| 3917 | | | 32,3100 | 77615 0 | | DAD | |
| 3918 | | | 32,3101 | 77650 1 | | GOTO | |
| 3919 | REP 1 | | 32,3102 | 65117 0 | | | RTENCK3D |

| | | | | | | | |
|-------|--------|----------|---------|---------|----------|-------|----------|
| R3920 | | | | | | | |
| 3921 | | | 32,3103 | 45020 1 | RTENCK3 | STO | CALL |
| 3922 | REP 10 | LAST 868 | 32,3104 | 03733 0 | | | RTENCKEX |
| 3923 | REP 20 | LAST 868 | 32,3105 | 27371 1 | | | INTSTALL |
| 3925 | | | 32,3106 | 43175 0 | RTENCK3A | VLOAD | CLEAR |
| 3926 | REP 7 | LAST 868 | 32,3107 | 03640 0 | | | R(T1)/ |
| 3927 | REP 12 | LAST 868 | 32,3110 | 01673 1 | | | INTYPFLG |
| 3928 | REP 11 | LAST 868 | 32,3111 | 25535 0 | RTENCK3B | STOVL | RCV |
| 3929 | REP 6 | LAST 856 | 32,3112 | 03700 0 | | | V2(T1)/ |
| 3930 | REP 10 | LAST 868 | 32,3113 | 15543 1 | | STODL | VCV |
| 3931 | REP 6 | LAST 858 | 32,3114 | 03716 1 | | | T1 |
| 3932 | REP 11 | LAST 868 | 32,3115 | 15517 0 | | STODL | TET |
| 3933 | REP 6 | LAST 868 | 32,3116 | 03736 0 | | | T2 |
| 3934 | REP 45 | LAST 858 | 32,3117 | 00041 1 | RTENCK3D | STORE | TDEC1 |
| 3935 | | | 32,3120 | 45014 0 | | CLEAR | CALL |

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| | | | | | | | |
|------|-----|----|------|-----|---------|---------|--------------|
| 3936 | REP | 11 | LAST | 504 | 32,3121 | 00263 0 | |
| 3937 | REP | 6 | LAST | 503 | 32,3122 | 27066 1 | MOONFLAG |
| 3938 | | | | | 32,3123 | 77775 1 | INTEGRVS |
| 3939 | REP | 34 | LAST | 858 | 32,3124 | 00001 0 | VLOAD |
| 3950 | REP | 12 | LAST | 868 | 32,3125 | 03656 1 | RATT |
| 3951 | | | | | 32,3126 | 70125 0 | STORE R(T2)/ |
| 3952 | REP | 6 | LAST | 858 | 32,3127 | 00015 0 | PDDL LXC,1 |
| 3953 | REP | 5 | LAST | 863 | 32,3130 | 03734 1 | TAT |
| 3954 | REP | 7 | LAST | 868 | 32,3131 | 27736 0 | CONICX1 |
| 3955 | REP | 23 | LAST | 858 | 32,3132 | 00007 0 | STOVL T2 |
| 3956 | REP | 10 | LAST | 868 | 32,3133 | 03710 1 | VATT |
| 3957 | | | | | 32,3134 | 77650 1 | STORE V(T2)/ |
| 3958 | REP | 11 | LAST | 868 | 32,3135 | 03733 0 | GOTO |

RTENCKEX



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P4000 V2(T1) COMPUTATION SUBROUTINE

R4001 DESCRIPTION
 R4002 A POST IMPULSE VELOCITY VECTOR (V2(T1)) IS COMPUTED WHICH EITHER
 R4003 (1) MEETS THE INPUT VELOCITY CHANGE DESIRED (RTEDVD) IN A MINIMUM TIME OR
 R4005 (2) IF A VELOCITY CHANGE ISN'T SPECIFIED (RTEDVD) = 0, A V2(T1) IS COMPUTED WHICH MINIMIZES THE IMPULSE (DV)
 R4007 AND CONSEQUENTLY FUEL.

R4008 CALLING SEQUENCE
 R4009 L CALL
 R4010 L+1 V2T100

R4011 NORMAL EXIT MODE
 R4012 AT L+2 OF CALLING SEQUENCE WITH MPAC = 0

R4013 ALARM EXIT MODE
 R4014 AT L+2 OF CALLING SEQUENCE WITH MPAC = OCTAL 605 FOR EXCESS ITERATIONS

R4015 SUBROUTINES CALLED
 R4016 GAMDV10
 R4017 XT1LIM
 R4018 DVCALC

R4019 SWACABLE INITIALIZATION REQUIRED

R4020 PUSHLIST
 R4021 NONE
 R4022 MPAC
 R4023 NONE
 R4024 OTHER

| | | | | | |
|-------|--------|---|--------|---------|---------------------------|
| R4025 | R(T1) | MAGNITUDE OF INITIAL POSITION VECTOR | DP | B29/B27 | METERS |
| R4027 | RCON | MAGNITUDE OF FINAL POSITION VECTOR | DP | B29/B27 | METERS |
| R4029 | V(T1)/ | INITIAL VELOCITY VECTOR | VECTOR | B7/B5 | METERS/CS |
| R4031 | RTEDVD | DELTA VELOCITY DESIRED | DP | B7/B5 | METERS/CS |
| R4033 | UR1/ | UNIT INITIAL VECTOR | VECTOR | B1 | |
| R4035 | UH/ | UNIT HORIZONTAL VECTOR | VECTOR | B1 | |
| R4037 | X(T2) | COTANGENT OF FINAL FLIGHT PATH ANGLE | DP | B0 | |
| R4039 | X(T1) | COTANGENT OF INITIAL FLIGHT PATH ANGLE (INPUT FOR PREC) | DP | B5 | |
| R4041 | CPPA | COSINE OF INITIAL FLIGHT PATH ANGLE | DP | B1 | |
| R4043 | MAAX1 | MAJOR AXIS LIMIT FOR LOWER BOUND ON GAMDV ITERATOR | DP | B30/B28 | METERS |
| R4045 | MAAX2 | MAJOR AXIS LIMIT FOR UPPER BOUND ON GAMDV ITERATOR | DP | B30/B28 | METERS |
| R4049 | PHI2 | REENTRY NEAR PERIGEE OR APOGEE INDICATE (RTE ONLY) | DP | B2 | -1 PERIGEE, +1 APOGEE |
| R4051 | N1 | CONIC OR PRECISION ITERATION COUNTER | DP | B28 | NEGATIVE CONIC, PLUS PREC |

R4054 OUTPUT

| | | | | | |
|-------|---------|---|--------|---------|-----------|
| R4055 | V2(T1)/ | POST IMPULSE INITIAL VELOCITY VECTOR | VECTOR | B7/B5 | METERS/CS |
| R4057 | DV | INITIAL VELOCITY CHANGE | DP | B7/B5 | METERS/CS |
| R4059 | X(T1) | COTANGENT OF INITIAL FLIGHT PATH ANGLE (POST IMPULSE) | DP | B5 | |
| R4061 | PCON | SEMI-LATUS RECTUM | DP | B28/B26 | METERS |
| R4063 | BETA1 | 1+X(T2)**2 | DP | B1 | |

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R4068 DEBRIS
R4069 PUSHLIST
R4070 00D X(T1),,=PREVIOUS PRECISION X(T1)
R4074 02D THETA1=BETA5*LAMBDA-1
R4076 05D THETA2=2*P(T1)*(LAMBDA-1)
R4078 06D THETA3=MUM* 5/R(T1)
R4080 10D X(T1)MIN=LOWER BOUND ON X(T1) IN GAMDV ITERATOR
R4082 12D DX(T1)MAX=MAXIMUM DELTA X(T1)
R4084 14D X(T1)MAX=UPPER BOUND ON X(T1) IN GAMDV ITERATOR
R4086 16D DX(T1)=ITERATOR INCREMENT
R4088 31D GAMDV10 SUBROUTINE RETURN ADDRESS
R4089 32D DVCALC SUBROUTINE RETURN ADDRESS
R4090 33D V2T100 SUBROUTINE RETURN ADDRESS

DP B5
TP B17
TP B38/B36
DP B-4/B-5
DP B5
DP B5
DP B5
DP B5

| | | | | | | | | |
|--------|-----|----|---------|---------|--------|-------|---------|-------------------------|
| 4100 | | | 32,3136 | 77620 0 | V2T100 | STO | | |
| 4101 | | | 32,3137 | 00041 1 | | 33D | | |
| 4104 | | | 32,3140 | 43001 1 | | SETPD | CLEAR | |
| 4105 | | | 32,3141 | 00001 0 | | | 0 | PL00D |
| 4106 | REP | 1 | 32,3142 | 00272 0 | | | P2RTE | |
| 4107 | | | 32,3143 | 00345 0 | | DLOAD | NORM | |
| 4108 | REP | 11 | 32,3144 | 03636 1 | | | RCON | |
| 4109 | REP | 42 | 32,3145 | 00047 1 | | | X1 | |
| 4110 | | | 32,3146 | 00325 0 | | PDDL | NORM | |
| 4111 | REP | 5 | 32,3147 | 03648 0 | | | R(T1) | |
| 4112 | REP | 33 | 32,3150 | 00051 0 | | | S1 | |
| 4113 | | | 32,3151 | 00013 0 | | STORE | 10D | |
| 4114 | | | 32,3152 | 56342 1 | | SR1 | DDV | R1/RCON = LAMBDA |
| 4115 | | | 32,3153 | 05280 0 | | XSU,1 | PDDL | R1 PL02D |
| 4116 | REP | 34 | 32,3154 | 00050 1 | | | S1 | |
| 4117 | REP | 12 | 32,3155 | 03726 1 | | | X(T2) | |
| 4118 | | | 32,3156 | 77716 1 | | DSO | | |
| 4120 | | | 32,3157 | 43342 0 | | SR1 | DAD | |
| 4121 | REP | 5 | 32,3160 | 31053 0 | | | 1RTER1 | |
| 4122 | REP | 4 | 52,3101 | 03754 1 | | STORE | BETA1 | 1*X(T2)**2 = BETA1 |
| 4123 | | | 32,3162 | 77605 1 | | DMP | | R1 |
| 4124 | | | 32,3103 | 00001 0 | | | 00D | |
| 41245 | | | 32,3164 | 00035 1 | | STORE | 28D | BETA1*LAMBDA = BETA5 |
| 41240 | | | 32,3105 | 53605 1 | | DMP | SL* | |
| 412461 | | | 32,3166 | 00001 0 | | | 00D | |
| 412462 | | | 32,3167 | 20172 1 | | | 0 -7,1 | |
| 4125 | | | 32,3170 | 45257 0 | | SL* | DSU | |
| 4126 | | | 32,3171 | 20172 1 | | | 0 -7,1 | |
| 4137 | REP | 1 | 32,3172 | 31071 0 | | | 1RTER17 | |
| 4128 | | | 32,3173 | 65234 1 | | RTB | PDDL | BETA5*LAMBDA-1 = THETA1 |
| 41282 | REP | 3 | 32,3174 | 45562 1 | | | TPMODE | R17 PL05D |
| 41285 | REP | 6 | 32,3175 | 31653 0 | | | 1RTER1 | |
| 41287 | | | 32,3176 | 57457 0 | | SR* | DCOMP | |
| 4129 | | | 32,3177 | 20801 1 | | | 0,1 | |
| 41295 | | | 32,3200 | 41215 1 | | DAD | DMP | |
| 4130 | | | 32,3201 | 00001 0 | | | 00D | |

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41302 RESP 6 LAST 871 32,3202 03646 0
41305 32,3203 47057 0
41307 32,3204 20172 1
41311 RESP 4 LAST 871 32,3205 45562 1
4132 32,3206 77725 1
4133 RESP 1 32,3207 33770 1
4134 32,3210 70501 1
4135 RESP 18 LAST 865 32,3211 00050 1
4138 32,3212 56284 1
4137 RESP 35 LAST 871 32,3213 00050 1
4138 32,3214 00013 0
4139 32,3215 65257 1
4140 32,3216 57170 0
4141 RESP 3 LAST 845 32,3217 03852 0
4142 32,3220 41406 0
4143 32,3221 77624 1
4144 RESP 1 32,3222 56633 1
4145 32,3223 41476 1
4146 32,3224 40476 0
4147 32,3225 41525 0
4148 RESP 3 LAST 845 32,3226 03854 0
4149 32,3227 45008 0
4150 RESP 2 LAST 872 32,3230 56633 1
4151 32,3231 50125 1
4152 RESP 10 LAST 865 32,3232 03730 0
4153 RESP 1 32,3233 65236 0
4154 32,3234 77650 1
4155 RESP 1 32,3235 65250 0

R4156 PROCESSED HERE IF NOT PRECISION COMPUTATION
4156 32,3236 77745 1 V2T102 DLOAD
4159 RESP 5 LAST 844 32,3237 03632 0
4160 32,3240 52054 1 BZE
4161 RESP 1 32,3241 65243 1
4162 RESP 1 32,3242 65344 1
4163 32,3243 50145 1 V2T105 DLOAD
4164 RESP 3 LAST 859 32,3244 03757 1
4165 RESP 2 LAST 872 32,3245 65344 1
4166 32,3246 77650 1
4167 RESP 1 32,3247 65352 0

R4168 DURING A PRECISION TRAJECTORY ITERATION CONSTRAIN THE INDEPENDENT
R4169 VARIABLE TO INSURE THAT ALL CONICS PASS THROUGH RCN ON THE SAME PASS
R4170 THROUGH X(T2)
4171 32,3250 47145 1 V2T110 DLOAD
4172 RESP 2 LAST 871 32,3251 31671 0
4173 RESP 5 LAST 872 32,3252 45562 1
4174 32,3253 65276 1 DCOMP

R(T1)
RTB
0 -TD,1
TPMODE
PDDL
RIMURTS
NORM
XSU,2
SR*
PDDL
MUM*.5/R(T1)=THETA3
PUSH
CALL
DCOMP
DCOMP
PDDL
PUSH
CALL
PDDL
GOTO
RTB
RTB
0 -TD,1
TPMODE
2*R(T1)*(LAMBDA-1)=THETA2
B36/B36 PLO8D
SR1
X2
DDV
S1
10D
MAMAX1
MAMAX1=MA
XTILIM
PUSH
SR4
PUSH
MAMAX2
CALL
XTILIM
RN
NN1A
V2T102
V2T110
X(T1)MIN
R5 PL12D
DX(T1)MAX
R5 PL14D
X(T1)MAX
R5 PL16D
B-4/B-5 PL10D
-1
R17 PL19D

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| Line | Op | Count | Label | Address | Next | Code | Comments | Labels |
|-------|-----|-------|-------|---------|---------|-------|----------|--------|
| 4175 | REP | 4 | LAST | 864 | 32,3254 | 31715 | 0 | |
| 4176 | | | | | 32,3255 | 45257 | 0 | |
| 4176S | | | | | 32,3256 | 20601 | 1 | |
| 4177 | | | | | 32,3257 | 00001 | 0 | |
| 4177S | | | | | 32,3260 | 53605 | 1 | |
| 4178 | | | | | 32,3261 | 00035 | 1 | |
| 4178S | | | | | 32,3262 | 20172 | 1 | |
| 4179 | | | | | 32,3263 | 76257 | 0 | |
| 4179S | | | | | 32,3264 | 20172 | 1 | |
| 4180 | | | | | 32,3265 | 65234 | 1 | |
| 4181 | REP | 6 | LAST | 872 | 32,3266 | 45562 | 1 | |
| 4182 | REP | 2 | LAST | 125 | 32,3267 | 03722 | 0 | |
| 4183 | | | | | 32,3270 | 00001 | 0 | |
| 4184 | | | | | 32,3271 | 77751 | 1 | |
| 4185 | | | | | 32,3272 | 53040 | 0 | |
| 4186 | REP | 1 | | | 32,3273 | 65300 | 1 | |
| 4186S | REP | 2 | LAST | 873 | 32,3274 | 65300 | 1 | |
| 4187 | | | | | 32,3275 | 52061 | 0 | |
| 4188 | | | | | 32,3276 | 20210 | 0 | |
| 4189 | REP | 1 | | | 32,3277 | 65311 | 1 | |
| 4190 | | | | | 32,3300 | 50145 | 1 | V2T115 |
| 4191 | REP | 4 | LAST | 862 | 32,3301 | 03761 | 1 | |
| 4192 | REP | 1 | | | 32,3302 | 65322 | 1 | |
| 4193 | | | | | 32,3303 | 77676 | 0 | |
| 4194 | REP | 5 | LAST | 873 | 32,3304 | 17761 | 1 | |
| 4195 | REP | 3 | LAST | 864 | 32,3305 | 31705 | 1 | |
| 4196 | REP | 11 | LAST | 872 | 32,3306 | 03730 | 0 | |
| 4197 | | | | | 32,3307 | 77650 | 1 | |
| 4198 | REP | 2 | LAST | 873 | 32,3310 | 65322 | 1 | |
| 4199 | | | | | 32,3311 | 47166 | 0 | V2T120 |
| 4200 | REP | 2 | LAST | 494 | 32,3312 | 45713 | 0 | |
| 4200S | | | | | 32,3313 | 50125 | 1 | |
| 4201 | REP | 6 | LAST | 873 | 32,3314 | 03761 | 1 | |
| 4202 | REP | 1 | | | 32,3315 | 65330 | 1 | |
| 4203 | | | | | 32,3316 | 45545 | 1 | |
| 4204 | | | | | 32,3317 | 77760 | 0 | |
| 4205 | | | | | 32,3320 | 77676 | 0 | |
| 4206 | | | | | 32,3321 | 00013 | 0 | |
| 4207 | | | | | 32,3322 | 53145 | 1 | V2T125 |
| 4208 | REP | 3 | LAST | 873 | 32,3323 | 03722 | 0 | |
| 4209 | REP | 3 | LAST | 872 | 32,3324 | 65344 | 1 | |
| 4210 | | | | | 32,3325 | 52040 | 1 | |
| 4211 | REP | 4 | LAST | 873 | 32,3326 | 65344 | 1 | |
| 4212 | REP | 2 | LAST | 872 | 32,3327 | 65352 | 0 | |
| 4213 | | | | | 32,3330 | 53145 | 1 | V2T130 |
| 4214 | REP | 4 | LAST | 873 | 32,3331 | 03722 | 0 | |
| 4215 | REP | 1 | | | 32,3332 | 65341 | 1 | |
| 4216 | | | | | 32,3333 | 71240 | 1 | |
| 4217 | REP | 2 | LAST | 873 | 32,3334 | 65341 | 1 | |
| 4218 | | | | | 32,3335 | 77626 | 0 | |

| Code | Address | Next | Comments | Labels |
|-------|---------|------|-------------------------|-----------|
| SR* | 2RTTB1 | | | |
| | DSU | | | |
| | 0,1 | | | |
| | 00D | | | |
| DMP | SL* | | | |
| | 26D | | | |
| SL* | 0 -7,1 | | | |
| | TAD | | | |
| | 0 -7,1 | | | |
| RTB | FDDL | | BETA5(2-LAMBDA)-1=BETA6 | B17 PL18D |
| | TMODE | | | |
| | X(T1) | | | |
| STORE | 00D | | X(T1),, | B5 PL18D |
| TLOAD | | | | |
| RW | RZE | | | |
| | V2T115 | | | |
| | V2T115 | | | |
| SL | GOTO | | | |
| | 7 | | | |
| | V2T120 | | | |
| DLOAD | RW | | | |
| | PHI2 | | | |
| | V2T125 | | | |
| DCOMP | | | | |
| STOCL | PHI2 | | | |
| | 10RTR | | | |
| STORE | NNJA | | | |
| GOTO | | | | |
| | V2T125 | | | |
| | RTB | | | |
| SORT | | | | |
| FDDL | RW | | BETA6** .5=X(T1) LIM | B5 PL18D |
| | PHI2 | | | |
| | V2T130 | | | |
| DLOAD | STADR | | | |
| STORE | 14D | | X(T1) LIM = X(T1) MAX | PL18D |
| DCOMP | | | | |
| STORE | 10D | | -X(T1) LIM = X(T1) MIN | |
| DLOAD | RZE | | | |
| | X(T1) | | | |
| | V2T140 | | | |
| RW | GOTO | | | |
| | V2T140 | | | |
| | V2T145 | | | |
| DLOAD | RZE | | | |
| | X(T1) | | | |
| | V2T135 | | | |
| RW | DLOAD | | | |
| | V2T135 | | | PL18D |
| STADR | | | | |

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| | | | | | | | | | | | |
|--------------------------------------|-----|----|------|---------|---------|-------|---|--------|--------|---------|---------------------------|
| 4219 | | | | 32,3336 | 77764 | 1 | | STORE | 10D | | X(T1) LIM = X(T1) MIN |
| 4220 | | | | 32,3337 | 77650 | 1 | | GOTO | | | |
| 4221 | REP | 3 | LAST | 873 | 32,3340 | 65352 | 0 | | V2T145 | | |
| 4222 | | | | | 32,3341 | 57545 | 1 | V2T135 | DLOAD | DCOMP | PL18D |
| 4113 | | | | | 32,3342 | 77626 | 0 | | STADR | | |
| 4224 | | | | | 32,3343 | 77760 | 0 | | STORE | 14D | -X(T1) LIM = X(T1) MAX |
| 4225 | | | | | 32,3344 | 77745 | 1 | V2T140 | DLOAD | | |
| 4226 | | | | | 32,3345 | 00013 | 0 | | | 10D | |
| 4227 | REP | 5 | LAST | 873 | 32,3346 | 37722 | 0 | | STOCL | X(T1) | X(T1) MIN = X(T1) |
| 4228 | | | | | 32,3347 | 00015 | 0 | | | 12D | |
| 4229 | | | | | 32,3350 | 52008 | 0 | | PUSH | GOTO | DX(T1) MAX = DX(T1) |
| 4230 | REP | 1 | | | 32,3351 | 65357 | 0 | | | V2T150 | PL18D |
| 4231 | | | | | 32,3352 | 77745 | 1 | V2T145 | DLOAD | | |
| 4232 | | | | | 32,3353 | 00017 | 1 | | | 14D | |
| 4233 | REP | 6 | LAST | 874 | 32,3354 | 17722 | 0 | | STOCL | X(T1) | X(T1) MAX = X(T1) |
| 4234 | | | | | 32,3355 | 00015 | 0 | | | 12D | |
| 4235 | | | | | 32,3350 | 41476 | 1 | | DCOMP | PUSH | -DX(T1) MAX = DX(T1) |
| 4236 | | | | | 32,3357 | 71624 | 1 | V2T150 | CALL | | GOTO X(T1) -DV ITERATOR |
| 4237 | REP | 1 | | | 32,3360 | 85500 | 1 | | | GAMDV10 | |
| 4238 | | | | | 32,3361 | 53145 | 1 | | DLOAD | RZE | EXIT IF MINIMUM FUEL MODE |
| 4239 | REP | 6 | LAST | 872 | 32,3382 | 03632 | 0 | | | RTEVD | |
| 4240 | REP | 1 | | | 32,3363 | 65476 | 1 | | | V2T1X | |
| R4241 CONTINUE IF TIME CRITICAL MODE | | | | | | | | | | | |
| 4242 | | | | | 32,3364 | 50025 | 0 | | DSJ | RNN | |
| 4243 | REP | 3 | LAST | 849 | 32,3365 | 03706 | 0 | | | DV | |
| 4244 | REP | 1 | | | 32,3366 | 05311 | 1 | | | V2T155 | |
| 4245 | | | | | 32,3367 | 77650 | 1 | | GOTO | | |
| 4246 | REP | 1 | | | 32,3370 | 65424 | 0 | | | V2T175 | |
| 4247 | | | | | 32,3371 | 50145 | 1 | V2T155 | DLOAD | RNN | |
| 4248 | REP | 12 | LAST | 873 | 32,3372 | 03730 | 0 | | | NN1A | |
| 4249 | REP | 1 | | | 32,3373 | 65376 | 0 | | | V2T160 | |
| 4250 | | | | | 32,3374 | 77650 | 1 | | GOTO | | |
| 4251 | REP | 1 | | | 32,3375 | 85431 | 1 | | | V2T185 | |
| R4252 CONIC TRAJECTORY COMPUTATION | | | | | | | | | | | |
| 4253 | | | | | 32,3376 | 53145 | 1 | V2T160 | DLOAD | RZE | |
| 4254 | REP | 7 | LAST | 074 | 32,3377 | 03722 | 0 | | | X(T1) | |
| 4255 | REP | 1 | | | 32,3400 | 85404 | 1 | | | V2T165 | |
| 4258 | | | | | 32,3401 | 52040 | 1 | | RNN | GOTO | |
| 4257 | REP | 2 | LAST | 874 | 32,3402 | 65404 | 1 | | | V2T165 | |
| 4250 | REP | 1 | | | 32,3403 | 65474 | 0 | | | V2T300 | |
| 4259 | | | | | 32,3404 | 53145 | 1 | V2T165 | DLOAD | RZE | |
| 4260 | REP | 4 | LAST | 872 | 32,3405 | 03157 | 1 | | | CPPA | |
| 4261 | REP | 2 | LAST | 874 | 32,3406 | 65474 | 0 | | | V2T300 | |
| 4262 | | | | | 32,3407 | 71240 | 1 | | RNN | DLOAD | |
| 4263 | REP | 3 | LAST | 874 | 32,3410 | 03474 | 0 | | | V2T300 | |
| 4264 | | | | | 32,3411 | 00017 | 1 | | | 14D | |

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| | | | | | | | | | | |
|-------|-----|----|------|-----|---------|-------|---|--------|---------|-------------------|
| 4265 | REP | 8 | LAST | 874 | 32,3412 | 17722 | 0 | STOCL | X(T1) | X(T1)MAX=X(T1) |
| 4266 | | | | | 32,3413 | 00015 | 0 | | 12D | |
| 4267 | | | | | 32,3414 | 77676 | 0 | DCOMP | | |
| 4268 | | | | | 32,3415 | 34021 | 0 | STCALL | 16D | -DX(T1)MAX=DX(T1) |
| 4269 | REP | 2 | LAST | 874 | 32,3416 | 65500 | 1 | | GANDV10 | |
| 4270 | | | | | 32,3417 | 45345 | 1 | DLOAD | DSU | |
| 4271 | REP | 7 | LAST | 874 | 32,3420 | 03632 | 0 | | RTEVD0 | |
| 4272 | REP | 4 | LAST | 874 | 32,3421 | 03706 | 0 | | DV | |
| 4273 | | | | | 32,3422 | 77640 | 0 | RNN | | |
| 4274 | REP | 4 | LAST | 874 | 32,3423 | 65474 | 0 | | V2T300 | |
| 4279 | | | | | 32,3424 | 71214 | 0 | V2T175 | SET | |
| 4280 | REP | 2 | LAST | 871 | 32,3425 | 00072 | 1 | | DLOAD | |
| 4281 | REP | 9 | LAST | 875 | 32,3426 | 03722 | 0 | | F2RTE | |
| 4282 | | | | | 32,3427 | 14017 | 1 | STOCL | X(T1) | X(T1)=X(T1)MAX |
| 4283 | | | | | 32,3430 | 00015 | 0 | | 14D | |
| 4284 | | | | | 32,3431 | 77676 | 0 | DCOMP | | |
| 4285 | | | | | 32,3432 | 34021 | 0 | STCALL | 16D | -DX(T1)MAX=DX(T1) |
| 4286 | REP | 3 | LAST | 875 | 32,3433 | 65500 | 1 | | GANDV10 | |
| 4287 | | | | | 32,3434 | 50145 | 1 | DLOAD | RNN | |
| 42875 | REP | 13 | LAST | 874 | 32,3435 | 03730 | 0 | | NN1A | |
| 4288 | REP | 5 | LAST | 875 | 32,3436 | 65474 | 0 | | V2T300 | |

R42885 PREVENT A LARGE CHANGE IN INDEPENDENT VARIABLE DURING AN ITERATION FOR A
R428851 PRECISION TRAJECTORY

| | | | | | | | | | | | |
|------|-----|----|------|-----|---------|-------|---|--------|--------|--|--|
| 4289 | | | | | 32,3437 | 45345 | 1 | V2T185 | DLOAD | DSU | |
| 4290 | REP | 10 | LAST | 875 | 32,3440 | 03722 | 0 | | X(T1) | | |
| 4291 | | | | | 32,3441 | 00001 | 0 | | 00D | | |
| 4292 | | | | | 32,3442 | 65246 | 1 | ARS | PDDL | X(T1)-X(T1),, / = BETA7 | |
| 4293 | | | | | 32,3443 | 00015 | 0 | | 12D | | |
| 4294 | | | | | 32,3444 | 44352 | 0 | SL1 | RDSU | | |
| 4295 | | | | | 32,3445 | 71240 | 1 | RNN | DLOAD | | |
| 4296 | REP | 6 | LAST | 875 | 32,3446 | 65474 | 0 | | V2T300 | | |
| 4297 | | | | | 32,3447 | 00001 | 0 | | 00D | CONTINUE IF BETA7 LARGER THAN 2DX(T1)MAX | |
| 4298 | REP | 11 | LAST | 875 | 32,3450 | 03722 | 0 | STORE | X(T1) | X(T1),, = X(T1) | |
| 4299 | | | | | 32,3451 | 50025 | 0 | DSU | RNN | | |
| 4300 | | | | | 32,3452 | 00017 | 1 | | 14D | | |
| 4301 | REP | 1 | | | 32,3453 | 65461 | 1 | | V2T195 | | |
| 4302 | | | | | 32,3454 | 77745 | 1 | DLOAD | | | |
| 4303 | | | | | 32,3455 | 00017 | 1 | | 14D | | |
| 4304 | REP | 12 | LAST | 875 | 32,3456 | 03722 | 0 | STORE | X(T1) | X(T1)MAX = X(T1) | |
| 4305 | | | | | 32,3457 | 77650 | 1 | GOTO | | | |
| 4306 | REP | 1 | | | 32,3460 | 65472 | 0 | | V2T205 | | |
| 4307 | | | | | 32,3461 | 45345 | 1 | V2T195 | DLOAD | DSU | |
| 4308 | REP | 13 | LAST | 875 | 32,3462 | 03722 | 0 | | X(T1) | | |
| 4309 | | | | | 32,3463 | 00013 | 0 | | 10D | | |
| 4310 | | | | | 32,3464 | 52040 | 1 | RNN | GOTO | | |
| 4311 | REP | 1 | | | 32,3465 | 65467 | 1 | | V2T200 | | |
| 4312 | REP | 2 | LAST | 875 | 32,3466 | 65472 | 0 | | V2T205 | | |
| 4313 | | | | | 32,3467 | 77745 | 1 | V2T200 | DLOAD | | |



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| | | | | | | | | |
|------|-----|----|---------|---------|---------|---------|---------|-------|
| 4314 | | | 32,3410 | 00013 0 | | 10D | | |
| 4315 | REP | 14 | LAST | 875 | 32,3471 | 03722 0 | STORE | X(T1) |
| 4316 | | | 32,3412 | 77624 1 | V2T205 | CALL | | |
| 4317 | REP | 1 | | | 32,3473 | 05701 1 | DVCALC | |
| 4318 | | | 32,3474 | 17745 1 | V2T300 | DLOAD | | |
| 4319 | REP | 5 | LAST | 866 | 32,3475 | 31611 0 | ZERRORB | |
| 4320 | | | 32,3476 | 77650 1 | V2T1X | GOTO | | |
| 4321 | | | 32,3477 | 00041 1 | | | 33D | |

X(T1)MIN = X(T1)

P4400 X(T1)-DV ITERATOR SUBROUTINE

B4401 DESCRIPTION
 B4402 COMPUTES A POST IMPULSE VELOCITY VECTOR (V2(T1)) WHICH REQUIRES A MINIMUM DV.
 B4404 CALLING SEQUENCE

B4405 L CALL
 B4406 L+1 GANDV10

B4407 NORMAL EXIT MODE
 B4410 AT L+2 OF CALLING SEQUENCE

B4411 ALARM EXIT MODE
 B4412 AT V2T1X WITH MPAC = OCTAL 605 FOR EXCESS ITERATIONS

B4413 SUBROUTINES CALLED
 B4414 DVCALC

B4415 BRASABLE INITIALIZATION REQUIRED

B4416 PUSHLIST

| | | | | | |
|-------|-----|--|----|---------|--|
| B4417 | 02D | THETA1=BETA5*LAMBDA-1 | TP | B17 | |
| B4419 | 05D | THETA2=2*P(T1)*(LAMBDA-1) | TP | B38/B36 | |
| B4421 | 08D | THETA3=MUM*.5/R(T1) | DP | B-4/B-5 | |
| B4423 | 10D | X(T1)MIN=LOWER BOUND ON INDEPENDENT VARIABLE X(T1) | DP | B5 | |
| B4425 | 12D | DX(T1)MAX=MAXIMUM DX(T1) | DP | B5 | |
| B4427 | 14D | X(T1)MAX=UPPER BOUND ON INDEPENDENT VARIABLE X(T1) | DP | B5 | |
| B4429 | 16D | DX(T1)=ITERATOR INCREMENT | DP | B5 | |

B4431 MPAC

B4432 NONE

B4433 OTHER

| | | | | | |
|-------|--------|--|------------|-------|--------------------------|
| B4434 | V(T1)/ | INITIAL VELOCITY VECTOR | VECTOR | B7/B5 | METERS/CS |
| B4436 | RTEDVD | DELTA VELOCITY DESIRED | DP | B7/B5 | METERS/CS |
| B4438 | UR1/ | UNIT INITIAL VECTOR | VECTOR | B1 | |
| B4440 | UH/ | UNIT HORIZONTAL VECTOR | VECTOR | B1 | |
| B4442 | X(T1) | COTANGENT OF INITIAL FLIGHT PATH ANGLE (FROM VERTICAL) | DP | B5 | |
| B4444 | F2RTE | TIME CRITICAL OR MINIMUM FUEL MODE INDICATOR | STATE AREA | | 0 MIN. FUEL, 1 MIN. TIME |

B4446 OUTPUT

| | | | | | |
|-------|---------|---|--------|---------|-----------|
| B4448 | V2(T1)/ | POST IMPULSE INITIAL VELOCITY VECTOR | VECTOR | B7/B5 | METERS/CS |
| B4450 | DV | INITIAL VELOCITY CHANGE | DP | B7/B5 | METERS/CS |
| B4452 | X(T1) | COTANGENT OF INITIAL PPA MEASURED FROM VERTICAL | DP | B5 | |
| B4454 | PCON | SEMI-LATUS RECTUM | DP | B28/B26 | METERS |

B4456 DEBRIS

B4457 PUSHLIST

| | | |
|-------|-----|-----------|
| B4459 | 00D | X(T1),, |
| B4462 | 02D | THETA1 |
| B4463 | 05D | THETA2 |
| B4464 | 08D | THETA3 |
| B4465 | 10D | X(T1)MIN |
| B4466 | 12D | DX(T1)MAX |



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| Address | Op | Comments | Code | Op | Code | Comments |
|---------|-----------------|-----------------------------------|---------|-------|---------|----------|
| R4467 | 14D | X(T1)MAX | | | | |
| R4468 | 16D | DX(T1) | | | | |
| R4473 | 22D | DV,=PREVIOUS DV | | | | |
| R4475 | 24D | BETA8=X(T1)+.1DX(T1) | | | | |
| R4477 | 31D | GAMDV10 SUBROUTINE RETURN ADDRESS | | | | |
| R4478 | 32D | DV CALC SUBROUTINE RETURN ADDRESS | | | | |
| R4479 | 33D | VZT100 SUBROUTINE RETURN ADDRESS | | | | |
| 4490 | | 32,3500 77620 0 | GAMDV10 | STO | | |
| 4491 | | 32,3501 00037 0 | | | | |
| 4500 | | 32,3502 45001 1 | | SETPD | CALL | |
| 4501 | | 32,3503 00023 0 | | | | |
| 4502 | REP 2 LAST 876 | 32,3504 65701 1 | | | | PL18D |
| 4503 | | 32,3505 45345 1 | | DLOAD | DSU | |
| 4504 | | 32,3506 00017 1 | | | | |
| 4505 | | 32,3507 00013 0 | | | | |
| 4506 | | 32,3510 77600 1 | | BOV | | |
| 4501 | REP 1 | 32,3511 65531 0 | | | GAMDV20 | |
| 4508 | | 32,3512 45206 1 | | PUSH | DSU | |
| 4509 | REP 1 | 32,3513 31772 1 | | | EPC9RTE | B5 PL20D |
| 4510 | | 32,3514 71240 1 | | RNN | DLOAD | |
| 4511 | REP 1 | 32,3515 65677 1 | | | GAMDVX | |
| 4512 | | 32,3516 00023 0 | | | 18D | |
| 4513 | | 32,3517 50025 0 | | DSU | RNN | |
| 4514 | | 32,3520 00015 0 | | | 12D | |
| 4515 | REP 1 | 32,3521 65525 0 | | | GAMDV15 | |
| 4516 | | 32,3522 52001 1 | | SETPD | GOTO | |
| 4511 | | 32,3523 00023 0 | | | 18D | PL18D |
| 45175 | REP 2 LAST 878 | 32,3524 65531 0 | | | GAMDV20 | |
| 4518 | | 32,3525 17745 1 | GAMDV15 | DLOAD | | |
| 4519 | | 32,3526 70565 0 | | SIGN | SR1 | PL18D |
| 4520 | | 32,3527 00021 1 | | | 18D | |
| 4521 | | 32,3530 00021 1 | | STORE | 18D | |
| 4522 | | 32,3531 77745 1 | GAMDV20 | DLOAD | | |
| 4523 | REP 1 | 32,3532 31701 0 | | | M144RTE | |
| 4524 | REP 6 LAST 863 | 32,3533 03732 1 | | STORE | NN2 | |
| 4525 | | 32,3534 43348 1 | GAMDV25 | DLOAD | DAD | |
| 4526 | REP 7 LAST 878 | 32,3535 03732 1 | | | NN2 | |
| 4527 | REP 4 LAST 865 | 32,3536 31675 1 | | | 1RTEB28 | |
| 4528 | | 32,3537 67240 0 | | RNN | SLOAD | |
| 4529 | REP 1 | 32,3540 65544 1 | | | GAMDV30 | |
| 4530 | REP 3 LAST 862 | 32,3541 31735 1 | | | OCT865 | |
| 4531 | | 32,3542 17650 1 | | GOTO | | |
| 4532 | REP 2 LAST 874 | 32,3543 65476 1 | | | V2T1X | |
| 4533 | REP 6 LAST 878 | 32,3544 03732 1 | GAMDV30 | STORE | NN2 | |
| 4534 | | 32,3545 65345 0 | | DLOAD | PDDL | |
| 4535 | REP 15 LAST 876 | 32,3546 03722 0 | | | X(T1) | |
| 4536 | REP 5 LAST 875 | 32,3547 03706 0 | | | DV | |
| 4537 | | 32,3550 43325 1 | | PDDL | DAD | |
| 4538 | REP 16 LAST 878 | 32,3551 03722 0 | | | X(T1) | |
| 4539 | | 32,3552 00021 1 | | | 18D | |

DP B7/B5
DP B5

X(T1)MAX-X(T1)MIN=BETA8 B5 PL20D

SOUNDS CLOSE TOGETHER

BETA8-DX(T1)MAX

PL18D

PL18D

BETA8(SIGNDX(T1))/2=DX(T1)

NN2=NN2+1
X(T1)=X(T1), B5 PL20D

DV=DV, B7/B5 PL22D

| LINE | REP | LAST | ADDR | DATA | OPERATION | COMMENT |
|--------------------------|--------|----------|---------|---------|-----------|-----------------------|
| 4540 | REP 17 | LAST 878 | 32,3553 | 37722 1 | STCALL | X(T1) |
| 4541 | REP 3 | LAST 878 | 32,3554 | 65701 1 | DVCALC | X(T1)+DX(T1)=X(T1) B5 |
| 4542 | | | 32,3555 | 71214 0 | BCN | DLOAD |
| 4543 | REP 3 | LAST 875 | 32,3556 | 00312 1 | | F2RTS |
| 4544 | REP 1 | | 32,3557 | 65573 0 | | GAMDV35 |
| 4545 | REP 6 | LAST 878 | 32,3580 | 03706 0 | | DV |
| 4546 | | | 32,3581 | 50025 0 | DSU | RNN |
| 4547 | | | 32,3582 | 00025 0 | | 20D |
| 4548 | REP 1 | | 32,3583 | 65570 0 | | GAMDV33 |
| 4549 | | | 32,3584 | 57545 1 | GAMDV32 | DLOAD DCOMP |
| 4550 | | | 32,3585 | 00021 1 | | 18D |
| 4551 | | | 32,3586 | 77742 0 | SR1 | |
| 4552 | | | 32,3587 | 00021 1 | STORE | 18D |
| 4553 | | | 32,3570 | 62001 1 | GAMDV33 | SETPD OOTO |
| 4554 | | | 32,3571 | 00023 0 | | 18D |
| 4555 | REP 1 | | 32,3572 | 65638 1 | | GAMDV50 PL18D |
| R4556 TIME CRITICAL MODE | | | | | | |
| 4557 | | | 32,3573 | 45345 1 | GAMDV35 | DLOAD DSU |
| 4558 | REP 8 | LAST 875 | 32,3574 | 03632 0 | | RTEDVD |
| 4559 | REP 7 | LAST 879 | 32,3575 | 03706 0 | | DV |
| 4560 | | | 32,3576 | 41525 0 | PDDL | PUSH |
| 4561 | | | 32,3577 | 51545 1 | GAMDV40 | DLOAD ARS |
| 4562 | | | 32,3600 | 00025 0 | | 20D |
| 4563 | | | 32,3601 | 50025 0 | DSU | RNN |
| 4564 | REP 1 | | 32,3602 | 31774 1 | | EPC10RTE |
| 4565 | REP 2 | LAST 878 | 32,3603 | 65677 1 | | GAMDVX |
| 4566 | | | 32,3604 | 71204 1 | GAMDV45 | ROVR DLOAD |
| 45661 | REP 8 | LAST 826 | 32,3605 | 57343 1 | | TCDANZIG |
| 4567 | | | 32,3606 | 60221 0 | RDSU | NORM |
| 4568 | REP 8 | LAST 879 | 32,3607 | 03706 0 | | DV |
| 4569 | REP 19 | LAST 872 | 32,3610 | 00050 1 | | X2 |
| 4570 | | | 32,3611 | 77725 1 | PDDL | |
| 4571 | | | 32,3612 | 70501 1 | NORM | SR1 |
| 4572 | REP 43 | LAST 871 | 32,3613 | 00047 1 | | X1 |
| 4573 | | | 32,3614 | 65271 0 | DDV | PDDL |
| 4576 | | | 32,3615 | 41221 0 | RDSU | DMP |
| 4577 | REP 18 | LAST 879 | 32,3616 | 03722 0 | | X(T1) |
| 4578 | | | 32,3617 | 77660 1 | XSU,1 | |
| 45791 | | | 32,3621 | 00021 1 | STORE | 18D |
| 4580 | | | 32,3623 | 20600 0 | SR* | RCV |
| 45801 | REP 1 | | 32,3624 | 65632 0 | | 0 -1,1 |
| 4581 | | | 32,3625 | 00021 1 | STORE | GAMDV47 |
| 4582 | | | 32,3626 | 45246 0 | ARS | DSU |
| 4583 | | | 32,3627 | 00015 0 | | 12D |
| 4584 | | | 32,3630 | 77640 0 | RNN | |
| 4585 | REP 2 | LAST 879 | 32,3631 | 65638 1 | | GAMDV50 |

$X(T1)+DX(T1)=X(T1)$ B5

CONTINUE IF FUEL CRITICAL MODE

$DV-DV=DVERR$ B7/R5 PL22D
 $DV,$ PL24D

ASSURE OV/PIND IS 0

$DV-DV,$ B7/R5-N2 PL22D
 $DVERR$ B8/R6-N1

$DVERR/ DV - DV$ PL18D

PRESERVE SIGN IF OVERFLOW

$(X(T1)-X(T1),)DVERR/(DV-DV,)=DX(T1)$



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| | | | | | | |
|------|--|---------|---------|---------|-------|------|
| 4586 | | 32,3632 | 75345 1 | GAMDV47 | DLOAD | SIGN |
| 4587 | | 32,3633 | 00015 0 | | | 12D |
| 4588 | | 32,3634 | 00021 1 | | | 16D |
| 4589 | | 32,3635 | 00021 1 | | STORE | 16D |

$Dx(T_1)MAX(SIGNDX(T_1))=DX(T_1)$

84590 CHECK TO KEEP INDEPENDENT VARIABLE IN BOUNDS

| | | | | | | |
|------|-----------------|---------|---------|---------|-------|----------|
| 4591 | | 32,3636 | 41345 0 | GAMDV50 | DLOAD | DMP |
| 4592 | | 32,3637 | 00021 1 | | | 16D |
| 4593 | REP 1 | 32,3640 | 31711 1 | | | 1.1RTSP1 |
| 4594 | | 32,3641 | 43352 1 | SL1 | | DAD |
| 4595 | REP 19 LAST 879 | 32,3642 | 03722 0 | | | X(T1) |
| 4596 | | 32,3643 | 00031 0 | STORE | | 24D |
| 4597 | | 32,3644 | 50025 0 | DSU | RNN | |
| 4598 | | 32,3645 | 00011 1 | | | 14D |
| 4599 | REP 1 | 32,3646 | 65655 1 | | | GAMDV55 |
| 4600 | | 32,3647 | 45345 1 | DLOAD | DSJ | |
| 4601 | | 32,3650 | 00017 1 | | | 14D |
| 4602 | REP 20 LAST 880 | 32,3651 | 03122 0 | | | X(T1) |
| 4603 | | 32,3652 | 77742 0 | SR1 | | |
| 4604 | | 32,3653 | 34021 0 | STCALL | | 16D |
| 4605 | REP 1 | 32,3654 | 85670 0 | | | GAMDV65 |
| 4606 | | 32,3655 | 45345 1 | GAMDV55 | DLOAD | DSJ |
| 4607 | | 32,3656 | 00031 0 | | | 24D |
| 4608 | | 32,3657 | 00013 0 | | | 10D |
| 4609 | | 32,3660 | 52040 1 | RNN | | GOTO |
| 4610 | REP 1 | 32,3661 | 85663 1 | | | GAMDV60 |
| 4611 | REP 2 LAST 880 | 32,3662 | 65670 0 | | | GAMDV65 |
| 4612 | | 32,3663 | 45345 1 | GAMDV60 | DLOAD | DSJ |
| 4613 | | 32,3664 | 00013 0 | | | 10D |
| 4614 | REP 21 LAST 880 | 32,3665 | 03122 0 | | | X(T1) |
| 4615 | | 32,3666 | 77742 0 | SR1 | | |
| 4616 | | 32,3667 | 00021 1 | STORE | | 16D |
| 4617 | | 32,3670 | 51545 1 | GAMDV65 | DLOAD | ABS |
| 4618 | | 32,3671 | 00021 1 | | | 16D |
| 4619 | | 32,3672 | 50025 0 | DSU | RNN | |
| 4620 | REP 2 LAST 878 | 32,3673 | 31772 1 | | | EPCGRTR |
| 4621 | REP 3 LAST 879 | 32,3674 | 65677 1 | | | GAMDVX |
| 4622 | | 32,3675 | 77650 1 | GOTO | | |
| 4623 | REP 1 | 32,3676 | 85534 0 | | | GAMDV25 |
| 4624 | | 32,3677 | 77650 1 | GAMDVX | GOTO | |
| 4625 | | 32,3700 | 00037 0 | | | 31D |

$X(T_1)+1.1DX(T_1)=RSTA9$ R5

$(X(T_1)MAX-X(T_1))/2=DX(T_1)$ R5

$(X(T_1)MIN-X(T_1))/2=DX(T_1)$ R5

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P4700 DV CALCULATION SUBROUTINE

| | | | |
|-------|-----------|---|------------------------|
| R4701 | INPUT | | |
| R4702 | PUSHLIST | | |
| R4703 | 02D | THETA1=BETA5*LAMBDA-1 | TP B17 |
| R4705 | 05D | THETA2=2*R(T1)*(LAMBDA-1) | TP B38/B38 |
| R4707 | 08D | THETA3=MU**5/R(T1) | DP B-4/B-5 |
| R4709 | OTHER | | |
| R4710 | X(T1) | COTANGENT OF POST IMPULSE INITIAL FLIGHT PATH ANGLE | DP B5 |
| R4712 | V(T1)/ | INITIAL VELOCITY VECTOR (PRE IMPULSE) | VECTOR B7/B5 METERS/CS |
| R4714 | UR1/ | UNIT INITIAL VECTOR | VECTOR B1 |
| R4716 | UH/ | UNIT HORIZONTAL VECTOR | VECTOR B1 |
| R4718 | | | |
| R4719 | OUTPUT | | |
| R4720 | V2(T1)/ | POST IMPULSE INITIAL VELOCITY VECTOR | VECTOR B7/B5 METERS/CS |
| R4722 | DV | INITIAL VELOCITY CHANGE | DP B7/B5 METERS/CS |
| R4724 | PCON | SEMI-LATUS RECTUM | DP B28/B28 METERS |
| R4726 | | | |
| R4727 | DERRIS | | |
| R4728 | 28D | THETA3*PCON**5 | DP B10/B8-N1 |
| R4730 | C(PUSLOC) | THETA3(PCON**5)*X(T1)*UR1/ | VECTOR B7/B5 |
| R4732 | 32D | DV CALC SUBROUTINE RETURN ADDRESS | |
| R4733 | X1 | NORMALIZATION FACTOR FOR VALUE IN 28D | |

R4734 PUSHLIST IS RESTORED TO ITS ENTRANCE VALUE UPON EXITING DV CALC.

| | | | | | | | | |
|--------|--------|----------|---------|---------|---------|-------|--------|--------------------------------------|
| 4750 | | | 32,3701 | 71220 1 | DV CALC | STO | DLOAD | |
| 4751 | | | 32,3702 | 00040 0 | | | 32D | |
| 4752 | REP 22 | LAST 880 | 32,3703 | 03722 0 | | | X(T1) | |
| 4753 | | | 32,3704 | 54318 1 | | DSO | SR | |
| 4754 | | | 32,3705 | 20810 1 | | | T | |
| 4755 | | | 32,3706 | 78278 0 | | DCOMP | TAD | |
| 4756 | | | 32,3707 | 00003 1 | | | 02D | |
| 4757 | | | 32,3710 | 41501 0 | | NORM | PUSH | |
| 4758 | REP 44 | LAST 879 | 32,3711 | 00047 1 | | | X1 | |
| 4759 | | | 32,3712 | 80351 0 | | TLOAD | NORM | |
| 4760 | | | 32,3713 | 00008 1 | | | 05D | |
| 4761 | REP 21 | LAST 879 | 32,3714 | 00050 1 | | | X2 | |
| 4762 | | | 32,3715 | 70434 0 | | RTB | SR1 | |
| 47625 | REP 3 | LAST 873 | 32,3716 | 45713 0 | | | DPMODE | |
| 476251 | | | 32,3717 | 58284 1 | | XSU,2 | DDV | |
| 4763 | REP 45 | LAST 881 | 32,3720 | 00048 0 | | | X1 | |
| 47635 | | | 32,3721 | 77857 0 | | SR* | | |
| 476351 | | | 32,3722 | 57170 0 | | | 6,2 | |
| 4764 | REP 3 | LAST 847 | 32,3723 | 03720 1 | | STORE | PCON | THETA2/(THETA1-X(T1)**2)=PCON B28/28 |
| 4765 | | | 32,3724 | 41386 1 | | SCRT | DMP | |
| 4766 | | | 32,3725 | 00011 1 | | | 08D | |
| 4767 | | | 32,3726 | 77701 1 | | NORM | | |
| 4768 | REP 46 | LAST 881 | 32,3727 | 00047 1 | | | X1 | |
| 4769 | | | 32,3730 | 14035 1 | | STODL | 28D | THETA3*PCON**5 B10/B8 -N1 |

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| | | | | | | | | | | |
|------|-----|----|------|-----|---------|---------|-------|---------|---------------------------|-----------|
| 4770 | REP | 23 | LAST | 881 | 32,3731 | 03722 0 | | | | |
| 4771 | | | | | 32,3732 | 74301 0 | NORM | X(T1) | | |
| 4772 | REP | 22 | LAST | 881 | 32,3733 | 00050 1 | | VXSC | | |
| 4773 | REP | 8 | LAST | 859 | 32,3734 | 03740 1 | | X2 | | |
| 4774 | | | | | 32,3735 | 74274 0 | XAD,2 | UR1/ | X(T1)*UR1/ | B5+B1 -N2 |
| 4775 | REP | 47 | LAST | 881 | 32,3736 | 00046 0 | | VXSC | | |
| 4776 | | | | | 32,3737 | 00035 1 | | X1 | | |
| 4777 | | | | | 32,3740 | 63257 1 | VSR* | 28D | | |
| 4778 | | | | | 32,3741 | 87207 0 | | FDVL | THETA3(PCON**5)X(T1)*UR1/ | B7/B5 |
| 4779 | REP | 5 | LAST | 859 | 32,3742 | 03746 1 | | 0 -9D,2 | + | |
| 4780 | | | | | 32,3743 | 53781 1 | VXSC | UH/ | THETA3(PCON**5)UH/ | B7/B5 |
| 4781 | | | | | 32,3744 | 00035 1 | | VSR* | | |
| 4782 | | | | | 32,3745 | 20575 1 | | 28D | | |
| 4783 | | | | | 32,3746 | 45455 1 | VAD | 0 -4,1 | = | |
| 4784 | REP | 7 | LAST | 888 | 32,3747 | 74077 1 | STORE | STADR | | |
| 4785 | | | | | 32,3750 | 51451 0 | | V2(T1)/ | V2(T1)/ | B7/B5 |
| 4786 | REP | 6 | LAST | 859 | 32,3751 | 03672 1 | VSI | ARVAL | | |
| 4787 | REP | 9 | LAST | 879 | 32,3752 | 03706 0 | | V(T1)/ | | |
| 4788 | | | | | 32,3753 | 77850 1 | STORE | DV | ARVAL(V2(T1)/-V1(T)/)=DV | B7/B5 |
| 4789 | | | | | 32,3754 | 00040 0 | OOTO | | | |
| | | | | | | | | 32D | | |



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P4800 SUBROUTINE TO COMPUTE BOUNDS ON INDEPENDENT VARIABLE X(T1)

| | | | | |
|-------|--------------|---|----|-------------|
| R4801 | INPUT | | | |
| R4802 | PUSHLIST | | | |
| R4803 | PUSHLOC -4 | MAJOR AXIS (MA) | DP | B30/B28 |
| R4805 | PUSHLOC -2 | MAJOR AXIS (MA) AGAIN | DP | B30/B28 |
| R4807 | 28D | BETA5=LAMBDA*SBTA1 | DP | B9 |
| R4809 | OTHER | | | |
| R4810 | RCON | | DP | B29/B27 |
| R4812 | R(T1) | | DP | B29/B27 |
| R4814 | OUTPUT | | | |
| R4815 | MPAC | | | |
| R4816 | X(T1)LIM | LIMIT ON INDEPENDENT VARIABLE X(T1) | DP | B5 |
| R4818 | DEBRIS | | | |
| R4819 | PUSHLIST | | | |
| R4820 | C(PUSHLOC) | MA-RCON | DP | (B30/28)-N1 |
| R4823 | C(PUSHLOC)+2 | MA | DP | B30/B28 |
| R4825 | X1 | NORMALIZATION FACTOR FOR MA-RCON | | |
| R4826 | 20D | XT1LIM SUBROUTINE RETURN ADDRESS | | |
| R4827 | PUSHLOC | IS RESTORED TO ITS ENTRANCE VALUE UPON EXITING XT1LIM | | |

| | | | | | | | | | |
|--------|-----|----|------|---------|---------|--------|---------|---------|--------------------------------|
| 4848 | REP | 1 | | 27,2000 | | SETLOC | RTE2 | | |
| 4849 | | | | 27,2033 | | RANK | | | |
| 4850 | | | | 27,2033 | 71220 1 | XT1LIM | SIO | DLOAD | |
| 4851 | | | | 27,2034 | 00024 1 | | | 20D | |
| 4852 | REP | 12 | LAST | 871 | 27,2035 | | | RCON | |
| 4853 | | | | | 27,2036 | | SR1 | RDSU | |
| 4854 | | | | | 27,2037 | | NORM | PDDL | MA-RCON |
| 4855 | REP | 23 | LAST | 882 | 27,2040 | | | X2 | B30-N1 |
| 4856 | | | | | 27,2041 | | PDDL | SR1 | |
| 4857 | REP | 7 | LAST | 872 | 27,2042 | | | R(T1) | |
| 4858 | | | | | 27,2043 | | RDSU | DDV | |
| 4859 | | | | | 27,2044 | | SL* | DMP | |
| 4860 | | | | | 27,2045 | | | 0 -1,2 | |
| 4861 | | | | | 27,2046 | | | 28D | |
| 48615 | | | | | 27,2047 | | SL* | | |
| 486151 | | | | | 27,2050 | | | 0 -7,1 | |
| 4862 | | | | | 27,2051 | | DSU | RNN | (BETA5(MA-R(T1)))/(MA-RCON))-1 |
| 4863 | REP | 1 | | | 27,2052 | | | 1RTEB10 | B10 |
| 4864 | REP | 1 | | | 27,2053 | | | XT1LIM5 | |
| 4865 | | | | | 27,2054 | | SORT | GOTO | |
| 4866 | REP | 1 | | | 27,2055 | | | XT1LIMX | |
| 4867 | | | | | 27,2056 | | XT1LIM5 | DLOAD | |
| 4868 | REP | 6 | LAST | 876 | 27,2057 | | | ZFRORTE | |
| 4869 | | | | | 27,2060 | | XT1LIMX | GOTO | |
| 4870 | | | | | 27,2061 | | | 20D | |



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P4900 CONSTANTS FOR THE P37 AND P70 PROGRAMS AND SUBROUTINES

| Address | Value | Label | Mode | Bank | RTBCON |
|---------|---------|---------|----------|---------|------------|
| 49005 | 38,3250 | | | BANK 36 | |
| 49006 | 34,2000 | | | RTBLOC | |
| 49001 | 34,3652 | | | BANK | |
| 4901 | 34,3652 | 20000 0 | 1RTER1 | 2DEC | 1.B-1 |
| 4901 | 34,3653 | 00000 1 | | | |
| 4902 | 34,3654 | 10000 0 | 1RTER2 | 2DEC | 1.B-2 |
| 4902 | 34,3655 | 00000 1 | | | |
| 4903 | 34,3656 | 04000 0 | 1RTER3 | 2DEC | 1.B-3 |
| 4903 | 34,3657 | 00000 1 | | | |
| 4904 | 34,3660 | 02000 0 | 1RTER4 | 2DEC | 1.B-4 |
| 4904 | 34,3661 | 00000 1 | | | |
| 4910 | 34,3662 | 00020 0 | 1RTER10 | 2DEC | 1.B-10 |
| 4910 | 34,3663 | 00000 1 | | | |
| 4912 | 34,3664 | 00004 0 | 1RTER12 | 2DEC | 1.B-12 |
| 4912 | 34,3665 | 00000 1 | | | |
| 4913 | 34,3666 | 00002 0 | 1RTER13 | 2DEC | 1.B-13 |
| 4913 | 34,3667 | 00000 1 | | | |
| 4911 | 34,3670 | 00000 1 | 1RTER17 | 2DEC | 1.B-17 |
| 4911 | 34,3671 | 04000 0 | | | |
| 4925 | 34,3672 | 00000 1 | 1RTER25 | 2DEC | 1.B-25 |
| 4925 | 34,3673 | 00010 0 | | | |
| 4928 | 34,3614 | 00000 1 | 1RTER28 | 2DEC | 1.B-28 |
| 4928 | 34,3675 | 00001 0 | | | |
| 4929 | 34,3616 | 00000 1 | Z8RORTE | 2DEC | 0 |
| 4929 | 34,3677 | 00000 1 | | | |
| 4930 | 34,3700 | 77777 0 | M144RTE | 2DEC | -144.B-28 |
| 4930 | 34,3701 | 77557 0 | | | |
| 49301 | 34,3702 | 77777 0 | M15RTE | 2DEC | -15 |
| 49301 | 34,3703 | 77760 0 | | | |
| 49302 | 34,3704 | 00000 1 | 10RTE | 2DEC | 10 |
| 49302 | 34,3705 | 00012 1 | | | |
| 49303 | 34,3706 | 54831 1 | M.6RTE | 2DEC | -.6 |
| 49303 | 34,3707 | 63145 1 | | | |
| 4931 | 34,3710 | 21463 0 | 1.1RTER1 | 2DEC | 1.1B-1 |
| 4931 | 34,3711 | 06315 0 | | | |
| 49311 | 34,3712 | 11717 0 | M6RTER28 | 2DEC | -6 |
| 49311 | 34,3713 | 77771 0 | | | |
| 49312 | 34,3714 | 37777 1 | 2RTER1 | 2OCT | 3777737777 |
| 49312 | 34,3715 | 37777 1 | | | |
| 4932 | 34,3716 | 77777 0 | M9RTER28 | 2DEC | -9 |
| 4932 | 34,3717 | 77766 0 | | | |
| 4933 | 34,3720 | 77777 0 | M8RTER28 | 2DEC | -8 |
| 4933 | 34,3721 | 77767 1 | | | |
| 4934 | 34,3722 | 00000 1 | 30480RTE | 2DEC | 30480.B-29 |
| 4934 | 34,3723 | 35610 0 | | | |
| 4935 | 34,3724 | 36703 0 | VCSPS | 2DEC | 30.8811B-5 |
| 4935 | 34,3725 | 03743 1 | | | |



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| | | | | | |
|------|---------|---------|----------|---------|---------------|
| 4936 | 34,3726 | 33041 1 | VCRCS | ZDEC | 27.0664B-5 |
| 4936 | 34,3727 | 37714 1 | | | |
| 4937 | 34,3730 | 00003 1 | MDOTRCS | ZDEC | .0016375B-3 |
| 4937 | 34,3731 | 13241 1 | | | |
| 4938 | 34,3732 | 20000 0 | CSURF | ZDEC | .5 |
| 4938 | 34,3733 | 00000 1 | | | |
| 4940 | 34,3734 | 00605 1 | OCT605 | OCT | 00605 |
| 4941 | 34,3735 | 00612 1 | OCT612 | OCT | 00612 |
| 4942 | 34,3736 | 00613 0 | OCT613 | OCT | 00613 |
| 4943 | 34,3737 | 40214 1 | MCOS7.5 | ZDEC | -.99144488 |
| 4943 | 34,3740 | 45286 1 | | | |
| 4944 | 34,3741 | 73645 1 | MSIN7.5 | ZDEC | -.13052619 |
| 4944 | 34,3742 | 56536 1 | | | |
| 4945 | 34,3743 | 70487 0 | MCOS22.5 | ZDEC | -.92387953B-2 |
| 4945 | 34,3744 | 71205 0 | | | |
| 4946 | 34,3745 | 16525 1 | THETA165 | ZDEC | .458333333 |
| 4946 | 34,3746 | 12525 0 | | | |
| 4947 | 34,3747 | 22525 0 | THETA210 | ZDEC | .583333333 |
| 4947 | 34,3750 | 12525 0 | | | |
| 4951 | 34,3751 | 17775 1 | EPC1RTE | ZDEC | .99966B-1 |
| 4951 | 34,3752 | 06676 0 | | | |
| 4952 | 34,3753 | 00000 1 | EPC2RTE | ZDEC | 100.B-29 |
| 4952 | 34,3754 | 00062 0 | | | |
| 4953 | 34,3755 | 00020 0 | EPC3RTE | ZDEC | .001 |
| 4953 | 34,3756 | 14223 1 | | | |
| 4954 | 34,3757 | 00000 1 | EPC4RTE | ZDEC | .00001 |
| 4954 | 34,3760 | 05174 0 | | | |
| 4955 | 34,3761 | 00002 0 | EPC5RTE | ZDEC | .01B-6 |
| 4955 | 34,3762 | 21727 0 | | | |
| 4956 | 34,3763 | 00000 1 | EPC6RTE | ZDEC | .000007B-1 |
| 4956 | 34,3764 | 01654 1 | | | |
| 4957 | 34,3765 | 00000 1 | EPC7RTE | ZDEC | 1000.B-29 |
| 4957 | 34,3766 | 00764 1 | | | |
| 4958 | 34,3767 | 00040 0 | EPC8RTE | ZDEC | .002 |
| 4958 | 34,3770 | 30447 0 | | | |
| 4959 | 34,3771 | 00000 1 | EPC9RTE | ZDEC | 1.B-25 |
| 4959 | 34,3772 | 00010 0 | | | |
| 4960 | 34,3773 | 00000 1 | EPC10RTE | ZDEC | .0001B-7 |
| 4960 | 34,3774 | 00322 1 | | | |
| 4961 | 35,3755 | | BANK | 35 | |
| 4962 | 35,2000 | | SETLOC | RTECON1 | |
| 4963 | 35,3755 | | BANK | | |
| 4964 | 35,3755 | 27657 0 | C4RTE | ZDEC | 8.E8B-30 |
| 4964 | 35,3756 | 01000 0 | | | |
| 4971 | 35,3757 | 00325 0 | K1RTE | ZDEC | 7.E8B-29 |
| 4971 | 35,3760 | 23740 0 | | | |
| 4972 | 35,3761 | 00306 1 | K2RTE | ZDEC | 6495000.B-29 |
| 4972 | 35,3762 | 06614 1 | | | |
| 4973 | 35,3763 | 76027 0 | K3RTE | ZDEC | -.06105 |
| 4973 | 35,3764 | 70156 1 | | | |



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| | | | | | |
|------|---------|---------|---------|------|----------------|
| 4974 | 35,3765 | 74517 1 | K4RTE | 2DEC | -.10453 |
| 4974 | 35,3766 | 54131 0 | | | |
| 4980 | 35,3767 | 30276 1 | R1MURTE | 2DEC | 199850.501B-18 |
| 4980 | 35,3770 | 05001 0 | | | |
| 4995 | 35,3771 | 00003 1 | R3RTE | 2DEC | 121920.B-29 |
| 4995 | 35,3772 | 27040 0 | | | |

L S-BAND ANTENNA FOR CM

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| | | | | | | | | | | | |
|-------|-----|-----|------|---------|---------|-------|------|--------|----------|----------|----------|
| 2000 | | | | 23,3140 | | | | BANK | 23 | | |
| 2001 | REP | 1 | | 42,2000 | | | | SETLOC | SBAND | | |
| 2002 | | | | 42,3565 | | | | BANK | | | |
| 2003 | REP | 1 | | | | | | COUNT* | 88/R05 | | |
| 2004 | REP | 3 | LAST | 762 | E4,1417 | | | EBANK* | EMSALT | | |
| 20061 | REP | 238 | LAST | 853 | 42,3565 | 0 | 4555 | 0 | SRANDANT | TC | BANKCALL |
| 20062 | REP | 8 | LAST | 757 | 42,3566 | 17573 | 0 | | CADR | R02BOTH | |
| 2007 | REP | 221 | LAST | 853 | 42,3567 | 0 | 6006 | 1 | TC | INTPRET | |
| 2008 | | | | | 42,3570 | 45034 | 1 | | RTB | CALL | |
| 2009 | REP | 24 | LAST | 744 | 42,3571 | 45505 | 0 | | | LOADTIME | |
| 2010 | REP | 9 | LAST | 731 | 42,3572 | 47432 | 1 | | | COUTRIG | |
| 2012 | REP | 46 | LAST | 868 | 42,3573 | 34041 | 0 | | STCALL | TDEC1 | |
| 2013 | REP | 9 | LAST | 734 | 42,3574 | 27045 | 0 | | | CNCONIC | |
| 2014 | | | | | 42,3575 | 46135 | 1 | | SLOAD | BHIZ | |
| 2015 | REP | 24 | LAST | 883 | 42,3576 | 00050 | 1 | | | X2 | |
| 2016 | REP | 1 | | | 42,3577 | 65612 | 1 | | | EISOI | |
| 2017 | | | | | 42,3600 | 77775 | 1 | | VLOAD | | |
| 2018 | REP | 35 | LAST | 869 | 42,3601 | 00001 | 0 | | | RATT | |
| 2019 | REP | 1 | | | 42,3602 | 00003 | 1 | | STORE | RCM | |
| 2020 | | | | | 42,3603 | 45145 | 0 | | DLOAD | CALL | |
| 2021 | REP | 9 | LAST | 869 | 42,3604 | 00015 | 0 | | | TAT | |
| 2022 | REP | 1 | | | 42,3605 | 54115 | 0 | | | LUNPOS | |
| 2023 | | | | | 42,3606 | 57455 | 1 | | VAD | VCOMP | |
| 2024 | REP | 2 | LAST | 887 | 42,3607 | 00003 | 1 | | | RCM | |
| 2025 | | | | | 42,3610 | 77650 | 1 | | GOTO | | |
| 2026 | REP | 2 | LAST | 887 | 42,3611 | 65614 | 1 | | | EISOI +2 | |
| 2027 | | | | | 42,3612 | 57575 | 1 | | EISOI | VLOAD | VCOMP |
| 2028 | REP | 36 | LAST | 887 | 42,3613 | 00001 | 0 | | | RATT | |
| 2029 | | | | | 42,3614 | 64201 | 0 | | SETPD | MXV | |
| 2030 | | | | | 42,3615 | 00003 | 1 | | | 2D | |
| 2031 | REP | 35 | LAST | 838 | 42,3616 | 01736 | 1 | | | REFSMAT | |
| 2032 | | | | | 42,3617 | 65372 | 1 | | VSL1 | PDDL | |
| 2033 | REP | 24 | LAST | 833 | 42,3620 | 15332 | 1 | | | H16ZEROS | |
| 2034 | REP | 1 | | | 42,3621 | 24025 | 0 | | STOVL | YAWANG | |
| 2035 | REP | 3 | LAST | 887 | 42,3622 | 00003 | 1 | | | RCM | |
| 2036 | | | | | 42,3623 | 77624 | 1 | | CALL | | |
| 2037 | REP | 5 | LAST | 877 | 42,3624 | 47577 | 1 | | | *SNB* | |
| 2038 | REP | 1 | | | 42,3625 | 00003 | 1 | | STORE | R | |
| 2039 | | | | | 42,3626 | 63256 | 0 | | UNIT | PDVL | |
| 2040 | REP | 2 | LAST | 887 | 42,3627 | 00003 | 1 | | | R | |
| 2041 | | | | | 42,3630 | 72431 | 1 | | VPROJ | VSL2 | |
| 2042 | REP | 2 | LAST | 281 | 42,3631 | 15324 | 0 | | | H1UNITZ | |
| 2043 | | | | | 42,3632 | 40045 | 1 | | BVSU | BOV | |
| 2044 | REP | 3 | LAST | 887 | 42,3633 | 00003 | 1 | | | R | |
| 2045 | REP | 1 | | | 42,3634 | 65635 | 1 | | | COVCNV | |
| 2046 | | | | | 42,3635 | 40056 | 0 | | COVCNV | UNIT | |
| 2047 | REP | 1 | | | 42,3636 | 65652 | 0 | | | NOADJUST | |
| 2048 | | | | | 42,3637 | 50206 | 0 | | PUSH | DOT | |

V 64 E GETS US HERE
CHECK IF IMU IS ON AND ALIGNED

PICKUP CURRENT TIME SCALED B-28
COMPUTE SINES AND COSINES OF CDU ANGLES
ADVANCE INTEGRATION TO TIME IN TDEC1
USING CONIC INTEGRATION
ORIGIN OF REFERENCE INERTIAL SYSTEM IS
EARTH = 0, MOON = 2

MOVE RATT TO PREVENT WIPEOUT
MOON, PUSH ON
GET ORIGINAL TIME
COMPUTE POSITION VECTOR OF MOON
R = -(RCM+RCM) = NEG. OF S/C POS. VEC

EARTH, R = -RCM

RCB TO STABLE MEMBER- B-1X B-29X B+1
2D
STABLE MEMBER. B-1X B-29X B+1 = B-29
8D

ZERO OUT YAWANG, SET UP FOR SMNB
TRANSFORMATION. SM COORD. SCALED B-29

SAVE NAV. BASE COORDINATES
14D

COMPUTE PROJECTION OF VECTOR INTO CM
XY-PLANE, R-(R.UZ)UZ
CLEAR OVERFLOW INDICATOR IF SET

TEST OVERFLOW FOR INDICATION OF NULL
VECTOR
20D

L S-BAND ANTENNA FOR CM

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| | | | | | | | |
|-------|-----|-----|------|-----|---------|--------|---|
| 2040 | REP | 4 | LAST | 389 | 42,3640 | 15330 | 0 |
| 2050 | | | | | 42,3641 | 65552 | 0 |
| 2051 | | | | | 42,3642 | 50315 | 0 |
| 2052 | REP | 1 | | | 42,3643 | 00017 | 1 |
| 2053 | REP | 2 | LAST | 281 | 42,3644 | 15326 | 1 |
| 2054 | | | | | 42,3645 | 51152 | 0 |
| 2055 | REP | 2 | LAST | 887 | 42,3646 | 65652 | 0 |
| 2056 | | | | | 42,3647 | 45345 | 1 |
| 2057 | REP | 10 | LAST | 624 | 42,3650 | 15340 | 1 |
| 2058 | | | | | 42,3651 | 77606 | 1 |
| 2059 | | | | | 42,3652 | 50375 | 0 |
| 2060 | REP | 1 | | | 42,3653 | 00011 | 1 |
| 2061 | REP | 3 | LAST | 887 | 42,3654 | 15324 | 0 |
| 2062 | | | | | 42,3655 | 65552 | 0 |
| 2063 | | | | | 42,3656 | 77625 | 0 |
| 2064 | REP | 3 | LAST | 835 | 42,3657 | 15322 | 0 |
| 2065 | REP | 4 | LAST | 275 | 42,3660 | 16321 | 0 |
| 2066 | REP | 2 | LAST | 887 | 42,3661 | 00025 | 0 |
| 2067 | REP | 2 | LAST | 275 | 42,3662 | 02323 | 1 |
| 2068 | | | | | 42,3663 | 77776 | 1 |
| 20681 | REP | 19 | LAST | 743 | 42,3664 | 3 1044 | 0 |
| 20682 | REP | 32 | LAST | 700 | 42,3665 | 7 4706 | 0 |
| 20683 | | | | | 42,3666 | 0 0006 | 1 |
| 20684 | REP | 32 | LAST | 624 | 42,3667 | 1 5423 | 0 |
| 2069 | REP | 1 | | | 42,3670 | 3 3704 | 1 |
| 2070 | REP | 239 | LAST | 887 | 42,3671 | 0 4555 | 0 |
| 2071 | REP | 3 | LAST | 561 | 42,3672 | 20504 | 1 |
| 2072 | REP | 7 | LAST | 510 | 42,3673 | 0 5514 | 1 |
| 2073 | REP | 8 | LAST | 888 | 42,3674 | 0 5514 | 1 |
| 2074 | REP | 102 | LAST | 851 | 42,3675 | 0 5112 | 0 |
| 2075 | REP | 25 | LAST | 892 | 42,3676 | 3 4710 | 0 |
| 2076 | REP | 16 | LAST | 851 | 42,3677 | 0 5415 | 1 |
| 2077 | REP | 60 | LAST | 779 | 42,3700 | 3 4712 | 1 |
| 2078 | REP | 240 | LAST | 888 | 42,3701 | 0 4555 | 0 |
| 2079 | REP | 12 | LAST | 759 | 42,3702 | 01732 | 0 |
| 2080 | REP | 2 | LAST | 244 | 42,3703 | 1 3567 | 1 |
| 2086 | | | | | 42,3704 | 01463 | 1 |
| 2087 | | | | | 0002 | | |
| 2088 | | | | | 0010 | | |
| 2089 | | | | | 0016 | | |
| 2090 | | | | | 0024 | | |
| 2091 | | | | | 0026 | | |
| 2092 | REP | 4 | LAST | 887 | 0002 | | |

| | |
|-----------|-------------|
| SL1 | HIUNITY |
| ACOS | ACOS |
| DOT | DOT |
| URP | URP |
| SL1 | HIUNITY |
| BPL | BPL |
| NOADJUST | NOADJUST |
| DSU | DSU |
| DLOAD | DLOAD |
| DPPOS MAX | DPPOS MAX |
| PUSH | PUSH |
| NOADJUST | VLOAD |
| DOT | DOT |
| UR | UR |
| HIUNITY | HIUNITY |
| ACOS | ACOS |
| SL1 | ACOS |
| DSU | DSU |
| HIDP1/4 | HIDP1/4 |
| RHOSB | RHOSB |
| STODL | STODL |
| YAWANG | YAWANG |
| STORE | GAMMASB |
| EXIT | EXIT |
| CA | EXTRACT |
| MASK | BITS |
| EXTEND | EXTEND |
| R2P | ENDEXT |
| CAP | V06N51 |
| TC | BANKCALL |
| CADR | GOMARKPR |
| TC | R5OFF |
| TC | R5OFF |
| TC | ENDOFJOB |
| CAP | BIT3 |
| TC | BLANKET |
| CAP | RIT1 |
| TC | BANKCALL |
| CADR | DELAYJOB |
| TOP | SRANDANT +2 |
| V06N51 | VN |
| RCM | EQUALS 2D |
| UR | EQUALS 8D |
| URP | EQUALS 14D |
| YAWANG | EQUALS 20D |
| PITCHANG | EQUALS 22D |
| R | EQUALS RCM |

COMPUTE YAW ANGLE = ACOS (URP.UX)
 REVOLUTIONS SCALED B0
 22D YAWANG

COMPUTE FOLLOWING- URP.UY
 POSITIVE
 YES, 0- 180 DEGREES
 NO, 181-360 DEGREES 20D
 COMPUTE 2 PI MINUS YAW ANGLE
 22D YAWANG
 COMPUTE PITCH ANGLE
 ACOS (UR.UZ) - PI/2

REVOLUTIONS B0

PATCH FOR CHECKOUT
 IS BIT 5 STILL ON

NO, WE HAVE BEEN ANSWERED
 DISPLAY ANGLES

TERMINATE

RECYCLE
 IMMEDIATE RETURN
 BLANK R3
 DELAY MINIMUM TIME TO ALLOW DISPLAY IN

L LUNAR LANDMARK SELECTION FOR CM

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| | | | | | | | | |
|--------|-----|-----|------|---------|------------------|----------------------|---|--|
| 0001 | | | | 31,3215 | | BANK 31 | | |
| 0002 | REP | 1 | | 31,2000 | | SETLOC R35 | | |
| 0003 | | | | 31,3215 | | BANK | | |
| 0004 | REP | 1 | | | | COUNT 31/R35 | | |
| 0005 | REP | 2 | LAST | 88 | E4,1724 | EBANK= JLOOPCNT | | |
| 0006 | REP | 222 | LAST | 887 | 31,3215 0 6006 1 | TC INTPRET | | |
| 0007 | | | | | 31,3216 77634 0 | RTB | | |
| 0008 | REP | 25 | LAST | 887 | 31,3217 45505 0 | LOADTIME | PICK UP TIME SCALED B-28 | |
| 0009 | REP | 37 | LAST | 897 | 31,3220 01046 1 | STORE DSPTM1 | | |
| 0010 | | | | | 31,3221 77776 1 | EXIT | | |
| 0011 | REP | 1 | | | 31,3222 3 3535 1 | DISCRET CAP V08N34** | DISPLAY GROUND ELAPSED TIME | |
| 0012 | REP | 241 | LAST | 888 | 31,3223 0 4555 0 | TC BANKCALL | | |
| 0013 | REP | 6 | LAST | 882 | 31,3224 20465 1 | CADR COMARKP | | |
| 0014 | REP | 33 | LAST | 888 | 31,3225 0 5423 1 | TC ENDEXT | TERMINATE WITH V34E | |
| 0015 | REP | 1 | | | 31,3226 0 3230 0 | TC CALCTLS | PROCEED WITH V33E | |
| 0016 | REP | 1 | | | 31,3227 0 3222 0 | TC DISCRET | NEW TIME LOADED VIA V25E | |
| 0017 | REP | 223 | LAST | 889 | 31,3230 0 6006 1 | CALCTLS TC INTPRET | | |
| 0018 | | | | | 31,3231 43175 0 | VLOAD SET | | |
| 00181 | REP | 8 | LAST | 897 | 31,3232 02028 1 | RLS | | |
| 001815 | REP | 12 | LAST | 857 | 31,3233 00482 1 | ERADFLAG | SET. CONSTANT REARTH (RM) | |
| 00182 | | | | | 31,3234 14001 0 | STOVL 0D | PD0-5 5 RP VECTOR | |
| 00183 | REP | 1 | | | 31,3235 23534 1 | RCSML | | |
| 00184 | | | | | 31,3236 14007 0 | STOVL 0D | PD6-7 5 DUMMY TIME | |
| 00185 | REP | 2 | LAST | 889 | 31,3237 23534 1 | RCSML | MPAC 5 NON-ZERO FOR MOON CASE | |
| 001853 | | | | | 31,3240 77614 1 | SET | | |
| 001856 | REP | 21 | LAST | 857 | 31,3241 01463 1 | LUNAPLAG | SET. LUNAR LAT-LONG | |
| 00186 | | | | | 31,3242 77624 1 | CALL | | |
| 00187 | REP | 1 | | | 31,3243 81762 0 | RPTGLONG | RP TO LONG | |
| 00188 | | | | | 31,3244 77745 1 | DLOAD | | |
| 00189 | REP | 8 | LAST | 857 | 31,3246 01106 1 | LONG | | |
| 001895 | REP | 1 | | | 31,3248 16353 0 | STOVL LSLONG | SAVE LND SITE LONG. | |
| 0019 | REP | 38 | LAST | 889 | 31,3247 01046 1 | DSPTM1 | | |
| 0020 | REP | 47 | LAST | 887 | 31,3250 34041 0 | STCALL TDEC1 | ADVANCE INTEGRATION TO TIME IN TDEC1 | |
| 0021 | REP | 7 | LAST | 858 | 31,3251 27022 1 | CMPREC | USING PRECISION INTEGRATION | |
| 0022 | | | | | 31,3252 77775 1 | VLOAD | | |
| 0023 | REP | 6 | LAST | 598 | 31,3253 00017 1 | RATT1 | | |
| 0025 | REP | 2 | LAST | 88 | 31,3254 02337 1 | STORE POSVECT | SAVE POSITION VECTOR SCALED B-27 | |
| 0026 | REP | 15 | LAST | 857 | 31,3255 26152 0 | STOVL ALPHAV | FOR LAT-LONG | |
| 0028 | REP | 5 | LAST | 503 | 31,3256 00025 0 | VATT1 | | |
| 0030 | REP | 2 | LAST | 88 | 31,3257 16345 1 | STOVL VELVECT | SAVE VEL. VECTOR B-5 | |
| 0031 | REP | 10 | LAST | 887 | 31,3260 00015 0 | TAT | | |
| 0032 | REP | 2 | LAST | 88 | 31,3261 36323 0 | STCALL VECTIME | SAVE TIME | |
| 0033 | REP | 7 | LAST | 857 | 31,3262 28322 0 | LAT-LONG | COMPUTE LAT, LONG, ALT OF S/C PD600 | |
| 0034 | | | | | 31,3263 76145 0 | DLOAD AXT,1 | SAVE S/C LONGITUDE | |
| 0035 | REP | 9 | LAST | 889 | 31,3264 01106 1 | LONG | | |
| 0036 | REP | 2 | LAST | 889 | 31,3265 02352 1 | LSLONG | | |
| 0037 | REP | 2 | LAST | 88 | 31,3266 36335 1 | STCALL LONGSAVE | XR1 = LANDING SITE LONG--SINUS MEDII, OCE | |
| 0038 | REP | 1 | | | 31,3267 63414 0 | ELAPTIME | ANUS PROCIJARM, MARE TRANQUILLITATIS | |
| | | | | | | | COMPUTE TL (TIME TO LANDING SITE) | |



L LANDMARK SELECTION FOR ON

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| Address | Operation | Count | Address | Address | Address | Instruction | Instruction | Instruction | Instruction |
|---------|------------------|---------|----------|----------|---------|-------------|-------------|-------------|---|
| 0089 | REP 3 LAST 890 | 31,3352 | 02327 0 | | | NKVAL | | | |
| 0090 | | 31,3353 | 52030 0 | | | BRIZ | GOTO | | J = NKVAL |
| 0091 | REP 1 | 31,3354 | 63356 1 | | | DISLID | DISLID | | YES, GO DISPLAY LANDMARK ID, MAYBE TL |
| 0092 | REP 1 | 31,3355 | 63315 0 | | | JLOOPP | JLOOPP | | NO, ONE MORE TIME |
| 0093 | | 31,3356 | 70535 0 | DISLID | BLOAD | SR1 | | | ID = -INDEXNUM/2 + 1 |
| 0094 | REP 3 LAST 890 | 31,3357 | 02334 1 | | | INDEXNUM | | | |
| 0095 | | 31,3360 | 63144 0 | | LXC,2 | INCR,2 | | | |
| 0096 | REP 288 LAST 863 | 31,3361 | 00154 1 | | | MPAC +0 | | | |
| 0097 | | 31,3362 | 00001 0 | | | ID | | | |
| 0098 | | 31,3363 | 77534 0 | | SKA,2 | EXIT | | | |
| 0099 | REP 24 LAST 732 | 31,3364 | 02751 0 | | | LANDMARK | | | DISPLAY LANDMARK ID |
| 0100 | REP 1 | 31,3365 | 3 3537 0 | | CAP | V05N70** | | | |
| 0101 | REP 243 LAST 890 | 31,3366 | 0 4555 0 | | TC | BANKCALL | | | |
| 0102 | REP 4 LAST 888 | 31,3367 | 20504 1 | | CADR | GMARKPR | | | |
| 0103 | REP 35 LAST 890 | 31,3370 | 0 5423 1 | | TC | ENDEXT | | | TERMINATE WITH V34E |
| 0104 | REP 1 | 31,3371 | 0 3376 0 | | TC | DISTL | | | PROCEED WITH V33E |
| 0105 | REP 1 | 31,3372 | 0 3404 1 | | TC | NEXTRAND | | | RECYCLE WITH V32E |
| 0106 | REP 21 LAST 840 | 31,3373 | 3 4715 0 | | CAP | FIVE | | | BLANK R1 AND R3 |
| 0107 | REP 17 LAST 888 | 31,3374 | 0 5415 1 | | TC | BLANKET | | | |
| 0108 | REP 103 LAST 888 | 31,3375 | 0 5112 0 | | TC | ENDOFJOB | | | |
| 0109 | REP 2 LAST 889 | 31,3376 | 3 3535 1 | DISTL | CAP | V06N34** | | | DISPLAY GROUND ELAPSED TIME TO LANDMARK |
| 0110 | REP 244 LAST 891 | 31,3377 | 0 4555 0 | | TC | BANKCALL | | | |
| 0111 | REP 8 LAST 890 | 31,3400 | 20465 1 | | CADR | GMARKP | | | |
| 0112 | REP 36 LAST 891 | 31,3401 | 0 5423 1 | | TC | ENDEXT | | | TERMINATE WITH V34E |
| 0113 | REP 2 LAST 891 | 31,3402 | 0 3404 1 | | TC | NEXTRAND | | | PROCEED WITH V33E |
| 0114 | REP 2 LAST 891 | 31,3403 | 0 3376 0 | | TC | DISTL | | | ILLEGAL RESPONSE, DO AGAIN |
| 0115 | REP 225 LAST 890 | 31,3404 | 0 6006 1 | NEXTRAND | TC | INTPRET | | | MUST WE GO ON |
| 0116 | | 31,3405 | 66350 1 | | LXA,1 | SSP | | | RESTORE COUNTER |
| 0117 | REP 4 LAST 890 | 31,3406 | 02325 1 | | | KLOOPNT | | | |
| 0118 | REP 36 LAST 872 | 31,3407 | 00051 0 | | | S1 | | | |
| 0119 | | 31,3410 | 00001 0 | | | ID | | | |
| 0120 | | 31,3411 | 77500 1 | | TIX,1 | EXIT | | | |
| 0121 | REP 1 | 31,3412 | 63307 0 | | | KLOOP | | | YES; K = K - 1 |
| 0122 | REP 37 LAST 891 | 31,3413 | 0 5423 1 | | TC | ENDEXT | | | K = 0, EXIT R35 |

L LUNAR LANDMARK SELECTION FOR CM

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| | | | | | | | |
|-------|-----|----|---------|---------|--------------|-----------|--|
| 0123 | | | 31,3414 | 66020 0 | ELAPTIME STO | SA,1 | SAVE RETURN AND INDEX 1 |
| 0124 | REP | 1 | 31,3415 | 02321 0 | | RESTLOCN | |
| 0125 | REP | 5 | 31,3416 | 02320 1 | | XRIHOLD | |
| 0126 | | | 31,3417 | 77601 0 | SETPD | | |
| 0127 | | | 31,3420 | 00001 0 | | OD | PD=00 |
| 0128 | | | 31,3421 | 65375 0 | VLOAD | PDDL | PD=06 |
| 0129 | REP | 4 | 31,3422 | 15324 0 | | HIUNITE | SET UP FOR RP-TO-R |
| 0130 | REP | 3 | 31,3423 | 02323 1 | | VECTIME | |
| 0131 | | | 31,3424 | 45125 0 | PDDL | CALL | PD=08 |
| 0132 | REP | 12 | 31,3425 | 15340 1 | | DPPOS MAX | |
| 0133 | REP | 5 | 31,3426 | 55341 1 | | RP-TO-R | TRANSFORM PLANETARY TO RCS PD=00 |
| 0134 | | | 31,3427 | 53515 0 | PDDL | UNIT | COMPUTE AND STORE UZ PD=06 |
| 0135 | REP | 3 | 31,3430 | 02337 1 | | POSVECT | POSITION VECTOR OF CM SCALED B-27 |
| 0136 | | | 31,3431 | 47206 0 | PUSH | VXV | COMPUTE AND STORE UR = UNIT(R) PD=12 |
| 0137 | REP | 1 | 31,3432 | 00001 0 | | UZZ | |
| 0138 | | | 31,3433 | 53572 1 | VSL1 | UNIT | |
| 0139 | | | 31,3434 | 47206 0 | PUSH | VXV | COMPUTE AND STORE UW=UNIT(UR X UZ) PD=18 |
| 0140 | REP | 2 | 31,3435 | 00001 0 | | UZZ | |
| 0141 | | | 31,3436 | 53572 1 | VSL1 | UNIT | |
| 0142 | | | 31,3437 | 47315 0 | PDDL | VXV | COMPUTE AND STORE UN=UNIT(UW X UZ) PD=24 |
| 0143 | REP | 4 | 31,3440 | 02337 1 | | POSVECT | POSITION VECTOR OF CM SCALED B-27 |
| 0144 | REP | 3 | 31,3441 | 02345 1 | | VELVECT | VELOCITY VECTOR OF CM SCALED B-5 |
| 0145 | | | 31,3442 | 53572 1 | VSL1 | UNIT | COMPUTE AND STORE U = UNIT(R X V) PD=30 |
| 0146 | | | 31,3443 | 70125 0 | PDDL | LXC,1 | RESTORE INDEX 1 COMPLEMENTED |
| 0147 | REP | 3 | 31,3444 | 02335 0 | | LONGSAVE | |
| 0148 | REP | 6 | 31,3445 | 02320 1 | | XRIHOLD | |
| 0149 | | | 31,3446 | 41223 1 | DSL* | DMP | |
| 0150 | | | 31,3447 | 00001 0 | | 0,1 | |
| 0151 | REP | 3 | 31,3450 | 23534 1 | | RRCM, | |
| 0152 | | | 31,3451 | 73406 1 | PUSH | SIN | DLONG = .997(LONG - LONGJ) PD=32 |
| 0153 | | | 31,3452 | 76561 1 | VXSC | VSL1 | |
| 0154 | REP | 1 | 31,3453 | 00023 0 | | LN | U'W = UW COS(DLONG) + UN SIN(DLONG) |
| 0155 | | | 31,3454 | 71525 0 | PDDL | COS | PD=36 |
| 0156 | | | 31,3455 | 76561 1 | VXSC | VSL1 | |
| 0157 | REP | 1 | 31,3456 | 00015 0 | | UW | |
| 0158 | | | 31,3457 | 47255 0 | VAD | VXV | PD=30,PD=24 |
| 0159 | | | 31,3460 | 53572 1 | VSL1 | UNIT | UD = UNIT (U'W X U) |
| 0160 | REP | 16 | 31,3461 | 02152 0 | STORE | ALPHAV | SET UD FOR LAT-LONG--POINT OF CLOSEST |
| 0161 | | | 31,3462 | 72441 0 | DOT | SL1 | APPROACH |
| 0162 | REP | 1 | 31,3463 | 00007 0 | | URR | COS (THETA) = (UD . UR) |
| 0163 | REP | 8 | 31,3464 | 02734 0 | STORE | CSTH | |
| 0164 | | | 31,3465 | 73526 1 | ACOS | SIN | THETA = ACOS((UD.UR), 0 TO PI |
| 0165 | REP | 8 | 31,3466 | 26732 0 | STOVL | SNTH | SIN (THETA), 0 TO PI |
| 01651 | REP | 2 | 31,3467 | 00007 0 | | URR | |
| 01652 | | | 31,3470 | 50235 0 | VXV | DOT | |
| 01653 | REP | 17 | 31,3471 | 02152 0 | | ALPHAV | |
| 01654 | | | 31,3472 | 00031 0 | | 24D | |
| 01655 | | | 31,3473 | 71244 0 | RPL | DLOAD | CHK ((R X (D).U) |
| 01656 | | | 31,3474 | 63500 1 | | +4D | |
| 01657 | REP | 9 | 31,3475 | 02732 0 | | SNTH | NRG, THETA = 2 PI - THETA |

L LUNAR LANDMARK SELECTION FOR CM

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| | | | | | |
|-------|-----|----|------|---------|-----------------|
| 01656 | | | | 31,3476 | 77676 0 |
| 01659 | REP | 10 | LAST | 892 | 31,3477 02732 0 |
| 0166 | | | | 31,3500 | 43175 0 |
| 0167 | REP | 5 | LAST | 892 | 31,3501 02337 1 |
| 0168 | REP | 7 | LAST | 863 | 31,3502 03466 0 |
| 0169 | REP | 10 | LAST | 863 | 31,3503 26857 1 |
| 0170 | REP | 4 | LAST | 892 | 31,3504 02345 1 |
| 0171 | REP | 14 | LAST | 863 | 31,3505 02746 0 |
| 0172 | | | | 31,3506 | 45160 1 |
| 0173 | | | | 31,3507 | 00012 1 |
| 0174 | REP | 6 | LAST | 850 | 31,3510 24737 1 |
| 0175 | | | | 31,3511 | 43014 0 |
| 0176 | REP | 1 | | | 31,3512 04313 1 |
| 0177 | REP | 1 | | | 31,3513 63523 0 |
| 0178 | REP | 1 | | | 31,3514 04310 1 |
| 0179 | REP | 2 | LAST | 893 | 31,3515 63523 0 |
| 0180 | | | | 31,3516 | 43345 1 |
| 0181 | REP | 4 | LAST | 892 | 31,3517 02323 1 |
| 0182 | REP | 9 | LAST | 863 | 31,3520 00037 0 |
| 0183 | | | | 31,3521 | 77650 1 |
| 0184 | REP | 2 | LAST | 892 | 31,3522 02321 0 |
| 0185 | | | | 31,3523 | 52145 0 |
| 0186 | REP | 25 | LAST | 887 | 31,3524 15332 1 |
| 0187 | REP | 3 | LAST | 893 | 31,3525 02321 0 |

DCOMP
 STORE SWTH
 VLOAD SET
 POSVECT
 RVSW
 STOVL RVEC
 VELVECT
 STORE VVEC
 AXC,1 CALL
 10D
 TIMETHET
 BQN
 BQN
 COGFLAG
 ETERROR
 INFINPLG
 ETERROR
 DLOAD DAD
 VECTIME
 T
 GOTO
 RETLOCN
 DLOAD GOTO
 HI6ZEROS
 RETLOCN

ERGO SIN (THETA) = - SIN (THETA)
 TIME ONLY
 MOON ONLY
 COMPUTE TRANSFER TIME
 NO SOLUTION SINCE NEAR RECTILINEAR
 NO PHYSICAL SOLUTION EXISTS
 COMPUTE GROUND ELAPSED TIME PD=00
 EXIT ELAPTIME
 RETURN WITH ZERO

L LUNAR LANDMARK SELECTION FOR CM

R018703 SUBROUTINE TO CONVERT RP (VECTOR IN PLAN. COORD. SYSTEM, EITHER
R018706 EARTH-FIXED OR MOON-FIXED) TO LAT, LONG, ALT.
R018709 CALLING SEQUENCE
R018712 L CALL
R018715 L+1 RPTOLONG
R018718 SUBROUTINES USED
R018721 RP-TO-R, LAT-LONG
R018724 INPUT
R018727 PDG-5D = RP VECTOR
R01873 PDG-7D = TIME
R018733 MPAC = 0 FOR EARTH, NON-ZERO FOR MOON.
R018736 ERADFLAG, LUNAPLAG.
R018739 OUTPUT

R018742 LATITUDE IN LAT (REVS. B-0)
R018745 LONGITUDE IN LONG (REVS. B-0)
R018748 ALTITUDE IN ALT (METERS B-29)

| | | | | | |
|------------------------|---------|---------|--------------|-------------|--------------------------------|
| 018749 REP 1 | 30,2000 | | | SETLOC R35A | |
| 01875 | 30,3762 | | | BANK | |
| 018751 | 30,3762 | 45020 1 | RPTOLONG STO | CALL | |
| 018754 REP 4 LAST 893 | 30,3763 | 02321 0 | | RESTLOCN | SAVE RETURN |
| 018757 REP 6 LAST 892 | 30,3764 | 55341 1 | | RP-TO-R | CONVERT RP TO R, B-27 FOR MOON |
| 01876 | 30,3765 | 70414 1 | | BOPF | IF LUNAR RESCALE B-27 TO B-29 |
| 018763 REP 23 LAST 890 | 30,3766 | 01743 0 | | | |
| 018766 | 30,3767 | 61770 0 | | | |
| 018769 REP 18 LAST 892 | 30,3770 | 18152 0 | | STOCL | LUNAPLAG |
| 018772 REP 4 LAST 892 | 30,3771 | 23534 1 | | | +1 |
| 018775 | 30,3772 | 77624 1 | | ALPHAV | |
| 018778 REP 9 LAST 890 | 30,3773 | 26322 0 | | RRC5ML | MPAC & DUMMY TIME |
| 01879 | 30,3774 | 77850 1 | | CALL | |
| 018793 REP 5 LAST 894 | 30,3775 | 02321 0 | | LAT-LONG | |
| 018795 REP 2 LAST 889 | 31,2000 | | | GOTO | |
| 018796 | 31,3526 | | | RESTLOCN | |
| 0188 | 31,3526 | 77763 0 | RANDTABL | SETLOC R35 | |
| 0189 | 31,3527 | 77751 1 | DEC | BANK | |
| 0190 | 31,3530 | 77737 1 | DEC | | +60 DEGREE BAND |
| 0191 | 31,3531 | 77725 1 | DEC | | +30 DEGREE BAND |
| 0192 | 31,3532 | 77713 1 | DEC | | +00 DEGREE BAND |
| 0193 | 31,3533 | 37716 0 | RRC5ML | 2DEC | -30 DEGREE BAND |
| 0193 | 31,3534 | 33108 0 | | | -60 DEGREE BAND |
| 0194 | 31,3535 | 01442 1 | V06N34** | VN | 00634 |
| 0195 | 31,3536 | 01437 0 | V06N31** | VN | 00631 |
| 0196 | 31,3537 | 01308 0 | V05N70** | VN | 00570 |
| 0197 | 0005 | | KCOUNT | EQUALS | 5D |
| 0198 | 0002 | | JCOUNT | EQUALS | 2D |
| 0199 | 0022 | | LNN | EQUALS | 18D |
| 0200 | 0014 | | UW | EQUALS | 12D |
| 0201 | 0008 | | URR | EQUALS | 6D |
| 0202 | 0000 | | UZZ | EQUALS | 0D |

L LUNAR LANDMARK SELECTION FOR CM

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R0203 *** TEMPORARY VALUES FOR LANDMARK TABLES-LEVINE/SAPONARO***

R02031 LATDAB HAS LATITUDES THAT GO FROM +8 TO -8 DEGREES
 R02032 LONGDAB HAS LONGITUDES THAT GO FROM +80 TO -80 DEGREES
 R02033 LATDAB AND LONGDAB ARE SCALED REVOLUTIONS B0
 R02034 ALTDAB HAS ALTITUDES MEASURED ABOVE THE MEAN LUNAR RADIUS
 R02035 ALTDAB IS SCALED IN METERS B-29

| 02036 | REP | 1 | | | COUNT | 31/LNDM | | | |
|-------|-----|---|---------|---------|--------|---------|-------------|----|--------|
| 0204 | | | 31,3540 | 77408 0 | LATDAB | ZDEC | -.015231481 | 2 | 5 29 S |
| 0204 | | | 31,3541 | 56241 0 | | | | | |
| 0205 | | | 31,3542 | 00043 0 | | ZDEC | .002175926 | 3 | 0 47 N |
| 0205 | | | 31,3543 | 24640 0 | | | | | |
| 0206 | | | 31,3544 | 00046 0 | | ZDEC | .002361111 | 4 | 0 51 N |
| 0206 | | | 31,3545 | 25716 0 | | | | | |
| 0207 | | | 31,3546 | 77741 0 | | ZDEC | -.001851852 | 5 | 0 40 S |
| 0207 | | | 31,3547 | 65060 1 | | | | | |
| 0208 | | | 31,3550 | 00055 1 | | ZDEC | .002777778 | 6 | 1 00 N |
| 0208 | | | 31,3551 | 20266 1 | | | | | |
| 0209 | | | 31,3552 | 77720 1 | | ZDEC | -.002916667 | 7 | 1 03 S |
| 0209 | | | 31,3553 | 46646 1 | | | | | |
| 0210 | | | 31,3554 | 77646 0 | | ZDEC | -.005462963 | 10 | 1 58 S |
| 0210 | | | 31,3555 | 57652 1 | | | | | |
| 0211 | | | 31,3556 | 00155 0 | | ZDEC | .006666667 | 11 | 2 24 N |
| 0211 | | | 31,3557 | 07202 0 | | | | | |
| 0212 | | | 31,3560 | 00466 0 | | ZDEC | .018935185 | 12 | 6 49 N |
| 0212 | | | 31,3561 | 07373 1 | | | | | |
| 0213 | | | 31,3562 | 00050 1 | | ZDEC | .00250 | 13 | 0 54 N |
| 0213 | | | 31,3563 | 36561 0 | | | | | |
| 0214 | | | 31,3564 | 00070 0 | | ZDEC | .003425926 | 14 | 1 14 N |
| 0214 | | | 31,3565 | 04130 1 | | | | | |
| 0215 | | | 31,3566 | 77662 0 | | ZDEC | -.004722222 | 15 | 1 42 S |
| 0215 | | | 31,3567 | 64143 0 | | | | | |
| 0216 | | | 31,3570 | 77747 0 | | ZDEC | -.001481481 | 16 | 0 32 S |
| 0216 | | | 31,3571 | 67215 0 | | | | | |
| 0217 | | | 31,3572 | 00062 0 | | ZDEC | .003101852 | 17 | 1 07 N |
| 0217 | | | 31,3573 | 32207 0 | | | | | |
| 0218 | | | 31,3574 | 00070 0 | | ZDEC | .003472222 | 20 | 1 15 N |
| 0218 | | | 31,3575 | 34343 1 | | | | | |
| 0219 | | | 31,3576 | 77463 0 | | ZDEC | -.0125 | 21 | 4 30 S |
| 0219 | | | 31,3577 | 46314 0 | | | | | |
| 0220 | | | 31,3600 | 00004 0 | | ZDEC | .000277777 | 22 | 0 06 N |
| 0220 | | | 31,3601 | 21505 1 | | | | | |
| 0221 | | | 31,3602 | 00271 0 | | ZDEC | .011342592 | 23 | 4 05 N |
| 0221 | | | 31,3603 | 32622 0 | | | | | |
| 0222 | | | 31,3604 | 00101 1 | | ZDEC | .003981481 | 24 | 1 26 N |
| 0222 | | | 31,3605 | 07343 1 | | | | | |
| 0223 | | | 31,3606 | 77574 1 | | ZDEC | -.008009259 | 25 | 2 53 S |
| 0223 | | | 31,3607 | 70656 0 | | | | | |
| 0224 | | | 31,3610 | 00065 1 | | ZDEC | .003240741 | 26 | 1 10 N |
| 0224 | | | 31,3611 | 03052 0 | | | | | |



L LUNAR LANDMARK SELECTION FOR CM

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| | | | | | | | |
|------|---------|---------|--------------|-------------|----|----|------|
| 0225 | 31,3612 | 77642 1 | 2DEC | -.005694444 | 27 | 2 | 03 E |
| 0225 | 31,3613 | 66360 1 | | | | | |
| 0226 | 31,3614 | 00045 0 | 2DEC | .002268518 | 30 | 0 | 49 N |
| 0226 | 31,3615 | 05287 1 | | | | | |
| 0227 | 31,3616 | 77577 1 | 2DEC | -.007824074 | 31 | 2 | 49 S |
| 0227 | 31,3617 | 71734 1 | | | | | |
| 0228 | 31,3620 | 00130 0 | 2DEC | .005416667 | 32 | 1 | 57 N |
| 0228 | 31,3621 | 27711 0 | | | | | |
| 0229 | 31,3622 | 05120 1 | LONGTAB 2DEC | .161157407 | 2 | 58 | 01 E |
| 0229 | 31,3623 | 14712 0 | | | | | |
| 0230 | 31,3624 | 05076 0 | 2DEC | .160046296 | 3 | 57 | 37 E |
| 0230 | 31,3625 | 06264 1 | | | | | |
| 0231 | 31,3626 | 04453 1 | 2DEC | .143287037 | 4 | 51 | 35 E |
| 0231 | 31,3627 | 23531 1 | | | | | |
| 0232 | 31,3630 | 03554 0 | 2DEC | .116018518 | 5 | 41 | 46 E |
| 0232 | 31,3631 | 33074 1 | | | | | |
| 0233 | 31,3632 | 03326 0 | 2DEC | .106851852 | 6 | 36 | 28 E |
| 0233 | 31,3633 | 25112 1 | | | | | |
| 0234 | 31,3634 | 03263 0 | 2DEC | .104675926 | 7 | 37 | 41 E |
| 0234 | 31,3635 | 00252 1 | | | | | |
| 0235 | 31,3636 | 03014 1 | 2DEC | .094537037 | 10 | 34 | 02 E |
| 0235 | 31,3637 | 34505 0 | | | | | |
| 0236 | 31,3640 | 03007 0 | 2DEC | .094212963 | 11 | 33 | 55 E |
| 0236 | 31,3641 | 22564 0 | | | | | |
| 0237 | 31,3642 | 02740 0 | 2DEC | .091805555 | 12 | 33 | 03 E |
| 0237 | 31,3643 | 04432 0 | | | | | |
| 0238 | 31,3644 | 02531 1 | 2DEC | .083564815 | 13 | 30 | 05 E |
| 0238 | 31,3645 | 04017 0 | | | | | |
| 0239 | 31,3646 | 02086 0 | 2DEC | .065833333 | 14 | 23 | 42 E |
| 0239 | 31,3647 | 23501 1 | | | | | |
| 0240 | 31,3650 | 01502 1 | 2DEC | .050925926 | 15 | 18 | 20 E |
| 0240 | 31,3651 | 13864 1 | | | | | |
| 0241 | 31,3652 | 01272 1 | 2DEC | .042638889 | 16 | 15 | 21 E |
| 0241 | 31,3653 | 23036 0 | | | | | |
| 0242 | 31,3654 | 00570 0 | 2DEC | .023009259 | 17 | 8 | 17 E |
| 0242 | 31,3655 | 37365 0 | | | | | |
| 0243 | 31,3656 | 00252 1 | 2DEC | .010416667 | 20 | 3 | 45 E |
| 0243 | 31,3657 | 25253 1 | | | | | |
| 0244 | 31,3660 | 00000 1 | 2DEC | .000046296 | 21 | 0 | 01 E |
| 0244 | 31,3661 | 30213 1 | | | | | |
| 0245 | 31,3662 | 77703 0 | 2DEC | -.003703704 | 22 | 1 | 20 W |
| 0245 | 31,3663 | 52142 1 | | | | | |
| 0246 | 31,3664 | 77254 1 | 2DEC | -.020694444 | 23 | 7 | 27 W |
| 0246 | 31,3665 | 76114 1 | | | | | |
| 0247 | 31,3666 | 77173 1 | 2DEC | -.023703704 | 24 | 8 | 32 W |
| 0247 | 31,3667 | 64334 1 | | | | | |
| 0248 | 31,3670 | 76265 1 | 2DEC | -.051435185 | 25 | 18 | 31 W |
| 0248 | 31,3671 | 51114 1 | | | | | |
| 0249 | 31,3672 | 75644 0 | 2DEC | -.068055556 | 26 | 24 | 30 W |
| 0249 | 31,3673 | 77223 1 | | | | | |

L LUNAR LANDMARK SELECTION FOR CM

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| | | | | | | | | |
|------|---------|---------|-------------|-------------|----|----|----|---|
| 0250 | 31,3674 | 75215 0 | 2DEC | -.085092593 | 27 | 30 | 38 | W |
| 0250 | 31,3675 | 72762 1 | | | | | | |
| 0251 | 31,3676 | 74613 0 | 2DEC | -.100833333 | 30 | 36 | 18 | W |
| 0251 | 31,3677 | 76225 0 | | | | | | |
| 0252 | 31,3700 | 74571 1 | 2DEC | -.101944444 | 31 | 36 | 42 | W |
| 0252 | 31,3701 | 67600 0 | | | | | | |
| 0253 | 31,3702 | 74174 0 | 2DEC | -.117407407 | 32 | 42 | 16 | W |
| 0253 | 31,3703 | 54550 0 | | | | | | |
| 0254 | 31,3704 | 77777 0 | ALTIAR 2DEC | -2090 R-29 | 2 | | | |
| 0254 | 31,3705 | 75752 0 | | | | | | |
| 0255 | 31,3706 | 77777 0 | 2DEC | -2090 R-29 | 3 | | | |
| 0255 | 31,3707 | 75752 0 | | | | | | |
| 0256 | 31,3710 | 77777 0 | 2DEC | -1790 R-29 | 4 | | | |
| 0256 | 31,3711 | 76200 1 | | | | | | |
| 0257 | 31,3712 | 77777 0 | 2DEC | -1090 R-29 | 5 | | | |
| 0257 | 31,3713 | 76736 1 | | | | | | |
| 0258 | 31,3714 | 77777 0 | 2DEC | -940 R-29 | 6 | | | |
| 0258 | 31,3715 | 77051 0 | | | | | | |
| 0259 | 31,3716 | 77777 0 | 2DEC | -290 R-29 | 7 | | | |
| 0259 | 31,3717 | 77556 1 | | | | | | |
| 0260 | 31,3720 | 77777 0 | 2DEC | -290 R-29 | 10 | | | |
| 0260 | 31,3721 | 77556 1 | | | | | | |
| 0261 | 31,3722 | 77777 0 | 2DEC | -1549 R-29 | 11 | | | |
| 0261 | 31,3723 | 76370 1 | | | | | | |
| 0262 | 31,3724 | 77777 0 | 2DEC | -890 R-29 | 12 | | | |
| 0262 | 31,3725 | 77102 1 | | | | | | |
| 0263 | 31,3726 | 77777 0 | 2DEC | -1490 R-29 | 13 | | | |
| 0263 | 31,3727 | 76426 0 | | | | | | |
| 0264 | 31,3730 | 77777 0 | 2DEC | -3230 R-29 | 14 | | | |
| 0264 | 31,3731 | 74660 1 | | | | | | |
| 0265 | 31,3732 | 00000 1 | 2DEC | 5110 R-29 | 15 | | | |
| 0265 | 31,3733 | 04773 0 | | | | | | |
| 0266 | 31,3734 | 00000 1 | 2DEC | 6910 R-29 | 16 | | | |
| 0266 | 31,3735 | 08577 1 | | | | | | |
| 0267 | 31,3736 | 00000 1 | 2DEC | 5110 R-29 | 17 | | | |
| 0267 | 31,3737 | 04773 0 | | | | | | |
| 0268 | 31,3740 | 00000 1 | 2DEC | 3010 R-29 | 20 | | | |
| 0268 | 31,3741 | 02741 1 | | | | | | |
| 0269 | 31,3742 | 00000 1 | 2DEC | 3910 R-29 | 21 | | | |
| 0269 | 31,3743 | 03643 0 | | | | | | |
| 0270 | 31,3744 | 77777 0 | 2DEC | -935 R-29 | 22 | | | |
| 0270 | 31,3745 | 77053 1 | | | | | | |
| 0271 | 31,3746 | 00000 1 | 2DEC | 2360 R-29 | 23 | | | |
| 0271 | 31,3747 | 02234 0 | | | | | | |
| 0272 | 31,3750 | 00000 1 | 2DEC | 2510 R-29 | 24 | | | |
| 0272 | 31,3751 | 02347 0 | | | | | | |
| 0273 | 31,3752 | 00000 1 | 2DEC | 210 R-29 | 25 | | | |
| 0273 | 31,3753 | 00151 1 | | | | | | |
| 0274 | 31,3754 | 00000 1 | 2DEC | 960 R-29 | 26 | | | |
| 0274 | 31,3755 | 00740 1 | | | | | | |



L LUNAR LANDMARK SELECTION FOR CM

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| | | | | | |
|------|---------|---------|------|------------|----|
| 0275 | 31,3756 | 00000 1 | 2DEC | 1310 B-29 | 27 |
| 0275 | 31,3757 | 01217 1 | | | |
| 0276 | 31,3760 | 00000 1 | 2DEC | 1410 B-29 | 30 |
| 0276 | 31,3761 | 01301 1 | | | |
| 0277 | 31,3762 | 77777 0 | 2DEC | -2624 B-29 | 31 |
| 0277 | 31,3763 | 75337 1 | | | |
| 0278 | 31,3764 | 77777 0 | 2DEC | -2445 B-29 | 32 |
| 0278 | 31,3765 | 75470 0 | | | |

*** END OF PANDORA .080 ***

L TVCINITIALIZE

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R1000 NAME TVCDAPON (TVC DAP INITIALIZATION AND STARTUP CALL)
 R1001 MOD NO 3 DATE 8 JUNE, 1967
 R1002 MOD BY ENGEL LOO SECTION P40-P47

R1003 FUNCTIONAL DESCRIPTION

R1004 PERFORMS TVCDAP INITIALIZATION (GAINS, TIMING PARAMETERS, FILTER VARIABLES, ETC.)
 R1005 COMPUTES STEERING (S40.8) GAIN KPRIMEBT, AND ZEROES PASTDELV,+1 VARIABLE
 R1006 MAKES INITIALIZATION CALL TO .NEEDLER. FOR TVC DAP NEEDLES-SETUP
 R1009 PERFORMS INITIALIZATION FOR ROLL DAP
 R1010 CALLS TVCEXECUTIVE AT TVCEXEC, VIA WAITLIST
 R1011 CALLS TVCDAP CDU-RATE INITIALIZATION PKG AT DAPINIT VIA TS
 R1012 MRCLEAN AND TVCINIT4 ARE POSSIBLE TVC-RESTART ENTRIES
 R1013 CALLING SEQUENCE - TSLOC=2CADR(TVCDAPON,ERANK=BZERO), TS=.6SECTS
 R1014 IN PARTICULAR, CALLED BY .IGNOVER..
 R1015 NORMAL EXIT MODE
 R1016 TCP RESUME
 R1017 SUBROUTINES CALLED
 R1018 NEEDLER, MASSPROP
 R1019 ALARM OR ABORT EXIT MODES
 R1020 NONE
 R1021 ERASABLE INITIALIZATION REQUIRED
 R1022 CSMMASS, LEMMASS, DAPDTR1 (FOR MASSPROP SUBROUTINE)
 R1023 TVC PAD LOADS (SEE LEVEL III DAP AND/OR P40 TESTS)
 R1024 FACTOFF, YACTOFF, CDUX
 R1025 TVCHASE, TSBITS OF FLAGWRD6, FOR RESTART PROTECTION (SEE IGNOVER)
 R1026 OUTPUT
 R1027 ALL TVC AND ROLL DAP ERASABLES, FLAGWRD6 (BITS 13,14), TS, WAITLIST
 R1028 DEBRIS
 R1029 NONE

| | | | | | | | | | |
|-------|-----|-----|----------|---------|----------|----------|-------|------------|--|
| 1030 | REF | 1 | | | | | | | COUNT# 88/INIT |
| 1031 | | | | 17,2030 | | | | | BANK 17 |
| 1032 | REF | 3 | LAST 683 | 17,2000 | | | | | SETLOC DAPST |
| 1033 | | | | 17,2030 | | | | | BANK |
| 1034 | REF | 2 | LAST 184 | E6,1742 | | | | | ERANK= BZERO |
| 1035 | REF | 7 | LAST 691 | 17,2030 | 22 016 0 | TVCDAPON | LXCH | BANKRUPT | TS RUPT ARRIVAL (CALL BY DOTVCN - P40) |
| 1036 | | | | 17,2031 | 0 0008 1 | | | EXTEND | SAVE 0 REQUIRED IN RESTARTS (MRCLEAN AND |
| 10361 | REF | 7 | LAST 692 | 17,2032 | 22 012 1 | | QXCH | GRUPT | TVCINIT4 ARE ENTRIES) |
| 1038 | REF | 1 | | 17,2033 | 3 2205 1 | MRCLEAN | CAP | NZERO | NUMBER TO ZERO, LESS ONE (MUST BE ODD) |
| A1039 | | | | | | | | | TVC RESTARTS ENTER HERE (NEW BANK) |
| 1040 | REF | 187 | LAST 841 | 17,2034 | 10 000 0 | +1 | CCS | A | |
| 1041 | REF | 14 | LAST 887 | 17,2035 | 55=447 0 | | TS | CNTR | |
| 1042 | REF | 158 | LAST 850 | 17,2036 | 3 4714 1 | | CAP | ZERO | |
| 1043 | REF | 78 | LAST 842 | 17,2037 | 54 001 1 | | TS | L | |
| 1044 | REF | 15 | LAST 899 | 17,2040 | 51=447 1 | | INDEX | CNTR | |
| 1045 | REF | 1 | | 17,2041 | 53=530 1 | | DXCH | OMEGAYC | FIRST (LAST) TWO LOCATIONS |
| 1046 | REF | 18 | LAST 899 | 17,2042 | 11=447 0 | | CCS | CNTR | |
| 1047 | REF | 1 | | 17,2043 | 1 2034 0 | | TCP | MRCLEAN +1 | |

L TVCINITIALIZE

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| | | | | | |
|--------|-----|-----|---------|----------|------------------------|
| 10471 | | | 17,2044 | 0 0006 1 | EXTEND |
| 10472 | REP | 1 | 17,2045 | 3 2212 1 | DCA INITLOC2 |
| 10473 | REP | 12 | 17,2046 | 53=313 0 | DXCH TSLOC |
| 10474 | REP | 17 | 17,2047 | 3 4672 0 | CAP POSMAX |
| 10475 | REP | 8 | 17,2050 | 54 030 0 | TS TIMES |
| 10476 | REP | 28 | 17,2051 | 1 5222 1 | TCP RESUME |
| | | | | | ENDMRC |
| 10477 | REP | 8 | 17,2052 | 22 016 0 | TVCINIT1 LXCH BANKRUPT |
| 10478 | | | 17,2053 | 0 0006 1 | EXTEND |
| 10479 | REP | 6 | 17,2054 | 22 012 1 | ONCH CRUPT |
| 1048 | REP | 31 | 17,2055 | 0 4633 0 | TC IRKCALL |
| 1049 | REP | 4 | 17,2056 | 13207 0 | CADR MASSPROP |
| 1050 | REP | 4 | 17,2057 | 30 110 1 | CAB ENDOT |
| 1051 | | | 17,2060 | 0 0006 1 | EXTEND |
| 1052 | REP | 1 | 17,2061 | 7 2206 0 | MP QNETHOU |
| 1053 | REP | 2 | 17,2062 | 55=647 1 | TS TENMDOT |
| 1054 | | | 17,2063 | 4 0000 0 | COM |
| 1055 | REP | 11 | 17,2064 | 6 1474 1 | AD CSMASS |
| 1056 | REP | 7 | 17,2065 | 55=662 0 | TS MASSIMP |
| 1059 | REP | 60 | 17,2066 | 31=466 1 | CAB DAPDATH1 |
| 1060 | REP | 44 | 17,2067 | 7 4675 0 | MASK BIT14 |
| 1061 | REP | 188 | 17,2070 | 10 000 0 | CCS A |
| 1062 | REP | 81 | 17,2071 | 3 4712 1 | CAP BIT1 |
| 1063 | REP | 17 | 17,2072 | 55=447 0 | TS CNTR |
| 10631 | REP | 18 | 17,2073 | 51=447 1 | INDEX CNTR |
| 106312 | REP | 1 | 17,2074 | 31=416 0 | CAB EKTLX/I |
| 106314 | REP | 2 | 17,2075 | 55=646 0 | TS KTLX/I |
| 10632 | REP | 32 | 17,2076 | 0 4633 0 | TC IRKCALL |
| 106322 | REP | 1 | 17,2077 | 35145 1 | CADR S40.15 |
| 1064 | REP | 1 | 17,2100 | 31=420 0 | TVCINIT2 CAB FTVCDT/2 |
| 1065 | REP | 79 | 17,2101 | 54 001 1 | TS L |
| 1066 | REP | 34 | 17,2102 | 3 4711 1 | CAP BIT2 |
| 1067 | REP | 19 | 17,2103 | 51=447 1 | INDEX CNTR |
| 1068 | REP | 189 | 17,2104 | 30 000 1 | CAB A |
| 1069 | REP | 3 | 17,2105 | 55=644 1 | TS KPRIMEDT |
| 1070 | | | 17,2106 | 4 0000 0 | COM |
| 1071 | REP | 18 | 17,2107 | 6 4672 0 | AD POSMAX |
| 1072 | REP | 62 | 17,2110 | 6 4712 1 | AD BIT1 |
| 1073 | REP | 3 | 17,2111 | 55=635 1 | TS TSTVCDT |
| 10732 | REP | 36 | 17,2112 | 4 4674 1 | CS BIT15 |
| 10733 | REP | 10 | 17,2113 | 7 0105 1 | MASK FLAGWRD9 |
| 10734 | REP | 11 | 17,2114 | 54 105 1 | TS FLAGWRD9 |

SET UP ANOTHER TS RUPT TO CONTINUE
INITIALIZATION AT TVCINIT1
THE PHCHK2 ENTRY (REDOTVC) AT TVCDAPCN
+3 IS IN ANOTHER BANK. MUST RESET
BECON TOO (FULL 2CADR), FOR THAT
ENTRY.

UPDATE IXK, IAVG/TLX FOR DAP GAINS (R03
OR NOUNS 46 AND 47 MUST BE CORRECT)

SPS FLOW RATE, SC.AT B+3 KG/CS

10-SEC MASS LOSS B+16 KG

DECREMENT FOR FIRST 10 SEC OF BURN

CHECK LEM-ON/OFF

LEM-ON (BIT1)
LEM-OFF (ZERO)

PICK UP LM-OFF, -ON KTLX/I

COMPUTE 1/CONACC, VARK

LEM-ON VALUE (PAD-LOAD, CS / 2)

LEM-OFF VALUE (4CS / 2)

(TEMP STORE)

PREPARE TSTVCDT

RESET SNTOVR FLAG



L TVCINITIALIZE

USER=5 PAGE NO. 3 E6 S3

| | | | | | | | | | | |
|-------|-----|-----|------|-----|---------|----------|----------|----------|--|--|
| 1074 | REP | 20 | LAST | 900 | 17,2115 | 51=447 1 | INDEX | CNTR | PICK UP LEM-OFF, -ON KPRIME | |
| 1075 | REP | 1 | | | 17,2116 | 31=413 0 | CAB | EXPRIME | | |
| 1076 | | | | | 17,2117 | 0 0008 1 | EXTEND | | | |
| 1077 | REP | 4 | LAST | 900 | 17,2120 | 7 1644 1 | MP | KPRIMEDT | (TVCDT/2, SC.AT B+14CS) | |
| 1078 | REP | 190 | LAST | 900 | 17,2121 | 22 000 1 | LXCH | A | SC.AT P1/8 (DIMENSIONLESS) | |
| 1079 | REP | 5 | LAST | 901 | 17,2122 | 53=045 0 | DXCH | KPRIMEDT | | |
| 1080 | REP | 21 | LAST | 901 | 17,2123 | 51=447 1 | INDEX | CNTR | PICK UP LEM-OFF, -ON REPPRAC | |
| 1081 | REP | 2 | LAST | 876 | 17,2124 | 31=423 0 | CAB | EREPPRAC | | |
| 1082 | REP | 4 | LAST | 878 | 17,2125 | 55=652 0 | TS | REPPRAC | | |
| 1083 | REP | 14 | LAST | 575 | 17,2126 | 3 7716 0 | CAP | NEGONE | PREVENT STROKE TEST UNTIL CALLED | |
| 1084 | REP | 2 | LAST | 103 | 17,2127 | 55=684 0 | TS | STRKTIME | | |
| 1085 | REP | 1 | | | 17,2130 | 3 4374 0 | CAP | NINETEEN | SET VCNTR FOR VARIABLE-GAIN UPDATES IN | |
| 1086 | REP | 4 | LAST | 878 | 17,2131 | 55=653 1 | TS | VCNTR | 10 SECONDS (TVCEXEC 1/2 SEC RATE) | |
| 10862 | REP | 7 | LAST | 863 | 17,2132 | 55=444 0 | TS | V97VCNTR | FOR ENCPAIL (R41) LOGIC | |
| 1087 | REP | 1 | | | 17,2133 | 31=421 1 | CAB | ETSWITCH | PREPARE SWITCHOVER COUNTER | |
| 1088 | REP | 80 | LAST | 900 | 17,2134 | 54 001 1 | TS | L | | |
| 1089 | | | | | 17,2135 | 6 0000 1 | DOUBLE | | (COUNTER DECREMENTS EVERY 1/2 SEC) | |
| 1090 | REP | 191 | LAST | 901 | 17,2136 | 22 000 1 | LXCH | A | LEM-OFF IN A, LEM-ON IN L | |
| 1091 | REP | 22 | LAST | 901 | 17,2137 | 51=447 1 | INDEX | CNTR | | |
| 1092 | REP | 192 | LAST | 901 | 17,2140 | 30 000 1 | CAB | A | | |
| 1093 | REP | 15 | LAST | 901 | 17,2141 | 6 7716 0 | AD | NEGONE | | |
| 1094 | REP | 23 | LAST | 901 | 17,2142 | 55=447 0 | TS | CNTR | CNTR = 2(SWITCHOVER TIME, SEC) - 1 | |
| 1095 | REP | 16 | LAST | 890 | 17,2143 | 31=425 0 | TVCINIT3 | CAB | TRIM VALUES TO TRIM-TRACKERS, OUTPUT | |
| 1096 | REP | 2 | LAST | 102 | 17,2144 | 55=625 0 | TS | FACTOFF | TRACKERS, OFFSET-UPDATES, AND | |
| 1097 | REP | 4 | LAST | 167 | 17,2145 | 55=631 0 | TS | PDELOFF | OFFSET-TRACKER FILTERS | |
| 1099 | REP | 3 | LAST | 655 | 17,2146 | 55=621 1 | TS | PCMD | NOTE, I.O-ORDER DELOFF, DELPRAR ZEROED | |
| | | | | | | | TS | DELPRAR | | |
| 1100 | REP | 5 | LAST | 887 | 17,2147 | 31=428 0 | CAB | YACTOFF | | |
| 1101 | REP | 2 | LAST | 102 | 17,2150 | 55=627 1 | TS | YDELOFF | | |
| 1102 | REP | 2 | LAST | 102 | 17,2151 | 55=632 0 | TS | YCMD | | |
| 1104 | REP | 3 | LAST | 655 | 17,2152 | 55=623 0 | TS | DELYRAR | | |
| 1111 | REP | 12 | LAST | 892 | 17,2153 | 4 1501 0 | NEEDLEIN | CS | RCSFLAGS | SET BIT 3 FOR INITIALIZATION PASS AND GO |
| 1112 | REP | 26 | LAST | 888 | 17,2154 | 7 4710 1 | MASK | RIT3 | | TO NEEDLER. WILL CLEAR FOR TVC DAP |
| 1113 | REP | 13 | LAST | 901 | 17,2155 | 27=501 0 | ADS | RCSFLAGS | | (RETURNS AFTER CADR) |
| 1114 | REP | 33 | LAST | 900 | 17,2156 | 0 4633 0 | TC | IRNKCALL | | |
| 1115 | REP | 5 | LAST | 540 | 17,2157 | 42404 1 | CADR | NEEDLER | | |
| 1116 | REP | 157 | LAST | 899 | 17,2160 | 3 4714 1 | TVCINIT4 | CAP | ZERO | SET TVCPHASE TO INDICATE TVCDAPON-THRU- |
| 1117 | REP | 3 | LAST | 852 | 17,2161 | 55=654 0 | TS | TVCPHASE | | NEEDLEIN INITIALIZATION FINISHED. |
| A1118 | | | | | | | | | | (POSSIBLE TVC-RESTART ENTRY) |
| 1119 | REP | 18 | LAST | 736 | 17,2162 | 30 032 0 | CAB | CDUX | PREPARE ROLL DAP LADDERS | |
| 1120 | REP | 6 | LAST | 188 | 17,2163 | 55=672 1 | TS | OCANOW | | |

L TVCINITIALIZE

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A1121
A1122

ROLL DAPS RE-START UPON A RESTART, BUT
RETAIN ORIGINAL CGAD (IGNOVER CDUX)

| | | | | | | | | | |
|--------|-----|----|------|-----|---------|--------|---|------------|----------|
| 11222 | REP | 32 | LAST | 827 | 17,2164 | 3 4676 | 1 | CAP | BIT13 |
| 11223 | | | | | 17,2165 | 0 0006 | 1 | EXTEND | |
| 11224 | REP | 27 | LAST | 783 | 17,2166 | 02 011 | 0 | RAND | DSALMOUT |
| 11225 | | | | | 17,2167 | 0 0006 | 1 | EXTEND | |
| 11226 | | | | | 17,2170 | 1 2173 | 1 | BZF | +3 |
| A11227 | | | | | | | | | |
| 1123 | REP | 8 | LAST | 900 | 17,2171 | 31=662 | 1 | CAB | MASSTMP |
| 1124 | REP | 12 | LAST | 900 | 17,2172 | 55=474 | 0 | TS | CSMASS |
| 1125 | REP | 6 | LAST | 700 | 17,2173 | 3 4731 | 0 | +3 | CAP |
| 1126 | REP | 41 | LAST | 779 | 17,2174 | 0 5140 | 1 | TC | .5SEC |
| 1127 | REP | 3 | LAST | 899 | E6,1742 | | | EBANK= | WAITLIST |
| 1128 | REP | 2 | LAST | 184 | 17,2175 | 02660 | 0 | 2CADR | BZERO |
| 1128 | | | | | 17,2176 | 34066 | 0 | | TVCXEC |
| 1129 | | | | | 17,2177 | 0 0006 | 1 | EXTEND | |
| 1130 | REP | 1 | | | 17,2200 | 3 2210 | 0 | DCA | DAPINIT5 |
| 1131 | REP | 13 | LAST | 900 | 17,2201 | 53=313 | 0 | DYCH | TSLOC |
| 1132 | REP | 4 | LAST | 900 | 17,2202 | 31=635 | 0 | CAB | TSVCDT |
| 1133 | REP | 9 | LAST | 900 | 17,2203 | 54 030 | 0 | TS | TIMES |
| 1134 | REP | 29 | LAST | 900 | 17,2204 | 1 5222 | 1 | ENDTVCIN | TCP |
| 1135 | | | | | 17,2205 | 00101 | 1 | NZERO | DEC |
| 1136 | REP | 17 | LAST | 440 | 4374 | | | NINETEEN = | VD1 |
| 1137 | | | | | 17,2206 | 03720 | 1 | ONEHQJ | DEC |
| 1138 | REP | 4 | LAST | 902 | E6,1742 | | | EBANK= | BZERO |
| 1139 | REP | 1 | | | 17,2207 | 03111 | 0 | DAPINIT5 | 2CADR |
| 1139 | REP | 1 | | | 17,2210 | 40066 | 0 | | DAPINIT |
| 11392 | REP | 5 | LAST | 902 | E6,1742 | | | EBANK= | BZERO |
| 1140 | REP | 1 | | | 17,2211 | 02052 | 1 | INITLOC2 | 2CADR |
| 1140 | REP | 1 | | | 17,2212 | 36066 | 1 | | TVCINIT1 |

IF ENGINE IS ALREADY OFF, ENGINEOFF HAS
ALREADY ESTABLISHED THE POST-BURN
CSMASS (MASSBACK DOES IT). DONT
TOUCH CSMASS. IF ENGINE IS ON,
THEN ITS OK TO DO THE COPYCYCLE
EVEN BURNS LESS THAN 0.4SEC ARE AQK

COPYCYCLE

CALL TVCXEXECUTIVE (ROLLDAP CALL, ETC)

CALL FOR DAPINIT

(ALLOW TIME FOR RESTART COMPUTATIONS)

MUST BE ODD FOR MRCLEAN

KG/CS B3 TO KG/10SEC B16 CONVERSION



L TVCEXECUTIVE USER-S PAGE NO. 1 E0 S3

R1000 PROGRAM NAME.... TVCEXECUTIVE, CONSISTING OF TVCEXEC, NEEDLEUP, VARGAINS
 R1001 RESPCHK, SWITCHOV, CG.CORR, STRKUP, TVCXPIN, ETC.
 R1002 LOG SECTION....TVCEXECUTIVE SUBROUTINEDAPCSM
 R1003 MOD BY ENGEL DATE 23 OCT, 1967

R1004 FUNCTIONAL DESCRIPTION....

R1005 *A SELF-PERPETUATING WAITLIST TASK AT 1/2 SECOND INTERVALS WHICH'
 R1006 PREPARES THE ROLL TVC DAP LADDERS
 R1007 PREPARES THE ROLL FDAI NEEDLE (FLY-TO OGA ERROR)
 R1008 PREPARES THE ROLL PHASE PLANE OGAERR (FLY-FROM OGA ERROR)
 R1009 PREPARES THE TVC ROLLDAP TASK WAITLIST CALL (3 CS DELAY)
 R1010 UPDATES THE NEEDLES DISPLAY
 R1011 IMPLEMENTS VARIABLE GAINS AND VARIABLE VEHICLE MASS
 R1012 PROVIDES FOR SWITCHOVER
 R1013 PROVIDES FOR A SINGLE-SHOT THRUST MISALIGNMENT CORRECTION AT SWTOVR
 R1014 PROVIDES FOR REPETITIVE THRUST MISALIGNMENT CORRECTIONS FOLLOWING
 R1015 SWITCHOVER
 R1016 PERFORMS CERTAIN STROKE TEST FUNCTIONS

R1017 CALLING SEQUENCE....

R1018 *TVCEXEC CALLED AS A WAITLIST TASK, IN PARTICULAR BY TVCINIT4 AND BY
 R1019 ITSELF, BOTH AT 1/2 SECOND INTERVALS

R1020 NORMAL EXIT MODE.... TASKOVER

R1021 ALARM OR ABORT EXIT MODES.... NONE

R1022 SUBROUTINES CALLED....NEEDLER, S40.15, MASSPROP, TASKOVER, IRNKCALL

R1023 OTHER INTERFACES....

R1024 *TVCRESTART PACKAGE FOR RESTARTS
 R1025 *PITCHDAP, YAWDAP FOR VARIABLE GAINS AND ENGINE TRIM ANGLES
 R1026 *S40.8 FOR KPRIME2T AT SWITCHOVER

R1027 ERASABLE INITIALIZATION REQUIRED....

R1028 *SEE TVCDAPCN....TVCINIT4
 R1029 *VARK AND 1/CONACC (S40.15 OF R03)
 R1030 *V68 INITIALIZATION PRIOR TO SWITCHOVER OR FOLLOWING A RESTART
 R1031 DURING A STROKE TEST, IF STROKE TEST FUNCTIONS ARE TO BE TESTED
 R1032 *PAD LOADS EREPPRAC, EORPRAC ETC.
 R1033 *BITS 15,14 OF FLAGWRD6 (TS BITS)
 R1034 *TVCXPHS FOR RESTARTS
 R1035 *ENGINE-ON BIT (11.13) FOR RESTARTS
 R1036 *CDUX, OQAD

R1037 OUTPUT....

L TVCEXECUTIVE

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R1038 *ROLL TVC DAP LADDERS, FDAI NEEDLE (AK), AND PHASE PLANE OGAERR
R1039 *VARIABLE GAINS FOR PITCH/YAW AND ROLL TVC DAPS
R1040 *SINGLE-SHOT AND REPETITIVE CORRECTIONS TO ENGINE TRIM ANGLES
R1041 PACTOFF AND YACTOFF
R1042 *CHANGES TO DAP SAMPLE RATES, DAP GAINS, AND STEERING-GAIN SCALING
R1043 AT (LEM-ON) SWITCHOVER
R1044 *STROKER, 4 SECONDS AFTER SWITCHOVER WHEN PRIOR V68, OR 2.5
R1045 SECONDS AFTER RESTART DURING A STROKE TEST

R1046 DEBRIS.... MUCH, BUT SHAREABLE WITH RCS/ENTRY, ALL IN ERANK6
1047 16,2660 BANK 16
1048 RESP 1 16,2000 SETLOC DAPROLL
1049 16,2660 BANK
1050 RESP 6 LAST 902 E6,1742 ERANK= BZERO
1051 RESP 1 COUNT* $$/TVCX
1052 RESP 25 LAST 692 16,2660 4 0102 0 TVCEXEC CS FLAGWRD6 CHECK FOR TERMINATION (BITS 15,14 READ
1053 RESP 13 LAST 692 16,2661 7 4105 0 MASK .OCT60000 10 FROM TVCDAPON TO RCSDAPON)
1054 16,2662 0 0008 1 EXTEND
1055 RESP 1 16,2663 6 3142 0 BZMP TVCXPIN TERMINATE

1056 RESP 7 LAST 902 16,2664 3 4731 0 CAP .5SEC W.L. CALL TO PERPETUATE TVCEXEC
1057 RESP 42 LAST 902 16,2665 0 5140 1 TC WAITLIST
1058 RESP 7 LAST 904 E6,1742 ERANK= BZERO
1059 RESP 3 LAST 902 16,2666 0 2660 0 ZCADR TVCEXEC
1059 16,2667 3 4066 0

1060 RESP 19 LAST 901 16,2670 30 032 0 ROLLPREP CAE CDUX UPDATE ROLL LADDERS (NO NEED TO RESTART-
1061 RESP 7 LAST 901 16,2671 57=672 0 XCH CGANOW PROTECT, SINCE ROLL DAPS RE-START)
1062 RESP 2 LAST 103 16,2672 57=673 1 XCH CGAPAST

1063 RESP 2 LAST 651 16,2673 31=450 1 CAE CGAD PREPARE ROLL FDAI NEEDLE WITH FLY-TO
1064 16,2674 0 0008 1 EXTEND ERROR (COMMAND - MEASURED)
1065 RESP 8 LAST 904 16,2675 21=672 1 MSU CGANOW FLY-TO OGA ERROR, SC.AT B-1 REVS
1066 RESP 12 LAST 539 16,2676 55=476 1 TS AK

1067 16,2677 0 0006 1 EXTEND PREPARE ROLL DAP PHASE PLANE OGAERR
1068 RESP 2 LAST 688 16,2700 7 7705 0 MP -BIT14
1069 RESP 1 16,2701 55=674 1 TS OGAERR PHASE-PLANE (FLY-FROM) OGAERROR,
A1070 SC.AT R+0 REVS

1071 RESP 27 LAST 779 16,2702 3 6214 0 CAP THREE SET UP ROLL DAP TASK (ALLOW SOME TIME)
1072 RESP 43 LAST 904 16,2703 0 5140 1 TC WAITLIST
1073 RESP 8 LAST 904 E6,1742 ERANK= BZERO
1074 RESP 1 16,2704 0 3313 0 ZCADR ROLL DAP
1074 RESP 1 16,2705 3 4066 0
1075 RESP 34 LAST 901 16,2706 0 4633 0 NEEDLEUP TC IRNKCALL. DO A NEEDLES UPDATE (RETURNS AFTER CADR)
1076 RESP 6 LAST 901 16,2707 4 2404 1 CADR -NEEDLER (NEEDLES RESTARTS ITSELF)
    
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| | | | | | | | | | | |
|--------|-----|-----|------|-----|---------|--------|---|----------|--------|-------------|
| 1077 | REP | 33 | LAST | 902 | 16,2710 | 3 4676 | 1 | VARGAINS | CAP | BIT13 |
| 1078 | | | | | 16,2711 | 0 0006 | 1 | | EXTEND | |
| 1079 | REP | 28 | LAST | 902 | 16,2712 | 02 011 | 0 | | RAND | DSALMOUT |
| 1080 | REP | 193 | LAST | 901 | 16,2713 | 10 000 | 0 | | CCS | A |
| 1081 | | | | | 16,2714 | 1 2720 | 1 | | TCP | +4 |
| 1082 | REP | 37 | LAST | 782 | 16,2715 | 3 4711 | 1 | +5 | CAP | TWO |
| 10821 | REP | 3 | LAST | 652 | 16,2716 | 55-661 | 0 | | TS | TVCXPHS |
| 10822 | REP | 1 | | | 16,2717 | 1 2750 | 0 | | TCP | SWT/COR |
| 10823 | REP | 8 | LAST | 901 | 16,2720 | 11-653 | 1 | | CCS | VCNTR |
| 10824 | | | | | 16,2721 | 1 2725 | 1 | | TCP | +4 |
| 10825 | REP | 1 | | | 16,2722 | 1 2731 | 1 | | TCP | GAINCHNG |
| 108252 | | | | | 16,2723 | 1 2723 | 1 | | TCP | +0 |
| 108253 | REP | 1 | | | 16,2724 | 1 2715 | 1 | | TCP | VARGAINS +5 |
| 10826 | REP | 3 | LAST | 678 | 16,2725 | 55-663 | 1 | +4 | TS | VCNTRIMP |
| 10827 | REP | 13 | LAST | 902 | 16,2726 | 31-474 | 1 | | CAB | CSMASS |
| 10828 | REP | 9 | LAST | 902 | 16,2727 | 55-662 | 0 | | TS | MASSTMP |
| 10829 | REP | 1 | | | 16,2730 | 1 2741 | 0 | | TCP | EXECCOPY |
| 1085 | REP | 35 | LAST | 904 | 16,2731 | 0 4633 | 0 | GAINCHNG | TC | IRNKCALL |
| 1086 | REP | 1 | | | 16,2732 | 13243 | 0 | | CADR | PIXCW |
| 1087 | REP | 2 | LAST | 900 | 16,2733 | 0 3145 | 1 | | TC | S40.15 |
| 1089 | REP | 3 | LAST | 900 | 16,2734 | 4 1647 | 1 | | CS | TENDOT |
| 1090 | REP | 14 | LAST | 905 | 16,2735 | 6 1474 | 1 | | AD | CSMASS |
| 1091 | REP | 10 | LAST | 905 | 16,2736 | 55-662 | 0 | | TS | MASSTMP |
| 1092 | REP | 2 | LAST | 901 | 16,2737 | 3 4374 | 0 | | CAP | NINETREN |
| 1093 | REP | 4 | LAST | 905 | 16,2740 | 55-663 | 1 | NOUPDATE | TS | VCNTRIMP |
| 1094 | REP | 4 | LAST | 905 | 16,2741 | 25-661 | 1 | EXECCOPY | INCR | TVCXPHS |
| 1095 | REP | 11 | LAST | 905 | 16,2742 | 31-662 | 1 | | CAB | MASSTMP |
| 1096 | REP | 15 | LAST | 905 | 16,2743 | 55-474 | 0 | | TS | CSMASS |
| 1097 | REP | 5 | LAST | 905 | 16,2744 | 31-663 | 0 | | CAB | VCNTRIMP |
| 1098 | REP | 6 | LAST | 905 | 16,2745 | 55-653 | 1 | | TS | VCNTR |
| 10982 | REP | 8 | LAST | 901 | 16,2746 | 55-444 | 0 | | TS | V97VCNTR |
| 1099 | REP | 5 | LAST | 905 | 16,2747 | 25-661 | 1 | | INCR | TVCXPHS |
| 1100 | REP | 24 | LAST | 901 | 16,2750 | 11-447 | 0 | SWT/COR | CCS | CNTR |
| 1101 | | | | | 16,2751 | 1 2755 | 0 | | TCP | +4 |
| 1102 | REP | 1 | | | 16,2752 | 1 2773 | 1 | | TCP | SWTCHVR |
| 1103 | REP | 1 | | | 16,2753 | 1 2761 | 1 | | TCP | REPCHK |
| 1104 | REP | 2 | LAST | 905 | 16,2754 | 1 2773 | 1 | | TCP | SWTCHVR |
| 1105 | REP | 2 | LAST | 103 | 16,2755 | 55-707 | 1 | +4 | TS | CNTRIMP |
| 1106 | REP | 14 | LAST | 848 | 16,2756 | 3 4716 | 0 | | CAP | SEVEN |
| 1107 | REP | 6 | LAST | 905 | 16,2757 | 55-661 | 0 | | TS | TVCXPHS |

CHECK ENGINE-ON BIT TO INHIBIT VARIABLE GAINS AND MASS IF ENGINE OFF CHANNEL 11

ON , SO OK TO UPDATE GAINS AND MASS OFF, SO BYPASS MASS/GAIN UPDATES, ALSO ENTRY FROM CCS BELOW WITH VCNTR = -0 (V97 R40 ENGFAL)

TEST FOR GAIN UPDATE TIME NOT YET NOW NOT USED NO, LOTHRUST (S40.6 R40)

PROTECT VCNTR AND CSMASS DURING AN IMPULSIVE BURN

UPDATE IX, IAVG, IAVG/TLX MASSPROP ENTRY (ALREADY INITIALIZED) UPDATE 1/CONACC, VARK UPDATE MASS FOR NEXT 10 SEC. OF BURN KG B.16

RESET THE VARIABLE-GAIN (UPDATE COUNTER (COUNTDOWN, FROM VARGAINS +1)

RESTART-PROTECT THE COPYCYCLE (1)

CSMASS KG B.16

VCNTR FOR ENGFAL (R41) MASS UPDATES AT SPSOFF COPYCYCLE OVER (2)

CHECK FOR SWITCHOVER/CG CORRECTION NOT YET NOW PRIOR SWITCHOVER (OR NONE) NOW (1/2 SEC SWITCHOVER, ONLY)

COUNT DOWN SETUP TVCXPHS FOR ENTRY AT CNTRCOPY



L TVCEXECUTIVE

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| LINE NO. | REP | TYPE | ADDR | DATA | OPERATION | PARAMS | DESCRIPTION |
|----------|---------|------|---------|------------------|-----------|---------------|--|
| 1108 | REP 1 | | 16,2760 | 1 3122 1 | TCP | CNTRCOPY | |
| 1109 | REP 5 | LAST | 901 | 16,2761 31=652 1 | REPCHK | CAB REPPRAC | CHECK FOR REPETITIVE UPDATES |
| 1110 | | | | 16,2762 0 0008 1 | EXTEND | | |
| 1111 | | | | 16,2763 6 2770 0 | BZMP | +5 | NO (NEG OR +-ZERO) |
| 1112 | REP 2 | LAST | 100 | 16,2764 55=448 1 | TS | TEMPDAP +1 | YES, SET UP CORRECTION FRACTION |
| 1113 | REP 22 | LAST | 891 | 16,2765 3 4715 0 | CAP | FIVE | ADVANCE TVCEXPHS |
| 1114 | REP 7 | LAST | 905 | 16,2766 55=661 0 | TS | TVCEXPHS | |
| 1115 | REP 1 | | | 16,2767 1 3053 0 | TCP | CORSETUP | |
| 1116 | REP 1 | | | 16,2770 3 4707 0 | +5 | CAP EIGHT | |
| 1117 | REP 8 | LAST | 906 | 16,2771 55=661 0 | TS | TVCEXPHS | |
| 1118 | REP 1 | | | 16,2772 1 3125 0 | TCP | STRKUP | |
| 1119 | REP 34 | LAST | 905 | 16,2773 3 4676 1 | SWTCHOVR | CAP BIT13 | CHECK ENGINE-ON BIT, NOT PERMITTING |
| 1120 | | | | 16,2774 0 0008 1 | EXTEND | | SWTCHOVER DURING ENGINE-SHUTDOWN |
| 1121 | REP 29 | LAST | 905 | 16,2775 02 011 0 | RAND | DSALMOUT | TAILOFF |
| 1122 | REP 194 | LAST | 905 | 16,2776 10 000 0 | CCS | A | |
| 1123 | | | | 16,2777 1 3001 1 | TCP | +2 | OK TO SWITCHOVER |
| 1124 | REP 2 | LAST | 904 | 16,3000 1 3142 1 | TCP | TVCEXFIN | DONT SWITCHOVER, TERMINATE |
| 11242 | REP 12 | LAST | 900 | 16,3001 4 0105 1 | CS | FLAGWR9 | SET SWITCHOVER FLAG (SWTOVER) FOR DWNLNK |
| 11243 | REP 37 | LAST | 900 | 16,3002 7 4674 1 | MASK | BIT15 | AND POST-BURN TRIM UPDATES (SEE |
| 11244 | REP 13 | LAST | 906 | 16,3003 26 105 1 | ADS | FLAGWR9 | ..RESTRIM.. (P40-P47)) |
| 1125 | REP 61 | LAST | 900 | 16,3004 31=466 1 | CAB | DAPDATR1 | SWTCHOVER...CHECK FOR LEM-OFF/ON |
| 1126 | REP 35 | LAST | 906 | 16,3005 7 4676 0 | MASK | BIT13 | (NOTE, SHOWS LEM-OFF) |
| 1127 | | | | 16,3006 0 0006 1 | EXTEND | | |
| 1128 | REP 1 | | | 16,3007 1 3013 1 | BZP | GAINDOWN | LEM-ON....FULL SWITCHOVER/CG CORRECTION |
| 1129 | REP 10 | LAST | 848 | 16,3010 3 4710 0 | CAP | PLUR | LEM-OFF....NO SWITCHOVER, JUST CG CORR. |
| 1130 | REP 9 | LAST | 906 | 16,3011 55=661 0 | TS | TVCEXPHS | |
| 1131 | REP 1 | | | 16,3012 1 3050 0 | TCP | TEMPSET | |
| 1132 | REP 2 | LAST | 900 | 16,3013 31=420 0 | GAINDOWN | CAB BTVCDT/2 | LEM-ON.... DROP GAIN BY (OLDTVCDT/8CS)SQ |
| 1133 | | | | 16,3014 0 0006 1 | EXTEND | | |
| 1134 | REP 33 | LAST | 888 | 16,3015 7 4708 0 | MP | BITS | |
| 1135 | REP 195 | LAST | 906 | 16,3016 22 000 1 | LXCH | A | |
| 1136 | | | | 16,3017 0 0006 1 | EXTEND | | |
| 1137 | REP 196 | LAST | 906 | 16,3020 7 0000 0 | MP | A | |
| 1138 | REP 197 | LAST | 906 | 16,3021 22 000 1 | LXCH | A | (TVCDT/8CS)SQD, SC.AT R+2 |
| 1139 | | | | 16,3022 0 0006 1 | EXTEND | | PREPARE NEW GAIN CONSTANT |
| 1140 | REP 3 | LAST | 900 | 16,3023 7 1646 0 | MP | KTLX/I | |
| 1141 | | | | 16,3024 20 001 1 | DDQRL | | |
| 1142 | | | | 16,3025 20 001 1 | DDQRL | | |
| 1143 | REP 2 | LAST | 103 | 16,3026 55=702 1 | TS | TKTLX/I | (FOR COPYCYCLE) |
| 1144 | REP 10 | LAST | 906 | 16,3027 25=661 1 | SWTCOPY | INCR TVCEXPHS | RESTART-PROTECT THE COPYCYCLE (3) |



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1145 REP 1 16,3030 3 7677 0
 1146 REP 5 LAST 902 16,3031 55=635 1
 1150 REP 2 LAST 901 16,3032 31=414 1
 1151 16,3033 6 0000 1
 1152 16,3034 6 0000 1
 1153 REP 6 LAST 901 16,3035 55=644 1

CAP OCT37774
 TS TSVCDT
 CAB EXPRIME +1
 DOUBLE
 DOUBLE
 TS KPRIMEDT

LEM-ON ONLY..... TS TIMER
 PREPARE KPRIMEDT FOR 80MS DAP, USING
 (KPRIMEDT+1 IS ZERO)

A1154
 A1155
 A1156
 A1157
 A1158

SCALING OF OMEGAC HAS CHANGED, BUT NO
 CHANGE OF REGISTERS. RATE COMMANDS
 ARE LOW BY (OLD TVCDT)/80, UNTIL
 NEXT 340.8 COMPUTATION, WHICH USES
 THE NEW KPRIMEDT.

1159 REP 3 LAST 906 16,3036 31=702 0
 1160 REP 4 LAST 906 16,3037 55=646 0

CAB KTLX/I
 TS KTLX/I

GAIN CONSTANT

11602 REP 3 LAST 905 16,3040 0 3154 1

TC 340.15 +7

UPDATE VARK (ONLY, NO CHANGE 1/CQACC)

1161 REP 3 LAST 245 16,3041 11=814 1
 1162 16,3042 1 3047 0
 1163 16,3043 1 3047 0
 1164 16,3044 1 3047 0
 1165 REP 2 LAST 906 16,3045 3 4707 0
 1166 REP 3 LAST 901 16,3046 55=664 0

STRKCALL CCS STROKER
 TCP +5
 TCP +4
 TCP +3
 CAP EIGHT
 TS STRKTIME

CHECK STROKER FOR VERB 68 INDICATION
 STROKE TEST IN PROGRESS (80MS DAP)
 +0 SAYS NO VERB 68 YET
 STROKE TEST IN PROGRESS (80MS DAP)
 -0 SAYS PRIOR VERB68, SO START
 STROKE TEST IN 4 SECONDS

1167 REP 11 LAST 906 16,3047 25=661 1

+543 INCR TVCXPMS

COPYCYCLE OVER (SWTCOVR ENTRY NEXT) (4)

1168 REP 1 16,3050 31=422 1
 1169 REP 3 LAST 906 16,3051 55=446 1

TEMPSET CAB BCORPRAC
 TS TEMPDAP +1

SET UP CORRECTION FRACTION

1170 REP 12 LAST 907 16,3052 25=661 1

INCR TVCXPMS

ENTRY FROM REPCHECK AT NEXT LOCATION (5)

1171 REP 62 LAST 906 16,3053 31=466 1
 1172 REP 36 LAST 906 16,3054 7 4676 0

CORSETUP CAB DAPDATR1
 MASK BIT13

CHECK FOR LEM-OFF/ON
 (NOTE, SHOWS LEM-OFF)

1173 16,3055 0 0006 1
 1174 16,3056 1 3060 0
 1175 REP 4 LAST 907 16,3057 31=446 0
 1176 REP 5 LAST 907 16,3060 6 1446 0
 1177 REP 6 LAST 907 16,3061 55=445 1

EXTEND
 BZP +2
 CAB TEMPDAP +1
 AD TEMPDAP +1
 TS TEMPDAP

LEM IS ON, PICK UP TEMPDAP+1
 LEM IS OFF, PICK UP 2(TEMPDAP+1)

1178 REP 16 LAST 901 16,3062 3 7716 0
 1179 REP 3 LAST 905 16,3063 55=707 1

CAB NEOONE
 TS CNTRIMP

CG.CORR USES TEMPDAP

SET UP FOR CNTR = -1 (SWTCOVR DONE)
 (COPYCYCLE AT .CNTRCOPY.)

1180 16,3064 0 0006 1
 1181 REP 3 LAST 901 16,3065 3 1626 1
 1182 REP 2 LAST 103 16,3066 53=704 1
 1183 REP 17 LAST 901 16,3067 4 1425 1
 1184 REP 4 LAST 901 16,3070 6 1621 0
 1185 16,3071 0 0006 1

CG.CORR EXTEND
 DCA PDRLOFF
 DXCH PACTIMP
 CS PACTOFF
 AD DELPRAR
 EXTEND

PITCH TRIM-TRACKER CORRECTION



L TVCXSOUTIVE

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| | | | | | | | | | | | |
|------|-----|----|------|-----|---------|----------|----------|--------|----------|--|-----|
| 1186 | REP | 7 | LAST | 907 | 16,3072 | 7 1445 1 | | MP | TEMPDAP | | |
| 1187 | | | | | 16,3073 | 20 001 1 | | DDQJEL | | | |
| 1188 | | | | | 16,3074 | 20 001 1 | | DDQJEL | | | |
| 1189 | REP | 3 | LAST | 907 | 16,3075 | 21=704 1 | | DAS | PACTIMP | | |
| 1190 | | | | | 16,3076 | 0 0006 1 | | EXTEND | | | |
| 1191 | REP | 3 | LAST | 901 | 16,3077 | 3 1830 0 | | DCA | YDELOFF | | |
| 1192 | REP | 2 | LAST | 103 | 16,3100 | 53=706 0 | | DXCH | YACTIMP | | |
| 1193 | REP | 6 | LAST | 901 | 16,3101 | 4 1426 1 | | CS | YACTOFF | | |
| 1194 | REP | 4 | LAST | 901 | 16,3102 | 6 1823 1 | | AD | DELYBAR | | |
| 1195 | | | | | 16,3103 | 0 0006 1 | | EXTEND | | | |
| 1196 | REP | 6 | LAST | 908 | 16,3104 | 7 1445 1 | | MP | TEMPDAP | | |
| 1197 | | | | | 16,3105 | 20 001 1 | | DDQJEL | | | |
| 1198 | | | | | 16,3106 | 20 001 1 | | DDQJEL | | | |
| 1199 | REP | 3 | LAST | 908 | 16,3107 | 21=706 0 | | DAS | YACTIMP | | |
| 1200 | REP | 13 | LAST | 907 | 16,3110 | 25=661 1 | CORCOPY | INCR | TVCXPHS | RESTART-PROTECT THE COPYCYCLE | (6) |
| 1201 | | | | | 16,3111 | 0 0006 1 | | EXTEND | | TRIM-ESTIMATES, AND | |
| 1202 | REP | 4 | LAST | 908 | 16,3112 | 3 1704 0 | | DCA | PACTIMP | | |
| 1203 | REP | 18 | LAST | 907 | 16,3113 | 55=425 1 | | TS | PACTOFF | TRIMS | |
| 1204 | REP | 4 | LAST | 907 | 16,3114 | 53=626 0 | | DXCH | PDELOFF | | |
| 1205 | | | | | 16,3115 | 0 0006 1 | | EXTEND | | | |
| 1206 | REP | 4 | LAST | 908 | 16,3116 | 3 1706 1 | | DCA | YACTIMP | | |
| 1207 | REP | 7 | LAST | 908 | 16,3117 | 55=426 1 | | TS | YACTOFF | | |
| 1208 | REP | 4 | LAST | 908 | 16,3120 | 53=630 1 | | DXCH | YDELOFF | | |
| 1209 | REP | 14 | LAST | 908 | 16,3121 | 25=661 1 | | INCR | TVCXPHS | COPYCYCLE OVER (SWT/COR ENTRY NEXT) | (7) |
| 1210 | REP | 4 | LAST | 907 | 16,3122 | 31=707 0 | CNTRCOPY | CAB | CNTRIMP | UPDATE CNTR (RESTARTS OK, FOLLOWS CPYCY) | |
| 1211 | REP | 25 | LAST | 905 | 16,3123 | 55=447 0 | | TS | CNTR | | |
| 1212 | REP | 15 | LAST | 908 | 16,3124 | 25=661 1 | | INCR | TVCXPHS | ENTRY FROM REPCHECK AT NEXT LOCATION | (8) |
| 1213 | REP | 4 | LAST | 907 | 16,3125 | 11=664 0 | STRKUP | CCS | STRKTIME | CHECK STROKE TEST START TIME | |
| 1214 | | | | | 16,3126 | 1 3131 0 | | TOP | +3 | IN 4SEC DELAY APTER SWITCHOVER | |
| 1215 | REP | 1 | | | 16,3127 | 1 3133 1 | | TOP | STRKNOW | START STROKE TEST NOW.... | |
| 1216 | REP | 3 | LAST | 906 | 16,3130 | 1 3142 1 | | TOP | TVCXFIN | NO STROKE TEST REQUEST YET | |
| 1217 | REP | 2 | LAST | 103 | 16,3131 | 55=710 1 | | TS | STRKTMP | COUNT DOWN | |
| 1218 | REP | 1 | | | 16,3132 | 1 3137 0 | | TOP | STRKCPY | | |
| 1219 | REP | 5 | LAST | 552 | 16,3133 | 31=412 1 | STRKNOW | CAB | ESTROKER | START THE STROKE TEST NOW.... | |
| 1220 | REP | 4 | LAST | 907 | 16,3134 | 55=614 1 | | TS | STRKER | | |
| 1221 | REP | 17 | LAST | 907 | 16,3135 | 3 7716 0 | | CAP | NECONE | KILL THE STROKE TEST CALL | |
| 1222 | REP | 3 | LAST | 908 | 16,3136 | 55=710 1 | | TS | STRKTMP | | |
| 1223 | REP | 16 | LAST | 908 | 16,3137 | 25=661 1 | STRKCPY | INCR | TVCXPHS | RESTART-PROTECT THE COPYCYCLE | (9) |



L TVCSEXECUTIVE

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| | | | | | | | | | | |
|------|-----|-----|------|-----|---------|----------|----------|----------|------|---------------|
| 1224 | REP | 4 | LAST | 908 | 16,3140 | 31-710 0 | CAS | STRCTIMP | | |
| 1225 | REP | 5 | LAST | 908 | 16,3141 | 55-664 0 | TS | STRCTIME | | |
| 1226 | REP | 156 | LAST | 901 | 16,3142 | 3 4714 1 | TVCSEFIN | CAP | ZERO | RESST TVCXPMS |
| 1227 | REP | 17 | LAST | 908 | 16,3143 | 55-661 0 | TS | TVCXPMS | | |
| 1228 | REP | 45 | LAST | 787 | 16,3144 | 1 5213 0 | TCF | TAKOVER | | OVER AND OUT |



L TVCS/EXECUTIVE

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| P1229 | NAME | S40.15 | INERTIA | COMPUTATIONS | | | | | | |
|-------|---------|--------|---------|--------------|----------|--------|--------|---------------|------------------------------------|---------------------------------|
| 1230 | REP 2 | LAST | 103 | E6,1650 | | | | | BRANK= | 1/CQACC |
| 1231 | REP 3 | LAST | 691 | 16,3145 | 31=470 0 | S40.15 | CAR | IXX | COMPUTE | 1/CQACC (RACC).... IXX SC.AT |
| 1232 | | | | 16,3146 | 0 0006 1 | | EXTEND | | B=20 | KG M SCD |
| 1233 | REP 1 | | | 16,3147 | 7 3164 0 | | MP | 2PI/M | 2PI/M, SC.AT | 1/(B+8 N M) |
| 1234 | | | | 16,3150 | 20 001 1 | | DDOURL | | | |
| 1235 | | | | 16,3151 | 20 001 1 | | DDOURL | | | |
| 1236 | | | | 16,3152 | 20 001 1 | | DDOURL | | | |
| 1237 | REP 3 | LAST | 910 | 16,3153 | 55=650 1 | | TS | 1/CQACC | SC.AT | B+9 SEC SCD / REV |
| 1243 | REP 5 | LAST | 907 | 16,3154 | 31=646 1 | +7 | CAR | KTLX/I | COMPUTE | VARX, SCALING IN THE KTLX/I FOR |
| 1244 | | | | 16,3155 | 0 0006 1 | | EXTEND | | LEM-OFF, ON. ENTRY FROM SWITCHOVER | |
| 1245 | REP 1 | | | 16,3156 | 7 1472 0 | | MP | IAVG/TIX | SCALED AT B+2 | SECONDS-SQUARED |
| 1246 | | | | 16,3157 | 20 001 1 | | DDOURL | | SCALING | |
| 1247 | | | | 16,3160 | 20 001 1 | | DDOURL | | | |
| 1248 | | | | 16,3161 | 20 001 1 | | DDOURL | | | |
| 1249 | REP 3 | LAST | 104 | 16,3162 | 55=651 0 | | TS | VARX | LEM-OFF | KPGEN3(0) OR LEM-ON VARX(0) |
| 1250 | REP 178 | LAST | 842 | 16,3163 | 0 0002 0 | | TC | 0 | | |
| 1251 | | | | 16,3164 | 33074 1 | 2PI/M | DEC | .00331017 B+8 | 2PI/M, SC.AT | 1/(B+8 N M) |



L TVCMASPROP USER#5 PAGE NO. 1 E0 53

R1000 PROGRAM NAME...MASPROP
 R1001 LOG SECTION...TVCMASPROP PROGRAMMER...MELANSON (ENGL, SCHLINDT)
 R1002 FUNCTIONAL DESCRIPTION'

R1003 MASSPROP OPERATES IN TWO MODES'(1)IF LEM MASS OR CONFIGURATION ARE UPDATED (MASPROP DOES NOT TEST
 R1005 FOR THIS) THE ENTIRE PROGRAM MUST BE RUN THROUGH, BREAKPOINT VALUES AND DERIVATIVES OF THE OUTPUTS WITH
 R1007 RESPECT TO CSM MASS BEING CALCULATED PRIOR TO CALCULATION OF THE OUTPUTS. (2)OTHERWISE, THE OUTPUTS CAN BE
 R1009 CALCULATED USING PREVIOUSLY COMPUTED BREAKPOINT VALUES AND DERIVATIVES.

R10095 CALLING SEQUENCES

R1010 IF LEM MASS OR CONFIGURATION HAS BEEN UPDATED, TRANSFER TO MASPROP, OTHERWISE TRANSFER TO FIXCW.
 R1012 L TC BANKCALL OR IBKCALL
 R1013 L+1 CADR MASPROP
 R1014 OR
 R1015 L+1 CADR FIXCW
 R1016 L+2 RETURNS VIA 0

R1017 CALLED IN PARTICULAR BY DONLN47 (JOB) AND TVCS(ROUTINE (TASK)

R1019 JOBS OR TASKS INITIATED - NONE

R1020 SUBROUTINES CALLED - NONE

R1021 ERASABLE INITIALIZATION REQUIRED

R1022 LEMMASS MUST CONTAIN LEM MASS SCALED AT B+16 IN KILOGRAMS
 R1023 CSMMASS MUST CONTAIN CSM MASS SCALED AT B+16 IN KILOGRAMS

R1024 DAPDATR1 MUST BE SET TO INDICATE VEHICLE CONFIGURATION.
 R10241 BITS (15,14,13) = (0 , 0 , 1) LEM OFF
 R102411 (0 , 1 , 0) LEM ON (ASCNT,DSCNT)
 R102412 (1 , 1 , 0) LEM ON (ASCNT ONLY)

R1025 ALARMS - NONE

R1026 EXIT - TC 0

R1027 OUTPUTS'

R1028 (1)IXX, SINGLE PRECISION SCALED AT B+20 IN KG-M SQ.
 R1029 (2)Iavg, SINGLE PRECISION SCALED AT B+20 IN KG-M SQ.
 R1030 (3)Iavg/TLX, SINGLE PRECISION, SCALED AT B+2 SEC-SQ
 R1031 THEY ARE STORED IN CONSECUTIVE REGISTERS IXX0, IXX1, IXX2
 R10311 CONVERSION FACTOR (SLUG-PTSQ) = 0.737562 (KG-MSQ)

L TVOMASSPROP

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R1032 OUTPUTS ARE CALCULATED AS FOLLOWS :

R1033 (1) IF LEM DOCKED, LENMASS IS FIRST ELIMINATED AS A PARAMETER

| | | | |
|-------|---|-----------|---|
| R1034 | VARST0 = INTVALLE0 + LENMASS(SLOPEVAL0) | IXX | BREAKPOINT VALUE |
| R1035 | VARST1 = INTVALLE1 + LENMASS(SLOPEVAL1) | I AVG | BREAKPOINT VALUE |
| R1036 | VARST2 = INTVALLE2 + LENMASS(SLOPEVAL2) | I AVG/TLX | BREAKPOINT VALUE |
| R1040 | VARST3 = INTVALLE3 + LENMASS(SLOPEVAL3) | I AVG/TLX | SLOPE FOR CSMMASS ± 33956 LBS (SPS ± 10000 LBS) |
| R1042 | VARST4 = INTVALLE4 + LENMASS(SLOPEVAL4) | I AVG | SLOPE FOR CSMMASS ± 33956 LBS (SPS ± 10000 LBS) |
| R1044 | VARST5 = INTVALLE5 + LENMASS(SLOPEVAL5) | IXX | SLOPE FOR ALL VALUES OF CSMMASS |
| R1046 | VARST6 = INTVALLE6 + LENMASS(SLOPEVAL6) | I AVG | SLOPE FOR CSMMASS ± 33956 LBS (SPS ± 10000 LBS) |
| R1048 | VARST7 = INTVALLE7 + LENMASS(SLOPEVAL7) | I AVG/TLX | SLOPE FOR CSMMASS ± 33956 LBS (SPS ± 10000 LBS) |
| R1050 | VARST8 = INTVALLE8 + LENMASS(SLOPEVAL8) | I AVG | DECREMENT TO BRKPT VALUE WHEN LEM DSCNT STAGE OFF |
| R1052 | VARST9 = INTVALLE9 + LENMASS(SLOPEVAL9) | I AVG/TLX | DECREMENT TO BRKPT VALUE WHEN LEM DSCNT STAGE OFF |
| R1054 | (2) IF LEM NOT DOCKED | | |

R1055 VARST0 = NOLEMMAL0 WHERE THE MEANING AND SCALING OF VARST0
 R1056 TO VARST9 ARE THE SAME AS GIVEN ABOVE
 R1057
 R1058 NOTE... FOR THIS CASE, VARST8,9 HAVE NO
 R1059 MEANING (THEY ARE COMPUTED BUT NOT USED)
 R1060 (3) THE FINAL OUTPUT CALCULATIONS ARE THEN DONE

R1061 $IXX0 = VARST0 + (CSMMASS + NEGRPW)VARST5$ IXX
 R1062 $IXX1 = VARST1 + (CSMMASS + NEGRPW)VARST(4 \text{ OR } 6)$ I AVG
 R1063 $IXX2 = VARST2 + (CSMMASS + NEGRPW)VARST(3 \text{ OR } 7)$ I AVG/TLX
 R1064 THE DATA USED CAME FROM CSM/IM SPACECRAFT OPERATIONAL DATA BOOK.
 R10641 VOL. 3, NASA DOCUMENT SNA-8-D-027 (MARCH 1968)

R1065 PERTINENT MASS DATA : CSM WEIGHT (FULL) 64100 LBS
 R1066 (EMPTY) 23956 LBS
 R1067 LEM WEIGHT (FULL) 32000 LBS
 R1068 (EMPTY) 14116 LBS

R10661 (WEIGHTS ARE FROM AMENDMENT J1 (APRIL 24, 1968) TO ABOVE DATA BOOK)

L TVCMASSPROP

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| | | | | | | | | | | |
|------|-----|----|------|---------|---------|----------|----------------------|--|--|---|
| 1069 | | | | 25,3766 | | | BANK 25 | | | |
| 1070 | REP | 1 | | 05,2000 | | | SETLOC DAPMASS | | | |
| 1071 | | | | 05,3207 | | | BANK | | | |
| 1072 | REP | 9 | LAST | 904 | | | EBANK= BZERO | | | |
| 1073 | REP | 1 | | | | | COUNT= SS/MASP | | | |
| 1074 | REP | 2 | LAST | 439 | 05,3207 | 3 4334 1 | MASSPROP CAP NINE | | | MASSPROP USES TVC/RCS INTERRUPT TEMPS |
| 1078 | REP | 2 | LAST | 101 | 05,3210 | 55=506 1 | TS PHI333 | | | SET UP TEN PASSES |
| 1076 | REP | 63 | LAST | 907 | 05,3211 | 31=466 1 | LEMTEST CAB DAPDATR1 | | | DETERMINE LEM STATUS |
| 1077 | REP | 37 | LAST | 907 | 05,3212 | 7 4676 0 | MARK BIT13 | | | |
| 1078 | REP | | | | 05,3213 | 0 0006 1 | EXTEND | | | |
| 1079 | REP | 1 | | | 05,3214 | 1 3220 0 | BZF LEMYES | | | |
| 1080 | REP | 3 | LAST | 913 | 05,3215 | 51=506 0 | LEMMO INDEX PHI333 | | | LEM NOT ATTACHED |
| 1081 | REP | 1 | | | 05,3216 | 3 3304 0 | CAP NOLMVAL | | | |
| 1082 | REP | 1 | | | 05,3217 | 1 3230 1 | TCP STOINST | | | |
| 1083 | REP | 5 | LAST | 274 | 05,3220 | 31=473 0 | LEMYES CAB LEMMASS | | | LEM IS ATTACHED |
| 1084 | | | | | 05,3221 | 6 0000 1 | DOUBLE | | | |
| 1085 | | | | | 05,3222 | 0 0006 1 | EXTEND | | | |
| 1080 | REP | 4 | LAST | 913 | 05,3223 | 5 1506 0 | INDEX PHI333 | | | |
| 1087 | REP | 1 | | | 05,3224 | 7 3326 1 | MP SLOPEVAL | | | |
| 1088 | | | | | 05,3225 | 20 001 1 | DDOUBL | | | |
| 1089 | REP | 5 | LAST | 913 | 05,3226 | 51=506 0 | INDEX PHI333 | | | |
| 1090 | REP | 1 | | | 05,3227 | 6 3314 1 | AD INTVALUE | | | |
| 1091 | REP | 6 | LAST | 913 | 05,3230 | 51=506 0 | STOINST INDRX PHI333 | | | STORAGE INST BEGIN HERE |
| 1092 | REP | 3 | LAST | 101 | 05,3231 | 55=511 1 | TS VARST0 | | | |
| 1093 | REP | 7 | LAST | 913 | 05,3232 | 11=506 1 | CC8 PHI333 | | | ARE ALL TEN PASSES COMPLETED |
| 1094 | REP | 5 | LAST | 900 | 05,3233 | 1 3210 0 | TCP MASSPROP +1 | | | NO - GO DECREMENT PHI333 |
| 1098 | REP | 64 | LAST | 913 | 05,3234 | 11=466 0 | DXTEST CC8 DAPDATR1 | | | IF NEG, BIT15 IS 1, LEM DSCNT STAGE OFF |
| 1099 | REP | 2 | LAST | 905 | 05,3235 | 1 3243 0 | TCP FIXCW | | | |
| 1100 | REP | 3 | LAST | 913 | 05,3236 | 1 3243 0 | TCP FIXCW | | | |
| 1101 | REP | 4 | LAST | 913 | 05,3237 | 53=522 1 | DXCH VARST0 +8D | | | |
| 1102 | REP | 5 | LAST | 913 | 05,3240 | 21=513 0 | DAS VARST0 +1 | | | |
| 1103 | REP | 1 | | | 05,3241 | 3 3341 1 | CA DXITFIX | | | |
| 1104 | REP | 6 | LAST | 913 | 05,3242 | 27=520 0 | ADS VARST0 +7 | | | |
| 1105 | REP | 35 | LAST | 900 | 05,3243 | 3 4711 1 | FIXCW CAP BIT2 | | | COMPUTATION PHASE BEGINS HERE. SET UP |
| 1106 | REP | 8 | LAST | 913 | 05,3244 | 55=506 1 | TS PHI333 | | | THREE PASSES |
| 1107 | REP | 2 | LAST | 101 | 05,3245 | 55=507 0 | TS PSI333 | | | |
| 1108 | REP | 16 | LAST | 905 | 05,3246 | 31=474 1 | CAB CSMASS | | | GET DELTA CSM WEIGHT - SIGN DETERMINES |
| 1109 | REP | 1 | | | 05,3247 | 6 3340 0 | AD NEGCPW | | | SLOPE LOCATIONS. |
| 1110 | | | | | 05,3250 | 6 0000 1 | DOUBLE | | | |
| 1111 | REP | 2 | LAST | 101 | 05,3251 | 55=510 0 | TS TEMP333 | | | |



L TVOMASSPROP

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| | | | | | | | | | | |
|------|-----|-----|------|---------|--------|---|-----|--|----------|--------------|
| 1112 | | | | 05,3252 | 0 0000 | 1 | | | EXTEND | |
| 1113 | REP | 1 | | 05,3253 | 6 3250 | 0 | | | BZP | PEGGY |
| 1114 | REP | 3 | LAST | 05,3254 | 3 7715 | 0 | 316 | | CAP | NS02 |
| 1115 | REP | 9 | LAST | 05,3255 | 55=508 | 1 | 913 | | TS | PHI333 |
| 1116 | REP | 10 | LAST | 05,3256 | 51=508 | 0 | 914 | | PEGGY | INDEX PHI333 |
| 1111 | REP | 1 | | 05,3257 | 31=516 | 1 | | | CAB | VARST5 |
| 1118 | | | | 05,3260 | 0 0000 | 1 | | | EXTEND | |
| 1119 | REP | 3 | LAST | 05,3261 | 7 1510 | 0 | 913 | | MP | TEMP333 |
| 1120 | | | | 05,3262 | 8 0000 | 1 | | | DOUBLE | |
| 1121 | REP | 3 | LAST | 05,3263 | 51=507 | 1 | 913 | | INDEX | PSI333 |
| 1122 | REP | 7 | LAST | 05,3264 | 8 1511 | 0 | 913 | | AD | VARST0 |
| 1123 | REP | 4 | LAST | 05,3265 | 51=507 | 1 | 914 | | INDEX | PSI333 |
| 1124 | REP | 4 | LAST | 05,3266 | 55=470 | 1 | 910 | | TS | IXX |
| 1125 | REP | 5 | LAST | 05,3267 | 11=507 | 0 | 914 | | CCS | PSI333 |
| 1126 | REP | 1 | | 05,3270 | 1 3300 | 0 | | | TCF | BQKPP2 |
| 1127 | REP | 65 | LAST | 05,3271 | 31=486 | 1 | 913 | | CAB | DAPDATR1 |
| 1128 | REP | 45 | LAST | 05,3272 | 7 4675 | 0 | 900 | | MASK | BIT14 |
| 1129 | REP | 198 | LAST | 05,3273 | 10 000 | 0 | 906 | | CCS | A |
| 1130 | REP | 8 | LAST | 05,3274 | 3 1473 | 0 | 913 | | CA | LEMMASS |
| 1131 | REP | 17 | LAST | 05,3275 | 8 1474 | 1 | 913 | | AD | CSMASS |
| 1132 | REP | 9 | LAST | 05,3276 | 55=475 | 1 | 849 | | TS | WRIGHT/O |
| 1133 | REP | 179 | LAST | 05,3277 | 0 0002 | 0 | 910 | | ENDMASSP | TC |
| 1134 | REP | 6 | LAST | 05,3300 | 55=507 | 0 | 914 | | BQKPP2 | TS PSI333 |
| 1135 | | | | 05,3301 | 0 0000 | 1 | | | EXTEND | |
| 1136 | REP | 11 | LAST | 05,3302 | 27=506 | 1 | 914 | | DIM | PHI333 |
| 1137 | REP | 2 | LAST | 05,3303 | 1 3258 | 1 | 914 | | TCF | PEGGY |

DETERMINE CORRECT SLOPE

ALL IS READY - CALCULATE OUTPUTS NOW
GET SLOPE

MULT BY DELTA CSM WEIGHT

ADD BREAKPOINT VALUE

***** OUTPUTS (IOX0, IOX1, IOX2) *****
BOOKKEEPING - MASSPROP FINISHED OR NOT
NO - GO TAKE CARE OF INDEXING REGISTERS

UPDATE WEIGHT/O

SCALED AT R=16 IN KILOGRAMS

REDUCE PSI BY ONE

L TVCMASPROP

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| | | | | | |
|------|---------|---------|----------|------|--------------------|
| 1138 | 05,3304 | 00818 0 | NOLENVAL | DEC | 25445. B-20 |
| 1139 | 05,3305 | 02528 1 | | DEC | 87450. B-20 |
| 1140 | 05,3306 | 02352 1 | | DEC | .30715 B-2 |
| 1141 | 05,3307 | 01471 1 | | DEC | 1.22877 E-5 R+12 |
| 1142 | 05,3310 | 00834 0 | | DEC | 1.6098 B-6 |
| 1143 | 05,3311 | 00812 1 | | DEC | 1.54 B-6 |
| 1144 | 05,3312 | 03706 0 | | DEC | 7.77177 B-6 |
| 1145 | 05,3313 | 04425 0 | | DEC | 3.46458 E-5 R+12 |
| 1146 | 05,3314 | 00844 1 | INTVALLE | DEC | 28850 B-20 |
| 1147 | 05,3315 | 03710 1 | | DEC | 127518 B-20 |
| 1148 | 05,3316 | 04248 0 | | DEC | .54059 B-2 |
| 1149 | 05,3317 | 02011 0 | | DEC | .153964 E-4 R+12 |
| 1150 | 05,3320 | 77501 0 | | DEC | -.742923 B-6 |
| 1151 | 05,3321 | 00812 1 | | DEC | 1.5398 B-6 |
| 1152 | 05,3322 | 04656 0 | | DEC | 9.68 B-6 |
| 1153 | 05,3323 | 10372 0 | | DEC | .847825 E-4 R+12 |
| 1154 | 05,3324 | 77128 1 | | DEC | -27228. R-20 |
| 1155 | 05,3325 | 76261 0 | | DEC | -.208478 B-2 |
| 1156 | 05,3326 | 00767 1 | SLOPEVAL | DEC | 1.98307 B-6 |
| 1157 | 05,3327 | 15624 0 | | DEC | 27.5774 B-6 |
| 1158 | 05,3330 | 03054 0 | | DEC | 2.3548 E-5 R+12 |
| 1159 | 05,3331 | 04532 1 | | DEC | 2.1777 E-9 R+28 |
| 1160 | 05,3332 | 10433 1 | | DEC | 1.044 E-3 R+8 |
| 1161 | 05,3333 | 00000 1 | | DEC | 0 |
| 1162 | 05,3334 | 22070 0 | | DEC | 2.21088 E-3 R+8 |
| 1163 | 05,3335 | 03204 1 | | DEC | 1.5166 E-9 R+28 |
| 1164 | 05,3336 | 77268 0 | | DEC | -1.284 B-6 |
| 1165 | 05,3337 | 02476 0 | | DEC | 2. E-5 R+12 |
| 1166 | 05,3340 | 70364 1 | NECRPW | DEC | -15402.17 R-16 |
| 1167 | 05,3341 | 75420 0 | DXITPIX | DEC* | -1.88275 E-5 R+12* |



L TVCSSTARTS

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11000 NAME...TVCSSTART PACKAGE, CONSISTING OF REDOTVC, ENABL1, 2, ONDSOUT, PHSCHK2, ETC.
 R1002 LOC SECTION...TVCSSTART PACKAGE SUBROUTINE...DAPCSM
 R1003 MOD BY ENGEL DATE.....18 OCT, 1967

R1004 FUNCTIONAL DESCRIPTION....

R1005 *RESTART-PROGS THE TVC DAPS, INCLUDING PITCHDAP, YAWDAP,
 R1006 TVCEXECUTIVE, ROLL DAP, TVCINIT4, TVCDAPON, AND STROKE TEST
 R1007 *TVC RESTARTS RECEIVE SPECIAL CONSIDERATION IN SEVERAL AREAS.
 R1008 RESTART DOWN-TIME IS IMPORTANT BECAUSE OF THE TRANSIENTS INTRODUCED
 11009 BY THE THRUST VECTOR RETURN TO THE ACTUATOR MECHANICAL NULLS
 R1010 FOLLOWING TVC- AND OPTICS-ERROR-COUNTER-DISENABLES (CHANNEL 12).
 R1011 TVC USES A MIXTURE OF WAITLIST, T5, T6, AND JOB CALLS. THERE IS
 R1012 FILTER MEMORY (UP TO 7TH ORDER) TO BE PROTECTED IF WILD TRANSIENTS
 R1013 ARE TO BE AVOIDED. SEVERAL COUNTERS ARE INVOLVED FOR TIMING TVC
 R1014 EVENTS SUCH AS SWITCHOVER AND STROKE TEST STARTUPS AND RE-STARTUPS.
 R1015 THE TVC GAINS ARE DECREMENTED. THE GIMBAL TRIM ESTIMATORS AND THE
 R1016 BODY AXIS ATTITUDE ERROR INTEGRATORS INVOLVE DIGITAL SUMMATION.
 R1017 DIGITAL DIFFERENTIATORS ARE INVOLVED IN THE BODY AXIS RATE ESTIMA-
 R1018 TIONS AND IN THE OUTPUTTING OF ACTUATOR COMMANDS. THERE IS AN
 R1019 OFFSET-TRACKER-FILTER TO PROTECT, ETC., ETC.
 R1020 *THOSE QUANTITIES WHICH MUST BE PROTECTED ARE STORED IN TEMPORARY
 R1021 REGISTERS AS THEY ARE COMPUTED, FOR UPDATING THE REAL REGISTERS
 R1022 DURING COPYCYCLES.
 R1023 *THE SEVERAL COPYCYCLES ARE EACH PROTECTED BY PHASE POINTS AT THEIR
 R1024 BEGINNING AND AT THEIR TERMINATION. THE PHASE POINTS ARE SIMPLY
 R1025 ..INCR.. INSTRUCTIONS, EITHER ..INCR TVCXPHS.. FOR COPYCYCLES
 R1026 IN THE TVCXSQUADME, OR ..INCR TVCPHASE.. FOR THE PITCH AND YAW
 R1027 COPYCYCLES. INDEXING ON EACH OF THESE POINTERS THEN PERMITS A
 R1028 RETURN TO THE APPROPRIATE RESTART POINTS.
 R1029 *IF A RESTART OCCURS DURING EITHER COPYCYCLE, THAT COPYCYCLE IS
 R1030 COMPLETED. THEN THE NORMAL TVCINIT4....DAPINIT...PITCHDAP STARTUP
 R1031 SEQUENCE IS CALLED UPON TO GET THINGS GOING AGAIN.
 R1032 *TVC-ENABLE AND OPTICS-ERROR-COUNTER ENABLE MUST BE SET ASAP
 R1033 (ALLOWING FOR PROCEDURAL DELAYS). THEN THE ENGINES ARE COMMANDED
 R1034 TO THE P-YACTOFP TRIM VALUES. THE DAPS ARE THEN READY TO GO ON THE
 R1035 AIR, WITH THE REGULAR STARTUP SEQUENCE, EITHER AT MRLEAN FOR A
 R1036 COMPLETE INITIALIZATION OR AT TVCINIT4 FOR A PARTIAL INITIALIZATION
 R1037 *FOR RESTARTS PRIOR TO THE SETTING OF THE T5 BITS IN IGNOVER THE
 R1038 PRS40.6 SECTION OF S40.6 TAKES CARE OF RE-ESTABLISHING TRIMS.
 R1039 *IF A RESTART OCCURS DURING THE TVCEXEC...TVCEXFIN SEQUENCE THE
 R1040 COMPUTATIONS WILL BE COMPLETED, STARTING AT THE APPROPRIATE RESTART
 R1041 POINT, AFTER THE DAPS ARE READY TO GO ON THE AIR.
 R1042 *IF A RESTART OCCURS PRIOR TO TVCINIT4 (TVCPHASE = -1) E.G. DURING
 R1043 THE EARLY DAP INITIALIZATION PHASE, THE DAP STARTUP SEQUENCE IS
 R1044 ENTERED AT MRLEAN FOR A FULL INITIALIZATION.
 R1045 *RESTARTS ARE NOT CRITICAL TO THE ROLL DAP PERFORMANCE, HENCE THE
 R1046 THE ROLL DAP IS MERELY RESTARTED.
 R1050 *RESTARTS DURING A STROKE TEST (STROKER IS NON-ZERO) WILL CAUSE THE
 R1051 STROKE TEST TO BE TERMINATED. A NEW V68 ENTRY WILL BE REQUIRED

L TVCRESTARTS

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R1052 TO GET IT GOING AGAIN (NO AUTOMATIC RESTART).
R1054 *REDOTVC IS REACHED FOLLOWING ANY RESTART WHICH FINDS THE TS BITS
R1055 (BITS 15,14 OF FLAG/RD6) SET FOR TVC. IGNOVER PREPARES TVCPHASE =-1
R1056 AND TVC EXPHS = 0 JUST BEFORE SETTING THESE BITS, JUST BEFORE
R1057 MAKING THE TS CALL TO TVCDAPON. T.V.N.G. TAKES OVER THE TS CLOCK
R1058 TO CALL R050P/R050APN WHICH RESETS THE TS BITS(FOR RC3) ON A
R1059 NORMAL SHUTDOWN.

R1060 CALLING SEQUENCE....TS, IN PARTICULAR BY ELRSKIP OF FRESH START/RESTART

R1061 NORMAL EXIT MODES....RESUME, NOCRSM, POSTJUMP (TO TVCINIT4 OR MRCLEAN)

R1062 ALARM OR ABORT EXIT MODES....NONE

R1063 SUBROUTINES CALLED....

R1064 *PCOPY+1, YCOPY+1 (PITCH AND YAW COPYCYCLES)
R1065 *ENABLE1,2, CMDSOUT (RE-ESTABLISH ACTUATOR TRIMS)
R1067 *MRCLEAN OR TVCINIT4 (TVCDAP INITIALIZATIONS)
R1068 *EXRSTRT AND TVCEXECUTIVE PHASE POINTS 1 THRU 9
R1069 *WAITLIST, IRNKCALL, POSTJUMP, ISWCALL

R1070 OTHER INTERFACES....IGNOVER AND R050APN (TS BITS), ELRSKIP (CALLS IT)

R1071 ERASABLE INITIALIZATION REQUIRED....

R1072 *TS BITS, TVCPHASE, TVCEXPHS
R1073 *TVC DAP VARIABLES
R1074 *OPERATIONS PERFORMED BY REDOTVC ARE BASED ON THE ASSUMPTION THAT
R1075 THE TVC DAPS ARE RUNNING NORMALLY

R1076 OUTPUT....

R1077 *PITCH AND YAW TVC DAP COPYCYCLES COMPLETED IF INTERRUPTED
R1078 *TVCEXECUTIVE COMPLETED IF INTERRUPTED
R1079 *STROKE TEST TERMINATED IF INTERRUPTED
R1080 *ACTUATOR TRIMS RE-ESTABLISHED (ACTUATORS BACK ON THE AIR)
R1081 *TVC DAP INITIALIZATION AS REQUIRED
R1082 *ALL TVC DAP OPERATIONS ON THE AIR

R1083 DERIS...TVC TEMPORARIES IN BRANK6

| | | | | | | |
|------|-----|---|------|---------|---------|--|
| 1084 | | | | 16,3165 | BANK | 18 |
| 1085 | REP | 2 | LAST | 904 | 16,2000 | SETLOC DAPROCL |
| 1086 | | | | 16,3165 | BANK | |
| 1087 | REP | 4 | LAST | 901 | E6,1654 | BRANK= TVCPHASE |
| 1088 | REP | 1 | | | | COUNT* 33/RSRT |
| 1089 | REP | 9 | LAST | 900 | 16,3165 | 22 016 0 REDOTVC LXCH BANKRUPT TVC RESTART PACKAGE |

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| | | | | | | | | | |
|-------|-----|-----|------|---------|------------------|----------|------------|----------------------------|--|
| 1090 | | | | 16,3166 | 0 0006 1 | EXTEND | | | |
| 1091 | REP | 9 | LAST | 900 | 16,3167 22 012 1 | OKCH | GRUPT | (..TCR.. IN ..PINCOPY..) | |
| 1092 | REP | 18 | LAST | 909 | 16,3170 11=661 0 | EXECPHS | CCS | TVCXPHS | CHECK TVCEXECUTIVE PHASE |
| 1093 | | | | | 16,3171 1 3173 0 | TCP | +2 | | MUST RESTART TVCEXECUTIVE |
| 1094 | REP | 1 | | | 16,3172 1 3177 1 | TCP | TVCDAFHS | | NO NEED TO RESTART TVCEXECUTIVE |
| 1095 | REP | 3 | LAST | 913 | 16,3173 3 4334 1 | CAP | NINE | | 9CS DELAY TO FORCE EXRSTRT TO OCCUR |
| 1096 | REP | 44 | LAST | 904 | 16,3174 0 5140 1 | TC | WAITLIST | | BEFORE PITCHDAP, AFTER CNDSQLT |
| 1097 | REP | 19 | LAST | 918 | E6,1661 | EBANK= | TVCXPHS | | |
| 1098 | REP | 1 | | | 16,3175 03271 0 | 2CADR | EXRSTRT | | |
| 1098 | REP | 1 | | | 16,3176 34066 0 | | | | |
| 1099 | REP | 2 | LAST | 133 | 16,3177 4 7700 0 | TVCDAFHS | CS | OCT37776 | CHECK BITS 15 AND 1 OF TVCPHASE TO SEE |
| 1100 | REP | 5 | LAST | 917 | 16,3200 7 1654 0 | MASK | TVCPHASE | | DAP RESTART LOCATION (-1,1,2,3) |
| 1101 | REP | 199 | LAST | 914 | 16,3201 10 000 0 | CCS | A | | |
| 1102 | REP | 1 | | | 16,3202 1 3256 1 | TCP | PINCOPY | | FINISH THE COPYCYCLE FIRST |
| 1103 | REP | 1 | | | 16,3203 1 3205 1 | TCP | ENABL1 | | JUST PREPARE THE OUTCOUNTERS AND GO |
| 1104 | REP | 1 | | | 16,3204 1 3282 0 | TCP | TRIM/CND | | (RE-DO P, YCMD INITIALIZATION FIRST |
| 1105 | REP | 24 | LAST | 611 | 16,3205 3 4703 1 | ENABL1 | CAP | BIT8 | TVC ENABLE, FOLLOWED BY 40 MS (MIN) WAIT |
| 11052 | REP | 24 | LAST | 640 | 16,3206 6 4700 1 | AD | BIT11 | | OPTICS DAC DISENGAGE TOO |
| 1106 | | | | | 16,3207 0 0006 1 | EXTEND | | | (ENABL1 ENTRIES...+0,- CCS, PINCOPY) |
| 1107 | REP | 31 | LAST | 690 | 16,3210 05 012 1 | WOR | CHAN12 | | |
| 1108 | REP | 1 | | | 16,3211 3 3275 1 | CAP | TVCADDR | | WAIT, CALLING ENABL2 (BRCON THERE) |
| 1109 | REP | 14 | LAST | 902 | 16,3212 55=312 1 | TS | T5LOC | | |
| 1110 | REP | 2 | LAST | 918 | 16,3213 3 3301 0 | CAP | TVCADDR +4 | | 60MS (TVCXADR) |
| 1111 | REP | 10 | LAST | 902 | 16,3214 54 030 0 | TS | TIMES | | |
| 1112 | REP | 30 | LAST | 902 | 16,3215 1 5222 1 | TCP | RESUME | | |
| 1113 | REP | 10 | LAST | 917 | 16,3216 22 016 0 | ENABL2 | LXCH | RANKRUPT | CONTINUE PREPARATION OF OUTCOUNTERS |
| 1114 | REP | 36 | LAST | 913 | 16,3217 3 4711 1 | CAP | BIT2 | | OPTICS ERROR CNTR ENABLE, 4MS MIN WAIT |
| 1115 | | | | | 16,3220 0 0006 1 | EXTEND | | | |
| 1116 | REP | 32 | LAST | 918 | 16,3221 05 012 1 | WOR | CHAN12 | | |
| 1117 | REP | 3 | LAST | 918 | 16,3222 3 3277 0 | CAP | TVCADDR +2 | | WAIT, CALLING CNDSQLT (BRCON THERE) |
| 1118 | REP | 15 | LAST | 918 | 16,3223 55=312 1 | TS | T5LOC | | |
| 1119 | REP | 3 | LAST | 918 | 16,3224 3 7700 1 | CAP | OCT37776 | | 20MS |
| 1120 | REP | 11 | LAST | 918 | 16,3225 54 030 0 | TS | TIMES | | |
| 1121 | REP | 2 | LAST | 188 | 16,3226 1 5224 1 | TCP | NOORSM | | |
| 1122 | REP | 11 | LAST | 918 | 16,3227 22 016 0 | CNDSQLT | LXCH | RANKRUPT | CONTINUE PREPARATION OF OUTCOUNTERS |
| 1123 | | | | | 16,3230 0 0006 1 | EXTEND | | | |
| 1124 | REP | 10 | LAST | 918 | 16,3231 22 012 1 | OKCH | GRUPT | | |



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| | | | | | | | | | |
|-------|-----|-----|------|-----|---------|----------|----------|----------------|---|
| 1125 | REP | 159 | LAST | 909 | 16,3232 | 4 4714 0 | CS | ZERO | MOST RECENT ACTUATOR COMMANDS (AVOID +0) |
| 1126 | REP | 5 | LAST | 901 | 16,3233 | 6 1631 1 | AD | PCND | |
| 1127 | REP | 3 | LAST | 667 | 16,3234 | 54 054 1 | TS | TVCPTCH | |
| 1128 | REP | 160 | LAST | 919 | 16,3235 | 4 4714 0 | CS | ZERO | |
| 1129 | REP | 3 | LAST | 901 | 16,3236 | 6 1632 1 | AD | YOND | |
| 1130 | REP | 2 | LAST | 667 | 16,3237 | 54 053 0 | TS | TVCYAW | |
| 1131 | REP | 3 | LAST | 667 | 16,3240 | 3 4755 1 | CAP | PRIO6 | RELEASE THE COUNTERS (BITS 11,12) |
| 1132 | REP | | | | 16,3241 | 0 0006 1 | EXTEND | | |
| 1133 | REP | 7 | LAST | 667 | 16,3242 | 05 014 1 | WOR | CHAN14 | |
| 1136 | REP | 6 | LAST | 918 | 16,3243 | 4 1654 0 | PHSCHK2 | CS TVCPHASE | CHECK TVCPHASE AGAIN |
| 1139 | REP | | | | 16,3244 | 0 0006 1 | EXTEND | | |
| 1140 | REP | | | | 16,3245 | 6 3250 0 | BZMP | +3 | |
| 1141 | REP | 46 | LAST | 828 | 16,3246 | 0 4574 0 | TC | POSTJUMP | IF NEGATIVE, RESTART AT MRCLEAN FOR FULL INITIALIZATION |
| 1142 | REP | 2 | LAST | 699 | 16,3247 | 36033 1 | CADR | MRCLEAN | |
| 11421 | REP | 5 | LAST | 908 | 16,3250 | 11=614 1 | CHKSTK | CCS STROKER | CHECK FOR STROKE TEST IN PROGRESS |
| 11422 | REP | 1 | | | 16,3251 | 1 3266 1 | TCF | TSTINITJ | YES, KILL IT |
| 11423 | REP | | | | 16,3252 | 1 3254 0 | TCF | +2 | NO, PROCEED |
| 11424 | REP | 2 | LAST | 919 | 16,3253 | 1 3266 1 | TCF | TSTINITJ | YES, KILL IT |
| 1143 | REP | 49 | LAST | 919 | 16,3254 | 0 4574 0 | +4 | TC POSTJUMP | IF POSITIVE OR ZERO, RESTART AT TVCINIT4 (ZEROS TVCPHASE, AND CALLS TVC DAPS) |
| 1144 | REP | 1 | | | 16,3255 | 36160 0 | CADR | TVCINIT4 | |
| 1145 | REP | | | | | | | | PICK UP THE APPROPRIATE COPYCYCLE |
| 1146 | REP | 7 | LAST | 919 | 16,3256 | 51=654 1 | PINCOPY | INDEX TVCPHASE | |
| 1147 | REP | 1 | | | 16,3257 | 3 3275 1 | CAP | TVCCADR | |
| 1148 | REP | 1 | | | 16,3260 | 0 4637 1 | TCR | ISWCALL | RE-ENTER THE COPYCYCLE, RETURN AT END |
| 1149 | REP | 2 | LAST | 918 | 16,3261 | 1 3205 1 | TCF | ENARL1 | NOW PREPARE THE OUTCOUNTERS |
| 1150 | REP | | | | 16,3262 | 0 0006 1 | TRIM/CND | EXTEND | TVC DAPS INITIALIZATION NOT COMPLETED, EG. P, YOND MAY NOT BE SET. SET... |
| 1151 | REP | 19 | LAST | 908 | 16,3263 | 3 1426 0 | DCA | FACTOFF | |
| 1152 | REP | 6 | LAST | 919 | 16,3264 | 53=632 0 | DXCH | PCND | |
| 1153 | REP | 3 | LAST | 919 | 16,3265 | 1 3205 1 | TCF | ENARL1 | NOW PREPARE THE OUTCOUNTERS |
| 1154 | REP | 161 | LAST | 919 | 16,3266 | 3 4714 1 | TSTINITJ | CAP ZERO | DISABLE STROKE TEST (-0 SHOWS PRIOR V68) |
| 1155 | REP | 6 | LAST | 919 | 16,3267 | 55=614 1 | TS | STROKER | (+0 MEANS NEW V68 REQUIRED FOR STARTUP) |
| 11552 | REP | 1 | | | 16,3270 | 1 3254 0 | TCF | CHKSTK +4 | |
| 1161 | REP | 20 | LAST | 918 | 16,3271 | 51=661 1 | EXRSTRT | INDEX TVCEXPHS | TVCEXECUTIVE RESTARTS...GO TO |
| 1162 | REP | 1 | | | 16,3272 | 3 3301 0 | CAP | TVCEXADR | APPROPRIATE RESTART POINT |
| 1163 | REP | 200 | LAST | 918 | 16,3273 | 50 000 1 | INDEX | A | |
| 1164 | REP | | | | 16,3274 | 1 0000 0 | TCF | 0 | |



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#1165 TVC RESTART TABLES.... ORDER IS REQUIRED. HI-ORDER WORDS ONLY, OF 2CADRS, SINCE BBCON IS ALREADY THERE.

| LINE | REP | TYPE | LOC | ADDR | WORD | TVCCADR | GENADR | TABLE |
|------|-----|------|------|------|---------|---------|---------|-------------------|
| 1167 | REP | 2 | LAST | 919 | 16,3275 | | | |
| 1168 | REP | 1 | | | 16,3275 | 03216 1 | TVCCADR | GENADR ENABL2 |
| 1169 | REP | 1 | | | 16,3276 | 40561 1 | +1 | CADR PCOPY +1 |
| 1170 | REP | 1 | | | 16,3277 | 03227 0 | +2 | GENADR CNDROUT |
| 1171 | REP | 1 | | | 16,3300 | 41037 0 | +3 | CADR YCOPY +1 |
| 1172 | | | | | 16,3301 | 37772 1 | TVCCADR | OCT 37772 |
| 1173 | REP | 2 | LAST | 905 | 16,3302 | 02742 1 | +1 | GENADR EXCOPY +1 |
| 1174 | REP | 2 | LAST | 905 | 16,3303 | 02750 1 | +2 | GENADR SWT/COR |
| 1175 | REP | 1 | | | 16,3304 | 03030 1 | +3 | GENADR SWTCOPY +1 |
| 1176 | REP | 2 | LAST | 906 | 16,3305 | 03050 1 | +4 | GENADR TEMPSET |
| 1177 | REP | 2 | LAST | 906 | 16,3306 | 03053 1 | +5 | GENADR CORSETUP |
| 1178 | REP | 1 | | | 16,3307 | 03111 0 | +6 | GENADR CORCOPY +1 |
| 1179 | REP | 2 | LAST | 906 | 16,3310 | 03122 0 | +7 | GENADR CNTRCOPY |
| 1180 | REP | 2 | LAST | 906 | 16,3311 | 03125 1 | +8D | GENADR STRKUP |
| 1181 | REP | 2 | LAST | 906 | 16,3312 | 03140 1 | +9D | GENADR STRKCPY +1 |

TABLE OF CADRS, UNUSED LOCs FOR GENADRS
(POR TS CALL, UNUSED TABLE LOC)
PITCH COPYCYCLE
(POR TS CALL, UNUSED TABLE LOC)
YAW COPYCYCLE
(UNUSED TABLE LOC, FILL WITH 60MS, TS)
TVCC(EXECUTIVE RESTART POINTS (ORDERED))



L TVCDAPS

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R1000 PROGRAM NAME....TVCDAP, CONSISTING OF PITCHDAP, YAWDAP, ETC.
R1001 LOG SECTION....TVCDAP SUBROUTINE....DAPCSM
R1002 MOD BY ENGEL DATE....27 OCT, 1967

R1003 FUNCTIONAL DESCRIPTION....

R1004 SELF-PERPETUATING TS TASKS WHICH GENERATE THE COMMAND SIGNALS
R1005 FOR THE PITCH AND YAW SPS GIMBAL ACTUATORS DURING TVC (SPS) BURNS,
R1006 IN RESPONSE TO BODY-AXIS RATE COMMANDS FROM CROSS-PRODUCT STEERING
R1007 (S40.8). IF NO STEERING (IMPULSIVE BURNS) MAINTAINS ATTITUDE-HOLD
R1008 ABOUT THE REFERENCE (INITIAL) DIRECTIONS (ZERO RATE COMMANDS).

R1009 THE PITCH AND YAW LOOPS ARE SEPARATE, BUT STRUCTURED IDENTICALLY.
R1010 EACH ATTITUDE-RATE LOOP INCLUDES GIMBAL ANGLE RATE DERIVATION,
R1011 GIMBAL/BODY AXIS TRANSFORMATION, BODY-AXIS ATTITUDE ERROR
R1012 INTEGRATION WITH ERROR LIMITING, THE CSM/LEM FILTER OR THE BRANCH
R1013 POINTS FOR THE CSM-ALONE (GEN3DAP) FILTER, OUTPUT LIMITER,
R1014 CG-OFFSET TRACKER FILTER, AND THE CG-TRACKER MINOR LOOP.

R1015 THE DAPS ARE CYCLIC, CALLING EACH OTHER AT 1/2 THE DAP SAMPLE
R1016 TIME, AS DETERMINED BY TSTVCDT. THE ACTUATOR COMMANDS ARE
R1017 REGENERATED AS ANALOG VOLTAGES BY THE OPTICS ERROR COUNTERS, WHICH
R1018 TRANSMIT THE SIGNAL TO THE ACTUATOR SERVOS WHEN THERE IS PROPER CDU
R1019 MODING.

R1020 REFERENCES FOR THE CSM/LEM FILTER DESIGN INCLUDE R503 BY STUBBS
R1021 (MIT IL OCT 1965) AND SGA MEMO R26-65 BY MARTIN (MIT IL OCT 1965).
R1022 REFERENCES FOR THE CSM FILTER DESIGN (SEE GEN3DAP) INCLUDE R533 BY
R1023 LU (MIT IL JUNE 1966).

R1024 OPERATIONAL ASPECTS OF THE INTEGRATED CONTROL PACKAGE, WITH DESIGN-
R1025 NOMINAL PARAMETER VALUES ARE DISCUSSED IN AG R336-67 BY ENGEL
R1026 (MIT IL OCT 1967) AND SGA MEMO R18-67 BY SCHLINDT (MIT IL OCT 1967)

R1027 CALLING SEQUENCE.... (TYPICALLY)

11028 TS CALL OF TVCDAPCN (P40-P47) BY IGNOVER (P40-P47)
R1029 TS CALL OF DAPINIT BY TVCINIT4 (P40-P47)
R1030 TS CALL OF DAPINIT BY DAPINIT
11031 TS CALL OF PITCHDAP BY DAPINIT
R1032 TS CALL OF YAWDAP BY PITCHDAP
R1033 TS CALL OF PITCHDAP BY YAWDAP
R1034 ETC.
R1035 (AUTOMATIC SEQUENCING FROM TVCDAPCN)

11038 NORMAL EXIT MODE....RESUME

R1037 ALARM OR ABORT EXIT MODES....NONE

11038 SUBROUTINES CALLED....



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R1039 HACK FOR STROKE TEST (V88) WAVEFORM GENERATION
R1040 NP0-, NP1-, NY0-, AND NY1NODE FOR GEN3DAP (LEM-OFF) FILTERS
R1041 PCOPY, YCOPY FOR COPY-CYCLES (USED ALSO BY TVC RESTART PACKAGE)
R1042 DAPINIT FOR INITIAL CDUS FOR RATE MEASUREMENTS
R1043 ERRORLIM, ACTLIM FOR INPUT (ATTITUDE-ERROR INTEGRATION) AND
R1044 OUTPUT (ACTUATOR COMMAND) LIMITING, COMMON TO PITCH AND
R1045 YAW DAPS
R1046 OPTVARK, NSLM, DSLM FOR CSM/LEM FILTER OPERATIONS, COMMON TO
R1047 PITCH AND YAW DAPS
R1048 RESUME

R1049 OTHER INTERFACES....

R1050 S40.8 CROSS-PRODUCT STEERING FOR BODY AXIS RATE COMMANDS OMEGA, ZC
R1051 S40.15 FOR THE INITIAL DAP GAINS KP/KPDN (LEM-ON) OR KPGEN3 (-OFF)
R1052 TVCEXECUTIVE FOR VARIABLE DAP GAINS, FILTER SAMPLE-RATE CHANGE AND
R1053 GAIN REDUCTION AT LEM-ON SWITCHOVER, SINGLE-SHOT CG ESTIMATION
R1054 AT SWITCHOVER AND REPETITIVE CG ESTIMATION AFTER SWITCHOVER.
R1055 TVCRESTART PACKAGE FOR TVC RESTART PROTECTION.

R1056 ERASABLE INITIALIZATION REQUIRED....

R1057 29 PAD-LOAD ERASABLES ESTROKER....EREPPRAC +1
R1058 KP/KPDN (KPGEN3) AS IN S40.15 (R03)
R1059 CONFIGURATION BITS (14, 13) OF DAPDATR1 AS IN R03
R1060 ENGINE-ON BIT (11.13) FOR RESTARTS
R1061 TVCPHASE FOR RESTARTS (SEE IGNOVER, AND TVCINIT4)
R1062 TS BITS (15, 14 OF FLAGWRD8) FOR RESTARTS
R1063 MISCELLANEOUS VARIABLES SET UP OR COMPUTED BY TVCDAPON....TVCINIT4,
R1064 INCLUDING THE ZEROING OF 64 TEMPORARIES BY MRCLEAN
R1065 CDUX, Y, Z AND SINCDUX.... COSCDUX AS PREPARED BY CDUTRIG1 (WITH
R1066 UPDATES EVERY 1/2 SECOND)
R1067 ALSO G.N PRIMARY, TVC ENABLE, AND OPTICS ERROR COUNTER ENABLE
R1068 UNLESS BENCH-TESTING.

R1069 OUTPUT....

R1070 TVCPITCH AND TVCYAW WITH COUNTER RELEASE (11.14 AND 11.13 INCREMEN-
R1071 TAL COMMANDS TO OPTICS ERROR COUNTERS), FILTER NODES, BODY-
R1072 AXIS ATTITUDE ERROR INTEGRATOR, TOTAL ACTUATOR COMMANDS,
R1073 OFFSET-TRACKER-FILTER OUTPUTS, ETC.

R1074 DERRIS....

R1075 MUCH, SHAREABLE WITH RCS/ENTRY, IN BRANK6 ONLY

| | | | |
|------|-------|---------|--------------|
| 1076 | | 17,2213 | BANK 17 |
| 1077 | REP 1 | 20,2000 | SETLOC DAPS2 |
| 1078 | | 20,2327 | BANK |



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1079 REF 10 LAST 913 E6,1742
1080 REF 1

BRANK= BZERO
COUNT* 88/DAPS



L TVCDAPS

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| Line | REP | Mode | Time | Address | Value | Operation | Comments |
|-------|-----|------|------|---------|---------|-----------|--|
| P1081 | | | | | | | PITCH TVCDAP STARTS HERE... (INCORPORATES CS/LEN DAP FILTER, MODOR DESIGN) |
| 1083 | REP | 12 | LAST | 918 | 20,2327 | 22 016 0 | PITCHDAP LXCH BANKRUPT TS ENTRY, NORMAL OR VIA DAPINIT |
| 1084 | | | | | 20,2330 | 0 0006 1 | EXTEND |
| 1085 | REP | 11 | LAST | 918 | 20,2331 | 22 012 1 | QXCH QRUPT |
| 1086 | REP | 1 | | | 20,2332 | 3 3420 1 | CAP YAWTS SET UP TS CALL FOR YAW AUTOPILOT (LOW-ORDER PART OF 2CADR ALREADY THERE) |
| 1087 | REP | 16 | LAST | 918 | 20,2333 | 55=312 1 | TS TSLOC |
| 1088 | REP | 4 | LAST | 907 | 20,2334 | 31=635 0 | CAB TSTVCDT |
| 1089 | REP | 12 | LAST | 918 | 20,2335 | 54 030 0 | TS TIMES |
| 1090 | REP | 7 | LAST | 919 | 20,2336 | 11=614 1 | PSTROKER CCS STROKER (STRKFLG) CHECK FOR STROKE TEST |
| 1091 | REP | 1 | | | 20,2337 | 0 3506 1 | TC HACK TEST-START OR TEST-IN-PROGRESS |
| 1092 | | | | | 20,2340 | 1 2342 1 | TCF +2 NO-TEST |
| 1093 | REP | 2 | LAST | 924 | 20,2341 | 0 3506 1 | TC HACK TEST-IN-PROGRESS |
| 1094 | REP | 9 | LAST | 736 | 20,2342 | 30 033 1 | PCDUOTS CAB CDUY COMPUTE CDUYDOT |
| 1095 | REP | 2 | LAST | 103 | 20,2343 | 57=655 0 | XCH PCDUYPST FOR PITCH AUTOPILOT |
| 1096 | | | | | 20,2344 | 0 0006 1 | EXTEND |
| 1097 | REP | 3 | LAST | 924 | 20,2345 | 21=655 1 | MSU PCDUYPST |
| 10971 | REP | 1 | | | 20,2346 | 0 2547 0 | TCR RLIMTEST |
| 1098 | REP | 2 | LAST | 103 | 20,2347 | 55=657 0 | TS MCDUYDOT RATE TEST (MINUS, SC, AT 1/2TVCDT REVS/SEC) |
| 1099 | REP | 12 | LAST | 736 | 20,2350 | 30 034 0 | CAB CDUZ COMPUTE CDUZDOT |
| 1100 | REP | 2 | LAST | 103 | 20,2351 | 57=656 0 | XCH PCDUZPST FOR PITCH AUTOPILOT |
| 1101 | | | | | 20,2352 | 0 0006 1 | EXTEND |
| 1102 | REP | 3 | LAST | 924 | 20,2353 | 21=656 1 | MSU PCDUZPST |
| 11021 | REP | 2 | LAST | 924 | 20,2354 | 0 2547 0 | TCR RLIMTEST |
| 1103 | REP | 2 | LAST | 103 | 20,2355 | 55=660 1 | TS MCDUZDOT RATE TEST (MINUS, SC, AT 1/2TVCDT REVS/SEC) |
| 1104 | | | | | 20,2356 | 0 0006 1 | PINTEGRAL EXTEND COMPUTE INTEGRAL OF BODY-AXIS PITCH-RATE |
| 1105 | REP | 2 | LAST | 102 | 20,2357 | 3 1616 1 | DCA PERRB ERROR, SC, AT 8-1 REVS |
| 1106 | REP | 6 | LAST | 104 | 20,2360 | 53=743 1 | DXCH ERRRTMP |
| 1107 | | | | | 20,2361 | 0 0006 1 | EXTEND |
| 1108 | REP | 2 | LAST | 899 | 20,2362 | 3 1530 0 | DCA OMEGAYC |
| 1109 | REP | 7 | LAST | 924 | 20,2363 | 21=743 1 | DAS ERRRTMP |
| 1110 | REP | 5 | LAST | 718 | 20,2364 | 4 0746 0 | CS COSCDUZ PREPARE BODY-AXIS PITCH RATE, OMEGAYB |
| 1111 | | | | | 20,2365 | 0 0006 1 | EXTEND |
| 1112 | REP | 5 | LAST | 718 | 20,2366 | 7 0750 1 | MP COSCDUX |
| 1113 | | | | | 20,2367 | 20 001 1 | DDOURL |
| 1114 | | | | | 20,2370 | 0 0006 1 | EXTEND |
| 1115 | REP | 3 | LAST | 924 | 20,2371 | 7 1657 0 | MP MCDUYDOT |
| 1116 | | | | | 20,2372 | 20 001 1 | DDOURL |
| 1117 | REP | 1 | | | 20,2373 | 53=536 1 | DXCH OMEGAYB |
| 1118 | REP | 3 | LAST | 924 | 20,2374 | 4 1660 1 | CS MCDUZDOT |
| 1119 | | | | | 20,2375 | 0 0006 1 | EXTEND |

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| | | | | | | | | | | | |
|------|-----|-----|------|-----|---------|--------|---|----------|----------|--|--|
| 1120 | REP | 5 | LAST | 118 | 20,2376 | 7 0742 | 1 | MP | SINCDLK | | |
| 1121 | | | | | 20,2377 | 20 001 | 1 | DDOUBL | | | |
| 1122 | REP | 2 | LAST | 924 | 20,2400 | 21=536 | 1 | DAS | OMEGAYB | (COMPLETED OMEGAYB, SC.AT 1/2TVCDT REVS) | |
| 1123 | | | | | 20,2401 | 0 0006 | 1 | EXTEND | | PICK UP -OMEGAYB (SIGN CHNG, INTEGRATE) | |
| 1124 | REP | 3 | LAST | 925 | 20,2402 | 4 1536 | 1 | DCS | OMEGAYB | | |
| 1125 | REP | 8 | LAST | 924 | 20,2403 | 21=743 | 1 | DAS | ERRBTMP | | |
| 1126 | REP | 1 | | | 20,2404 | 0 3126 | 1 | PERORLIM | TCR | ERRORLIM | PITCH BODY-AXIS-ERROR INPUT LIMITER |
| 1127 | REP | 66 | LAST | 914 | 20,2405 | 31=466 | 1 | P1FILMP | CAB | DAPDATR1 | CHECK FOR LEM-ON/-OFF |
| 1128 | REP | 46 | LAST | 914 | 20,2406 | 7 4875 | 0 | MASK | BIT14 | | (BIT 14 INDICATES LEM IS ON) |
| 1129 | REP | 201 | LAST | 919 | 20,2407 | 10 000 | 0 | CCS | A | | |
| 1130 | | | | | 20,2410 | 1 2413 | 1 | TCF | +3 | | USE LEM-ON FILTER |
| 1131 | REP | 50 | LAST | 919 | 20,2411 | 0 4574 | 0 | TC | POSTJUMP | | USE LEM-OFF (GEN3DAP) FILTER |
| 1132 | REP | 1 | | | 20,2412 | 36213 | 1 | CADR | NP0N0DE | | |
| 1133 | | | | | 20,2413 | 0 0006 | 1 | PFORWARD | EXTEND | | LEM-ON FILTER COMPUTATIONS. |
| 1134 | REP | 3 | LAST | 104 | 20,2414 | 4 1544 | 1 | DCS | PDSUM | | DENOMINATOR TERMS, SC.AT B+0 SPASCREVS |
| 1135 | REP | 1 | | | 20,2415 | 53=745 | 1 | DXCH | JZERO | | |
| 1136 | REP | 9 | LAST | 925 | 20,2416 | 31=742 | 1 | CAB | ERRBTMP | | INPUT ERROR, SC.AT B-1 REVS |
| 1137 | REP | 3 | LAST | 104 | 20,2417 | 6 1541 | 0 | AD | PNSUM | | NUMERATOR TERMS, SC.AT B-1 REVS |
| 1138 | | | | | 20,2420 | 0 0006 | 1 | EXTEND | | | |
| 1139 | REP | 1 | | | 20,2421 | 7 4727 | 0 | MP | KPDN | | KPDN, SC.AT B+1 SPASCREV |
| 1140 | REP | 2 | LAST | 925 | 20,2422 | 21=745 | 1 | DAS | JZERO | | |
| 1141 | REP | 4 | LAST | 925 | 20,2423 | 31=542 | 0 | CAB | PNSUM +1 | | |
| 1142 | | | | | 20,2424 | 0 0006 | 1 | EXTEND | | | |
| 1143 | REP | 2 | LAST | 925 | 20,2425 | 7 4727 | 0 | MP | KPDN | | |
| 1144 | REP | 3 | LAST | 925 | 20,2426 | 27=745 | 1 | ADS | JZERO +1 | | |
| 1145 | REP | 81 | LAST | 901 | 20,2427 | 54 001 | 1 | TS | L | | |
| 1146 | | | | | 20,2430 | 1 2432 | 1 | TCF | +2 | | |
| 1147 | REP | 4 | LAST | 925 | 20,2431 | 27=744 | 0 | ADS | JZERO | | (SC.AT B+0 SPASCREV), (JZERO = CMDTMP) |
| 1148 | | | | | 20,2432 | 0 0006 | 1 | JZSTORE | EXTEND | | PREPARE JZERO FOR DENOMINATOR LADDER |
| 1149 | REP | 5 | LAST | 925 | 20,2433 | 3 1745 | 0 | DCA | JZERO | | SC.AT B+0 SPASCREV |
| 1150 | | | | | 20,2434 | 20 001 | 1 | DDOUBL | | | |
| 1151 | | | | | 20,2435 | 20 001 | 1 | DDOUBL | | | |
| 1152 | | | | | 20,2436 | 20 001 | 1 | DDOUBL | | | |
| 1153 | REP | 3 | LAST | 105 | 20,2437 | 53=727 | 0 | DXCH | J1TMP | | SC.AT B-3 SPASCREV |
| 1154 | REP | 1 | | | 20,2440 | 0 3141 | 0 | OPTVARKP | TCR | OPTVARK | PITCH VARIABLE-GAIN PACKAGE |
| 1155 | | | | | 20,2441 | 0 0006 | 1 | POFFSET | EXTEND | | SIGN CHANGE IN FORWARD LOOP |
| 1156 | REP | 6 | LAST | 105 | 20,2442 | 4 1745 | 1 | DCS | CMDTMP | | (GEN3DAP RETURNS AT POFFSET) |
| 1157 | REP | 7 | LAST | 925 | 20,2443 | 53=745 | 1 | DXCH | CMDTMP | | |
| 1158 | | | | | 20,2444 | 0 0006 | 1 | EXTEND | | | ADD IN DOUBLE-PRECISION CG OFFSETS |
| 1159 | REP | 5 | LAST | 908 | 20,2445 | 3 1626 | 1 | DCA | PDRLOFF | | |
| 1160 | REP | 8 | LAST | 925 | 20,2446 | 21=745 | 1 | DAS | CMDTMP | | |



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| | | | | | | | | | | |
|-------|-----|-----|------|-----|---------|----------|----------|--------|-----------|---|
| 1161 | REP | 9 | LAST | 925 | 20,2447 | 31=745 0 | PROLND | CAB | CHDTMP +1 | ROUND UP FOR OUTPUT |
| 1162 | | | | | 20,2450 | 6 0000 1 | | DOUBLE | | |
| 1163 | REP | 62 | LAST | 925 | 20,2451 | 54 001 1 | | TS | L | |
| 1164 | REP | 162 | LAST | 919 | 20,2452 | 3 4714 1 | | CAP | ZERO | |
| 1165 | REP | 10 | LAST | 926 | 20,2453 | 6 1744 1 | | AD | CHDTMP | |
| 1166 | REP | 1 | | | 20,2454 | 0 3161 1 | PACLIM | TCR | ACTLIM | PITCH ACTUATOR-COMMAND-LIMITER |
| 1167 | REP | 7 | LAST | 919 | 20,2455 | 4 1631 0 | PCUT | CS | PCND | INCREMENTAL PITCH COMMAND |
| 1168 | REP | 11 | LAST | 926 | 20,2456 | 6 1744 1 | | AD | CHDTMP | |
| 1169 | REP | 4 | LAST | 919 | 20,2457 | 26 054 1 | | ADS | TVCPITCH | UPDATE THE ERROR COUNTER (NO RESTART- PROTECT, SINCE ERROR CNTR ZEROED) |
| A1170 | | | | | | | | | | |
| 1171 | REP | 25 | LAST | 918 | 20,2460 | 3 4700 1 | | CAP | BIT11 | BIT FOR TVCPITCH COUNT RELEASE |
| 1172 | | | | | 20,2461 | 0 0008 1 | | EXTEND | | |
| 1173 | REP | 6 | LAST | 919 | 20,2462 | 05 014 1 | | WOR | CHAN14 | |
| 1174 | REP | 67 | LAST | 925 | 20,2463 | 31=466 1 | P2FILIMP | CAB | DAPDATR1 | CHECK FOR LEM-ON/-OFF (BIT 14 INDICATES LEM IS ON) |
| 1175 | REP | 47 | LAST | 925 | 20,2464 | 7 4675 0 | | MAK | BIT14 | |
| 1176 | REP | 202 | LAST | 925 | 20,2465 | 10 000 0 | | CCS | A | |
| 1177 | | | | | 20,2466 | 1 2471 0 | | TCF | +3 | USE LEM-ON FILTER |
| 1178 | REP | 51 | LAST | 925 | 20,2467 | 0 4574 0 | | TC | POSTLUMP | USE LEM-OFF (GEN3DAP) FILTER |
| 1179 | REP | 1 | | | 20,2470 | 36246 1 | | CADR | NP1NODE | |
| 1180 | REP | 10 | LAST | 925 | 20,2471 | 31=742 1 | BZSTORE | CAB | ERRBTMP | PREPARE BZERO (UPPER WORD OF ERRBTMP) FOR NUMERATOR LADDER....SC.AT B-1 SC.AT B-2 REVS FOR LADDER |
| 1181 | | | | | 20,2472 | 6 0000 1 | | DOUBLE | | |
| 1182 | REP | 3 | LAST | 105 | 20,2473 | 55=717 0 | | TS | B1TMP | PREPARE TEMPORARIES, FOR UPDATING PITCH NUMERATOR LADDER |
| 1183 | | | | | 20,2474 | 0 0006 1 | PNLADDER | EXTEND | | |
| 1184 | REP | 2 | LAST | 101 | 20,2475 | 3 1546 1 | | DCA | B1 | |
| 1185 | REP | 3 | LAST | 105 | 20,2476 | 53=721 0 | | DXCH | B2TMP | |
| 1186 | | | | | 20,2477 | 0 0006 1 | | EXTEND | | |
| 1187 | REP | 2 | LAST | 102 | 20,2500 | 3 1550 0 | | DCA | B3 | |
| 1188 | REP | 3 | LAST | 105 | 20,2501 | 53=723 1 | | DXCH | B4TMP | |
| 1189 | | | | | 20,2502 | 0 0006 1 | | EXTEND | | |
| 1190 | REP | 2 | LAST | 102 | 20,2503 | 3 1552 1 | | DCA | B5 | |
| 1191 | REP | 3 | LAST | 105 | 20,2504 | 53=725 1 | | DXCH | B6TMP | |
| 1192 | REP | 1 | | | 20,2505 | 0 3173 1 | PNSUMC | TCR | NSLM | PITCH NUMERATOR SUM |
| 1193 | | | | | 20,2506 | 0 0006 1 | PDLADDER | EXTEND | | PREPARE TEMPORARIES, FOR UPDATING PITCH DENOMINATOR LADDER |
| 1194 | REP | 2 | LAST | 102 | 20,2507 | 3 1554 1 | | DCA | J1 | |
| 1195 | REP | 3 | LAST | 105 | 20,2510 | 53=731 1 | | DXCH | J2TMP | |
| 1196 | | | | | 20,2511 | 0 0006 1 | | EXTEND | | |
| 1197 | REP | 2 | LAST | 102 | 20,2512 | 3 1556 0 | | DCA | J2 | |
| 1198 | REP | 3 | LAST | 105 | 20,2513 | 53=733 0 | | DXCH | J3TMP | |
| 1199 | | | | | 20,2514 | 0 0006 1 | | EXTEND | | |
| 1200 | REP | 2 | LAST | 102 | 20,2515 | 3 1560 0 | | DCA | J3 | |

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| | | | | | | | | | | | |
|-------|-----|-----|------|-----|---------|----------|----------|--------|-------------|--|-------------------------------------|
| 1201 | REP | 3 | LAST | 105 | 20,2516 | 53=735 0 | | DXCH | J4TMP | | |
| 1202 | | | | | 20,2517 | 0 0008 1 | | EXTEND | | | |
| 1203 | REP | 3 | LAST | 104 | 20,2520 | 3 1562 1 | | DCA | J4 | | |
| 1204 | REP | 4 | LAST | 105 | 20,2521 | 53=737 1 | | DXCH | J5TMP | | |
| 1205 | | | | | 20,2522 | 0 0008 1 | | EXTEND | | | |
| 1206 | REP | 3 | LAST | 104 | 20,2523 | 3 1584 1 | | DCA | J5 | | |
| 1207 | REP | 3 | LAST | 105 | 20,2524 | 53=741 0 | | DXCH | J6TMP | | |
| 1208 | REP | 1 | | | 20,2525 | 0 3233 0 | POSUMC | TCR | DSUM | | PITCH DENOMINATOR SUM |
| 1209 | REP | 12 | LAST | 926 | 20,2526 | 31=744 1 | DELBRAP | CAS | QNDTMP | | UPDATE PITCH OFFSET-TRACKER-FILTER |
| 1210 | | | | | 20,2527 | 0 0008 1 | | EXTEND | | | (GEN3DAP RETURNS AT ..DELBRAP..) |
| 1211 | REP | 1 | | | 20,2530 | 7 3421 1 | | MP | 1-B(-AT) | | |
| 1212 | REP | 2 | LAST | 104 | 20,2531 | 53=716 1 | | DXCH | DELBRIMP | | |
| 1213 | REP | 5 | LAST | 907 | 20,2532 | 31=621 0 | | CAS | DELPRAR | | |
| 1214 | | | | | 20,2533 | 0 0008 1 | | EXTEND | | | |
| 1215 | REP | 1 | | | 20,2534 | 7 3422 1 | | MP | B(-AT) | | |
| 1216 | REP | 3 | LAST | 927 | 20,2535 | 21=718 1 | | DAS | DELBRIMP | | |
| 1217 | REP | 6 | LAST | 927 | 20,2536 | 31=622 0 | | CAS | DELPRAR +1 | | |
| 1218 | | | | | 20,2537 | 0 0008 1 | | EXTEND | | | |
| 1219 | REP | 2 | LAST | 927 | 20,2540 | 7 3422 1 | | MP | B(-AT) | | |
| 1220 | REP | 4 | LAST | 927 | 20,2541 | 27=718 1 | | ADS | DELBRIMP +1 | | |
| 1221 | REP | 63 | LAST | 926 | 20,2542 | 54 001 1 | | TS | L | | |
| 1222 | | | | | 20,2543 | 1 2545 0 | | TCP | +2 | | |
| 1223 | REP | 5 | LAST | 927 | 20,2544 | 27=715 1 | | ADS | DELBRIMP | | |
| 1224 | REP | 2 | LAST | 920 | 20,2545 | 0 2560 0 | PCOPYCYC | TCR | PCOPY | | PITCH COPYCYCLE |
| 1225 | REP | 31 | LAST | 918 | 20,2546 | 1 5222 1 | PDAPEND | TCP | RESUME | | PITCH DAP COMPLETED |
| 12251 | REP | 13 | LAST | 927 | 20,2547 | 55=744 0 | RLIMTEST | TS | QNDTMP | | TEST FOR EXCESSIVE CDU RATES |
| 12261 | | | | | 20,2550 | 0 0008 1 | | EXTEND | | | IF CDU DIFFERENCE EXCEEDS 2.33 DEG |
| 12271 | REP | 1 | | | 20,2551 | 7 3415 0 | | MP | 1/RTLIM | | IN ONE SAMPLE PERIOD, SET CDURATE=0 |
| 12281 | | | | | 20,2552 | 0 0008 1 | | EXTEND | | | |
| 12291 | | | | | 20,2553 | 1 2556 1 | | BZF | +3 | | |
| 12301 | REP | 163 | LAST | 926 | 20,2554 | 3 4714 1 | | CAP | ZERO | | |
| 12311 | REP | 14 | LAST | 927 | 20,2555 | 55=744 0 | | TS | QNDTMP | | |
| 12321 | REP | 15 | LAST | 927 | 20,2556 | 31=744 1 | | CAS | QNDTMP | | |
| 12331 | REP | 180 | LAST | 914 | 20,2557 | 0 0002 0 | | TC | 0 | | |



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P12341 PITCH TVCDAP COPYCYCLE SUBROUTINE (CALLED VIA PITCH TVCDAP OR TVC RESTART PACKAGE)

| | | | | | | | | | | | |
|--------|-----|----|------|-----|---------|--------|------|-------|---------|-------------|---|
| 12361 | REP | 8 | LAST | 919 | 20,2560 | 25=654 | 1 | PCOPY | INCR | TVCPHASE | RESTART-PROTECT THE COPYCYCLE. NOTE POSSIBLE RE-ENTRY FROM RESTART PACKAGE, SHOULD A RESTART OCCUR DURING PITCH COPYCYCLE. |
| A12371 | | | | | | | | | | | |
| A12381 | | | | | | | | | | | |
| A12391 | | | | | | | | | | | |
| 12401 | | | | | 20,2561 | 0 | 0006 | 1 | NEWS(S) | EXTEND | UPDATE PITCH NUMERATOR LADDER FROM TEMPORARIES |
| 12411 | REP | 4 | LAST | 926 | 20,2562 | 3 | 1720 | 0 | | DCA B1TMP | |
| 12421 | REP | 3 | LAST | 926 | 20,2563 | 53=546 | 0 | | | DXCH B1 | |
| 12431 | | | | | 20,2564 | 0 | 0006 | 1 | | EXTEND | |
| 12441 | REP | 3 | LAST | 105 | 20,2565 | 3 | 1722 | 1 | | DCA B3TMP | |
| 12451 | REP | 3 | LAST | 926 | 20,2566 | 53=550 | 1 | | | DXCH B3 | |
| 12461 | | | | | 20,2567 | 0 | 0006 | 1 | | EXTEND | |
| 12471 | REP | 3 | LAST | 105 | 20,2570 | 3 | 1724 | 1 | | DCA B5TMP | |
| 12481 | REP | 3 | LAST | 926 | 20,2571 | 53=552 | 0 | | | DXCH B5 | |
| 12491 | | | | | 20,2572 | 0 | 0006 | 1 | NEWS(S) | EXTEND | UPDATE PITCH DENOMINATOR LADDER FROM TEMPORARIES |
| 12501 | REP | 4 | LAST | 925 | 20,2573 | 3 | 1727 | 1 | | DCA J1TMP | |
| 12511 | REP | 3 | LAST | 926 | 20,2574 | 53=554 | 0 | | | DXCH J1 | |
| 12521 | | | | | 20,2575 | 0 | 0006 | 1 | | EXTEND | |
| 12531 | REP | 4 | LAST | 926 | 20,2576 | 3 | 1731 | 0 | | DCA J2TMP | |
| 12541 | REP | 3 | LAST | 926 | 20,2577 | 53=556 | 1 | | | DXCH J2 | |
| 12551 | | | | | 20,2600 | 0 | 0006 | 1 | | EXTEND | |
| 12561 | REP | 4 | LAST | 926 | 20,2601 | 3 | 1733 | 1 | | DCA J3TMP | |
| 12571 | REP | 3 | LAST | 926 | 20,2602 | 53=560 | 1 | | | DXCH J3 | |
| 12581 | | | | | 20,2603 | 0 | 0006 | 1 | | EXTEND | |
| 12591 | REP | 4 | LAST | 927 | 20,2604 | 3 | 1735 | 1 | | DCA J4TMP | |
| 12601 | REP | 4 | LAST | 927 | 20,2605 | 53=562 | 0 | | | DXCH J4 | |
| 12611 | | | | | 20,2606 | 0 | 0006 | 1 | | EXTEND | |
| 12621 | REP | 5 | LAST | 927 | 20,2607 | 3 | 1737 | 0 | | DCA J5TMP | (ALSO NP1TMP,+1 TO NP1,+1) |
| 12631 | REP | 4 | LAST | 927 | 20,2610 | 53=564 | 0 | | | DXCH J5 | |
| 12641 | | | | | 20,2611 | 0 | 0006 | 1 | MISC | EXTEND | MISC....PITCH-RATE-ERROR INTEGRATOR |
| 12651 | REP | 11 | LAST | 926 | 20,2612 | 3 | 1743 | 0 | | DCA ERRBTMP | |
| 12661 | REP | 3 | LAST | 540 | 20,2613 | 55=477 | 0 | | | TS AK1 | FOR PITCH NEEDLES, SC.AT R-1 REVS |
| 12671 | REP | 3 | LAST | 924 | 20,2614 | 53=616 | 0 | | | DXCH FERRR | |
| 12681 | | | | | 20,2615 | 0 | 0006 | 1 | | EXTEND | PITCH NUMERATOR SUM (ALSO NP2TMP,+1 TO NP2,+1) |
| 12691 | REP | 4 | LAST | 104 | 20,2616 | 3 | 1712 | 1 | | DCA NSUMTMP | |
| 12701 | REP | 5 | LAST | 925 | 20,2617 | 53=542 | 1 | | | DXCH PNSUM | |
| 12711 | | | | | 20,2620 | 0 | 0006 | 1 | | EXTEND | PITCH DENOMINATOR SUM (ALSO NP3TMP,+1 TO NP3,+1) |
| 12721 | REP | 4 | LAST | 104 | 20,2621 | 3 | 1714 | 1 | | DCA DSUMTMP | |
| 12731 | REP | 4 | LAST | 925 | 20,2622 | 53=544 | 1 | | | DXCH PDSUM | |
| 12741 | REP | 16 | LAST | 927 | 20,2623 | 31=744 | 1 | | | CAB CMDTMP | PITCH ACTUATOR COMMAND |
| 12751 | REP | 8 | LAST | 926 | 20,2624 | 55=631 | 0 | | | TS PCMD | |
| 12761 | | | | | 20,2625 | 0 | 0006 | 1 | | EXTEND | PITCH OFFSET-TRACKER-FILTER |



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12771 RESP 6 LAST 927 20,2626 3 1716 0
12761 RESP 7 LAST 927 20,2627 53=622 1
12791 RESP 9 LAST 928 20,2630 25=654 1
12801 RESP 101 LAST 927 20,2631 0 0002 0

DCA DELBRIMP
DXCH DELPEAR

INCR TVCHASE

TC 0

PITCH COPYCYCLE COMPLETED

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| Line | REP | TVCDAP | STARTS | HERE | ... | (INCORPORATES CSM/LEM DAP FILTER, MODOR DESIGN) | YAWDAP | LXCH | BANKRUPT | TS ENTRY, NORMAL |
|--------|--------|--------|--------|---------|----------|---|--------|----------|----------|--|
| 12831 | REP 13 | LAST | 924 | 20,2632 | 22 016 0 | | YAWDAP | LXCH | BANKRUPT | TS ENTRY, NORMAL |
| 12841 | REP 12 | LAST | 924 | 20,2633 | 0 0008 1 | | | EXTEND | | |
| 12851 | REP 12 | LAST | 924 | 20,2634 | 22 012 1 | | | QKCH | GRUPT | |
| 12861 | REP 1 | | | 20,2635 | 3 3416 1 | | | CAP | PITCHS | SET UP TS CALL FOR PITCH AUTOPILOT (LOW-ORDER PART OF 2CADR ALREADY THERE) |
| 12871 | REP 17 | LAST | 924 | 20,2636 | 55-312 1 | | | TS | TSLOC | |
| 12881 | REP 7 | LAST | 924 | 20,2637 | 31-635 0 | | | CAS | TSVCDT | |
| 12891 | REP 13 | LAST | 924 | 20,2640 | 54 030 0 | | | TS | TIMES | |
| 12901 | REP 8 | LAST | 924 | 20,2641 | 11-614 1 | YSTROKER | CCS | STROKER | | (STROKFLG) CHECK FOR STROKE TEST |
| 12911 | REP 3 | LAST | 924 | 20,2642 | 0 3508 1 | | TC | HACK | | TEST-START OR TEST-IN-PROGRESS |
| 12921 | REP 3 | LAST | 924 | 20,2643 | 1 2645 0 | | TCF | +2 | | NO-TEST |
| 12931 | REP 4 | LAST | 930 | 20,2644 | 0 3508 1 | | TC | HACK | | TEST-IN-PROGRESS |
| A12941 | | | | | | | | | | |
| 12951 | | | | 20,2645 | 0 0008 1 | YINTEGR | EXTEND | | | USE BODY RATES FROM PITCHDAP (PCDDOTS) |
| 12961 | REP 2 | LAST | 102 | 20,2646 | 3 1620 1 | | DCA | YERRB | | COMPUTE INTEGRAL OF BODY-AXIS YAW-RATE |
| 12971 | REP 12 | LAST | 928 | 20,2647 | 53-743 1 | | DXCH | ERRBTMP | | ERROR, SC. AT B-1 REVS |
| 12981 | | | | 20,2650 | 0 0008 1 | | | EXTEND | | |
| 12991 | REP 1 | | | 20,2651 | 3 1532 1 | | DCA | OMEGA2C | | |
| 13001 | REP 13 | LAST | 930 | 20,2652 | 21-743 1 | | DAS | ERRBTMP | | |
| 13011 | REP 6 | LAST | 924 | 20,2653 | 30 746 1 | | CAS | COSCDUZ | | PREPARE BODY-AXIS YAW-RATE, OMEGA2R |
| 13021 | | | | 20,2654 | 0 0008 1 | | | EXTEND | | |
| 13031 | REP 6 | LAST | 925 | 20,2655 | 7 0742 1 | | MP | SINCDUX | | |
| 13041 | | | | 20,2656 | 20 001 1 | | | DDOUBL | | |
| 13051 | | | | 20,2657 | 0 0008 1 | | | EXTEND | | |
| 13061 | REP 4 | LAST | 924 | 20,2660 | 7 1657 0 | | MP | MCDU2DOT | | |
| 13071 | | | | 20,2661 | 20 001 1 | | | DDOUBL | | |
| 13081 | REP 1 | | | 20,2662 | 53-540 0 | | DXCH | OMEGA2R | | |
| 13091 | REP 4 | LAST | 924 | 20,2663 | 4 1660 1 | | CS | MCDU2DOT | | |
| 13101 | | | | 20,2664 | 0 0008 1 | | | EXTEND | | |
| 13111 | REP 6 | LAST | 924 | 20,2665 | 7 0750 1 | | MP | COSCDUX | | |
| 13121 | | | | 20,2666 | 20 001 1 | | | DDOUBL | | |
| 13131 | REP 2 | LAST | 930 | 20,2667 | 21-540 0 | | DAS | OMEGA2R | | (COMPLETED OMEGA2R, SC. AT 1/2 TVCDT REVS) |
| 13141 | | | | 20,2670 | 0 0008 1 | | | EXTEND | | PICK UP -OMEGA2R (SIGN CHNG, INTEGRATE) |
| 13151 | REP 3 | LAST | 930 | 20,2671 | 4 1540 0 | | DCS | OMEGA2R | | |
| 13161 | REP 14 | LAST | 930 | 20,2672 | 21-743 1 | | DAS | ERRBTMP | | |
| 13171 | REP 2 | LAST | 925 | 20,2673 | 0 3126 1 | YERORLIM | TCR | ERRORLIM | | YAW BODY-AXIS-ERROR INPUT LIMITER |
| 13181 | REP 68 | LAST | 926 | 20,2674 | 31-466 1 | Y1PILJMP | CAS | DAPDATR1 | | CHECK FOR LEM-ON/-OFF |
| 13191 | REP 48 | LAST | 926 | 20,2675 | 7 4675 0 | | MASK | RIT14 | | (BIT 14 INDICATES LEM IS ON) |



| L | TVCAPS | | | | | | | | | |
|-------|---------|------|-----|---------|----------|----------|---------------|--|--|--|
| 13201 | REP 203 | LAST | 930 | 20,2676 | 10 000 0 | CCS | A | | | |
| 13211 | | | | 20,2677 | 1 2702 1 | TCF | +3 | | | USE LIM-ON FILTER |
| 13221 | REP 52 | LAST | 931 | 20,2700 | 0 4574 0 | TC | POSTJUMP | | | USE LIM-OFF (GEN3DAP) FILTER |
| 13231 | REP 1 | | | 20,2701 | 36405 0 | CADR | NYQCODE | | | |
| 13241 | | | | 20,2702 | 0 0006 1 | YFORWARD | EXTEND | | | LIM-ON FILTER COMPUTATIONS |
| 13251 | REP 3 | LAST | 104 | 20,2703 | 4 1570 0 | DCS | YDSUM | | | DENOMINATOR TERMS, SC.AT B+0 SPASCREVS |
| 13261 | REP 1 | | | 20,2704 | 53=745 1 | DXCH | YZERO | | | |
| 13271 | REP 15 | LAST | 930 | 20,2705 | 31=742 1 | CAB | ERRTMP | | | INPUT ERROR, SC.AT B-1 REVS |
| 13281 | REP 3 | LAST | 104 | 20,2706 | 6 1565 0 | AD | YNSUM | | | NUMERATOR TERMS, SC.AT B-1 REVS |
| 13291 | | | | 20,2707 | 0 0006 1 | EXTEND | | | | |
| 13301 | REP 1 | | | 20,2710 | 7 4727 0 | MP | KYDN | | | KYDN, SC.AT B+1 SPASCREV |
| 13311 | REP 2 | LAST | 931 | 20,2711 | 21=745 1 | DAS | YZERO | | | |
| 13321 | REP 4 | LAST | 931 | 20,2712 | 31=566 0 | CAB | YNSUM +1 | | | |
| 13331 | | | | 20,2713 | 0 0006 1 | EXTEND | | | | |
| 13341 | REP 2 | LAST | 931 | 20,2714 | 7 4727 0 | MP | KYDN | | | |
| 13351 | REP 3 | LAST | 931 | 20,2715 | 27=745 1 | ADS | YZERO +1 | | | |
| 13361 | REP 64 | LAST | 927 | 20,2716 | 54 001 1 | TS | L | | | |
| 13371 | | | | 20,2717 | 1 2721 0 | TCF | +2 | | | |
| 13381 | REP 4 | LAST | 931 | 20,2720 | 27=744 0 | ADS | YZERO | | | (SC.AT B+0 SPASCREV), (YZERO = CMDTMP) |
| 13391 | | | | 20,2721 | 0 0006 1 | YZSTORE | EXTEND | | | |
| 13401 | REP 5 | LAST | 931 | 20,2722 | 3 1745 0 | DCA | YZERO | | | PREPARE YZERO FOR DENOMINATOR LADDER |
| 13411 | | | | 20,2723 | 20 001 1 | DDOUBL | | | | SC.AT B+0 SPASCREV |
| 13421 | | | | 20,2724 | 20 001 1 | DDOUBL | | | | |
| 13431 | | | | 20,2725 | 20 001 1 | DDOUBL | | | | |
| 13441 | REP 1 | | | 20,2726 | 53=727 0 | DXCH | Y1TMP | | | SC.AT B-3 SPASCREV |
| 13451 | REP 2 | LAST | 925 | 20,2727 | 0 3141 0 | OPTVARKY | TCR OPTVARK | | | YAW VARIABLE-GAIN PACKAGE |
| 13461 | | | | 20,2730 | 0 0006 1 | YOFFSET | EXTEND | | | |
| 13471 | REP 17 | LAST | 928 | 20,2731 | 4 1745 1 | DCS | CMDTMP | | | SIGN CHANGE IN FORWARD LOOP |
| 13481 | REP 18 | LAST | 931 | 20,2732 | 53=745 1 | DXCH | CMDTMP | | | (GEN3DAP RETURNS AT YOFFSET) |
| 13491 | | | | 20,2733 | 0 0006 1 | EXTEND | | | | |
| 13501 | REP 5 | LAST | 908 | 20,2734 | 3 1630 0 | DCA | YDELOFF | | | ADD IN DOUBLE-PRECISION CG OFFSETS |
| 13511 | REP 19 | LAST | 931 | 20,2735 | 21=745 1 | DAS | CMDTMP | | | |
| 13521 | REP 20 | LAST | 931 | 20,2736 | 31=745 0 | YROUND | CAB CMDTMP +1 | | | ROUND UP FOR OUTPUT |
| 13531 | | | | 20,2737 | 6 0000 1 | DOUBLE | | | | |
| 13541 | REP 85 | LAST | 931 | 20,2740 | 54 001 1 | TS | L | | | |
| 13551 | REP 164 | LAST | 927 | 20,2741 | 3 4714 1 | CAP | ZERO | | | |
| 13561 | REP 21 | LAST | 931 | 20,2742 | 6 1744 1 | AD | CMDTMP | | | |
| 13571 | REP 2 | LAST | 928 | 20,2743 | 0 3161 1 | YACLIM | TCR ACTLIM | | | YAW ACTUATOR-COMMAND-LIMITER |
| 13581 | REP 4 | LAST | 919 | 20,2744 | 4 1632 0 | YOUT | CS YCMD | | | INCREMENTAL YAW COMMAND |
| 13591 | REP 22 | LAST | 931 | 20,2745 | 6 1744 1 | AD | CMDTMP | | | |
| 13601 | REP 3 | LAST | 919 | 20,2746 | 28 053 0 | ADS | TVCYAW | | | UPDATE THE ERROR COUNTER (NO RESTART-PROTECT, SINCE ERROR CNTR ZEROED) |

A13611



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| | | | | | | | | |
|-------|-----|-----|------|-----|---------|----------|----------|--------------|
| 13821 | REP | 27 | LAST | 778 | 20,2747 | 3 4677 0 | CAP | BIT12 |
| 13831 | | | | | 20,2750 | 0 0006 1 | EXTEND | |
| 13841 | REP | 9 | LAST | 928 | 20,2751 | 05 014 1 | WOR | CHAN14 |
| 13851 | REP | 69 | LAST | 930 | 20,2752 | 31=466 1 | Y2FILJMP | CAB DAPDATR1 |
| 13861 | REP | 49 | LAST | 930 | 20,2753 | 7 4675 0 | MASK | BIT14 |
| 13871 | REP | 204 | LAST | 931 | 20,2754 | 10 000 0 | CCS | A |
| 13881 | | | | | 20,2755 | 1 2760 0 | TCF | +3 |
| 13891 | REP | 53 | LAST | 931 | 20,2756 | 0 4574 0 | TC | POSTJUMP |
| 13701 | REP | 1 | | | 20,2757 | 36440 1 | CADR | NY1NODE |
| 13711 | REP | 16 | LAST | 931 | 20,2760 | 31=742 1 | CZSTORE | CAB ERRBTMP |
| 13721 | | | | | 20,2761 | 6 0000 1 | DOUBLE | |
| 13731 | REP | 1 | | | 20,2762 | 55=717 0 | TS | C1TMP |
| 13741 | | | | | 20,2763 | 0 0006 1 | YNLADDER | EXTEND |
| 13751 | REP | 2 | LAST | 102 | 20,2764 | 3 1572 0 | DCA | C1 |
| 13761 | REP | 1 | | | 20,2765 | 53=721 0 | DXCH | C2TMP |
| 13771 | | | | | 20,2766 | 0 0006 1 | EXTEND | |
| 13781 | REP | 2 | LAST | 102 | 20,2767 | 3 1574 0 | DCA | C3 |
| 13791 | REP | 1 | | | 20,2770 | 53=723 1 | DXCH | C4TMP |
| 13801 | | | | | 20,2771 | 0 0006 1 | EXTEND | |
| 13811 | REP | 2 | LAST | 102 | 20,2772 | 3 1576 1 | DCA | C5 |
| 13821 | REP | 1 | | | 20,2773 | 53=725 1 | DXCH | C6TMP |
| 13831 | REP | 2 | LAST | 928 | 20,2774 | 0 3173 1 | YNSUMC | TCR NSLM |
| 13841 | | | | | 20,2775 | 0 0006 1 | YDLADDER | EXTEND |
| 13851 | REP | 2 | LAST | 102 | 20,2776 | 3 1600 0 | DCA | Y1 |
| 13861 | REP | 1 | | | 20,2777 | 53=731 1 | DXCH | Y2TMP |
| 13871 | | | | | 20,3000 | 0 0006 1 | EXTEND | |
| 13881 | REP | 2 | LAST | 102 | 20,3001 | 3 1602 1 | DCA | Y2 |
| 13891 | REP | 1 | | | 20,3002 | 53=733 0 | DXCH | Y3TMP |
| 13901 | | | | | 20,3003 | 0 0006 1 | EXTEND | |
| 13911 | REP | 2 | LAST | 102 | 20,3004 | 3 1604 1 | DCA | Y3 |
| 13921 | REP | 1 | | | 20,3005 | 53=735 0 | DXCH | Y4TMP |
| 13931 | | | | | 20,3006 | 0 0006 1 | EXTEND | |
| 13941 | REP | 3 | LAST | 104 | 20,3007 | 3 1606 0 | DCA | Y4 |
| 13951 | REP | 2 | LAST | 104 | 20,3010 | 53=737 1 | DXCH | Y5TMP |
| 13961 | | | | | 20,3011 | 0 0006 1 | EXTEND | |
| 13971 | REP | 3 | LAST | 104 | 20,3012 | 3 1610 1 | DCA | Y5 |
| 13981 | REP | 1 | | | 20,3013 | 53=741 0 | DXCH | Y6TMP |
| 13991 | REP | 2 | LAST | 927 | 20,3014 | 0 3233 0 | YDSUMC | TCR DSLM |
| 14001 | REP | 23 | LAST | 931 | 20,3015 | 31=744 1 | DELRARY | CAB CMDTMP |
| 14011 | | | | | 20,3016 | 0 0006 1 | EXTEND | |
| 14021 | REP | 2 | LAST | 927 | 20,3017 | 7 3421 1 | MP | 1-B(-AT) |

BIT FOR TVCYAW COUNT RELEASE

CHECK FOR LEM-ON/-OFF
(BIT 14 INDICATES LEM IS ON)

USE LEM-ON FILTER
USE LEM-OFF (GEN3DAP) FILTER

PREPARE CZERO (UPPER WORD OF ERRBTMP)
FOR NUMERATOR LADDER... SC AT B-1
SC AT B-2 REVS FOR LADDER
PREPARE TEMPORARIES, FOR UPDATING YAW
NUMERATOR LADDER

YAW NUMERATOR SUM
PREPARE TEMPORARIES, FOR UPDATING YAW
DENOMINATOR LADDER

YAW DENOMINATOR SUM

UPDATE YAW OFFSET-TRACKER-FILTER
(GEN3DAP RETURNS AT ..DELRARY..)

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| | | | | | | | | | | | | |
|-------|-----|----|------|-----|---------|--------|---|----------|-------------|--------|-----|---------------|
| 14031 | REP | 7 | LAST | 929 | 20,3020 | 53=716 | 1 | DYCH | DELBRTMP | | | |
| 14041 | REP | 5 | LAST | 908 | 20,3021 | 31=623 | 1 | CAB | DELYBAR | | | |
| 14051 | REP | | | | 20,3022 | 0 0008 | 1 | EXTEND | | | | |
| 14061 | REP | 3 | LAST | 927 | 20,3023 | 7 3422 | 1 | MP | E(-AT) | | | |
| 14071 | REP | 6 | LAST | 933 | 20,3024 | 21=716 | 1 | DAS | DELBRTMP | | | |
| 14081 | REP | 6 | LAST | 933 | 20,3025 | 31=624 | 0 | CAB | DELYBAR +1 | | | |
| 14091 | REP | | | | 20,3026 | 0 0008 | 1 | EXTEND | | | | |
| 14101 | REP | 4 | LAST | 933 | 20,3027 | 7 3422 | 1 | MP | E(-AT) | | | |
| 14111 | REP | 9 | LAST | 933 | 20,3030 | 27=716 | 1 | ADS | DELBRTMP +1 | | | |
| 14121 | REP | 86 | LAST | 931 | 20,3031 | 54 001 | 1 | TS | L | | | |
| 14131 | REP | | | | 20,3032 | 1 3034 | 1 | YCP | +2 | | | |
| 14141 | REP | 10 | LAST | 933 | 20,3033 | 27=716 | 1 | ADS | DELBRTMP | | | |
| 14151 | REP | 2 | LAST | 920 | 20,3034 | 0 3036 | 1 | YCOPYCYC | TCR | YCOPY | YAW | COPYCYCLE |
| 14161 | REP | 32 | LAST | 927 | 20,3035 | 1 5222 | 1 | YDAPEND | TCP | RESUME | YAW | DAP COMPLETED |



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P14171 YAW TVCDAP COPYCYCLE SUBROUTINE (CALLED VIA YAW TVCDAP OR TVC RESTART PACKAGE)

| Line | Label | REP | Code | Address | Value | Comment | Operation | Phase | Description | |
|--------|-------|-----|------|---------|---------|----------|-----------|--------|-------------|---|
| 14191 | REP | 10 | LAST | 929 | 20,3036 | 25=654 1 | YCOPY | INCR | TVCPHASE | RESTART-PROTECT THE COPYCYCLE. NOTE POSSIBLE RE-ENTRY FROM RESTART PACKAGE, SHOULD A RESTART OCCUR DURING YAW COPYCYCLE. |
| A14201 | | | | | | | | | | |
| A14211 | | | | | | | | | | |
| A14221 | | | | | | | | | | |
| 14231 | | | | | 20,3037 | 0 0006 1 | NEW(C) | EXTEND | | UPDATE YAW NUMERATOR LADDER FROM TEMPORARIES |
| 14241 | REP | 2 | LAST | 932 | 20,3040 | 3 1720 0 | | DCA | C1TMP | |
| 14251 | REP | 3 | LAST | 932 | 20,3041 | 53=572 1 | | DCH | C1 | |
| 14261 | | | | | 20,3042 | 0 0006 1 | | EXTEND | | |
| 14271 | REP | 1 | | | 20,3043 | 3 1722 1 | | DCA | C3TMP | |
| 14281 | REP | 3 | LAST | 932 | 20,3044 | 53=574 1 | | DCH | C3 | |
| 14291 | | | | | 20,3045 | 0 0006 1 | | EXTEND | | |
| 14301 | REP | 1 | | | 20,3046 | 3 1724 1 | | DCA | C5TMP | |
| 14311 | REP | 3 | LAST | 932 | 20,3047 | 53=576 0 | | DCH | C5 | |
| 14321 | | | | | 20,3050 | 0 0006 1 | NEW(Y) | EXTEND | | UPDATE YAW DENOMINATOR LADDER FROM TEMPORARIES |
| 14331 | REP | 2 | LAST | 931 | 20,3051 | 3 1727 1 | | DCA | Y1TMP | |
| 14341 | REP | 3 | LAST | 932 | 20,3052 | 53=600 1 | | DCH | Y1 | |
| 14351 | | | | | 20,3053 | 0 0006 1 | | EXTEND | | |
| 14361 | REP | 2 | LAST | 932 | 20,3054 | 3 1731 0 | | DCA | Y2TMP | |
| 14371 | REP | 3 | LAST | 932 | 20,3055 | 53=602 0 | | DCH | Y2 | |
| 14381 | | | | | 20,3056 | 0 0006 1 | | EXTEND | | |
| 14391 | REP | 2 | LAST | 932 | 20,3057 | 3 1733 1 | | DCA | Y3TMP | |
| 14401 | REP | 3 | LAST | 932 | 20,3060 | 53=604 0 | | DCH | Y3 | |
| 14411 | | | | | 20,3061 | 0 0006 1 | | EXTEND | | |
| 14421 | REP | 2 | LAST | 932 | 20,3062 | 3 1735 1 | | DCA | Y4TMP | |
| 14431 | REP | 4 | LAST | 932 | 20,3063 | 53=606 1 | | DCH | Y4 | |
| 14441 | | | | | 20,3064 | 0 0006 1 | | EXTEND | | |
| 14451 | REP | 3 | LAST | 932 | 20,3065 | 3 1737 0 | | DCA | Y5TMP | (ALSO NY1TMP,+1 TO NY1,+1) |
| 14461 | REP | 4 | LAST | 932 | 20,3066 | 53=610 0 | | DCH | Y5 | |
| 14471 | | | | | 20,3067 | 0 0006 1 | MISC | EXTEND | | MISC...YAW-RATE-ERROR INTEGRATOR |
| 14481 | REP | 17 | LAST | 932 | 20,3070 | 3 1743 0 | | DCA | ERRBTMP | |
| 14491 | REP | 3 | LAST | 540 | 20,3071 | 55=500 1 | | TS | AK2 | |
| 14501 | REP | 3 | LAST | 930 | 20,3072 | 53=620 0 | | DCH | YERRB | FOR YAW NEEDLES, SC.AT R-1 REVS |
| 14511 | | | | | 20,3073 | 0 0006 1 | | EXTEND | | YAW NUMERATOR SUM |
| 14521 | REP | 5 | LAST | 928 | 20,3074 | 3 1712 1 | | DCA | NSUMTMP | (ALSO NY2TMP,+1 TO NY2,+1) |
| 14531 | REP | 5 | LAST | 931 | 20,3075 | 53=566 1 | | DCH | YNSUM | |
| 14541 | | | | | 20,3076 | 0 0006 1 | | EXTEND | | YAW DENOMINATOR SUM |
| 14551 | REP | 5 | LAST | 928 | 20,3077 | 3 1714 1 | | DCA | DSUMTMP | (ALSO NY3TMP,+1 TO NY3,+1) |
| 14561 | REP | 4 | LAST | 931 | 20,3100 | 53=570 0 | | DCH | YDSUM | |
| 14571 | REP | 24 | LAST | 932 | 20,3101 | 31=744 1 | | CAE | CMDTMP | YAW ACTUATOR COMMAND |
| 14581 | REP | 5 | LAST | 931 | 20,3102 | 55=632 0 | | TS | YCMD | |
| 14591 | | | | | 20,3103 | 0 0006 1 | | EXTEND | | YAW OFFSET-TRACKER-FILTER |



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| | | | | | | | | |
|-------|-----|-----|------|-----|---------|----|------|---|
| 14601 | REP | 11 | LAST | 933 | 20,3104 | 3 | 1716 | 0 |
| 14611 | REP | 7 | LAST | 933 | 20,3105 | 53 | 624 | 1 |
| 14621 | REP | 165 | LAST | 931 | 20,3106 | 3 | 4714 | 1 |
| 14631 | REP | 11 | LAST | 934 | 20,3107 | 55 | 654 | 0 |
| 14641 | REP | 162 | LAST | 929 | 20,3110 | 0 | 0002 | 0 |

| | |
|------|----------|
| DCA | DELBRIMP |
| DXCH | DELYBAR |

| | |
|-----|----------|
| CAP | ZERO |
| TS | TVCPHASE |

YAW COPYCYCLE COMPLETED
RESET TVCPHASE

| | |
|----|---|
| TC | 0 |
|----|---|

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P14651 SUBROUTINES COMMON TO BOTH PITCH AND YAW DAPS....
 R14661 INITIALIZATION PACKAGE FOR CDURATES....

| | | | | | | | | | |
|-------|-----|----|------|-----|---------|----------|---------|-----------|----------|
| 14671 | REF | 14 | LAST | 930 | 20,3111 | 22 016 0 | DAPINIT | LXCH | BANKRUPT |
| 14681 | REF | 18 | LAST | 908 | 20,3112 | 3 7716 0 | CAP | NECOONE | |
| 14691 | REF | 8 | LAST | 930 | 20,3113 | 6 1635 0 | AD | TSVCDT | |
| 14701 | REF | 3 | LAST | 429 | 20,3114 | 6 4674 0 | AD | NEOMAX | |
| 14711 | REF | 9 | LAST | 936 | 20,3115 | 6 1635 0 | AD | TSVCDT | |
| 14721 | REF | 14 | LAST | 930 | 20,3116 | 54 030 0 | TS | TIMES | |
| 14731 | REF | 2 | LAST | 930 | 20,3117 | 3 3416 1 | CAP | PITCHTS | |
| 14741 | REF | 18 | LAST | 930 | 20,3120 | 55=312 1 | TS | TSLOC | |
| 14751 | REF | 10 | LAST | 924 | 20,3121 | 30 033 1 | CAB | CDUJ | |
| 14761 | REF | 4 | LAST | 924 | 20,3122 | 55=655 1 | TS | PCDUJPSST | |
| 14771 | REF | 13 | LAST | 924 | 20,3123 | 30 034 0 | CAB | CDUZ | |
| 14781 | REF | 4 | LAST | 924 | 20,3124 | 55=656 1 | TS | PCDUZPSST | |

TS RUPT ENTRY (CALLED BY TVCINT4)

SET UP
 TS CALL FOR PITCHDAP IN TVCDT SECS
 (TSVCDT = POSMAX - TVCDT/2 +1)

(RBCON ALREADY THERE)

READ AND STORE CDUS FOR DIFFERENTIATOR
 PAST-VALUES

14791 REF 3 LAST 918 20,3125 1 5224 1
 R14801 BODY-AXIS-ERROR INPUT LIMITER PACKAGE....

| | | | | | | | | | |
|-------|-----|----|------|-----|---------|----------|----------|---------|----------|
| 14811 | REF | 18 | LAST | 934 | 20,3126 | 31=742 1 | ERROR.LM | CAB | ERRBTMP |
| 14821 | | | | | 20,3127 | 0 0006 1 | EXTEND | | |
| 14831 | REF | 1 | | | 20,3130 | 7 4710 1 | MP | | 1/ERR.LM |
| 14841 | | | | | 20,3131 | 0 0006 1 | EXTEND | | |
| 14851 | | | | | 20,3132 | 1 3140 0 | RZF | | +6 |
| 14861 | REF | 19 | LAST | 936 | 20,3133 | 11=742 0 | CCS | ERRBTMP | |
| 14871 | REF | 1 | | | 20,3134 | 3 4676 1 | CAP | ERR.LM | |
| 14881 | | | | | 20,3135 | 1 3137 0 | TCP | | +2 |
| 14891 | REF | 2 | LAST | 936 | 20,3136 | 4 4676 0 | CS | ERR.LM | |
| 14901 | REF | 20 | LAST | 936 | 20,3137 | 55=742 0 | TS | ERRBTMP | |

CHECK FOR INPUT-ERROR LIMIT
 CHECKS UPPER WORD ONLY

LIMIT WRITES OVER UPPER WORD ONLY

14911 REF 183 LAST 935 20,3140 0 0002 0
 R14921 VARIABLE-GAIN PACKAGE....

| | | | | | | | | | |
|-------|-----|-----|------|-----|---------|----------|---------|-----|-----------|
| 14931 | REF | 25 | LAST | 934 | 20,3141 | 31=744 1 | OPTVARK | CAB | CMDTMP |
| 14941 | | | | | 20,3142 | 0 0006 1 | EXTEND | | |
| 14951 | REF | 4 | LAST | 910 | 20,3143 | 7 1651 0 | MP | | VARC |
| 14961 | REF | 26 | LAST | 936 | 20,3144 | 53=745 1 | DXCH | | CMDTMP |
| 14971 | REF | 205 | LAST | 932 | 20,3145 | 22 000 1 | LXCH | | A |
| 14981 | | | | | 20,3146 | 0 0006 1 | EXTEND | | |
| 14991 | REF | 5 | LAST | 936 | 20,3147 | 7 1651 0 | MP | | VARC |
| 15001 | REF | 27 | LAST | 936 | 20,3150 | 27=745 1 | ADS | | CMDTMP +1 |
| 15011 | REF | 67 | LAST | 933 | 20,3151 | 54 001 1 | TS | | L |

VARIABLE-GAIN PACKAGE....CMDTMP CONTAINS
 JZERO OR YZERO
 VARIABLE-GAIN, SC.AT 4 ASCRRV/SPASCRV

LO-ORDER WORD OF INPUT CMDTMP

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| | | | | | | | | | |
|--------|---------------------------------------|-----|------|---------|------------------|--------|----------|----------------------------------|--------------------------------------|
| 15021 | | | | 20,3152 | 1 3154 0 | TCP | +2 | | |
| 15031 | REP | 28 | LAST | 936 | 20,3153 27=744 0 | ADS | CMDTMP | | |
| 15041 | REP | 29 | LAST | 937 | 20,3154 53=745 1 | DXCH | CMDTMP | FIX UP SCALING | |
| 15051 | | | | 20,3155 | 20 001 1 | DDOUBL | | | |
| 15061 | | | | 20,3156 | 20 001 1 | DDOUBL | | | |
| 15071 | REP | 30 | LAST | 937 | 20,3157 53=745 1 | DXCH | CMDTMP | | |
| 15081 | REP | 184 | LAST | 936 | 20,3160 0 0002 0 | TC | 0 | | |
| R15091 | ACTUATOR-COMMAND LIMITER PACKAGES.... | | | | | | | | |
| 15101 | | | | 20,3161 | 0 0006 1 | ACTLIM | EXTEND | CHECK FOR ACTUATOR COMMAND LIMIT | |
| 15111 | REP | 1 | | 20,3162 | 7 3414 1 | MP | 1/ACTSAT | | |
| 15121 | | | | 20,3163 | 0 0006 1 | EXTEND | | | |
| 15131 | | | | 20,3164 | 1 3172 1 | BZF | +6 | | |
| 15141 | REP | 31 | LAST | 937 | 20,3165 11=744 0 | CCS | CMDTMP | APPLY LIMITS | |
| 15151 | REP | 1 | | 20,3166 | 3 3413 1 | CAP | ACTSAT | | |
| 15161 | | | | 20,3167 | 1 3171 1 | TCP | +2 | | |
| 15171 | REP | 2 | LAST | 937 | 20,3170 4 3413 0 | CS | ACTSAT | | |
| 15181 | REP | 32 | LAST | 937 | 20,3171 55=744 0 | TS | CMDTMP | LIMITS WRITE OVER CMDTMP | |
| 15191 | REP | 185 | LAST | 937 | 20,3172 0 0002 0 | TC | 0 | | |
| R15201 | NUMERATOR-SLM COMPUTATION.... | | | | | | | | |
| 15211 | REP | 5 | LAST | 928 | 20,3173 31=717 1 | NSLM | CAE | B1TMP | PREPARE NUMERATOR SLM, SCALING IS AT |
| 15221 | | | | 20,3174 | 0 0006 1 | EXTEND | | | R+0 REVS (= R+2 X R-2) |
| 15231 | REP | 1 | | 20,3175 | 7 3423 0 | MP | N1 | | |
| 15241 | REP | 6 | LAST | 934 | 20,3176 53=712 0 | DXCH | NSLMTMP | | |
| 15251 | REP | 4 | LAST | 928 | 20,3177 31=720 0 | CAE | B2TMP | | |
| 15261 | | | | 20,3200 | 0 0006 1 | EXTEND | | | |
| 15271 | REP | 1 | | 20,3201 | 7 3424 1 | MP | N2 | | |
| 15281 | REP | 7 | LAST | 937 | 20,3202 21=712 0 | DAS | NSLMTMP | | |
| 15291 | REP | 4 | LAST | 928 | 20,3203 31=721 1 | CAE | B3TMP | | |
| 15301 | | | | 20,3204 | 0 0006 1 | EXTEND | | | |
| 15311 | REP | 1 | | 20,3205 | 7 3425 0 | MP | N3 | | |
| 15321 | REP | 6 | LAST | 937 | 20,3206 21=712 0 | DAS | NSLMTMP | | |
| 15331 | REP | 4 | LAST | 928 | 20,3207 31=722 1 | CAE | B4TMP | | |
| 15341 | | | | 20,3210 | 0 0006 1 | EXTEND | | | |
| 15351 | REP | 1 | | 20,3211 | 7 3426 0 | MP | N4 | | |
| 15361 | REP | 9 | LAST | 937 | 20,3212 21=712 0 | DAS | NSLMTMP | | |
| 15371 | REP | 4 | LAST | 928 | 20,3213 31=723 0 | CAE | B5TMP | | |
| 15381 | | | | 20,3214 | 0 0006 1 | EXTEND | | | |



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| | | | | | | | | |
|--------|---------------------------------|-----|------|---------|---------|--------|--------|--------------|
| 15391 | REP | 1 | | 20,3215 | 7 3427 | 1 | MP | N5 |
| 15401 | REP | 10 | LAST | 937 | 20,3216 | 21=712 | DAS | NSUMTMP |
| 15411 | REP | 4 | LAST | 928 | 20,3217 | 31=724 | CAB | B6TMP |
| 15421 | | | | | 20,3220 | 0 0008 | EXTEND | |
| 15431 | REP | 1 | | | 20,3221 | 7 3430 | MP | N6 |
| 15441 | REP | 11 | LAST | 938 | 20,3222 | 21=712 | DAS | NSUMTMP |
| 15451 | REP | 3 | LAST | 105 | 20,3223 | 31=725 | CAB | B7TMP |
| 15461 | | | | | 20,3224 | 0 0008 | EXTEND | |
| 15471 | REP | 1 | | | 20,3225 | 7 3431 | MP | N7 |
| 15481 | REP | 12 | LAST | 938 | 20,3226 | 21=712 | DAS | NSUMTMP |
| 15491 | REP | 13 | LAST | 938 | 20,3227 | 53=712 | NSUMSC | DxCH NSUMTMP |
| 15501 | | | | | 20,3230 | 20 001 | DOUCL | |
| 15511 | REP | 14 | LAST | 938 | 20,3231 | 53=712 | DxCH | NSUMTMP |
| 15521 | REP | 186 | LAST | 937 | 20,3232 | 0 0002 | TC | 0 |
| R15531 | DENOMINATOR-SUM COMPUTATION.... | | | | | | | |
| 15541 | REP | 5 | LAST | 928 | 20,3233 | 31=726 | DSUM | CAB J1TMP |
| 15551 | | | | | 20,3234 | 0 0008 | EXTEND | |
| 15561 | REP | 1 | | | 20,3235 | 7 3432 | MP | D1 |
| 15571 | REP | 6 | LAST | 934 | 20,3236 | 53=714 | DxCH | DSUMTMP |
| 15581 | REP | 6 | LAST | 938 | 20,3237 | 31=726 | CAB | J1TMP |
| 15591 | | | | | 20,3240 | 0 0008 | EXTEND | |
| 15601 | REP | 2 | LAST | 938 | 20,3241 | 7 3433 | MP | D1 +1 |
| 15611 | REP | 7 | LAST | 938 | 20,3242 | 27=714 | ADS | DSUMTMP +1 |
| 15621 | REP | 88 | LAST | 938 | 20,3243 | 54 001 | TS | L |
| 15631 | | | | | 20,3244 | 1 3246 | TCF | +2 |
| 15641 | REP | 8 | LAST | 938 | 20,3245 | 27=713 | ADS | DSUMTMP |
| 15651 | REP | 7 | LAST | 938 | 20,3246 | 31=727 | CAB | J1TMP +1 |
| 15661 | | | | | 20,3247 | 0 0008 | EXTEND | |
| 15671 | REP | 3 | LAST | 938 | 20,3250 | 7 3432 | MP | D1 |
| 15681 | REP | 9 | LAST | 938 | 20,3251 | 27=714 | ADS | DSUMTMP +1 |
| 15691 | REP | 89 | LAST | 938 | 20,3252 | 54 001 | TS | L |
| 15701 | | | | | 20,3253 | 1 3255 | TCF | +2 |
| 15711 | REP | 10 | LAST | 938 | 20,3254 | 27=713 | ADS | DSUMTMP |
| 15721 | REP | 5 | LAST | 928 | 20,3255 | 31=730 | D2J2 | CAB J2TMP |
| 15731 | | | | | 20,3256 | 0 0008 | EXTEND | |
| 15741 | REP | 1 | | | 20,3257 | 7 3434 | MP | D2 |
| 15751 | REP | 11 | LAST | 938 | 20,3260 | 21=714 | DAS | DSUMTMP |
| 15761 | REP | 6 | LAST | 938 | 20,3261 | 31=730 | CAB | J2TMP |
| 15771 | | | | | 20,3262 | 0 0008 | EXTEND | |
| 15781 | REP | 2 | LAST | 938 | 20,3263 | 7 3435 | MP | D2 +1 |
| 15791 | REP | 12 | LAST | 938 | 20,3264 | 27=714 | ADS | DSUMTMP +1 |
| 15801 | REP | 90 | LAST | 938 | 20,3265 | 54 001 | TS | L |

FIX UP SCALING (NOW AT B+0 REVS)

SC.AT B-1 REV

PREPARE DENOMINATOR SUM, SCALED
AT B+1 SPASCREVS (= B+4 X B-3)
(J1TMP = J,YZERO, SC.AT B-3 REVS)



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| | | | | | | | | | |
|-------|-----|----|------|---------|----------|-----------|--------|------------|-------|
| 15811 | | | | 20,3266 | 1 3270 0 | | TCP | +2 | |
| 15821 | REP | 13 | LAST | 938 | 20,3267 | 27=713 1 | ADS | DSLMTMP | |
| 15831 | REP | 7 | LAST | 938 | 20,3270 | 31=731 0 | CAB | J2TMP +1 | |
| 15841 | | | | 20,3271 | 0 0006 1 | | EXTEND | | |
| 15851 | REP | 3 | LAST | 938 | 20,3272 | 7 3434 0 | MP | D2 | |
| 15861 | REP | 14 | LAST | 939 | 20,3273 | 27=714 0 | ADS | DSLMTMP +1 | |
| 15871 | REP | 91 | LAST | 938 | 20,3274 | 54 001 1 | TS | L | |
| 15881 | | | | 20,3275 | 1 3277 1 | | TCP | +2 | |
| 15891 | REP | 15 | LAST | 939 | 20,3276 | 27=713 1 | ADS | DSLMTMP | |
| 15901 | REP | 5 | LAST | 928 | 20,3277 | 31=732 0 | D3J3 | CAB | J3TMP |
| 15911 | | | | 20,3300 | 0 0006 1 | | EXTEND | | |
| 15921 | REP | 1 | | | 20,3301 | 7 3436 1 | MP | D3 | |
| 15931 | REP | 16 | LAST | 939 | 20,3302 | 21=714 0 | DAS | DSLMTMP | |
| 15941 | REP | 6 | LAST | 939 | 20,3303 | 31=732 0 | CAB | J3TMP | |
| 15951 | | | | 20,3304 | 0 0006 1 | | EXTEND | | |
| 15961 | REP | 2 | LAST | 939 | 20,3305 | 7 3437 0 | MP | D3 +1 | |
| 15971 | REP | 17 | LAST | 939 | 20,3306 | 27=714 0 | ADS | DSLMTMP +1 | |
| 15981 | REP | 92 | LAST | 939 | 20,3307 | 54 001 1 | TS | L | |
| 15991 | | | | 20,3310 | 1 3312 0 | | TCP | +2 | |
| 16001 | REP | 18 | LAST | 939 | 20,3311 | 27=713 1 | ADS | DSLMTMP | |
| 16011 | REP | 7 | LAST | 939 | 20,3312 | 31=733 1 | CAB | J3TMP +1 | |
| 16021 | | | | 20,3313 | 0 0006 1 | | EXTEND | | |
| 16031 | REP | 3 | LAST | 939 | 20,3314 | 7 3436 1 | MP | D3 | |
| 16041 | REP | 19 | LAST | 939 | 20,3315 | 27=714 0 | ADS | DSLMTMP +1 | |
| 16051 | REP | 93 | LAST | 939 | 20,3316 | 54 001 1 | TS | L | |
| 16061 | | | | 20,3317 | 1 3321 0 | | TCP | +2 | |
| 16071 | REP | 20 | LAST | 939 | 20,3320 | -27=713 1 | ADS | DSLMTMP | |
| 16081 | REP | 5 | LAST | 928 | 20,3321 | 31=734 0 | D4J4 | CAB | J4TMP |
| 16091 | | | | 20,3322 | 0 0006 1 | | EXTEND | | |
| 16101 | REP | 1 | | | 20,3323 | 7 3440 0 | MP | D4 | |
| 16111 | REP | 21 | LAST | 939 | 20,3324 | 21=714 0 | DAS | DSLMTMP | |
| 16121 | REP | 8 | LAST | 939 | 20,3325 | 31=734 0 | CAB | J4TMP | |
| 16131 | | | | 20,3326 | 0 0006 1 | | EXTEND | | |
| 16141 | REP | 2 | LAST | 939 | 20,3327 | 7 3441 1 | MP | D4 +1 | |
| 16151 | REP | 22 | LAST | 939 | 20,3330 | 27=714 0 | ADS | DSLMTMP +1 | |
| 16161 | REP | 94 | LAST | 939 | 20,3331 | 54 001 1 | TS | L | |
| 16171 | | | | 20,3332 | 1 3334 1 | | TCP | +2 | |
| 16181 | REP | 23 | LAST | 939 | 20,3333 | 27=713 1 | ADS | DSLMTMP | |
| 16191 | REP | 7 | LAST | 939 | 20,3334 | 31=735 1 | CAB | J4TMP +1 | |
| 16201 | | | | 20,3335 | 0 0006 1 | | EXTEND | | |
| 16211 | REP | 3 | LAST | 939 | 20,3336 | 7 3440 0 | MP | D4 | |
| 16221 | REP | 24 | LAST | 939 | 20,3337 | 27=714 0 | ADS | DSLMTMP +1 | |
| 16231 | REP | 95 | LAST | 939 | 20,3340 | 54 001 1 | TS | L | |
| 16241 | | | | 20,3341 | 1 3343 1 | | TCP | +2 | |
| 16251 | REP | 25 | LAST | 939 | 20,3342 | 27=713 1 | ADS | DSLMTMP | |
| 16261 | REP | 6 | LAST | 928 | 20,3343 | 31=736 1 | D5J5 | CAB | J5TMP |
| 16271 | | | | 20,3344 | 0 0006 1 | | EXTEND | | |



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| | | | | | | | | | |
|-------|-----|-----|------|---------|---------|--------|--------|--------------|--------------------------------------|
| 16281 | REP | 1 | | 20,3345 | 7 3442 | 1 | MP | D5 | |
| 16291 | REP | 26 | LAST | 939 | 20,3346 | 21=714 | DAS | DSLMTMP | |
| 16301 | REP | 7 | LAST | 939 | 20,3347 | 31=736 | CAE | J5TMP | |
| 16311 | | | | | 20,3350 | 0 0008 | EXTEND | | |
| 16321 | REP | 2 | LAST | 940 | 20,3351 | 7 3443 | MP | D5 +1 | |
| 16331 | REP | 27 | LAST | 940 | 20,3352 | 27=714 | ADS | DSLMTMP +1 | |
| 16341 | REP | 96 | LAST | 939 | 20,3353 | 54 001 | TS | L | |
| 16351 | | | | | 20,3354 | 1 3356 | TCP | +2 | |
| 16361 | REP | 28 | LAST | 940 | 20,3355 | 27=713 | ADS | DSLMTMP | |
| 16371 | REP | 8 | LAST | 940 | 20,3356 | 31=737 | CAE | J5TMP +1 | |
| 16381 | | | | | 20,3357 | 0 0008 | EXTEND | | |
| 16391 | REP | 3 | LAST | 940 | 20,3360 | 7 3442 | MP | D5 | |
| 16401 | REP | 29 | LAST | 940 | 20,3361 | 27=714 | ADS | DSLMTMP +1 | |
| 16411 | REP | 97 | LAST | 940 | 20,3362 | 54 001 | TS | L | |
| 16421 | | | | | 20,3363 | 1 3365 | TCP | +2 | |
| 16431 | REP | 30 | LAST | 940 | 20,3364 | 27=713 | ADS | DSLMTMP | |
| 16441 | REP | 4 | LAST | 927 | 20,3365 | 31=740 | CAE | J5TMP | D6J6 |
| 16451 | | | | | 20,3366 | 0 0008 | EXTEND | | |
| 16461 | REP | 1 | | | 20,3367 | 7 3444 | MP | D6 | |
| 16471 | REP | 31 | LAST | 940 | 20,3370 | 21=714 | DAS | DSLMTMP | |
| 16481 | REP | 5 | LAST | 940 | 20,3371 | 31=740 | CAE | J5TMP | |
| 16491 | | | | | 20,3372 | 0 0008 | EXTEND | | |
| 16501 | REP | 2 | LAST | 940 | 20,3373 | 7 3445 | MP | D6 +1 | |
| 16511 | REP | 32 | LAST | 940 | 20,3374 | 27=714 | ADS | DSLMTMP +1 | |
| 16521 | REP | 98 | LAST | 940 | 20,3375 | 54 001 | TS | L | |
| 16531 | | | | | 20,3376 | 1 3400 | TCP | +2 | |
| 16541 | REP | 33 | LAST | 940 | 20,3377 | 27=713 | ADS | DSLMTMP | |
| 16551 | REP | 6 | LAST | 940 | 20,3400 | 31=741 | CAE | J5TMP +1 | |
| 16561 | | | | | 20,3401 | 0 0008 | EXTEND | | |
| 16571 | REP | 3 | LAST | 940 | 20,3402 | 7 3444 | MP | D6 | |
| 16581 | REP | 34 | LAST | 940 | 20,3403 | 27=714 | ADS | DSLMTMP +1 | |
| 16591 | REP | 99 | LAST | 940 | 20,3404 | 54 001 | TS | L | |
| 16601 | | | | | 20,3405 | 1 3407 | TCP | +2 | |
| 16611 | REP | 35 | LAST | 940 | 20,3406 | 27=713 | ADS | DSLMTMP | |
| 16621 | REP | 36 | LAST | 940 | 20,3407 | 53=714 | DSLMS | DxCH DSLMTMP | FIX UP SCALING (NOW AT R+1 SPASCREV) |
| 16631 | | | | | 20,3410 | 20 001 | DDQRL | | |
| 16641 | REP | 37 | LAST | 940 | 20,3411 | 53=714 | DxCH | DSLMTMP | SC,AT B+0 SPASCREV |
| 16651 | REP | 187 | LAST | 938 | 20,3412 | 0 0002 | TC | 0 | |

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P16661 CONSTANTS FOR AUTOPILOTS

R16671 NOTE....1 ASCREV (ACTUATOR CMD SCALING) = 85.41 ARCSEC/BIT OR 1.07975111 REVS (85.41X16384/3600/360)

R16691 1 SPASCREV (SPECIAL ACTUATOR CMD SCALING) = 1.04620942 REVS

| | | | | | | | | | |
|--------|--------|----------|---------|---------|----------|--------|-------------|--|--|
| 16711 | | | 20,3413 | 00375 0 | ACTSAT | DEC | 253 | | ACTUATOR LIMIT (6 DEG), SC.AT 1ASCREV |
| 16721 | | | 20,3414 | 00101 1 | 1/ACTSAT | DEC | .0039525692 | | RECIPROCAL (1/253) |
| 16731 | REP 38 | LAST 913 | 4676 | | ERRLIM | EQUALS | BIT13 | | FILTER INPUT LIMIT...B-3 REVS (45DEG), |
| 16741 | REP 27 | LAST 901 | 4710 | | 1/ERRLIM | EQUALS | BIT3 | | SC.AT B-1 REV, AND ITS RECIPROCAL |
| 16751 | | | 20,3415 | 00115 1 | 1/RTLIM | DEC | 0.004715 | | .004715(COLDIP) = 0 IF COLDIP ± 2.33 DEG |
| 16761 | REP 1 | | 4727 | | KPDN | = | DEC45 | | DESIGN-NOMINAL FILTER GAIN, SC.AT B+1 |
| 16771 | REP 3 | LAST 925 | 4727 | | KYDN | = | KPDN | | SPASCREV (FOR DEC45 BITS EXACTLY) |
| A16781 | | | | | | | | | KPDN = .005747 DEG/DEG |
| A16791 | | | | | | | | | SCALED KPDN = DEC45 |
| A16801 | | | | | | | | | 1SPASCREV = KPDN(B+14)/(2X45) |
| A16811 | | | | | | | | | = 1.04620942 REVS |
| 16821 | REP 1 | | 20,3416 | 02327 0 | PITCHTS | GENADR | PITCHDAP | | UPPER WORDS OF TS 2CADRS, LOWER WORDS |
| 16831 | REP 2 | LAST 902 | 20,3417 | 03111 0 | DAPTS | GENADR | DAPINIT | | (BBCON) ALREADY THERE. ORDER IS |
| 16841 | REP 1 | | 20,3420 | 02632 1 | YAWTS | GENADR | YAWDAP | | REQUIRED. |
| 16851 | | | 20,3421 | 00243 1 | 1-B(-AT) | OCT | 00243 | | AT = .01SEC...EITHER(1/A=4SEC, T=40MS), |
| 16861 | | | 20,3422 | 37535 0 | B(-AT) | OCT | 37535 | | OR(1/A=8SEC, T=80MS) |
| 16871 | | | 20,3423 | 50166 0 | N1 | DEC | -2.9708385 | | B-2 NUMERATOR COEFS (CSM/LEM), SC.AT B-2 |
| 16881 | | | 20,3424 | 31436 1 | N2 | DEC | 3.1947342 | | B-2 |
| 16891 | | | 20,3425 | 74561 0 | N3 | DEC | -0.40962906 | | B-2 |
| 16901 | | | 20,3426 | 53277 0 | N4 | DEC | -2.5780275 | | B-2 |
| 16911 | | | 20,3427 | 27550 1 | N5 | DEC | 2.9629319 | | B-2 |
| 16921 | | | 20,3430 | 63725 1 | N6 | DEC | -1.5101470 | | B-2 |
| 16931 | | | 20,3431 | 02400 1 | N7 | DEC | 0.31243224 | | B-2 |
| 16941 | | | 20,3432 | 66341 1 | D1 | 2DEC | -4.7798977 | | B-4 DENOMINATOR COEFS (CSM/LEM), SC.AT B+4 |
| 16941 | | | 20,3433 | 54237 0 | | | | | |



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| | | | | | | |
|-------|---------|---------|----|------|------------|-----|
| 16951 | 20,3434 | 22707 1 | D2 | 2DEC | 9.4452763 | B-4 |
| 16951 | 20,3435 | 36641 1 | | | | |
| 16961 | 20,3436 | 54220 0 | D3 | 2DEC | -9.8593475 | B-4 |
| 16961 | 20,3437 | 40714 1 | | | | |
| 16971 | 20,3440 | 13344 0 | D4 | 2DEC | 5.7231811 | B-4 |
| 16971 | 20,3441 | 21146 1 | | | | |
| 16981 | 20,3442 | 74401 1 | D5 | 2DEC | -1.7484750 | B-4 |
| 16981 | 20,3443 | 61760 1 | | | | |
| 16991 | 20,3444 | 00340 0 | D6 | 2DEC | 0.21933335 | B-4 |
| 16991 | 20,3445 | 23073 1 | | | | |



L TVCSTROKETEST

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R1000 NAME STROKE TEST PACKAGE (INCLUDING INITIALIZATION PACKAGE)
R1001 ORIGINAL CODING BY OLSSON LOG SECTION....STROKE TEST PACKAGE
R1002 MOD BY ENGEL DATE....21 MARCH, 1967

R1003 FUNCTIONAL DESCRIPTION....
R1004 STROKE TEST PACKAGE GENERATES A WAVEFORM DESIGNED TO EXCITE BENDING
R1005 STRKTSTI (STROKE TEST INITIALIZATION) IS CALLED AS A JOB BY V88.
R1006 IT INITIALIZES ALL ERASABLES READ FOR A STROKE TEST, AND
R1007 THEN TESTS FOR AN 80MS DAP. IF 80MS IT SETS STROKER = ESTROKER
R1008 FOR AN IMMEDIATE STROKE TEST, OTHERWISE IT MERELY ENABLES
R1009 A STROKE TEST BY SETTING STROKER TO -0. THE STROKE TEST
R1010 THEN AWAITS SWITCHOVER TO THE 80MS DAP WHEREUPON IT IS
R1011 ENABLED AFTER AN ADDITIONAL 4 SECOND DELAY TO AVOID
R1012 THE SWITCHOVER TRANSIENTS (SEE STRKCALL, STRKUP IN
R1013 TVCEXECUTIVE)
R1014
R1015 HACK (STROKE TEST) GENERATES THE WAVEFORM BY DUMPING PULSE BURSTS
R1016 OF PROPER SIGN AND IN PROPER SEQUENCE DIRECTLY INTO
R1017 TVCPITCH, WORKING IN CONJUNCTION WITH BOTH PITCH AND YAW
R1018 TVC DAPS, WITH INTERMEDIATE WAITLIST CALLS. NOTE, HOWEVER
R1019 THAT THE STROKE TEST IS PERFORMED ONLY IN THE PITCH AXIS.
R1020 AN EXAMPLE WAVEFORM IS GIVEN BELOW, TO DEMONSTRATE STROKE-
R1021 TEST PARAMETER SELECTION
R1022 RESTARTS CAUSE TEST TO BE TERMINATED. ANOTHER V88 READ IF TEST
R1023 IS TO BE RE-RUN.
R1024 PULSE BURST SIZE IS PAD-LOADED (ESTROKER) SO THAT AMPLITUDE OF
R1025 WAVEFORM CAN BE CHANGED. THERE ARE TEN PULSE BURSTS IN
R1026 THE HALF-AMPLITUDE OF THE FIRST FREQUENCY SET IN THE
R1027 STANDARD WAVEFORM. AMPLITUDE IS 10(ESTROKER)(1/42.15),
R1028 NOMINALLY 50/42.15 = 1.185 DEG
R1029
R1030 CALLING SEQUENCE....
R1031 EXTENDED VERB 68 SETS UP STRKTSTI JOB
R1032 PITCH AND YAW TVCDAPS, FINDING STROKER NON-ZERO, DO A ..TC HACK..
R1033 AN INTERNALLY-GENERATED WAITLIST CALL ENTERS AT ..HACKWLST..
R1034
R1035 NORMAL EXIT MODES....
R1036 TC BUNKER (...0.. IF ENTRY FROM DAP, ..TCTSKOVR.. IF FROM WAITLIST)LIST
R1037 SUBROUTINES CALLED....
R1038 WAITLIST
R1039 ALARM OR ABORT EXIT MODES....
R1040 NONE
R1041 ERASABLE INITIALIZATION REQUIRED....
R1042 ESTROKER (PAD-LOAD)
R1043 STROKER, CADDY, REVS, CARD, N
R1044
R1045 OUTPUT....
R1046 STRKTSTI...INITIALIZATION FOR STROKE TEST
R1047 HACK, HACKWLST...PULSE BURSTS INTO TVCPITCH VIA ..ADS..
R1048 RESETS STROKER = +0 WHEN TEST COMPLETED
R1049
R1050 DEPRIS....
R1051 N = CADDY = +0, CARD = -0, REVS = -1
R1052 BUNKER
R1053



L TVCSTROKETEST

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P1054 EXAMPLE STROKE TEST WAVE FORM, DEMONSTRATING PARAMETER SELECTION
 R1055 NOTE,...THIS IS NOT THE OFFICIAL WAVEFORM....

```

R1056          **          **
R1058          **          **
R1060          **          **
R1062          * *        * *
R1064          * *        * *
R1066          * *        * *
R1068          * *        * *
R1070          * *        * *
R1072          * *        * *
R1074          * *        * *
R1076          * *        * *
R1078          * *        * *
R1080          -----
R1082          * *        * *
R1084          * *        * *
R1086          * *        * *
R1088          * *        * *
R1090          * *        * *
R1092          * *        * *
R1094          * *        * *
R1096          * *        * *
R1098          * *        * *
R1100          * *        * *
R1102          * *        * *
R1104          * *        * *
R1105          * *        * *
  
```

EXAMPLE WAVEFORM (EACH * REPRESENTS
85.41 ARCSEC OF ACTUATOR CMD)

FOR THIS (UNOFFICIAL, EXAMPLE) WAVEFORM, THE REQUIRED PARAMETERS ARE AS FOLLOWS....

```

R1107          PCARD = +3 (NUMBER OF SETS)
R1108          ESTROKER = +3 (PULSE BURST SIZE, SC.AT 85.41 ARCSEC/BIT)

R1109          SET1..
R1110          PREVS = +3 (NUMBER REVERSALS MINUS 1)
R1111          PCADDY = +4 (NUMBER OF PULSE BURSTS IN 1/2 AMPLITUDE)
R1112          SET2..
R1113          PCARD1 = +9 (NUMBER REVERSALS MINUS 1)
R1114          PCARD4 = +2 (NUMBER OF PULSE BURSTS IN 1/2 AMPLITUDE)
R1115          SET3..
R1116          PCARD2 = +9 (NUMBER REVERSALS MINUS 1)
R1117          PCARD5 = +1 (NUMBER OF PULSE BURSTS IN 1/2 AMPLITUDE)
R1118          SET4..
R1119          PCARD3 = +0 (NUMBER REVERSALS MINUS 1)
R1120          PCARD6 = +0 (NUMBER OF PULSE BURSTS IN 1/2 AMPLITUDE)
  
```

L TVCSTROKSTEST

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P1121 STROKE TEST INITIALIZATION PACKAGE (AS A JOB, FROM VERB 68)

| | | | | | | | | | | | |
|-------|-----|-----|------|---------|---------|----------|----------------|---------|--|--|--|
| 1122 | | | | 17,2213 | | | BANK 17 | | | | |
| 1123 | REP | 2 | LAST | 922 | 20,2000 | | SETLOC DAPS2 | | | | |
| 1124 | | | | | 20,3448 | | BANK | | | | |
| 1125 | REP | 1 | | | | | COUNT# 88/STRK | | | | |
| 1126 | REP | 2 | LAST | 103 | E6,1665 | | BRANK# CADDY | | | | |
| 1127 | REP | 1 | | | 20,3446 | 0 3465 0 | STRTSTI TCR | TSTINIT | | | STROKE TEST INITIALIZATION PKG (CALLED AS A JOB BY VERB 68) |
| A1128 | | | | | | | | | | | |
| 1129 | | | | | 20,3447 | 0 0004 0 | TVCDCR# INHINT | | | | STROKE TEST PERMITTED ONLY WITH 80MS D. CHECK CURRENT TIMING |
| 1130 | REP | 10 | LAST | 938 | 20,3450 | 31=635 0 | CAB TS TVCDT | | | | |
| 1131 | REP | 100 | LAST | 940 | 20,3451 | 54 001 1 | TS L | | | | |
| 1132 | REP | 2 | LAST | 907 | 20,3452 | 3 7677 0 | CAP OCT37774 | | | | LOOK FOR 80MS (TS) |
| 1133 | | | | | 20,3453 | 0 0006 1 | EXTEND | | | | |
| 1134 | REP | 10 | LAST | 184 | 20,3454 | 06 001 0 | ROR LCHAN | | | | +0 IF 80MS |
| 1135 | REP | 206 | LAST | 938 | 20,3455 | 10 000 0 | CCS A | | | | NOT 80MS |
| 1136 | | | | | 20,3456 | 1 3482 0 | TCP +4 | | | | |
| 1137 | REP | 6 | LAST | 908 | 20,3457 | 31=412 1 | CAB ESTROKER | | | | 80MS. OK, SET STROKER FOR TEST |
| 1138 | REP | 9 | LAST | 930 | 20,3460 | 55=614 1 | TS STROKER | | | | |
| 1139 | | | | | 20,3461 | 1 3464 0 | TCP +3 | | | | |
| 1140 | REP | 166 | LAST | 935 | 20,3462 | 4 4714 0 | CS ZERO | | | | ENABLE, BUT DO NOT ACTIVATE STROK |
| 1141 | REP | 10 | LAST | 945 | 20,3463 | 55=614 1 | TS STROKER | | | | TEST, AWAITING SWITCHOVER TO MOD0R (MOD80) |
| A1142 | | | | | | | | | | | |
| 1143 | REP | 104 | LAST | 891 | 20,3464 | 1 5112 1 | TCP ENDOFJOB | | | | NORMAL ENTRY FROM STRTSTI |
| 1144 | REP | 1 | | | 20,3465 | 4 3475 0 | CS PCADDY | | | | |
| 1145 | REP | 3 | LAST | 945 | 20,3466 | 55=665 1 | TS CADDY | | | | NOTE SON CHNG PCADDY(+) TO CADDY(-) |
| 1146 | REP | 2 | LAST | 103 | 20,3467 | 55=666 1 | TS N | | | | |
| 1147 | REP | 1 | | | 20,3470 | 3 3476 1 | CAP PREVS | | | | |
| 1148 | REP | 2 | LAST | 103 | 20,3471 | 55=670 0 | TS REVS | | | | |
| 1149 | REP | 1 | | | 20,3472 | 4 3477 1 | CS PCARD | | | | NOTE SON CHNG PCARD(+) TO CARD(-) |
| 1150 | REP | 2 | LAST | 103 | 20,3473 | 55=671 1 | TS CARD | | | | |
| 1151 | REP | 166 | LAST | 940 | 20,3474 | 0 0002 0 | TC 0 | | | | RETURN TO STRTSTI+1 (OR CHKSTK+2OR+4) |



L TVCSTROKE TEST USER'S PAGE NO. 4 Pg 53

P1152 THE OFFICIAL STROKE TEST WAVEFORM (3 JAN, 1967) CONSISTS OF FOUR STROKE SETS, AS FOLLOWS....

R1154 SET 1...10 BURSTS IN 1/2 AMP, 4 REVERSALS
 R1155 SET 2... 6 BURSTS IN 1/2 AMP, 6 REVERSALS
 R1156 SET 3... 5 BURSTS IN 1/2 AMP, 10 REVERSALS
 R1157 SET 4... 4 BURSTS IN 1/2 AMP, 14 REVERSALS
 R1158 THE PULSE BURST SIZE (ESTROKER) IS PAD-LOADED (65 BITS AS OF 3JAN, 1967)
 R1159 THE REMAINING WAVEFORM-GENERATING PARAMETERS ARE AS FOLLOWS....

| | | | | | | | |
|------|---------|-------|---|--------|-----|----|---|
| 1160 | 20,3475 | 00012 | 1 | PCAB2Y | DEC | 10 | NO. PULSE BURSTS IN 1/2 AMP, SET1...(+10) |
| 1161 | 20,3476 | 00003 | 1 | FRSGB | DEC | 3 | NO. REVERSALS MINUS 1, SET1.....(3) |
| 1162 | 20,3477 | 00004 | 0 | PCABD | DEC | 4 | NO. STROKE SETS.....(+ 4) |
| 1163 | 20,3500 | 00005 | 1 | PCABD1 | DEC | 5 | NO. REVERSALS MINUS 1, SET2.....(5) |
| 1164 | 20,3501 | 00011 | 1 | PCABD2 | DEC | 9 | 3.....(9) |
| 1165 | 20,3502 | 00015 | 0 | PCABD3 | DEC | 13 | 4.....(13) |
| 1166 | 20,3503 | 00008 | 1 | PCABD4 | DEC | 6 | NO. PULSE BURSTS IN 1/2 AMP, SET2...(+ 6) |
| 1167 | 20,3504 | 00005 | 1 | PCABD5 | DEC | 5 | SET3...(+ 5) |
| 1168 | 20,3505 | 00004 | 0 | PCABD6 | DEC | 4 | SET4...(+ 4) |

1169 REP 37 LAST 918 4711 20MS = BIT2
 1170 STROKE TEST PACKAGE PROPR....

1171 REP 2 LAST 103 Pg, 1667 EBANK= BUNKER

1172 20,3506 0 0006 1 HACK EXTEND ENTRY (IN TS RUPT) FROM TVCDAPS
 1173 REP 3 LAST 946 20,3507 23=667 1 QXCH BUNKER SAVE 0 FOR DAP RETURN

1174 REP 1 20,3510 3 4711 1 CAP 20MS 2DAPSK2(PASSES/DAP)X2(CS/PASS)=8CS=TVCDT
 1175 REP 45 LAST 918 20,3511 0 5140 1 TC WAITLIST
 1176 REP 4 LAST 946 Pg, 1667 EBANK= BUNKER
 1177 REP 1 20,3512 03515 0 ZCADR HACKWLST
 1178 REP 1 20,3513 40066 0 TCP +3

1179 REP 1 20,3515 3 4367 1 HACKWLST CAP TCTSKOVR ENTRY FROM WAITLIST
 1180 REP 5 LAST 946 20,3516 55=667 0 TS BUNKER BUNKER IS TC TASKOVER

1181 REP 11 LAST 945 20,3517 3 1614 0 GA STROKER STROKE
 1182 REP 5 LAST 926 20,3520 26 054 1 ADS TVCPITCH

1183 REP 26 LAST 926 20,3521 3 4700 1 CAP BIT11 RELEASE THE ERROR COUNTERS
 1184 20,3522 0 0006 1 EXTEND

1185 REP 10 LAST 932 20,3523 05 014 1 WOR CHAN14 COUNT DOWN THE NO. BURSTS, THIS SLOPE
 1186 REP 4 LAST 945 20,3524 25=665 0 INCR CADDY

L TVCSTROKSTST

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| | | | | | | | | | | | | |
|------|-----|----|------|-----|---------|----|------|---|----------|----------|---|--------------------------|
| 1187 | REP | 5 | LAST | 946 | 20,3525 | 4 | 1665 | 1 | CS | CADDY | | |
| 1188 | | | | | 20,3526 | 0 | 0006 | 1 | EXTEND | | | |
| 1189 | | | | | 20,3527 | 6 | 3531 | 0 | BZP | +2 | | |
| 1190 | REP | 6 | LAST | 946 | 20,3530 | 0 | 1667 | 1 | TC | BUNKER | EXIT, WHILE ON A SLOPE | |
| 1191 | REP | 3 | LAST | 945 | 20,3531 | 11 | 670 | 0 | CCS | REVS | | |
| 1192 | REP | 1 | | | 20,3532 | 1 | 3552 | 1 | TCP | REVUP | POSITIVE REVS | |
| 1193 | REP | 2 | LAST | 947 | 20,3533 | 1 | 3556 | 0 | TCP | REVUP +4 | FINAL REVERSAL, THIS SET | |
| 1194 | REP | 3 | LAST | 945 | 20,3534 | 25 | 671 | 0 | INCR | CARD | NEGATIVE REVS SET LAST PASS, READY FOR | |
| 1195 | REP | 4 | LAST | 947 | 20,3535 | 4 | 1671 | 1 | CS | CARD | THE NEXT SET. CHECK IF NO MORE SETS | |
| 1196 | | | | | 20,3536 | 0 | 0006 | 1 | EXTEND | | | |
| 1197 | REP | 1 | | | 20,3537 | 1 | 3550 | 0 | BZP | STROKILL | ALL SETS COMPLETED | |
| 1198 | REP | 5 | LAST | 947 | 20,3540 | 51 | 671 | 0 | INDEX | CARD | | |
| 1199 | REP | 2 | LAST | 945 | 20,3541 | 3 | 3503 | 1 | CAF | PCARD +4 | PICK UP NO. REVERSALS (-), NEXT SET | |
| 1200 | REP | 4 | LAST | 947 | 20,3542 | 55 | 670 | 0 | TS | REVS | REINITIALIZE | |
| 1201 | REP | 6 | LAST | 947 | 20,3543 | 51 | 671 | 0 | INDEX | CARD | | |
| 1202 | REP | 3 | LAST | 947 | 20,3544 | 4 | 3506 | 0 | CS | PCARD +7 | PICK UP NO. BURSTS IN 1/2AMP, NEXT SET | |
| 1203 | REP | 3 | LAST | 945 | 20,3545 | 55 | 666 | 1 | TS | N | REINITIALIZE | |
| 1204 | REP | 6 | LAST | 947 | 20,3546 | 55 | 665 | 1 | TS | CADDY | | |
| 1205 | REP | 7 | LAST | 947 | 20,3547 | 0 | 1667 | 1 | TC | BUNKER | EXIT, AT END OF SET | |
| 1206 | REP | 12 | LAST | 946 | 20,3550 | 55 | 614 | 1 | STROKILL | TS | RESET (TO +0) TO END TEST | |
| 1207 | REP | 8 | LAST | 947 | 20,3551 | 0 | 1667 | 1 | TC | BUNKER | EXIT, STROKE TEST FINIS | |
| 1208 | REP | 5 | LAST | 947 | 20,3552 | 55 | 670 | 0 | REVUP | TS | ALL REVERSALS EXCEPT LAST OF SET | |
| 1209 | REP | 4 | LAST | 947 | 20,3553 | 3 | 1666 | 0 | CA | N | | |
| 1210 | | | | | 20,3554 | 6 | 0000 | 1 | DOUBLE | | 2 X 1/2AMP | |
| 1211 | | | | | 20,3555 | 1 | 3561 | 1 | TCP | +4 | | |
| 1212 | REP | 99 | LAST | 851 | 20,3556 | 4 | 4712 | 0 | +4 | CS | ONE | FINAL REVERSAL, THIS SET |
| 1213 | REP | 6 | LAST | 947 | 20,3557 | 55 | 670 | 0 | TS | REVS | PREPARE TO BRANCH TO NEW BURST | |
| 1214 | REP | 5 | LAST | 947 | 20,3560 | 3 | 1666 | 0 | CA | N | JUST RETURN TO ZERO, FINAL SLOPE OF SET | |
| 1215 | REP | 7 | LAST | 947 | 20,3561 | 55 | 665 | 1 | TS | CADDY | CADUP | |
| 1216 | REP | 13 | LAST | 947 | 20,3562 | 4 | 1614 | 1 | CS | STROKER | CHANGE SIGN OF SLOPE | |
| 1217 | REP | 14 | LAST | 947 | 20,3563 | 55 | 614 | 1 | TS | STROKER | | |
| 1218 | REP | 9 | LAST | 947 | 20,3564 | 0 | 1667 | 1 | TC | BUNKER | EXIT AT A REVERSAL (SLOPE CHANGE) | |



L TVCROLLDAP

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R1000 PROGRAM NAME...ROLL AUTOPILOT, CONSISTING OF ROLLDAP,DURATION,NOROLL1,E
R1001 ORIGINAL CODING BY F.W.MARTIN, 1965 (SUNDIAL) TC.
R1003 LOG SECTION...ROLL AUTOPILOT SUBROUTINE...DAPCSM
R1004 MOD BY ENGEL DATE 28 DEC, 1967 (SUNDISK TO COLOSSUS)
R1005 FUNCTIONAL DESCRIPTION....

R1006 *AN ADAPTATION OF THE LEM'P-AXIS CONTROLLER
R1007 *MAINTAIN OGA WITHIN 5 DEG DEADEND OF OGAD, WHERE OGAD = OGA AS SEEN
R1008 BY IGNOVER (IGNITION)
R1009 *MAINTAIN OGA RATE LESS THAN 0.1 DEG/SEC LIMIT CYCLE RATE
R1012 *SWITCHING LOGIC IN PHASE PLANE... SEE GSOP CHAPTER 3
R1013 *USES TS CLOCK TO TIME JET FIRINGS
R1014 *MAXIMUM JET FIRING TIME = 2.56 SECONDS, LIMITED TO 2.5 IF GREATER
R1015 *MINIMUM JET FIRING TIME = 15 MS
R1016 *JET PAIRS FIRE ALTERNATELY
R1017 *AT LEAST 1/2 SECOND DELAY BEFORE A NEW JET PAIR IS FIRED
R1018 *JET FIRINGS MAY NOT BE EXTENDED, ONLY SHORTENED, WHEN RE-EVALUATION
R1019 OF A JET FIRING TIME IS MADE ON A LATER PASS

R1020 CALLING SEQUENCE....

R1021 *ROLLDAP CALL VIA WAITLIST, IN PARTICULAR BY TVCEXEC (EVERY 1/2 SEC)
R1022 WITH A RCS DELAY TO ALLOW FREE TIME FOR OTHER RPTS (DWRPT, ETC.)

R1023 NORMAL EXIT MODES.... ENDOFJOB
R1024 ALARM OR ABORT EXIT MODES.... NONE
R1025 SUBROUTINES CALLED.....NONE
R1026 OTHER INTERFACES....

R1027 *TVCEXEC SETS UP ROLLDAP TASK EVERY 1/2 SECOND AND UPDATES 1/CONACC
R1028 EVERY 10 SECONDS (VIA MASSPROP AND S40.15)
R1029 *TVCRESTART PACKAGE WILL RE-START ROLL DAP AFTER A RESTART (PICKING
R1030 UP THE ORIGINAL OGAD)

R1032 BRASABLE INITIALIZATION REQUIRED....

R1033 *1/CONACC (S40.15)
R1034 *OGAD (CDUX, AT IGNOVER)
R1035 *OGANOW (CDUX AT TVCINIT4 AND TVCEXECUTIVE)
R1036 *OGAPAST (OGANOW AT TVCEXECUTIVE)
R10362 *ROLLPIRE = TEMREQ = ROLLWORD = 0 (MRCLEAN LOOP IN TVCDAPON)
R1037 OUTPUT....

R1038 *ROLL JET PAIR FIRINGS

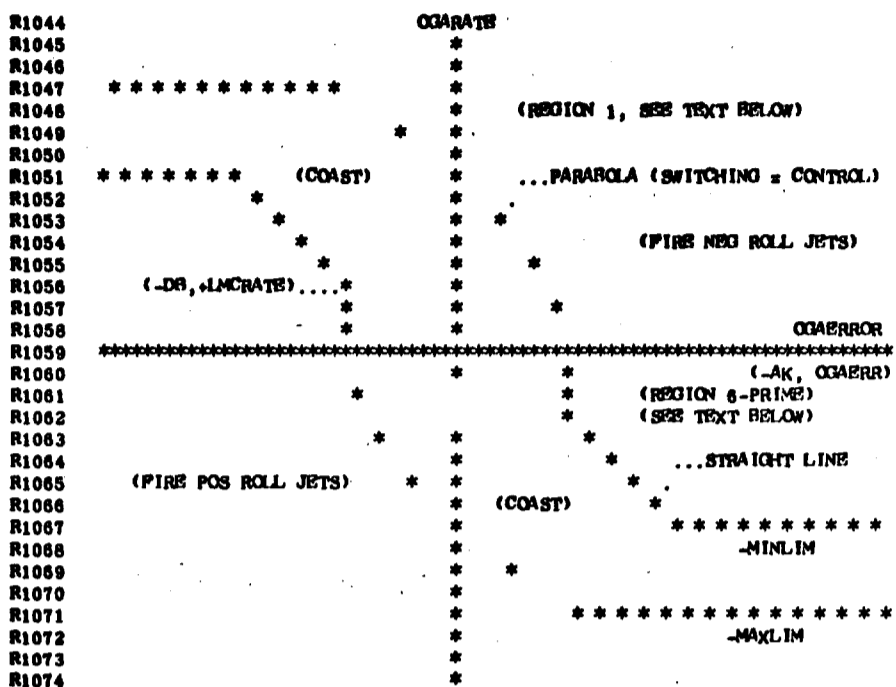
R1040 DERRIS.... MISCELLANEOUS, SHAREABLE WITH RCS/ENTRY, IN BRANK6 ONLY



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R1041 SOME NOTES ON THE ROLL AUTOPILOT, AND IN PARTICULAR, ON ITS SWITCHING
 R1042 LOGIC. SEE SECTION THREE OF THE GSOP (SUNDISK/COLOSSUS) FOR DETAILS.
 R1043 SWITCHING LOGIC IN THE PHASE PLANE....



R1075 SWITCHING PARABOLAS ARE CONTROL PARABOLAS, THUS REQUIRING KNOWLEDGE OF
 R1076 CONTROL ACCELERATION CONACC, OR ITS RECIPROCAL, 1/CONACC, THE TVC
 R1077 ROLL DAP GAIN (SEE TVCEXECUTIVE VARIABLE GAIN PACKAGE). JET
 R1078 FIRING TIME IS SIMPLY THAT REQUIRED TO ACHIEVE THE DESIRED OGARATE,
 R1079 SUBJECT TO THE LIMITATIONS DISCUSSED UNDER FUNCTIONAL DESCRIPTION,
 R1080 ABOVE.

R1081 THE THREE CONTROL REGIONS (+, -, AND ZERO TORQUE) ARE COMPRISED OF
 R1082 TWELVE SUBSET REGIONS (1...6, AND THE CORRESPONDING 1-PRIME...
 R1083 6-PRIME) SEE SECTION 3 OF THE GSOP (SUNDISK OR COLOSSUS)

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R1084 GIVEN THE OPERATING POINT NOT IN THE COAST REGION, THE DESIRED OGARATE
 R1085 IS AT THE POINT OF PENETRATION OF THE COAST REGION BY THE CONTROL
 R1086 PARABOLA WHICH PASSES THROUGH THE OPERATING POINT. FOR REGION 3
 R1087 DESIRED OGARATE IS SIMPLY \pm MAXLIM. FOR REGIONS 1 OR 6 THE SOLUTION
 R1088 TO A QUADRATIC IS REQUIRED (THE PENETRATION IS ALONG THE STRAIGHT
 R1089 LINE OR MINLIM BOUNDRY SWITCH LINES). AN APPROXIMATION IS MADE
 R1090 INSTEAD. CONSIDER AN OPERATING POINT IN REGION 6. PASS A TANGENT TO
 R1091 THE CONTROL PARABOLA THROUGH THE OPERATING POINT, AND FIND ITS
 R1092 INTERSECTION WITH THE STRAIGHT LINE SECTION OF THE SWITCH CURVE...
 R1093 THE INTERSECTION DEFINES DESIRED OGARATE. IF THE OPERATING POINT IS
 R1094 CLOSE TO THE SWITCH LINE, THE APPROXIMATION IS QUITE GOOD (INDEED
 R1095 THE APPROXIMATE AND QUADRATIC SOLUTIONS CONVERGE IN THE LIMIT AS
 R1096 THE SWITCH LINE IS APPROACHED). IF THE OPERATING POINT IS NOT CLOSE
 R1097 TO THE SWITCH LINE, THE APPROXIMATE SOLUTION GIVES VALID TREND
 R1098 INFORMATION (DIRECTION OF DESIRED OGARATE) AT LEAST. THE
 R1099 RE-EVALUATION OF DESIRED OGARATE IN SUBSEQUENT ROLL DAP PASSES (1/2
 R1100 SECOND INTERVALS) WILL BENEFIT FROM THE CONVERGENT NATURE OF THE
 R1101 APPROXIMATION.

R1101 FOR LARGE OGAERROR THE TANGENT INTERSECTS \pm MINLIM SWITCH BOUNDRY BEFORE
 R1102 INTERSECTING THE STRAIGHT LINE SWITCH. HOWEVER THE MINLIM IS
 R1103 IGNORED IN COMPUTING THE FIRING TIME, SO THAT THE EXTENSION (INTO
 R1104 THE COAST REGION) OF THE STRAIGHT LINE SWITCH IS WHAT IS FIRED TO.
 R1105 IF THE ROLL DAP FINDS ITSELF IN THE COAST REGION BEFORE REACHING
 R1106 THE DESIRED INTERSECTION (IE, IN THE REGION BETWEEN THE MINLIM
 R1107 AND THE STRAIGHT LINE SWITCH) IT WILL EXHIBIT NORMAL COAST-REGION
 R1108 BEHAVIOR AND TURN OFF THE JETS. THE PURPOSE OF THIS FIRING POLICY
 R1109 IS TO MAINTAIN STATIC ROLL STABILITY IN THE EVENT OF A JET
 R1110 FAILED-ON.

R1113 WHEN THE OPERATING POINT IS IN REGION 1 THE SAME APPROXIMATION IS
 R1114 MADE, BUT AT AN ARTIFICIALLY-CREATED OR DUMMY OPERATING POINT,
 R1115 DEFINED BY.. OGAERROR = INTERSECTION OF CONTROL PARABOLA AND
 R1116 OGAERROR AXIS, OGARATE = \pm LMCRATE WHERE SIGN IS OPPOSITE THAT OF
 R1117 REAL OPERATING POINT RATE. WHEN THE OPERATING POINT HAS PASSED
 R1118 FROM REGION 1 TO REGION 6, THE DUMMY POINT IS NO LONGER REQUIRED,
 R1119 AND THE SOLUTION REVERTS TO THAT OF A REGULAR REGION 6 POINT.
 R1120 EQUATION FOR SWITCHING PARABOLA (SEE FIGURE ABOVE)....

R1121
 R1122
$$SOGAERROR = (DR - (SOCARATE)^2 / (CNACC)^2) SQN(SOCARATE)$$

 R1123 EQUATION FOR SWITCHING STRAIGHT LINE SEGMENT....

R1124
$$SOCARATE = -(-SLOPE)(SOGAERROR) - SQN(SOCARATE) INTERCEP$$

R1125 WHERE INTERCEP = DR(-SLOPE) - LMCRATE

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R1126 EQUATION FOR INTERSECTION, CONTROL PARABOLA AND STRAIGHT SWITCH LINE....

R1127 DOGADOT = NUM/DEN, WHERE

R1128 NUM = (-SLOPE)(OGARATE)² (1/CONACC)

R1129 +SON(DELOGA)(-SLOPE)(OGAERROR - SON(DELOGA)(DB))

R1131 -LMCRATE

R1132 DEN = (-SLOPE)(OGARATE)(1/CONACC) - SON(DELOGA)

R1133 DELOGA = OGAERROR - (DB - (OGADOT)² (1/CONACC)/2)SON(OGADOT)

R1134 FOR REGIONS 6 AND 6-PRIME USE ACTUAL OPERATING POINT (OGA, OGARATE)

R1135 FOR OGAERROR AND OGARATE IN THE INTERSECTION EQUATIONS ABOVE.

R1136 FOR REGIONS 1 AND 1-PRIME USE DUMMY OPERATING POINT FOR OGAERROR

R1137 AND OGARATE, WHERE THE DUMMY POINT IS GIVEN BY....

R1139 OGAERROR = DELOGA + DB SON(OGARATE)

R1140 OGARATE = -LMCRATE SON(OGARATE)

R1141 NOTE, OGAERROR = OGA - OGA0 USES DUMMY REGISTER OGA IN ROLL DAP CODING

R1142 ALSO, AT POINT WHERE DOGADOT IS COMPUTED, REGISTER DELOGA IS USED

R1143 AS A DUMMY REGISTER FOR THE OGAERROR IN THE NUM EQUATION ABOVE



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P11432 ROLL DAP CODING....

| | | | | | | | | | |
|------|-----|-----|------|-----|---------|----------|---------|--|----------------|
| 2000 | REP | 3 | LAST | 917 | 16,2000 | | | | BSTLOC DAPROLL |
| 2001 | | | | | 16,3313 | | | | BANK |
| 2002 | REP | 9 | LAST | 904 | 16,1672 | | | | BRANK= OGANOW |
| 2003 | REP | 1 | | | | | | | COUNT# SS/ROLL |
| 2006 | REP | 10 | LAST | 952 | 16,3313 | 31-672 0 | ROLLDAP | | CAB OGANOW |
| 2007 | | | | | 16,3314 | 0 0006 1 | | | EXTEND |
| 2008 | REP | 3 | LAST | 904 | 16,3315 | 21-673 0 | | | MSU OGAPAST |
| 2009 | | | | | 16,3316 | 0 0006 1 | | | EXTEND |
| 2010 | REP | 34 | LAST | 906 | 16,3317 | 7 4706 0 | | | MP BITS |
| 2011 | REP | 207 | LAST | 945 | 16,3320 | 22 000 1 | | | LXCH A |
| 2012 | REP | 1 | | | 16,3321 | 55-533 1 | | | TS OGARATE |

OGA RATE ESTIMATOR...SIMPLE FIRST-ORDER DIFFERENCE (SAMPLE TIME = 1/2 SEC)

SC,AT B-4 REV/SEC

R2017 COMPUTATIONS WHICH FOLLOW USE OGA FOR OGAERR (SAME REGISTER)
R2018 EXAMINE DURATION OF LAST ROLL FIRING IF JETS ARE NOW ON.

| | | | | | | | | |
|------|-----|---|------|-----|---------|----------|-------------|--------------|
| 2019 | REP | 2 | LAST | 102 | 16,3322 | 3 1611 0 | DURATION CA | ROLLPIRE |
| 2020 | | | | | 16,3323 | 0 0006 1 | | EXTEND |
| 2021 | | | | | 16,3324 | 1 3326 1 | | BZF +2 |
| 2022 | REP | 1 | | | 16,3325 | 1 3334 1 | | TCP ROLLOGIC |

SAME SQN AS PRESENT TORQ,MAGN=POS MAX

ROLL JETS ARE NOW OFF. ENTER LOGIC, JETS NOW ON.

| | | | | | | | | |
|------|-----|---|------|-----|---------|----------|--------|----------|
| 2023 | REP | 2 | LAST | 102 | 16,3326 | 31-613 1 | CAB | TEMREG |
| 2024 | | | | | 16,3327 | 0 0006 1 | EXTEND | |
| 2025 | REP | 2 | LAST | 952 | 16,3330 | 1 3334 1 | BZF | ROLLOGIC |

EXAMINE LAST FIRING INTERVAL. IF POSITIVE, DONT FIRE. ENTER LOGIC, JETS NOW OFF.

| | | | | | | | | |
|------|-----|-----|------|-----|---------|----------|---------|--------------|
| 2026 | REP | 167 | LAST | 945 | 16,3331 | 3 4714 1 | CAP | ZERO |
| 2027 | REP | 3 | LAST | 952 | 16,3332 | 55-613 0 | TS | TEMREG |
| 2028 | REP | 46 | LAST | 909 | 16,3333 | 1 5213 0 | WAIT1/2 | TCP TASKOVER |

JETS HAVE NOT BEEN OFF FOR 1/2 SEC. WAIT RESET TEMREG. EXIT ROLL DAP

R2029 COMPUTE DR-(1/2 CONACC) (OGARATE)SQ (1/2 IN THE SCALING)

| | | | | | | | | |
|------|-----|---|------|-----|---------|----------|----------|-------------|
| 2030 | REP | 2 | LAST | 952 | 16,3334 | 4 1533 1 | ROLLOGIC | CS OGARATE |
| 2031 | | | | | 16,3335 | 0 0006 1 | | EXTEND |
| 2032 | REP | 4 | LAST | 910 | 16,3336 | 7 1650 1 | | MP 1/CONACC |
| 2033 | | | | | 16,3337 | 0 0006 1 | | EXTEND |
| 2034 | REP | 3 | LAST | 952 | 16,3340 | 7 1533 1 | | MP OGARATE |
| 2035 | REP | 1 | | | 16,3341 | 6 3727 0 | | AD DB |
| 2036 | REP | 4 | LAST | 952 | 16,3342 | 55-613 0 | | TS TEMREG |

SCALED AT 2(-4) REV/SEC

SCALED AT 2(+9) SEC SQ /REV

SCALED AT 2(+0) REV QUANTITY SCALED AT 2(+0) REV.

R2037 GET SIGN OF OGARATE

| | | | | | | | | |
|------|-----|----|------|-----|---------|----------|--------|---------|
| 2038 | REP | 4 | LAST | 952 | 16,3343 | 3 1533 0 | CA | OGARATE |
| 2039 | | | | | 16,3344 | 0 0006 1 | EXTEND | |
| 2040 | | | | | 16,3345 | 6 3350 1 | BZMP | +3 |
| 2041 | REP | 63 | LAST | 900 | 16,3346 | 3 4712 1 | CA | BIT1 |
| 2042 | | | | | 16,3347 | 1 3351 1 | TCP | +2 |
| 2043 | REP | 64 | LAST | 952 | 16,3350 | 4 4712 0 | CS | BIT1 |
| 2044 | REP | 2 | LAST | 103 | 16,3351 | 55-676 0 | TS | SCNRT |

LET SQN(0) BE NEGATIVE

* OR - 2(-14)

R2045 CALCULATE DISTANCE FROM SWITCH PARABOLA, DELOGA

| | | | | | | | | |
|------|-----|---|------|-----|---------|----------|--------|--------|
| 2046 | | | | | 16,3352 | 0 0006 1 | EXTEND | |
| 2047 | REP | 5 | LAST | 952 | 16,3353 | 7 1613 0 | MP | TEMREG |

SQN(OGARATE) TEMREG NOW IN I.

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| | | | | | | | | | | |
|-------|--|-----|------|-----|---------|----------|---------|----------|---|---|
| 2048 | REP | 101 | LAST | 945 | 16,3354 | 4 0001 1 | CS | L | | |
| 2049 | REP | 3 | LAST | 103 | 16,3355 | 6 1674 0 | AD | OGA | SCALED AT 2(+0) REV | |
| 2050 | REP | 2 | LAST | 103 | 16,3356 | 55=677 1 | DELOGAC | TS | SC.AT B+0 REV, PLUS TO RIGHT OF C-PARAB | |
| R2051 | EXAMINE SON(DELOGA) AND CREATE CA OR CS INSTR. DEPENDING UPON SIGN. | | | | | | | | | |
| 2052 | | | | | 16,3357 | 0 0006 1 | EXTEND | | | |
| 2053 | | | | | 16,3360 | 6 3363 1 | BZMP | +3 | | |
| 2054 | REP | 11 | LAST | 688 | 16,3361 | 3 4371 0 | CAP | PRI030 | =CA (30000) | |
| 2055 | | | | | 16,3362 | 1 3364 1 | TCP | +2 | | |
| 2056 | REP | 38 | LAST | 906 | 16,3363 | 3 4674 0 | CAP | BIT15 | =CS (40000) | |
| 2057 | REP | 2 | LAST | 103 | 16,3364 | 55=700 0 | TS | 1 | | |
| 2058 | REP | 3 | LAST | 953 | 16,3365 | 51=700 1 | INDEX | I | TSET ON I SON(OGARATE) | |
| 2059 | REP | 3 | LAST | 952 | 16,3366 | 0 1676 1 | 0 | SONRT | CA OR CS | |
| 2060 | | | | | 16,3367 | 4 0000 0 | COM | | | |
| 2061 | | | | | 16,3370 | 0 0006 1 | EXTEND | | | |
| 2062 | REP | 1 | | | 16,3371 | 6 3442 0 | REG1TST | BZMP | ROLLON | IF REGION 1 (DELOGA OGARATE SAME SIGN) |
| R2063 | NO JET FIRE YET. TEST FOR MAX OGARATE | | | | | | | | | |
| 2064 | REP | 4 | LAST | 953 | 16,3372 | 51=700 1 | INDEX | I | | |
| 2065 | REP | 5 | LAST | 952 | 16,3373 | 0 1533 0 | 0 | OGARATE | CA OR CS... BOTH MUST BE NEG. HERE | |
| 2066 | REP | 2 | LAST | 103 | 16,3374 | 55=701 1 | TS | IOGARATE | I.E. I OGARATE | |
| 2067 | REP | 1 | | | 16,3375 | 6 3735 0 | AD | MAXLIM | SCALED AT 2(-4) REV/SEC | |
| 2068 | | | | | 16,3376 | 0 0006 1 | EXTEND | | | |
| 2069 | REP | 1 | | | 16,3377 | 6 3521 1 | REG3TST | BZMP | RATELIM | IF REGION 3 (RATES TOO HIGH, FIRE JETS) |
| R2070 | COMPUTATION OF I((-SLOPE)OGA + OGARATE) - INTERCEPT. NOTE THAT STR. LINE | | | | | | | | | |
| R2071 | SWITCH SLOPE IS (SLOPE) DEG/SEC/DEG, A NEG. QUANTITY | | | | | | | | | |
| 2072 | REP | 6 | LAST | 953 | 16,3400 | 3 1533 0 | CA | OGARATE | | |
| 2073 | | | | | 16,3401 | 0 0006 1 | EXTEND | | | |
| 2074 | REP | 50 | LAST | 932 | 16,3402 | 7 4675 0 | MP | BIT14 | | |
| 2075 | REP | 6 | LAST | 952 | 16,3403 | 55=613 0 | TS | TEMREG | | |
| 2076 | REP | 4 | LAST | 953 | 16,3404 | 3 1674 0 | CA | OGA | | |
| 2077 | | | | | 16,3405 | 0 0006 1 | EXTEND | | | |
| 2078 | REP | 1 | | | 16,3406 | 7 3730 1 | MP | -SLOPE | | |
| 2079 | | | | | 16,3407 | 20 001 1 | DDOUBL | | | |
| 2080 | | | | | 16,3410 | 20 001 1 | DDOUBL | | | |
| 2081 | | | | | 16,3411 | 20 001 1 | DDOUBL | | (OGA ERROR MUST BE LESS THAN +-225 DEG) | |
| 2082 | REP | 7 | LAST | 953 | 16,3412 | 6 1613 1 | AD | TEMREG | | |
| 2083 | REP | 5 | LAST | 953 | 16,3413 | 51=700 1 | INDEX | I | | |
| 2084 | REP | 208 | LAST | 952 | 16,3414 | 0 0000 1 | 0 | A | I((-SLOPE)OGA+OGARATE) AT 2(-3)REV/SEC | |
| 2085 | | | | | 16,3415 | 4 0000 0 | COM | | | |
| 2086 | REP | 1 | | | 16,3416 | 6 3732 1 | AD | INTERCEP | SCALED AT 2(-3) REV. | |
| 2087 | | | | | 16,3417 | 4 0000 0 | COM | | | |
| 2088 | | | | | 16,3420 | 0 0006 1 | EXTEND | | | |
| 2089 | REP | 1 | | | 16,3421 | 6 3632 0 | REG2TST | BZMP | NOROLL | IF REGION 2 (COAST SIDE OF STRT LINE) |
| R2090 | CHECK TO SEE IF OGARATE IS ABOVE MINLIM | | | | | | | | | |
| 2091 | REP | 3 | LAST | 953 | 16,3422 | 3 1701 0 | CA | IOGARATE | ALWAYS NEGATIVE | |
| 2092 | REP | 1 | | | 16,3423 | 6 3733 0 | AD | MINLIM | SCALED AT 2(-4) REV/SEC | |

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| | | | | | | | |
|-------|--|--|---------|----------|--------------|----------|--|
| 2093 | | | 16,3424 | 0 0008 1 | EXTEND | | |
| 2094 | REP 2 LAST 953 | | 16,3425 | 6 3632 0 | REGATST BZNF | NOROLL | IF REGION 4 (COAST SIDE OF MINLIM) |
| R2095 | ALL AREAS CHECKED EXCEPT LAST AREA...NO FIRE IN THIS SMALL SEGMENT | | | | | | |
| 2096 | REP 6 LAST 953 | | 16,3426 | 51=700 1 | INDEX I | | |
| 2097 | REP 5 LAST 953 | | 16,3427 | 0 1674 0 | 0 | OGA | |
| 2098 | | | 16,3430 | 4 0000 0 | COM | | |
| 2099 | REP 2 LAST 952 | | 16,3431 | 6 3727 0 | AD | DB | |
| 2100 | | | 16,3432 | 4 0000 0 | COM | | |
| 2101 | | | 16,3433 | 0 0008 1 | EXTEND | | |
| 2102 | REP 3 LAST 954 | | 16,3434 | 6 3632 0 | REGATST BZNF | NOROLL | IF REGION 5 (COAST SIDE OF DB) |
| R2103 | JETS MUST FIRE NOW, OGARATE IS NEG. (OR VISA VERSA), USE DIRECT STR. LINE. | | | | | | |
| R2104 | DELOGA AND DELOGART ARE USED AS DUMMY VARIABLES IN THE SOLUTION OF A | | | | | | |
| R2105 | STRAIGHT LINE APPROXIMATION TO A QUADRATIC SOLUTION OF THE INTERSECTION | | | | | | |
| R2106 | OF THE CONTROL PARABOLA AND THE STRAIGHT-LINE SWITCH LINE. THE STRAIGHT | | | | | | |
| R2107 | LINE IS THE TANGENT TO THE CONTROL PARABOLA AT THE OPERATING POINT. (FOR | | | | | | |
| R2108 | OPERATING POINTS IN REGIONS 6 AND 6-PRIME) | | | | | | |
| 2109 | REP 6 LAST 954 | | 16,3435 | 31=674 0 | REGION6 CAE | OGA | USE ACTUAL OPERATING POINT FOR TANGENT |
| 2110 | REP 3 LAST 953 | | 16,3436 | 55=677 1 | TS | DELOGA | ACTUAL STATE |
| 2111 | REP 7 LAST 953 | | 16,3437 | 3 1533 0 | CA | OGARATE | |
| 2112 | REP 2 LAST 103 | | 16,3440 | 55=675 0 | TS | DELOGART | ACTUAL STATE, I.E. DEL OGARATE |
| 2113 | REP 1 | | 16,3441 | 1 3451 0 | TCF | ONROLL | |
| R2114 | JETS ALSO FIRE FROM HERE EXCEPT OGARATE IS POS(VISA VERSA), USE INDIRECT | | | | | | |
| R2115 | STRAIGHT LINE ESTABLISHED BY TANGENT TO A CONTROL PARABOLA AT ((DELOGA | | | | | | |
| R2116 | + DB SGN(DELOGA)), -LMCRATE SGN(DELOGA)) (THIS IS THE DUMMY | | | | | | |
| R2117 | OPERATING POINT FOR OPERATING POINTS IN REGIONS 1 AND 1-PRIME) | | | | | | |
| 2118 | REP 7 LAST 954 | | 16,3442 | 51=700 1 | ROLLON | INDEX I | |
| 2119 | REP 3 LAST 954 | | 16,3443 | 0 3727 0 | 0 | DB | |
| 2120 | REP 4 LAST 954 | | 16,3444 | 27=677 1 | ADS | DELOGA | DELOGA WAS DIST. FROM SWITCH PARABOLA |
| 2121 | REP 1 | | 16,3445 | 4 3731 0 | CS | LMCRATE | LIMIT CYCLE RATE AT 2(-4) REV/SEC |
| 2122 | REP 6 LAST 954 | | 16,3446 | 51=700 1 | INDEX I | | |
| 2123 | REP 209 LAST 953 | | 16,3447 | 0 0000 1 | 0 | A | |
| 2124 | REP 3 LAST 954 | | 16,3450 | 55=675 0 | TS | DELOGART | EVALUATE STATE FOR INDIRECT LINE. |
| R2125 | SOLVE STRAIGHT LINES SIMULTANEOUSLY TO OBTAIN DESIRED OGARATE. | | | | | | |
| 2126 | | | 16,3451 | 0 0008 1 | ONROLL | EXTEND | DELOGART IN ACC. ON ARRIVAL. |
| 2127 | REP 5 LAST 952 | | 16,3452 | 7 1650 1 | MP | 1/CONACC | |
| 2128 | | | 16,3453 | 6 0000 1 | DOUBLE | | |
| 2129 | | | 16,3454 | 0 0008 1 | EXTEND | | |
| 2130 | REP 2 LAST 953 | | 16,3455 | 7 3730 1 | MP | -SLOPE | |
| 2131 | REP 8 LAST 953 | | 16,3456 | 55=613 0 | TS | TEMREG | 2(-SLOPE)RATE /CONACC |
| 2132 | | | 16,3457 | 0 0008 1 | EXTEND | | |
| 2133 | REP 4 LAST 954 | | 16,3460 | 7 1675 0 | MP | DELOGART | |
| 2134 | REP 5 LAST 954 | | 16,3461 | 55=675 0 | TS | DELOGART | 2(-SLOPE)(RATESQ) /CONACC |
| 2135 | REP 27 LAST 946 | | 16,3462 | 4 4700 0 | CS | BIT11 | |
| 2136 | REP 9 LAST 954 | | 16,3463 | 51=700 1 | INDEX I | | |



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| REP | REP | REP | REP | REP | REP | REP | REP | REP | REP | REP | REP | REP | REP | REP | REP | REP | REP | REP | REP | REP | | |
|--------|---|-----|------|-----|---------|----------|----------|-----|--------|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|
| 2137 | REP | 210 | LAST | 954 | 16,3464 | 0 0000 1 | | | | | | | | | | | | | | | | |
| 2138 | REP | 9 | LAST | 954 | 16,3465 | 27=613 0 | RATEDRN | ADS | TEMPRO | | | | | | | | | | | | | |
| 2139 | REP | 10 | LAST | 954 | 16,3466 | 51=700 1 | | | INDEX | I | | | | | | | | | | | | |
| 2140 | REP | 5 | LAST | 954 | 16,3467 | 0 1677 0 | | | 0 | DELOGA | | | | | | | | | | | | |
| 2141 | REP | 4 | LAST | 954 | 16,3470 | 4 0000 0 | | | COM | | | | | | | | | | | | | |
| 2142 | REP | 4 | LAST | 954 | 16,3471 | 8 3727 0 | | | AD | DE | | | | | | | | | | | | |
| 2143 | REP | 3 | LAST | 954 | 16,3472 | 4 0000 0 | | | COM | | | | | | | | | | | | | |
| 2144 | REP | 3 | LAST | 954 | 16,3473 | 4 0000 1 | | | EXTEND | | | | | | | | | | | | | |
| 2145 | REP | 3 | LAST | 954 | 16,3474 | 7 3730 1 | | | MP | -SLOPE | | | | | | | | | | | | |
| 2146 | REP | 6 | LAST | 954 | 16,3475 | 27=675 0 | | | ADS | DELOGART | | | | | | | | | | | | |
| 2147 | REP | 8 | LAST | 954 | 16,3476 | 0 0701 1 | | | | | | | | | | | | | | | | |
| 2148 | REP | 28 | LAST | 954 | 16,3477 | 0 0006 1 | | | EXTEND | | | | | | | | | | | | | |
| 2149 | REP | 7 | LAST | 954 | 16,3500 | 7 4700 0 | | | MP | BIT11 | | | | | | | | | | | | |
| 2150 | REP | 1 | LAST | 954 | 16,3501 | 0 1010 1 | | | | | | | | | | | | | | | | |
| 2151 | REP | 102 | LAST | 953 | 16,3502 | 56 001 0 | | | XCH | L | | | | | | | | | | | | |
| 2152 | REP | 168 | LAST | 952 | 16,3503 | 3 4714 1 | | | LA | ZERU | | | | | | | | | | | | |
| 2153 | REP | 10 | LAST | 955 | 16,3504 | 0 0006 1 | | | EXTEND | | | | | | | | | | | | | |
| 2154 | REP | 10 | LAST | 955 | 16,3505 | 11=613 0 | | | DV | TEMPRO | | | | | | | | | | | | |
| 2155 | REP | 1 | | | 16,3506 | 0 0006 1 | | | EXTEND | | | | | | | | | | | | | |
| 2156 | REP | 1 | | | 16,3507 | 1 3515 1 | | | BZF | DVCK | | | | | | | | | | | | |
| 2157 | REP | 211 | LAST | 955 | 16,3510 | 10 000 0 | MINLIMAP | CCS | A | | | | | | | | | | | | | |
| 2158 | REP | 19 | LAST | 900 | 16,3511 | 3 4672 0 | | | CAP | POSMAX | | | | | | | | | | | | |
| 2159 | REP | 1 | | | 16,3512 | 1 3524 0 | | | TCP | ROLLSET | | | | | | | | | | | | |
| 2160 | REP | 20 | LAST | 955 | 16,3513 | 4 4672 1 | | | CS | POSMAX | | | | | | | | | | | | |
| 2161 | REP | 2 | LAST | 955 | 16,3514 | 1 3524 0 | | | TCP | ROLLSET | | | | | | | | | | | | |
| 2162 | REP | 212 | LAST | 955 | 16,3515 | 22 000 1 | | | DVCK | LXCH | A | | | | | | | | | | | |
| 2163 | REP | 11 | LAST | 955 | 16,3516 | 0 0006 1 | | | EXTEND | | | | | | | | | | | | | |
| 2164 | REP | 11 | LAST | 955 | 16,3517 | 11=613 0 | | | DV | TEMPRO | | | | | | | | | | | | |
| 2165 | REP | 3 | LAST | 955 | 16,3520 | 1 3524 0 | | | TCP | ROLLSET | | | | | | | | | | | | |
| 2173 | REP | 2 | LAST | 953 | 16,3521 | 4 3735 1 | RATELIM | CS | MAXLIM | | | | | | | | | | | | | |
| 2174 | REP | 11 | LAST | 955 | 16,3522 | 51=700 1 | | | INDEX | I | | | | | | | | | | | | |
| 2175 | REP | 213 | LAST | 955 | 16,3523 | 0 0000 1 | | | 0 | A | | | | | | | | | | | | |
| R2176 | BASED ON DESIRED RATE - PRESENT RATE, COMPUTE JET FIRE TIME | | | | | | | | | | | | | | | | | | | | | |
| 2177 | REP | 12 | LAST | 955 | 16,3524 | 55=613 0 | ROLLSET | TS | TEMPRO | | | | | | | | | | | | | |
| 2178 | REP | 8 | LAST | 954 | 16,3526 | 61=533 0 | | | EXTEND | | | | | | | | | | | | | |
| 21781 | REP | 13 | LAST | 955 | 16,3527 | 55=613 0 | | | SU | OGARATE | | | | | | | | | | | | |
| 21782 | REP | 214 | LAST | 955 | 16,3530 | 1 3533 0 | | | TS | TEMPRO | | | | | | | | | | | | |
| 217821 | REP | 2 | LAST | 842 | 16,3531 | 50 000 1 | | | TCP | +3 | | | | | | | | | | | | |
| 217822 | REP | 2 | LAST | 842 | 16,3532 | 4 4673 0 | | | INDEX | A | | | | | | | | | | | | |
| 2179 | REP | 1 | | | 16,3533 | 0 0006 1 | | | CS | LIMITS | | | | | | | | | | | | |
| 2180 | REP | 1 | | | 16,3534 | 7 7665 1 | | | EXTEND | | | | | | | | | | | | | |
| 2181 | REP | 1 | | | 16,3535 | 0 0006 1 | | | MP | TSCALE | | | | | | | | | | | | |
| | | | | | 16,3535 | 0 0006 1 | | | EXTEND | | | | | | | | | | | | | |

DENOMINATOR COMPLETED

DENOMINATOR COMPLETED

PLACE NUMERATOR IN L FOR OVERFL. CHECK

OVERFLOW, IF ANYTHING, NOW APPEARS IN A

NO OVERFLOW... (0,L)/TEMPRO = 0,L.

POSITIVE OVERFLOW

NEGATIVE OVERFLOW

PUT NUMERATOR BACK INTO A, 0 IN L

RESULT OF DIVISION IS DESIRED OGARATE (SCALED AT R-4 REV/SEC)

IF I = CA, DESIRED RATE IS -MAXLIM

STORE DESIRED OGARATE (SCALED R-4)

RATE DIFF. SCALED AT 2(-4) REV/SEC OVERFLOW PROTECT

A A
A A
A A

TSCALE = 8/10.24

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| | | | | | | | | |
|-------|---|-----|------|-----|---------|----------|----------|--------------|
| 2182 | REP | 6 | LAST | 954 | 16,3536 | 7 1650 1 | MP | 1/CONACC |
| 2183 | | | | | 16,3537 | 20 001 1 | DDOUEL | |
| 21831 | | | | | 16,3540 | 20 001 1 | DDOURL | |
| 2184 | REP | 14 | LAST | 955 | 16,3541 | 55-613 0 | TS | TEMREG |
| 21841 | | | | | 16,3542 | 1 3545 1 | TCP | +3 |
| 21842 | REP | 215 | LAST | 955 | 16,3543 | 50 000 1 | INDEX | A |
| 21843 | REP | 3 | LAST | 955 | 16,3544 | 4 4673 0 | CS | LIMITS |
| 2185 | REP | 15 | LAST | 956 | 16,3545 | 55-613 0 | TS | TEMREG |
| 2186 | | | | | 16,3546 | 0 0006 1 | EXTEND | |
| 2187 | REP | 4 | LAST | 954 | 16,3547 | 1 3632 1 | BZF | NOROLL |
| R2188 | JET FIRE TIME IS NZ, ARE JETS ON NOW. | | | | | | | |
| 21881 | REP | 16 | LAST | 956 | 16,3550 | 31-613 1 | CAB | TEMREG |
| 2189 | | | | | 16,3551 | 0 0006 1 | EXTEND | |
| 2190 | REP | 3 | LAST | 952 | 16,3552 | 7 1611 1 | MP | ROLLFIRE |
| 2191 | REP | 216 | LAST | 956 | 16,3553 | 10 000 0 | CCS | A |
| 2192 | REP | 1 | | | 16,3554 | 1 3560 0 | TCP | MOREROLL |
| 2193 | REP | 1 | | | 16,3555 | 1 3563 0 | TCP | NEWROLL |
| 2194 | REP | 5 | LAST | 956 | 16,3556 | 1 3632 1 | TCP | NOROLL |
| 2195 | REP | 2 | LAST | 956 | 16,3557 | 1 3563 0 | TCP | NEWROLL |
| R2196 | CONTINUE PRESENT FIRING | | | | | | | |
| 2197 | REP | 169 | LAST | 955 | 16,3560 | 3 4714 1 | MOREROLL | CAP ZERO |
| 2198 | REP | 12 | LAST | 955 | 16,3561 | 55-700 0 | TS | I |
| 2199 | REP | 1 | | | 16,3562 | 1 3574 0 | TCP | MAXFIRE |
| R2200 | START NEW FIRING BUT CHECK IF GREATER THAN MINIMUM FIRE TIME. | | | | | | | |
| 2201 | REP | 17 | LAST | 956 | 16,3563 | 11-613 0 | NEWROLL | CCS TEMREG |
| 2202 | REP | 100 | LAST | 947 | 16,3564 | 6 4712 1 | AD | ONE |
| 2203 | | | | | 16,3565 | 1 3567 1 | TCP | +2 |
| 2204 | REP | 101 | LAST | 956 | 16,3566 | 6 4712 1 | AD | ONE |
| 2205 | | | | | 16,3567 | 4 0000 0 | COM | |
| 2206 | REP | 1 | | | 16,3570 | 6 3736 0 | AD | TMINFIRE |
| 2207 | | | | | 16,3571 | 4 0000 0 | COM | |
| 2208 | | | | | 16,3572 | 0 0006 1 | EXTEND | |
| 2209 | REP | 6 | LAST | 956 | 16,3573 | 6 3632 0 | MINTST | BZP NOROLL |
| R2210 | PROCEED WITH NEW FIRING BUT NOT LONGER THAN TMAXFIRE | | | | | | | |
| 2211 | REP | 18 | LAST | 956 | 16,3574 | 3 1613 1 | MAXFIRE | CA TEMREG |
| 2212 | | | | | 16,3575 | 0 0006 1 | EXTEND | |
| 2213 | REP | 1 | | | 16,3576 | 7 4710 1 | MP | 1/TMAXFIR |
| 2214 | | | | | 16,3577 | 0 0006 1 | EXTEND | |
| 2215 | REP | 1 | | | 16,3600 | 1 3606 0 | MINTST | BZP NOMXPIRE |
| 2216 | REP | 217 | LAST | 956 | 16,3601 | 10 000 0 | CCS | A |
| 2217 | REP | 1 | | | 16,3602 | 3 3737 1 | CAP | TMAXFIRE |
| 2218 | | | | | 16,3603 | 1 3605 0 | TCP | +2 |
| 2219 | REP | 2 | LAST | 956 | 16,3604 | 4 3737 0 | CS | TMAXFIRE |
| 2220 | REP | 19 | LAST | 956 | 16,3605 | 55-613 0 | TS | TEMREG |

SCALED AT 2(+9) SECS/RBY

OVERFLOW PROTECT

JET FIRE TIME AT 625 MICROSEC/HIT
POS MEANS POSITIVE ROLL TORQUE.

DESIRED CHANGE IN COARATE

(SIGN OF TORQUE...ZERO IF JETS NOW OFF)

CONTINUE FIRING WITH PRESENT POLARITY
START NEW FIRING NOW, PLUS
TERMINATE OLD FIRING, NEW SIGN REQUESTED
START NEW FIRING NOW, MINUS

USE TEMP. AS MOREROLL SWITCH

CALL THIS TBPIRE

-MAG(TBPIRE)
TMINFIRE-MAG(TBPIRE)

IF NOT GREATER THAN TMINFIRE (NEW FIRE)

I.E. 1/TMAXFIRE

IF LESS THAN TMAXFIRE

USE MAXIMUM

USE MAXIMUM

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| REP | LAST | TIME | CCS | TEMP | ROLL | EXTEND | OTHER | DESCRIPTION |
|-------|------|------|---------|----------|------|----------|--------|------------------------------------|
| R2221 | | | | | | | | SET UP SIGN OF REQUIRED TORQUE |
| 2222 | 20 | 956 | 16,3606 | 11=613 0 | | NOMXPIRE | CCS | FOR TORQUE SIGN |
| 2223 | 21 | 955 | 16,3607 | 3 4672 0 | | | CA | POSITIVE TORQUE REQUIRED |
| 2224 | | | 16,3610 | 1 3612 0 | | | TCP | +2 |
| 2225 | 4 | 936 | 16,3611 | 3 4674 0 | | | CA | NEGATIVE TORQUE REQUIRED |
| 2226 | 4 | 956 | 16,3612 | 55=611 1 | | | TS | SET ROLLFIRE FOR + OR - TORQUE |
| 2227 | | | 16,3613 | 4 0000 0 | | | COM | |
| 2228 | | | 16,3614 | 0 0006 1 | | | EXTEND | COMPLEMENT... POS. FOR NEG. TORQUE |
| 2229 | | | 16,3615 | 6 3620 0 | | | BZPF | +3 |
| 2230 | 21 | 957 | 16,3616 | 4 1613 0 | | | CS | POSITIVE TORQUE REQUIRED |
| 2231 | 22 | 957 | 16,3617 | 55=613 0 | | | TS | TEMPREQ |
| 2232 | 13 | 956 | 16,3620 | 3 1700 1 | | FIRELOCK | CA | I |
| 2233 | | | 16,3621 | 0 0006 1 | | | EXTEND | |
| 2234 | 1 | | 16,3622 | 1 3624 0 | | | BZPF | FIREPLUG |
| 2235 | 1 | | 16,3623 | 1 3635 0 | | | TCP | JETROLL |
| 2236 | 1 | | 16,3624 | 30 031 0 | | FIREPLUG | CAE | TIME6 |
| 2237 | | | 16,3625 | 0 0006 1 | | | EXTEND | |
| 2238 | 23 | 957 | 16,3626 | 61=613 1 | | | SU | TEMPREQ |
| 2241 | | | 16,3627 | 0 0006 1 | | | EXTEND | |
| 2242 | 47 | 952 | 16,3630 | 6 5213 1 | | EXTENTST | BZPF | TASKOVER |
| 2243 | 2 | 957 | 16,3631 | 1 3635 0 | | | TCP | JETROLL |
| 2244 | 170 | 956 | 16,3632 | 4 4714 0 | | NOROLL | CS | ZERO |
| 2245 | 5 | 957 | 16,3633 | 55=611 1 | | | TS | ROLLFIRE |
| 2246 | 24 | 957 | 16,3634 | 55=613 0 | | | TS | TEMPREQ |
| 2247 | | | 16,3635 | 0 0006 1 | | JETROLL | EXTEND | |
| 2248 | 1 | | 16,3636 | 3 3726 1 | | | DCA | NOROLLTS |
| 2249 | 2 | 127 | 16,3637 | 53=311 1 | | | DXCH | TBLOC |
| 2250 | 25 | 957 | 16,3640 | 3 1613 1 | | | CA | TEMPREQ |
| 2251 | 2 | 957 | 16,3641 | 54 031 1 | | | TS | TIME6 |
| 2252 | 14 | 957 | 16,3642 | 3 1700 1 | | | CA | I |
| 2253 | | | 16,3643 | 0 0006 1 | | | EXTEND | |
| 2254 | 48 | 957 | 16,3644 | 1 5213 0 | | SAMEJETS | BZPF | TASKOVER |
| 2255 | 6 | 957 | 16,3645 | 11=611 1 | | | CCS | ROLLFIRE |
| 2256 | 1 | | 16,3646 | 1 3652 1 | | | TCP | +TORQUE |
| 2257 | 1 | | 16,3647 | 1 3713 0 | | | TCP | TENABL |
| 2258 | 1 | | 16,3650 | 1 3673 1 | | | TCP | -TORQUE |
| 2259 | 2 | 957 | 16,3651 | 1 3713 0 | | | TCP | TENABL |
| R2260 | | | | | | | | PROCEED WITH + TORQUE |
| 2261 | 2 | 102 | 16,3652 | 3 1612 0 | | +TORQUE | CA | ROLLWORD |
| 2262 | 65 | 952 | 16,3653 | 7 4712 0 | | | MASK | BIT1 |
| 2263 | | | 16,3654 | 0 0006 1 | | | EXTEND | |
| 2264 | 1 | | 16,3655 | 1 3665 0 | | | BZPF | NO.9-11 |

FOR TORQUE SIGN
 POSITIVE TORQUE REQUIRED
 NEGATIVE TORQUE REQUIRED
 SET ROLLFIRE FOR + OR - TORQUE
 COMPLEMENT... POS. FOR NEG. TORQUE
 POSITIVE TORQUE REQUIRED
 IS IT MOREROLL
 YES
 MAC(T6PIRE) NOW IN TEMPREQ
 CHECK FOR EXTENDED FIRING
 IF EXTENSION WANTED, DONT, EXIT ROLL DAP
 COAST... (NEG ZERO FOR TIME6)
 NOTE, JETS CAN FIRE NEXT PASS
 ENTER JET FIRING TIME
 I=0 IF MOREROLL, KEEP SAME JETS ON
 IF JETS ON KEEP SAME JETS. EXIT ROLL DAP
 WHAT WAS THE LAST +TORQUE COMBINATION
 WAS IT NO.9-11
 NOT 9-11, SO USE IT THIS TIME



L TVCROLLDAP

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| | | | | | | | | | |
|------|-----|----|------|-----|---------|----------|----------|--------|----------|
| 2265 | REF | 66 | LAST | 957 | 16,3656 | 4 4712 0 | NO.13-15 | CS | BIT1 |
| 2266 | REF | 3 | LAST | 957 | 16,3657 | 7 1612 1 | | MASK | ROLLWORD |
| 2267 | REF | 4 | LAST | 958 | 16,3660 | 55-612 1 | | TS | ROLLWORD |
| 2268 | REF | 1 | | | 16,3661 | 3 4732 0 | | CAP | +ROLL2 |
| 2269 | | | | | 16,3662 | 0 0006 1 | | EXTEND | |
| 2270 | REF | 2 | LAST | 179 | 16,3663 | 01 006 0 | | WRITE | CHAN6 |
| 2271 | REF | 3 | LAST | 957 | 16,3664 | 1 3713 0 | | TCP | T8ENABL |
| 2272 | REF | 67 | LAST | 958 | 16,3665 | 3 4712 1 | NO.9-11 | CAP | BIT1 |
| 2273 | REF | 5 | LAST | 958 | 16,3666 | 27-612 1 | | ADS | ROLLWORD |
| 2274 | REF | 1 | | | 16,3667 | 3 4715 0 | | CAP | +ROLL1 |
| 2275 | | | | | 16,3670 | 0 0006 1 | | EXTEND | |
| 2276 | REF | 3 | LAST | 958 | 16,3671 | 01 006 0 | | WRITE | CHAN6 |
| 2277 | REF | 4 | LAST | 958 | 16,3672 | 1 3713 0 | | TCP | T8ENABL |
| 2278 | REF | 6 | LAST | 958 | 16,3673 | 3 1612 0 | -TORQUE | CA | ROLLWORD |
| 2279 | REF | 38 | LAST | 948 | 16,3674 | 7 4711 0 | | MASK | BIT2 |
| 2280 | | | | | 16,3675 | 0 0006 1 | | EXTEND | |
| 2281 | REF | 1 | | | 16,3676 | 1 3706 1 | | BZF | NO.12-10 |
| 2282 | REF | 39 | LAST | 958 | 16,3677 | 4 4711 0 | NO.16-14 | CS | BIT2 |
| 2283 | REF | 7 | LAST | 958 | 16,3700 | 7 1612 1 | | MASK | ROLLWORD |
| 2284 | REF | 8 | LAST | 958 | 16,3701 | 55-612 1 | | TS | ROLLWORD |
| 2285 | REF | 1 | | | 16,3702 | 3 3740 1 | | CAP | -ROLL2 |
| 2286 | | | | | 16,3703 | 0 0006 1 | | EXTEND | |
| 2287 | REF | 4 | LAST | 958 | 16,3704 | 01 006 0 | | WRITE | CHAN6 |
| 2288 | REF | 5 | LAST | 958 | 16,3705 | 1 3713 0 | | TCP | T8ENABL |
| 2289 | REF | 40 | LAST | 958 | 16,3706 | 3 4711 1 | NO.12-10 | CAP | BIT2 |
| 2290 | REF | 9 | LAST | 958 | 16,3707 | 27-612 1 | | ADS | ROLLWORD |
| 2291 | REF | 1 | | | 16,3710 | 3 4377 0 | | CAP | -ROLL1 |
| 2292 | | | | | 16,3711 | 0 0006 1 | | EXTEND | |
| 2293 | REF | 5 | LAST | 958 | 16,3712 | 01 006 0 | | WRITE | CHAN6 |
| 2294 | REF | 39 | LAST | 953 | 16,3713 | 3 4674 0 | T8ENABL | CAP | BIT15 |
| 2295 | | | | | 16,3714 | 0 0006 1 | | EXTEND | |
| 2296 | REF | 8 | LAST | 577 | 16,3715 | 05 013 0 | | WOR | CHAN13 |
| 2297 | REF | 49 | LAST | 957 | 16,3716 | 1 5213 0 | RDAPEND | TCP | TASKOVER |

CHANGE BIT 1 TO ZERO

1ST + JETS TO FIRE (MRCLEAN OS ROLLWORD)
CHANGE BIT 1 TO ONE

WHAT WAS LAST -TORQUE COMBINATION
WAS IT NO.12-10

NOT 12-10, SO USE IT THIS TIME

CHANGE BIT 2 TO ZERO

1ST -JETS TO FIRE (MRCLEAN OS ROLLWORD)
CHANGE BIT 2 TO ONE

EXIT ROLL DAP

L TVCROLLDAP

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P2298 THIS T6 TASK SHUTS OFF ALL ROLL JETS

| | | | | | | | | | |
|------|-----|-----|------|-----|---------|----------|----------|--------|----------|
| 2299 | REP | 15 | LAST | 936 | 16,3717 | 22 016 0 | NOROLL1 | LXCH | BANKRUPT |
| 2300 | REP | 171 | LAST | 957 | 16,3720 | 3 4714 1 | | CAP | ZERO |
| 2301 | REP | 7 | LAST | 957 | 16,3721 | 55-611 1 | | TS | ROLLFIRE |
| 2302 | | | | | 16,3722 | 0 0006 1 | | EXTEND | |
| 2303 | REP | 6 | LAST | 958 | 16,3723 | 01 006 0 | KILLJETS | WRITE | CHANG |
| 2304 | REP | 4 | LAST | 936 | 16,3724 | 1 5224 1 | | TCP | NOGRSM |

SHUT OFF ALL (ROLL) JETS, (A T6 TASK
CALLED BY ..JETROLL..)
ZERO INDICATES JETS NOW OFF



L TVCROLLDAP

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P2305 CONSTANTS FOR ROLL AUTOPILOT....

| | | | | | | | |
|--------|--------|----------|---------|---------|------------|--------------|--|
| 2306 | REP 11 | LAST 923 | 58,1742 | | | EBANK= BZERO | |
| 2307 | REP 1 | | 16,3725 | 03717 0 | NOROL1Ts | 2CADR | NOROLL1 |
| 2307 | REP 1 | | 16,3728 | 34066 0 | | | |
| 2309 | | | 16,3727 | 00344 1 | DB | DEC | .01388889 DEAD BAND (5 DEG), SC.AT B+0 REV |
| 2310 | | | 16,3730 | 06315 0 | -SLOPE | DEC | 0.2 -SWITCHLINE SLOPE(0.2 PER SEC) SC.AT B+0 PER SEC |
| A2311 | | | 16,3731 | 00111 0 | LMCRATE | DEC | .00027778 B+4 LIMIT CYCLE RATE (0.1 DEG/SEC) SC.AT B-4 REV/SEC |
| A2313 | | | 16,3732 | 00510 0 | INTERCEP | DEC | .0025 B+3 DB(-SLOPE) - LMCRATE, SC.AT B-3 REV/SEC |
| 2314 | | | 16,3733 | 01330 0 | MINLIM | DEC | .00277778 B+4 RATELIM,MIN (1DEG/SEC), SC.AT B-4 REV/SEC |
| 2315 | | | 16,3734 | 00027 1 | 1/MINLIM | DEC | 360 B-16 RECIPROCAL THEREOF, SHIFTED 14 RIGHT |
| 2316 | | | 16,3735 | 07071 0 | MAXLIM | DEC | .01388889 B+4 RATELIM,MAX (5DEG/SEC), SC.AT B-4 REV/SEC |
| 2318 | | | 16,3738 | 00030 1 | TMINFIRE | DEC | 1.5 B+4 15 MS (14 MIN), SC.AT 16 BITS/CS |
| 2319 | | | 16,3737 | 07640 1 | TMAXFIRE | DEC | 250 B+4 2.5 SEC, SC.AT 16 BITS/CS |
| 2320 | REP 28 | LAST 941 | 4710 | | 1/TMPFIR = | BIT3 | RECIPROCAL THEREOF, SHIFTED 14 RIGHT, ROUNDS TO OCT00004, SO ALLOWS 2.56 SEC FIRINGS BEFORE APPLYING LIMIT (B+3) (16BITS/CS) (100CS/SEC) |
| A23201 | | | | | | | |
| A23202 | | | | | | | |
| 23203 | REP 4 | LAST 787 | 7665 | | TSCALE = | PRI031 | |
| 2321 | REP 23 | LAST 906 | 4715 | | +ROLL1 = | FIVE | ONBITS FOR JETS 9 AND 11 |
| 2322 | REP 2 | LAST 197 | 4732 | | +ROLL2 = | OCT120 | ONBITS FOR JETS 13 AND 15 |
| 2323 | REP 5 | LAST 845 | 4377 | | -ROLL1 = | TEN | ONBITS FOR JETS 12 NAD 10 |
| 2324 | | | 16,3740 | 00240 1 | -ROLL2 | OCT | 240 ONBITS FOR JETS 16 AND 14 |

PROGRAM NAME... GENJAP FILTERS, CONSISTING OF NPONDS, NPINDS, NYNODS, NYINDS, ETC.

LOG SECTION... GENJAP FILTERS SUBROUTINE... DAPCSM

MOD BY ENDEL

20 OCT, 1967

FUNCTIONAL DESCRIPTION...

R1904 THE GENJAP FILTER PACKAGE IS DESIGNED TO PROVIDE FLEXIBLE, LAST-MINUTE CHANGEABLE DIGITAL AUTOPILOT FILTERS FOR LEM-OFF FLIGHT. GROUNDABLES FOR THE DESIGN AND USE OF THE PACKAGE ARE AS FOLLOWS...

R1903 1. FILTER COEFFICIENTS AND GAINS IN BRASABLE MEMORY

R1902 2. UP TO THIRD-ORDER NUMERATOR OR DENOMINATOR

R1901 3. OPERATIONAL PIT WITHIN THE STRUCTURE OF THE REGULAR LEM-ON DAP CODING

R1900 4. DENOMINATOR POLES INSIDE THE Z-PLANE UNIT CIRCLE

R1999 5. NUMERATOR ZEROS INSIDE THE Z-PLANE DOUBLE-UNIT CIRCLE

R1998 6. HIGH FREQUENCY (BODES) GAIN LESS THAN 8ASCRTVS, OR 8.6380088 DEG/DEG

R1997 THE FILTERS ARE SHOWN IN THE FOLLOWING DIAGRAMS...

R1996 PITCH GENJAP FILTER..

R1995 YAW GENJAP FILTER..

R1994 *****

R1993 KPOEN3 *****

R1992 *****

R1991 *****

R1990 *****

R1989 *****

R1988 *****

R1987 *****

R1986 *****

R1985 *****

R1984 *****

R1983 *****

R1982 *****

R1981 *****

R1980 *****

R1979 *****

R1978 *****

R1977 *****

R1976 *****

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R1949 *****

R1948 *****

R1947 *****

R1946 *****

R1945 *****

R1944 *****

R1943 *****

R1942 *****

R1941 *****

R1940 *****

R1939 *****

R1938 *****

R1937 *****

R1936 *****

R1935 *****

R1934 *****

R1933 *****

R1932 *****

R1931 *****

R1930 *****

R1929 *****

R1928 *****

R1927 *****

R1926 *****

R1925 *****

R1924 *****

L TVCGEN3FILTERS

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P1071 THE IMPLEMENTING EQUATIONS FOR THESE FILTERS ARE AS FOLLOWS.....

R1073 PITCH GEN3DAP.... YAW GEN3DAP....
 R1075 NPD = (B+4) KPGEN3 NP0 NYD = (B+4) KYGEN3 NY0
 R1077 NP0 = AP0 EP +4(Z-1) NP1 NY0 = AY0 EY +4(Z-1) NY1
 R1079 NY1 = AP1 EP - BP1 NP0 + (Z-1) NP2 NY1 = AY1 EY - BY1 NY0 + (Z-1) NY2
 R1081 NP2 = AP2 EP - BP2 NP0 + (Z-1) NP3 NY2 = AY2 EY - BY2 NY0 + (Z-1) NY3
 R1083 NP3 = AP3 EP - BP3 NP0 NY3 = AY3 EY - BY3 NY0
 R1085 FILTER INPUTS EP AND EY ARE PICKED UP FROM REGULAR LEM-ON CODING AT BRRTMP (UPPER WORD ONLY), THIS ARE
 R1087 SINGLE PRECISION QUANTITIES SCALED AT B-1 REVS. FILTER OUTPUTS NPD AND NYD ARE LEFT IN DOUBLE PRECISION AT
 R1089 CMDTMP, SCALED AT 1 ASCREV, READY FOR OUTPUT PROCESSING VIA REGULAR LEM-ON CODING AT .P, YOFFSET.
 R1091 FOLLOWING OUTPUT PROCESSING, RETURN TO THE GEN3DAP FILTERS IS MADE FOR CALCULATION OF THE REMAINING NODES
 R1093 NP1 TO NP3, OR NY1 TO NY3. GEN3DAP FILTERS THEN RETURN TO THE LEM-ON CODING AT .DELBARP, Y... FOR RESPECTIVE
 R1095 OFFSET-TRACKER-FILTER COMPUTATIONS AND COPYCYCLES. NOTE THE EQUIVALENCES... NP1TMP=J5TMP, NP1=J5,
 R1097 NP2TMP=NSLTMTP, NP2=PNSLM, NP3TMP=DSLTMTP, NP3=PDSLM, WITH CORRESPONDING RELATIONS FOR YAW. THIS THE COPY-
 R1099 CYCLE PCOPY, FROM THE GEN3DAP STANDPOINT, IS EFFECTIVE FROM PMISC-3 TO ITS END AT TC Q. YCOPY FROM YMISC-3.
 R1101 SCALING OF THE FILTER NODES, COEFFICIENTS, AND GAINS WITHIN THE AGC IS AS FOLLOWS.....

| R1103 | QUANTITY | QUANTITY | PHYS.UNITS | MAX.VALUE | SCALE AT (FOR) | |
|-------|---|----------|------------|-----------|----------------|------------------------|
| R1105 | EP | EY | REVS | 1/8 | B-1 REV | (CDU SCALING) |
| R1107 | NP0 | NY0 | REVS | (B+1) | B+1 REV | |
| R1109 | NP1 | NY1 | REVS | (B+3) | B+3 REV | |
| R1111 | NP2 | NY2 | REVS | (B+3) | B+3 REV | |
| R1113 | NP3 | NY3 | REVS | (B+3) | B+3 REV | |
| R1115 | NPD | NYD | ASC REVS | (1) | 1 ASCREV | (ACTUATOR CDU SCALING) |
| R1117 | KPGEN3 | KYGEN3 | ASCREV/REV | (8) | B+3 ASCREV/REV | |
| R1119 | AP0 | AY0 | DIMLESS. | 1 | B+2 | |
| R1121 | AP1 | AY1 | DIMLESS. | 6 | B+4 | |
| R1123 | AP2 | AY2 | DIMLESS. | 12 | B+4 | |
| R1125 | AP3 | AY3 | DIMLESS. | 8 | B+4 | |
| R1127 | BP1 | BY1 | DIMLESS. | 3 | B+2 | |
| R1129 | BP2 | BY2 | DIMLESS. | 3 | B+2 | |
| R1131 | BP3 | BY3 | DIMLESS. | 1 | B+2 | |
| R1132 | FILTER COEFFICIENTS, GAINS, AND NODES ARE HELD IN DOUBLE PRECISION (ERASABLE) TO PERMIT CONSERVATIVE | | | | | |
| R1134 | SCALING AND YET OFFSET TRUNCATION LOSSES. THIS APPEARS NECESSARY IF FILTER FLEXIBILITY IS TO BE MAINTAINED. | | | | | |
| R1136 | COMPUTATION TIME IS NOT CRITICAL. | | | | | |

L TVC GEN 3 FILTERS

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- R1138 CALLING SEQUENCE....
- R1139 *TC POSTJUMP....
- R1140 CADR NPONCODE, NP1, NY0, NY1. SPECIFICALLY, FROM PITCHDAP OR YAWDAP
- R1141 (TVC DAP), AT P1FILJMP, P2FILJMP, Y1FILJMP, Y2FILJMP
- R1142 NORMAL EXIT MODE....
- R1143 *TC POSTJUMP....
- R1144 CADR (POFFSET, DELRARP), (YOFFSET, DELBARY). IE, RETURNS TO
- R1145 PITCHDAP OR YAWDAP AT APPROPRIATE ENTRY POINT
- R1146 ALARM OR ABORT EXIT MODES.... NONE
- R1147 SUBROUTINES CALLED.... NONE
- R1148 ERASABLE INITIALIZATION REQUIRED....
- R1149 *AP0(SP), AP1(DP), ... AP3(DP), (PITCH AND YAW) NUMERATOR COEFFICIENTS
- R1150 (PAD LOADS)
- R1151 *BP1(DP), ... BP3(DP), (PITCH AND YAW) DENOMINATOR COEFFICIENTS
- R1152 (PAD LOADS)
- R1153 *KPOEN3 (S40.15 OF R03)
- R1154 OUTPUT....
- R1155 *CONDIMP (NPD, NYD) FOR OUTPUT PROCESSING BY PITCHDAP OR YAWDAP
- R1156 *OTHER FILTER NODES
- R1157 DEBRIS... TVC TEMPORARIES, SHARABLE WITH RCS/ENTRY IN ERANK6 ONLY
- 1158 21,2028 BANK 21
- 1159 REP 1 17,2000 SETLOC DAPS4
- 1160 17,2213 BANK
- 1161 REP 1 E6,1742 ERANK= EP
- 1162 REP 1 COUNT* SS/GEN3



L TVCGEN3FILTERS

P1163 PITCH GEN3DAP FILTER.....

| | | | | | | | | |
|------|-----|-----|------|---------|----------|----------|-------------|-----------|
| 1164 | | | | 17,2213 | 0 0006 1 | NP0NODE | EXTEND | |
| 1165 | REP | 1 | | 17,2214 | 3 1564 1 | | DCA NP1 | |
| 1166 | | | | 17,2215 | 20 001 1 | | DDQJRL | |
| 1167 | | | | 17,2216 | 20 001 1 | | DDQJRL | |
| 1168 | REP | 1 | | 17,2217 | 53=562 0 | | DXCH NP0 | |
| 1169 | REP | 2 | LAST | 963 | 17,2220 | 31=742 1 | AP0(EP) | CAS EP |
| 1170 | | | | 17,2221 | 0 0006 1 | | EXTEND | |
| 1171 | REP | 2 | LAST | 99 | 17,2222 | 7 1427 0 | MP | AP0 |
| 1172 | REP | 2 | LAST | 964 | 17,2223 | 21=562 0 | DAS | NP0 |
| 1173 | REP | 3 | LAST | 964 | 17,2224 | 31=561 1 | NP0NODE | CAS NP0 |
| 1174 | | | | 17,2225 | 0 0006 1 | | EXTEND | |
| 1175 | REP | 2 | LAST | 104 | 17,2226 | 7 1651 0 | MP | KPCEN3 |
| 1176 | REP | 1 | | 17,2227 | 53=745 1 | | DXCH NP0 | |
| 1177 | REP | 4 | LAST | 964 | 17,2230 | 31=562 1 | CAS | NP0 +1 |
| 1178 | | | | 17,2231 | 0 0006 1 | | EXTEND | |
| 1179 | REP | 3 | LAST | 964 | 17,2232 | 7 1651 0 | MP | KPCEN3 |
| 1180 | | | | 17,2233 | 22 007 0 | | ZI. | |
| 1181 | REP | 218 | LAST | 956 | 17,2234 | 22 000 1 | DXCH | A |
| 1182 | REP | 2 | LAST | 964 | 17,2235 | 21=745 1 | DAS | NP0 |
| 1183 | REP | 3 | LAST | 964 | 17,2236 | 53=745 1 | DXCH | NP0 |
| 1184 | | | | 17,2237 | 20 001 1 | | DDQJRL | |
| 1185 | | | | 17,2240 | 20 001 1 | | DDQJRL | |
| 1186 | | | | 17,2241 | 20 001 1 | | DDQJRL | |
| 1187 | | | | 17,2242 | 20 001 1 | | DDQJRL | |
| 1188 | REP | 4 | LAST | 964 | 17,2243 | 53=745 1 | DXCH | NP0 |
| 1189 | REP | 54 | LAST | 932 | 17,2244 | 0 4574 0 | TC | POSTJUMP |
| 1190 | REP | 1 | | 17,2245 | 40441 1 | | CADR | POFFSET |
| 1191 | | | | 17,2246 | 0 0006 1 | NP1NODE | EXTEND | |
| 1192 | REP | 1 | | 17,2247 | 3 1542 0 | | DCA NP2 | |
| 1193 | REP | 1 | | 17,2250 | 53=737 1 | | DXCH NP1TMP | |
| 1194 | REP | 5 | LAST | 964 | 17,2251 | 4 1561 0 | BP1(NP0) | CS NP0 |
| 1195 | | | | 17,2252 | 0 0006 1 | | EXTEND | |
| 1196 | REP | 2 | LAST | 99 | 17,2253 | 7 1436 0 | MP | BP1 |
| 1197 | REP | 2 | LAST | 964 | 17,2254 | 21=737 1 | DAS | NP1TMP |
| 1198 | REP | 6 | LAST | 964 | 17,2255 | 4 1562 0 | CS | NP0 +1 |
| 1199 | | | | 17,2256 | 0 0006 1 | | EXTEND | |
| 1200 | REP | 3 | LAST | 964 | 17,2257 | 7 1436 0 | MP | BP1 |
| 1201 | REP | 3 | LAST | 964 | 17,2260 | 27=737 1 | ADS | NP1TMP +1 |
| 1202 | REP | 103 | LAST | 955 | 17,2261 | 54 001 1 | TS | L |
| 1203 | | | | 17,2262 | 1 2264 1 | | TCP | +2 |
| 1204 | REP | 4 | LAST | 964 | 17,2263 | 27=736 0 | ADS | NP1TMP |

FORM NODE NP0....COLLECT (PAST NP1)
(COMES HERE FROM REG. DAP CODING)

SPXSP MULTIPLY FOR NUMERATOR COMPONENT
EP = ERRSTMP, SP, SC, AT B-1 REVS

COMPLETED NODE NP0, SC, AT B+1 REVS
FORM NODE NPD....SPXDP MULTIPLY BY GAIN

SC, AT B+4 ASCREV SINCE KPCEN3 AT B+3

FIX UP SCALING

COMPLETED NODE NPD, SC, AT 1ASCREV
TRANSFER BACK TO REGULAR DAP CODING FOR
OUTPUT (NPD = ENDIMP, DP)
FORM NODE NP1....COLLECT (PAST NP2)
(COMES HERE FROM REG. DAP CODING)

DPXDP MULTIPLY FOR DENOMINATOR COMPONENT



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| | | | | | | | | | |
|------|-----|-----|------|-----|---------|----------|----------------|-----------|--|
| 1205 | REP | 7 | LAST | 964 | 17,2264 | 4 1561 0 | CS | NP0 | |
| 1206 | | | | | 17,2265 | 0 0006 1 | EXTEND | | |
| 1207 | REP | 4 | LAST | 964 | 17,2266 | 7 1437 1 | MP | BP1 +1 | |
| 1208 | REP | 5 | LAST | 964 | 17,2267 | 27=737 1 | ADS | NP1TMP +1 | |
| 1209 | REP | 104 | LAST | 964 | 17,2270 | 54 001 1 | TS | L | |
| 1210 | | | | | 17,2271 | 1 2273 1 | TCP | +2 | |
| 1211 | REP | 6 | LAST | 965 | 17,2272 | 27=736 0 | ADS | NP1TMP | |
| 1212 | REP | 3 | LAST | 964 | 17,2273 | 31=742 1 | AP1(EP) CAB | EP | DPXSP MULTIPLY FOR NUMERATOR COMPONENT |
| 1213 | | | | | 17,2274 | 0 0006 1 | EXTEND | | |
| 1214 | REP | 2 | LAST | 99 | 17,2275 | 7 1430 0 | MP | AP1 | |
| 1215 | REP | 7 | LAST | 965 | 17,2276 | 21=737 1 | DAS | NP1TMP | |
| 1216 | REP | 4 | LAST | 965 | 17,2277 | 31=742 1 | CAB | EP | |
| 1217 | | | | | 17,2300 | 0 0006 1 | EXTEND | | |
| 1218 | REP | 3 | LAST | 965 | 17,2301 | 7 1431 1 | MP | AP1 +1 | |
| 1219 | REP | 8 | LAST | 965 | 17,2302 | 27=737 1 | ADS | NP1TMP +1 | |
| 1220 | REP | 105 | LAST | 965 | 17,2303 | 54 001 1 | TS | L | |
| 1221 | | | | | 17,2304 | 1 2306 1 | TCP | +2 | |
| 1222 | REP | 9 | LAST | 965 | 17,2305 | 27=736 0 | ADS | NP1TMP | COMPLETED NODE NP1 |
| 1223 | | | | | 17,2306 | 0 0006 1 | NP2NODE EXTEND | | FORM NODE NP2...COLLECT (PAST NP3) |
| 1224 | REP | 1 | | | 17,2307 | 3 1544 0 | DCA | NP3 | |
| 1225 | REP | 1 | | | 17,2310 | 53=712 0 | DCH | NP2TMP | |
| 1226 | REP | 8 | LAST | 965 | 17,2311 | 4 1561 0 | BP2(NP0) CS | NP0 | DPXDP MULTIPLY FOR DENOMINATOR COMPONENT |
| 1227 | | | | | 17,2312 | 0 0006 1 | EXTEND | | |
| 1228 | REP | 2 | LAST | 100 | 17,2313 | 7 1440 1 | MP | BP2 | |
| 1229 | REP | 2 | LAST | 965 | 17,2314 | 21=712 0 | DAS | NP2TMP | |
| 1230 | REP | 9 | LAST | 965 | 17,2315 | 4 1562 0 | CS | NP0 +1 | |
| 1231 | | | | | 17,2316 | 0 0006 1 | EXTEND | | |
| 1232 | REP | 3 | LAST | 965 | 17,2317 | 7 1440 1 | MP | BP2 | |
| 1233 | REP | 3 | LAST | 965 | 17,2320 | 27=712 0 | ADS | NP2TMP +1 | |
| 1234 | REP | 106 | LAST | 965 | 17,2321 | 54 001 1 | TS | L | |
| 1235 | | | | | 17,2322 | 1 2324 1 | TCP | +2 | |
| 1236 | REP | 4 | LAST | 965 | 17,2323 | 27=711 0 | ADS | NP2TMP | |
| 1237 | REP | 10 | LAST | 965 | 17,2324 | 4 1561 0 | CS | NP0 | |
| 1238 | | | | | 17,2325 | 0 0006 1 | EXTEND | | |
| 1239 | REP | 4 | LAST | 965 | 17,2326 | 7 1441 0 | MP | BP2 +1 | |
| 1240 | REP | 5 | LAST | 965 | 17,2327 | 27=712 0 | ADS | NP2TMP +1 | |
| 1241 | REP | 107 | LAST | 965 | 17,2330 | 54 001 1 | TS | L | |
| 1242 | | | | | 17,2331 | 1 2333 1 | TCP | +2 | |
| 1243 | REP | 6 | LAST | 965 | 17,2332 | 27=711 0 | ADS | NP2TMP | |
| 1244 | REP | 5 | LAST | 965 | 17,2333 | 31=742 1 | AP2(EP) CAB | EP | DPXSP MULTIPLY FOR NUMERATOR COMPONENT |
| 1245 | | | | | 17,2334 | 0 0006 1 | EXTEND | | |
| 1246 | REP | 2 | LAST | 99 | 17,2335 | 7 1432 1 | MP | AP2 | |
| 1247 | REP | 7 | LAST | 965 | 17,2336 | 21=712 0 | DAS | NP2TMP | |
| 1248 | REP | 6 | LAST | 965 | 17,2337 | 31=742 1 | CAB | EP | |
| 1249 | | | | | 17,2340 | 0 0006 1 | EXTEND | | |
| 1250 | REP | 3 | LAST | 965 | 17,2341 | 7 1433 0 | MP | AP2 +1 | |
| 1251 | REP | 8 | LAST | 965 | 17,2342 | 27=712 0 | ADS | NP2TMP +1 | |

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| | | | | | | | | | |
|-------|-----|-----|------|-----|---------|----------|---------|-----------|--|
| 1252 | REP | 108 | LAST | 965 | 17,2343 | 54 001 1 | TS | L | |
| 1253 | | | | | 17,2344 | 1 2346 0 | TCP | +2 | |
| 1254 | REP | 9 | LAST | 965 | 17,2345 | 27=711 0 | ADS | NP2TMP | COMPLETED NODE NP2 |
| 1255 | REP | 11 | LAST | 965 | 17,2346 | 4 1561 0 | NP3NODE | CS | NP0 |
| 1256 | | | | | 17,2347 | 0 0006 1 | EXTEND | | FORM NODE NP3...NO PAST NODES, DIRECT |
| 1257 | REP | 2 | LAST | 100 | 17,2350 | 7 1442 0 | MP | BP3 | TO DPXDP MULTIPLY FOR DENOMINATOR |
| 1258 | REP | 1 | | | 17,2351 | 53=714 0 | DXCH | NP3TMP | COMPONENT |
| 1259 | REP | 12 | LAST | 966 | 17,2352 | 4 1562 0 | CS | NP0 +1 | |
| 1260 | | | | | 17,2353 | 0 0006 1 | EXTEND | | |
| 1261 | REP | 3 | LAST | 966 | 17,2354 | 7 1442 0 | MP | BP3 | |
| 1262 | REP | 2 | LAST | 966 | 17,2355 | 27=714 0 | ADS | NP3TMP +1 | |
| 1263 | REP | 109 | LAST | 966 | 17,2356 | 54 001 1 | TS | L | |
| 1264 | | | | | 17,2357 | 1 2361 0 | TCP | +2 | |
| 1265 | REP | 3 | LAST | 966 | 17,2360 | 27=713 1 | ADS | NP3TMP | |
| 1266 | REP | 13 | LAST | 966 | 17,2361 | 4 1561 0 | CS | NP0 | |
| 1267 | | | | | 17,2362 | 0 0006 1 | EXTEND | | |
| 1268 | REP | 4 | LAST | 966 | 17,2363 | 7 1443 1 | MP | BP3 +1 | |
| 1269 | REP | 4 | LAST | 966 | 17,2364 | 27=714 0 | ADS | NP3TMP +1 | |
| 1270 | REP | 110 | LAST | 966 | 17,2365 | 54 001 1 | TS | L | |
| 1271 | | | | | 17,2366 | 1 2370 0 | TCP | +2 | |
| 1272 | REP | 5 | LAST | 966 | 17,2367 | 27=713 1 | ADS | NP3TMP | |
| 1273 | REP | 7 | LAST | 965 | 17,2370 | 31=742 1 | AP3(EP) | CAB | EP |
| 1274 | | | | | 17,2371 | 0 0006 1 | EXTEND | | DPXSP MULTIPLY FOR NUMERATOR COMPONENT |
| 1275 | REP | 2 | LAST | 99 | 17,2372 | 7 1434 1 | MP | AP3 | |
| 1276 | REP | 6 | LAST | 966 | 17,2373 | 21=714 0 | DAS | NP3TMP | |
| 1277 | REP | 8 | LAST | 966 | 17,2374 | 31=742 1 | CAB | EP | |
| 1278 | | | | | 17,2375 | 0 0006 1 | EXTEND | | |
| 1279 | REP | 3 | LAST | 966 | 17,2376 | 7 1435 0 | MP | AP3 +1 | |
| 1280 | REP | 7 | LAST | 966 | 17,2377 | 27=714 0 | ADS | NP3TMP +1 | |
| 1281 | REP | 111 | LAST | 966 | 17,2400 | 54 001 1 | TS | L | |
| 1282 | | | | | 17,2401 | 1 2403 0 | TCP | +2 | |
| 1283 | REP | 8 | LAST | 966 | 17,2402 | 27=713 1 | ADS | NP3TMP | COMPLETED NODE NP3, AND PITCH GEN3DAP |
| A1284 | | | | | | | | | FILTER COMPUTATIONS |
| 1285 | REP | 55 | LAST | 964 | 17,2403 | 0 4574 0 | TC | POSTJUMP | RETURN TO CSMDAP CODING FOR PITCH |
| 1286 | REP | 1 | | | 17,2404 | 40526 1 | CADR | DELBARP | OFFSET-TRACKER-FILTER COMPUTATIONS, |
| A1287 | | | | | | | | | AND PITCH DAP COPYCYCLE. |

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F1288 YAW GEN3DAP FILTER....

| | | | | | | | | | | |
|------|-----|-----|------|---------|---------|--------|---------|----------|-----------|--|
| 1289 | | | | 17,2405 | 0 0008 | 1 | NY0NODE | EXTEND | | FORM NODE NY0....COLLECT (PAST NY1) |
| 1290 | REP | 1 | | 17,2406 | 3 1610 | 1 | | DCA | NY1 | (COMES HERE FROM REG. DAP CODING) |
| 1291 | | | | 17,2407 | 20 001 | 1 | | DDOUBL | | |
| 1292 | | | | 17,2410 | 20 001 | 1 | | DDOUBL | | |
| 1293 | REP | 1 | | 17,2411 | 53=808 | 1 | | DxCH | NY0 | |
| 1294 | REP | 1 | | 17,2412 | 31=742 | 1 | AY0(EY) | CAB | EY | SPXSP MULTIPLY FOR NUMERATOR COMPONENT |
| 1295 | | | | 17,2413 | 0 0008 | 1 | | EXTEND | | EY = ERRBTMP, SP, SC.AT B-1 REVS |
| 1296 | REP | 1 | | 17,2414 | 7 1427 | 0 | | MP | AY0 | |
| 1297 | REP | 2 | LAST | 967 | 17,2415 | 21=606 | 1 | DAS | NY0 | COMPLETED NODE NY0, SC.AT B+1 REVS |
| 1298 | REP | 3 | LAST | 967 | 17,2416 | 31=805 | 0 | NY0NODE | CAB | NY0 |
| 1299 | | | | 17,2417 | 0 0008 | 1 | | EXTEND | | FORM NODE NYD....SPXDP MULTIPLY BY GAIN |
| 1300 | REP | 1 | | 17,2420 | 7 1651 | 0 | | MP | KYGEN3 | |
| 1301 | REP | 1 | | 17,2421 | 53=745 | 1 | | DxCH | NYD | |
| 1302 | REP | 4 | LAST | 967 | 17,2422 | 31=606 | 0 | | CAB | NY0 +1 |
| 1303 | | | | 17,2423 | 0 0008 | 1 | | EXTEND | | |
| 1304 | REP | 2 | LAST | 967 | 17,2424 | 7 1651 | 0 | | MP | KYGEN3 |
| 1305 | | | | 17,2425 | 22 007 | 0 | | ZL | | |
| 1306 | REP | 219 | LAST | 964 | 17,2426 | 22 000 | 1 | LxCH | A | SC.AT B+4 ASCREV SINCE KYGEN3 AT B+1 |
| 1307 | REP | 2 | LAST | 967 | 17,2427 | 21=745 | 1 | DAS | NYD | |
| 1308 | REP | 3 | LAST | 967 | 17,2430 | 53=745 | 1 | | DxCH | NYD |
| 1309 | | | | 17,2431 | 20 001 | 1 | | DDOUBL | | FIX UP SCALING |
| 1310 | | | | 17,2432 | 20 001 | 1 | | DDOUBL | | |
| 1311 | | | | 17,2433 | 20 001 | 1 | | DDOUBL | | |
| 1312 | | | | 17,2434 | 20 001 | 1 | | DDOUBL | | |
| 1313 | REP | 4 | LAST | 967 | 17,2435 | 53=745 | 1 | | DxCH | NYD |
| 1314 | REP | 56 | LAST | 966 | 17,2436 | 0 4574 | 0 | TC | POSTJUMP | COMPLETED NODE NYD, SC.AT 1ASCREV |
| 1315 | REP | 1 | | 17,2437 | 40730 | 1 | | CADR | YOFFSET | TRANSFER BACK TO REGULAR DAP CODING FOR |
| 1316 | | | | 17,2440 | 0 0008 | 0 | NY1NODE | EXTEND | | OUTPUT (NYD = CNDTMP, DP) |
| 1317 | REP | 1 | | 17,2441 | 3 1566 | 0 | | DCA | NY2 | FORM NODE NY1....COLLECT (PAST NY2) |
| 1318 | REP | 1 | | 17,2442 | 53=737 | 1 | | DxCH | NY1TMP | (COMES HERE FROM REG. DAP CODING) |
| 1319 | REP | 5 | LAST | 967 | 17,2443 | 4 1605 | 1 | BY1(NY0) | CS | NY0 |
| 1320 | | | | 17,2444 | 0 0008 | 1 | | EXTEND | | DPXDP MULTIPLY FOR DENOMINATOR COMPONENT |
| 1321 | REP | 1 | | 17,2445 | 7 1436 | 0 | | MP | BY1 | |
| 1322 | REP | 2 | LAST | 967 | 17,2446 | 21=737 | 1 | DAS | NY1TMP | |
| 1323 | REP | 6 | LAST | 967 | 17,2447 | 4 1606 | 1 | CS | NY0 +1 | |
| 1324 | | | | 17,2450 | 0 0008 | 1 | | EXTEND | | |
| 1325 | REP | 2 | LAST | 967 | 17,2451 | 7 1436 | 0 | | MP | BY1 |
| 1326 | REP | 3 | LAST | 967 | 17,2452 | 27=737 | 1 | ADS | NY1TMP +1 | |
| 1327 | REP | 112 | LAST | 966 | 17,2453 | 54 001 | 1 | TS | L | |
| 1328 | | | | 17,2454 | 1 2456 | 0 | | TCP | +2 | |
| 1329 | REP | 4 | LAST | 967 | 17,2455 | 27=736 | 0 | ADS | NY1TMP | |



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| | | | | | | | | | | |
|------|-----|-----|------|-----|---------|----------|----------|--------|-----------|--|
| 1330 | REP | 7 | LAST | 967 | 17,2456 | 4 1605 1 | | CS | NY0 | |
| 1331 | | | | | 17,2457 | 0 0006 1 | | EXTEND | | |
| 1332 | REP | 3 | LAST | 967 | 17,2460 | 7 1437 1 | | MP | BY1 +1 | |
| 1333 | REP | 5 | LAST | 967 | 17,2461 | 27=737 1 | | ADS | NY1TMP +1 | |
| 1334 | REP | 113 | LAST | 967 | 17,2462 | 54 001 1 | | TS | L | |
| 1335 | | | | | 17,2463 | 1 2465 0 | | TCP | +2 | |
| 1336 | REP | 6 | LAST | 968 | 17,2464 | 27=736 0 | | ADS | NY1TMP | |
| 1337 | REP | 2 | LAST | 967 | 17,2465 | 31=742 1 | AY1(BY) | CAB | EY | DPXSP MULTIPLY FOR NUMERATOR COMPONENT |
| 1338 | | | | | 17,2466 | 0 0006 1 | | EXTEND | | |
| 1339 | REP | 1 | | | 17,2467 | 7 1430 0 | | MP | AY1 | |
| 1340 | REP | 7 | LAST | 968 | 17,2470 | 21=737 1 | | DAS | NY1TMP | |
| 1341 | REP | 3 | LAST | 968 | 17,2471 | 31=742 1 | | CAB | EY | |
| 1342 | | | | | 17,2472 | 0 0006 1 | | EXTEND | | |
| 1343 | REP | 2 | LAST | 968 | 17,2473 | 7 1431 1 | | MP | AY1 +1 | |
| 1344 | REP | 8 | LAST | 968 | 17,2474 | 27=737 1 | | ADS | NY1TMP +1 | |
| 1345 | REP | 114 | LAST | 968 | 17,2475 | 54 001 1 | | TS | L | |
| 1346 | | | | | 17,2476 | 1 2500 1 | | TCP | +2 | |
| 1347 | REP | 9 | LAST | 968 | 17,2477 | 27=736 0 | | ADS | NY1TMP | COMPLETED NODE NY1 |
| 1348 | | | | | 17,2500 | 0 0006 1 | NY2NODE | EXTEND | | FORM NODE NY2...COLLECT (PAST NY3) |
| 1349 | REP | 1 | | | 17,2501 | 3 1570 1 | | DCA | NY3 | |
| 1350 | REP | 1 | | | 17,2502 | 53=712 0 | | DCH | NY2TMP | |
| 1351 | REP | 8 | LAST | 968 | 17,2503 | 4 1605 1 | BY2(NY0) | CS | NY0 | DPXDP MULTIPLY FOR DENOMINATOR COMPONENT |
| 1352 | | | | | 17,2504 | 0 0006 1 | | EXTEND | | |
| 1353 | REP | 1 | | | 17,2505 | 7 1440 1 | | MP | BY2 | |
| 1354 | REP | 2 | LAST | 968 | 17,2506 | 21=712 0 | | DAS | NY2TMP | |
| 1355 | REP | 9 | LAST | 968 | 17,2507 | 4 1606 1 | | CS | NY0 +1 | |
| 1356 | | | | | 17,2510 | 0 0006 1 | | EXTEND | | |
| 1357 | REP | 2 | LAST | 968 | 17,2511 | 7 1440 1 | | MP | BY2 | |
| 1358 | REP | 3 | LAST | 968 | 17,2512 | 27=712 0 | | ADS | NY2TMP +1 | |
| 1359 | REP | 115 | LAST | 968 | 17,2513 | 54 001 1 | | TS | L | |
| 1360 | | | | | 17,2514 | 1 2516 0 | | TCP | +2 | |
| 1361 | REP | 4 | LAST | 968 | 17,2515 | 27=711 0 | | ADS | NY2TMP | |
| 1362 | REP | 10 | LAST | 968 | 17,2516 | 4 1605 1 | | CS | NY0 | |
| 1363 | | | | | 17,2517 | 0 0006 1 | | EXTEND | | |
| 1364 | REP | 3 | LAST | 968 | 17,2520 | 7 1441 0 | | MP | BY2 +1 | |
| 1365 | REP | 5 | LAST | 968 | 17,2521 | 27=712 0 | | ADS | NY2TMP +1 | |
| 1366 | REP | 116 | LAST | 968 | 17,2522 | 54 001 1 | | TS | L | |
| 1367 | | | | | 17,2523 | 1 2525 0 | | TCP | +2 | |
| 1368 | REP | 6 | LAST | 968 | 17,2524 | 27=711 0 | | ADS | NY2TMP | |
| 1369 | REP | 4 | LAST | 968 | 17,2525 | 31=742 1 | AY2(EY) | CAB | EY | DPXSP MULTIPLY FOR NUMERATOR COMPONENT |
| 1370 | | | | | 17,2526 | 0 0006 1 | | EXTEND | | |
| 1371 | REP | 1 | | | 17,2527 | 7 1432 1 | | MP | AY2 | |
| 1372 | REP | 7 | LAST | 968 | 17,2530 | 21=712 0 | | DAS | NY2TMP | |
| 1373 | REP | 5 | LAST | 968 | 17,2531 | 31=742 1 | | CAB | EY | |
| 1374 | | | | | 17,2532 | 0 0006 1 | | EXTEND | | |
| 1375 | REP | 2 | LAST | 968 | 17,2533 | 7 1433 0 | | MP | AY2 +1 | |



L TVCGEN3/FILTERS

| | | | | | | | | | |
|-------|-----|-----|------|-----|---------|--------|------|---------|-----------|
| 1376 | REP | 8 | LAST | 968 | 17,2534 | 27-712 | 0 | ADS | NY2TMP +1 |
| 1377 | REP | 117 | LAST | 968 | 17,2535 | 54 | 001 | TS | L |
| 1378 | | | | | 17,2536 | 1 | 2540 | TCP | +2 |
| 1379 | REP | 9 | LAST | 969 | 17,2537 | 27-711 | 0 | ADS | NY2TMP |
| 1380 | REP | 11 | LAST | 968 | 17,2540 | 4 | 1605 | NY3NODE | CS NY0 |
| 1381 | | | | | 17,2541 | 0 | 0006 | EXTEND | |
| 1382 | REP | 1 | | | 17,2542 | 7 | 1442 | MP | BY3 |
| 1383 | REP | 1 | | | 17,2543 | 53-714 | 0 | DXCH | NY3TMP |
| 1384 | REP | 12 | LAST | 969 | 17,2544 | 4 | 1606 | CS | NY0 +1 |
| 1385 | | | | | 17,2545 | 0 | 0006 | EXTEND | |
| 1386 | REP | 2 | LAST | 969 | 17,2546 | 7 | 1442 | MP | BY3 |
| 1387 | REP | 2 | LAST | 969 | 17,2547 | 27-714 | 0 | ADS | NY3TMP +1 |
| 1388 | REP | 118 | LAST | 969 | 17,2550 | 54 | 001 | TS | L |
| 1389 | | | | | 17,2551 | 1 | 2553 | TCP | +2 |
| 1390 | REP | 3 | LAST | 969 | 17,2552 | 27-713 | 1 | ADS | NY3TMP |
| 1391 | REP | 13 | LAST | 969 | 17,2553 | 4 | 1605 | CS | NY0 |
| 1392 | | | | | 17,2554 | 0 | 0006 | EXTEND | |
| 1393 | REP | 3 | LAST | 969 | 17,2555 | 7 | 1443 | MP | BY3 +1 |
| 1394 | REP | 4 | LAST | 969 | 17,2556 | 27-714 | 0 | ADS | NY3TMP +1 |
| 1395 | REP | 119 | LAST | 969 | 17,2557 | 54 | 001 | TS | L |
| 1396 | | | | | 17,2560 | 1 | 2562 | TCP | +2 |
| 1397 | REP | 5 | LAST | 969 | 17,2561 | 27-713 | 1 | ADS | NY3TMP |
| 1398 | REP | 6 | LAST | 968 | 17,2562 | 31-742 | 1 | AY3(EY) | CAB EY |
| 1399 | | | | | 17,2563 | 0 | 0006 | EXTEND | |
| 1400 | REP | 1 | | | 17,2564 | 7 | 1434 | MP | AY3 |
| 1401 | REP | 6 | LAST | 969 | 17,2565 | 21-714 | 0 | DAS | NY3TMP |
| 1402 | REP | 7 | LAST | 969 | 17,2566 | 31-742 | 1 | CAB | EY |
| 1403 | | | | | 17,2567 | 0 | 0006 | EXTEND | |
| 1404 | REP | 2 | LAST | 969 | 17,2570 | 7 | 1435 | MP | AY3 +1 |
| 1405 | REP | 7 | LAST | 969 | 17,2571 | 27-714 | 0 | ADS | NY3TMP +1 |
| 1406 | REP | 120 | LAST | 969 | 17,2572 | 54 | 001 | TS | L |
| 1407 | | | | | 17,2573 | 1 | 2575 | TCP | +2 |
| 1408 | REP | 8 | LAST | 969 | 17,2574 | 27-713 | 1 | ADS | NY3TMP |
| A1409 | | | | | | | | | |
| 1410 | REP | 57 | LAST | 967 | 17,2575 | 0 | 4574 | TC | POSTJUMP |
| 1411 | REP | 1 | | | 17,2576 | 41015 | 0 | CADR | DELBARY |
| A1412 | | | | | | | | | |

COMPLETED NODE NY2

FORM NODE NY3...NO PAST NODES, DIRECT TO DPXSP MULTIPLY FOR DENOMINATOR COMPONENT

DPXSP MULTIPLY FOR NUMERATOR COMPONENT

COMPLETED NODE NY3, AND YAW GEN3DAP FILTER COMPUTATIONS RETURN TO CSMDAP CODING FOR YAW OFFSET-TRACKER-FILTER COMPUTATIONS, AND YAW DAP COPYCYCLE.



L MYSUBS

| | | | | | | |
|------|-------|----------|-----|---------|--------|---------------|
| 0001 | | | | 20,3565 | | BANK 20 |
| 0002 | REP 1 | | | 21,2000 | | SETLOC MYSUBS |
| 0003 | | | | 21,2026 | | BANK |
| 0004 | REP 3 | LAST 202 | E6, | 1510 | | EBANK= KMPAC |
| 0005 | REP 1 | | | 4767 | SPCOS1 | EQUALS SPCOS |
| 0006 | REP 1 | | | 4770 | SPSIN1 | EQUALS SPSIN |
| 0007 | REP 2 | LAST 970 | | 4767 | SPCOS2 | EQUALS SPCOS |
| 0008 | REP 2 | LAST 970 | | 4770 | SPSIN2 | EQUALS SPSIN |
| 0009 | REP 1 | | | | COUNT | 21/DARMS |

R0010 ONE AND ONE HALF PRECISION MULTIPLICATION ROUTINE

| | | | | | | | | |
|------|---------|----------|---------|----------|---------|--------|----------|--------|
| 0011 | REP 2 | LAST 106 | 21,2026 | 55=512 1 | SMALLMP | TS | KMPTEMP | A(X+Y) |
| 0012 | | | 21,2027 | 0 0006 1 | | EXTEND | | |
| 0013 | REP 4 | LAST 970 | 21,2030 | 7 1511 1 | | MP | KMPAC +1 | |
| 0014 | REP 5 | LAST 970 | 21,2031 | 55=511 1 | | TS | KMPAC +1 | AY |
| 0015 | REP 172 | LAST 959 | 21,2032 | 3 4714 1 | | CAP | ZERO | |
| 0016 | REP 6 | LAST 970 | 21,2033 | 57=510 1 | | XCH | KMPAC | |
| 0017 | | | 21,2034 | 0 0006 1 | | EXTEND | | |
| 0018 | REP 3 | LAST 970 | 21,2035 | 7 1512 1 | | MP | KMPTEMP | AX |
| 0019 | REP 7 | LAST 970 | 21,2036 | 21=511 1 | | DAS | KMPAC | AX+AY |
| 0020 | REP 189 | LAST 945 | 21,2037 | 0 0002 0 | | TC | 0 | |

R0021 SUBROUTINE FOR DOUBLE PRECISION ADDITIONS OF ANGLES
R0022 A AND L CONTAIN A DP(18) ANGLE SCALED BY 180 DEGS TO BE ADDED TO KMPAC.
R0023 RESULT IS PLACED IN KMPAC. TIMING = 6 MCT (22 MCT ON OVERFLOW)

| | | | | | | | | |
|------|---------|----------|---------|----------|--------|--------|----------|----------------------|
| 0024 | REP 6 | LAST 970 | 21,2040 | 21=511 1 | DPADD | DAS | KMPAC | |
| 0025 | | | 21,2041 | 0 0006 1 | | EXTEND | | |
| 0026 | REP 1 | | 21,2042 | 1 2057 0 | | BZF | TSK +1 | NO OVERFLOW |
| 0027 | REP 9 | LAST 970 | 21,2043 | 11=510 0 | | CCS | KMPAC | |
| 0028 | REP 1 | | 21,2044 | 1 2060 1 | | TCF | DPADD+ | + OVERFLOW |
| 0029 | | | 21,2045 | 1 2047 1 | | TCF | +2 | |
| 0030 | REP 1 | | 21,2046 | 1 2062 0 | | TCF | DPADD- | - OVERFLOW |
| 0031 | REP 10 | LAST 970 | 21,2047 | 11=511 1 | | CCS | KMPAC +1 | |
| 0032 | REP 1 | | 21,2050 | 1 2065 1 | | TCF | DPADD2+ | UPPER = 0, LOWER + |
| 0033 | | | 21,2051 | 1 2053 1 | | TCF | +2 | |
| 0034 | | | 21,2052 | 4 0000 0 | | COM | | UPPER = 0, LOWER - |
| 0035 | REP 22 | LAST 957 | 21,2053 | 6 4672 0 | | AD | POS MAX | LOWER = 0, A=0 |
| 0036 | REP 11 | LAST 970 | 21,2054 | 55=511 1 | | TS | KMPAC +1 | CAN NOT OVERFLOW |
| 0037 | REP 23 | LAST 970 | 21,2055 | 3 4672 0 | | CA | POS MAX | UPPER WAS = 0 |
| 0038 | REP 12 | LAST 970 | 21,2056 | 55=510 0 | TSK | TS | KMPAC | |
| 0039 | REP 190 | LAST 970 | 21,2057 | 0 0002 0 | | TC | 0 | |
| 0040 | REP 5 | LAST 957 | 21,2060 | 6 4674 0 | DPADD+ | AD | NEG MAX | KMPAC GREATER THAN 0 |
| 0041 | REP 2 | LAST 970 | 21,2061 | 1 2056 1 | | TCF | TSK | |

L MYSUBS

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| | | | | | | | | | | | |
|------|-----|----|------|---------|---------|------|------|--------|---------|----------|-------------------|
| 0042 | | | | 21,2062 | 4 | 0000 | 0 | DPADD- | CON | | |
| 0043 | REP | 24 | LAST | 970 | 21,2063 | 6 | 4672 | 0 | AD | POS MAX | KMPAC LESS THAN 0 |
| 0044 | REP | 3 | LAST | 970 | 21,2064 | 1 | 2056 | 1 | TCP | TSK | |
| 0045 | REP | 6 | LAST | 970 | 21,2065 | 6 | 4674 | 0 | DPADD2+ | AD | NEG MAX |
| 0046 | REP | 13 | LAST | 970 | 21,2066 | 55 | 511 | 1 | TS | KMPAC +1 | CAN NOT OVERFLOW |
| 0047 | REP | 7 | LAST | 971 | 21,2067 | 3 | 4674 | 0 | CA | NEG MAX | UPPER WAS = 0 |
| 0048 | REP | 4 | LAST | 971 | 21,2070 | 1 | 2056 | 1 | TCP | TSK | |



L NYSUBS



L RCS-CSM DIGITAL AUTOPILOT

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P0001 TS INTERRUPT PROGRAM FOR THE RCS-CSM AUTOPILOT
R0002 START OF TS INTERRUPT PROGRAM
0003                                20,3565
0004 RESP 2 LAST 691 21,2000
0005                                21,2071

0006 RESP 1                                COUNT 21/DAPRC

0007 RESP 14 LAST 971 E6,1510
0008 RESP 16 LAST 959 21,2071 22 016 0 REDORCS
0009 RESP 2 LAST 692 21,2072 3 1465 1
0010                                21,2073 0 0006 1
00101                                21,2074 6 2076 1
00102                                21,2075 1 2100 0
00103 RESP 102 LAST 956 21,2076 4 4712 0
00104 RESP 3 LAST 973 21,2077 55=465 0
0011                                21,2100 0 0008 1
0012 RESP 1                                21,2101 3 2105 1
0013 RESP 19 LAST 936 21,2102 53=313 0
0014 RESP 3 LAST 692 21,2103 1 2107 1
0015 RESP 15 LAST 973 E6,1510
0016 RESP 4 LAST 973 21,2104 02106 1 RCSLOC
0016                                21,2105 42066 1
0017 RESP 17 LAST 973 21,2106 22 016 0 RCSATT
0018                                21,2107 0 0008 1
0019 RESP 13 LAST 930 21,2110 22 012 1
0020 RESP 40 LAST 958 21,2111 3 4674 0
0021                                21,2112 0 0006 1
0022 RESP 5 LAST 682 21,2113 02 031 1
0023                                21,2114 0 0006 1
0024 RESP 1                                21,2115 1 2144 0
A0025

0026 RESP 14 LAST 901 21,2116 4 1501 0
0027 RESP 51 LAST 953 21,2117 7 4675 0
0028 RESP 15 LAST 973 21,2120 27=501 0
0029 RESP 25 LAST 971 21,2121 3 4672 0
0030 RESP 7 LAST 690 21,2122 55=332 0
00301 RESP 173 LAST 970 21,2123 3 4714 1
00302 RESP 5 LAST 173 21,2124 55=567 0
00303 RESP 3 LAST 111 21,2125 55=570 0
00304 RESP 2 LAST 107 21,2126 55=571 1
0031 RESP 52 LAST 973 21,2127 3 4675 1
0032                                21,2130 0 0006 1
0033 RESP 6 LAST 973 21,2131 02 031 1
003309                                21,2132 0 0006 1
    
```

```

BANK 20
SETLOC DAP53
BANK

COUNT 21/DAPRC

EBANK= KMPAC
LXCH BANKRUPT
CA TSPHASE
EXTEND
RZMP +2
TCP +3
CS ONE
TS TSPHASE
EXTEND
DCA RCSLOC
DXCH TSLC
TCP RCSATT +1
EBANK= KMPAC
ZCADR RCSATT

LXCH BANKRUPT
EXTEND
OXCH ORUPT
CAP BIT15
EXTEND
RAND CHAN31
EXTEND
RZP SETTS

CS RCSFLAGS
MASK BIT14
ADS RCSFLAGS
CAP POSMAX
TS HOLDFLAG
CAP ZERO
TS ERRORX
TS ERRORY
TS ERRORZ
CAP BIT14
EXTEND
RAND CHAN31
EXTEND

RESTART OF AUTOPILOT COMES HERE
ON A TS RUPT.

IF TSPHASE +0, -0, OR -, RESET TO -
IF TSPHASE +, LEAVE IT +. DO A PRES-DAP

HOOK UP TS RUPT TO AUTOPILOT

SAVE RR
SAVE 0

BIT15 CHAN31 = 0 IF IMU POWER IS ON AND
S/C CONT SW IS IN CMC (I.E. IF G/C AUTO
PILOT IS FULLY ENABLED)

IF G/C AUTOPILOT IS FULLY ENABLED,
GO TO SETTS

IF G/C AUTOPILOT IS NOT FULLY ENABLED,
SET NORATE FLAG,
SET HOLDFLAG +,
ZERO ERRORX, ERRORY, AND ERRORZ,

AND CHECK FREE FUNCTION (BIT14 CHAN31).
    
```

L RCS-CSM DIGITAL AUTOPILOT

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| | | | | | | | | | | |
|-------|-----|----|------|-----|---------|--------|---|----------|-----------|--|
| 00331 | REF | 2 | LAST | 973 | 21,2133 | 1 2144 | 0 | BZF | SETTS | IP IN FREE MODE, GO TO SETTS. |
| 00332 | REF | 4 | LAST | 973 | 21,2134 | 55=465 | 0 | TS | TS PHASE | IF NOT IN FREE MODE, |
| 00333 | REF | 1 | | | 21,2135 | 3 7676 | 1 | CAP | OCT37768 | SCHEDULE REINITIALIZATION (FRESHDAP) |
| 00334 | REF | 15 | LAST | 936 | 21,2136 | 54 030 | 0 | TS | TIMES | IN 100 MS VIA T\$RUPT |
| 00335 | REF | 3 | LAST | 690 | 21,2137 | 0 2616 | 1 | TCR | ZEROJET | ZERO JET CHANNELS IN 14 MS VIA ZEROJET |
| 0034 | REF | 1 | | | 21,2140 | 1 2334 | 0 | TCP | KMATRIX | |
| 0035 | | | | | 21,2141 | 37770 | 0 | DELTATT | OCT 37770 | 60MS (TIMES) |
| 0036 | | | | | 21,2142 | 37776 | 0 | DELTATT2 | OCT 37776 | 20MS (TIMES) |
| 0037 | | | | | 21,2143 | 37634 | 1 | QNBSEK | DEC 16284 | 1 SEC(TIMES) |
| 0038 | | | | | 0005 | | | CHAN5 | EQUALS 5 | |
| 0039 | | | | | 0006 | | | CHAN6 | EQUALS 6 | |
| 0043 | REF | 4 | LAST | 227 | 7671 | | | PRI034A | = | PRI034 |
| R0044 | | | | | | | | | | CHECK PHASE OF TS PROGRAM |

R0045 BECAUSE OF THE LENGTH OF THE TS PROGRAM, IT HAS BEEN DIVIDED INTO
R0046 THREE PARTS, TS PHASE1, TS PHASE2, AND THE JET SELECTION LOGIC,
R0047 TO ALLOW FOR THE EXECUTION OF OTHER
R0048 INTERRUPTS. TS PHASE IS ALSO USED IN THE INITIALIZATION OF THE AUTOPILOT
R0049 VARIABLES AT TURN ON.
R0050 THE CODING OF TS PHASE IS...

| | | | | | | | | | | |
|-------|--|--|--|--|--|--|--|--|--|--|
| R0051 | | | | | | | | | | + = INITIALIZE TS RCS-CSM AUTOPILOT |
| R0052 | | | | | | | | | | TS PHASE = +0 = PHASE2 OF THE TS PROGRAM |
| R0053 | | | | | | | | | | - = RESTART DAP |
| R0054 | | | | | | | | | | -0 = PHASE1 OF THE TS PROGRAM |

| | | | | | | | | | | | |
|------|-----|----|------|-----|---------|--------|---|-------|-----------|---------------------------------------|--|
| 0055 | REF | 5 | LAST | 974 | 21,2144 | 11=465 | 0 | SETTS | CCS | TS PHASE | |
| 0056 | REF | 1 | | | 21,2145 | 1 2530 | 1 | TCP | FRESHDAP | TURN ON AUTOPILOT | |
| 0057 | REF | 1 | | | 21,2146 | 1 2645 | 0 | TCP | TS PHASE2 | BRANCH TO PHASE2 OF PROGRAM | |
| 0058 | REF | 1 | | | 21,2147 | 1 2532 | 0 | TCP | REDAP | RESTART AUTOPILOT | |
| 0059 | REF | 6 | LAST | 974 | 21,2150 | 55=465 | 0 | TS | TS PHASE | PHASE 1 RESET FOR PHASE 2 | |
| 0060 | REF | 16 | LAST | 974 | 21,2151 | 3 0030 | 1 | CA | TIMES | | |
| 0061 | REF | 2 | LAST | 107 | 21,2152 | 55=634 | 0 | TS | TS TIME | USED IN COMPENSATING FOR DELAYS IN TS | |
| 0062 | REF | 1 | | | 21,2153 | 3 2142 | 1 | CAP | DELTATT2 | RESET FOR T\$RUPT IN 20MS FOR PHASE2 | |
| 0063 | REF | 17 | LAST | 974 | 21,2154 | 54 030 | 0 | TS | TIMES | OF PROGRAM | |

L RCS-CSM DIGITAL AUTOPILOT

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P0064 IMU STATUS CHECK

| | | | | | | | | | | |
|-------|-----|-----|------|-----|---------|--------|---|---------|----------|----------|
| 0065 | REP | 26 | LAST | 361 | 21,2155 | 4 1321 | 1 | | CS | IMODES33 |
| 0066 | REP | 36 | LAST | 777 | 21,2156 | 7 4705 | 0 | | MASK | BIT6 |
| 0067 | REP | 220 | LAST | 967 | 21,2157 | 10 000 | 0 | | CCS | A |
| 0068 | REP | 1 | | | 21,2160 | 1 2174 | 0 | | TCP | RATEPILT |
| 0069 | REP | 16 | LAST | 973 | 21,2161 | 4 1501 | 0 | FREECHK | CS | RCSFLAGS |
| 0070 | REP | 53 | LAST | 973 | 21,2162 | 7 4675 | 0 | | MASK | BIT14 |
| 0071 | REP | 17 | LAST | 975 | 21,2163 | 27=501 | 0 | | ADS | RCSFLAGS |
| 0072 | REP | 54 | LAST | 975 | 21,2164 | 3 4675 | 1 | | CAP | BIT14 |
| 0073 | REP | 6 | LAST | 973 | 21,2165 | 55=332 | 0 | | TS | HOLDFLAG |
| A0074 | | | | | | | | | | |
| A0075 | | | | | | | | | | |
| 0076 | | | | | 21,2166 | 0 0006 | 1 | | EXTEND | |
| 0077 | REP | 7 | LAST | 973 | 21,2167 | 02 031 | 1 | | RAND | CHAN31 |
| 0078 | | | | | 21,2170 | 0 0006 | 1 | | EXTEND | |
| 0079 | REP | 1 | | | 21,2171 | 1 2403 | 0 | | BZF | KRESUME1 |
| 0080 | REP | 1 | | | 21,2172 | 1 2520 | 0 | | TCP | REINIT |
| 0081 | | | | | 21,2173 | 00030 | 1 | | BITS4,5 | OCT 30 |
| 0082 | REP | 18 | LAST | 975 | 21,2174 | 3 1501 | 1 | | RATEPILT | CA |
| 0083 | REP | 55 | LAST | 975 | 21,2175 | 7 4675 | 0 | | MASK | BIT14 |
| 0084 | | | | | 21,2176 | 0 0006 | 1 | | EXTEND | |
| 0085 | | | | | 21,2177 | 1 2201 | 1 | | BZF | +2 |
| 0086 | REP | 2 | LAST | 974 | 21,2200 | 1 2334 | 0 | | TCP | KMATRIX |

CHECK IMU STATUS
 BIT6 = 0 IMU OK
 BIT6 = 1 NO IMU

 BIT14 INDICATES THAT RATES HAVE NOT BEEN INITIALIZED

 NO ATTITUDE REFERENCE
 STOP ANY AUTOMATIC STEERING AND PREPARE TO PICK UP CDU ANGLES UPON RESUMPTION OF ATTITUDE HOLD

R0087 RATE FILTER TIMING = 7.72MS

R0088 RATE FILTER EQUATIONS
 R0089 $DRHO = DELRHO - (.1)ADOT + (1 - GAIN1)DRHO$
 R0090
 R0091 $ADOT = ADOT + GAIN2 DRHO + KMJ DPT$
 R0092 -1
 R0093 *
 R0094 WHERE DELRHO = ANGR (CDU - CDU)
 R0095 -1

| | | | | | | | | | | |
|------|-----|----|------|-----|---------|--------|---|---------|--------|----------|
| 0096 | REP | 38 | LAST | 905 | 21,2201 | 3 4711 | 1 | | CAP | TWO |
| 0097 | REP | 3 | LAST | 110 | 21,2202 | 55=506 | 1 | DRHLOOP | TS | SPNDX |
| 0098 | | | | | 21,2203 | 6 0000 | 1 | | DOUBLE | |
| 0099 | REP | 2 | LAST | 106 | 21,2204 | 55=507 | 0 | | TS | DPNDX |
| 0100 | REP | 3 | LAST | 975 | 21,2205 | 51=507 | 1 | | INDEX | DPNDX |
| 0101 | REP | 2 | LAST | 106 | 21,2206 | 4 1552 | 0 | | CS | DRHO |
| 0102 | | | | | 21,2207 | 0 0006 | 1 | | EXTEND | |
| 0103 | REP | 2 | LAST | 107 | 21,2210 | 5 1617 | 0 | | INDEX | ATTKALMN |
| 0104 | REP | 1 | | | 21,2211 | 7 3063 | 0 | | MP | GAIN1 |
| 0105 | REP | 4 | LAST | 975 | 21,2212 | 51=507 | 1 | | INDEX | DPNDX |
| 0106 | REP | 3 | LAST | 975 | 21,2213 | 21=553 | 1 | | DAS | DRHO |
| 0107 | | | | | 21,2214 | 0 0006 | 1 | | EXTEND | |

CHECK FOR FREE MODE

 IN FREE MODE PROVIDE FREE CONTROL ONLY
TILT.....

 SEE IF RATEFILTER HAS BEEN INITIALIZED

 IF SO, PROCEED WITH RATE DERIVATION

 IF NOT, SKIP RATE DERIVATION

DRHO SCALED 180 DEGS

 PICK UP DESIRED FILTER GAIN

 (.1 -.064)DRHO

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0108 REP 5 LAST 975 21,2215 5 1507 1
 0109 REP 6 LAST 108 21,2216 4 1534 0
 0110 REP 16 LAST 973 21,2217 53=511 1
 0111 REP 2 LAST 280 21,2220 3 4676 1
 0112 REP 1 21,2221 0 2026 1
 0113 REP 17 LAST 976 21,2222 53=511 1
 0114 REP 6 LAST 976 21,2223 51=507 1
 0115 REP 4 LAST 975 21,2224 21=553 1
 0116 REP 4 LAST 975 21,2225 11=506 1
 0117 REP 1 21,2226 1 2202 1

 0118 REP 20 LAST 904 21,2227 3 0032 0
 0119 REP 2 LAST 107 21,2230 57=635 0
 0120 21,2231 0 0006 1
 0121 REP 3 LAST 976 21,2232 21=635 1
 0122 21,2233 4 0000 0
 A0123
 0124 21,2234 22 007 0
 01241 REP 2 LAST 106 21,2235 53=516 0
 0125 REP 11 LAST 936 21,2236 3 0033 1
 0126 REP 2 LAST 107 21,2237 57=636 0
 0127 21,2240 0 0006 1
 0128 REP 3 LAST 976 21,2241 21=636 1
 0129 21,2242 4 0000 0
 0130 REP 1 21,2243 55=502 0
 0131 21,2244 0 0006 1
 0132 REP 2 LAST 107 21,2245 7 1640 0
 0133 REP 3 LAST 976 21,2246 21=516 0
 A0134
 A0135
 0136 REP 2 LAST 108 21,2247 3 1641 0
 0137 21,2250 0 0006 1
 0138 REP 2 LAST 976 21,2251 7 1502 0
 0139 REP 2 LAST 106 21,2252 53=520 0
 0140 REP 2 LAST 108 21,2253 3 1643 1
 0141 21,2254 0 0006 1
 0142 REP 3 LAST 976 21,2255 7 1502 0
 0143 REP 1 21,2256 53=522 1
 0144 REP 14 LAST 936 21,2257 3 0034 0
 0145 REP 2 LAST 107 21,2260 57=637 1
 0146 21,2261 0 0006 1
 0147 REP 3 LAST 976 21,2262 21=637 0
 0148 21,2263 4 0000 0
 0149 REP 4 LAST 976 21,2264 55=502 0
 0150 21,2265 0 0006 1
 0151 REP 2 LAST 108 21,2266 7 1642 1
 0152 REP 3 LAST 976 21,2267 21=520 0
 A01521
 0153 REP 2 LAST 108 21,2270 3 1644 0
 0154 21,2271 0 0006 1

INDEX DPNDX
 DCS ADOT
 DXCH KMPAC
 CA QUARTER
 TC SMALLMP
 DXCH KMPAC
 INDEX DPNDX
 DAS DRHO
 CCS SPNDX
 TCF DRHLOOP

 CA CDUX
 XCH RHO
 EXTEND
 MSU RHO
 COM

 ZL
 DXCH DELTEMPX
 CA CDUY
 XCH RHO1
 EXTEND
 MSU RHO1
 COM
 TS TSTEMP
 EXTEND
 MP AMCR1
 DAS DELTEMPX

 CA AMCR4
 EXTEND
 MP TSTEMP
 DXCH DELTEMPY
 CA AMCR7
 EXTEND
 MP TSTEMP
 DXCH DELTEMPZ
 CA CDUZ
 XCH RHO2
 EXTEND
 MSU RHO2
 COM
 TS TSTEMP
 EXTEND
 MP AMCR5
 DAS DELTEMPY

 CA AMCR8
 EXTEND

-(.1)ADOT

MEASURED BODY RATES--

$$\text{DEL RHO} = \text{AMCR} (\text{CDU} - \text{CDU}') - 1$$

$$(\text{CDUY} - \text{RHO1}) \text{ SCALED } 90 \text{ DEGS}$$

$$\text{DELTEMPX} = (\text{CDUX} - \text{RHO}) + \text{AMCR1} (\text{CDUY} - \text{RHO1})$$

MUST BE DOUBLE PRECISION OR WILL LOSE PULSES

$$(\text{CDUZ} - \text{RHO2}) \text{ SCALED } 90 \text{ DEGS}$$

$$\text{DELTEMPY} = \text{AMCR4} (\text{CDUY} - \text{RHO1}) + \text{AMCR5} (\text{CDUZ} - \text{RHO2})$$

L MCS-C84 DIGITAL AUTOPILOT

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| | | | | | | | | |
|--------|-----|-----|------|-----|---------|----------|----------|-----------|
| 0155 | REP | 5 | LAST | 976 | 21,2272 | 7 1502 0 | MP | TS TEMP |
| 0156 | REP | 2 | LAST | 976 | 21,2273 | 21=522 1 | DAS | DELTEMPZ |
| A01561 | | | | | | | | |
| 0157 | REP | 39 | LAST | 975 | 21,2274 | 3 4711 1 | CAP | TWO |
| 0158 | REP | 5 | LAST | 976 | 21,2275 | 55=508 1 | ADOTLOOP | TS SPNDX |
| 0159 | | | | | 21,2276 | 6 0000 1 | DOUBLE | |
| 0160 | REP | 7 | LAST | 976 | 21,2277 | 55=507 0 | TS | DPNDX |
| 01601 | | | | | 21,2300 | 0 0006 1 | EXTEND | |
| 01602 | REP | 8 | LAST | 977 | 21,2301 | 5 1507 1 | INDEX | DPNDX |
| 01603 | REP | 4 | LAST | 976 | 21,2302 | 3 1516 1 | DCA | DELTEMPX |
| 01604 | REP | 9 | LAST | 977 | 21,2303 | 51=507 1 | INDEX | DPNDX |
| 01605 | REP | 5 | LAST | 976 | 21,2304 | 21=553 1 | DAS | DRHO |
| 01606 | | | | | 21,2305 | 0 0006 1 | EXTEND | |
| 01607 | REP | 10 | LAST | 977 | 21,2306 | 5 1507 1 | INDEX | DPNDX |
| 01608 | REP | 5 | LAST | 977 | 21,2307 | 3 1516 1 | DCA | DELTEMPX |
| 01609 | REP | 11 | LAST | 977 | 21,2310 | 51=507 1 | INDEX | DPNDX |
| 016091 | REP | 2 | LAST | 106 | 21,2311 | 21=542 1 | DAS | MERRORX |
| 0161 | REP | 12 | LAST | 977 | 21,2312 | 51=507 1 | INDEX | DPNDX |
| 0162 | REP | 6 | LAST | 977 | 21,2313 | 3 1552 1 | CA | DRHO |
| 0163 | | | | | 21,2314 | 6 0000 1 | DOUBLE | |
| 0164 | | | | | 21,2315 | 6 0000 1 | DOUBLE | |
| 0165 | | | | | 21,2316 | 0 0006 1 | EXTEND | |
| 0166 | REP | 3 | LAST | 975 | 21,2317 | 5 1617 0 | INDEX | ATTRKALMN |
| 0167 | REP | 1 | | | 21,2320 | 7 3101 0 | MP | GAIN2 |
| 0168 | REP | 13 | LAST | 977 | 21,2321 | 51=507 1 | INDEX | DPNDX |
| 0169 | REP | 7 | LAST | 976 | 21,2322 | 21=534 0 | DAS | ADOT |
| 0170 | REP | 6 | LAST | 977 | 21,2323 | 51=508 0 | INDEX | SPNDX |
| 0171 | REP | 3 | LAST | 691 | 21,2324 | 3 1620 1 | CA | KMJ |
| 0172 | | | | | 21,2325 | 0 0006 1 | EXTEND | |
| 0173 | REP | 7 | LAST | 977 | 21,2326 | 5 1506 0 | INDEX | SPNDX |
| 0174 | REP | 2 | LAST | 106 | 21,2327 | 7 1547 1 | MP | DPT |
| 0175 | REP | 14 | LAST | 977 | 21,2330 | 51=507 1 | INDEX | DPNDX |
| 0176 | REP | 6 | LAST | 977 | 21,2331 | 21=534 0 | DAS | ADOT |
| 0177 | REP | 8 | LAST | 977 | 21,2332 | 11=508 1 | OCS | SPNDX |
| 0178 | REP | 1 | | | 21,2333 | 1 2275 1 | TCF | ADOTLOOP |
| 0179 | REP | 2 | LAST | 107 | 21,2334 | 3 1560 0 | CA | ATTSEC |
| 0180 | REP | 2 | LAST | 833 | 21,2335 | 7 4721 0 | MASK | LOW4 |
| 0181 | REP | 221 | LAST | 975 | 21,2336 | 10 000 0 | OCS | A |
| 0182 | REP | 1 | | | 21,2337 | 1 2345 0 | TCF | TENTHSEK |
| 0183 | REP | 5 | LAST | 974 | 21,2340 | 3 7671 0 | CAP | PRI034 |
| 0184 | REP | 28 | LAST | 829 | 21,2341 | 0 5027 1 | TC | NOVAC |
| 0185 | REP | 18 | LAST | 976 | E6,1510 | | ERANK= | KMPAC |
| 0186 | REP | 1 | | | 21,2342 | 03444 0 | 2CADR | AMBLOUPDT |
| 0186 | REP | 1 | | | 21,2343 | 44066 1 | | |
| 0187 | REP | 4 | LAST | 918 | 21,2344 | 3 4334 1 | CAP | NINE |
| 0188 | REP | 3 | LAST | 977 | 21,2345 | 55=560 1 | TENTHSEK | TS ATTSEC |

DELTEMPZ = AMCB7(CDUY-RHO1)
+ AMCB8(CDUZ-RHO2)

N.B.
N.B.
PICK UP DESIRED FILTER GAINS
ADOT + (.16)(.1)DRHO
-1
S/C TORQUE TO INERTIA RATIO
SCALED (450)(1600)/(57.3)(16384)=1/1.3

KMJ(DPT)
END CALCULATION OF VEHICLE RATES

CALL FOR 1 SEC UPDATE OF TRANSFORMATION
MATRIX FROM GIMBAL AXRS TO BODY AXRS



L RCS-CM DIGITAL AUTOPILOT USER-5 PAGE NO. 6 E6 S3

R0189 WHEN AUTOMATIC MANEUVERS ARE BEING PERFORMED, THE FOLLOWING ANGLE ADDITION MUST BE MADE TO PROVIDE A SMOOTH
 R0191 SEQUENCE OF ANGULAR COMMANDS TO THE AUTOPILOT--

R0192 CDUXD = CDUXD + DELCDUX (DOUBLE PRECISION)
 R0193 CDUYD = CDUYD + DELCDUY (DOUBLE PRECISION)
 R0194 CDUZD = CDUZD + DELCDUZ (DOUBLE PRECISION)

R0195 THE STEERING PROGRAMS--
 R0196 1) ATTITUDE MANEUVER ROUTINE
 R0198 2) LEM TRACKING

R0199 SHOULD GENERATE THE DESIRED ANGLES (CDUXD, CDUYD, CDUZD) AS WELL AS THE INCREMENTAL ANGLES (DELCDUX, DELCDUY,
 R0201 DELCDUZ) SO THAT THE GIMBAL ANGLE COMMANDS CAN BE INTERPOLATED BETWEEN UPDATES.

R0203 HOLDFLAG CODING--

R0204 + = GRAB PRESENT CDU ANGLES AND STORE IN THETADX, THETADY, THETADZ
 R0205 AND PERFORM ATTITUDE HOLD ABOUT THESE ANGLES
 R0206 ALSO IGNORE AUTOMATIC STEERING

R0207 SET = + BY
 R0208 1) INITIALIZATION PHASE OF AUTOPILOT
 R0209 2) OCCURRENCE OF RHC COMMANDS
 R0210 3) FREE MODE
 R0211 4) SWITCH OVER TO ATTITUDE HOLD FROM AUTO
 R0212 WHILE DOING AUTOMATIC STEERING (IN THIS CASE
 R021203 HOLDFLAG IS NOT ACTUALLY SET TO +, BUT THE LOGIC
 R021205 FUNCTIONS AS IF IT WERE.)
 R02121 5) S/C CONTROL SWITCH IN SCS
 R02122 6) IMU POWER OFF

R0213 +0 = IN ATTITUDE HOLD ABOUT A PREVIOUSLY ESTABLISHED REFERENCE
 R0214 - = PERFORMING AUTOMATIC MANEUVER
 R0215 -0 = NOT USED AT PRESENT

R0216 NOTE THAT THIS FLAG MUST BE SET = - BY THE STEERING PROGRAM IF IT IS TO COMMAND THE AUTOPILOT.
 R0218 SINCE ASTRONAUT ACTION MAY CHANGE THE HOLDFLAG SETTING, IT SHOULD BE MONITORED BY THE STEERING PROGRAM TO
 R0220 DETERMINE IF THE AUTOMATIC SEQUENCE HAS BEEN INTERRUPTED AND IF SO, TAKE APPROPRIATE ACTION.

| | | | | | | | | | | | |
|-------|-----|-----|------|-----|---------|----|------|---|---------|----------|--|
| R0222 | REF | 9 | LAST | 975 | 21,2346 | 4 | 1332 | 0 | CS | HOLDFLAG | |
| 0223 | | | | | 21,2347 | 0 | 0000 | 1 | EXTEND | | |
| 0224 | REF | 1 | | | 21,2350 | 6 | 2375 | 1 | BZMP | DACNDLS | IF HOLDFLAG +0,-0,+ , BYPASS AUTOMATIC |
| A0225 | | | | | | | | | | | COMMANDS |
| 0226 | REF | 40 | LAST | 977 | 21,2351 | 3 | 4711 | 1 | DCUINCR | CAP | TWO |
| 0227 | REF | 9 | LAST | 977 | 21,2352 | 55 | 508 | 1 | DELOOP | TS | SPNDX |
| 0228 | | | | | 21,2353 | 6 | 0000 | 1 | DOUBLE | | |
| 0229 | REF | 15 | LAST | 977 | 21,2354 | 55 | 507 | 0 | TS | DPNDX | |
| 0230 | | | | | 21,2355 | 0 | 0000 | 1 | EXTEND | | |
| 0231 | REF | 222 | LAST | 977 | 21,2356 | 5 | 0000 | 1 | INDEX | A | |
| 0232 | REF | 9 | LAST | 585 | 21,2357 | 3 | 1647 | 0 | DCA | CDUXD | |



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| | | | | | | | | | |
|------|-----|----|------|-----|---------|--------|---|--------|---------|
| 0233 | REP | 19 | LAST | 977 | 21,2360 | 53=511 | 1 | DxCH | KMPAC |
| 0234 | | | | | 21,2361 | 0 0006 | 1 | EXTEND | |
| 0235 | REP | 16 | LAST | 978 | 21,2362 | 5 1507 | 1 | INDEX | DPNDX |
| 0236 | REP | 6 | LAST | 586 | 21,2363 | 3 1576 | 1 | DCA | DELCDUX |
| 0237 | REP | 1 | | | 21,2364 | 0 2040 | 1 | TC | DPADD |
| 0238 | | | | | 21,2365 | 0 0006 | 1 | EXTEND | |
| 0239 | REP | 20 | LAST | 979 | 21,2366 | 3 1511 | 0 | DCA | KMPAC |
| 0240 | REP | 10 | LAST | 978 | 21,2367 | 51=506 | 0 | INDEX | SPNDX |
| 0241 | REP | 5 | LAST | 643 | 21,2370 | 55=572 | 1 | TS | THSTADX |
| 0242 | REP | 17 | LAST | 979 | 21,2371 | 51=507 | 1 | INDEX | DPNDX |
| 0243 | REP | 10 | LAST | 978 | 21,2372 | 53=647 | 1 | DxCH | CDLND |
| 0244 | REP | 11 | LAST | 979 | 21,2373 | 11=506 | 1 | CCS | SPNDX |
| 0245 | REP | 1 | | | 21,2374 | 1 2352 | 0 | TCF | DELOOP |



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R0246 RCS-CSM AUTOPILOT ATTITUDE ERROR DISPLAY

R0247 THREE TYPES OF ATTITUDE ERRORS MAY BE DISPLAYED ON THE FDAI-

R0248 MODE 1) AUTOPILOT FOLLOWING ERRORS SELECTED BY V61B
 R0250 GENERATED INTERNALLY BY THE AUTOPILOT

R0251 MODE 2) TOTAL ATTITUDE ERRORS SELECTED BY V62B
 R0253 WITH RESPECT TO THE CONTENTS OF N22

R02531 MODE 3) TOTAL ASTRONAUT ATTITUDE ERRORS SELECTED BY V63B
 R02533 WITH RESPECT TO THE CONTENTS OF N17

R0254 MODE 1 IS PROVIDED AS A MONITOR OF THE RCS DAP AND ITS ABILITY TO TRACK AUTOMATIC STEERING COMMANDS. IN THIS
 R0256 MODE THE ATTITUDE ERRORS WILL BE ZEROED WHEN THE CMC MODE SWITCH IS IN FREE

R0259 MODE 2 IS PROVIDED TO ASSIST THE CREW IN MANUALLY MANEUVERING THE S/C TO THE ATTITUDE (GIMBAL ANGLES) SPECIFIED
 R0261 IN N22. THE ATTITUDE ERRORS WRT THESE ANGLES AND THE CURRENT CDU ANGLES ARE RESOLVED INTO S/C CONTROL AXES
 R0263 AS A FLY-TO INDICATOR.

R02631 MODE 3 IS PROVIDED TO ASSIST THE CREW IN MANUALLY MANEUVERING THE S/C TO THE ATTITUDE (GIMBAL ANGLES) SPECIFIED
 R02633 IN N17. THE ATTITUDE ERRORS WRT THESE ANGLES AND THE CURRENT CDU ANGLES ARE RESOLVED INTO S/C CONTROL AXES
 R02635 AS A FLY-TO INDICATOR.

R0264 V60 IS PROVIDED TO LOAD N17 WITH A SNAPSHOT OF THE CURRENT CDU ANGLES, THUS SYNCHRONIZING THE MODE 3 DISPLAY
 R0266 WITH THE CURRENT S/C ATTITUDE. THIS VERR MAY BE USED AT ANY TIME.

R0269 THESE DISPLAYS WILL BE AVAILABLE IN ANY MODE (AUTO, HOLD, FREE, G+N, OR SC8) ONCE THE RCS DAP HAS BEEN
 R0271 INITIATED VIA V46E. MODE 1, HOWEVER, WILL BE MEANINGFUL ONLY IN G+N AUTO OR HOLD. THE CREW MAY PRESET (VIA
 R0273 V25N17) AN ATTITUDE REFERENCE (DESIRED GIMBAL ANGLES) INTO N17 AT ANY TIME.

| | | | | | | | | | | | | | | | | |
|------|-----|----|------|-----|---------|---|------|---|---------|--------|----------|-----------|---------|----------|-----|----------|
| 0278 | REP | 19 | LAST | 975 | 21,2375 | 4 | 1501 | 0 | DACNDLS | CS | RCSFLAGS | ALTERNATE | BETWEEN | FDAIDSP1 | AND | FDAIDSP2 |
| 0279 | REP | 32 | LAST | 700 | 21,2376 | 7 | 4707 | 1 | | MASK | BIT4 | | | | | |
| 0280 | | | | | 21,2377 | 0 | 0008 | 1 | | EXTEND | | | | | | |
| 0281 | REP | 1 | | | 21,2400 | 1 | 3144 | 1 | | BZF | FDAIDSP2 | | | | | |

| | | | | | | | | | | | | | | | | |
|------|-----|----|------|-----|---------|----|------|---|----------|-----|----------|--|--|--|--|-------------|
| 0282 | REP | 20 | LAST | 980 | 21,2401 | 27 | -501 | 0 | FDAIDSP1 | ADS | RCSFLAGS | | | | | |
| 0283 | REP | 7 | LAST | 904 | 21,2402 | 0 | 2404 | 0 | | TC | NEEDLER | | | | | |
| 0284 | REP | 33 | LAST | 933 | 21,2403 | 1 | 5222 | 1 | KRESUME1 | TCP | RESUME | | | | | END PHASE 1 |

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R0285 FDAI ATTITUDE ERROR DISPLAY SUBROUTINE

R0286 PROGRAM DESCRIPTION' D. KEENE 5/24/67

R0287 THIS SUBROUTINE IS USED TO DISPLAY ATTITUDE ERRORS ON THE FDAI VIA THE DIGITAL TO ANALOG CONVERTERS (DACs)
R0289 IN THE CDUS. CARE IS TAKEN TO METER OUT THE APPROPRIATE NUMBER OF PULSES TO THE IMU ERROR COUNTERS AND PREVENT
R0291 OVERFLOW, TO CONTROL THE RELAY SEQUENCING, AND TO AVOID INTERFERENCE WITH THE COARSE ALIGN LOOP WHICH ALSO USES
R0293 THE DACs.
R0294 CALLING SEQUENCE'

R0295 DURING THE INITIALIZATION SECTION OF THE USER-S PROGRAM, BITS OF RCSFLAGS SHOULD BE SET TO INITIATE THE
R0297 TURN-ON SEQUENCE WITHIN THE NEEDLES PROGRAM'

R0298 CS RCSFLAGS IN BRANK6
R0299 MASK BITS
R0300 ADS RCSFLAGS

R0301 THEREAFTER, THE ATTITUDE ERRORS GENERATED BY THE USER SHOULD BE TRANSFERRED TO THE FOLLOWING LOCATIONS IN BRANK6'

R0303 AK SCALED 180 DEGREES NOTE' THESE LOCATIONS ARE SUBJECT
R0304 AK1 SCALED 180 DEGREES TO CHANGE
R0305 AK2 SCALED 180 DEGREES

R0306 FULL SCALED DEFLECTION CORRESPONDS TO 16 7/8 DEGREES OF ATTITUDE ERROR
R0307 (= 384 BITS IN IMU ERROR COUNTER)

R0308 A CALL TO NEEDLER WILL THEN UPDATE THE DISPLAY'

R0309 INHINT
R0310 TC INKCALL NOTE' BRANK SHOULD BE SET TO E6
R0311 CADR NEEDLER
R0312 RELINT

R0313 THIS PROCESS SHOULD BE REPEATED EACH TIME THE ERRORS ARE UPDATED. AT LEAST 3 PASSES THRU THE PROGRAM ARE
R0315 REQUIRED BEFORE ANYTHING IS ACTUALLY DISPLAYED ON THE ERROR METERS.
R0316 NOTE' EACH CALL TO NEEDLER MUST BE SEPARATED BY AT LEAST 50MS TO ASSURE PROPER RELAY SEQUENCING.

R0318 BRASABLE USED'

R0319 AK CDUXCMD
R0320 AK1 CDUYCMD
R0321 AK2 CDUZCMD
R0322 EDRIVEX A,L,Q
R0323 EDRIVEY T5TEMP
R0324 EDRIVEZ SPNDX

R0325 SWITCHES' RCSFLAGS BITS 3,2

R0326 I/O CHANNELS' CHAN12 BIT 4 (COARSE ALIGN - READ ONLY)



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R0327          CHAN12 BIT 6 (IMU ERROR COUNTER ENABLE)
R0328          CHAN14 BIT 13,14,15 (DAC ACTIVITY)
R0329 SIGN. CONVENTION: AK = THSTAC - THETA
R0330          WHERE THSTAC = COMMAND ANGLE
R0331          THETA = PRESENT ANGLE

0332 REF 33 LAST 980 21,2404 3 4707 0 NEEDLER CAP BIT4
0333          21,2405 0 0006 1          EXTEND
0334 REF 33 LAST 918 21,2406 02 012 0          RAND CHAN12
0335          21,2407 0 0006 1          EXTEND
0336 REF 1          21,2410 1 2415 1          BZP NEEDLER1
0337 REF 21 LAST 980 21,2411 4 1501 0          CS RCSPLAGS
0338 REF 29 LAST 960 21,2412 7 4710 1          MASK BIT3
0339 REF 22 LAST 982 21,2413 27=501 0          ADS RCSPLAGS
0340 REF 191 LAST 970 21,2414 0 0002 0          TC 0

0341 REF 23 LAST 982 21,2415 3 1501 1 NEEDLER1 CA RCSPLAGS
0342 REF 28 LAST 737 21,2416 7 6211 1          MASK SIX
0343          21,2417 0 0006 1          EXTEND
0344 REF 1          21,2420 1 2455 0          BZP NEEDLES3
0345 REF 30 LAST 982 21,2421 7 4710 1          MASK BIT3
0346          21,2422 0 0006 1          EXTEND
0347 REF 2 LAST 243 21,2423 1 2446 1          BZP NEEDLER2

0348 REF 37 LAST 975 21,2424 4 4705 0          CS BIT6
0349          21,2425 0 0006 1          EXTEND
0350 REF 34 LAST 982 21,2426 03 012 1          WAND CHAN12
0351 REF 174 LAST 973 21,2427 4 4714 0 NEEDLER11 CS ZERO
0352 REF 13 LAST 904 21,2430 55=476 1          TS AK
0353 REF 4 LAST 928 21,2431 55=477 0          TS AK1
0354 REF 4 LAST 934 21,2432 55=500 1          TS AK2
0355 REF 2 LAST 113 21,2433 55=503 1          TS EDRIVEK
0356 REF 2 LAST 113 21,2434 55=504 0          TS EDRIVEY
0357 REF 2 LAST 113 21,2435 55=505 1          TS EDRIVEZ
0358 REF 2 LAST 148 21,2436 54 050 0          TS CDUXCMD
0359 REF 2 LAST 148 21,2437 54 051 1          TS CDUYCMD
0360 REF 2 LAST 148 21,2440 54 052 1          TS CDUZCMD
0361 REF 29 LAST 982 21,2441 4 6211 1          CS SIX
0362 REF 24 LAST 982 21,2442 7 1501 0          MASK RCSPLAGS
0363 REF 41 LAST 958 21,2443 6 4711 1          AD BIT2
0364 REF 25 LAST 982 21,2444 55=501 0          TS RCSPLAGS
0365 REF 192 LAST 982 21,2445 0 0002 0          TC 0

0366 REF 38 LAST 982 21,2446 3 4705 1 NEEDLER2 CAP BIT6
0367          21,2447 0 0006 1          EXTEND
0368 REF 35 LAST 982 21,2450 05 012 1          WOR CHAN12
0369 REF 30 LAST 982 21,2451 4 6211 1          CS SIX

```

CHECK FOR COARSE ALIGN ENABLE
IF IN COARSE ALIGN DO NOT USE IMU
ERROR COUNTERS. DONT USE NEEDLES

SET BIT3 FOR INITIALIZATION PASS

BIT3 = 0, BIT2 = 1

FIRST PASS BIT3 = 1
DISABLE IMU ERROR COUNTER TO ZERO DACS
MUST WAIT AT LEAST 60 MS BEFORE
ENABLING COUNTERS.
ZERO THE INPUTS ON FIRST PASS

ZERO THE DISPLAY REGISTERS

ZERO THE OUT COUNTERS

RESET RCSPLAGS FOR PASS2

END PASS1

ENABLE IMU ERROR COUNTERS

RESET RCSPLAGS TO DISPLAY ATTITUDE



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| | | | | | | | | | | | | |
|------|-----|-----|------|-----|---------|--------|------|---|----------|------------|-----------------------------------|-----------------------------------|
| 0370 | REP | 26 | LAST | 982 | 21,2452 | 7 | 1501 | 0 | MASK | RCSPLAGS | ERRORS | WAIT ATLEAST 4 MS FOR |
| 0371 | REP | 27 | LAST | 983 | 21,2453 | 55=501 | 0 | 0 | TS | RCSPLAGS | RELAY CLOSURE | |
| 0372 | REP | 193 | LAST | 982 | 21,2454 | 0 | 0002 | 0 | TC | 0 | | |
| 0373 | REP | 39 | LAST | 982 | 21,2455 | 3 | 4705 | 1 | NEEDLES3 | CAP | BITS | CHECK TO SEE IF IMU ERROR COUNTER |
| 0374 | | | | | 21,2456 | 0 | 0006 | 1 | EXTEND | | | IS ENABLED |
| 0375 | REP | 36 | LAST | 982 | 21,2457 | 02 | 012 | 0 | RAND | CHAN12 | | |
| 0376 | | | | | 21,2460 | 0 | 0006 | 1 | EXTEND | | | |
| 0377 | REP | 6 | LAST | 980 | 21,2461 | 1 | 2411 | 0 | RZP | NEEDLER +5 | | IF NOT RECYCLE NEEDLES |
| 0378 | REP | 41 | LAST | 978 | 21,2462 | 3 | 4711 | 1 | NEEDLES | CAP | TWO | |
| 0379 | REP | 12 | LAST | 979 | 21,2463 | 55=506 | 1 | 0 | DACLOOP | TS | SPNDX | |
| 0380 | REP | 3 | LAST | 978 | 21,2464 | 4 | 4676 | 0 | CS | QUARTER | | |
| 0381 | | | | | 21,2465 | 0 | 0006 | 1 | EXTEND | | | |
| 0382 | REP | 13 | LAST | 983 | 21,2466 | 5 | 1506 | 0 | INDEX | SPNDX | | |
| 0383 | REP | 14 | LAST | 982 | 21,2467 | 7 | 1476 | 1 | MP | AK | | |
| 0384 | REP | 121 | LAST | 989 | 21,2470 | 54 | 001 | 1 | TS | L | | |
| 0385 | REP | 223 | LAST | 978 | 21,2471 | 10 | 000 | 0 | CCS | A | | |
| 0386 | REP | 1 | | | 21,2472 | 3 | 2526 | 1 | CA | DACLIMIT | | |
| 0387 | | | | | 21,2473 | 1 | 2475 | 1 | TC | +2 | | |
| 0388 | REP | 2 | LAST | 983 | 21,2474 | 4 | 2526 | 0 | CS | DACLIMIT | | |
| 0389 | REP | 122 | LAST | 983 | 21,2475 | 6 | 0001 | 0 | AD | L | | |
| 0390 | REP | 6 | LAST | 977 | 21,2476 | 55=502 | 0 | 0 | TS | TSTEMP | OV/FLO CHK | |
| 0391 | | | | | 21,2477 | 1 | 2503 | 1 | TC | +4 | | |
| 0392 | REP | 224 | LAST | 983 | 21,2500 | 50 | 000 | 1 | INDEX | A | ON OVERFLOW LIMIT OUTPUT TO +-384 | |
| 0393 | REP | 3 | LAST | 983 | 21,2501 | 3 | 2526 | 1 | CAP | DACLIMIT | | |
| 0394 | REP | 123 | LAST | 983 | 21,2502 | 54 | 001 | 1 | TS | L | | |
| 0395 | REP | 14 | LAST | 983 | 21,2503 | 51=506 | 0 | 0 | INDEX | SPNDX | CURRENT VALUE OF DAC | |
| 0396 | REP | 3 | LAST | 982 | 21,2504 | 4 | 1503 | 1 | CS | EDRIVE | | |
| 0397 | REP | 124 | LAST | 983 | 21,2505 | 6 | 0001 | 0 | AD | L | | |
| 0398 | REP | 15 | LAST | 983 | 21,2506 | 51=506 | 0 | 0 | INDEX | SPNDX | | |
| 0399 | REP | 3 | LAST | 982 | 21,2507 | 28 | 050 | 0 | ADS | COJXCMD | | |
| 0400 | REP | 16 | LAST | 983 | 21,2510 | 51=506 | 0 | 0 | INDEX | SPNDX | | |
| 0401 | REP | 4 | LAST | 983 | 21,2511 | 23=503 | 0 | 0 | LXCH | EDRIVE | | |
| 0402 | REP | 17 | LAST | 983 | 21,2512 | 11=506 | 1 | 0 | CCS | SPNDX | | |
| 0403 | REP | 1 | | | 21,2513 | 1 | 2463 | 0 | TC | DACLOOP | | |
| 0404 | REP | 4 | LAST | 588 | 21,2514 | 3 | 7707 | 0 | CAP | 13,14,15 | | |
| 0405 | | | | | 21,2515 | 0 | 0006 | 1 | EXTEND | | | |
| 0406 | REP | 11 | LAST | 946 | 21,2516 | 05 | 014 | 1 | WOR | CHAN14 | SET DAC ACTIVITY BITS | |
| 0407 | REP | 194 | LAST | 983 | 21,2517 | 0 | 0002 | 0 | TC | 0 | | |
| 0408 | REP | 1 | | | 21,2520 | 3 | 2524 | 0 | REINIT | CAP | DELAY200 |TILT LOGIC |
| 0409 | REP | 18 | LAST | 974 | 21,2521 | 54 | 030 | 0 | TS | TIME5 | REINITIALIZE DAP IN 200MS | |
| 0410 | REP | 7 | LAST | 974 | 21,2522 | 55=485 | 0 | 0 | TS | TSPHASE | | |
| 0411 | REP | 34 | LAST | 980 | 21,2523 | 1 | 5222 | 1 | TC | RESUME | | |
| 0412 | | | | | 21,2524 | 37754 | 0 | 0 | DELAY200 | DEC | 16384 | 200MS |
| 0413 | | | | | 21,2525 | 77177 | 0 | 0 | DEC | | -384 | |



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| | | | | |
|------|---------|---------|--------------|-------|
| 0414 | 21,2526 | 37200 1 | DACLIMIT DEC | 18000 |
| 0415 | 21,2527 | 00600 1 | DEC | 384 |



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| | | | | | | | | |
|--------|--|-----|------|-----|---------|----------|----------|---------------|
| 0473 | REP | 21 | LAST | 976 | 21,2557 | 3 0032 0 | CA | CDUX |
| 0474 | REP | 4 | LAST | 976 | 21,2560 | 55=635 1 | TS | RHO |
| 0475 | REP | 12 | LAST | 976 | 21,2561 | 3 0033 1 | CA | CDUY |
| 0476 | REP | 4 | LAST | 976 | 21,2562 | 55=636 1 | TS | RHO1 |
| 0477 | REP | 15 | LAST | 976 | 21,2563 | 3 0034 0 | CA | CDUZ |
| 0478 | REP | 4 | LAST | 976 | 21,2564 | 55=637 0 | TS | RHO2 |
| 0479 | REP | 177 | LAST | 985 | 21,2565 | 3 4714 1 | CAP | ZERO |
| 0480 | REP | 6 | LAST | 983 | 21,2566 | 55=485 0 | TS | TS PHASE |
| 0481 | REP | 27 | LAST | 975 | 21,2567 | 4 1321 1 | CS | IMODES33 |
| 0482 | REP | 40 | LAST | 983 | 21,2570 | 7 4705 0 | MASK | BIT6 |
| 0483 | REP | 225 | LAST | 983 | 21,2571 | 10 000 0 | CCS | A |
| 0484 | REP | 1 | | | 21,2572 | 1 2576 0 | TCF | IMJACK |
| 0485 | REP | 5 | LAST | 985 | 21,2573 | 55=817 1 | TS | ATKALMN |
| 0486 | REP | 1 | | | 21,2574 | 3 2612 0 | CAP | RCSINITB |
| 0487 | REP | 1 | | | 21,2575 | 1 2603 1 | TCF | RCSWIT |
| A0488 | | | | | | | | |
| 0489 | REP | 6 | LAST | 977 | 21,2576 | 3 7671 0 | IMJACK | CAP |
| 0490 | REP | 29 | LAST | 977 | 21,2577 | 0 5027 1 | TC | NOVAC |
| 0491 | REP | 21 | LAST | 979 | E6,1510 | | EBANK= | KMPAC |
| 0492 | REP | 2 | LAST | 977 | 21,2600 | 03444 0 | ZCADR | AMBQUPDT |
| 0492 | REP | | | | 21,2601 | 44066 1 | | |
| 0493 | REP | 1 | | | 21,2602 | 3 2611 0 | CAP | RCSINIT |
| 0494 | REP | 28 | LAST | 983 | 21,2603 | 55=501 0 | RCSWIT | TS |
| A0495 | | | | | | | | |
| A0496 | | | | | | | | |
| 0497 | REP | 1 | | | 21,2604 | 3 2613 1 | CAP | TSWAITB0 |
| A0498 | | | | | | | | |
| A0499 | | | | | | | | |
| 0500 | REP | 19 | LAST | 983 | 21,2605 | 54 030 0 | TS | TIMES |
| 0501 | REP | 35 | LAST | 983 | 21,2606 | 0 5222 0 | TC | RESUME |
| A0502 | | | | | | | | |
| A0503 | | | | | | | | |
| R0504 | CONSTANTS USED IN INITIALIZATION PROGRAM | | | | | | | |
| 0505 | | | | | 21,2607 | 00044 1 | NO.TSVAR | DEC 36 |
| 0506 | | | | | 21,2610 | 07534 1 | -.24 | DEC .24 |
| 0507 | | | | | 21,2611 | 00004 0 | RCSINIT | OCT 00004 |
| 0508 | | | | | 21,2612 | 20004 1 | RCSINITB | OCT 20004 |
| 0509 | | | | | 21,2613 | 37772 1 | TSWAITB0 | DEC 16378 |
| 0510 | REP | 22 | LAST | 986 | E6,1510 | | EBANK= | KMPAC |
| 0511 | REP | 1 | | | 21,2614 | 03644 1 | T6ADDR | ZCADR T6START |
| 0511 | REP | 1 | | | 21,2615 | 36066 1 | | |
| 053001 | REP | 6 | LAST | 985 | 21,2616 | 3 4717 1 | ZEROUJET | CAP ELEVEN |
| 053002 | REP | 21 | LAST | 985 | 21,2617 | 55=506 1 | TS | SPNDX |
| 053003 | REP | 178 | LAST | 986 | 21,2620 | 3 4714 1 | CAP | ZERO |

RESET AUTOPILOT TO BEGIN EXECUTING PHASE2 OF PROGRAM

CHECK IMU STATUS
IF BIT6 = 0 IMU IN FINE ALIGN
IF BIT6 = 1 IMU NOT READY

CANNOT USE IMU
PROVIDE FREE CONTROL ONLY
DONT START UP RATE FILTER
SIGNAL NO RATE FILTER

START MATRIX INITIALIZATION
BYPASS IF IMU NOT IN FINE ALIGN

CLEAR BIT14 -ASSUME WE HAVE A GOOD IMU
CLEAR BIT1 -INITIALIZE T6 PROGRAM
SET BIT3 -INITIALIZE NEEDLES
CLEAR BIT4 -RESET FOR FDAIDSP1
NEXT T5RUPT 80 MS FROM NOW TO ALLOW IMU
ERROR COUNTER TO ZERO.
(MINIMUM DELAY = 15 MS)
SINCE ATKALMN IS +11, PROGRAM WILL THEN
PICK UP THE KALMAN FILTER GAINS. RATE
FILTER WILL BEGIN OPERATING ZOOMS FROM
NOW

= SLOPE OF 0.6/SEC

= 6 CS

ZERO RIAS2, RIAS1, RIAS, YWORD2,
YWORD1, PWORD2, PWORD1, RWORD2,
AND RWORD1.

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| | | | | | | | | | |
|--------|-----|-----|------|-----|---------|--------|---|-----------|------------|
| 053004 | REP | 22 | LAST | 986 | 21,2621 | 51=506 | 0 | INDEX | SPNDX |
| 053005 | REP | 2 | LAST | 100 | 21,2622 | 55=451 | 1 | TS | RWORD1 |
| 053006 | REP | 23 | LAST | 987 | 21,2623 | 11=506 | 1 | CCS | SPNDX |
| 053007 | REP | 5 | LAST | 985 | 21,2624 | 1 2617 | 1 | TCP | ZEROJET +1 |
| 053008 | REP | 12 | LAST | 985 | 21,2625 | 3 4710 | 0 | CAP | FOUR |
| 053009 | REP | 2 | LAST | 100 | 21,2626 | 55=462 | 1 | TS | BLAST1 +1 |
| 05301 | REP | 7 | LAST | 986 | 21,2627 | 3 4717 | 1 | CAP | ELEVEN |
| 0531 | REP | 2 | LAST | 100 | 21,2630 | 55=464 | 1 | TS | BLAST2 +1 |
| 0532 | REP | 66 | LAST | 958 | 21,2631 | 4 4712 | 0 | CS | BIT1 |
| 0533 | REP | 29 | LAST | 986 | 21,2632 | 7 1501 | 0 | MASK | RCSPLAGS |
| 0534 | REP | 30 | LAST | 987 | 21,2633 | 55=501 | 0 | TS | RCSPLAGS |
| 0535 | | | | | 21,2634 | 0 0006 | 1 | EXTEND | |
| 0536 | REP | 1 | | | 21,2635 | 3 2615 | 1 | DCA | TSADDR |
| 0537 | REP | 3 | LAST | 957 | 21,2636 | 53=311 | 1 | DXCH | TSLOC |
| 0538 | REP | 1 | | | 21,2637 | 3 3034 | 0 | CAP | =+14MS |
| 0539 | REP | 3 | LAST | 957 | 21,2640 | 54 031 | 1 | TS | TIME6 |
| 0540 | REP | 41 | LAST | 973 | 21,2641 | 3 4674 | 0 | CAP | BIT15 |
| 0541 | | | | | 21,2642 | 0 0006 | 1 | EXTEND | |
| 0542 | REP | 9 | LAST | 958 | 21,2643 | 05 013 | 0 | WOR | CHAN13 |
| 0543 | REP | 195 | LAST | 983 | 21,2644 | 0 0002 | 0 | TC | 0 |
| 0544 | REP | 6 | LAST | 986 | 21,2645 | 11=617 | 1 | TS PHASE2 | CCS |
| 0545 | REP | 1 | | | 21,2646 | 1 3132 | 0 | TCP | ATTKALMN |
| 0546 | | | | | 21,2647 | 1 2651 | 0 | TCP | KALUPDT |
| 0547 | | | | | 21,2650 | 1 2651 | 0 | TCP | +2 |
| 0548 | REP | 2 | LAST | 974 | 21,2651 | 3 2142 | 1 | TCP | +1 |
| 0549 | REP | 20 | LAST | 986 | 21,2652 | 56 030 | 1 | CA | DELTATT2 |
| 0550 | REP | 4 | LAST | 985 | 21,2653 | 27=634 | 0 | XCH | TIME6 |
| 05501 | REP | 31 | LAST | 987 | 21,2654 | 3 1501 | 1 | ADS | TS TIME |
| 05502 | REP | 42 | LAST | 987 | 21,2655 | 7 4674 | 1 | CA | RCSPLAGS |
| 05503 | | | | | 21,2656 | 0 0006 | 1 | MASK | BIT15 |
| 05504 | REP | 1 | | | 21,2657 | 1 2661 | 0 | EXTEND | |
| 05505 | REP | 104 | LAST | 985 | 21,2660 | 4 4712 | 0 | BZP | NCHIAUTO |
| 05506 | REP | 7 | LAST | 987 | 21,2661 | 55=617 | 1 | CS | ONE |
| | | | | | | | | NCHIAUTO | TS |
| | | | | | | | | | ATTKALMN |

RESET BIT1 OF RCSPLAGS TO 0

ENABLE TBRUPT TO SHUT OFF JETS IN 14 MS.

IF (.) INITIALIZE RATE ESTIMATE

ONLY IF ATTKALMN POSITIVE

RESET FOR PHASE3 IN 20 MS
(JET SELECTION LOGIC)
TO COMPENSATE FOR DELAYS IN TBRUPT
IF A HIGH RATE AUTO MANUEVR IS IN
PROGRESS (BIT 15 OF RCSPLAGS SET), SET
ATTKALMN TO -1
OTHERWISE SET ATTKALMN TO 0.



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P0551 MANUAL ROTATION COMMANDS
 0552 REP 1 21,2662 4 3016 1
 0553 REP 32 LAST 987 21,2663 7 1501 0
 0554 REP 33 LAST 988 21,2664 55=501 0

CS OCT01760
 MASK RCSPLAGS
 TS RCSPLAGS

RESET FORCED FIRING BITS (BITS 10 TO 5 OF RCSPLAGS) TO ZERO

0555 21,2665 0 0006 1
 0556 REP 8 LAST 975 21,2666 00 031 0
 0557 REP 125 LAST 983 21,2667 54 001 1
 0558 REP 3 LAST 985 21,2670 3 1632 1
 0559 21,2671 0 0006 1
 0560 REP 11 LAST 945 21,2672 06 001 0
 0561 REP 1 21,2673 7 3022 0
 0562 21,2674 0 0006 1
 0563 REP 1 21,2675 6 2710 0

EXTEND
 READ CHAN31
 TS L
 CA CH31TEMP
 EXTEND
 RKOR LCHAN
 MASK MANROT
 EXTEND
 BZMP NOCHANGE

= OCT00077

0564 REP 226 LAST 986 21,2676 22 000 1
 0565 REP 4 LAST 988 21,2677 55=632 0

LXCH A
 TS CH31TEMP

SAVE CONTENTS OF CHANNEL 31 IN CH31TEMP

0566 REP 126 LAST 988 21,2700 3 0001 0
 0567 21,2701 0 0006 1
 0568 REP 35 LAST 952 21,2702 7 4706 0
 0569 REP 127 LAST 988 21,2703 3 0001 0
 0570 REP 34 LAST 988 21,2704 27=501 0

CA L
 EXTEND
 MP BITS
 CA L
 ADS RCSPLAGS

PUT BITS 6-1 OF A IN BITS 10-5 OF L

SET FORCED FIRING BITS FOR AXES WITH CHANGES IN COMMAND. BITS 10,9 FOR ROLL, BITS 8,7 FOR YAW, BITS 6,5 FOR PITCH

A0571
 A0572
 A0573

0574 REP 35 LAST 988 21,2705 4 1501 0
 0575 REP 1 21,2706 7 3023 1
 0576 REP 36 LAST 988 21,2707 27=501 0

CS RCSPLAGS
 MASK OCT16000
 ADS RCSPLAGS

SET RATE DAMPING FLAGS (BITS 13,12,AND 11 OF RCSPLAGS)

0577 REP 5 LAST 988 21,2710 4 1632 0
 0578 REP 2 LAST 988 21,2711 7 3022 0
 0579 21,2712 0 0006 1
 0580 REP 1 21,2713 6 3234 1

NOCHANGE CS CH31TEMP
 MASK MANROT
 EXTEND
 BZMP AHPNOROT

IF NO MANUAL COMMANDS, GO TO AHPNOROT

0581 REP 11 LAST 985 21,2714 55=332 0
 0582 REP 2 LAST 539 21,2715 0 3114 0

TS HOLDFLAG
 TC STICKCHK

SET HOLDFLAG +

A0583
 A0584
 A0585
 A0586

WHEN THE RHC IS OUT OF DETENT, PMANNDX, YMANNDX, AND RMANNDX ARE ALL SET, BY MEANS OF STICKCHK, TO 0, 1, OR 2 FOR NO, +, OR - ROTATION RESPECTIVELY AS COMMANDED BY THE RHC.

A0587
 A0588
 A0589
 A0590
 A0591
 A0592

HOWEVER, IT IS WELL TO NOTE THAT AFTER THE RHC IS RETURNED TO DETENT, THE PROGRAM BRANCHES TO AHPNOROT AND AVOIDS STICKCHK SO PMANNDX, YMANNDX, AND RMANNDX ARE NOT RESET TO ZERO BUT RATHER LEFT SET TO THEIR LAST OUT OF DETENT

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A0593

0594 RESP 22 LAST 779 21,2716 4 0075 1
 0595 RESP 56 LAST 975 21,2717 7 4675 0
 0596 RESP 23 LAST 989 21,2720 26 075 1
 0597 RESP 57 LAST 989 21,2721 3 4675 1
 0598 21,2722 0 0006 1
 0599 RESP 9 LAST 988 21,2723 02 031 1
 0600 21,2724 0 0008 1
 0601 RESP 1 21,2725 6 3035 1

0602 RESP 37 LAST 988 21,2726 3 1501 1
 0603 RESP 58 LAST 989 21,2727 7 4675 0
 0604 RESP 227 LAST 988 21,2730 10 000 0
 0605 RESP 2 LAST 975 21,2731 1 2520 0

0606 RESP 24 LAST 980 21,2732 4 4715 1
 0607 RESP 5 LAST 688 21,2733 6 1130 1
 0608 21,2734 0 0006 1
 0609 21,2735 6 2740 0
 0610 RESP 105 LAST 987 21,2736 4 4712 0
 0611 RESP 8 LAST 987 21,2737 55=617 1
 0614 RESP 42 LAST 983 21,2740 3 4711 1
 0615 RESP 24 LAST 987 21,2741 55=506 1
 0616 21,2742 6 0000 1
 0617 RESP 18 LAST 979 21,2743 55=507 0
 0618 RESP 25 LAST 989 21,2744 51=506 0
 0619 RESP 3 LAST 539 21,2745 3 1658 0
 0620 21,2746 0 0006 1
 0621 RESP 1 21,2747 1 2771 0
 A0622

0623 RESP 6 LAST 989 21,2750 6 1130 1
 0624 RESP 196 LAST 987 21,2751 54 002 1
 0625 RESP 197 LAST 989 21,2752 50 002 0
 0626 RESP 1 21,2753 3 3023 0
 0627 21,2754 0 0006 1
 0628 RESP 29 LAST 783 21,2755 7 4702 1
 0629 RESP 19 LAST 989 21,2756 51=507 1
 0630 RESP 11 LAST 985 21,2757 53=526 0

0631 RESP 38 LAST 989 21,2760 3 1501 1
 0632 RESP 2 LAST 988 21,2761 7 3023 1
 0633 21,2762 0 0006 1
 0634 RESP 1 21,2763 1 3001 1
 A0635

CS FLAGWD1
 MASK BIT14
 ADS FLAGWD1

CAP BIT14
 EXTEND
 RAND CHAN31
 EXTEND
 BZMP FREEPUNC

CA RCSPLAGS
 MASK BIT14
 CCS A
 TCP REINIT

CS FIVE
 AD RATEINDX
 EXTEND
 BZMP +3
 CS ONE

TS ATTKALMN
 CAP TWO
 SETWBODY TS SPNDX
 DOUBLE
 TS DPNDX
 INDEX SPNDX
 CA RMANNDX
 EXTEND
 BZMP NORATE

AD RATEINDX
 TS 0
 INDEX 0
 CA MANTABLE -1
 EXTEND
 MP BIT9
 INDEX DPNDX
 DXCH WBODY

CA RCSPLAGS
 MASK OCT16000
 EXTEND
 BZMP MERUPDAT

VALUES.

SET STIKFLAG TO INFORM STEERING PROGRAMS (P20) THAT ASTRONAUT HAS ASSUMED ROTATIONAL CONTROL OF SPACECRAFT

EXAMINE RCSPLAGS TO SEE IF RATE FILTER HAS BEEN INITIALIZED IF SO, PROCEED WITH MANUAL RATE COMMANDSTILT, RECYCLE TO INITIALIZE FILTER

IF MANUAL MANEUVER IS AT HIGH RATE, SET ATTKALMN TO -1. OTHERWISE, LEAVE ATTKALMN ALONE.

AUTO-HOLD MANUAL ROTATION

RMANNDX = 0 NO ROTATION
 = 1 + ROTATION
 = 2 - ROTATION
 IF NO ROTATION COMMAND ON THIS AXIS, GO TO NORATE.

RATEINDX = 0 0.05 DEG/SEC
 = 2 0.2 DEG/SEC
 = 4 0.5 DEG/SEC
 = 6 4.0 DEG/SEC

MULTIPLY MANTABLE BY 2 TO THE -6 TO GET COMMANDED RATE. SET WBODY TO COMMANDED RATE.

IS RATE DAMPING COMPLETED (BITS 13,12 AND 11 OF RCSPLAGS ALL ZERO.) IF SO, GO TO MERUPDAT TO UPDATE CUMULATIVE ATTITUDE ERROR.



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| | | | | | | | | | | |
|-------|-----|-----|------|-----|---------|----------|----------|--------|-------------|--|
| 0636 | REP | 179 | LAST | 986 | 21,2764 | 3 4714 1 | ZEROER | CA | ZERO | ZEROER ZEROS MERRORS |
| 0637 | | | | | 21,2765 | 22 007 0 | | ZL | | |
| 0638 | REP | 20 | LAST | 989 | 21,2766 | 51=507 1 | | INDEX | DPNDX | |
| 0639 | REP | 3 | LAST | 977 | 21,2767 | 53=542 1 | | DYCH | MERRORX | |
| 0640 | REP | 1 | | | 21,2770 | 1 3007 1 | | TCP | SPNDXCHK | |
| 0641 | | | | | 21,2771 | 22 007 0 | NORATE | ZL | | |
| 0642 | REP | 21 | LAST | 990 | 21,2772 | 51=507 1 | | INDEX | DPNDX | |
| 0643 | REP | 12 | LAST | 989 | 21,2773 | 53=526 0 | | DYCH | WBODY | ZERO WBODY FOR THIS AXIS |
| 0644 | REP | 39 | LAST | 989 | 21,2774 | 3 1501 1 | | CA | RCSFLAGS | |
| 0645 | REP | 3 | LAST | 989 | 21,2775 | 7 3023 1 | | MASK | OCT16000 | |
| 0646 | | | | | 21,2776 | 0 0006 1 | | EXTEND | | IS RATE DAMPING COMPLETED |
| 0647 | REP | 2 | LAST | 990 | 21,2777 | 1 3007 1 | | BZP | SPNDXCHK | YES, KEEP CURRENT MERRORX GO TO SPNDXCHK |
| 0648 | REP | 1 | | | 21,3000 | 1 2764 1 | | TCP | ZEROER | NO, GO TO ZEROER |
| 0649 | REP | 198 | LAST | 989 | 21,3001 | 50 002 0 | MERUPDAT | INDEX | O | MERRORX=MERRORX+MEASURED CHANGE IN ANGLE |
| 0650 | REP | 2 | LAST | 989 | 21,3002 | 4 3023 1 | | CS | MANTABLE -1 | -COMMANDED CHANGE IN ANGLE |
| 0651 | | | | | 21,3003 | 0 0006 1 | | EXTEND | | THE ADDITION OF MEASURED CHANGE IN ANGLE |
| 0652 | REP | 43 | LAST | 784 | 21,3004 | 7 4704 0 | | MP | BITT | HAS ALREADY BEEN DONE IN THE RATE FILTER |
| 0653 | REP | 22 | LAST | 990 | 21,3005 | 51=507 1 | | INDEX | DPNDX | COMMANDED CHANGE IN ANGLE = WBODY TIMES |
| 0654 | REP | 4 | LAST | 990 | 21,3006 | 21=542 1 | | DAS | MERRORX | .1SEC = MANTABLE ENTRY TIMES 2 TO THE -8 |
| 0655 | REP | 23 | LAST | 990 | 21,3007 | 51=507 1 | SPNDXCHK | INDEX | DPNDX | |
| 0656 | REP | 5 | LAST | 990 | 21,3010 | 3 1541 0 | | CA | MERRORX | |
| 0657 | REP | 26 | LAST | 989 | 21,3011 | 51=506 0 | | INDEX | SPNDX | ERRORX = HIGH ORDER WORD OF MERRORX |
| 0658 | REP | 6 | LAST | 973 | 21,3012 | 55=567 0 | | TS | ERRORX | |
| 0659 | REP | 27 | LAST | 990 | 21,3013 | 11=508 1 | | CCS | SPNDX | |
| 0660 | REP | 1 | | | 21,3014 | 1 2741 0 | | TCP | SETWBODY | |
| 0661 | REP | 1 | | | 21,3015 | 1 3425 0 | | TCP | JETS | |
| 0662 | | | | | 21,3016 | 01760 1 | OCT01760 | OCT | 01760 | FORCED FIRING BITS MASK |
| 0663 | | | | | 21,3017 | 01400 1 | OCT01400 | OCT | 01400 | ROLL FORCED FIRING MASK |
| 0664 | | | | | 21,3020 | 00060 1 | OCT00060 | OCT | 00060 | PITCH FORCED FIRING MASK |
| 0665 | | | | | 21,3021 | 00300 1 | OCT00300 | OCT | 00300 | YAW FORCED FIRING MASK |
| A0666 | | | | | | | | | | ORDER OF DEFINITION MUST BE PRESERVED FOR INDEXING |
| A0667 | | | | | | | | | | |
| 0668 | | | | | 21,3022 | 00077 1 | MANROT | OCT | 77 | |
| 0669 | | | | | 21,3023 | 16000 0 | OCT16000 | OCT | 16000 | RATE DAMPING FLAGS MASK |
| 0670 | | | | | 21,3024 | 00165 0 | MANTABLE | DEC | .0071111 | |
| 0671 | | | | | 21,3025 | 77612 1 | | DEC | -.0071111 | |
| 0672 | | | | | 21,3026 | 00722 0 | | DEC | .028444 | |
| 0673 | | | | | 21,3027 | 77055 1 | | DEC | -.028444 | |
| 0674 | | | | | 21,3030 | 02215 0 | | DEC | .071111 | |
| 0675 | | | | | 21,3031 | 75562 1 | | DEC | -.071111 | |
| 0676 | | | | | 21,3032 | 22151 1 | | DEC | .568889 | |
| 0677 | | | | | 21,3033 | 55626 0 | | DEC | -.568889 | |
| 0678 | | | | | 21,3034 | 00027 1 | =+14MS | DEC | 23 | |
| 0679 | REP | 4 | LAST | 989 | 21,3035 | 51=656 0 | FREEFUNG | INDEX | RMANNDX | ACCELERATION |

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| | | | | | | | |
|------|-----|-----|----------|---------|----------|---------|----------|
| 0680 | REP | 1 | | 21,3036 | 3 3047 1 | CA | PRESTAU |
| 0681 | REP | 2 | LAST 107 | 21,3037 | 55=561 0 | TS | TAU |
| 0682 | REP | 3 | LAST 540 | 21,3040 | 51=657 1 | INDEX | PMANNDX |
| 0683 | REP | 2 | LAST 991 | 21,3041 | 3 3047 1 | CA | PRESTAU |
| 0684 | REP | 2 | LAST 107 | 21,3042 | 55=562 0 | TS | TAU1 |
| 0685 | REP | 3 | LAST 540 | 21,3043 | 51=660 0 | INDEX | YMANNDX |
| 0686 | REP | 3 | LAST 991 | 21,3044 | 3 3047 1 | CA | PRESTAU |
| 0687 | REP | 2 | LAST 107 | 21,3045 | 55=563 1 | TS | TAU2 |
| 0688 | REP | 1 | | 21,3046 | 1 3053 0 | TCP | T8PROGM |
| 0689 | | | | 21,3047 | 00000 1 | PRESTAU | DEC 0 |
| 0690 | | | | 21,3050 | 00740 1 | DEC | 480 |
| 0691 | | | | 21,3051 | 77037 0 | DEC | -480 |
| 0692 | | | | 21,3052 | 00000 1 | DEC | 0 |
| 0693 | REP | 180 | LAST 990 | 21,3053 | 3 4714 1 | T8PROGM | CAF ZERO |
| 0694 | REP | 7 | LAST 990 | 21,3054 | 55=567 0 | TS | ERRORX |
| 0695 | REP | 4 | LAST 973 | 21,3055 | 55=570 0 | TS | ERRORY |
| 0696 | REP | 3 | LAST 973 | 21,3056 | 55=571 1 | TS | ERRORZ |
| 0697 | REP | 1 | | 21,3057 | 1 3743 0 | TCP | T8PROG |

COMMANDS

| | |
|---------|-----------|
| PRESTAU | 0 SEC |
| +1 | +0.10 SEC |
| +2 | -0.10 SEC |
| (+3) | 0 SEC |

FOR MANUAL ROTATIONS



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| | | | | | |
|-------|------------------|---------|----------|-------------|----------|
| 06975 | | 21,3060 | 06604 0 | DEC | .2112 |
| 0698 | | 21,3061 | 32703 1 | DEC | .8400 |
| 0699 | | 21,3062 | 06604 0 | DEC | .2112 |
| 0700 | | 21,3063 | 02031 1 | GAIN1 DEC | .0640 |
| 0701 | | 21,3064 | 12132 1 | DEC | .3180 |
| 0702 | | 21,3065 | 13030 0 | DEC | .3452 |
| 0703 | | 21,3066 | 14047 1 | DEC | .3774 |
| 0704 | | 21,3067 | 15241 1 | DEC | .4161 |
| 0705 | | 21,3070 | 16650 0 | DEC | .4634 |
| 0706 | | 21,3071 | 20555 0 | DEC | .5223 |
| 0707 | | 21,3072 | 23065 0 | DEC | .5970 |
| 0708 | | 21,3073 | 26137 0 | DEC | .6933 |
| 0709 | | 21,3074 | 32053 0 | DEC | .8151 |
| 0710 | | 21,3075 | 35712 0 | DEC | .9342 |
| 07105 | | 21,3076 | 00435 0 | DEC | .0174 |
| 0711 | | 21,3077 | 12412 1 | DEC | .2600 |
| 0712 | | 21,3100 | 00435 0 | DEC | .0174 |
| 0713 | | 21,3101 | 00032 0 | GAIN2 DEC | .0010 |
| 0714 | | 21,3102 | 01350 0 | DEC | .0434 |
| 0715 | | 21,3103 | 01575 1 | DEC | .0545 |
| 0716 | | 21,3104 | 02103 1 | DEC | .0666 |
| 0717 | | 21,3105 | 02523 1 | DEC | .0832 |
| 0718 | | 21,3106 | 03327 1 | DEC | .1069 |
| 0719 | | 21,3107 | 04432 0 | DEC | .1422 |
| 0720 | | 21,3110 | 06264 1 | DEC | .1985 |
| 0721 | | 21,3111 | 11351 0 | DEC | .2955 |
| 0722 | | 21,3112 | 17324 1 | DEC | .4617 |
| 0723 | | 21,3113 | 33622 1 | DEC | .6683 |
| 0724 | REP 7 LAST 983 | 21,3114 | 55=502 0 | STICKCHK TS | TS TEMP |
| 0725 | REP 28 LAST 904 | 21,3115 | 7 6214 1 | MASK | THRSE |
| 0726 | REP 4 LAST 991 | 21,3116 | 55=657 0 | TS | PMANNDX |
| 0727 | REP 6 LAST 992 | 21,3117 | 3 1502 1 | CA | TS TEMP |
| 0728 | | 21,3120 | 0 0006 1 | EXTEND | |
| 0729 | REP 4 LAST 983 | 21,3121 | 7 4676 0 | MP | QUARTER |
| 0730 | REP 9 LAST 992 | 21,3122 | 55=502 0 | TS | TS TEMP |
| 0731 | REP 29 LAST 992 | 21,3123 | 7 6214 1 | MASK | THRSE |
| 0732 | REP 4 LAST 991 | 21,3124 | 55=660 1 | TS | YMANNDX |
| 0733 | REP 10 LAST 992 | 21,3125 | 3 1502 1 | CA | TS TEMP |
| 0734 | | 21,3126 | 0 0006 1 | EXTEND | |
| 0735 | REP 5 LAST 992 | 21,3127 | 7 4676 0 | MP | QUARTER |
| 0736 | REP 5 LAST 990 | 21,3130 | 55=656 1 | TS | PMANNDX |
| 0737 | REP 199 LAST 990 | 21,3131 | 0 0002 0 | TC | 0 |
| 0738 | REP 9 LAST 989 | 21,3132 | 55=617 1 | KALUPDT TS | ATIKALMN |
| A0739 | | | | | |
| 0740 | REP 1 | 21,3133 | 3 2141 1 | CA | DEL/TATT |
| 0741 | REP 5 LAST 987 | 21,3134 | 6 1634 1 | AD | TS TEMP |

FILTER GAIN FOR TRANSLATION, LEM ON
 FILTER GAIN FOR TRANSLATION 2(ZETA)WN DT
 FILTER GAIN FOR 4 DEGREE/SEC MANEUVERS
 KALMAN FILTER GAINS FOR INITIALIZATION
 OF ATTITUDE RATES

FILTER GAIN FOR TRANSLATION, LEM ON
 FILTER GAIN FOR TRANSLATION (WN) (WN) DT
 FILTER GAIN FOR 4 DEGREE/SEC MANEUVERS
 SCALED 10

INDEXES FOR MANUAL ROTATION

MAN RATE 0 0 RATE (DP)
 +1 +RATE (DP)
 +2 -RATE (DP)
 (+3) 0 RATE (DP)

INITIALIZATION OF ATTITUDE RATES USING
 KALMAN FILTER TAKES 1.1 SEC

=1 SEC - 80MS
 + DELAYS

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| | | | | | | | | |
|--------|-----|-----|------|-----|---------|----------|----------|-------------|
| 0742 | REP | 21 | LAST | 987 | 21,3135 | 54 030 0 | TS | TIMES |
| 0743 | | | | | 21,3136 | 1 3141 1 | TCP | +3 |
| 0744 | REP | 3 | LAST | 987 | 21,3137 | 3 2142 1 | CAF | DELTATT2 |
| 0745 | REP | 22 | LAST | 993 | 21,3140 | 54 030 0 | TS | TIMES |
| 0752 | REP | 181 | LAST | 991 | 21,3141 | 4 4714 0 | KRESUME2 | CS ZERO |
| 0753 | REP | 9 | LAST | 986 | 21,3142 | 55=465 0 | TS | TS PHASE |
| 0754 | REP | 36 | LAST | 986 | 21,3143 | 1 5222 1 | TCP | RESUME |
| 0755 | REP | 34 | LAST | 982 | 21,3144 | 4 4707 1 | FDAIDSP2 | CS BIT4 |
| 0756 | REP | 40 | LAST | 990 | 21,3145 | 7 1501 0 | MASK | RCSPLAGS |
| 0757 | REP | 41 | LAST | 993 | 21,3146 | 55=501 0 | TS | RCSPLAGS |
| | | | | | | | | |
| 0758 | REP | 11 | LAST | 784 | 21,3147 | 4 0074 0 | CS | FLAGWRD0 |
| 0759 | REP | 30 | LAST | 989 | 21,3150 | 7 4702 1 | MASK | BIT9 |
| 0760 | | | | | 21,3151 | 0 0008 1 | EXTEND | |
| 0761 | REP | 1 | | | 21,3152 | 1 3161 0 | BZF | FDAITOTL |
| 0762 | | | | | 21,3153 | 0 0008 1 | EXTEND | |
| 0763 | REP | 8 | LAST | 991 | 21,3154 | 4 1570 0 | DCS | ERRORX |
| 0764 | REP | 15 | LAST | 983 | 21,3155 | 53=477 0 | DXCH | AK |
| 0765 | REP | 4 | LAST | 991 | 21,3156 | 4 1571 1 | CS | ERRORZ |
| 0766 | REP | 5 | LAST | 982 | 21,3157 | 55=500 1 | TS | AK2 |
| 0767 | REP | 37 | LAST | 993 | 21,3160 | 1 5222 1 | TCP | RESUME |
| 0768 | REP | 14 | LAST | 906 | 21,3161 | 3 0105 0 | FDAITOTL | CA FLAGWRD9 |
| 07681 | REP | 41 | LAST | 986 | 21,3162 | 7 4705 0 | MASK | BIT8 |
| 07682 | | | | | 21,3163 | 0 0008 1 | EXTEND | |
| 07683 | REP | 1 | | | 21,3164 | 1 3227 1 | BZF | WRIN17 |
| A07684 | | | | | | | | |
| 07685 | | | | | 21,3165 | 0 0008 1 | WRIN22 | EXTEND |
| 0769 | REP | 2 | LAST | 412 | 21,3166 | 3 1157 0 | DCA | CHEETA |
| 0770 | REP | 2 | LAST | 106 | 21,3167 | 53=514 1 | DXCH | WTEMP |
| 0771 | REP | 9 | LAST | 586 | 21,3170 | 3 1155 1 | CA | CPhi |
| | | | | | | | | |
| 0772 | | | | | 21,3171 | 0 0008 1 | GETAKS | EXTEND |
| 0773 | REP | 22 | LAST | 986 | 21,3172 | 20 032 1 | MSJ | CDUX |
| 0774 | REP | 16 | LAST | 993 | 21,3173 | 55=476 1 | TS | AK |
| 0775 | REP | 3 | LAST | 993 | 21,3174 | 3 1513 1 | CA | WTEMP |
| 0776 | | | | | 21,3175 | 0 0008 1 | EXTEND | |
| 0777 | REP | 13 | LAST | 986 | 21,3176 | 20 033 0 | MSJ | CDUY |
| 0778 | REP | 11 | LAST | 992 | 21,3177 | 55=502 0 | TS | TS TEMP |
| 0779 | | | | | 21,3200 | 0 0008 1 | EXTEND | |
| 0780 | REP | 3 | LAST | 976 | 21,3201 | 7 1640 0 | MP | AMCR1 |
| 0781 | REP | 17 | LAST | 993 | 21,3202 | 27=476 1 | ADS | AK |
| 0782 | REP | 12 | LAST | 993 | 21,3203 | 3 1502 1 | CA | TS TEMP |
| 0783 | | | | | 21,3204 | 0 0008 1 | EXTEND | |
| 0784 | REP | 3 | LAST | 976 | 21,3205 | 7 1641 1 | MP | AMCR4 |

SAFETY PLAY TO ASSURE
A TSDRPT
RESET FOR PHASE1
RESUME INTERRUPTED PROGRAM

RESET FOR FDAIDSP1

ON - DISPLAY ONE OF THE TOTAL ATTITUDE
ERRORS

OFF - DISPLAY AUTOPILOT FOLLOWING ERROR

END PHASE 1

IS N22ORN17 (BITS OF FLAGWRD9) = 0
IF SO, GO TO WRIN17
OTHERWISE, CONTINUE ON TO WRIN22 AND
GET SET TO COMPUTE TOTAL ATTITUDE
ERROR WRT N22 BY PICKING UP THE THREE
COMPONENTS OF N22

COMPUTE TOTAL ATTITUDE ERROR FOR
DISPLAY ON FDAI ERROR NEEDLES



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| | | | | | | | | | |
|------|-----|----|------|-----|---------|----------|-------|--------|----------|
| 0785 | REP | 5 | LAST | 982 | 21,3206 | 55=477 0 | | TS | AK1 |
| 0786 | REP | 13 | LAST | 993 | 21,3207 | 3 1502 1 | | CA | TSTEMP |
| 0787 | | | | | 21,3210 | 0 0006 1 | | EXTEND | |
| 0788 | REP | 3 | LAST | 976 | 21,3211 | 7 1843 0 | | MP | AMCB7 |
| 0789 | REP | 6 | LAST | 993 | 21,3212 | 55=500 1 | | TS | AK2 |
| 0190 | REP | 4 | LAST | 993 | 21,3213 | 3 1514 0 | | CA | WTEMP +1 |
| 0791 | | | | | 21,3214 | 0 0008 1 | | EXTEND | |
| 0192 | REP | 16 | LAST | 986 | 21,3215 | 20 034 1 | | MSU | CDUZ |
| 0193 | REP | 14 | LAST | 994 | 21,3216 | 55=502 0 | | TS | TSTEMP |
| 0794 | | | | | 21,3217 | 0 0006 1 | | EXTEND | |
| 0795 | REP | 3 | LAST | 976 | 21,3220 | 7 1842 1 | | MP | AMCB5 |
| 0796 | REP | 6 | LAST | 994 | 21,3221 | 27=477 0 | | ADS | AK1 |
| 0191 | REP | 15 | LAST | 994 | 21,3222 | 3 1502 1 | | CA | TSTEMP |
| 0798 | | | | | 21,3223 | 0 0006 1 | | EXTEND | |
| 0199 | REP | 3 | LAST | 976 | 21,3224 | 7 1644 1 | | MP | AMCB8 |
| 0800 | REP | 7 | LAST | 994 | 21,3225 | 27=500 1 | | ADS | AK2 |
| 0801 | REP | 38 | LAST | 993 | 21,3228 | 1 5222 1 | | TCP | RESUME |
| 0802 | | | | | 21,3227 | 0 0006 1 | WRN17 | EXTEND | |
| 0803 | REP | 9 | LAST | 987 | 21,3230 | 3 1335 0 | | DCA | CPHIX +1 |
| 0804 | REP | 5 | LAST | 994 | 21,3231 | 53=514 1 | | DXCH | WTEMP |
| 0805 | REP | 10 | LAST | 994 | 21,3232 | 3 1333 0 | | CA | CPHIX |
| 0806 | REP | 1 | | | 21,3233 | 1 3171 1 | | TCP | GETAKS |

END PHASE1 OF RCS DAP

GET SET TO COMPUTE TOTAL ASTRONAUT ATTITUDE ERROR WRT N17 BY PICKING UP THE THREE COMPONENTS OF N17



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L RCS-CRM DIGITAL AUTOPILOT

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L AUTOMATIC MANEUVERS

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| | | | | | | | | | |
|------|-----|-----|------|---------|---------|--------|---|----------|----------------|
| 0001 | | | | 21,3234 | | | | | BANK 21 |
| 0002 | REP | 3 | LAST | 973 | 21,2000 | | | | SETLOC DAPS3 |
| 0003 | | | | | 21,3234 | | | | BANK |
| 0004 | REP | 1 | | | | | | | COUNT 21/DAPAM |
| 0005 | REP | 23 | LAST | 988 | E6,1510 | | | | EBANK= KMPAC |
| 0006 | | | | | 21,3234 | 0 0006 | 1 | AHPNOROT | EXTEND |
| 0007 | REP | 10 | LAST | 989 | 21,3235 | 00 031 | 0 | | READ CHAN31 |
| 0008 | REP | 59 | LAST | 989 | 21,3236 | 7 4675 | 0 | | MASK BIT14 |
| 0009 | | | | | 21,3237 | 0 0006 | 1 | | EXTEND |
| 0010 | REP | 1 | | | 21,3240 | 6 3256 | 0 | | BZMP PREBCONT |
| 0011 | REP | 42 | LAST | 993 | 21,3241 | 3 1501 | 1 | | CA RCSPLAGS |
| 0012 | REP | 60 | LAST | 998 | 21,3242 | 7 4675 | 0 | | MASK BIT14 |
| 0013 | REP | 228 | LAST | 989 | 21,3243 | 10 000 | 0 | | CCS A |
| 0014 | REP | 3 | LAST | 989 | 21,3244 | 1 2520 | 0 | | TCF REINIT |
| 0015 | | | | | 21,3245 | 0 0006 | 1 | | EXTEND |
| 0016 | REP | 11 | LAST | 996 | 21,3246 | 00 031 | 0 | | READ CHAN31 |
| 0017 | REP | 39 | LAST | 041 | 21,3247 | 7 4676 | 0 | | MASK BIT13 |
| 0018 | | | | | 21,3250 | 0 0006 | 1 | | EXTEND |
| 0019 | REP | 1 | | | 21,3251 | 6 3356 | 1 | | BZMP HOLDPLNC |
| 0020 | REP | 1 | | | 21,3252 | 3 1332 | 1 | AUTOCONT | CA HOLDFLAG |
| 0021 | REP | 12 | LAST | 988 | 21,3253 | 0 0006 | 1 | | EXTEND |
| 0022 | | | | | 21,3254 | 6 3306 | 1 | | BZMP ATTHOLD |
| 0023 | REP | 1 | | | 21,3255 | 1 3362 | 1 | | TCF GRARANG |
| 0024 | REP | 1 | | | | | | | |

SEE IF RATE FILTER HAS BEEN INITIALIZED

IF SO, PROCEED WITH ATTITUDE CONTROL
IF NOT, RECYCLE TO INITIALIZE FILTER
AUTOMATIC CONTROL. YET

IF HOLDFLAG IS +, GO TO GRARANG.
OTHERWISE, GO TO ATTHOLD.

R0026 MINIMUM IMPULSE CONTROL

| | | | | | | | | | |
|------|-----|-----|------|-----|---------|----------|---|----------|---------------|
| 0027 | REP | 106 | LAST | 989 | 21,3256 | 3 4712 | 1 | PREBCONT | CAP ONE |
| 0028 | REP | 13 | LAST | 998 | 21,3257 | 55*332 | 0 | | TS HOLDFLAG |
| 0029 | | | | | | | | | |
| 0030 | | | | | 21,3260 | 0 0006 | 1 | | EXTEND |
| 0031 | REP | 2 | LAST | 132 | 21,3261 | 00 032 | 0 | | READ CHAN32 |
| 0032 | REP | 128 | LAST | 988 | 21,3262 | 54 001 | 1 | | TS L |
| 0033 | | | | | 21,3263 | 4 0000 | 0 | | COM |
| 0034 | REP | 3 | LAST | 988 | 21,3264 | 7 3022 | 0 | | MASK MANROT |
| 0035 | REP | 3 | LAST | 985 | 21,3265 | 7 1633 | 1 | | MASK CHANTEMP |
| 0036 | REP | 4 | LAST | 998 | 21,3266 | 23*833 | 0 | | LXCH CHANTEMP |
| 0037 | REP | 3 | LAST | 988 | 21,3267 | 0 3114.0 | | | TC STICKCHK |
| 0038 | REP | 6 | LAST | 992 | 21,3270 | 51*858 | 0 | | INDEX RMANNDX |
| 0039 | REP | 1 | | | 21,3271 | 3 3302 | 0 | | CA MINTAU |
| 0040 | REP | 3 | LAST | 991 | 21,3272 | 55*561 | 0 | | TS TAU |
| 0041 | REP | 5 | LAST | 992 | 21,3273 | 51*857 | 1 | | INDEX RMANNDX |
| 0042 | REP | 2 | LAST | 998 | 21,3274 | 3 3302 | 0 | | CA MINTAU |
| 0043 | REP | 3 | LAST | 991 | 21,3275 | 55*562 | 0 | | TS TAU1 |
| 0044 | REP | 5 | LAST | 992 | 21,3218 | 51*860 | 0 | | INDEX YMANNDX |
| 0045 | REP | 3 | LAST | 998 | 21,3217 | 3 3302 | 0 | | CA MINTAU |

RESET HOLDFLAG
INHIBIT AUTOMATIC STEERING

MINTAU +0
+1 +14MS MINIMUM IMPULSE
+2 -14MS TIME
+3 +0



L AUTOMATIC MANEUVERS

| | | | | | | | | | | |
|------|-----|---|------|-----|---------|--------|---|--------|---------|---------|
| 0046 | REP | 3 | LAST | 991 | 21,3300 | 55=563 | 1 | TS | TAU2 | |
| 0047 | REP | 2 | LAST | 991 | 21,3301 | 1 3053 | 0 | TCP | T6PROOM | |
| 0048 | | | | | 21,3302 | 00000 | 1 | MINTAU | DEC | 0 |
| 0049 | | | | | 21,3303 | 00027 | 1 | DEC | 23 | = 14MS |
| 0050 | | | | | 21,3304 | 77750 | 0 | DEC | -23 | = -14MS |
| 0051 | | | | | 21,3305 | 00000 | 1 | DEC | 0 | |



L AUTOMATIC MANEUVERS

P0052 CALCULATION OF ATTITUDE ERRORS-

R0053 - * - - -
R0054 AK = AMCB (CDUX - THETADX) + BIAS

R0055 IE *AK * * 1 SIN(PSI) 0 ** CDUX - THETADX * *BIAS *
R0057 * * * * ** * * * *
R0059 *AK1* = * 0 COS(PSI)COS(PHI) SIN(PHI)** CDUY - THETADY * *BIAS1*
R0061 * * * * ** * * * *
R0063 *AK2* = * 0 -COS(PSI)SIN(PHI) COS(PHI)** CDUZ - THETADZ * *BIAS2*

R0065 THE BIASES ARE ADDED ONLY WHILE PERFORMING AUTOMATIC MANEUVERS (ESP KALCMANU) TO PROVIDE ADDITIONAL LEAD
R0067 AND PREVENT OVERSHOOT WHEN STARTING AN AUTOMATIC MANEUVER. NORMALLY THE REQUIRED LEAD IS ONLY 1-2 DEGREES.
R0069 BUT DURING HIGH RATE MANEUVERS IT CAN BE AS MUCH AS 7 DEGREES. THE BIASES ARE COMPUTED BY KALCMANU AND REMAIN
R0071 FIXED UNTIL THE MANEUVER IS COMPLETED AT WHICH TIME THEY ARE RESET TO ZERO.

| | | | | | | | | | |
|------|-----|----|------|-----|---------|----------|--------|----|-------------|
| 0075 | REP | 23 | LAST | 993 | 21,3306 | 3 0032 0 | ATHOLD | CA | CDUX |
| 0076 | | | | | 21,3307 | 0 0006 1 | | | EXTEND |
| 0077 | REP | 6 | LAST | 979 | 21,3310 | 21=572 1 | | | MSU THETADX |
| 0078 | REP | 9 | LAST | 993 | 21,3311 | 55=567 0 | | | TS ERRORX |
| 0079 | REP | 14 | LAST | 993 | 21,3312 | 3 0033 1 | | | CA CDUY |
| 0080 | | | | | 21,3313 | 0 0006 1 | | | EXTEND |
| 0081 | REP | 3 | LAST | 643 | 21,3314 | 21=573 0 | | | MSU THETADY |
| 0082 | REP | 16 | LAST | 994 | 21,3315 | 55=502 0 | | | TS TS TEMP |
| 0083 | | | | | 21,3316 | 0 0006 1 | | | EXTEND |
| 0084 | REP | 4 | LAST | 993 | 21,3317 | 7 1640 0 | | | MP AMCB1 |
| 0085 | REP | 10 | LAST | 993 | 21,3320 | 27=567 0 | | | ADS ERRORX |
| 0086 | REP | 17 | LAST | 998 | 21,3321 | 3 1502 1 | | | CA TS TEMP |
| 0087 | | | | | 21,3322 | 0 0006 1 | | | EXTEND |
| 0088 | REP | 4 | LAST | 993 | 21,3323 | 7 1641 1 | | | MP AMCB4 |
| 0089 | REP | 5 | LAST | 991 | 21,3324 | 55=570 0 | | | TS ERRORY |
| 0090 | REP | 18 | LAST | 998 | 21,3325 | 3 1502 1 | | | CA TS TEMP |
| 0091 | | | | | 21,3326 | 0 0006 1 | | | EXTEND |
| 0092 | REP | 4 | LAST | 994 | 21,3327 | 7 1643 0 | | | MP AMCB7 |
| 0093 | REP | 5 | LAST | 993 | 21,3330 | 55=571 1 | | | TS ERRORZ |
| 0094 | REP | 17 | LAST | 994 | 21,3331 | 3 0034 0 | | | CA CDUZ |
| 0095 | | | | | 21,3332 | 0 0006 1 | | | EXTEND |
| 0096 | REP | 3 | LAST | 114 | 21,3333 | 21=574 1 | | | MSU THETADZ |
| 0097 | REP | 19 | LAST | 998 | 21,3334 | 55=502 0 | | | TS TS TEMP |
| 0098 | | | | | 21,3335 | 0 0006 1 | | | EXTEND |
| 0099 | REP | 4 | LAST | 994 | 21,3336 | 7 1642 1 | | | MP AMCB5 |
| 0100 | REP | 6 | LAST | 998 | 21,3337 | 27=570 0 | | | ADS ERRORY |
| 0101 | REP | 20 | LAST | 998 | 21,3340 | 3 1502 1 | | | CA TS TEMP |
| 0102 | | | | | 21,3341 | 0 0006 1 | | | EXTEND |
| 0103 | REP | 4 | LAST | 994 | 21,3342 | 7 1644 1 | | | MP AMCB8 |
| 0104 | REP | 6 | LAST | 998 | 21,3343 | 27=571 1 | | | ADS ERRORZ |
| 0105 | REP | 14 | LAST | 996 | 21,3344 | 4 1332 0 | | | CS HCLDFLAG |
| 0106 | | | | | 21,3345 | 0 0006 1 | | | EXTEND |



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| | | | | | | | | |
|--------|-----|-----|------|-----|---------|----------|----------|--------------|
| 0107 | REP | 2 | LAST | 990 | 21,3346 | 6 3425 1 | BZMP | JETS |
| 0108 | REP | 4 | LAST | 411 | 21,3347 | 3 1564 1 | CA | BIAS |
| 0109 | REP | 11 | LAST | 998 | 21,3350 | 27-587 0 | ADS | ERRORX |
| 0110 | REP | 4 | LAST | 411 | 21,3351 | 3 1565 0 | CA | BIAS1 |
| 0111 | REP | 7 | LAST | 998 | 21,3352 | 27-570 0 | ADS | ERRORY |
| 0112 | REP | 4 | LAST | 411 | 21,3353 | 3 1566 0 | CA | BIAS2 |
| 0113 | REP | 7 | LAST | 998 | 21,3354 | 27-571 1 | ADS | ERRORZ |
| 0114 | REP | 3 | LAST | 999 | 21,3355 | 1 3425 0 | TCP | JETS |
| 0115 | REP | 15 | LAST | 998 | 21,3356 | 11-332 0 | HOLDPLNC | CCS HOLDFLAG |
| 0116 | | | | | 21,3357 | 1 3362 1 | TCP | +3 |
| 0117 | REP | 2 | LAST | 998 | 21,3360 | 1 3306 0 | TCP | ATTHOLD |
| 0118 | | | | | 21,3361 | 1 3362 1 | TCP | +1 |
| 0119 | REP | 182 | LAST | 993 | 21,3362 | 3 4714 1 | ORABANG | CAP ZERO |
| 01191 | REP | 13 | LAST | 990 | 21,3363 | 55-525 0 | TS | WBODY |
| 01192 | REP | 14 | LAST | 999 | 21,3364 | 55-526 0 | TS | WBODY +1 |
| 01193 | REP | 5 | LAST | 585 | 21,3365 | 55-527 1 | TS | WBODY1 |
| 01194 | REP | 6 | LAST | 999 | 21,3366 | 55-530 1 | TS | WBODY1 +1 |
| 01195 | REP | 6 | LAST | 585 | 21,3367 | 55-531 0 | TS | WBODY2 |
| 01196 | REP | 7 | LAST | 999 | 21,3370 | 55-532 0 | TS | WBODY2 +1 |
| 01197 | REP | 5 | LAST | 999 | 21,3371 | 55-564 0 | TS | BIAS |
| 01198 | REP | 5 | LAST | 999 | 21,3372 | 55-565 1 | TS | BIAS1 |
| 01199 | REP | 5 | LAST | 999 | 21,3373 | 55-566 1 | TS | BIAS2 |
| 0120 | REP | 43 | LAST | 996 | 21,3374 | 3 1501 1 | CA | RCSPLAGS |
| 01201 | REP | 4 | LAST | 990 | 21,3375 | 7 3023 1 | MAK | OCT16000 |
| 012011 | | | | | 21,3376 | 0 0006 1 | EXTEND | |
| 01202 | REP | 1 | | | 21,3377 | 1 3405 1 | BZP | ENDDAMP |
| 01203 | REP | 183 | LAST | 999 | 21,3400 | 3 4714 1 | CAP | ZERO |
| 01204 | REP | 12 | LAST | 999 | 21,3401 | 55-567 0 | TS | ERRORX |
| 01205 | REP | 8 | LAST | 999 | 21,3402 | 55-570 0 | TS | ERRORY |
| 01206 | REP | 8 | LAST | 999 | 21,3403 | 55-571 1 | TS | ERRORZ |
| 01207 | REP | 4 | LAST | 999 | 21,3404 | 1 3425 0 | TCP | JETS |
| 01208 | REP | 16 | LAST | 999 | 21,3405 | 55-332 0 | ENDDAMP | TS HOLDFLAG |
| 01209 | | | | | 21,3406 | 0 0006 1 | EXTEND | |
| 0121 | REP | 24 | LAST | 998 | 21,3407 | 3 0033 1 | DCA | CDUX |
| 01211 | REP | 7 | LAST | 998 | 21,3410 | 53-573 0 | DXCH | THETADX |
| 01212 | REP | 18 | LAST | 998 | 21,3411 | 3 0034 0 | CA | CDUZ |
| 01213 | REP | 4 | LAST | 998 | 21,3412 | 55-574 1 | TS | THETADZ |
| 01214 | REP | 3 | LAST | 999 | 21,3413 | 1 3306 0 | TCP | ATTHOLD |

AD BIASES ONLY IF PERFORMING AUTOMATIC

ZERO WORDYS AND BIASES

IS RATE DAMPING COMPLETED
IF SO, GO TO ENDDAMP
OTHERWISE, ZERO ERRORS

SET HOLDFLAG +0

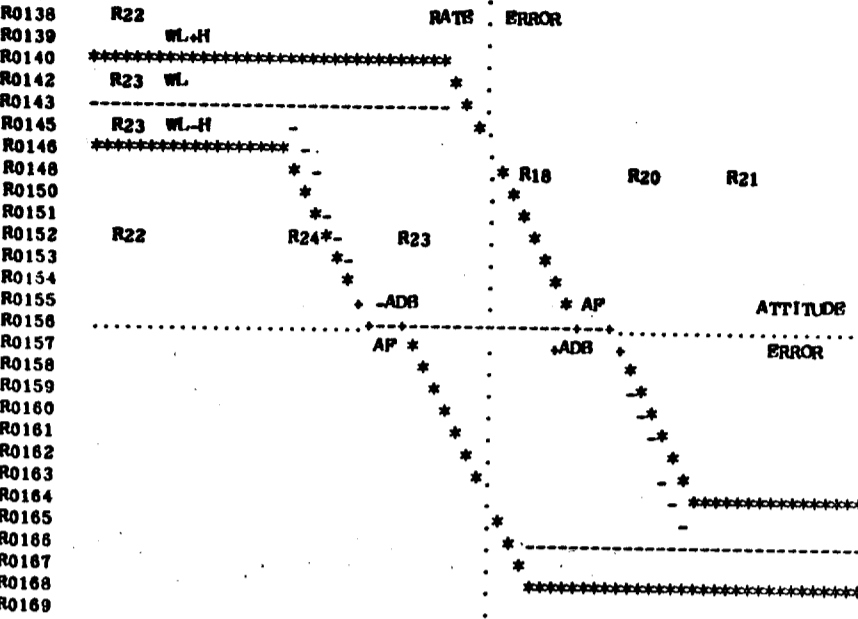
PICK UP CDU ANGLES FOR ATTITUDE HOLD
REFERENCES



L AUTOMATIC MANEUVERS

P0130 JET SWITCHING LOGIC AND CALCULATION OF REQUIRED ROTATION COMMANDS

R0131 DETERMINE THE LOCATION OF THE RATE ERROR AND THE ATTITUDE ERROR RELATIVE TO THE SWITCHING LOGIC IN THE PHASE PLANE.
 R0133 PLANE.
 R0134 COMPUTE THE CHANGE IN RATE CORRESPONDING TO THE ATTITUDE ERROR NECESSARY TO DRIVE THE THE S/C INTO THE
 R0136 APPROPRIATE DEADZONE.
 R0137



**** SWITCH LINES ENCLOSING DEADZONES
 ----- DESIRED RATE LINES
 R20, R21, R22, ETC REGIONS IN PHASE PLANE FOR COMPUTING DESIRED RESPONSE

R0170 FIG. 1 PHASE PLANE SWITCHING LOGIC
 R0171 CONSTANTS FOR JET SWITCHING LOGIC

| | | | | | | |
|------|---------|---------|--------------|-------------|---------------------------|-------|
| 0172 | 21,3414 | 00114 0 | WLH/SLOP DEC | .00463 | = WL-H/SLOPE = .83333 DEG | \$180 |
| 0173 | 21,3415 | 00055 1 | WL-H/SLP DEC | .00277 | = WL-H/SLOPE = .5 DEG | \$180 |
| 0174 | 21,3416 | 00022 1 | WLH 2DEC | .0011111111 | = WL-H = 0.5 DEG/SEC | \$450 |
| 0174 | 21,3417 | 06426 1 | | | | |
| 0175 | 21,3420 | 00012 1 | WLMH 2DEC | .0008888888 | = WL-H = 0.3 DEG/SEC | \$450 |
| 0175 | 21,3421 | 35415 1 | | | | |
| 0176 | 21,3422 | 00016 0 | WL 2DEC | .0008888888 | = WL = 0.4 DEG/SEC | \$450 |
| 0176 | 21,3423 | 22021 1 | | | | |

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| | | | | | | | | | | |
|--------|-----|-----|------|---------|---------|--------|--------|---------|--------|----------|
| 0177 | | | | 21,3424 | 12173 | 1 | SLOPE2 | DEC | .32 | |
| 0178 | REP | 5 | LAST | 688 | 21,3425 | 3 1655 | 0 | JETS | CA | ADB |
| 0179 | REP | 13 | LAST | 987 | 21,3426 | 6 4710 | 0 | | AD | FOUR |
| 0180 | REP | 21 | LAST | 996 | 21,3427 | 55=502 | 0 | | TS | TS TEMP |
| 0181 | REP | 43 | LAST | 989 | 21,3430 | 3 4711 | 1 | | CAP | TWO |
| 0182 | REP | 28 | LAST | 990 | 21,3431 | 55=506 | 1 | JLOOP | TS | SPNDX |
| 0183 | | | | | 21,3432 | 6 0000 | 1 | | DOUBLE | |
| 0184 | REP | 24 | LAST | 990 | 21,3433 | 55=507 | 0 | | TS | DPNDX |
| 0185 | | | | | 21,3434 | 0 0006 | 1 | | EXTEND | |
| 0186 | REP | 229 | LAST | 996 | 21,3435 | 5 0000 | 1 | | INDEX | A |
| 0187 | REP | 9 | LAST | 977 | 21,3436 | 3 1534 | 1 | | DCA | ADOT |
| 0188 | REP | 2 | LAST | 106 | 21,3437 | 53=516 | 0 | | DYCH | EDOT |
| 0189 | REP | 17 | LAST | 999 | 21,3440 | 3 1332 | 1 | | CA | HOLDFLAG |
| 0190 | | | | | 21,3441 | 0 0006 | 1 | | EXTEND | |
| 0191 | REP | 1 | | | 21,3442 | 1 3447 | 1 | | BZF | INHOLD |
| A01911 | | | | | | | | | | |
| 0192 | | | | | 21,3443 | 0 0006 | 1 | | EXTEND | |
| 0193 | REP | 25 | LAST | 1001 | 21,3444 | 5 1507 | 1 | | INDEX | DPNDX |
| 0194 | REP | 15 | LAST | 999 | 21,3445 | 4 1526 | 0 | | DCS | WBODY |
| 0195 | REP | 3 | LAST | 1001 | 21,3446 | 21=516 | 0 | | DAS | EDOT |
| 0198 | REP | 29 | LAST | 1001 | 21,3447 | 51=506 | 0 | INHOLD | INDEX | SPNDX |
| 0197 | REP | 13 | LAST | 999 | 21,3450 | 3 1567 | 1 | | CA | ERRORX |
| 0198 | REP | 2 | LAST | 106 | 21,3451 | 55=517 | 1 | | TS | ABRR |
| 0199 | REP | 4 | LAST | 1001 | 21,3452 | 11=515 | 0 | | CCS | EDOT |
| 0200 | REP | 1 | | | 21,3453 | 1 3463 | 1 | | TCF | POSVEL |
| 0201 | REP | 1 | | | 21,3454 | 1 3456 | 1 | | TCF | SIGNCK1 |
| 0202 | REP | 1 | | | 21,3455 | 1 3473 | 0 | | TCF | NEGVEL |
| 0203 | REP | 5 | LAST | 1001 | 21,3456 | 11=516 | 0 | SIGNCK1 | CCS | EDOT +1 |
| 0204 | REP | 2 | LAST | 1001 | 21,3457 | 1 3463 | 1 | | TCF | POSVEL |
| 0205 | REP | 3 | LAST | 1001 | 21,3460 | 1 3463 | 1 | | TCF | POSVEL |
| 0208 | REP | 2 | LAST | 1001 | 21,3461 | 1 3473 | 0 | | TCF | NEGVEL |
| 0207 | REP | 3 | LAST | 1001 | 21,3462 | 1 3473 | 0 | | TCF | NEGVEL |
| 0208 | | | | | 21,3463 | 0 0006 | 1 | POSVEL | EXTEND | |
| 0209 | REP | 6 | LAST | 1001 | 21,3464 | 3 1516 | 1 | | DCA | EDOT |
| 0210 | REP | 2 | LAST | 106 | 21,3465 | 53=521 | 1 | | DYCH | EDOTVEL |
| 0211 | REP | 22 | LAST | 1001 | 21,3466 | 3 1502 | 1 | | CA | TS TEMP |
| 0212 | REP | 1 | | | 21,3467 | 55=523 | 0 | | TS | ADRVEL |
| 0213 | REP | 3 | LAST | 1001 | 21,3470 | 3 1517 | 0 | | CA | ABRR |
| 0214 | REP | 2 | LAST | 106 | 21,3471 | 55=522 | 1 | | TS | ABRRVEL |
| 0215 | REP | 1 | | | 21,3472 | 0 3502 | 0 | | TC | J6. |
| 0216 | | | | | 21,3473 | 0 0006 | 1 | NROVEL | EXTEND | |
| 0217 | REP | 7 | LAST | 1001 | 21,3474 | 4 1516 | 0 | | DCS | EDOT |
| 0218 | REP | 3 | LAST | 1001 | 21,3475 | 53=521 | 1 | | DYCH | EDOTVEL |
| 0219 | REP | 23 | LAST | 1001 | 21,3476 | 4 1502 | 0 | | CS | TS TEMP |
| 0220 | REP | 2 | LAST | 1001 | 21,3477 | 55=523 | 0 | | TS | ADRVEL |
| 0221 | REP | 4 | LAST | 1001 | 21,3500 | 4 1517 | 1 | | CS | ABRR |
| 0222 | REP | 3 | LAST | 1001 | 21,3501 | 55=522 | 1 | | TS | ABRRVEL |
| 0223 | | | | | 21,3502 | 0 0006 | 1 | J6. | EXTEND | |

= 0.8 DEG/SEC/DEG 8450/180

AP = FLAT REGION = .044 DEG
ADB,AP

HOLDFLAG = +0 MEANS THAT DAP IS IN
ATTITUDE HOLD AND RATE DAMPING IS OVR.
IF THIS IS THE CASE, BYPASS ADDITION
OF WBODY AND GO TO INHOLD

= ADOT-WBODY

ABRR = RIAS + AK

+(ADR,AP)

-(ADR,AP)



L AUTOMATIC MANEUVERS

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| | | | | | | | | |
|------|-----|----|-----------|---------|----------|--------|----------|----------|
| 0224 | REP | 6 | LAST 1001 | 21,3503 | 61-655 0 | SU | ADB | |
| 0225 | REP | 1 | | 21,3504 | 6 3414 0 | AD | WLH/SLOP | |
| 0226 | | | | 21,3505 | 0 0006 1 | EXTEND | | |
| 0227 | REP | 1 | | 21,3506 | 6 3535 1 | BZMP | J8 | |
| 0228 | REP | 24 | LAST 1001 | 21,3507 | 4 1502 0 | CS | TS TEMP | (ADB,AP) |
| 0229 | REP | 4 | LAST 1001 | 21,3510 | 6 1522 0 | AD | AERRVEL | |
| 0230 | | | | 21,3511 | 0 0006 1 | EXTEND | | |
| 0231 | | | | 21,3512 | 6 3514 1 | BZMP | +2 | |
| 0232 | REP | 1 | | 21,3513 | 1 3526 1 | TCP | J7 | |
| 0233 | | | | 21,3514 | 0 0006 1 | EXTEND | | |
| 0234 | REP | 4 | LAST 1001 | 21,3515 | 4 1521 1 | DCS | EDOTVEL | |
| 0235 | | | | 21,3516 | 0 0006 1 | EXTEND | | |
| 0236 | REP | 3 | LAST 985 | 21,3517 | 11-654 0 | DV | SLOPE | |
| 0237 | | | | 21,3520 | 0 0006 1 | EXTEND | | |
| 0238 | REP | 5 | LAST 1002 | 21,3521 | 61-522 0 | SU | AERRVEL | |
| 0239 | REP | 7 | LAST 1002 | 21,3522 | 6 1655 0 | AD | ADB | |
| 0240 | | | | 21,3523 | 0 0006 1 | EXTEND | | |
| 0241 | REP | 1 | | 21,3524 | 6 3614 1 | BZMP | J18 | |
| 0242 | REP | 1 | | 21,3525 | 1 3670 1 | TCP | J23 | |
| 0243 | REP | 1 | | 21,3526 | 4 3415 0 | J7 | CS | WL-H/SLP |
| 0244 | | | | 21,3527 | 0 0006 1 | EXTEND | | |
| 0245 | REP | 25 | LAST 1002 | 21,3530 | 61-502 1 | SU | TS TEMP | (ADB,AP) |
| 0246 | REP | 6 | LAST 1002 | 21,3531 | 6 1522 0 | AD | AERRVEL | |
| 0247 | | | | 21,3532 | 0 0006 1 | EXTEND | | |
| 0248 | REP | 1 | | 21,3533 | 6 3620 0 | BZMP | J20 | |
| 0249 | REP | 1 | | 21,3534 | 1 3631 1 | TCP | J21 | |
| 0250 | | | | 21,3535 | 0 0006 1 | J8 | EXTEND | |
| 0251 | REP | 1 | | 21,3536 | 4 3417 1 | DCS | WLH | |
| 0252 | REP | 6 | LAST 994 | 21,3537 | 53-514 1 | DXCH | WTRMP | |
| 0253 | | | | 21,3540 | 0 0006 1 | EXTEND | | |
| 0254 | REP | 5 | LAST 1002 | 21,3541 | 3 1521 0 | DCA | EDOTVEL | |
| 0255 | REP | 7 | LAST 1002 | 21,3542 | 21-514 1 | DAS | WTEMP | |
| 0256 | REP | 8 | LAST 1002 | 21,3543 | 11-513 0 | CCS | WTEMP | |
| 0257 | REP | 1 | | 21,3544 | 1 3657 1 | TCP | J22 | |
| 0258 | REP | 1 | | 21,3545 | 1 3547 0 | TCP | SIGNCK2 | |
| 0259 | REP | 1 | | 21,3546 | 1 3553 0 | TCP | NJ22 | |
| 0260 | REP | 9 | LAST 1002 | 21,3547 | 11-514 1 | CCS | WTEMP +1 | |
| 0261 | REP | 2 | LAST 1002 | 21,3550 | 1 3657 1 | TCP | J22 | |
| 0262 | REP | 3 | LAST 1002 | 21,3551 | 1 3657 1 | TCP | J22 | |
| 0263 | REP | 2 | LAST 1002 | 21,3552 | 1 3553 0 | TCP | NJ22 | |
| 0264 | | | | 21,3553 | 0 0006 1 | NJ22 | EXTEND | |
| 0265 | REP | 6 | LAST 1002 | 21,3554 | 3 1521 0 | DCA | EDOTVEL | |
| 0266 | | | | 21,3555 | 0 0006 1 | EXTEND | | |
| 0267 | REP | 4 | LAST 1002 | 21,3556 | 11-654 0 | DV | SLOPE | |
| 0268 | REP | 26 | LAST 1002 | 21,3557 | 6 1502 1 | AD | TS TEMP | (ADB,AP) |
| 0269 | REP | 7 | LAST 1002 | 21,3560 | 6 1522 0 | AD | AERRVEL | |

L AUTOMATIC MANEUVERS

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| | | | | | | | | | |
|------|-----|-----|------|------|---------|----------|---------|----------|--------------------|
| 0270 | REP | 230 | LAST | 1001 | 21,3561 | 10 000 0 | CCS | A | |
| 0271 | REP | 2 | LAST | 1002 | 21,3562 | 1 3870 1 | TCP | J23 | |
| 0272 | REP | 3 | LAST | 1003 | 21,3563 | 1 3870 1 | TCP | J23 | |
| 0273 | | | | | 21,3564 | 1 3566 0 | TCP | +2 | |
| 0274 | REP | 4 | LAST | 1003 | 21,3565 | 1 3870 1 | TCP | J23 | |
| 0275 | | | | | 21,3566 | 0 0006 1 | EXTEND | | |
| 0276 | REP | 1 | | | 21,3567 | 4 3421 1 | DCS | WLH4 | WL - H |
| 0277 | REP | 10 | LAST | 1002 | 21,3570 | 53=514 1 | DXCH | WTEMP | |
| 0278 | | | | | 21,3571 | 0 0006 1 | EXTEND | | |
| 0279 | REP | 7 | LAST | 1002 | 21,3572 | 3 1521 0 | DCA | EDOTVEL | |
| 0280 | REP | 11 | LAST | 1003 | 21,3573 | 21=514 1 | DAS | WTEMP | |
| 0281 | REP | 12 | LAST | 1003 | 21,3574 | 11=513 0 | CCS | WTEMP | |
| 0282 | REP | 5 | LAST | 1003 | 21,3575 | 1 3870 1 | TCP | J23 | |
| 0283 | REP | 1 | | | 21,3576 | 1 3800 0 | TCP | SIGNCK3 | |
| 0284 | REP | 1 | | | 21,3577 | 1 3804 1 | TCP | NJ23 | |
| 0285 | REP | 13 | LAST | 1003 | 21,3600 | 11=514 1 | SIGNCK3 | CCS | WTEMP +1 |
| 0286 | REP | 8 | LAST | 1003 | 21,3601 | 1 3870 1 | TCP | J23 | |
| 0287 | REP | 7 | LAST | 1003 | 21,3602 | 1 3870 1 | TCP | J23 | |
| 0288 | REP | 2 | LAST | 1003 | 21,3603 | 1 3804 1 | TCP | NJ23 | |
| 0289 | REP | 8 | LAST | 1002 | 21,3604 | 3 1522 0 | NJ23 | CA | ARRVEL |
| 0290 | REP | 27 | LAST | 1002 | 21,3605 | 6 1502 1 | AD | TSTEMP | (ADR,AP) |
| 0291 | REP | 2 | LAST | 1002 | 21,3606 | 8 3415 1 | AD | WL-H/SLP | |
| 0292 | REP | 231 | LAST | 1003 | 21,3607 | 10 000 0 | CCS | A | |
| 0293 | REP | 1 | | | 21,3610 | 1 3702 0 | TCP | J24 | |
| 0294 | REP | 2 | LAST | 1003 | 21,3611 | 1 3702 0 | TCP | J24 | |
| 0295 | REP | 4 | LAST | 1002 | 21,3612 | 1 3657 1 | TCP | J22 | |
| 0296 | REP | 5 | LAST | 1003 | 21,3613 | 1 3657 1 | TCP | J22 | |
| 0297 | | | | | 21,3614 | 0 0006 1 | J18 | EXTEND | |
| 0298 | REP | 8 | LAST | 1001 | 21,3615 | 4 1516 0 | DCS | EDOT | |
| 0299 | REP | 24 | LAST | 996 | 21,3616 | 53=511 1 | DXCH | KMPAC | |
| 0300 | REP | 1 | | | 21,3617 | 1 3713 0 | TCP | JTIME | |
| 0301 | REP | 5 | LAST | 1001 | 21,3620 | 4 1517 1 | J20 | CS | AERR |
| 0302 | REP | 3 | LAST | 1001 | 21,3621 | 6 1523 1 | AD | ADRVEL | |
| 0303 | | | | | 21,3622 | 0 0006 1 | EXTEND | | |
| 0304 | REP | 1 | | | 21,3623 | 7 3424 1 | MP | SLOPE2 | (HYSTERESIS SLOPE) |
| 0305 | REP | 25 | LAST | 1003 | 21,3624 | 53=511 1 | DXCH | KMPAC | |
| 0306 | | | | | 21,3625 | 0 0006 1 | EXTEND | | |
| 0307 | REP | 9 | LAST | 1003 | 21,3626 | 4 1516 0 | DCS | EDOT | |
| 0308 | REP | 26 | LAST | 1003 | 21,3627 | 21=511 1 | DAS | KMPAC | |
| 0309 | REP | 2 | LAST | 1003 | 21,3630 | 1 3713 0 | TCP | JTIME | |
| 0310 | REP | 10 | LAST | 1003 | 21,3631 | 11=515 0 | J21 | CCS | EDOT |
| 0311 | REP | 1 | | | 21,3632 | 1 3850 0 | TCP | JP | |
| 0312 | REP | 1 | | | 21,3633 | 1 3835 0 | TCP | SIGNCK4 | |
| 0313 | REP | 1 | | | 21,3634 | 1 3841 0 | TCP | JN | |
| 0314 | REP | 11 | LAST | 1003 | 21,3635 | 11=516 0 | SIGNCK4 | CCS | EDOT +1 |



L AUTOMATIC MANEUVERS

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| | | | | | | | | |
|---------|-----|----|-----------|---------|-----------|---------|--------|----------|
| 0315 | REP | 2 | LAST 1003 | 21,3636 | 1 3650 0 | | TCP | JP |
| 0316 | REP | 3 | LAST 1004 | 21,3637 | 1 3650 0 | | TCP | JP |
| 0317 | REP | 2 | LAST 1003 | 21,3640 | 1 3641 0 | | TCP | JN |
| 0318 | | | | 21,3641 | 0 0006 1 | JN | EXTEND | |
| 0319 | REP | 12 | LAST 1003 | 21,3642 | 4 1516 0 | | DCS | EDOT |
| 0320 | REP | 27 | LAST 1003 | 21,3643 | 53*511 1 | | DXCH | KMPAC |
| 0321 | | | | 21,3644 | 0 0006 1 | | EXTEND | |
| 0322 | REP | 1 | | 21,3645 | 3 3423 1 | | DCA | WL |
| 0323 | REP | 28 | LAST 1004 | 21,3646 | 21*511 1 | | DAS | KMPAC |
| 0324 | REP | 3 | LAST 1003 | 21,3647 | 1 3713 0 | | TCP | JTIME |
| 0325 | | | | 21,3650 | 0 0008 1 | JP | EXTEND | |
| 0326 | REP | 13 | LAST 1004 | 21,3651 | 4 1518 0 | | DCS | EDOT |
| 0327 | REP | 29 | LAST 1004 | 21,3652 | 53*511 1 | | DXCH | W A C |
| 0328 | | | | 21,3653 | 0 0008 1 | | EXTEND | |
| 0329 | REP | 2 | LAST 1004 | 21,3654 | 4 3423 0 | | DCS | WL |
| 0330 | REP | 30 | LAST 1004 | 21,3655 | 21.1511 1 | | DAS | W A C |
| 0331 | REP | 4 | LAST 1004 | 21,3656 | 1 3713 0 | | SF | JTIME |
| 0332 | REP | 14 | LAST 1004 | 21,3657 | 11*515 0 | J22 | CCS | EDOT |
| 0333 | REP | 3 | LAST 1004 | 21,3660 | 1 3641 0 | | TCP | JN |
| 0334 | REP | 1 | | 21,3661 | 1 3663 0 | | TCP | SIGNCK5 |
| 0335 | REP | 4 | LAST 1004 | 21,3662 | 1 3650 0 | | TCP | JP |
| 0336 | REP | 15 | LAST 1004 | 21,3883 | 11*518 0 | SIGNCK5 | CCS | EDOT +1 |
| 0337 | REP | 4 | LAST 1004 | 21,3664 | 1 3641 0 | | TCP | JN |
| 0338 | REP | 5 | LAST 1004 | 21,3665 | 1 3641 0 | | TCP | JN |
| 0339 | REP | 5 | LAST 1004 | 21,3666 | 1 3650 0 | | TCP | JP |
| 0340 | REP | 6 | LAST 1004 | 21,3667 | 1 3650 0 | | TCP | JP |
| 0341 | REP | 30 | LAST 1001 | 21,3670 | 51*508 0 | J23 | INDEX | SPNDX |
| 034151 | REP | 40 | LAST 996 | 21,3671 | 4 4876 0 | | CS | BIT13 |
| 034152 | REP | 44 | LAST 999 | 21,3672 | 7 1501 0 | | MASK | RCSFLAGS |
| 034153 | REP | 45 | LAST 1004 | 21,3673 | 55*501 0 | | TS | RCSFLAGS |
| A034154 | | | | | | | | |
| 034155 | REP | 31 | LAST 1004 | 21,3674 | 51*508 0 | | INDEX | SPNDX |
| 034156 | REP | 1 | | 21,3675 | 3 3017 1 | | CAP | OCTO1400 |
| 034157 | REP | 46 | LAST 1004 | 21,3676 | 7 1501 0 | | MASK | RCSFLAGS |
| 034158 | | | | 21,3677 | 0 0006 1 | | EXTEND | |
| 034159 | REP | 1 | | 21,3700 | 1 3734 0 | | BZF | DOJET +2 |
| 03416 | REF | 2 | LAST 1002 | 21,3701 | 1 3614 0 | | TCP | J18 |
| 0342 | REP | 6 | LAST 1003 | 21,3702 | 4 1517 1 | J24 | CS | ARRR |
| 0343 | | | | 21,3703 | 0 0006 1 | | EXTEND | |
| 0344 | REP | 4 | LAST 1003 | 21,3704 | 61*523 1 | | SU | ADRVEL |
| 0345 | | | | 21,3705 | 0 0006 1 | | EXTEND | |
| 0346 | REP | 2 | LAST 1003 | 21,3708 | 1 3424 1 | | MP | SLOPE2 |
| 0347 | REP | 31 | LAST 1004 | 21,3707 | 53*511 1 | | DXCH | KMPAC |
| 0348 | | | | 21,3710 | 0 0006 1 | | EXTEND | |

RESET RATE DAMPING FLAG
 BIT13 FOR ROLL (SPNDX = 0)
 BIT12 FOR PITCH (SPNDX = 1)
 BIT11 FOR YAW (SPNDX = 2)

IS THERE TO BE A FORCED FIRING ON THIS
 AXIS

NO, GO TO DOJET +2 AND DO NOTHING

YES, GO TO J18 AND FORCE A FIRING

(HYSTERESIS SLOPE)



L AUTOMATIC MANEUVERS

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| | | | | | | | | |
|------|-----|----|-----------|---------|--------|---|-----|-------|
| 0349 | REP | 16 | LAST 1004 | 21,3711 | 4 1516 | 0 | DCS | EDOT |
| 0350 | REP | 32 | LAST 1004 | 21,3712 | 21-511 | 1 | DAS | KMPAC |



L AUTOMATIC MANEUVERS

P0351 COMPUTE THE JET ON TIME NECESSARY TO ACCOMPLISH THE DESIRED CHANGE IN RATE, IS

R0353 $T = J/\Delta W$
R0354 J

R0355 $\Delta W =$ DESIRED CHANGE IN S/C ANGULAR RATE AS DETERMINED BY THE
R0356 SWITCHING LOGIC, AT THIS POINT STORED IN KMPAC.

R0357 $J/M =$ S/C INERTIA TO TORQUE RATIO SCALED BY
R0358 $(57.3/450)(B24/1600)(1/.8)$
R0359 FOR 1 JET OPERATION (M = 700 FT-LB).
R0360 IF $J/M = J(\text{SLUG-FT}^2) \times 0.0000085601608$

R0361 THE CORRESPONDING COMPUTER VARIABLES ESTABLISHED BY
R0362 KEYBOARD ENTRY ARE

R0363 J/M (ROLL)
R0364 J/M1 (PITCH)
R0365 J/M2 (YAW)

R0366 T = JET ON-TIME SCALED 16384/1600 SEC
R0367 J

R0368 THE COMPUTER VARIABLES ARE

R0369 TAU (ROLL)
R0370 TAU1 (PITCH)
R0371 TAU2 (YAW)

| REP | INDEX | SPNDX | PICK UP S/C INERTIA/TORQUE RATIO SCALED (57.3/450)(B24/1600) FOR 1-JET OPERATION |
|------|------------------|------------------|--|
| 0372 | REP 32 LAST 1004 | 21,3713 51=508 0 | JTIME |
| 0373 | REP 3 LAST 691 | 21,3714 3 1623 1 | INDEX CA |
| 0374 | REP 2 LAST 976 | 21,3715 0 2026 1 | CA J/M |
| 0375 | REP 29 LAST 955 | 21,3716 3 4700 1 | TC SMALLMP |
| 0376 | REP 3 LAST 1006 | 21,3717 0 2026 1 | CA BIT11 |
| 0377 | REP 33 LAST 1005 | 21,3720 11=510 0 | TC SMALLMP |
| 0378 | | 21,3721 1 3725 0 | CCS KMPAC |
| 0379 | REP 1 | 21,3722 1 3731 0 | TCP +4 |
| 0380 | | 21,3723 1 3727 1 | TCP TAU1NORM |
| 0381 | REP 2 LAST 1006 | 21,3724 1 3731 0 | TCP +4 |
| 0382 | REP 26 LAST 973 | 21,3725 3 4672 0 | TCP TAU1NORM |
| 0383 | REP 2 LAST 1004 | 21,3726 1 3732 0 | CA POSMAX |
| 0384 | REP 8 LAST 971 | 21,3727 3 4674 0 | TCP DOJET |
| 0385 | REP 3 LAST 1006 | 21,3730 1 3732 0 | CA NEGMAX |
| 0386 | REP 34 LAST 1006 | 21,3731 3 1511 0 | TCP DOJET |
| 0387 | REP 33 LAST 1006 | 21,3732 51=508 0 | TAUNORM CA |
| 0388 | REP 4 LAST 996 | 21,3733 55=561 0 | DOJET INDEX |
| 0389 | REP 34 LAST 1006 | 21,3734 11=506 1 | TS SPNDX |
| 0390 | REP 1 | 21,3735 1 3431 0 | CCS SPNDX |
| 0391 | REP 2 LAST 991 | 21,3736 1 3743 0 | TCP JLOOP |
| | | | TCP T6PROG |

L AUTOMATIC MANEUVERS

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| | | | | | | | | | | |
|------|-----|-----|------|------|---------|--------|---|----------|--------|----------|
| 0392 | REP | 184 | LAST | 999 | 21,3737 | 3 4714 | 1 | ZEROCMDS | CAP | ZERO |
| 0393 | REP | 5 | LAST | 1006 | 21,3740 | 55-561 | 0 | | TS | TAU |
| 0394 | REP | 4 | LAST | 996 | 21,3741 | 55-562 | 0 | | TS | TAU1 |
| 0395 | REP | 4 | LAST | 997 | 21,3742 | 55-563 | 1 | | TS | TAU2 |
| 0396 | | | | | 21,3743 | 0 0006 | 1 | T6PROG | EXTEND | |
| 0397 | REP | 1 | | | 21,3744 | 3 3750 | 0 | | DCA | JETADDR |
| 0398 | REP | 20 | LAST | 973 | 21,3745 | 53-313 | 0 | | DCH | TSLOC |
| 0399 | REP | 39 | LAST | 994 | 21,3746 | 1 5222 | 1 | | TCF | RESUME |
| 0400 | REP | 35 | LAST | 1006 | E0,1510 | | | | BRANK= | KMPAC |
| 0401 | REP | 1 | | | 21,3747 | 02577 | 0 | JETADDR | 2CADR | JETSLECT |
| 0401 | REP | 1 | | | 21,3750 | 30066 | 1 | | | |

WHEN THE ROTATION COMMANDS (TAUS)
HAVE BEEN DETERMINED
RESET TSLOC FOR PHASE3



L RCS-CSM DAP EXECUTIVE PROGRAMS

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R0001 CALCULATION OF AMCB, AMBG ONCE EVERY SECOND

R0002 AMCB = 1 SIN(PSI) 0
 R0003 0 COS(PSI)COS(PHI) SIN(PHI)
 R0004 0 -COS(PSI)SIN(PHI) COS(PHI)
 R0005
 R0006 AMBG = 1 -TAN(PSI)COS(PHI) TAN(PSI)SIN(PHI)
 R0007 0 COS(PHI)/COS(PSI) -SIN(PHI)/COS(PSI)
 R0008 0 SIN(PHI) COS(PHI)
 R0009

R0010 WHERE PHI AND PSI ARE CDU ANGLES

R0011

R0012

| | | | | | | |
|------|---------|-----------|----------|----------|-------------|-----------------|
| 0013 | | | 20,3565 | | | BANK 20 |
| 0014 | REP 1 | | 22,2000 | | | SETLOC DAP58 |
| 0015 | | | 22,3444 | | | BANK |
| 0016 | REP 1 | | | | | COUNT# 55/DAPEX |
| 0017 | REP 36 | LAST 1007 | E6, 1510 | | | EBANK= KMPAC |
| 0018 | REP 26 | LAST 904 | 22,3444 | 3 0102 1 | AMRQUPDT CA | FLAGWRD6 |
| 0019 | | | 22,3445 | 0 0006 1 | | EXTEND |
| 0020 | REP 105 | LAST 945 | 22,3446 | 6 5112 0 | RZMP | ENDOFJOB |
| 0021 | REP 61 | LAST 996 | 22,3447 | 7 4675 0 | MASK | BIT14 |
| 0022 | | | 22,3450 | 0 0006 1 | | EXTEND |
| 0023 | REP 106 | LAST 1008 | 22,3451 | 1 5112 1 | RZP | ENDOFJOB |
| 0024 | REP 19 | LAST 999 | 22,3452 | 3 0034 0 | CA | CDUZ |
| 0025 | REP 1 | | 22,3453 | 0 4770 0 | TC | SPSIN2 |
| 0026 | REP 5 | LAST 998 | 22,3454 | 55=640 0 | TS | AMCR1 |
| 0027 | REP 20 | LAST 1008 | 22,3455 | 3 0034 0 | CA | CDUZ |
| 0028 | REP 1 | | 22,3456 | 0 4767 0 | TC | SPCOS2 |
| 0029 | REP 2 | LAST 108 | 22,3457 | 55=645 0 | TS | CAPSI |
| 0030 | REP 1 | | 22,3460 | 3 3504 0 | CAP | QUADANGL |
| 0031 | | | 22,3461 | 0 0006 1 | | EXTEND |
| 0032 | REP 25 | LAST 999 | 22,3462 | 20 032 1 | MSU | CDUX |
| 0033 | | | 22,3463 | 4 0000 0 | COM | |
| 0034 | REP 1 | | 22,3464 | 0 4767 0 | TC | SPCOS1 |
| 0035 | REP 5 | LAST 998 | 22,3465 | 55=644 1 | TS | AMCR8 |
| 0036 | | | 22,3466 | 0 0006 1 | | EXTEND |
| 0037 | REP 3 | LAST 1008 | 22,3467 | 7 1645 0 | MP | CAPSI |
| 0038 | REP 5 | LAST 998 | 22,3470 | 55=641 1 | TS | AMCR4 |
| 0039 | REP 2 | LAST 1008 | 22,3471 | 3 3504 0 | CAP | QUADANGL |
| 0040 | | | 22,3472 | 0 0006 1 | | EXTEND |
| 0041 | REP 26 | LAST 1008 | 22,3473 | 20 032 1 | MSU | CDUX |
| 0042 | | | 22,3474 | 4 0000 0 | COM | |
| 0043 | REP 1 | | 22,3475 | 0 4770 0 | TC | SPSIN1 |
| 0044 | REP 5 | LAST 998 | 22,3476 | 55=642 1 | TS | AMCR5 |
| 0045 | | | 22,3477 | 0 0006 1 | | EXTEND |
| 0046 | REP 4 | LAST 1008 | 22,3500 | 7 1645 0 | MP | CAPSI |
| 0047 | | | 22,3501 | 4 0000 0 | COM | |

CHECK FOR RCS AUTOPILOT

BIT15 = 0, BIT14 = 1
 IF NOT RCS, EXIT

TO PROTECT TVC DAP ON SWITCHOVER

CALCULATE AMCB

MUST CHECK FOR GIMBAL LOCK
 = 7.25 DEGREES JET QUAD ANGLAR OPFSRT

CDUX - 7.25 DEG

CDUX - 7.25 DEG



L RGS-CSM DAP EXECUTIVE PROGRAMS

USBRMS PAGE NO. 2 E6 S3

| | | | | | | | | | | |
|------|-----|-----|------|------|---------|--------|------|---------|-------|----------|
| 0048 | REP | 5 | LAST | 998 | 22,3502 | 55-643 | 0 | TS | ANDBY | |
| 0049 | REP | 107 | LAST | 1008 | 22,3503 | 1 | 5112 | 1 | TCP | ENDOFJOB |
| 0050 | | | | | 22,3504 | 01224 | 1 | QJADANL | DEC | 660 |

= 1.25 DEGREES



L JET SELECTION LOGIC

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```

0001          21,3751          BANK 21
0002 REF 2 LAST 963 17,2900 SETLOC DAP34
0003          17,2577          BANK

0004 REF 1          COUNT 17/DAPJS

0005 REF 37 LAST 1008 E6,1510 BRANK= KMPAC
0006 EXAMINE CHANNEL 31 FOR TRANSLATION COMMANDS

0007 REF 18 LAST 973 17,2577 22 016 0 JETSELECT LXCH BANKRUPT
0008 REF 1          17,2600 3 2661 1 CAP DELTATT3
0009 REF 6 LAST 992 17,2601 6 1634 1 AD T5TIME
0010 REF 23 LAST 993 17,2602 54 030 0 TS TIME5
0011          17,2603 1 2606 1 TCP +3
0012 REF 1          17,2604 3 2662 1 CAP DELATT20
0013 REF 24 LAST 1010 17,2605 54 030 0 TS TIME5
0014 REF 1          17,2606 3 3340 0 CAP =14MS
0015 REF 4 LAST 987 17,2607 54 031 1 TS TIME6
0016 REF 9 LAST 1006 17,2610 3 4674 0 CAP NEGMAX
0017          17,2611 0 0006 1 EXTEND
0018 REF 10 LAST 987 17,2612 05 013 0 WOR CHAN13
0019          17,2613 0 0006 1 EXTEND
0020 REF 14 LAST 973 17,2614 22 012 1 QXCH CRUPT
0021 REF 1          17,2615 3 2660 0 CAP XLNMASK
0022          17,2616 0 0006 1 EXTEND
0023 REF 12 LAST 996 17,2617 06 031 0 RKOR CHAN31
0024 REF 2 LAST 1010 17,2620 7 2660 1 MASK XLNMASK
0025          17,2621 0 0006 1 EXTEND
0026 REF 1          17,2622 1 2663 1 BZF NOXLNCMD
0027 REF 28 LAST 1003 17,2623 55=502 0 TS T5TEMP
0028          17,2624 0 0006 1 EXTEND
0029 REF 31 LAST 993 17,2625 7 4702 1 MP BIT9
0030 REF 30 LAST 992 17,2626 7 6214 1 MASK THREE
0031 REF 3 LAST 106 17,2627 55=513 0 TS XNDX1
0032 REF 2 LAST 106 17,2630 55=514 1 TS XNDX2
0033 REF 29 LAST 1010 17,2631 3 1502 1 CA T5TEMP
0034          17,2632 0 0006 1 EXTEND
0035 REF 44 LAST 990 17,2633 7 4704 1 MP BIT7
0036 REF 31 LAST 1010 17,2634 7 6214 1 MASK THREE
0037 REF 3 LAST 106 17,2635 55=515 0 TS YNDX

0038 REF 30 LAST 1010 17,2636 3 1502 1 CA T5TEMP
0039          17,2637 0 0006 1 EXTEND
0040 REF 36 LAST 988 17,2640 7 4706 0 MP BITS
0041 REF 32 LAST 1010 17,2641 7 6214 1 MASK THREE
0042 REF 2 LAST 106 17,2642 55=516 0 TS ZNDX

0043 REF 70 LAST 932 17,2643 3 1466 1 CA DAPDATR1
00432 REF 62 LAST 1008 17,2644 7 4675 0 MASK BIT14
00434          17,2645 0 0006 1 EXTEND

```

= 60 MS RESET TO EXECUTE PHASE1

= 20 MS TO ASSURE A T5RUPT

RESET T6 TO INITIALIZE THE JET CHANNELS IN 14 MS

= 7700 OCT EXAMINE THE TRANSLATION HAND CONTROLLER

AC QUAD X-TRANSLATION INDEX
BD QUAD X-TRANSLATION INDEX

1 = + XLN
2 = - XLN
3 = NO XLN
Y-TRANSLATION INDEX

Z-TRANSLATION INDEX

SET ATTKALM TO PICK UP FILTER GAINS FOR TRANSLATIONS.
CHECK DAPDATR1 BIT 14 FOR LEM ATTACHED.

L JET SELECTION LOGIC

USER=5 PAGE NO. 2 Pg 53

| | | | | | | | | | |
|-------|-----|----|-----------|---------|----------|----------|----------|-------|-----------------------------------|
| 00438 | REP | 1 | | 17,2648 | 1 2651 0 | BZF | NOLEM | | |
| 00438 | REP | 33 | LAST 1010 | 17,2647 | 4 8214 1 | CS | THREE | | IF LEM IS ON, SET ATTKALMN = -3 |
| 0044 | | | | 17,2650 | 1 2652 0 | TCP | +2 | | |
| 00442 | REP | 44 | LAST 1001 | 17,2651 | 4 4711 0 | NOLEM | CS | TWO | IF LEM IS OFF, SET ATTKALMN = -2. |
| 00444 | REP | 10 | LAST 992 | 17,2652 | 55-617 1 | TS | ATTKALMN | | (+, -1, 0) |
| 0045 | REP | 4 | LAST 888 | 17,2653 | 11-631 0 | CCS | XTRANS | | USING ED-X ZERO XNDX1 |
| 0046 | REP | 4 | LAST 1010 | 17,2654 | 55-513 0 | TS | XNDX1 | | |
| 0047 | REP | 1 | | 17,2655 | 1 2667 0 | TCP | PWORD | | USING AC-X ZERO XNDX2 |
| 0048 | REP | 3 | LAST 1010 | 17,2656 | 55-514 1 | TS | XNDX2 | | |
| 0049 | REP | 2 | LAST 1011 | 17,2657 | 1 2667 0 | TCP | PWORD | | |
| 0050 | | | | 17,2660 | 07700 1 | XLNAND | OCT | 7700 | = 60 MS |
| 0051 | | | | 17,2661 | 37772 1 | DELATT3 | DEC | 16376 | = 20 MS |
| 0052 | | | | 17,2662 | 37776 0 | DELATT20 | DEC | 16382 | ZERO ALL REQUESTS FOR TRANSLATION |
| 0053 | REP | 5 | LAST 1011 | 17,2663 | 55-513 0 | NOXNAND | TS | XNDX1 | |
| 0054 | REP | 4 | LAST 1011 | 17,2664 | 55-514 1 | TS | XNDX2 | | |
| 0055 | REP | 4 | LAST 1010 | 17,2665 | 55-515 0 | TS | YNDX | | |
| 0056 | REP | 3 | LAST 1010 | 17,2666 | 55-516 0 | TS | ZNDX | | |

R0057 PITCH COMMANDS TIMING(NO X-TRANS, NO QUAD FAILS) 324CT

| | | | | | | | | | |
|-------|-----|-----|-----------|---------|----------|--------|---------|--------|--|
| 0058 | REP | 5 | LAST 1007 | 17,2667 | 11-582 0 | PWORD | CCS | TRU1 | CHECK FOR PITCH COMMANDS |
| 0059 | REP | 107 | LAST 996 | 17,2670 | 3 4712 1 | CAP | ONE | | |
| 0060 | | | | 17,2671 | 1 2673 0 | TCP | +2 | | 0 = NO PITCH |
| 0061 | REP | 45 | LAST 1011 | 17,2672 | 3 4711 1 | CAP | TWO | | +1 = + PITCH |
| 0062 | REP | 2 | LAST 106 | 17,2673 | 55-520 0 | TS | PINDEX | | +2 = - PITCH |
| 0063 | REP | 5 | LAST 889 | 17,2674 | 11-626 0 | CCS | RACFAIL | | FLAG FOR REAL AC QUAD FAILURES |
| 0064 | REP | 1 | | 17,2675 | 1 2701 1 | TCP | APAILP | | 0 = NO REAL AC FAILURES |
| 0065 | REP | 1 | | 17,2676 | 1 2711 0 | TCP | TARPCCM | | + = A QUAD FAILED |
| 0066 | REP | 1 | | 17,2677 | 1 2703 0 | TCP | CPAILP | | - = C QUAD FAILED |
| 0067 | REP | 2 | LAST 1011 | 17,2700 | 1 2711-0 | TCP | TARPCCM | | IF FAILURES ARE PRESENT IGNORE X-TRANSLATIONS ON THIS AXIS |
| A0068 | | | | | | | | | |
| A0069 | | | | | | | | | |
| 0070 | REP | 5 | LAST 977 | 17,2701 | 3 4334 1 | APAILP | CAP | NINE | IF FAILURE IS PRESENT JET OPERATION IS ASSUMED. IGNORE X-TRANSLATION |
| 0071 | REP | 3 | LAST 1011 | 17,2702 | 1 2713 1 | TCP | TARPCCM | +2 | |
| 0072 | REP | 2 | LAST 824 | 17,2703 | 3 5656 1 | CPAILP | CAP | TWELVE | |
| 0073 | REP | 4 | LAST 1011 | 17,2704 | 1 2713 1 | TCP | TARPCCM | +2 | |
| 0074 | | | | 17,2705 | 00000 1 | XLNDX | DEC | 0 | INDEXES FOR TRANSLATION COMMANDS FOR USE IN TABLE LOOK UP |
| 0075 | | | | 17,2706 | 00003 1 | DEC | DEC | 3 | |
| 0076 | | | | 17,2707 | 00006 1 | DEC | DEC | 6 | |
| 0077 | | | | 17,2710 | 00000 1 | DEC | DEC | 0 | |

0078 REP 3 LAST 712 5656 TWELVE = OCT14
 R0079 TABLE LOOK UP FOR PITCH COMMANDS WITH AND WITHOUT X-TRANSLATION AND AC QUAD FAILURES PRESENT.
 R0081 BITS 9, 10 CONTAIN THE NUMBER OF PITCH JETS USED TO PERFORM THE PITCH ROTATION



L JET SELECTION LOGIC

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| | | | | | | | | | | |
|------|-----|-----|------|------|---------|--------|------|---------|--------|---------|
| 0083 | REP | 6 | LAST | 1011 | 17,2711 | 51=513 | 1 | TARPCOM | INDEX | XNDX1 |
| 0084 | REP | 1 | | | 17,2712 | 3 | 2705 | 1 | CA | XLNDX |
| 0085 | REP | 3 | LAST | 1011 | 17,2713 | 6 | 1520 | 1 | AD | PINDEX |
| 0086 | REP | 232 | LAST | 1003 | 17,2714 | 50 | 000 | 1 | INDEX | A |
| 0087 | REP | 1 | | | 17,2715 | 3 | 2741 | 1 | CA | PYTABLE |
| 0088 | REP | 1 | | | 17,2716 | 7 | 2760 | 0 | MASK | PJETS |
| 0089 | REP | 2 | LAST | 100 | 17,2717 | 55=453 | 0 | | TS | PWORD1 |
| 0090 | | | | | 17,2720 | 0 | 0006 | 1 | EXTEND | |
| 0091 | REP | 45 | LAST | 1010 | 17,2721 | 7 | 4704 | 1 | MP | BIT7 |
| 0092 | REP | 2 | LAST | 106 | 17,2722 | 55=523 | 0 | | TS | NPJETS |

=1417 OCT

= NO. OF PITCH JETS

R0093 YAW JET COMMANDS TIMING(NO X-TRANS, NO QUAD FAILURES) 32MCT

| | | | | | | | | | | |
|------|-----|-----|------|------|---------|--------|------|-------|--------|------------|
| 0094 | REP | 5 | LAST | 1007 | 17,2723 | 11=563 | 1 | YWORD | CCS | TAU2 |
| 0095 | REP | 108 | LAST | 1011 | 17,2724 | 3 | 4712 | 1 | CAP | ONE |
| 0096 | | | | | 17,2725 | 1 | 2727 | 0 | TCP | +2 |
| 0097 | REP | 46 | LAST | 1011 | 17,2726 | 3 | 4711 | 1 | CAP | TWO |
| 0098 | REP | 2 | LAST | 106 | 17,2727 | 55=521 | 1 | | TS | YINDEX |
| 0099 | REP | 5 | LAST | 689 | 17,2730 | 11=627 | 1 | | CCS | RDPAIL |
| 0100 | REP | 1 | | | 17,2731 | 1 | 2735 | 0 | TCP | BPAILY |
| 0101 | REP | 1 | | | 17,2732 | 1 | 2762 | 1 | TCP | TARYCOM |
| 0102 | REP | 1 | | | 17,2733 | 1 | 2737 | 1 | TCP | DPAILY |
| 0103 | REP | 2 | LAST | 1012 | 17,2734 | 1 | 2762 | 1 | TCP | TARYCOM |
| 0104 | REP | 6 | LAST | 1011 | 17,2735 | 3 | 4334 | 1 | BPAILY | CAP |
| 0105 | REP | 3 | LAST | 1012 | 17,2736 | 1 | 2764 | 1 | TCP | TARYCOM +2 |
| 0106 | REP | 3 | LAST | 1011 | 17,2737 | 3 | 5656 | 1 | DPAILY | CAP |
| 0107 | REP | 4 | LAST | 1012 | 17,2740 | 1 | 2764 | 1 | TCP | TARYCOM +2 |

CHECK FOR YAW COMMANDS

YAW ROTATION INDEX

FLAG FOR B OR D QUAD FAILURES

0 = NO BD FAILURE
+ = B QUAD FAILED
- = D QUAD FAILED

L JET SELECTION LOGIC

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P0108 TABLE FOR PITCH(YAW) COMMANDS
 R0109 BITS 4,3,2,1 = PITCH, X-TRANSLATION JETS SELECTED
 R0110 BITS 10,9 = NO. PITCH JETS USED TO PERFORM ROTATION
 R0111 BITS 8,7,6,5 = YAW, X-TRANSLATION JETS SELECTED
 R0112 BITS 12,11 = NO. YAW JETS USED TO PERFORM ROTATION

| Address | Value | Mask | Label | OCT | ROT | TRANS | QUAD | BIAS |
|---------|---------|---------|---------|----------|-----|-------|------|------|
| A0113 | | | | | | | | |
| 0114 | 17,2741 | 00000 1 | PYTABLE | OCT 0 | 0 | 0 | | 0 |
| 0115 | 17,2742 | 05125 1 | | OCT 5125 | + | 0 | | 0 |
| 0116 | 17,2743 | 05252 1 | | OCT 5252 | - | 0 | | 0 |
| 0117 | 17,2744 | 00231 1 | | OCT 0231 | 0 | + | | 3 |
| 0118 | 17,2745 | 02421 1 | | OCT 2421 | + | + | | 3 |
| 0119 | 17,2746 | 02610 1 | | OCT 2610 | - | + | | 3 |
| 0120 | 17,2747 | 00146 1 | | OCT 0146 | 0 | - | | 6 |
| 0121 | 17,2750 | 02504 1 | | OCT 2504 | + | - | | 6 |
| 0122 | 17,2751 | 02442 1 | | OCT 2442 | - | - | | 6 |
| 0123 | 17,2752 | 00000 1 | | OCT 0 | 0 | | A(B) | 9 |
| 0124 | 17,2753 | 02421 1 | | OCT 2421 | + | | A(B) | 9 |
| 0125 | 17,2754 | 02442 1 | | OCT 2442 | - | | A(B) | 9 |
| 0126 | 17,2755 | 00000 1 | | OCT 0 | 0 | | C(D) | 12 |
| 0127 | 17,2756 | 02504 1 | | OCT 2504 | + | | C(D) | 12 |
| 0128 | 17,2757 | 02610 1 | | OCT 2610 | - | | C(D) | 12 |

R0129 MASKS FOR PITCH AND YAW COMMANDS

| | | | | |
|------|---------|---------|-------|----------|
| 0130 | 17,2760 | 01417 1 | PJETS | OCT 1417 |
| 0131 | 17,2761 | 06360 1 | YJETS | OCT 6360 |

R0132 TABLE LOOK UP FOR YAW COMMANDS WITH AND WITHOUT X-TRANSLATION AND AC QUAD FAILURES PRESENT
 R0134 BITS 11, 12 CONTAIN THE NUMBER OF YAW JETS USED TO PERFORM THE YAW ROTATION

| | | | | | | | | |
|------|---------|-----------|---------|----------|---------|--------|---------|--|
| 0136 | REP 5 | LAST 1011 | 17,2762 | 51-514 0 | TABYCOM | INDEX | XNDX2 | |
| 0137 | REP 2 | LAST 1012 | 17,2763 | 3 2705 1 | | CA | XLNDX | |
| 0138 | REP 3 | LAST 1012 | 17,2764 | 6 1521 0 | | AD | YINDEX | |
| 0139 | REP 233 | LAST 1012 | 17,2765 | 50 000 1 | | INDEX | A | |
| 0140 | REP 2 | LAST 1012 | 17,2766 | 3 2741 1 | | CA | PYTABLE | |
| 0141 | REP 1 | | 17,2767 | 7 2761 1 | | MASK | YJETS | = 6360 OCT |
| 0142 | REP 2 | LAST 100 | 17,2770 | 55-455 0 | | TS | YWORD1 | |
| 0143 | REP | | 17,2771 | 0 0006 1 | | EXTEND | | |
| 0144 | REP 37 | LAST 1010 | 17,2772 | 7 4706 0 | | MP | RITS | |
| 0145 | REP 1 | | 17,2773 | 55-524 1 | | TS | NYJETS | NO. OF YAW JETS USED TO PERFORM ROTATION |



L JET SELECTION LOGIC

USBR#S PAGE NO. 5 E6 S3

P0146 ROLL COMMANDS TIMING(NO Y,Z TRANS, NO QUAD FAILS) 45MCT

| | | | | | | | | | | | |
|------|-----|-----|------|------|---------|--------|---|----------|-----|---------|--|
| 0147 | REP | 8 | LAST | 1007 | 17,2774 | 11=561 | 0 | RWORD | CCS | TAU | CHECK FOR ROLL COMMANDS |
| 0148 | REP | 109 | LAST | 1012 | 17,2775 | 3 4712 | 1 | | CAP | ONE | |
| 0149 | | | | | 17,2776 | 1 3000 | 0 | | TCP | +2 | |
| 0150 | REP | 47 | LAST | 1012 | 17,2777 | 3 4711 | 1 | | CAP | TWO | |
| 0151 | REP | 2 | LAST | 108 | 17,3000 | 55=517 | 1 | | TS | RINDEX | |
| 0152 | REP | 3 | LAST | 889 | 17,3001 | 11=630 | 1 | | CCS | ACORD | FLAG FOR AC OR BD QUAD SELECTION FOR ROLL COMMANDS |
| 0153 | REP | 1 | | | 17,3002 | 1 3073 | 1 | | TCP | BDROLL | +, +0 = BD ROLL |
| 0154 | REP | 2 | LAST | 1014 | 17,3003 | 1 3073 | 1 | | TCP | BDROLL | -, -0 = AC ROLL |
| 0155 | | | | | 17,3004 | 1 3005 | 0 | | TCP | +1 | |
| 0156 | REP | 6 | LAST | 1011 | 17,3005 | 11=628 | 0 | ACROLL | CCS | RACFAIL | CHECK FOR REAL FAILURES ON AC QUADS |
| 0157 | REP | 1 | | | 17,3006 | 1 3012 | 0 | | TCP | RAPAIL | |
| 0158 | REP | 1 | | | 17,3007 | 1 3022 | 0 | | TCP | RCLNS | |
| 0159 | REP | 1 | | | 17,3010 | 1 3014 | 0 | | TCP | RCFAIL | |
| 0160 | REP | 2 | LAST | 1014 | 17,3011 | 1 3022 | 0 | | TCP | RCLNS | |
| 0161 | REP | 7 | LAST | 1012 | 17,3012 | 3 4334 | 1 | RAPAIL | CAP | NINE | QUAD FAILURE WILL GET 1-JET OPERATION |
| 0162 | REP | 1 | | | 17,3013 | 1 3024 | 0 | | TCP | TABRCOM | |
| 0163 | REP | 4 | LAST | 1012 | 17,3014 | 3 5656 | 1 | RCFAIL | CAP | TWELVE | |
| 0164 | REP | 2 | LAST | 1014 | 17,3015 | 1 3024 | 0 | | TCP | TABRCOM | |
| 0165 | | | | | 17,3016 | 00000 | 1 | XLNINDEX | DEC | 0 | |
| 0166 | | | | | 17,3017 | 00001 | 0 | | DEC | 1 | INDEXES FOR TRANSLATION |
| 0167 | | | | | 17,3020 | 00002 | 0 | | DEC | 2 | |
| 0168 | | | | | 17,3021 | 00000 | 1 | | DEC | 0 | |

R0169 TABLE LOOK UP FOR AC-ROLL COMMANDS WITH AND WITHOUT Y-TRANSLATION AND ACQUAD FAILURES PRESENT
R0171 BITS 9,10,11 CONTAIN THE MAGNITUDE AND DIRECTION OF THE ROLL

| | | | | | | | | | | | |
|------|-----|-----|------|------|---------|--------|---|---------|-------|----------|--|
| 0172 | REP | 5 | LAST | 1011 | 17,3022 | 51=515 | 1 | RCLNS | INDEX | YNDX | NO AC QUAD FAILURES INCLUDE +,-,0, Y-TRANSLATION |
| 0173 | REP | 3 | LAST | 1013 | 17,3023 | 3 2705 | 1 | | CA | XLNINDEX | |
| 0174 | REP | 3 | LAST | 1014 | 17,3024 | 6 1517 | 0 | TABRCOM | AD | RINDEX | |
| 0175 | REP | 234 | LAST | 1013 | 17,3025 | 50 000 | 1 | | INDEX | A | |
| 0176 | REP | 1 | | | 17,3026 | 3 3155 | 0 | | CA | RTABLE | |
| 0177 | REP | 1 | | | 17,3027 | 7 3174 | 1 | | MASK | ACRJET5 | = 3760 OCT |
| 0178 | REP | 3 | LAST | 987 | 17,3030 | 55=451 | 1 | | TS | RWORD1 | |

R0179 CHECK FOR Z-TRANSLATIONS ON BD

| | | | | | | | | | | | |
|------|-----|---|------|------|---------|--------|---|----------|--------|-------|------------------|
| 0180 | REP | 4 | LAST | 1011 | 17,3031 | 3 1516 | 1 | BDZCHECK | CA | ZNDX | |
| 0181 | | | | | 17,3032 | 0 0006 | 1 | | EXTEND | | |
| 0182 | REP | 1 | | | 17,3033 | 6 3065 | 1 | | RZMP | NORDZ | NO Z-TRANSLATION |

L JET SELECTION LOGIC

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P0183 TABLE LOOK UP FOR ED Z-TRANSLATION WITH AND WITHOUT REAL ED QUAD FAILURES. Z-TRANSLATION WILL BE POSS-
 N0185 IBLE AS LONG AS ROLL COMMANDS CAN BE SATISFIED WITH THE AC ROLL JETS. CRITERION.. IF THE RESULTANT NET ROLL
 R0187 COMMANDS = 0 (WITH Z-TRANSLATION) AND IF TAU = 0, THEN INCLUDE THE ED Z-TRANSLATION COMMANDS. IF THE RESULTANT
 R0189 ROLL COMMAND = 0, AND IF TAU NZ, THEN IGNORE THE ED Z-TRANSLATION

| | | | | | | | | | | |
|------|-----|-----|-----------|---------|--------|---|----------|----------|-------------------------------------|--|
| 0180 | REP | 6 | LAST 1012 | 17,3034 | 11=627 | 1 | CCS | REDFAIL | | |
| 0191 | REP | 34 | LAST 1011 | 17,3035 | 3 6214 | 0 | CAP | THREE | | |
| 0192 | | | | 17,3036 | 1 3040 | 1 | TCP | +2 | | |
| 0193 | REP | 31 | LAST 882 | 17,3037 | 3 6211 | 0 | CAP | SIX | | |
| 0194 | REP | 5 | LAST 1014 | 17,3040 | 51=518 | 1 | INDEX | ZNDX | | |
| 0195 | REP | 1 | | 17,3041 | 8 3018 | 0 | AD | XLN1NDX | | |
| 0196 | REP | 235 | LAST 1014 | 17,3042 | 50 000 | 1 | INDEX | A | | |
| 0197 | REP | 1 | | 17,3043 | 3 3176 | 1 | CA | YZTABLE | = 3417 OCT | |
| 0198 | REP | 1 | | 17,3044 | 7 3207 | 0 | MASK | EDZJETS | ADD TO ROLL COMMANDS | |
| 0199 | REP | 4 | LAST 1014 | 17,3045 | 6 1451 | 0 | AD | RWORD1 | IF POSSIBLE. MUST CHECK TAU FIRST | |
| 0200 | REP | 31 | LAST 1010 | 17,3046 | 55=502 | 0 | TS | TSTEMP | | |
| 0201 | | | | 17,3047 | 0 0006 | 1 | EXTEND | | | |
| 0202 | REP | 46 | LAST 1012 | 17,3050 | 7 4704 | 1 | MP | BIT7 | DETERMINE THE NET ROLL COMMAND WITH | |
| 0203 | REP | 1 | | 17,3051 | 6 6061 | 0 | AD | =-4 | Z-TRANSLATION ADDED ON | |
| 0204 | REP | 2 | LAST 106 | 17,3052 | 55=522 | 1 | TS | NRJETS | NET NO. OF +,- ROLL JETS ON | |
| 0205 | | | | 17,3053 | 0 0006 | 1 | EXTEND | | | |
| 0206 | REP | 1 | | 17,3054 | 1 3080 | 0 | BZF | TAUCHECK | | |
| 0207 | REP | 32 | LAST 1015 | 17,3055 | 3 1502 | 1 | ACRDZ | CA | TSTEMP | Z-TRANSLATION ACCEPTED EVEN THO WE MAY |
| 0208 | REP | 5 | LAST 1015 | 17,3056 | 55=451 | 1 | TS | RWORD1 | | HAVE INTRODUCED AN UNDESIRABLE ROLL. |
| 0209 | REP | 1 | | 17,3057 | 1 3321 | 0 | TCP | ROLLTIME | | BRANCH TO JET ON-TIME CALCULATIONS |
| 0210 | REP | 7 | LAST 1014 | 17,3060 | 11=561 | 0 | TAUCHECK | CCS | TAU | |
| 0211 | REP | 2 | LAST 1014 | 17,3061 | 1 3065 | 0 | TCP | NORDZ | | |
| 0212 | REP | 1 | | 17,3062 | 1 3055 | 0 | TCP | ACRDZ | | |
| 0213 | REP | 3 | LAST 1015 | 17,3063 | 1 3065 | 0 | TCP | NORDZ | | |
| 0214 | REP | 2 | LAST 1015 | 17,3064 | 1 3055 | 0 | TCP | ACRDZ | | |
| 0215 | REP | 6 | LAST 1015 | 17,3065 | 3 1451 | 0 | NORDZ | CA | RWORD1 | Z-TRANSLATION NOT ACCEPTED |
| 0216 | | | | 17,3066 | 0 0006 | 1 | EXTEND | | | |
| 0217 | REP | 47 | LAST 1015 | 17,3067 | 7 4704 | 1 | MP | BIT7 | | |
| 0218 | REP | 1 | | 17,3070 | 6 7715 | 0 | AD | =-2 | | |
| 0219 | REP | 3 | LAST 1015 | 17,3071 | 55=522 | 1 | TS | NRJETS | | |
| 0220 | REP | 2 | LAST 1015 | 17,3072 | 1 3321 | 0 | TCP | ROLLTIME | | BRANCH TO JET ON-TIME CALCULATION |



L JET SELECTION LOGIC

P0221 RD QMAD SELECTION FOR ROLL COMMANDS

| | | | | | | | | | |
|------|-----|-----|-----------|---------|--------|---|----------|--------|----------|
| 0222 | REP | 7 | LAST 1015 | 17,3073 | 11*027 | 1 | BDROLL | CCS | RDPFAIL |
| 0223 | REP | 1 | | 17,3074 | 1 3100 | I | | TCP | RBPAIL |
| 0224 | REP | 1 | | 17,3075 | 1 3104 | 0 | | TCP | RZXLNS |
| 0225 | REP | 1 | | 17,3070 | 1 3102 | 0 | | TCP | RDPAIL |
| 0226 | REP | 2 | LAST 1016 | 17,3077 | 1 3104 | 0 | | TCP | RZXLNS |
| 0227 | REP | 8 | LAST 1014 | 17,3100 | 3 4334 | 1 | RBPAIL | CAP | NINE |
| 0228 | REP | 1 | | 17,3101 | 1 3100 | 1 | | TCP | TABRZCMD |
| 0229 | REP | 5 | LAST 1014 | 17,3102 | 3 5858 | 1 | RDPAIL | CAP | TWELVE |
| 0230 | REP | 2 | LAST 1016 | 17,5103 | 1 3108 | 1 | | TCP | TABRZCMD |
| 0231 | REP | 6 | LAST 1015 | 17,3104 | 51*518 | I | RZXLNS | INDEX | ZNDX |
| 0232 | REP | 4 | LAST 1014 | 17,3105 | 3 2708 | 1 | | CA | XLNDX |
| 0233 | REP | 4 | LAST 1014 | 17,3106 | 6 1517 | 0 | TABRZCMD | AD | RINDEX |
| 0234 | REP | 236 | LAST 1015 | 17,3107 | 50 000 | I | | INDEX | A |
| 0235 | REP | 2 | LAST 1014 | 17,3110 | 3 3155 | 0 | | CA | RTABLE |
| 0236 | REP | 1 | | 17,3111 | 7 3175 | 0 | | MASK | RORJETS |
| 0237 | REP | 7 | LAST 1015 | 17,3112 | 55-451 | 1 | | TS | RWORD1 |
| 0238 | REP | 6 | LAST 1014 | 17,3113 | 3 1515 | 1 | ACYCHECK | CA | YNDX |
| 0239 | REP | 1 | | 17,3114 | 0 0006 | 1 | | EXTEND | |
| 0240 | REP | 1 | | 17,3115 | 1 3147 | 1 | | RZF | NOACY |
| 0241 | REP | 7 | LAST 1014 | 17,3116 | 11*628 | 0 | | CCS | RACPA IL |
| 0242 | REP | 35 | LAST 1015 | 17,3117 | 3 6214 | 0 | | CAP | THREE |
| 0243 | REP | 1 | | 17,3120 | 1 3122 | 1 | | TCP | +2 |
| 0244 | REP | 32 | LAST 1015 | 17,3121 | 3 6211 | 0 | | CAP | SIX |
| 0245 | REP | 7 | LAST 1016 | 17,3122 | 51*515 | 1 | | INDEX | YNDX |
| 0246 | REP | 2 | LAST 1015 | 17,3123 | 6 3018 | 0 | | AD | XLN1NDX |
| 0247 | REP | 237 | LAST 1016 | 17,3124 | 50 000 | 1 | | INDEX | A |
| 0248 | REP | 2 | LAST 1015 | 17,3125 | 3 3176 | 1 | | CA | YZTABLE |
| 0249 | REP | 1 | | 17,3128 | 7 3210 | 0 | | MASK | ACYJETS |
| 0250 | REP | 6 | LAST 1016 | 17,3127 | 6 1451 | 0 | | AD | RWORD1 |
| 0251 | REP | 33 | LAST 1015 | 17,3130 | 55-502 | 0 | | TS | TS TEMP |
| 0252 | REP | 1 | | 17,3131 | 0 0008 | 1 | | EXTEND | |
| 0253 | REP | 35 | LAST 993 | 17,3132 | 7 4707 | 1 | | MP | RITA |
| 0254 | REP | 2 | LAST 1015 | 17,3133 | 6 6061 | 0 | | AD | =-4 |
| 0255 | REP | 4 | LAST 1015 | 17,3134 | 55-522 | 1 | | TS | NRJETS |
| 0256 | REP | 1 | | 17,3135 | 0 0006 | 1 | | EXTEND | |
| 0257 | REP | 1 | | 17,3136 | 1 3142 | 1 | | RZF | TAUCHK |
| 0258 | REP | 34 | LAST 1016 | 17,3137 | 3 1502 | 1 | RDRACZ | CA | TS TEMP |
| 0259 | REP | 9 | LAST 1016 | 17,3140 | 55-451 | 1 | | TS | RWORD1 |
| 0260 | REP | 3 | LAST 1015 | 17,3141 | 1 3321 | 0 | | TCP | ROLLTIME |
| 0261 | REP | 8 | LAST 1015 | 17,3142 | 11*581 | 0 | TAUCHK | CCS | TAU |
| 0262 | REP | 2 | LAST 1016 | 17,3143 | 1 3147 | 1 | | TCP | NOACY |
| 0263 | REP | 1 | | 17,3144 | 1 3137 | 0 | | TCP | RDRACZ |
| 0264 | REP | 3 | LAST 1016 | 17,3145 | 1 3147 | 1 | | TCP | NOACY |
| 0265 | REP | 2 | LAST 1016 | 17,3146 | 1 3137 | 0 | | TCP | RDRACZ |

NO RD FAILURES
+,-,0 Z-TRANSLATION PRESENT

= 34017 OCT

ANY Y-TRANSLATION

NO Y-TRANSLATION

= 34360 OCT

FOR EXPLANATION SEE CODING ON RTABLE

NO. OF NET ROLL JETS

IF NRJETS = 0

Y-TRANSLATION ACCEPTED

BRANCH TO JET ON-TIME CALCULATIONS



L JST SELECTION LOGIC

Y-TRANSLATION NOT ACCEPTED

| | | | | | | | | |
|------|-----|----|-----------|---------|----------|-------|--------|----------|
| 0266 | REP | 10 | LAST 1016 | 17,3147 | 3 1451 0 | NOACY | CA | RWORD1 |
| 0267 | | | | 17,3150 | 0 0006 1 | | EXTEND | |
| 0268 | REP | 38 | LAST 1016 | 17,3151 | 7 4707 1 | | MP | BIT4 |
| 0269 | REP | 2 | LAST 1015 | 17,3152 | 6 7715 0 | | AD | s-2 |
| 0270 | REP | 5 | LAST 1016 | 17,3153 | 55-522 1 | | TS | NRJETS |
| 0271 | REP | 4 | LAST 1016 | 17,3154 | 1 3321 0 | | TCP | ROLLTIME |



L JET SELECTION LOGIC

R0272 TABLE FOR ROLL, Y AND Z-TRANSLATION COMMANDS

R0273 EITHER AC OR BD ROLL MAY BE SELECTED. IF AC ROLL IS SELECTED, Y-TRANSLATIONS MAY BE SATISFIED SIMULTANEOUSLY
 Do275 PROVIDED THAT THERE ARE NO AC QUAD FAILURES. IF THERE ARE AC FAILURES, Y-TRANSLATION COMMANDS WILL BE IGNORED,
 R0277 IN WHICH CASE THE ASTRONAUT SHOULD SWITCH TO BD ROLL.
 R0278 IF BDROLL IS SELECTED, Z-TRANSLATIONS MAY BE SATISFIED SIMULTANEOUSLY PROVIDED THAT THERE ARE NO BD QUAD
 Do280 FAILURES. IF THERE ARE BD FAILURES, Z-TRANSLATION COMMANDS WILL BE IGNORED, IN WHICH CASE THE ASTRONAUT SHOULD
 R0282 SWITCH TO AC ROLL.
 R0283 NOTE THAT IF ONE QUAD FAILS (E.G. B FAILED), Z-TRANSLATION IS STILL POSSIBLE AND THAT THE UNDESIRABLE ROLL
 R0285 INTRODUCED BY THIS TRANSLATION WILL BE COMPENSATED BY THE TWO AC ROLL JETS ACTUATED BY THE AUTOPILOT LOGIC.

Do207 WORD MAKE UP....RTABLE

R0288 TWO WORDS, CORRESPONDING TO AC OR BD ROLL SELECTION, HAVE BEEN COMBINED INTO ONE TABLE. THE WORD CORRESPOND-
 R0290 ING TO AC ROLL HAS THE FOLLOWING INTERPRETATION.
 R0291 BITS 9,10,11 ARE CODED TO GIVE THE NET ROLL TORQUE FOR THE WORD SELECTED. THE CODING IS..
 Do293 BIT NO. 11 10 9 NO. OF ROLL JETS

| | | |
|-------|-------|----|
| A0294 | 0 0 0 | -2 |
| R0295 | 0 0 1 | -1 |
| R0296 | 0 1 0 | 0 |
| R0297 | 0 1 1 | +1 |
| R0298 | 1 0 0 | +2 |

R0299 THIS WORD MAY THEN BE ADDED TO THE WORD SELECTED FROM THE YZ-TRANSLATION TABLE, WHICH HAS THE SAME TYPE OF
 R0301 CODING AS ABOVE, AND THE NET ROLL DETERMINED BY SHIFTING THE RESULTANT WORD RIGHT 8 PLACES AND SUBTRACTING FOUR.

R0303 THE WORD CORRESPONDING TO BD ROLL HAS A SIMILAR INTERPRETATION, EXCEPT THAT BITS 12, 13, 14 ARE CODED
 R0305 (AS ABOVE) TO GIVE THE NET ROLL TORQUE.

| | | | | | | ROLL | TRANS | QUADFAIL | BIAS |
|------|---------|---------|--------|-----|-------|------|--------|----------|------|
| 0307 | 17,3155 | 11000 1 | RTABLE | OCT | 11000 | 0 | | | 0 |
| 0308 | 17,3156 | 22125 1 | | OCT | 22125 | + | | | 0 |
| 0309 | 17,3157 | 00252 1 | | OCT | 00252 | - | | | 0 |
| 0310 | 17,3160 | 11231 1 | | OCT | 11231 | 0 | +Y(+Z) | | 3 |
| 0311 | 17,3161 | 15421 1 | | OCT | 15421 | + | +Y(+Z) | | 3 |
| 0312 | 17,3162 | 04610 1 | | OCT | 04610 | - | +Y(+Z) | | 3 |
| 0313 | 17,3103 | 11146 1 | | OCT | 11148 | 0 | -Y(-Z) | | 6 |
| 0314 | 17,3164 | 15504 1 | | OCT | 15504 | + | -Y(-Z) | | 6 |
| 0315 | 17,3165 | 04442 1 | | OCT | 04442 | - | -Y(-Z) | | 6 |
| 0316 | 17,3166 | 11000 1 | | OCT | 11000 | 0 | | A(B) | 9 |
| 0317 | 17,3161 | 15504 1 | | OCT | 15504 | + | | A(B) | 9 |
| 0318 | 17,3170 | 04610 1 | | OCT | 04810 | - | | A(B) | 9 |
| 0319 | 17,3171 | 11000 1 | | OCT | 11000 | 0 | | C(D) | 12 |
| 0320 | 17,3172 | 15421 1 | | OCT | 15421 | + | | C(D) | 12 |
| 0321 | 17,3113 | 04442 1 | | OCT | 04442 | - | | C(D) | 12 |



L JET SELECTION LOGIC

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R0322 RTABLE MASKS -

| | | | | | |
|------|---------|---------|---------|-----|-------|
| 0323 | 17,3174 | 03760 0 | ACRJETS | OCT | 03760 |
| 0324 | 17,3175 | 34017 0 | EDRJETS | OCT | 34017 |



L JST SELECTION LOGIC

R0325 Y, Z TRANSLATION TABLE

R0326 ONCE AC OR BD ROLL IS SELECTED THE QUAD PAIR WHICH IS NOT BEING USED TO SATISFY THE ROLL COMMANDS MAY BE
R0328 USED TO SATISFY THE REMAINING TRANSLATION COMMANDS. HOWEVER, WE MUST MAKE SURE THAT ROLL COMMANDS ARE SATISFIED
R0330 WHEN THEY OCCUR. THEREFORE, THE Y-Z TRANSLATIONS FROM THIS TABLE WILL BE IGNORED IF THE NET ROLL TORQUE OF THE
R0332 COMBINED WORD IS ZERO AND THE ROLL COMMANDS ARE NON-ZERO. THIS SITUATION WOULD OCCUR, FOR EXAMPLE, IF WE EN-
R0334 COUNTER SIMULTANEOUS +R +Y -Z COMMANDS AND A QUAD D FAILURE WHILE USING AC FOR ROLL.

R0336 TO FACILITATE THE LOGIC, THE Y-Z TRANSLATION TABLE HAS BEEN CODED IN A MANNER SIMILAR TO THE ROLL TABLE
R0338 ABOVE.

R0339 BITS 9,10,11 ARE CODED TO GIVE THE NET ROLL TORQUE INCURRED BY Z-TRANSLATIONS. THE WORD SELECTED CAN THEN BE
R0341 ADDED TO THE AC-ROLL WORD AND THE RESULTANT ROLL TORQUE DETERMINED FROM THE COMBINED WORD. SIMILARLY BITS
R0343 12,13,14 ARE CODED TO GIVE THE NET ROLL TORQUE INCURRED BY Y-TRANSLATIONS WHEN BD-ROLL IS SELECTED.

| A0345 | | | | | | TRANSLATION | QUADPAIR | BIAS |
|-------|---------|---------|---------|-----|-------|-------------|----------|------|
| 0346 | 17,3176 | 11000 1 | YZTABLE | OCT | 11000 | 0 | | 0 |
| 0347 | 17,3177 | 11231 1 | | OCT | 11231 | +Z(+Y) | | 0 |
| 0348 | 17,3200 | 11146 1 | | OCT | 11146 | -Z(-Y) | | 0 |
| 0349 | 17,3201 | 11000 1 | | OCT | 11000 | 0 | B(A) | 3 |
| 0350 | 17,3202 | 04610 1 | | OCT | 04610 | +Z(+Y) | B(A) | 3 |
| 0351 | 17,3203 | 15504 1 | | OCT | 15504 | -Z(-Y) | B(A) | 3 |
| 0352 | 17,3204 | 11000 1 | | OCT | 11000 | 0 | D(C) | 6 |
| 0353 | 17,3205 | 15421 1 | | OCT | 15421 | +Z(+Y) | D(C) | 6 |
| 0354 | 17,3206 | 04442 1 | | OCT | 04442 | -Z(-Y) | D(C) | 6 |

R0355 YZ-TABLE MASKS-

| | | | | | |
|------|---------|---------|---------|-----|-------|
| 0356 | 17,3207 | 03417 0 | RDZJETS | OCT | 03417 |
| 0357 | 17,3210 | 34360 0 | ACYJETS | OCT | 34360 |

R0358 ADDITIONAL CONSTANTS

| | | | | | | | | |
|------|-----|---|------|-----|------|-----|---|------|
| 0359 | REP | 4 | LAST | 914 | 7715 | --2 | = | NEG2 |
| 0360 | REP | 1 | | | 0001 | --4 | = | NEG4 |



L JET SELECTION LOGIC

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P0361 CALCULATION OF JET ON-TIMES

R0362 THE ROTATION COMMANDS (TAU'S), WHICH WERE DETERMINED FROM THE JET SWITCHING LOGIC ON THE BASIS OF SINGLE JET
 110384 OPERATION, MUST NOW BE UPDATED BY THE ACTUAL NUMBER OF JETS TO BE USED IN SATISFYING THESE COMMANDS. TAU MUST
 110360 ALSO BE DECREMENTED ACCORDING TO THE EXPECTED TORQUE GENERATED BY THE NEW COMMANDS ACTING OVER THE NEXT TS INT-
 R0368 ERVAL.

(10360 IN ORDER TO MAINTAIN ACCURATE KNOWLEDGE OF VEHICLE ANGULAR RATES, WE MUST ALSO PROVIDE EXPECTED FIRING TIMES
 R0371 (DPT'S, ALSO IN TERMS OF 1-JET OPERATION) FOR THE RATE FILTER.

(10372 NOTE THAT TRANSLATIONS CAN PRODUCE ROTATIONS EVEN THOUGH NO ROTATIONS WERE CALLED FOR. NEVERTHELESS, WE MUST
 110374 UPDATE DPT.

110373 WHEN THE ROTATIONS HAVE FINISHED, WE MUST PROVIDE CHANNEL INFORMATION TO THE TS PROGRAM TO CONTINUE ON WITH
 R0377 THE TRANSLATIONS. THIS WILL BE DONE IN THE NEXT SECTION. HOWEVER, TO INSURE THAT JETS ARE NOT FIRED FOR LESS
 (10379 THAN A MINIMUM IMPULSE (14MS), ALL JET CHANNEL COMMANDS WILL BE HELD FIXED FROM THE START OF THE TS PROGRAM FOR
 110381 ATLEAST 14MS UNTIL THE INITIALIZATION OF NEW COMMANDS. MOREOVER, A 14MS ON-TIME WILL BE ADDED TO ANY ROTATIONAL
 R0383 COMMANDS GENERATED BY THE MANUAL CONTROLS OR THE JET SWITCHING LOGIC, AND ALL TRANSLATION COMMANDS WILL BE
 R0385 ACTIVE FOR ATLEAST ONE CYCLE OF THE TS PROGRAM (.1SEC)

R0386 PITCH JET ON-TIME CALCULATION

| | | | | | | | | | |
|-------|-----|---|-----------|---------|----------|----------|----------|--------|--|
| 0387 | REP | 6 | LAST 1011 | 17,3211 | 11=562 0 | PITCHTIM | CCS | TAU1 | |
| 0388 | REP | 1 | | 17,3212 | 1 3221 1 | TCP | PTAUPOS | | |
| 0389 | | | | 17,3213 | 1 3215 0 | TCP | +2 | | |
| 0390 | REP | 1 | | 17,3214 | 1 3217 1 | TCP | PTALNEG | | |
| 0391 | REP | 2 | LAST 106 | 17,3215 | 55=550 1 | TS | DPT1 | | NO PITCH ROTATION |
| 0392 | REP | 1 | | 17,3216 | 1 3417 1 | TCP | PBYPASS | | COMMANDS |
| 0393 | REP | 3 | LAST 1012 | 17,3217 | 4 1523 0 | PTALNEG | CS | NPJETS | |
| 0394 | REP | 4 | LAST 1021 | 17,3220 | 55=523 0 | TS | NPJETS | | |
| 0395 | REP | 7 | LAST 1021 | 17,3221 | 3 1562 1 | PTAUPOS | CA | TAU1 | |
| 0396 | | | | 17,3222 | 0 0006 1 | EXTEND | | | |
| 0397 | REP | 5 | LAST 1021 | 17,3223 | 5 1523 1 | INDEX | NPJETS | | |
| 0398 | REP | 1 | | 17,3224 | 7 3400 1 | MP | NJET | | |
| 0399 | REP | 3 | LAST 987 | 17,3225 | 55=461 1 | TS | RLAST1 | | |
| 0400 | REP | 1 | | 17,3226 | 6 3333 1 | AD | =-.1SEC | | |
| 0401 | | | | 17,3227 | 0 0006 1 | EXTEND | | | |
| 0402 | REP | 1 | | 17,3230 | 6 3241 0 | BZMP | AD14MSP | | |
| 0403 | REP | 6 | LAST 1021 | 17,3231 | 51=523 1 | INDEX | NPJETS | | THE PITCH ON-TIME IS GREATER THAN .1 SEC |
| 0404 | REP | 1 | | 17,3232 | 3 3334 0 | CA | DPTMAX | | |
| 0405 | REP | 3 | LAST 1021 | 17,3233 | 55=550 1 | TS | DPT1 | | |
| 0406 | | | | 17,3234 | 4 0000 0 | COM | | | |
| 0407 | REP | 6 | LAST 1021 | 17,3235 | 27=562 0 | ADS | TAU1 | | UPDATE TAU1 |
| 0408 | REP | 1 | | 17,3236 | 3 3335 1 | CAP | =+.1SEC | | LIMIT THE LENGTH OF PITCH ROTATION |
| 0409 | REP | 4 | LAST 1021 | 17,3237 | 55=461 1 | TS | RLAST1 | | COMMANDS TO 0.1 SEC SO THAT ONLY |
| 0410 | REP | 1 | | 17,3240 | 1 3404 0 | TCP | ASMLWP | | X-TRANSLATIONS WILL CONTINUE ON SWITCH |
| A0411 | | | | | | | | | OVER TO TVC |
| 0412 | REP | 5 | LAST 1021 | 17,3241 | 4 1461 1 | AD14MSP | CS | RLAST1 | SEE IF JET ON TIME LESS THAN |
| 0413 | REP | 2 | LAST 1010 | 17,3242 | 6 3340 0 | AD | =14MS | | MINIMUM IMPULSE TIME |
| 0414 | | | | 17,3243 | 0 0006 1 | EXTEND | | | |
| 0415 | REP | 1 | | 17,3244 | 6 3247 0 | BZMP | PRLASTOK | | IF SO LIMIT MINIMUM ON TIME TO 14 MS |
| 0416 | REP | 3 | LAST 1021 | 17,3245 | 3 3340 0 | CAP | =14MS | | |



L JBT SELECTION LOGIC

| | | | | | | | | |
|------|-----|---|-----------|---------|----------|----------|--------|--------|
| 0417 | REP | 6 | LAST 1021 | 17,3246 | 55=461 1 | | TS | BLAST1 |
| 0418 | REP | 7 | LAST 1022 | 17,3247 | 3 1461 0 | PBLASTOK | CA | BLAST1 |
| 0419 | | | | 17,3250 | 0 0008 1 | | EXTEND | |
| 0420 | REP | 7 | LAST 1021 | 17,3251 | 7 1523 0 | | MP | NPJETS |
| 0421 | REP | 4 | LAST 1021 | 17,3252 | 23=550 0 | | LXCH | DFT1 |
| 0422 | REP | 9 | LAST 1021 | 17,3253 | 55=562 0 | | TS | TAU1 |
| 0423 | REP | 2 | LAST 1021 | 17,3254 | 1 3404 0 | | TCF | ASBLWP |

THE PITCH COMMANDS WILL BE COMPLETED WITHIN THE TS-CYCLE TIME FOR USE IN UPDATING RATE FILTER ZERO TAU1 (ACC CONTAINS ZERO)

L JET SELECTION LOGIC

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P0424 YAW JET ON-TIME CALCULATION

| | | | | | | | | |
|------|-----|---|-----------|---------|----------|----------|--------|----------|
| 0425 | REP | 6 | LAST 1012 | 17,3255 | 11=563 1 | YAWTIME | CCS | TAU2 |
| 0426 | REP | 1 | | 17,3256 | 1 3265 1 | | TCP | YDAUPOS |
| 0427 | | | | 17,3257 | 1 3261 0 | | TCP | +2 |
| 0428 | REP | 1 | | 17,3260 | 1 3263 1 | | TCP | YDALNEG |
| 0429 | REP | 2 | LAST 106 | 17,3261 | 55=551 0 | | TS | DFT2 |
| 0430 | REP | 1 | | 17,3262 | 1 3563 0 | | TCP | YBYPASS |
| 0431 | REP | 2 | LAST 1013 | 17,3263 | 4 1524 1 | YDALNEG | CS | NYJETS |
| 0432 | REP | 3 | LAST 1023 | 17,3264 | 55=524 1 | | TS | NYJETS |
| 0433 | REP | 7 | LAST 1023 | 17,3265 | 3 1563 0 | YDAUPOS | CA | TAU2 |
| 0434 | | | | 17,3266 | 0 0006 1 | | EXTEND | |
| 0435 | REP | 4 | LAST 1023 | 17,3267 | 5 1524 0 | | INDEX | NYJETS |
| 0436 | REP | 2 | LAST 1021 | 17,3270 | 7 3400 1 | | MP | NJET |
| 0437 | REP | 3 | LAST 987 | 17,3271 | 55=463 0 | | TS | BLAST2 |
| 0438 | REP | 2 | LAST 1021 | 17,3272 | 6 3333 1 | | AD | =-.1SEC |
| 0439 | | | | 17,3273 | 0 0006 1 | | EXTEND | |
| 0440 | REP | 1 | | 17,3274 | 6 3305 1 | | BZMF | AD14MSY |
| 0441 | REP | 5 | LAST 1023 | 17,3275 | 51=524 0 | | INDEX | NYJETS |
| 0442 | REP | 2 | LAST 1021 | 17,3276 | 3 3334 0 | | CA | DFIMAX |
| 0443 | REP | 3 | LAST 1023 | 17,3277 | 55=551 0 | | TS | DFT2 |
| 0444 | | | | 17,3300 | 4 0000 0 | | COM | |
| 0445 | REP | 8 | LAST 1023 | 17,3301 | 27=563 1 | | ADS | TAU2 |
| 0446 | REP | 2 | LAST 1021 | 17,3302 | 3 3335 1 | | CAP | =+.1SEC |
| 0447 | REP | 4 | LAST 1023 | 17,3303 | 55=463 0 | | TS | BLAST2 |
| 0448 | REP | 1 | | 17,3304 | 1 3550 0 | | TCP | ASBLWY |
| 0449 | REP | 5 | LAST 1023 | 17,3305 | 4 1463 0 | AD14MSY | CS | BLAST2 |
| 0450 | REP | 4 | LAST 1021 | 17,3306 | 6 3340 0 | | AD | =14MS |
| 0451 | | | | 17,3307 | 0 0006 1 | | EXTEND | |
| 0452 | REP | 1 | | 17,3310 | 6 3313 0 | | BZMF | YBLASTOK |
| 0453 | REP | 5 | LAST 1023 | 17,3311 | 3 3340 0 | | CAP | =14MS |
| 0454 | REP | 6 | LAST 1023 | 17,3312 | 55=463 0 | | TS | BLAST2 |
| 0455 | REP | 7 | LAST 1023 | 17,3313 | 3 1463 1 | YBLASTOK | CA | BLAST2 |
| 0456 | | | | 17,3314 | 0 0006 1 | | EXTEND | |
| 0457 | REP | 6 | LAST 1023 | 17,3315 | 7 1524 1 | | MP | NYJETS |
| 0458 | REP | 4 | LAST 1023 | 17,3316 | 23=551 1 | | LXCH | DFT2 |
| 0459 | REP | 9 | LAST 1023 | 17,3317 | 55=563 1 | | TS | TAU2 |
| 0460 | REP | 2 | LAST 1023 | 17,3320 | 1 3550 0 | | TCP | ASBLWY |

NO YAW ROTATION COMMANDS

YAW COMMANDS WILL LAST LONGER THAN .1SEC

DECREMENT TAU2
LIMIT THE LENGTH OF YAW ROTATION COMMAND
TO 0.1 SEC SO THAT ONLY X-TRANSLATION
WILL CONTINUE ON SWITCH OVER TO TVC

SEE IF JET ON-TIME LESS THAN
MINIMUM IMPULSE TIME

IF SO, LIMIT MINIMUM ON-TIME TO 14 MS

YAW COMMANDS WILL BE COMPLETED WITHIN
THE TSCYCLE TIME

ZERO TAU2



L JET SELECTION LOGIC

P0481 ROLL ON-TIME CALCULATION-

| | | | | | | | | | |
|-------|------|----|-----------|---------|----------|----------|----------|--------|--|
| 0462 | RESP | 9 | LAST 1016 | 17,3321 | 11=561 0 | ROLLTIME | CCS | TAU | |
| 0463 | RESP | 1 | | 17,3322 | 1 3341 0 | TCP | RBLAST | | |
| 0464 | | | | 17,3323 | 1 3325 1 | TCP | +2 | | |
| 0465 | RESP | 2 | LAST 1024 | 17,3324 | 1 3341 0 | TCP | RBLAST | | |
| 0466 | RESP | 6 | LAST 1017 | 17,3325 | 51=522 0 | INDEX | NRJETS | | |
| 0467 | RESP | 3 | LAST 1023 | 17,3326 | 3 3334 0 | CA | DPTMAX | | UPDATE DPT EVEN THO NO ROLL COMMANDS ARE PRESENT |
| 0468 | RESP | 3 | LAST 977 | 17,3327 | 55=547 1 | TS | DPT | | |
| 0469 | RESP | 1 | | 17,3330 | 1 3543 1 | TCP | RBYPASS | | |
| 0470 | | | | 17,3331 | 77037 0 | DEC | -480 | | = -.3SEC |
| 0471 | | | | 17,3332 | 77277 0 | DEC | -320 | | = -.2SEC |
| 0472 | | | | 17,3333 | 77537 0 | DEC | -160 | | = -.1SEC |
| 0473 | | | | 17,3334 | 00000 1 | DPTMAX | DEC | 0 | 0 |
| 0474 | | | | 17,3335 | 00240 1 | DEC | 160 | | = +.1SEC |
| 0475 | | | | 17,3336 | 00500 1 | DEC | 320 | | = +.2SEC |
| 0476 | | | | 17,3337 | 00740 1 | DEC | 480 | | = +.3SEC |
| 0477 | | | | 17,3340 | 00027 1 | DEC | 23 | | =14MS |
| 0478 | RESP | 10 | LAST 1024 | 17,3341 | 3 1561 1 | RBLAST | CA | TAU | |
| 0479 | | | | 17,3342 | 0 0006 1 | EXTEND | | | |
| 0480 | RESP | 7 | LAST 1024 | 17,3343 | 5 1522 0 | INDEX | NRJETS | | |
| 0481 | RESP | 3 | LAST 1023 | 17,3344 | 7 3400 1 | MP | NJET | | |
| 0482 | RESP | 2 | LAST 100 | 17,3345 | 55=457 1 | TS | RBLAST | | RBLAST IS AN INTERMEDIATE VARIABLE USED IN DETERMINING THE JET ON-TIMES |
| A0483 | | | | | | | | | |
| 0484 | RESP | 3 | LAST 1023 | 17,3346 | 6 3333 1 | AD | -.1SEC | | |
| 0485 | | | | 17,3347 | 0 0006 1 | EXTEND | | | |
| 0486 | RESP | 1 | | 17,3350 | 6 3361 0 | BZMP | AD14MSR | | |
| 0487 | RESP | 8 | LAST 1024 | 17,3351 | 51=522 0 | INDEX | NRJETS | | THE ROLL ROTATION WILL LAST LONGER THAN THE TS CYCLE TIME |
| 0488 | RESP | 4 | LAST 1024 | 17,3352 | 3 3334 0 | CA | DPTMAX | | |
| 0489 | RESP | 4 | LAST 1024 | 17,3353 | 55=547 1 | TS | DPT | | |
| 0490 | | | | 17,3354 | 4 0000 0 | COM | | | |
| 0491 | RESP | 11 | LAST 1024 | 17,3355 | 27=561 0 | ADS | TAU | | |
| 0492 | RESP | 3 | LAST 1023 | 17,3356 | 3 3335 1 | CAP | +.1SEC | | LIMIT THE LENGTH OF ROLL ROTATION COMMANDS TO 0.1 SEC SO THAT ONLY Y-Z TRANSLATION COMMANDS CONTINUE |
| 0493 | RESP | 3 | LAST 1024 | 17,3357 | 55=457 1 | TS | RBLAST | | |
| 0494 | RESP | 1 | | 17,3360 | 1 3424 1 | TCP | ASMBLWR | | |
| 0495 | RESP | 4 | LAST 1024 | 17,3361 | 4 1457 1 | AD14MSR | CS | RBLAST | SEE IF THE JET ON-TIME LESS THAN MINIMUM IMPULSE TIME |
| 0496 | RESP | 6 | LAST 1023 | 17,3362 | 6 3340 0 | AD | =14MS | | |
| 0497 | | | | 17,3363 | 0 0006 1 | EXTEND | | | |
| 0498 | RESP | 1 | | 17,3364 | 6 3367 0 | BZMP | RBLASTOK | | |
| 0499 | RESP | 7 | LAST 1024 | 17,3365 | 3 3340 0 | CAP | =14MS | | IF SO, LIMIT MINIMUM ON-TIME TO 14 MS |
| 0500 | RESP | 5 | LAST 1024 | 17,3366 | 55=457 1 | TS | RBLAST | | |
| 0501 | RESP | 6 | LAST 1024 | 17,3367 | 3 1457 0 | RBLASTOK | CA | RBLAST | |
| 0502 | | | | 17,3370 | 0 0006 1 | EXTEND | | | |
| 0503 | RESP | 9 | LAST 1024 | 17,3371 | 7 1522 1 | MP | NRJETS | | |
| 0504 | RESP | 5 | LAST 1024 | 17,3372 | 23=547 0 | LXCH | DPT | | |
| 0505 | RESP | 12 | LAST 1024 | 17,3373 | 55=561 0 | TS | TAU | | ZERO TAU |
| 0506 | RESP | 2 | LAST 1024 | 17,3374 | 1 3424 1 | TCP | ASMBLWR | | |



L JST SELECTION LOGIC

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| | | | | | |
|------|---------|--------------|-----|----------|----------------|
| 0507 | 17,3375 | 05252 1 | DBC | -.333333 | = -1/3 |
| 0508 | 17,3376 | 57777 1 | DBC | -.500000 | = -1/2 |
| 0509 | 17,3377 | 40000 0 | DBC | -.999999 | = -1 (NEGMAX) |
| 0510 | 17,3400 | 00000 1 NJST | DBC | 0 | |
| 0511 | 17,3401 | 37777 1 | DBC | .999999 | = +1 (POS MAX) |
| 0512 | 17,3402 | 20000 0 | DBC | .500000 | = +1/2 |
| 0513 | 17,3403 | 12525 0 | DBC | .333333 | = +1/3 |



L JET SELECTION LOGIC

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R0514 WHEN THE ROTATION COMMANDS ARE COMPLETED, IT IS NECESSARY TO REPLACE THESE COMMANDS BY NEW COMMANDS WHICH
 R0516 CONTINUE ON WITH THE TRANSLATIONS IF ANY ARE PRESENT.
 R0517 IN THIS SECTION THESE NEW COMMANDS ARE GENERATED AND STORED FOR REPLACEMENT OF THE CHANNEL COMMANDS WHEN THE
 R0519 CORRESPONDING ROTATIONS ARE COMPLETED.

R0520 GENERATION OF THE SECOND PITCH(X-TRANS) WORD...PWORD2

| | | | | | | | | | |
|------|-----|-----|-----------|---------|----------|---------|-------|---------|---------------------------------------|
| 0521 | REP | 8 | LAST 1016 | 17,3404 | 11=028 0 | ASMBLWP | CCS | RACFAIL | |
| 0522 | REP | 1 | | 17,3405 | 1 3413 0 | | TCP | PPX2 | IF FAILURE ON AC IGNORE X-TRANSLATION |
| 0523 | | | | 17,3406 | 1 3410 0 | | TCP | +2 | |
| 0524 | REP | 2 | LAST 1028 | 17,3407 | 1 3413 0 | | TCP | PPX2 | |
| 0525 | REP | 7 | LAST 1012 | 17,3410 | 51=513 1 | | INDEX | XNDX1 | |
| 0526 | REP | 5 | LAST 1016 | 17,3411 | 3 2705 1 | | CA | XLANDX | |
| 0527 | REP | 238 | LAST 1016 | 17,3412 | 50 000 1 | | INDEX | A | |
| 0528 | REP | 3 | LAST 1013 | 17,3413 | 3 2741 1 | | PPX2 | CA | PYTABLE |
| 0529 | REP | 2 | LAST 1012 | 17,3414 | 7 2760 0 | | MASK | PJETS | |
| 0530 | REP | 2 | LAST 100 | 17,3415 | 55=454 1 | | TS | PWORD2 | |
| 0531 | REP | 1 | | 17,3416 | 1 3255 1 | | TCP | YAWTIME | |
| | | | | | | | | | |
| 0532 | REP | 3 | LAST 1012 | 17,3417 | 3 1453 1 | PRYPASS | CA | PWORD1 | THE T6 PROGRAM WILL LOAD PWORD2 |
| 0533 | REP | 3 | LAST 1028 | 17,3420 | 55=454 1 | | TS | PWORD2 | UPON ENTRY |
| 0534 | REP | 185 | LAST 1007 | 17,3421 | 3 4714 1 | | CAP | ZERO | |
| 0535 | REP | 8 | LAST 1022 | 17,3422 | 55=461 1 | | TS | RIAST1 | THERE IS NO PWORD2 |
| 0536 | REP | 2 | LAST 1028 | 17,3423 | 1 3255 1 | | TCP | YAWTIME | |



L JET SELECTION LOGIC

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P0537 GENERATION OF THE SECOND ROLL (Y,Z) WORD (RWORD2)

| | | | | | | | | | | |
|------|-----|-----|------|------|---------|----------|---------|--------|----------|----------------------------|
| 0538 | REP | 8 | LAST | 1016 | 17,3424 | 11=515 0 | ASMBLWR | CCS | YNDX | CHECK FOR Y-TRANS |
| 0539 | REP | 1 | | | 17,3425 | 1 3435 1 | | TCP | ACRD2Y | |
| 0540 | REP | 186 | LAST | 1026 | 17,3426 | 3 4714 1 | NO2Y | CAP | ZERO | |
| 0541 | REP | 2 | LAST | 100 | 17,3427 | 55=452 1 | | TS | RWORD2 | |
| 0542 | REP | 7 | LAST | 1016 | 17,3430 | 11=516 0 | | CCS | ZNDX | CHECK FOR Z-TRANS |
| 0543 | REP | 1 | | | 17,3431 | 1 3500 0 | | TCP | ACRD2Z | |
| 0544 | REP | 187 | LAST | 1027 | 17,3432 | 3 4714 1 | NO2Z | CAP | ZERO | |
| 0545 | REP | 3 | LAST | 1027 | 17,3433 | 27=452 1 | | ADS | RWORD2 | |
| 0546 | REP | 1 | | | 17,3434 | 1 3211 1 | | TCP | PITCHTIM | RWORD2 ASSEMBLED |
| 0547 | REP | 4 | LAST | 1014 | 17,3435 | 11=630 1 | ACRD2Y | CCS | ACORFD | |
| 0548 | REP | 1 | | | 17,3436 | 1 3453 1 | | TCP | AC2Y | CAN DO Y-TRANS |
| 0549 | REP | 2 | LAST | 1027 | 17,3437 | 1 3453 1 | | TCP | AC2Y | |
| 0550 | | | | | 17,3440 | 1 3441 1 | | TCP | +1 | USING AC FOR ROLL |
| 0551 | REP | 9 | LAST | 1026 | 17,3441 | 11=626 0 | | CCS | RACPAII. | |
| 0552 | REP | 1 | | | 17,3442 | 1 3426 0 | | TCP | NO2Y | USING AC AND AC HAS FAILED |
| 0553 | | | | | 17,3443 | 1 3445 0 | | TCP | +2 | |
| 0554 | REP | 2 | LAST | 1027 | 17,3444 | 1 3426 0 | | TCP | NO2Y | DITTO |
| 0555 | REP | 9 | LAST | 1027 | 17,3445 | 51=515 1 | | INDEX | YNDX | NO FAILURES, CAN DO Y |
| 0556 | REP | 6 | LAST | 1026 | 17,3446 | 3 2705 1 | | CA | XI.NDX | |
| 0557 | REP | 239 | LAST | 1026 | 17,3447 | 50 000 1 | | INDEX | A | |
| 0558 | REP | 3 | LAST | 1016 | 17,3450 | 3 3155 0 | | CA | RTABLE | |
| 0559 | REP | 2 | LAST | 1014 | 17,3451 | 7 3174 1 | | MASK | ACRJETS | |
| 0560 | REP | 3 | LAST | 1027 | 17,3452 | 1 3427 1 | | TCP | NO2Y +1 | |
| 0561 | REP | 10 | LAST | 1027 | 17,3453 | 11=626 0 | AC2Y | CCS | RACPAII. | |
| 0562 | REP | 36 | LAST | 1016 | 17,3454 | 3 6214 0 | | CAP | THREE | |
| 0563 | | | | | 17,3455 | 1 3437 0 | | TCP | +2 | |
| 0564 | REP | 33 | LAST | 1016 | 17,3456 | 3 6211 0 | | CAP | SIX | |
| 0565 | REP | 10 | LAST | 1027 | 17,3457 | 51=515 1 | | INDEX | YNDX | |
| 0566 | REP | 3 | LAST | 1016 | 17,3460 | 6 3016 0 | | AD | XI.NDX | |
| 0567 | REP | 240 | LAST | 1027 | 17,3461 | 50 000 1 | | INDEX | A | |
| 0568 | REP | 3 | LAST | 1016 | 17,3462 | 3 3176 1 | | CA | YZTABLE | |
| 0569 | REP | 2 | LAST | 1016 | 17,3463 | 7 3210 0 | | MASK | ACYJETS | |
| 0570 | REP | 4 | LAST | 1027 | 17,3464 | 55=452 1 | | TS | RWORD2 | |
| 0571 | | | | | 17,3465 | 0 0006 1 | | EXTEND | | |
| 0572 | REP | 37 | LAST | 1017 | 17,3466 | 7 4707 1 | | MP | BIT4 | |
| 0573 | REP | 3 | LAST | 1017 | 17,3467 | 6 7715 0 | | AD | =-2 | |
| 0574 | REP | 10 | LAST | 1024 | 17,3470 | 55=522 1 | | TS | NRJETS | |
| 0575 | REP | 7 | LAST | 1024 | 17,3471 | 4 1457 1 | | CS | RLAST | |
| 0576 | REP | 4 | LAST | 1024 | 17,3472 | 6 3335 1 | | AD | =+.1SEC | |
| 0577 | | | | | 17,3473 | 0 0006 1 | | EXTEND | | |
| 0578 | REP | 11 | LAST | 1027 | 17,3474 | 7 1522 1 | | MP | NRJETS | |
| 0579 | REP | 129 | LAST | 996 | 17,3475 | 3 0001 0 | | CA | L | |
| 0580 | REP | 6 | LAST | 1024 | 17,3476 | 27=547 1 | | ADS | DFT | |
| 0581 | REP | 4 | LAST | 1027 | 17,3477 | 1 3430 1 | | TCP | NO2Y +2 | |



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| | | | | | | | | |
|------|-----|-----|-----------|---------|----------|---------|--------|----------|
| 0582 | REP | 5 | LAST 1027 | 17,3500 | 11=630 1 | ACRD2Z | CCS | ACORBD |
| 0583 | REP | 1 | | 17,3501 | 1 3531 1 | | TCP | BDP2Z |
| 0584 | REP | 2 | LAST 1028 | 17,3502 | 1 3531 1 | | TCP | BDP2Z |
| 0585 | | | | 17,3503 | 1 3504 1 | | TCP | +1 |
| 0586 | REP | 6 | LAST 1018 | 17,3504 | 11=627 1 | | CCS | RBDFAIL |
| 0587 | REP | 37 | LAST 1027 | 17,3505 | 3 6214 0 | | CAP | THREE |
| 0588 | | | | 17,3506 | 1 3510 1 | | TCP | +2 |
| 0589 | REP | 34 | LAST 1027 | 17,3507 | 3 6211 0 | | CAP | SIX |
| 0590 | REP | 8 | LAST 1027 | 17,3510 | 51=516 1 | | INDEX | ZNDX |
| 0591 | REP | 4 | LAST 1027 | 17,3511 | 6 3016 0 | | AD | XI N1NDX |
| 0592 | REP | 241 | LAST 1027 | 17,3512 | 50 000 1 | | INDEX | A |
| 0593 | REP | 4 | LAST 1027 | 17,3513 | 3 3178 1 | | CA | YZTABLE |
| 0594 | REP | 2 | LAST 1015 | 17,3514 | 7 3207 0 | | MASK | BDZJETS |
| 0595 | REP | 5 | LAST 1027 | 17,3515 | 27=452 1 | | ADS | RWORD2 |
| 0596 | | | | 17,3516 | 0 0006 1 | | EXTEND | |
| 0597 | REP | 48 | LAST 1015 | 17,3517 | 7 4704 1 | | MP | BITY |
| 0598 | REP | 4 | LAST 1027 | 17,3520 | 6 7715 0 | | AD | =-2 |
| 0599 | REP | 12 | LAST 1027 | 17,3521 | 55=522 1 | | TS | NRJETS |
| 0600 | REP | 8 | LAST 1027 | 17,3522 | 4 1457 1 | | CS | BLAST |
| 0601 | REP | 5 | LAST 1027 | 17,3523 | 6 3335 1 | | AD | =+.1SEC |
| 0602 | | | | 17,3524 | 0 0006 1 | | EXTEND | |
| 0603 | REP | 13 | LAST 1028 | 17,3525 | 7 1522 1 | | MP | NRJETS |
| 0604 | REP | 130 | LAST 1027 | 17,3526 | 3 0001 0 | | CA | L |
| 0605 | REP | 7 | LAST 1027 | 17,3527 | 27=547 1 | | ADS | DFT |
| 0606 | REP | 2 | LAST 1027 | 17,3530 | 1 3211 1 | | TCP | PITCHTIM |
| 0607 | REP | 9 | LAST 1028 | 17,3531 | 11=627 1 | RDP2Z | CCS | RBDFAIL |
| 0608 | REP | 1 | | 17,3532 | 1 3432 0 | | TCP | NO2Z |
| 0609 | | | | 17,3533 | 1 3535 0 | | TCP | +2 |
| 0610 | REP | 2 | LAST 1028 | 17,3534 | 1 3432 0 | | TCP | NO2Z |
| 0611 | REP | 9 | LAST 1028 | 17,3535 | 51=516 1 | | INDEX | ZNDX |
| 0612 | REP | 7 | LAST 1027 | 17,3536 | 3 2705 1 | | CA | XI NNDX |
| 0613 | REP | 242 | LAST 1028 | 17,3537 | 50 000 1 | | INDEX | A |
| 0614 | REP | 4 | LAST 1027 | 17,3540 | 3 3155 0 | | CA | RTABLE |
| 0615 | REP | 2 | LAST 1016 | 17,3541 | 7 3175 0 | | MASK | RORJETS |
| 0616 | REP | 3 | LAST 1028 | 17,3542 | 1 3433 1 | | TCP | NO2Z +1 |
| 0617 | REP | 11 | LAST 1017 | 17,3543 | 3 1451 0 | RRYPASS | CA | RWORD1 |
| 0618 | REP | 6 | LAST 1028 | 17,3544 | 55=452 1 | | TS | RWORD2 |
| 0619 | REP | 188 | LAST 1027 | 17,3545 | 3 4714 1 | | CAP | ZERO |
| 0620 | REP | 9 | LAST 1028 | 17,3546 | 55=457 1 | | TS | BLAST |
| 0621 | REP | 3 | LAST 1028 | 17,3547 | 1 3211 1 | | TCP | PITCHTIM |

USING BD-ROLL.
MUST CHECK FOR BD FAILURES

USING AC FOR ROLL, CAN DO Z-TRANS

USING RD-ROLL AND RD HAS FAILED

DITTO

L JET SELECTION LOGIC

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P0622 GENERATION OF THE SECOND YAW (X-TRANS) WORD...YWORD2

| | | | | | | | | |
|------|-----|-----|-----------|---------|----------|---------|-------|----------|
| 0623 | REP | 10 | LAST 1028 | 17,3550 | 11=627 1 | ASMBLWY | CCS | REDPAIL |
| 0624 | REP | 1 | | 17,3551 | 1 3557 1 | | TCP | FYX2 |
| 0625 | | | | 17,3552 | 1 3554 1 | | TCP | +2 |
| 0626 | REP | 2 | LAST 1029 | 17,3553 | 1 3557 1 | | TCP | FYX2 |
| 0627 | REP | 6 | LAST 1013 | 17,3554 | 51=514 0 | | INDEX | XNDX2 |
| 0628 | REP | 8 | LAST 1028 | 17,3555 | 3 2705 1 | | CA | XLNNDX |
| 0629 | REP | 243 | LAST 1028 | 17,3556 | 50 000 1 | | INDEX | A |
| 0630 | REP | 4 | LAST 1028 | 17,3557 | 3 2741 1 | FYX2 | CA | PYTABLE |
| 0631 | REP | 2 | LAST 1013 | 17,3560 | 7 2761 1 | | MARK | YJETS |
| 0632 | REP | 2 | LAST 100 | 17,3561 | 55=456 0 | | TS | YWORD2 |
| 0633 | REP | 1 | | 17,3562 | 1 3567 1 | | TCP | T6 SETUP |
| 0634 | REP | 3 | LAST 1013 | 17,3563 | 3 1455 1 | YBYPASS | CA | YWORD1 |
| 0635 | REP | 3 | LAST 1029 | 17,3564 | 55=456 0 | | TS | YWORD2 |
| 0636 | REP | 189 | LAST 1028 | 17,3565 | 3 4714 1 | | CAP | ZERO |
| 0637 | REP | 8 | LAST 1023 | 17,3566 | 55=463 0 | | TS | BLAST2 |

IF FAILURE ON BD IGNORE X-TRANSLATION



L JET SELECTION LOGIC

P0638 SORT THE JET ON-TIMES

R0639 AT THIS POINT ALL THE CHANNEL COMMANDS AND JET ON-TIMES HAVE BEEN DETERMINED. IN SUMMARY THESE ARE-

R0641 RWORD1
R0642 RWORD2 BLAST
R0643 PWORD1
R0644 PWORD2 BLAST1
R0645 YWORD1
R0646 YWORD2 BLAST2

R0647 IN THIS SECTION THE JET ON-TIMES ARE SORTED AND THE SEQUENCE OF T6 INTERRUPTS IS DETERMINED. TO FACILITATE
R0649 THE SORTING PROCESS AND THE T6 PROGRAM, THE VARIABLES BLAST, BLAST1, BLAST2, ARE RESERVED AS DOUBLE PRECISION
R0651 WORDS. THE LOWER PART OF THESE WORDS CONTAIN A BRANCH INDEX ASSOCIATED WITH THE ROTATION AXIS OF THE HIGHER
R0653 ORDER WORD.

| | | | | | | | | | | | |
|------|-----|-----|------|------|---------|--------|---|----------|--------|-----------|----------------------------------|
| 0654 | REP | 190 | LAST | 1029 | 17,3567 | 3 4714 | 1 | T6SETUP | CAP | ZERO | BRANCH INDEX FOR ROLL |
| 0655 | REP | 10 | LAST | 1028 | 17,3570 | 55=460 | 0 | | TS | BLAST +1 | |
| 0656 | REP | 14 | LAST | 1001 | 17,3571 | 3 4710 | 0 | | CAP | FOUR | BRANCH INDEX FOR PITCH |
| 0657 | REP | 9 | LAST | 1028 | 17,3572 | 55=462 | 1 | | TS | BLAST1 +1 | |
| 0658 | REP | 8 | LAST | 987 | 17,3573 | 3 4717 | 1 | | CAP | ELEVEN | BRANCH INDEX FOR YAW |
| 0659 | REP | 9 | LAST | 1029 | 17,3574 | 55=464 | 1 | | TS | BLAST2 +1 | |
| 0660 | REP | 11 | LAST | 1030 | 17,3575 | 4 1457 | 1 | | CS | BLAST | |
| 0661 | REP | 10 | LAST | 1030 | 17,3576 | 6 1461 | 0 | | AD | BLAST1 | |
| 0662 | | | | | 17,3577 | 0 0006 | 1 | | EXTEND | | |
| 0663 | REP | 1 | | | 17,3600 | 6 3824 | 1 | | BZMP | DXCHT12 | T1 OR T2 |
| 0664 | REP | 11 | LAST | 1030 | 17,3601 | 4 1461 | 1 | CHECKT23 | CS | BLAST1 | |
| 0665 | REP | 10 | LAST | 1030 | 17,3602 | 6 1463 | 1 | | AD | BLAST2 | |
| 0666 | | | | | 17,3603 | 0 0006 | 1 | | EXTEND | | |
| 0667 | REP | 1 | | | 17,3604 | 6 3830 | 1 | | BZMP | DXCHT23 | |
| 0668 | REP | 12 | LAST | 1030 | 17,3605 | 4 1461 | 1 | CALCDT6 | CS | BLAST1 | |
| 0669 | REP | 11 | LAST | 1030 | 17,3606 | 27=463 | 0 | | ADS | BLAST2 | |
| 0670 | REP | 12 | LAST | 1030 | 17,3607 | 4 1457 | 1 | | CS | BLAST | |
| 0671 | REP | 13 | LAST | 1030 | 17,3610 | 27=461 | 1 | | ADS | BLAST1 | END OF SORTING PROCEDURE |
| 0672 | | | | | 17,3611 | 0 0006 | 1 | | EXTEND | | RESET TSLOC TO BEGIN PHASE1 |
| 0673 | REP | 1 | | | 17,3612 | 3 3823 | 0 | | DCA | RCS2CADR | |
| 0674 | REP | 21 | LAST | 1007 | 17,3613 | 53=313 | 0 | | DXCH | TSLOC | |
| 0675 | REP | 69 | LAST | 987 | 17,3614 | 4 4712 | 0 | ENDJETS | CS | BIT1 | RESET BIT1 FOR INITIALIZATION OF |
| 0676 | REP | 47 | LAST | 1004 | 17,3615 | 7 1501 | 0 | | MASK | RCSPLAGS | T6 PROGRAM |
| 0677 | REP | 48 | LAST | 1030 | 17,3616 | 55=501 | 0 | | TS | RCSPLAGS | |
| 0678 | REP | 191 | LAST | 1030 | 17,3617 | 4 4714 | 0 | | CS | ZERO | RESET TS PHASE FOR PHASE1 |
| 0679 | REP | 10 | LAST | 993 | 17,3620 | 55=465 | 0 | | TS | TS PHASE | |
| 0680 | REP | 40 | LAST | 1007 | 17,3621 | 1 5222 | 1 | | TCF | RESUME | RESUME INTERRUPTED PROGRAM |
| 0681 | REP | 38 | LAST | 1010 | 16,1510 | | | | BRANK= | KMPAC | |
| 0682 | REP | 5 | LAST | 973 | 17,3622 | 02106 | 1 | RCS2CADR | ZCADR | RCSATT | |
| 0682 | | | | | 17,3623 | 42066 | 1 | | | | |



L JST SELECTION LOGIC

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| | | | | | | | | |
|------|-----|----|-----------|---------|----------|---------|--------|----------|
| 0683 | REP | 13 | LAST 1030 | 17,3624 | 53=460 0 | DxCHT12 | DxCH | BLAST |
| 0684 | REP | 14 | LAST 1030 | 17,3625 | 53=462 1 | | DxCH | BLAST1 |
| 0685 | REP | 14 | LAST 1031 | 17,3626 | 53=460 0 | | DxCH | BLAST |
| 0686 | REP | 1 | | 17,3627 | 1 3601 1 | | TCP | CHECKT23 |
| 0687 | REP | 10 | LAST 1031 | 17,3628 | 53=460 1 | | DxCH | BLAST1 |
| 0688 | REP | 12 | LAST 1030 | 17,3631 | 53=464 1 | | DxCH | BLAST2 |
| 0689 | REP | 16 | LAST 1031 | 17,3632 | 53=462 1 | | DxCH | BLAST1 |
| 0690 | REP | 15 | LAST 1031 | 17,3633 | 4 1457 1 | | US | BLAST |
| 0691 | REP | 17 | LAST 1031 | 17,3634 | 6 1461 0 | | AD | BLAST1 |
| 0692 | | | | 17,3635 | 0 0006 1 | | EXTEND | |
| 0693 | | | | 17,3636 | 6 3640 0 | | BZPF | +2 |
| 0694 | REP | 1 | | 17,3637 | 1 3605 0 | | TCP | CALCDT6 |
| 0695 | REP | 16 | LAST 1031 | 17,3640 | 53=460 0 | | DxCH | BLAST |
| 0696 | REP | 18 | LAST 1031 | 17,3641 | 53=462 1 | | DxCH | BLAST1 |
| 0697 | REP | 17 | LAST 1031 | 17,3642 | 53=460 0 | | DxCH | BLAST |
| 0698 | REP | 2 | LAST 1031 | 17,3643 | 1 3605 0 | | TCP | CALCDT6 |

L JET SELECTION LOGIC

P0699 TO PROGRAM AND CHANNEL SETUP

| | | | | | | | | | |
|------|-----|-----|-----------|---------|----------|----------|--------|-----------|--|
| 0700 | | | 21,3751 | | | BANK | 21 | | |
| 0701 | REP | 1 | 17,2000 | | | SETLOC | DAPSS | | |
| 0702 | | | 17,3644 | | | BANK | | | |
| 0703 | REP | 19 | LAST 1010 | 17,3644 | 22 016 0 | TSTART | LXCH | BANKRUPT | |
| 0704 | | | | 17,3645 | 0 0006 1 | | EXTEND | | |
| 0705 | REP | 15 | LAST 1010 | 17,3646 | 22 012 1 | | QXCH | GRUPT | |
| 0706 | REP | 5 | LAST 1010 | 17,3647 | 10 031 1 | | CCS | TIME6 | |
| 0707 | REP | 41 | LAST 1030 | 17,3650 | 1 5222 1 | | TCP | RESUME | |
| 0708 | | | | 17,3651 | 1 3653 0 | | TCP | +2 | |
| 0709 | REP | 42 | LAST 1032 | 17,3652 | 1 5222 1 | | TCP | RESUME | |
| 0710 | REP | 49 | LAST 1030 | 17,3653 | 4 1501 0 | | CS | RCSPLAGS | |
| 0711 | REP | 70 | LAST 1030 | 17,3654 | 7 4712 0 | | MASK | BIT1 | |
| 0712 | | | | 17,3655 | 0 0006 1 | | EXTEND | | |
| 0713 | REP | 1 | | 17,3656 | 1 3667 1 | | BZP | TBRUPTOR | |
| 0714 | REP | 50 | LAST 1032 | 17,3657 | 27-501 0 | | ADS | RCSPLAGS | |
| 0715 | REP | 12 | LAST 1028 | 17,3660 | 3 1451 0 | | CA | RWORD1 | |
| 0716 | | | | 17,3661 | 0 0006 1 | | EXTEND | | |
| 0717 | REP | 7 | LAST 959 | 17,3662 | 01 006 0 | | WRITE | CHAN6 | |
| 0718 | REP | 4 | LAST 1028 | 17,3663 | 3 1453 1 | | CA | PWORD1 | |
| 0719 | REP | 4 | LAST 1029 | 17,3664 | 6 1455 1 | | AD | YWORD1 | |
| 0720 | | | | 17,3665 | 0 0006 1 | | EXTEND | | |
| 0721 | REP | 3 | LAST 652 | 17,3666 | 01 005 0 | | WRITE | CHAN5 | |
| 0722 | REP | 18 | LAST 1031 | 17,3667 | 11-457 1 | TBRUPTOR | CCS | BLAST | |
| 0723 | REP | 1 | | 17,3670 | 1 3747 1 | | TCP | ZBLAST | |
| 0724 | REP | 1 | | 17,3671 | 1 3706 1 | | TCP | REPLACE | |
| 0725 | | | | 17,3672 | 1 3674 0 | | TCP | +2 | |
| 0726 | REP | 2 | LAST 1032 | 17,3673 | 1 3706 1 | | TCP | REPLACE | |
| 0727 | REP | 19 | LAST 1031 | 17,3674 | 11-461 1 | TBL1 | CCS | BLAST1 | |
| 0728 | REP | 1 | | 17,3675 | 1 3752 0 | | TCP | ZBLAST1 | |
| 0729 | REP | 1 | | 17,3676 | 1 3713 0 | | TCP | REPLACE1 | |
| 0730 | | | | 17,3677 | 1 3701 0 | | TCP | +2 | |
| 0731 | REP | 2 | LAST 1032 | 17,3700 | 1 3713 0 | | TCP | REPLACE1 | |
| 0732 | REP | 13 | LAST 1031 | 17,3701 | 11-463 0 | TBL2 | CCS | BLAST2 | |
| 0733 | REP | 1 | | 17,3702 | 1 3755 1 | | TCP | ZBLAST2 | |
| 0734 | REP | 1 | | 17,3703 | 1 3720 0 | | TCP | REPLACE2 | |
| 0735 | REP | 43 | LAST 1032 | 17,3704 | 1 5222 1 | | TCP | RESUME | |
| 0736 | REP | 2 | LAST 1032 | 17,3705 | 1 3720 0 | | TCP | REPLACE2 | |
| 0737 | REP | 19 | LAST 1032 | 17,3706 | 51-460 1 | REPLACE | INDEX | BLAST +1 | |
| 0738 | REP | 1 | | 17,3707 | 0 3725 1 | | TC | REPLACR | |
| 0739 | REP | 110 | LAST 1014 | 17,3710 | 4 4712 0 | | CS | ONE | |
| 0740 | REP | 20 | LAST 1032 | 17,3711 | 55-457 1 | | TS | BLAST | |
| 0741 | REP | 1 | | 17,3712 | 1 3674 0 | | TCP | TBL1 | |
| 0742 | REP | 20 | LAST 1032 | 17,3713 | 51-462 0 | REPLACE1 | INDEX | BLAST1 +1 | |

CHECK TO SEE IF TIME6 WAS RESET
AFTER TBRUPT OCCURED (IN TBRUPT)
IF SO WAIT FOR NEXT TBRUPT BEFORE
TAKING ACTION

IF BIT1 IS 0 RESET TO 1
AND INITIALIZE CHANNEL

INITIALIZE CHANNELS 5,6 WITH WORD1

ZERO BLAST1
REPLACE WORD1



L JET SELECTION LOGIC

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| | | | | | | | |
|------|-----|-----|-----------|---------|----------|----------|-----------------|
| 0743 | REP | 2 | LAST 1032 | 17,3714 | 0 3725 1 | TC | REPLACER |
| 0744 | REP | 111 | LAST 1032 | 17,3715 | 4 4712 0 | CS | ONE |
| 0745 | REP | 21 | LAST 1032 | 17,3718 | 55=461 1 | TS | BLAST1 |
| 0746 | REP | 1 | | 17,3717 | 1 3701 0 | TCP | TBL2 |
| 0747 | REP | 14 | LAST 1032 | 17,3720 | 51=464 0 | REPLACE2 | INDEX BLAST2 +1 |
| 0748 | REP | 3 | LAST 1033 | 17,3721 | 0 3725 1 | TC | REPLACER |
| 0749 | REP | 112 | LAST 1033 | 17,3722 | 4 4712 0 | CS | ONE |
| 0750 | REP | 15 | LAST 1033 | 17,3723 | 55=463 0 | TS | BLAST2 |
| 0751 | REP | 44 | LAST 1032 | 17,3724 | 1 5222 1 | TCP | RESUME |
| 0752 | REP | 7 | LAST 1026 | 17,3725 | 3 1452 0 | REPLACER | CA RWORD2 |
| 0753 | | | | 17,3726 | 0 0006 1 | EXTEND | |
| 0754 | REP | 8 | LAST 1032 | 17,3727 | 01 008 0 | WRITE | CHAN6 |
| 0755 | REP | 200 | LAST 992 | 17,3730 | 0 0002 0 | TC | 0 |
| 0756 | REP | 3 | LAST 1029 | 17,3731 | 3 2761 0 | REPLACER | CA YJETS |
| 0757 | | | | 17,3732 | 0 0006 1 | EXTEND | |
| 0758 | REP | 4 | LAST 1032 | 17,3733 | 02 005 0 | RAND | CHAN5 |
| 0759 | REP | 4 | LAST 1026 | 17,3734 | 6 1454 0 | AD | PWORD2 |
| 0760 | | | | 17,3735 | 0 0006 1 | EXTEND | |
| 0761 | REP | 5 | LAST 1033 | 17,3736 | 01 005 0 | WRITE | CHAN5 |
| 0762 | REP | 201 | LAST 1033 | 17,3737 | 0 0002 0 | TC | 0 |
| 0763 | REP | 3 | LAST 1026 | 17,3740 | 3 2760 1 | REPLACER | CA PJETS |
| 0764 | | | | 17,3741 | 0 0006 1 | EXTEND | |
| 0765 | REP | 6 | LAST 1033 | 17,3742 | 02 005 0 | RAND | CHAN5 |
| 0766 | REP | 4 | LAST 1029 | 17,3743 | 6 1456 1 | AD | YWORD2 |
| 0767 | | | | 17,3744 | 0 0006 1 | EXTEND | |
| 0768 | REP | 7 | LAST 1033 | 17,3745 | 01 005 0 | WRITE | CHAN5 |
| 0769 | REP | 202 | LAST 1033 | 17,3746 | 0 0002 0 | TC | 0 |
| 0770 | REP | 192 | LAST 1030 | 17,3747 | 3 4714 1 | ZBLAST | CAP ZERO |
| 0771 | REP | 21 | LAST 1032 | 17,3750 | 57=457 0 | XCH | BLAST |
| 0772 | REP | 1 | | 17,3751 | 1 3757 0 | TCP | ENART8 |
| 0773 | REP | 193 | LAST 1033 | 17,3752 | 3 4714 1 | ZBLAST1 | CAP ZERO |
| 0774 | REP | 22 | LAST 1033 | 17,3753 | 57=461 0 | XCH | BLAST1 |
| 0775 | REP | 2 | LAST 1033 | 17,3754 | 1 3757 0 | TCP | ENART8 |
| 0776 | REP | 194 | LAST 1033 | 17,3755 | 3 4714 1 | ZBLAST2 | CAP ZERO |
| 0777 | REP | 16 | LAST 1033 | 17,3756 | 57=463 1 | XCH | BLAST2 |
| 0778 | REP | 6 | LAST 1032 | 17,3757 | 54 031 1 | ENART8 | TS TIME8 |
| 0779 | REP | 10 | LAST 1010 | 17,3760 | 3 4674 0 | CAP | NECMAX |
| 0780 | | | | 17,3761 | 0 0006 1 | EXTEND | |
| 0781 | REP | 11 | LAST 1010 | 17,3762 | 05 013 0 | WOR | CHAN13 |
| 0782 | REP | 45 | LAST 1033 | 17,3763 | 1 5222 1 | TCP | RESUME |

INITIALIZE CHANNELS 5,6 WITH WORD 2

ENABLE TRUPT

R0783 END OF T8 INTERRUPT

0784 17,3764 ENDSLECT EQUALS



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R0001 SUBROUTINE TO READ GYMBAL ANGLES AND FORM DIFFERENCES. GIMBAL ANGLES ARE SAVED IN 2S COMPLEMENT, BUT THE
R0003 DIFFERENCES ARE IN 1S COMP. ENTER AND READ ANGLES EACH .1 SEC.

R0004 CM/DSTBY = 1 FOR DAP OPERATION
R0005 CM/DSTBY = 0 TO TERMINATE DAP OPERATION.

| | | | | | | | | | |
|-------|-----|----|-----------|---------|----------|---------|-------------|------|--|
| 0006 | | | 15,2454 | | | BANK | 15 | | |
| 0007 | REP | 1 | 15,2000 | | | SETLOC | STRYDAP | | |
| 0008 | | | 15,2454 | | | BANK | | | |
| 0009 | REP | 1 | | | | COUNT | 15/DAPEN | | |
| 0010 | REP | 29 | LAST 842 | E6,1661 | | BRANK | AGC | | |
| 0011 | REP | 6 | LAST 960 | 15,2454 | 3 4377 0 | READYMR | CA | TEN | KEEP RESTART DT GOING RELATIVE TO |
| 0012 | REP | 5 | LAST 779 | 15,2455 | 27=725 1 | ADS | CM/GYNDT | | PIPTIME. (GROUP 6) |
| A0013 | | | | | | | | | IF A RESTART OCCURS, SKIP PRESENT CYCLE. THE |
| A0014 | | | | | | | | | MASCHNG PROTECTION IS IN CM/DAPIC. |
| 0015 | REP | 42 | LAST 993 | 15,2456 | 3 4705 1 | CA | BIT6 | | CHECK FOR FINE ALIGN MODE OF CDU. |
| 0016 | REP | 26 | LAST 986 | 15,2457 | 7 1321 1 | MASK | IMODES33 | | (PROTECT AGC/PIP ETC AS WELL AS |
| 0017 | | | | 15,2460 | 0 0006 1 | EXTEND | | | GIMBAL DIFFERENCES) |
| 0018 | REP | 1 | | 15,2461 | 1 2467 1 | BZF | READYM1 | | OK |
| 0019 | REP | 71 | LAST 1032 | 15,2462 | 4 4712 0 | CS | BIT1 | | NOT IN FINE ALIGN, SO IDLE. |
| 0020 | REP | 10 | LAST 840 | 15,2463 | 7 0102 0 | MASK | CM/FLAGS | | SET GYNDIPSW =0 |
| 0021 | REP | 11 | LAST 1034 | 15,2464 | 54 102 0 | TS | CM/FLAGS | | |
| 0022 | REP | 1 | | 15,2465 | 0 6000 1 | TC | FLUSHJET | | QUENCH JETS, SINCE MAY BE A WHILE. |
| 0023 | REP | 1 | | 15,2466 | 0 2534 1 | TC | CM/GYMIC +2 | | |
| 0024 | REP | 27 | LAST 1008 | 15,2467 | 3 0032 0 | READYM1 | CA | CDUX | |
| 0025 | REP | 30 | LAST 1034 | 15,2470 | 57=661 1 | XCH | AGC | | |
| 0026 | | | | 15,2471 | 0 0006 1 | EXTEND | | | |
| 0027 | REP | 31 | LAST 1034 | 15,2472 | 21=661 0 | MSU | AGC | | -DELAGC=AGC(N-1) - AGC(N) |
| 0028 | REP | 2 | LAST 109 | 15,2473 | 55=675 0 | TS | -DELAGC | | |
| 0029 | REP | 15 | LAST 998 | 15,2474 | 3 0033 1 | CA | CDUY | | |
| 0030 | REP | 2 | LAST 109 | 15,2475 | 57=662 1 | XCH | AIG | | |
| 0031 | | | | 15,2476 | 0 0006 1 | EXTEND | | | |
| 0032 | REP | 3 | LAST 1034 | 15,2477 | 21=662 0 | MSU | AIG | | |
| 0033 | REP | 2 | LAST 109 | 15,2500 | 55=676 0 | TS | -DELAIG | | |
| 0034 | REP | 21 | LAST 1008 | 15,2501 | 3 0034 0 | CA | CDUZ | | |
| 0035 | REP | 3 | LAST 778 | 15,2502 | 57=663 0 | XCH | AMG | | |
| 0036 | | | | 15,2503 | 0 0006 1 | EXTEND | | | |
| 0037 | REP | 4 | LAST 1034 | 15,2504 | 21=663 1 | MSU | AMG | | |
| 0038 | REP | 2 | LAST 109 | 15,2505 | 55=677 1 | TS | -DELAMG | | |

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| | | | | | | | | | |
|-------|-----|-----|-----------|---------|----------|----------|--------|-----------|--|
| 0039 | REP | 12 | LAST 1034 | 15,2508 | 4 0102 0 | DOB RATE | CS | CM/FLAGS | CM/DSTBY=103D BIT2 GYM DIPSW=104D BIT1 |
| 0040 | REP | 38 | LAST 1028 | 15,2507 | 7 6214 1 | | MASK | THREE | |
| 0041 | REP | 244 | LAST 1029 | 15,2510 | 50 000 1 | | INDEX | A | |
| 0042 | | | | 15,2511 | 0 2512 0 | | TC | +1 | |
| 0043 | REP | 1 | | 15,2512 | 0 2521 0 | | TC | DOB RATE | OK, OO ON |
| 0044 | REP | 2 | LAST 1034 | 15,2513 | 0 2532 1 | | TC | CM/GYMIC | DONT CALC BODYRATE ON FIRST PASS. |
| 0045 | | | | 15,2514 | 12 515 0 | | NOOP | | |
| 0046 | REP | 2 | LAST 1034 | 15,2515 | 0 6000 1 | | TC | FLUSHJET | TURN OFF ALL JETS |
| 0047 | REP | 88 | LAST 844 | 15,2516 | 0 5301 0 | | TC | PHASCHNG | |
| 0048 | | | | 15,2517 | 00006 1 | | OCT | 00006 | DEACTIVATE DAP GROUP 6. |
| 0049 | REP | 50 | LAST 958 | 15,2520 | 0 5213 1 | | TC | TASKOVER | |
| 0050 | REP | 113 | LAST 1033 | 15,2521 | 3 4712 1 | DOB RATE | CA | ONE | DO BODYRATE |
| 0051 | REP | 2 | LAST 110 | 15,2522 | 55=720 1 | DOB RATE | TS | JETEM | SKIP BODYRATE. |
| 0052 | REP | 7 | LAST 1034 | 15,2523 | 3 4377 0 | | CA | TEN | KEEP CDU READ GOING. |
| 0053 | REP | 46 | LAST 946 | 15,2524 | 0 5140 1 | | TC | WAITLIST | |
| 0054 | REP | 32 | LAST 1034 | E6,1661 | | | FRANK= | AOC | |
| 0055 | REP | 2 | LAST 213 | 15,2525 | 02454 0 | | 2CADR | READYTIME | |
| 0055 | | | | 15,2526 | 32066 0 | | | | |
| A0056 | | | | | | | | | DOES NOT PROTECT TRK, SO IN SPSIN/COS |
| 0057 | REP | 3 | LAST 1035 | 15,2527 | 11=720 1 | | CCS | JETEM | |
| 0058 | REP | 1 | | 15,2530 | 0 2556 0 | | TC | BODYRATE | |
| 0059 | REP | 51 | LAST 1035 | 15,2531 | 0 5213 1 | | TC | TASKOVER | SKIP CALC ON INITIAL PASS. (PASSES) |
| 0060 | REP | 13 | LAST 1035 | 15,2532 | 26 102 0 | CM/GYMIC | ADS | CM/FLAGS | GYM DIPSW' C(A)=1, KNOW BIT IS 0 |
| 0061 | REP | 195 | LAST 1033 | 15,2533 | 3 4714 1 | | CAP | ZERO | |
| 0062 | REP | 2 | LAST 109 | 15,2534 | 55=711 0 | | TS | JETAG | |
| 0063 | REP | 2 | LAST 109 | 15,2535 | 55=706 0 | | TS | OLDEL P | |
| 0064 | REP | 2 | LAST 109 | 15,2536 | 55=707 1 | | TS | OLDEL Q | |
| 0065 | REP | 2 | LAST 109 | 15,2537 | 55=710 1 | | TS | OLDEL R | |
| 0066 | REP | 4 | LAST 840 | 15,2540 | 55=723 1 | | TS | GAMDOT | NO GYM DIP, PROP NO GAM DIP. |
| 0067 | REP | 1 | | 15,2541 | 0 2522 0 | | TC | DOB RATE | |



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P0068 COME HERE TO CORRECT FOR OVERFLOW IN ANGULAR CALCULATIONS

| | | | | | | | |
|------|---------|-------------------|---------|----------|----------|--------|----------|
| 0069 | REP 131 | LAST 1028 | 15,2542 | 54 001 1 | ANGOVCOR | TS | L |
| 0070 | REP 203 | LAST 1033 | 15,2543 | 0 0002 0 | | TC | 0 |
| 0071 | REP 245 | LAST 1035 | 15,2544 | 50 000 1 | | INDEX | A |
| 0072 | REP 4 | LAST 956 | 15,2545 | 3 4673 1 | | CAP | LIMITS |
| 0073 | REP 132 | LAST 1036 | 15,2546 | 26 001 1 | | ADS | L |
| 0074 | REP 204 | LAST 1036 | 15,2547 | 0 0002 0 | | TC | 0 |
| 0075 | | | 6000 | | | BLOCK | 3 |
| 0076 | REP 1 | | | | | COUNT | 03/DAPEN |
| 0077 | | | 6000 | 3 0007 0 | FLUSHJET | CA | 7 |
| 0078 | | | 6001 | 0 0006 1 | | EXTEND | |
| 0079 | REP 1 | | 6002 | 01 006 0 | | WRITE | ROLLJETS |
| 0080 | | | 6003 | 0 0006 1 | | EXTEND | |
| 0081 | REP 1 | | 6004 | 01 005 0 | | WRITE | PYJETS |
| 0082 | REP 205 | LAST 1036 | 6005 | 0 0002 0 | | TC | 0 |
| 0083 | | | 15,2550 | | | BANK | 15 |
| 0084 | REP 2 | LAST 1034 TO 1036 | | 60 60* | | COUNT | 15/DAPEN |
| 0085 | REP 2 | LAST 1034 | 15,2000 | | | SETLOC | STRYDAP |
| 0086 | | | 15,2550 | | | BANK | |
| 0087 | | | 15,2550 | 4 0000 0 | RATEAVG | COM | |
| 0088 | REP 4 | LAST 1035 | 15,2551 | 6 1720 0 | | AD | JETEM |
| 0096 | | | 15,2552 | 0 0006 1 | | EXTEND | |
| 0097 | REP 3 | LAST 436 | 15,2553 | 7 4675 0 | | MP | HALP |
| 0098 | REP 5 | LAST 1036 | 15,2554 | 6 1720 0 | | AD | JETEM |
| 0099 | REP 206 | LAST 1036 | 15,2555 | 0 0002 0 | | TC | 0 |

THIS COSTS 2 MCT TO USE.
NO OVFL.

COME HERE TO TURN OFF ALL JETS.

ZERO CHANNEL 6

ZERO CHANNEL 5

SUBROUTINE TO ESTIMATE RATES IN PRESENCE
OF CONSTANT ACCELERATION.

DELV (EST) = DELV + (DELV-OLDDELV)/2

L CM ENTRY DIGITAL AUTOPILOT

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P0101 THESE ARE CALLED FOR THE VARIOUS INITIALIZATIONS NEEDED.

| | | | | | | | |
|--------|-----|-----|-----------|------------------|----------------|-----------|--|
| 0102 | | | 20,3565 | | BANK 20 | | |
| 0103 | REP | 1 | 20,2000 | | SETLOC DAP51 | | |
| 0104 | | | 20,3565 | | BANK | | |
| 0105 | REP | 1 | | | COUNT 20/DAPEN | | |
| 0106 | REP | 33 | LAST 1035 | E6,1861 | EBANK= AGC | | |
| 0107 | REP | 3 | LAST 841 | 20,3565 3 4752 0 | CM/DAPON CA | EBACK | |
| 0108 | REP | 40 | LAST 841 | 20,3566 54 003 0 | TS | EBANK | |
| 0109 | REP | 52 | LAST 783 | 20,3567 0 5447 0 | TC | DOWNFLAG | RESET DAPBIT1. TS RESTART IDENTIFIER. |
| 01095 | REP | 2 | LAST 690 | 20,3570 0 0132 1 | ADRES | DAPBIT1 | BIT 15 FLAG 6 CM FLAGS. |
| 0110 | REP | 53 | LAST 1037 | 20,3571 0 5447 0 | TC | DOWNFLAG | RESET DAPBIT2 |
| 01105 | REP | 2 | LAST 690 | 20,3572 0 0133 0 | ADRES | DAPBIT2 | BIT 14 FLAG 6 |
| 0111 | | | | 20,3573 0 0006 1 | EXTEND | | |
| 0112 | REP | 1 | | 20,3574 3 3712 0 | DCA | TS IDLER1 | DISABLE RCS CALCULATION |
| 0113 | REP | 22 | LAST 1030 | 20,3575 53=313 0 | DACH | TSLOC | |
| 0114 | | | | 20,3576 0 0006 1 | EXTEND | | |
| 0115 | REP | 2 | LAST 1037 | 20,3577 3 3712 0 | DCA | TS IDLER1 | DISABLE RCS JET CALLS |
| 0116 | REP | 4 | LAST 987 | 20,3600 53=311 1 | DACH | TSLOC | |
| 0117 | REP | 3 | LAST 1035 | 20,3601 0 6000 1 | TC | FLUSHJET | JETS DEPARTED ON SM, ZERO JET BITS. |
| 0118 | REP | 5 | LAST 983 | 20,3602 4 7707 1 | CS | 13,14,15 | |
| 0119 | REP | 71 | LAST 1010 | 20,3603 7 1486 0 | MASK | DAPDATR1 | SET CONFIG BITS =0 FOR ENTRY |
| 0120 | REP | 72 | LAST 1037 | 20,3604 55=466 0 | TS | DAPDATR1 | |
| 0121 | | | | 20,3605 0 3811 1 | TC | +4 | |
| 0122 | REP | 8 | LAST 904 | 20,3606 3 4731 0 | NOTYET CA | .5SEC | |
| 0123 | REP | 245 | LAST 891 | 20,3607 0 4555 0 | TC | BANKCALL | (DELAYJOB DOES INHINT) |
| 0124 | REP | 13 | LAST 888 | 20,3610 0 1732 0 | CADR | DELAYJOB | GANDIPSW = 94D BIT11, INITLY=0 |
| 0125 | REP | 30 | LAST 1006 | 20,3611 3 4700 1 | CA | BIT11 | IF ZERO, WAIT UNTIL CM/POSE UPDATE. |
| 0126 | REP | 14 | LAST 1035 | 20,3612 7 0102 0 | MASK | CM/FLAGS | |
| 0127 | | | | 20,3613 0 0006 1 | EXTEND | | |
| 0128 | REP | 1 | | 20,3614 1 3606 0 | BZF | NOTYET | |
| 0129 | REP | 114 | LAST 1035 | 20,3615 4 4712 0 | CS | ONE | ACTIVATE CM/DAP |
| 0130 | REP | 51 | LAST 1032 | 20,3616 55=501 0 | TS | RCSFLAGS | USE BIT3 TO INITIALIZE NEEDLER ON |
| A0131 | | | | | | | NEXT PASS. |
| 0132 | REP | 3 | LAST 749 | 20,3617 55=727 0 | TS | P63FLAG | SO WAKEP62 WILL NOT BE INITIATED UNTIL |
| A0133 | | | | | | | HEADSUP IS SET IN P62. |
| A0134 | | | | | | | FLAG TO PREVENT MULTIPLE CALLS TO WAKEP62. |
| 0135 | | | | 20,3620 3 0007 0 | CA | 7 | |
| 0136 | REP | 3 | LAST 1035 | 20,3621 55=711 0 | TS | JETAG | |
| 01361 | REP | 3 | LAST 173 | 20,3622 55=713 1 | TS | PAXERR1 | KEEP NEEDLES ZERO UNTIL DAP UPDATE |
| A01362 | | | | | | | IN CASE CMDAPMOD IS NOT +1. |



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| | | | | | |
|------|-----|----|-----------|---------|----------|
| 0137 | | | | 20,3623 | 0 0004 0 |
| 0138 | | | | 20,3624 | 0 0006 1 |
| 0139 | REP | 4 | LAST 841 | 20,3625 | 3 1666 0 |
| 0140 | REP | 3 | LAST 747 | 20,3626 | 53=804 0 |
| 0141 | REP | 5 | LAST 841 | 20,3627 | 3 1664 1 |
| 0142 | REP | 2 | LAST 110 | 20,3630 | 55=717 0 |
| 0143 | | | | 20,3631 | 0 0006 1 |
| 0144 | REP | 4 | LAST 1036 | 20,3632 | 7 4675 0 |
| 0145 | REP | 12 | LAST 827 | 20,3633 | 55=715 1 |
| | | | | | |
| 0146 | REP | 15 | LAST 1037 | 20,3634 | 4 0102 0 |
| 0147 | REP | 28 | LAST 932 | 20,3635 | 7 4677 1 |
| 0148 | REP | 16 | LAST 1038 | 20,3636 | 26 102 0 |
| | | | | | |
| 0149 | REP | 16 | LAST 777 | 20,3637 | 4 0076 1 |
| 0150 | REP | 72 | LAST 1034 | 20,3640 | 7 4712 0 |
| 0151 | REP | 17 | LAST 1038 | 20,3641 | 26 076 1 |
| | | | | | |
| 0152 | | | | 20,3642 | 0 0003 1 |
| | | | | | |
| 0153 | REP | 58 | LAST 969 | 20,3643 | 0 4574 0 |
| 0154 | REP | 1 | | 20,3644 | 54342 0 |

INHINT
 EXTEND
 DCA ALFA/180
 DXCH ALFACOM
 CA ROLL/180
 TS ROLLHOLD
 EXTEND
 MP HALP
 TS ROLLC
 CS CM/FLAGS
 MASK BIT12
 ADS CM/FLAGS
 CS FLAGRD2
 MASK BIT1
 ADS FLAGRD2
 RELINT
 TC POSTLAMP
 CADR P62.1

DO ATTITUDE HOLD UNTIL KEYBOARD ESTABLISHES HEADSUP.

FOR ATTITUDE HOLD IN MODE +1.

NOT INTERESTED IN LO WORD.

CMDAPRM =93D BIT12 INITLY=0
 SET BIT TO 1.

SET NODOFLAG TO PREVENT FURTHER V 37 ENTRIES.

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P0155 INITIALIZE CM/DAP. WAITLIST CALL FOR READYMB. SET SWITCH CM/DSTBY =1
 R0156 SO READACC WILL ENTER A WILST CALL FOR SETJTAG
 R0157 CM/DAPARM = 0 , SO ONLY BODY RATE AND ATTITUDE CALCULATIONS ARE DONE.
 R0158 SET AVEEXIT TO CONTINUE AT CM/POSE
 R0159

| | | | | | | | | | |
|--------|-----|-----|-----------|---------|----------|----------|--------|------------|---|
| 0160 | REP | 4 | LAST 1037 | 20,3645 | 3 4752 0 | CM/DAPIC | CA | EBACK | |
| 0161 | REP | 41 | LAST 1037 | 20,3646 | 54 003 0 | | TS | EBANK | |
| 0162 | | | | 20,3647 | 0 0004 0 | | | INHINT | |
| 0163 | REP | 15 | LAST 803 | 20,3650 | 4 1205 0 | CM/DAP2C | CS | PIPTIME +1 | |
| A0164 | | | | | | | | | PRIO OF P62 L PRIO AVG, 'PIPTM=PIPTM1 |
| 0165 | REP | 6 | LAST 1038 | 20,3651 | 55=720 1 | | TS | JETEM | |
| 0166 | REP | 1 | | 20,3652 | 3 4675 1 | | CA | POS1/2 | |
| 0167 | REP | 2 | LAST 1039 | 20,3653 | 6 4675 1 | | AD | POS1/2 | |
| 0168 | REP | 14 | LAST 724 | 20,3654 | 6 0025 0 | | AD | TIME1 | OVFL GUARANTEED |
| 0169 | REP | 7 | LAST 1039 | 20,3655 | 27=720 1 | | ADS | JETEM | C(A) = DELTA TIME SINCE PIPUP |
| 0170 | REP | 25 | LAST 989 | 20,3656 | 4 4715 1 | | CS | FIVE | |
| 0171 | REP | 6 | LAST 1039 | 20,3657 | 6 1720 0 | | AD | JETEM | |
| 0172 | REP | 248 | LAST 1038 | 20,3660 | 10 000 0 | | CCS | A | |
| 0173 | REP | 1 | | 20,3661 | 6 3710 1 | | AD | -CDUT+1 | |
| 0174 | | | | 20,3662 | 1 3660 0 | | TCP | -2 | |
| 0175 | | | | 20,3663 | 13 664 1 | | NOOP | | |
| 0176 | REP | 115 | LAST 1037 | 20,3664 | 6 4712 1 | | AD | ONE | SEND NO ZERO TO WILST |
| 0177 | REP | 6 | LAST 1034 | 20,3665 | 55=725 1 | | TS | CM/GYMDT | FOR RESTART |
| 0178 | REP | 47 | LAST 1035 | 20,3666 | 0 5140 1 | | TC | WAITLIST | |
| 0179 | REP | 34 | LAST 1037 | E6,1661 | | | EBANK= | AGC | |
| 0180 | REP | 3 | LAST 1035 | 20,3667 | 02454 0 | | 2CADR | READYMB | |
| 0180 | | | | 20,3670 | 32066 0 | | | | |
| 0181 | REP | 1 | | 20,3671 | 4 3707 0 | | CS | CM/SWIC1 | GANDIPSW, GYMDIPSW, CM/DSTRY |
| 0182 | REP | 17 | LAST 1038 | 20,3672 | 7 0102 0 | | MASK | CM/FLAGS | DAPARM, .05GSM, LATSW, ENTRYDSP |
| 0183 | REP | 1 | | 20,3673 | 6 4377 0 | | AD | CM/SWIC2 | SET CM/DSTRY, LATSW |
| A01831 | | | | | | | | | DISABLE ENTRY DISPLAY, SINCE DES. GIMB. |
| A01832 | | | | | | | | | CALC. (P62.3) GOES TO ENDEXIT. |
| 0184 | REP | 18 | LAST 1039 | 20,3674 | 54 102 0 | | TS | CM/FLAGS | |
| 0185 | | | | 20,3675 | 3 0007 0 | | CA | 7 | |
| 0186 | REP | 5 | LAST 841 | 20,3676 | 55=666 1 | | TS | RETA/180 | NECESSARY' NO OVFL CORRECTION |
| 0188 | REP | 116 | LAST 1039 | 20,3677 | 3 4712 1 | | CA | ONE | INITIALIZE THE TM OF BODY RATES VIA |
| 0189 | REP | 1 | | 20,3700 | 54 305 0 | | TS | SW/NDX | UPFLUPP. |
| 0190 | REP | 29 | LAST 829 | 20,3701 | 0 5261 1 | | TC | 2PHSCOND | DOES INHINT/RELINT |
| 0191 | | | | 20,3702 | 40116 0 | | OCT | 40116 | SAVE TRASP6 |
| 0192 | | | | 20,3703 | 05024 1 | | OCT | 05024 | |
| 0193 | | | | 20,3704 | 13000 0 | | OCT | 13000 | |
| 0194 | REP | 59 | LAST 1038 | 20,3705 | 0 4574 0 | | TC | POSTAMP | |



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| | | | | | | |
|-------|-----|--------------|---------|---------|------------|----------------|
| 0195 | REP | 1 | 20,3706 | 54326 1 | CADR | P62.2 |
| 0196 | | | 20,3707 | 16017 0 | CM/SWIC1 | OCT 16017 |
| 01961 | REP | 8 LAST 1035 | 4377 | | CM/SWIC2 = | TEN |
| 0197 | | | 20,3710 | 77766 0 | -CDUT+1 | OCT 77766 |
| 0198 | REP | 23 LAST 1037 | 1312 | | EBANK= | T5LOC |
| 0199 | REP | 6 LAST 890 | 20,3711 | 03143 1 | T5 IDLER1 | 2CADR T5 IDLOC |
| 0199 | | | 20,3712 | 12062 0 | | |

00012 ' CM/DSTBY, LATSW

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R0200 THIS SECTION CALCULATES THE ANGULAR BODY RATES EACH .1 SEC. THE ANGULAR RATES ARE THOSE ALONG THE BODY AXES
 R0202 XB, YB, ZB, AND ARE NORMALLY DESIGNATED P, Q, R. REQUIREMENT' TEMPORARY ERASE, JETEM, JETEM +1

R0204 SINCE RESTARTS ZERO THE JET OUTPUT CHANNELS, NO ATTEMPT IS MADE TO RESTART THE ENTRY DAPS. THAT IS,
 R0206 THE 0.1 SEC DAPS WILL MISS A CYCLE, AND WILL PICK UP AT THE NEXT 0.1 SEC UPDATE. MOST OF THE TIME THE 2 SEC
 R0208 ROLL SYSTEM WILL MISS ONLY 0.1 SEC OF CONTROL. HOWEVER IF THE RESTART OCCURS AFTER THE SECTION TIMEST HAS
 R0210 STARTED, THEN THE ROLL SYSTEM WILL MISS ONE CYCLE.
 R0211 THIS IS NECESSARY UNDER THE GROUND RULE THAT NO JET COMMANDS SHALL BE LESS THAN 14 MS.

| | | | | | | | | | | | |
|-------|-----------|----|------|---------------|----------------------------|---------------------------|----------|--------|----------|-----------------------|---|
| 0213 | REP | 35 | LAST | 1039 | E6,1661 | | | | EBANK= | AGC | |
| 0214 | | | | | 15,2556 | | | | BANK | 15 | |
| 0215 | REP | 3 | LAST | 1038 | 15,2000 | | | | SETLOC | STRYDAP | |
| 02151 | | | | | 15,2556 | | | | BANK | | |
| 0216 | REP | 3 | LAST | 1036 TO 1037' | 6 | 66* | | | COUNT | 15/DAPEN | |
| 0218 | REP | 5 | LAST | 1034 | 15,2556 | 3 1663 0 | BODYRATE | CA | ANG | | THESE ARE 25 COMPL NOS, BUT USE ANYWAY. |
| 0219 | REP | 3 | LAST | 970 | 15,2557 | 0 4767 0 | | TC | SPCOS | | |
| 0220 | REP | 2 | LAST | 110 | 15,2560 | 55=511 1 | | TS | COSM | | |
| 0221 | REP | 36 | LAST | 1041 | 15,2561 | 3 1661 1 | | CA | AGC | C(AGC) = AGC/180 | |
| 0222 | REP | 3 | LAST | 970 | 15,2562 | 0 4770 0 | | TC | SPSIN | SINO | |
| 0223 | REP | 2 | LAST | 110 | 15,2563 | 55=512 1 | | TS | SINO | SINO = SIN(AGC) | |
| 0224 | | | | | 15,2564 | 0 0006 1 | | EXTEND | | | |
| 0225 | REP | 3 | LAST | 1041 | 15,2565 | 7 1511 1 | | MP | COSM | | |
| 0226 | REP | 2 | LAST | 110 | 15,2566 | 55=514 1 | | TS | SINOCOSM | SO CM | |
| 0227 | REP | 37 | LAST | 1041 | 15,2567 | 3 1661 1 | | CA | AGC | | |
| 0228 | REP | 4 | LAST | 1041 | 15,2570 | 0 4767 0 | | TC | SPCOS | COSO | |
| 0229 | REP | 2 | LAST | 110 | 15,2571 | 55=513 0 | | TS | COSO | | |
| 0230 | | | | | 15,2572 | 0 0006 1 | | EXTEND | | | |
| 0231 | REP | 4 | LAST | 1041 | 15,2573 | 7 1511 1 | | MP | COSM | | |
| 0232 | REP | 1 | | | 15,2574 | 55=515 0 | | TS | COSOCOSM | CO CM | |
| R0233 | PITCHDOT' | | | | 0 TCDU/180 = IDOT TCDU/180 | COSO COSM + MDOT TCDU/180 | SINO | | | | |
| 0234 | REP | 3 | LAST | 1034 | 15,2575 | 4 1677 1 | | CS | -DELAG | | |
| 0235 | | | | | 15,2576 | 0 0006 1 | | EXTEND | | | |
| 0236 | REP | 3 | LAST | 1041 | 15,2577 | 7 1512 1 | | MP | SINO | | |
| 0237 | REP | 9 | LAST | 1039 | 15,2600 | 53=721 0 | | DXCH | JETEM | 2 LOCS | |
| 0238 | REP | 3 | LAST | 1034 | 15,2601 | 4 1676 0 | | CS | -DELAG | | |
| 0239 | | | | | 15,2602 | 0 0006 1 | | EXTEND | | | |
| 0240 | REP | 2 | LAST | 1041 | 15,2603 | 7 1515 0 | | MP | COSOCOSM | | |
| 0241 | REP | 10 | LAST | 1041 | 15,2604 | 21=721 0 | | DAS | JETEM | | |
| 0242 | REP | 11 | LAST | 1041 | 15,2605 | 3 1720 0 | | CA | JETEM | | |
| 0243 | REP | 3 | LAST | 1035 | 15,2606 | 57=707 0 | | XCH | OLDELO | | |
| 0244 | REP | 1 | | | 15,2607 | 0 2550 0 | | TC | RATEAVG | | |
| 0245 | REP | 2 | LAST | 109 | 15,2610 | 55=702 1 | | TS | GRF. | PITCHDOT = 0 TCDU/180 | |

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P0246 YAWDOT' R TCDU/180 = -IDOT TCDU/180 COSM SINO + MDOT TCDU/180 COSO

| | | | | | | | |
|------|-----|----|-----------|---------|----------|--------|----------|
| 0247 | REP | 4 | LAST 1041 | 15,2611 | 4 1677 1 | CS | -DELAG |
| 0248 | | | | 15,2612 | 0 0005 1 | EXTEND | |
| 0249 | REP | 3 | LAST 1041 | 15,2613 | 7 1513 0 | MP | COSO |
| 0250 | REP | 12 | LAST 1041 | 15,2614 | 53=721 0 | DXCH | JETEM |
| 0251 | REP | 4 | LAST 1041 | 15,2615 | 3 1676 1 | CA | -DELAG |
| 0252 | | | | 15,2616 | 0 0006 1 | EXTEND | |
| 0253 | REP | 3 | LAST 1041 | 15,2617 | 7 1514 1 | MP | SINOCOSM |
| 0254 | REP | 13 | LAST 1042 | 15,2620 | 21=721 0 | DAS | JETEM |
| 0255 | REP | 14 | LAST 1042 | 15,2621 | 3 1720 0 | CA | JETEM |
| 0256 | REP | 3 | LAST 1035 | 15,2622 | 57=710 0 | XCH | OLDEL |
| 0257 | REP | 2 | LAST 1041 | 15,2623 | 0 2550 0 | TC | RATEAVG |
| 0258 | REP | 2 | LAST 109 | 15,2624 | 55=703 0 | TS | PREL |

YAWDOT = R TCDU/180

R0259 ROLLDOT' P TCDU/180 = CDOT TCDU/180 + IDOT TCDU/180 SINM

| | | | | | | | |
|------|-----|-----|-----------|---------|----------|--------|---------|
| 0260 | REP | 6 | LAST 1041 | 15,2625 | 3 1663 0 | CA | AND |
| 0261 | REP | 4 | LAST 1041 | 15,2626 | 0 4770 0 | TC | SPSIN |
| 0262 | REP | 2 | LAST 110 | 15,2627 | 55=510 0 | TS | SINM |
| 0263 | | | | 15,2630 | 0 0006 1 | EXTEND | |
| 0264 | REP | 5 | LAST 1042 | 15,2631 | 7 1676 0 | MP | -DELAG |
| 0265 | REP | 15 | LAST 1042 | 15,2632 | 55=720 1 | TS | JETEM |
| 0266 | REP | 196 | LAST 1035 | 15,2633 | 3 4714 1 | CA | ZERO |
| 0267 | | | | 15,2634 | 20 001 1 | DOORL | |
| 0268 | REP | 3 | LAST 1034 | 15,2635 | 6 1675 1 | AD | -DELAG |
| 0269 | REP | 16 | LAST 1042 | 15,2636 | 6 1720 0 | AD | JETEM |
| 0270 | REP | 247 | LAST 1039 | 15,2637 | 4 0000 0 | CS | A |
| 0271 | REP | 17 | LAST 1042 | 15,2640 | 55=720 1 | TS | JETEM |
| 0272 | REP | 3 | LAST 1035 | 15,2641 | 57=706 1 | XCH | OLDEL |
| 0273 | REP | 3 | LAST 1042 | 15,2642 | 0 2550 0 | TC | RATEAVG |
| 0274 | REP | 2 | LAST 109 | 15,2643 | 55=701 1 | TS | PREL |

ROUND L INTO A

ROLLDOT = P TCDU/180

A0275

IF GAMDOT ± 0.5 DEG/SEC, THEN GAMDOT = 0

| | | | | | | | |
|------|-----|----|-----------|---------|----------|--------|----------|
| 0276 | REP | 5 | LAST 1035 | 15,2644 | 11=723 1 | CCS | GAMDOT |
| 0277 | | | | 15,2645 | 0 2647 0 | TC | +2 |
| 0278 | REP | 1 | | 15,2646 | 0 2671 0 | TC | NOGAMDOT |
| 0279 | REP | 6 | LAST 1038 | 15,2647 | 4 1664 0 | CS | ROLL/180 |
| 0280 | REP | 5 | LAST 1042 | 15,2650 | 0 4770 0 | TC | SPSIN |
| 0281 | | | | 15,2651 | 0 0006 1 | EXTEND | |
| 0282 | REP | 6 | LAST 1042 | 15,2652 | 7 1723 1 | MP | GAMDOT |
| 0283 | REP | 18 | LAST 1042 | 15,2653 | 55=721 0 | TS | JETEM +1 |
| 0284 | | | | 15,2654 | 0 0006 1 | EXTEND | |
| 0285 | REP | 1 | | 15,2655 | 7 3217 1 | MP | SINTRIM |
| 0287 | REP | 3 | LAST 1042 | 15,2656 | 27=701 1 | ADS | PREL |
| 0288 | REP | 7 | LAST 1042 | 15,2657 | 3 1664 1 | CA | ROLL/180 |
| 0289 | REP | 5 | LAST 1041 | 15,2660 | 0 4767 0 | TC | SPCOS |

-SR GAMDOT

SIN(-20) (FOR NOMINAL L/D = .3)
PREL TCDU/180 = (P-SALP SR GAMDOT) TCDU/180

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| | | | | | | | |
|-------|-----|--------------|---------|----------|----------|----------|--|
| 0290 | | | 15,2661 | 4 0000 0 | COM | | |
| 0291 | | | 15,2662 | 0 0006 1 | EXTEND | | |
| 0292 | REP | 7 LAST 1042 | 15,2663 | 7 1723 1 | MP | GANDOT | |
| 0293 | REP | 3 LAST 1041 | 15,2664 | 27-702 1 | ADS | QREL | QREL TCDU/180=(Q-CR GANDOT) TCDU/180 |
| 0294 | REP | 19 LAST 1042 | 15,2665 | 4 1721 0 | CS | JETEM +1 | B() = -SR GANDOT |
| 0295 | | | 15,2666 | 0 0006 1 | EXTEND | | |
| 0296 | REP | 1 | 15,2667 | 7 3220 0 | MP | COSTRIM | COS(-20) (FOR NOMINAL L/D = .3) |
| 0297 | REP | 3 LAST 1042 | 15,2670 | 27-703 0 | ADS | RREL | RREL TCDU/180=(R-CALP SR GANDOT)TCDU/180 |
| 0298 | REP | 29 LAST 1038 | 15,2671 | 3 4677 0 | NOGANDUT | CA | BIT12 |
| 0299 | REP | 19 LAST 1039 | 15,2672 | 7 0102 0 | MARK | CM/FLAGS | |
| 0300 | | | 15,2673 | 0 0006 1 | EXTEND | | |
| 0301 | REP | 52 LAST 1035 | 15,2674 | 1 5213 0 | STBYDUMP | RZP | TASKOVER |
| 0302 | REP | 27 LAST 1008 | 15,2675 | 3 4672 0 | CA | POSMAK | |
| 0303 | REP | 25 LAST 1010 | 15,2676 | 54 030 0 | TS | TIMES | PICK UP AT ATTRATES IN 10 MS OR SO. |
| 0304 | | | 15,2677 | 0 0006 1 | EXTEND | | |
| 0305 | REP | 1 | 15,2700 | 3 2704 0 | DCA | ATDOTCAD | |
| 0306 | REP | 24 LAST 1040 | 15,2701 | 53=313 0 | DXCH | TSLOC | DOES NOT PROTECT TRK, SO IN SPSIN/COS |
| A0307 | | | | | | | |
| 0308 | REP | 53 LAST 1043 | 15,2702 | 0 5213 1 | TC | TASKOVER | |
| 0309 | REP | 38 LAST 1041 | E6,1661 | | BRANK= | AGC | |
| 0310 | REP | 1 | 15,2703 | 02705 1 | ATDOTCAD | 2CADR | ATTRATES |
| 0310 | REP | 1 | 15,2704 | 32066 0 | | | |



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P0311 CALCULATE BODY ATTITUDE RATES AND INTEGRATE TO OBTAIN ATTITUDE ANGLES.

R0312 CB PHIDOT TCDU/180 = (CA PREL + SA RREL) TCDU/180
R0313 BETADOT TCDU/180 = (-SA PREL + CA RREL) TCDU/180
R0314 ALFADOT TCDU = (CRREL + SB PHIDOT) TCDU/180

| | | | | | | | | | | |
|-------|-----|----|------|------|---------|----------|----------|--------|----------|---------------------------------------|
| 0315 | REP | 20 | LAST | 1032 | 15,2705 | 22 016 0 | ATTRATES | LXCH | BANKRUPT | CONTINUE HERE VIA TS |
| 0316 | | | | | 15,2706 | 0 0006 1 | | EXTEND | | TASK MAY BE SKIPPED AT RESTART. |
| 0317 | REP | 16 | LAST | 1032 | 15,2707 | 22 012 1 | | CRCH | CRUPT | |
| 0318 | REP | 11 | LAST | 356 | 15,2710 | 3 0021 1 | | CA | SR | |
| 0319 | | | | | 15,2711 | 6 0000 1 | | DOUBLE | | |
| 0320 | REP | 2 | LAST | 111 | 15,2712 | 55-623 0 | | TS | CM/SAVE | |
| A0321 | | | | | | | | | | DOES NOT PROTECT TRK, SO IN SPSIN/COS |
| 0322 | REP | 4 | LAST | 1043 | 15,2713 | 3 1702 0 | | CA | CRREL | |
| 0323 | REP | 5 | LAST | 1038 | 15,2714 | 6 1665 0 | | AD | ALPA/180 | |
| 0324 | REP | 1 | | | 15,2715 | 0 2542 0 | | TC | ANGV/COR | |
| 0325 | REP | 6 | LAST | 1044 | 15,2716 | 55-665 1 | | TS | ALPA/180 | |
| 0326 | REP | 6 | LAST | 1042 | 15,2717 | 0 4767 0 | | TC | SPCOS | |
| 0327 | REP | 2 | LAST | 110 | 15,2720 | 55-506 1 | | TS | CALPA | CALPA |
| 0328 | REP | 2 | LAST | 109 | 15,2721 | 55-705 0 | | TS | PHIDOT | |
| 0329 | | | | | 15,2722 | 0 0006 1 | | EXTEND | | |
| 0330 | REP | 4 | LAST | 1042 | 15,2723 | 7 1701 1 | | MP | PREL | |
| 0331 | REP | 3 | LAST | 1044 | 15,2724 | 57-705 1 | | XCH | PHIDOT | CA PREL |
| 0332 | | | | | 15,2725 | 0 0006 1 | | EXTEND | | |
| 0333 | REP | 4 | LAST | 1043 | 15,2726 | 7 1703 0 | | MP | RREL | CA RREL |
| 0334 | REP | 2 | LAST | 109 | 15,2727 | 55-704 1 | | TS | BETADOT | |
| 0335 | REP | 7 | LAST | 1044 | 15,2730 | 3 1665 0 | | CA | ALPA/180 | |
| 0336 | REP | 6 | LAST | 1042 | 15,2731 | 0 4770 0 | | TC | SPSIN | |
| 0337 | REP | 2 | LAST | 110 | 15,2732 | 55-507 0 | | TS | SALPA | SIN(ALPA) |
| 0338 | | | | | 15,2733 | 0 0006 1 | | EXTEND | | |
| 0339 | REP | 5 | LAST | 1044 | 15,2734 | 7 1703 0 | | MP | RREL | SA RREL |
| 0340 | REP | 4 | LAST | 1044 | 15,2735 | 27-705 0 | | ADS | PHIDOT | CR PHIDOT, SAVED. |
| 0341 | REP | 3 | LAST | 1044 | 15,2736 | 4 1507 0 | | CS | SALPA | |
| 0342 | | | | | 15,2737 | 0 0006 1 | | EXTEND | | |
| 0343 | REP | 5 | LAST | 1044 | 15,2740 | 7 1701 1 | | MP | PREL | |
| 0344 | REP | 3 | LAST | 1044 | 15,2741 | 27-704 1 | | ADS | BETADOT | SAVE BETADOT TCDU/180 |
| 0345 | REP | 6 | LAST | 1039 | 15,2742 | 27-666 1 | | ADS | BETA/180 | BETA DONE. |
| 0346 | REP | 7 | LAST | 1044 | 15,2743 | 0 4770 0 | | TC | SPSIN | |
| 0347 | | | | | 15,2744 | 0 0006 1 | | EXTEND | | |
| 0348 | REP | 5 | LAST | 1044 | 15,2745 | 7 1705 0 | | MP | PHIDOT | NEGLECT CR IN CR PHIDOT |
| 0349 | REP | 8 | LAST | 1044 | 15,2746 | 6 1665 0 | | AD | ALPA/180 | |
| 0350 | REP | 2 | LAST | 1044 | 15,2747 | 0 2542 0 | | TC | ANGV/COR | |
| 0351 | REP | 9 | LAST | 1044 | 15,2750 | 55-665 1 | | TS | ALPA/180 | ALPA DONE. |

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| | | | | | | | |
|---|-----|-----|-----------|------------------|---------|-------------|--------------------------------------|
| 0352 | | | 15,2751 | 4 0000 0 | CON | | |
| 0353 | REP | 4 | LAST 1038 | 15,2752 8 1803 0 | AD | ALFACOM | |
| 0354 | REP | 3 | LAST 1044 | 15,2753 0 2542 0 | TC | ANGOVCOR | JUST IN CASE ... |
| 0355 | REP | 7 | LAST 994 | 15,2754 55=477 0 | TS | AK1 | |
| 0356 | REP | 2 | LAST 111 | 15,2755 55=572 1 | TS | QAXERR | FOR PITCH FDAI AND EDIT. |
| 0357 | REP | 8 | LAST 1044 | 15,2756 3 1705 1 | CA | PHIDOT | PHIDOT TCDU/180, NEGLECTING CB |
| 0358 | REP | 8 | LAST 1042 | 15,2757 6 1664 1 | AD | ROLL/180 | |
| 0359 | REP | 4 | LAST 1045 | 15,2760 0 2542 0 | TC | ANGOVCOR | |
| 0360 | REP | 3 | LAST 173 | 15,2761 55=714 0 | TS | ROLLTM | ROLL/180 FOR TM. |
| 0361 | REP | 9 | LAST 1045 | 15,2762 55=664 0 | TS | ROLL/180 | ROLL DONE. |
| R0362 START YAW AUTOPILOT HERE. RATE DAMPING WITH ENFORCED COORDINATED ROLL MANEUVER. | | | | | | | |
| 0364 | REP | 31 | LAST 982 | 15,2763 3 4710 0 | CA | BITS | .05GSW =102D BITS SW=0, LESS .05G |
| 0365 | REP | 20 | LAST 1043 | 15,2764 7 0102 0 | MARK | CM/FLAGS | SWITCH =1, GREATER THAN .05 G |
| 0366 | | | | 15,2765 0 0006 1 | EXTEND | | |
| 0367 | REP | 1 | | 15,2766 1 3054 1 | BZP | EXDAP | IF G LESS THAN .05 |
| 0368 | REP | 117 | LAST 1039 | 15,2767 4 4712 0 | CB | ONE | IF G GREO THAN .05 |
| 0369 | REP | 5 | LAST 748 | 15,2770 55=700 0 | TS | QMDAPMOD | SAVE -1 FOR USE IN CM/RCS |
| 0370 | REP | 8 | LAST 1045 | 15,2771 55=477 0 | TS | AK1 | TO ZERO PITCH AND YAW FDAI NEEDLES |
| 0371 | REP | 8 | LAST 994 | 15,2772 55=500 1 | TS | AK2 | IN ATM. (MODE =-1) |
| 03713 | REP | 8 | LAST 1044 | 15,2773 4 1701 1 | CS | PREL | YAW ERROR = RREL - PREL TAN(ALPA) |
| 0372 | | | | 15,2774 0 0006 1 | EXTEND | | |
| 0373 | REP | 2 | LAST 1042 | 15,2775 7 3217 1 | MP | SINTRIM | LET SIN(-20) BE APPROX FOR TAN(-20) |
| 0374 | REP | 8 | LAST 1044 | 15,2776 6 1703 1 | AD | RREL | |
| 0375 | REP | 1 | | 15,2777 0 3044 1 | TC | 2D/SDZ | GO TEST DZ. GET TAG' +0 IF IN DZ |
| 0376 | REP | 248 | LAST 1042 | 15,3000 50 000 1 | INDEX | A | +/- 1 IF NOT |
| 0377 | REP | 1 | | 15,3001 3 3222 0 | CAP | YJBTCODE | |
| 0378 | REP | 20 | LAST 1043 | 15,3002 55=720 1 | TS | JETEM | |
| R0379 START PITCH AUTOPILOT HERE. RATE DAMPING ONLY. | | | | | | | |
| 0380 | REP | 5 | LAST 1044 | 15,3003 3 1702 0 | CA | QREL | |
| 0381 | REP | 2 | LAST 1045 | 15,3004 0 3044 1 | TC | 2D/SDZ | |
| 0382 | REP | 249 | LAST 1045 | 15,3005 50 000 1 | EXDAPIN | INDEX | COME HERE FROM FX ATM DAP |
| 0383 | REP | 1 | | 15,3006 3 3225 1 | CAP | P/RJCODE | |
| 0384 | REP | 21 | LAST 1045 | 15,3007 27=720 1 | ADS | JETEM | COMBINE ALL NEW BITS. |
| 0385 | | | | 15,3010 0 0006 1 | EXTEND | | DOES NOT REQUIRE SAVING OLD CODES. |
| 0386 | REP | 2 | LAST 1036 | 15,3011 01 005 0 | WRITE | PYJETS | SET PYCHAN TO DESIRED BIT CONFIG. |
| 0387 | REP | 4 | LAST 1037 | 15,3012 11=711 0 | CCS | JETAG | |
| 0388 | REP | 1 | | 15,3013 0 3236 0 | TC | CM/RCS | |
| 0389 | REP | 1 | | 15,3014 0 3716 1 | TC | CM/FDAI | |
| 0390 | REP | 1 | | 15,3015 0 3723 1 | TC | CM/FDAIR -1 | (JETAG=-1 EQUIVALENT TO QMDAPMOD=+1) |



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P0391 DEAD ZONE LOGIC USED BY ENTRY DIGITAL AUTOPILOTS.

| | | | | | | | | | |
|-------|-----|-----|-----------|---------|----------|---------|-------|---------|---|
| 0392 | REF | 250 | LAST 1045 | 15,3016 | 10 000 0 | 3DDZ | CCS | A | YAWLIM=1.0-3/180=16384-273=16111 |
| 0393 | REF | 1 | | 15,3017 | 6 3215 1 | | AD | YAWLIM | |
| 0394 | REF | 1 | | 15,3020 | 1 3050 0 | | TCF | DZCOM | |
| 0395 | REF | 2 | LAST 1046 | 15,3021 | 6 3215 1 | | AD | YAWLIM | |
| 0396 | REF | 1 | | 15,3022 | 1 3051 1 | | TCF | DZNCCM | |
| A0397 | | | | | | | | | |
| 0398 | REF | 1 | | 15,3023 | 55-624 1 | BIASEDZ | TS | JTEM2 | BIASED DZ FOR EXT ATM DAP. |
| 0399 | REF | 251 | LAST 1046 | 15,3024 | 10 000 0 | | CCS | A | SAVE RATE/180. ERROR/180 IS IN L. |
| 0400 | REF | 1 | | 15,3025 | 4 3214 1 | | CS | CM/BIAS | START ERROR DZ. |
| 0401 | | | | 15,3026 | 1 3030 0 | | TCF | +2 | = .6/180 |
| 0402 | REF | 2 | LAST 1046 | 15,3027 | 3 3214 0 | | CA | CM/BIAS | |
| 0403 | REF | 133 | LAST 1036 | 15,3030 | 6 0001 0 | | AD | L | BIAS THE ERROR. |
| 0404 | REF | 207 | LAST 1036 | 15,3031 | 22 002 0 | | LXCH | Q | SAVE CALLERS RETURN ADDRESS. |
| 0405 | REF | 1 | | 15,3032 | 0 3016 0 | | TC | 3DDZ | GO GENERATE THE ERROR BIT. |
| 0406 | REF | 134 | LAST 1046 | 15,3033 | 52 002 1 | | DXCH | L | BIT TO L, RESTORE CALLERS Q. |
| 0407 | REF | 2 | LAST 1046 | 15,3034 | 11-624 1 | 4D/SDZ | CCS | JTEM2 | CAME HERE IN EXT ATM. C(L) = ERROR BIT |
| 0408 | REF | 1 | | 15,3035 | 6 3212 0 | | AD | 4D/SLIM | IF RATE GEO 4D/S, SET L=0 AND TAKE |
| 0409 | | | | 15,3036 | 1 3040 1 | | TCF | +2 | JET BITS ACCORDING TO SIGN OF RATE. |
| 0410 | REF | 2 | LAST 1046 | 15,3037 | 6 3212 0 | | AD | 4D/SLIM | |
| 0411 | REF | 252 | LAST 1046 | 15,3040 | 54 000 0 | | TS | A | |
| 0412 | | | | 15,3041 | 1 3043 1 | | TCF | +2 | RATE OK. CONTINUE |
| 0413 | | | | 15,3042 | 22 007 0 | | ZL | | RATE GEO 4 D/S. OVER RIDE ERROR BIT |
| 0414 | REF | 3 | LAST 1046 | 15,3043 | 57-624 0 | | XCH | JTEM2 | AND CONTINUE TO GET SIGN. |
| 0415 | REF | 253 | LAST 1046 | 15,3044 | 10 000 0 | 2D/SDZ | CCS | A | COME HERE TO TEST IF A WITHIN 2DEG/S DZ |
| 0416 | REF | 1 | | 15,3045 | 6 3213 1 | | AD | YDOTLIM | 1.0 - YDOT DZ (OR FOOT) |
| 0417 | | | | 15,3046 | 1 3051 1 | | TCF | +3 | |
| 0418 | REF | 2 | LAST 1046 | 15,3047 | 6 3213 1 | | AD | YDOTLIM | YDOT DZ = 2 DEG/SEC |
| 0419 | | | | 15,3050 | 4 0000 0 | | DZCOM | COM | |
| 0420 | REF | 22 | LAST 1045 | 15,3051 | 55-721 0 | DZNCCM | TS | JTEM +1 | GENERATE TAG, SET C(A) = --1 OUTSIDE DZ |
| 0421 | REF | 197 | LAST 1042 | 15,3052 | 3 4714 1 | | CA | ZERO | SET C(A) = +0 INSIDE |
| 0422 | REF | 208 | LAST 1046 | 15,3053 | 0 0002 0 | | TC | Q | |

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P0423 EXTRA ATMOSPHERIC DIGITAL AUTOPILOT

R0424 1. IF ABS(CALP) -C(45) POS, USE
 R0426 BETA' YAW ERROR = SQN(CALP) (BETACOM -BETA)
 R0428 RATE = BETADOT
 R0430 R-AXIS = CONTROL

IF CALPA POS, ONDAPMOD = +0
 IF CALPA NEG, ONDAPMOD = -0
 IF ONDAPMOD = -0, RATE = RREL

R0431 ROLL' ROLL ERROR = SQN(CALP) (ROLLC - ROLL)
 R0433 RATE = PREL
 R0434 P-AXIS = CONTROL

IF ONDAPMOD = -0, RATE DAMP ONLY.

R0435 2. IF C(45) GEO CALPA GEO -C(45), USE
 R0437 BETA' ROLL ERROR = SQN(-CALP) (BETACOM -BETA)
 R0438 RATE = BETADOT
 R0439 P-AXIS = CONTROL

ONDAPMOD = +1

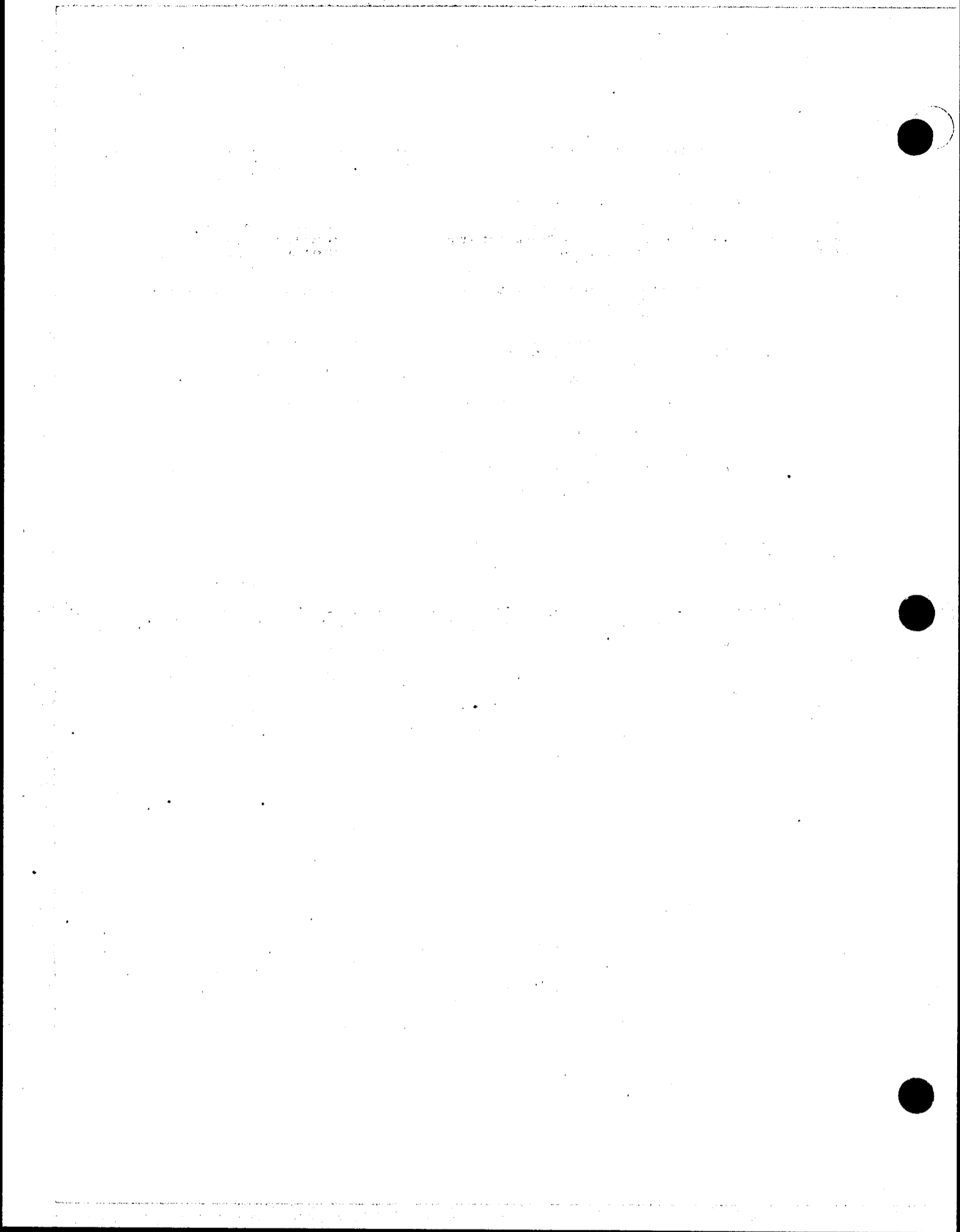
R0440 ROLL' YAW ERROR = SQN(CALP) (ROLLC -ROLL)
 R0442 RATE = RREL
 R0443 R-AXIS = CONTROL

RATE DAMP ONLY.

R0444 3. FOR ALL CASRS, USE
 R0445 ALFA' PITCH ERROR = (ALFACOM - ALFA)
 R0446 RATE = QREL
 R0447 Q-AXIS = CONTROL

R0448

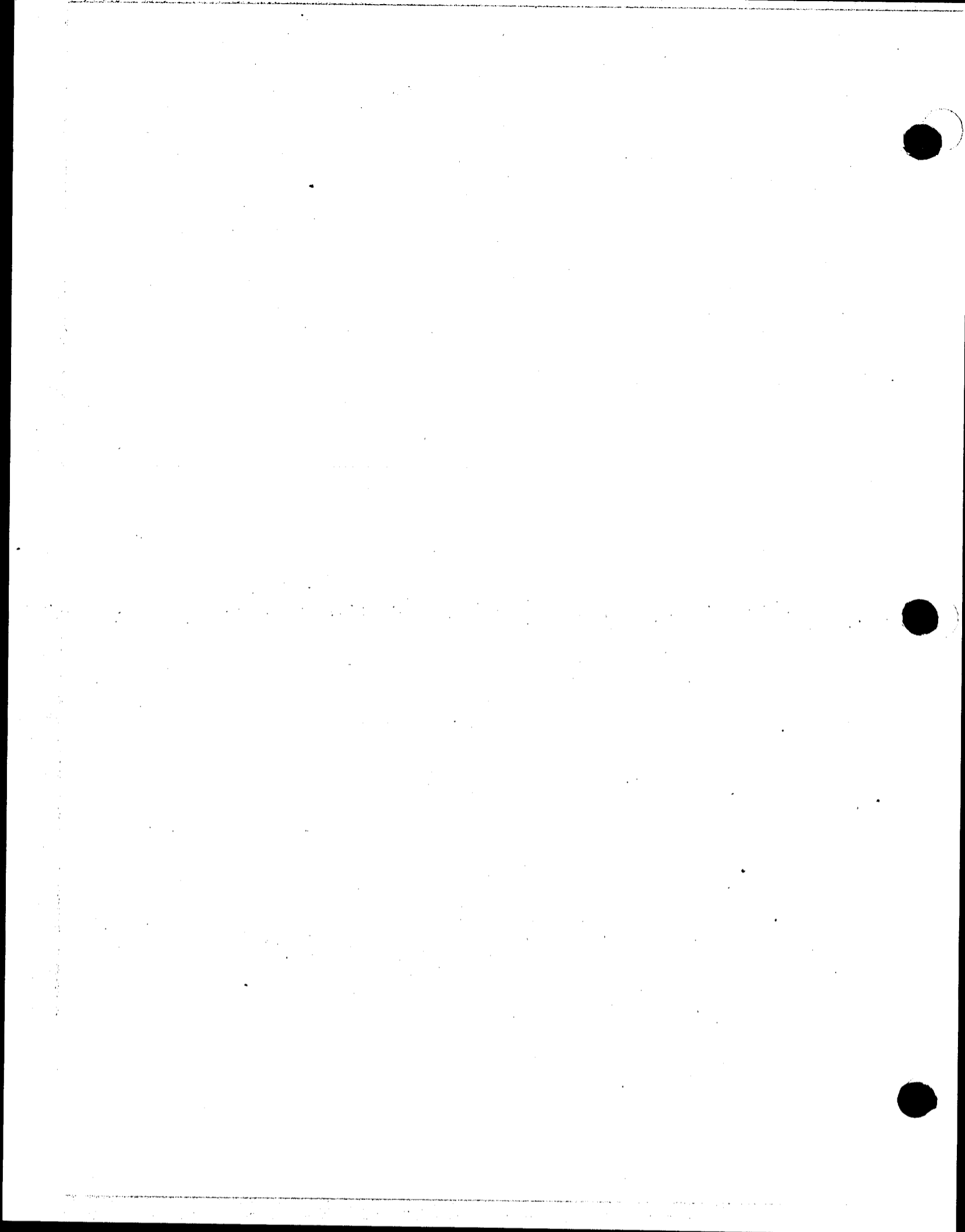
| | | | | | | | | | |
|-------|-----|-----|-----------|---------|----------|-------|-----|----------|------------------------------|
| 0449 | REP | 6 | LAST 1045 | 15,3054 | 55=700 0 | EXDAP | TS | ONDAPMOD | +0 FOR NOW |
| 0450 | REP | 7 | LAST 1044 | 15,3055 | 4 1666 1 | | CS | BETA/180 | |
| 0451 | REP | 2 | LAST 110 | 15,3056 | 6 1604 1 | | AD | BETACOM | |
| 0452 | REP | 23 | LAST 1046 | 15,3057 | 55=721 0 | | TS | JSTEM +1 | PRESERVE THIS FOR A WHILE. |
| 0453 | REP | 3 | LAST 1044 | 15,3060 | 11=506 1 | | CCS | CALPA | |
| 0454 | REP | 1 | | 15,3061 | 6 3216 1 | | AD | C45LIM | =1.0-COS(45) |
| 0455 | | | | 15,3062 | 1 3064 1 | | TCP | +2 | |
| 0456 | REP | 2 | LAST 1047 | 15,3063 | 6 3216 1 | | AD | C45LIM | |
| 0457 | REP | 254 | LAST 1046 | 15,3064 | 54 000 0 | | TS | A | |
| 0458 | REP | 1 | | 15,3065 | 1 3146 0 | | TCP | EXDAP2 | HERE IF ABS(CALPA) > COS(45) |
| 04582 | REP | 4 | LAST 1047 | 15,3066 | 11=506 1 | | CCS | CALPA | YCALPAY 5 0.707 |
| 04583 | | | | 15,3067 | 1 3070 1 | | TCP | +1 | CONTINUE IF POS |



1047-A

| | | | | | |
|------|-----|-----|-----------|---------|----------|
| 0459 | REP | 4 | LAST 1037 | 15,3070 | 11*727 0 |
| 0460 | REF | 1 | | 15,3071 | 0 3104 1 |
| 0461 | | | | 15,3072 | 0 3074 1 |
| 0462 | REF | 2 | LAST 1047 | 15,3073 | 0 3104 1 |
| 0463 | REP | 89 | LAST 1035 | 15,3074 | 0 5301 0 |
| 0464 | | | | 15,3075 | 40334 1 |
| 0465 | REP | 118 | LAST 1045 | 15,3076 | 4 4712 0 |
| 0466 | REP | 5 | LAST 1041 | 15,3077 | 55*727 0 |

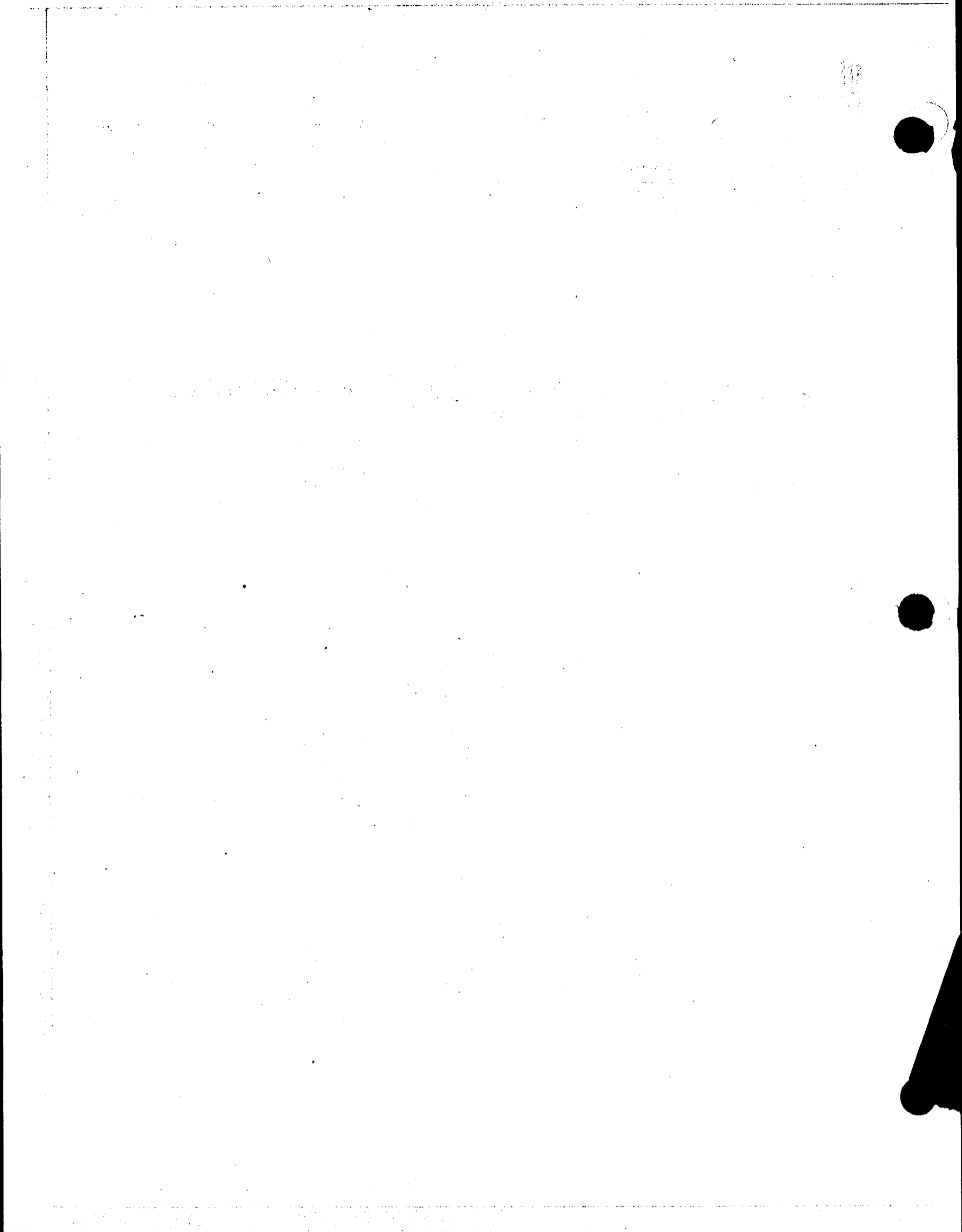
| | | |
|-----|---------|---------------------------------|
| CCS | P63FLAG | VALID VALUES ARE: -1, +1, +0. |
| TC | EXDAP4 | |
| TC | +2 | |
| TC | EXDAP4 | |
| TC | PHASCHG | SINGLE PASS THROUGH HERE. |
| OCT | 40334 | |
| CS | ONE | |
| TS | P63FLAG | SET FLAG TO ASSURE SINGLE PASS. |



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| | | | | | | | | | |
|-------|-----|-----|-----------|---------|----------|--------|--------|----------|---|
| 0467 | REP | 1 | | 15,3100 | 3 3211 0 | | CA | MSBC | |
| 0468 | REP | 48 | LAST 1039 | 15,3101 | 0 5140 1 | | TC | WAITLIST | |
| 0469 | REP | 39 | LAST 1043 | 15,3102 | 0 2374 0 | | BRANK= | AOC | |
| 0470 | REP | 2 | LAST 209 | 15,3102 | 0 2374 0 | | ZCADR | WAKEP62 | CALL TO TERMINATE P62 IN N SEC. |
| 0470 | | | | 15,3103 | 54068 0 | | | | 65 DEG/ 3080/SEC = 21 SEC NOMINAL TRANSIT TIME FROM ALPA=45 TO ALPA TRIM. |
| A0471 | | | | | | | | | |
| A0472 | | | | | | | | | |
| 0473 | REP | 5 | LAST 1045 | 15,3104 | 11=711 0 | EXDAP4 | CCS | JETAG | ROLLJET INTERPACE TEST BETWEEN .1 SEC DAP AND THE 2 SEC CM/RCS DAP |
| 0474 | REP | 1 | | 15,3105 | 1 3113 0 | | TCP | EXDAP3 | |
| 0475 | REP | 2 | LAST 1046 | 15,3106 | 1 3113 0 | | TCP | EXDAP3 | |
| 0476 | REP | 198 | LAST 1046 | 15,3107 | 3 4714 1 | | CA | ZERO | |
| 0477 | | | | 15,3110 | 0 0006 1 | | EXTEND | | |
| 0478 | REP | 2 | LAST 1036 | 15,3111 | 01 006 0 | | WRITE | ROLLJETS | TURN OFF ROLL JETS IF ON AND WAIT UNTIL START OF 2 SEC CM/RCS CYCLE RESTORE PROPER VALUE +0 |
| 0479 | REP | 6 | LAST 1046 | 15,3112 | 55=711 0 | | TS | JETAG | |
| A0480 | | | | | | | | | ROLL FDAI WILL BE IN ERROR UNTIL NEXT CM/RCS CALL. HERE IF ABS(CALPA) GEO COS(45) |
| 0481 | REP | 5 | LAST 1047 | 15,3113 | 11=506 1 | EXDAP3 | CCS | CALPA | |
| 0482 | REP | 24 | LAST 1047 | 15,3114 | 3 1721 1 | | CA | JETEM +1 | |
| 0483 | REP | 1 | | 15,3115 | 1 3121 1 | | TCP | EXDAP1 | |
| 0484 | REP | 199 | LAST 1048 | 15,3116 | 4 4714 0 | | CS | ZERO | |
| 0485 | REP | 7 | LAST 1047 | 15,3117 | 55=700 0 | | TS | CNDAPMOD | FOR CM/RCS |
| 0486 | REP | 25 | LAST 1048 | 15,3120 | 4 1721 0 | | CS | JETEM +1 | |
| 0487 | REP | 1 | | 15,3121 | 55=573 0 | EXDAP1 | TS | RAXERR | FOR YAW FDAI WANT RAXERR FOR TM. |
| 0488 | REP | 9 | LAST 1045 | 15,3122 | 55=500 1 | | TS | AK2 | |
| 0489 | REP | 135 | LAST 1046 | 15,3123 | 54 001 1 | | TS | L | |
| 0490 | REP | 6 | LAST 1046 | 15,3124 | 11=700 0 | | CCS | CNDAPMOD | COORDINATE BETA CONTROL. C(CNDAPMOD) CAN BE +1, +0, OR -0. USE RETADOT TO COORD IN MODE +0 OTHERWISE USE RRRL. |
| 0491 | | | | 15,3125 | 0 3130 0 | | TC | +3 | |
| 0492 | REP | 119 | LAST 1047 | 15,3126 | 3 4712 1 | | CA | QRE | |
| 0493 | REP | 255 | LAST 1047 | 15,3127 | 50 000 1 | | INDEX | A | |
| 0494 | REP | 7 | LAST 1045 | 15,3130 | 3 1703 1 | | CA | RRRL | |
| 0495 | REP | 1 | | 15,3131 | 0 3023 0 | | TC | BIASEDZ | GO TEST DZ. +0 IF IN DZ, +-1 OTHERWISE IF GEO 4D/S, SET ERROR BIT IN L =0 |
| A0496 | | | | | | | | | |
| -0497 | | | | 15,3132 | 0 0006 1 | | EXTEND | | |
| 0498 | REP | 12 | LAST 988 | 15,3133 | 04 001 1 | | ROR | LCHAN | L HAS BETA BIT |
| 0499 | REP | 256 | LAST 1048 | 15,3134 | 50 000 1 | | INDEX | A | |
| 0500 | REP | 2 | LAST 1045 | 15,3135 | 3 3222 0 | | CAP | YJETCODE | |
| 0501 | REP | 26 | LAST 1048 | 15,3136 | 55=720 1 | | TS | JETEM | |
| 0502 | REP | 3 | LAST 1045 | 15,3137 | 3 1572 0 | | CA | QAXERR | ALPA ERROR. |
| 0503 | REP | 136 | LAST 1048 | 15,3140 | 54 001 1 | | TS | L | |
| 0504 | REP | 6 | LAST 1045 | 15,3141 | 3 1702 0 | | CA | QREL | FOR ALPADOT USE QREL |
| 0505 | REP | 2 | LAST 1048 | 15,3142 | 0 3023 0 | | TC | BIASEDZ | |
| 0506 | | | | 15,3143 | 0 0006 1 | | EXTEND | | |
| 0507 | REP | 13 | LAST 1048 | 15,3144 | 04 001 1 | | ROR | LCHAN | |
| 0508 | REP | 1 | | 15,3145 | 1 3005 0 | | TCP | EXDAPIN | CONTINUE ON IN DAP |
| 0509 | REP | 9 | LAST 1048 | 15,3146 | 25=700 1 | EXDAP2 | INCR | CNDAPMOD | SET CNDAPMOD TO +1 |
| 0510 | REP | 120 | LAST 1048 | 15,3147 | 4 4712 0 | | CS | QRE | INDICATE CHANGE FROM .1 SEC UPDATE TO |



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| | | | | | | | |
|--|-----------------------------|-------------------------------------|-------------------------------|----------------------------------|--|-------------------------|--|
| 0511 A0512 | REP 7 | LAST 1048 | 15,3150 | 55=711 0 | TS | JETAG | TO 2 SEC FOR ROLL JETS. (IF CMDAPMOD =0 AND JETAG =-1, QUENCHES JETS IF ON) |
| 0513 0514 0515 | REP 6 REP 7 | LAST 1047 LAST 1049 | 15,3151 15,3152 15,3153 | 11=727 0 55=727 0 13 154 0 | CCS TS NOOP | P03FLAG P03FLAG | IF FLAG WAS +1, SET =0. |
| 0516 0517 0518 | REP 4 REP 27 | LAST 1044 LAST 1048 | 15,3154 15,3155 15,3156 | 11=507 0 4 1721 0 1 3180 1 | CCS CS TCP | SALFA JETEM +1 +2 | BETA CONTROL WITH P JETS |
| 0519 0520 0521 | REP 28 REP 4 | LAST 1049 LAST 1037 | 15,3157 15,3180 15,3181 | 3 1721 1 55=713 1 0 0008 1 | CA TS EXTEND | JETEM +1 PAXERR1 | TEMP SAVE. ERROR/180 |
| 0522 0523 0524 | REP 5 REP 5 REP 137 | LAST 1038 LAST 1049 LAST 1048 | 15,3182 15,3183 15,3184 | 7 4675 0 57=713 0 54 001 1 | MP XCH TS | HALF PAXERR1 L | CM/FDAI EXPECTS ERROR/360. ERROR/360 FOR FDAI, GET ERROR/180. |
| 0525 0526 0527 | REP 5 REP 4 REP 5 | LAST 1049 LAST 1044 LAST 1049 | 15,3185 15,3186 15,3187 | 11=507 0 4 1704 1 0 3171 0 | CCS CS TC | SALFA BETADOT +2 | USE BETADOT TO COORD IN MODE +1 |
| 0528 0529 0530 | REP 5 REP 3 | LAST 1049 LAST 1048 | 15,3170 15,3171 | 3 1704 0 0 3023 0 | CA TC EXTEND | BETADOT BIASEDZ | |
| 0531 0532 0533 | REP 14 REP 257 REP 2 | LAST 1048 LAST 1048 LAST 1045 | 15,3173 15,3174 15,3175 | 04 001 1 50 000 1 3 3225 1 | ROR INDEX CAP | LCHAN A P/RJCODE | GET ROLL CODE ROLL CONTROL WITH YAW JETS. WE,LL SKIP REGULAR ROLL SYST |
| 0534 0535 | REP 3 | LAST 1048 | 15,3176 15,3177 | 0 0008 1 01 006 0 | EXTEND WRITE | ROLLJETS | |
| 0536 0537 0538 | REP 3 REP 10 | LAST 1038 LAST 1045 | 15,3200 15,3201 15,3202 | 3 1717 1 0 0008 1 21=664 0 | CA EXTEND MSU | ROLLHOLD ROLL/180 | ROLL/180 AT CM/DAPCN TIME. 1,5 COMPL, BUT SO WHATS A BIT. * FORCE A LIMIT CYCLE IN YAW RATE. |
| 0539 0540 0541 | REP 138 REP 6 REP 139 | LAST 1049 LAST 1049 LAST 1049 | 15,3203 15,3204 15,3205 | 54 001 1 11=507 0 3 0001 0 | TS CCS CA | L SALFA L | TO REMOVE ITS BIASING EFFECT ON M DOT. |
| 0542 0543 0544 | REP 2 REP 140 REP 3 | LAST 1048 LAST 1049 LAST 1049 | 15,3206 15,3207 15,3210 | 0 3121 0 4 0001 1 0 3121 0 | TC CS TC | EXDAP1 L EXDAP1 | |
| 0545 A0546 0547 0548 A0549 | | | 15,3211 15,3212 15,3213 | 04084 1 37734 0 37756 1 | NSEC DEC 4D/SLIM DEC YDOTLIM DEC | 2100 16348 16366 | 65 DEG/ 3 DEG/SEC IF NSEC IS CHANGED, REMEMBR TO CHANGE 4.33SPOT. 1.0 -4/180 D/S = 4/1800 EXP 14 =1.0 - YDOT DZ= 16384 -18 YDOT DZ = YDOT TCDU/180 = 2/1800 EXP 14 |
| 0550 0551 0552 R0553 | | | 15,3214 15,3215 15,3216 | 00087 0 37287 0 11277 0 | CM/BIAS YAWLIM C45LIM DEC DEC DEC | 55 16055 .29289 | =.6/180 R14 = 55 YAWLIM=1.0-3.6/180=16384-329=16055 =1.0-COS(45) |
| 05531 05532 | | | 15,3217 15,3220 | 65033 1 36044 1 | SINTRIM COSTRIM DEC DEC | -.34202 .93969 | SIN(-20) (FOR NOMINAL L/D = .3) COS(-20) (FOR NOMINAL L/D = .3) |



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R05534 TO MAKE DAP INSENSITIVE TO PITCH ERRORS DUE TO ACCUMULATED NAV ERRORS, USE NOMINAL VALUE (-20 DEG) FOR TRIM ALFA
R05536 USED DURING ATMOSPHERIC COORDINATION. OUTSIDE ATMOSPHERE, NAV ERRORS WILL BE SLIGHT, BUT ALFA CAN DIFFER GREATLY
R05538 FROM TRIM, SO USE ON-BOARD ESTIMATES.

A0554

JET CODE TABLES FOLLOW

| | | | | | | |
|------|---------|---------|----------|-------------|----------------|---------------------|
| 0555 | 15,3221 | 00120 1 | OCTAL | 00120 | POS Y | |
| 0556 | 15,3222 | 00000 1 | YJETCODE | OCTAL 00000 | RCS JET BITS | |
| 0557 | 15,3223 | 00240 1 | OCTAL | 00240 | NSG Y | |
| 0558 | 15,3224 | 00005 1 | OCTAL | 00005 | POS R JET BITS | ALSO POS P JET BITS |
| 0559 | 15,3225 | 00000 1 | P/RJCODE | OCTAL 00000 | | |
| 0560 | 15,3226 | 00012 1 | OCTAL | 00012 | NSG R | ALSO NSG P |

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R0561 RCS THIS SECTION IS ENTERED EACH 2 SEC BY WAITLIST CALL FOLLOWING A DELAY OF 1.2 SEC AFTER PIPUP.
 R0563 THE TASK SETJTAG SETS A FLAG IN JETAG TO SIGNIFY THAT ROLL UPDATE IS DUE. IN ROUGHLY 5 CS BODYRATE WILL BE
 R0565 EXECUTED AND JETAG WILL CAUSE CM/RCS TO ACT ON ROLLC IMMEDIATELY THEREAFTER. THE
 R0567 TASK SAVES THE CALL TIME SO THAT CM/RCS CAN DETERMINE HOW MUCH OF THE 2 SEC INTERVAL REMAINS BEFORE THE
 R0569 NEXT UPDATE.

| | | | | | | | | | | | |
|-------|-----|-----|------|------|---------|--------|---|---------|-----|----------|------------------------------------|
| 0570 | REP | 15 | LAST | 1039 | 15,3227 | 4 0025 | 1 | SETJTAG | CS | TIME1 | SAVE NOMINAL UPDATE TIME FOR SYNCH |
| 0571 | REP | 2 | LAST | 109 | 15,3230 | 55=712 | 0 | | TS | TUSED | |
| A0572 | | | | | | | | | | | THE 5 CS APPEARS IN TIMETST. |
| 0573 | REP | 121 | LAST | 1048 | 15,3231 | 3 4712 | 1 | | CA | ONE | RATHER THAN INCR, FOR SAFETY |
| 0574 | REP | 8 | LAST | 1049 | 15,3232 | 55=711 | 0 | | TS | JETAG | SET JETAG=1 TO CAUSE CM/RCS TO BE |
| 0575 | REP | 99 | LAST | 1047 | 15,3233 | 0 8301 | 0 | | TC | PHASCHNG | |
| 0576 | | | | | 15,3234 | 00001 | 0 | | OCT | 00001 | |

| | | | | | | | | | | | |
|------|-----|----|------|------|---------|--------|---|--|----|----------|-------------------------------------|
| 0577 | REP | 54 | LAST | 1043 | 15,3235 | 0 5213 | 1 | | TC | TASKOVER | EXECUTED AFTER NEXT BODYRATE UPDATE |
|------|-----|----|------|------|---------|--------|---|--|----|----------|-------------------------------------|

R0578 PREDICTIVE ROLL SYSTEM ENTRY STEERING PROVIDES ROLL COMMAND IN LOC ROLLC. THE FOLLOWING CALCULATES THE
 R0580 TRAJECTORY TO THE ORIGIN IN PHASE PLANE (X,V). PROGRAM ENTERS JET ON AND OFF CALLS INTO WILST TO PRODUCE
 R0582 THE DESIRED TRAJECTORY. ONLY THOSE CALLS WHICH CAN BE EXECUTED WITHIN THE INTERVAL T (2 SEC) ARE ENTERED IN
 R0584 WILST, THE REMAINDER ARE RECONSIDERED AT NEXT UPDATE.

| | | | | | | | | | | |
|------|-----|---|------|-----|------|--|--|--------|--------|-----------|
| 0585 | REP | 4 | LAST | 186 | 4674 | | | HALPPR | EQUALS | NEG1/2 +1 |
|------|-----|---|------|-----|------|--|--|--------|--------|-----------|

A0586 CLEAR JETAG BEFORE TIMETST. SET TO +0 TO SHOW
 A0587 ROLL DAP CALLED. IN EVENT OF RESTART, BODYRATE
 A0588 MAY MISS A CYCLE. CM/RCS WILL MISS A CYCLE ONLY
 A0589 IF A RESTART OCCURS AFTER TIMETST COMMENCES.

| | | | | | | | | | | | |
|------|-----|-----|------|------|---------|--------|---|--------|--------|----------|--|
| 0590 | REP | 122 | LAST | 1051 | 15,3236 | 4 4712 | 0 | CM/RCS | CS | ONE | |
| 0591 | REP | 2 | LAST | 110 | 15,3237 | 55=617 | 1 | | TS | JNDX | SET NDX FOR POS ROLL, AND CHANGE LATER |
| 0592 | REP | 1 | | | 15,3240 | 4 4726 | 1 | | CS | 2T/TCDU | ROLLOTT = DELAOG + DELAIG SINM =DELR |
| 0593 | | | | | 15,3241 | 0 0008 | 1 | | EXTEND | | |
| 0594 | REP | 7 | LAST | 1045 | 15,3242 | 7 1701 | 1 | | MP | PREL | DELR/180 = RDOT TCDU/180 = RDOT/1800 |
| 0595 | REP | 141 | LAST | 1049 | 15,3243 | 6 0001 | 0 | | AD | L | -2 RDOT T/180 IN L |
| 0596 | REP | 2 | LAST | 110 | 15,3244 | 55=613 | 0 | | TS | -VT/180 | SAVE -2VT/180 HERE |
| 0597 | REP | 11 | LAST | 1049 | 15,3245 | 4 1664 | 0 | | CS | ROLL/180 | |
| 0598 | REP | 12 | LAST | 1044 | 15,3246 | 54 021 | 0 | | TS | SR | SAVE (-R/180) /2 |
| 0599 | REP | 21 | LAST | 1045 | 15,3247 | 4 0102 | 0 | | CS | CM/FLAGS | |
| 0600 | REP | 38 | LAST | 1027 | 15,3250 | 7 4707 | 1 | | MASK | BIT4 | LATSW = 101D BIT4 |
| 0601 | | | | | 15,3251 | 0 0006 | 1 | | EXTEND | | ROLL OVER TOP S |
| 0602 | REP | 1 | | | 15,3252 | 1 3260 | 1 | | BZF | GETLOX | NO, TAKE SHORTEST PATH |
| 0603 | REP | 22 | LAST | 1051 | 15,3253 | 26 102 | 0 | | ADS | CM/FLAGS | YES, ENFORCE ROLL OVER TOP.. (BIT =0) |
| 0604 | REP | 13 | LAST | 1038 | 15,3254 | 3 1715 | 0 | | CA | ROLLC | (ROLLC/180) /2 |
| 0605 | REP | 13 | LAST | 1051 | 15,3255 | 6 0021 | 1 | | AD | SR | -(R/180) /2 |
| 0606 | REP | 2 | LAST | 110 | 15,3256 | 57=614 | 0 | | XCH | LCX/360 | DIFFERENT X RECD HERE. DISCONT AT 180. |
| 0607 | REP | 1 | | | 15,3257 | 1 3320 | 1 | | TCP | COMPAT | POSSIBLE OVP. ABOVE. |

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| | | | | | | | | | |
|------|------|----------|-----------|----------|-------------------------|----------|----------|----------|---------------------------------------|
| 0608 | REP | 3 | LAST 1039 | 15,3260 | 3 4675 1 | GETLX | CA | POS1/2 | FORM RCON/360 |
| 0609 | | | | 15,3261 | 6 0000 1 | | DOUBLE | | |
| 0610 | REP | 14 | LAST 1051 | 15,3282 | 6 1715 0 | | AD | ROLLC | |
| 0611 | REP | 3 | LAST 1051 | 15,3283 | 57=614 0 | | XCH | LX/360 | IGNORE POSSIBLE OVFL. |
| 0612 | REP | 14 | LAST 1051 | 15,3284 | 3 0021 1 | | CA | SR | FORM -R/360 |
| 0613 | REP | 5 | LAST 1051 | 15,3285 | 6 4673 1 | | AD | NEG1/2 | |
| 0614 | REP | 6 | LAST 1052 | 15,3286 | 6 4673 1 | | AD | NEG1/2 | IGNORE OVFL |
| 0615 | REP | 4 | LAST 1052 | 15,3287 | 57=614 0 | | XCH | LX/360 | -R/360 |
| 0616 | REP | 5 | LAST 1052 | 15,3270 | 27=614 1 | | ADS | LX/360 | LX/360 = RCON/360 -R/360 RANGE (-1,1) |
| 0617 | DOES | SCN(-VT) | (VT/180) | (VT/180) | (180/(4 A1 TT COSALFA)) | + X/360 | + SCN(X) | / 2 | OVFL # |
| 0619 | REP | 3 | LAST 1051 | 15,3271 | 11=613 0 | | CCS | -VT/180 | TAKE SHORTEST ANGULAR PATH |
| 0620 | REP | 123 | LAST 1051 | 15,3272 | 6 4712 1 | | AD | ONE | (BASED ON SINGLE JET ACCELERATION) |
| 0621 | | | | 15,3273 | 1 3275 0 | | TCF | +2 | |
| 0622 | REP | 124 | LAST 1052 | 15,3274 | 6 4712 1 | | AD | ONE | |
| 0623 | | | | 15,3275 | 0 0006 1 | | EXTEND | | |
| 0624 | REP | 4 | LAST 1052 | 15,3276 | 7 1613 0 | | MP | -VT/180 | C(-VT/180) = -2 VT/180 |
| 0625 | | | | 15,3277 | 0 0006 1 | | EXTEND | | |
| 0626 | REP | 1 | | 15,3300 | 7 3767 0 | | MP | 1/16A1 | = 180/(16 A1 TT) |
| 0627 | | | | 15,3301 | 0 0006 1 | | EXTEND | | |
| 0628 | REP | 6 | LAST 1048 | 15,3302 | 11=506 1 | | DV | CALFA | |
| 0629 | REP | 142 | LAST 1051 | 15,3303 | 54 001 1 | | TS | L | |
| 0630 | REP | 6 | LAST 1052 | 15,3304 | 11=614 1 | | CCS | LX/360 | |
| 0631 | REP | 4 | LAST 1052 | 15,3305 | 3 4675 1 | | CAP | POS1/2 | |
| 0632 | | | | 15,3306 | 1 3310 1 | | TCF | +2 | |
| 0633 | REP | 5 | LAST 1052 | 15,3307 | 4 4675 0 | | CS | POS1/2 | |
| 0634 | REP | 7 | LAST 1052 | 15,3310 | 6 1614 0 | | AD | LX/360 | IS LX/360 LESS THAN 180 DEG S |
| 0635 | REP | 143 | LAST 1052 | 15,3311 | 6 0001 0 | | AD | L | |
| 0636 | REP | 144 | LAST 1052 | 15,3312 | 54 001 1 | | TS | L | |
| 0637 | REP | 2 | LAST 1051 | 15,3313 | 1 3320 1 | | TCF | COMPAT | YES, GO ON. |
| 0638 | REP | 256 | LAST 1049 | 15,3314 | 50 000 1 | TRTAGXPI | INDEX | A | NO, SHIPT X BY - SCN(X) 2 PI |
| 0639 | REP | 1 | | 15,3315 | 4 4674 1 | | CS | HALPPR | +A YIELDS -1/2 |
| 0640 | | | | 15,3316 | 6 0000 1 | | DOUBLE | | |
| 0641 | REP | 6 | LAST 1052 | 15,3317 | 27=614 1 | | ADS | LX/360 | |
| 0642 | REP | 9 | LAST 1052 | 15,3320 | 3 1614 0 | COMPAT | CA | LX/360 | CORRECT FOR ASSUMED COORD TURN. |
| 0643 | | | | 15,3321 | 0 0006 1 | | EXTEND | | |
| 0644 | REP | 7 | LAST 1052 | 15,3322 | 7 1506 1 | | MP | CALFA | COS ALFA |
| 0645 | REP | 10 | LAST 1052 | 15,3323 | 55=614 1 | | TS | LX/360 | SCALED LX OK HERE. |
| 0646 | REP | 10 | LAST 1048 | 15,3324 | 11=700 0 | | CCS | CMDARMOD | FOUR POSSIBILITIES HERE |
| 0647 | REP | 1 | | 15,3325 | 0 3714 0 | | TC | DZCALL1 | EXIT, SETTING JETAG=0.(C(A)=0) |
| 0648 | | | | | | | | | ALL 3 AXES ALREADY DONE. |
| 0649 | | | | 15,3326 | 0 3327 1 | | TC | +1 | G LESS THAN .05. CA POS. CONTINUE |
| 0650 | REP | 11 | LAST 1052 | 15,3327 | 3 1614 0 | | CA | LX/360 | G GEO .05. CONTINUE IN CM/RCS |
| 0651 | REP | 12 | LAST 1052 | 15,3330 | 55=614 1 | | TS | LX/360 | CMDARMOD=-0. DAMPING ONLY. SET LX=0 |
| 0652 | REP | 6 | LAST 1049 | 15,3331 | 55=713 1 | | TS | PAXERR1 | SAVE LX FOR PDAI AND EDIT.(/360) |

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| | | | | | | | | | |
|-------|--|-----|-----------|---------|----------|----------|----------|---|-----------------------|
| 0653 | REF | 5 | LAST 1052 | 15,3332 | 3 1613 1 | CA | -VT/180 | OBT - 2 VT/180 | |
| 0654 | REF | 15 | LAST 1052 | 15,3333 | 54 021 0 | TS | SR | | |
| 0655 | REF | 16 | LAST 1053 | 15,3334 | 3 0021 1 | CA | SR | OBT -VT/180, LEAVE -VT/360 IN SR FOR DZ | |
| 0656 | REF | 1 | | 15,3335 | 55=570 0 | TS | -VT/180E | DIAGNOSTIC *** | |
| 0657 | REF | 8 | LAST 1053 | 15,3336 | 57=613 1 | XCH | -VT/180 | NOW CONTENTS OF -VT/180 AS LABELED | |
| 0658 | | | | 15,3337 | 0 0006 1 | EXTEND | | | |
| 0659 | REF | 7 | LAST 1053 | 15,3340 | 7 1613 0 | MP | -VT/180 | B(A) = -2VT/180 | |
| 0660 | | | | 15,3341 | 0 0006 1 | EXTEND | | | |
| 0661 | REF | 1 | | 15,3342 | 7 3767 0 | MP | 160/BATT | | |
| 0662 | REF | 2 | LAST 110 | 15,3343 | 55=616 0 | TS | VSO/4API | | |
| R0663 | IS SQN(VT) ((180/4A1 TT) VT/180 VT/180 - .5 BUFLIM/360) -X/360 | | | | | | | | - .5 BUFLIM/360 POS W |
| 0665 | | | | 15,3344 | 6 0000 1 | WHICHALF | DOUBLE | | |
| 0666 | | | | 15,3345 | 4 0000 0 | COM | | FOR SECOND BURN, A1 | |
| 0667 | REF | 1 | | 15,3346 | 6 3773 1 | AD | BUFLIM | =BUFLIM/(2 360) | |
| 0668 | REF | 145 | LAST 1052 | 15,3347 | 54 001 1 | TS | L | | |
| 0669 | REF | 8 | LAST 1053 | 15,3350 | 11=613 0 | CCS | -VT/180 | | |
| 0670 | REF | 146 | LAST 1053 | 15,3351 | 4 0001 1 | CS | L | | |
| 0671 | | | | 15,3352 | 1 3354 1 | TCF | +2 | | |
| 0672 | REF | 147 | LAST 1053 | 15,3353 | 3 0001 0 | CA | L | | |
| 0673 | REF | 13 | LAST 1052 | 15,3354 | 6 1614 0 | AD | LCK/360 | | |
| 0674 | REF | 2 | LAST 1053 | 15,3355 | 6 3773 1 | AD | BUFLIM | | |
| 0675 | | | | 15,3356 | 0 0006 1 | EXTEND | | | |
| 0676 | REF | 1 | | 15,3357 | 6 3374 1 | BZ= | REFLECT | POINT (X,V) IN LHP. | |
| R0677 | IS SQN(VT) ((180/4A1 TT) VT/180 VT/180 - .5 BUFLIM/360) -X/360 | | | | | | | | + .5 BUFLIM/360 NEG W |
| 0679 | | | | 15,3360 | 4 0000 0 | COM | | | |
| 0680 | REF | 3 | LAST 1053 | 15,3361 | 6 3773 1 | AD | BUFLIM | | |
| 0681 | REF | 4 | LAST 1053 | 15,3362 | 6 3773 1 | AD | BUFLIM | | |
| 0682 | | | | 15,3363 | 0 0006 1 | EXTEND | | | |
| 0683 | REF | 1 | | 15,3364 | 6 3403 0 | BZ= | DZ1 | POINT (X,V) IN RHP. | |
| R0684 | IS POINT WITHIN VELOCITY DZ W | | | | | | | | |
| 0685 | REF | 1 | | 15,3365 | 4 3766 1 | CS | VSQMIN | IS VSO/4API - (VSO/4API) MIN NEG W | |
| 0686 | REF | 3 | LAST 1053 | 15,3366 | 6 1616 1 | AD | VSO/4API | | |
| 0687 | | | | 15,3367 | 0 0006 1 | EXTEND | | | |
| 0688 | REF | 1 | | 15,3370 | 6 3676 0 | BZ= | DZCALL | YES. | |
| R0689 | POINT IS IN BUFFER ZONE. THRUST TO X AXIS. | | | | | | | | |
| 0690 | REF | 3 | LAST 1051 | 15,3371 | 4 1617 1 | CS | JNDX | | |
| 0691 | REF | 2 | LAST 111 | 15,3372 | 55=620 0 | TS | JNDX1 | | |
| 0692 | REF | 1 | | 15,3373 | 0 3456 0 | TC | OVLIN1 | | |
| 0699 | REF | 9 | LAST 1053 | 15,3374 | 4 1613 0 | REFLECT | CS | -VT/180 | |
| 0700 | REF | 10 | LAST 1053 | 15,3375 | 55=613 0 | TS | -VT/180 | REFLECT LHP INTO RHP REL. TO TERM CONTR | |
| 0701 | REF | 17 | LAST 1053 | 15,3376 | 54 021 0 | TS | SR | -VT/360 SAVED FOR DZ. | |



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| | | | | | | | | | |
|------|-----|----|-----------|---------|--------|------|---|----|---------|
| 0702 | REP | 14 | LAST 1053 | 15,3377 | 4 | 1614 | 1 | CS | LCX/360 |
| 0703 | REP | 15 | LAST 1054 | 15,3400 | 55=614 | 1 | | TS | LCX/360 |
| 0704 | REP | 4 | LAST 1053 | 15,3401 | 4 | 1617 | 1 | CS | JNDX |
| 0705 | REP | 5 | LAST 1054 | 15,3402 | 55=617 | 1 | | TS | JNDX |

R0706 IS VSO/4API - (VSO/4API) MIN NEG S

| | | | | | | | | | | |
|------|-----|---|-----------|---------|---|------|---|-----|--------|----------|
| 0707 | REP | 2 | LAST 1053 | 15,3403 | 4 | 3766 | 1 | DZ1 | CS | VSQMIN |
| 0708 | REP | 4 | LAST 1053 | 15,3404 | 6 | 1616 | 1 | | AD | VSO/4API |
| 0709 | | | | 15,3405 | 0 | 0006 | 1 | | EXTEND | |
| 0710 | REP | 1 | | 15,3406 | 6 | 3410 | 1 | | BZMP | DZ2 |
| 0711 | REP | 1 | | 15,3407 | 1 | 3415 | 0 | | TOP | MAXVTEST |

IS VSO/4API - (VSO/4API) MIN NEG S

YES, GO TEST FURTHER.
NO

R0712 IS X/360 - XMIN/360 -VT/360 NEG S

| | | | | | | | | | | |
|------|-----|----|-----------|---------|---|------|---|-----|--------|----------|
| 0713 | REP | 1 | | 15,3410 | 4 | 3771 | 1 | DZ2 | CS | XMIN/360 |
| 0714 | REP | 16 | LAST 1054 | 15,3411 | 6 | 1614 | 0 | | AD | LCX/360 |
| 0715 | REP | 16 | LAST 1053 | 15,3412 | 6 | 0021 | 1 | | AD | SR |
| 0716 | | | | 15,3413 | 0 | 0006 | 1 | | EXTEND | |
| 0717 | REP | 2 | LAST 1053 | 15,3414 | 6 | 3676 | 0 | | BZMP | DZCALL |

XMIN/360 = 4/360

C(SR) = -VT/360
IS X/360 - XMIN/360 -VT/360 NEG S
YES, IN DZ. EXIT SETTING JETAG=0.

R0718 IS XD/360 - VM/360K - XS/360 POS V

| | | | | | | | | | | |
|-------|-----|----|-----------|---------|--------|------|---|----------|--------|----------|
| 0719 | REP | 6 | LAST 1054 | 15,3415 | 4 | 1617 | 1 | MAXVTEST | CS | JNDX |
| 0720 | REP | 3 | LAST 1053 | 15,3416 | 55=620 | 0 | | | TS | JNDX1 |
| 0721 | REP | 1 | | 15,3417 | 4 | 3773 | 0 | | CS | XS/360 |
| 0722 | REP | 5 | LAST 1054 | 15,3420 | 6 | 1616 | 1 | | AD | VSO/4API |
| 0723 | REP | 17 | LAST 1054 | 15,3421 | 6 | 1614 | 0 | | AD | LCX/360 |
| 0724 | REP | 2 | LAST 110 | 15,3422 | 55=615 | 0 | | | TS | XD/360 |
| A0725 | | | | | | | | | | |
| 0726 | REP | 1 | | 15,3423 | 6 | 3772 | 0 | | AD | -VM/360K |
| 0727 | | | | 15,3424 | 4 | 0000 | 0 | | COM | |
| 0728 | | | | 15,3425 | 0 | 0006 | 1 | | EXTEND | |
| 0729 | REP | 1 | | 15,3426 | 6 | 3434 | 1 | | BZMP | MAXVTIM1 |
| 0730 | REP | 3 | LAST 1054 | 15,3427 | 3 | 1615 | 1 | | CA | XD/360 |
| 0731 | | | | 15,3430 | 0 | 0006 | 1 | | EXTEND | |
| 0732 | REP | 1 | | 15,3431 | 7 | 4675 | 0 | | MP | KTRCS |
| 0733 | | | | 15,3432 | 20 | 001 | 1 | | DDOUBL | |

NOW CAN SET JNDX1 FOR TON2 JETS.
XS/360 = (XMIN - YMIN/K) / 360

XD/360 = X/360 + VSO/4API X INTERCEPT
BUT C(XD/360) = (XD - XS) / 360
X INTERCEPT FOR MAX V (VM)

YES, THRUST TO VM

GO SAVE PREDICTED DRIFTING VELOCITY.

INSURE THAT 0 IS POS AS TAG.

SET +0 AS TAG

VDT/180 OR VMT/180.

| | | | | | | | | | | |
|------|-----|----|-----------|---------|--------|------|---|----------|---------|----------|
| 0734 | REP | 1 | | 15,3433 | 0 | 3437 | 1 | | TC | GETON1 |
| 0735 | | | | 15,3434 | 0 | 0006 | 1 | MAXVTIM1 | EXTEND | |
| 0736 | | | | 15,3435 | 22 | 007 | 0 | | Z0 | |
| 0737 | REP | 1 | | 15,3436 | 4 | 3772 | 1 | | CS | -VMT/180 |
| 0738 | REP | 1 | | 15,3437 | 55=567 | 0 | | GETON1 | TS | VDT/180 |
| 0739 | REP | 11 | LAST 1053 | 15,3440 | 6 | 1613 | 1 | | AD | -VT/180 |
| 0740 | | | | 15,3441 | 6 | 0000 | 1 | | DDOUBLE | |
| 0741 | | | | 15,3442 | 0 | 0006 | 1 | | EXTEND | |
| 0742 | REP | 2 | LAST 1053 | 15,3443 | 7 | 3767 | 0 | | MP | 180/BATT |
| 0743 | REP | 2 | LAST 111 | 15,3444 | 55=621 | 1 | | | TS | TON1 |

TON1 / 4T

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| | | | | | | | |
|-------|---------|-----------|---------|----------|----------|-------------|-----------------------------------|
| 0744 | | | 15,3445 | 0 0006 1 | EXTEND | | |
| 0745 | REP 1 | | 15,3446 | 6 3450 0 | BZMP | OVRLINE | |
| 0746 | REP 1 | | 15,3447 | 0 3462 1 | TC | GETON2 | RESET O POS IF CAME FROM MAXVTIM1 |
| 0747 | REP 209 | LAST 1046 | 15,3456 | 10 002 1 | OVRLINE | CCS | Q |
| 0748 | REP 2 | LAST 1053 | 15,3451 | 1 3456 1 | TCF | OVRLINE1 | |
| 0749 | REP 4 | LAST 1054 | 15,3452 | 3 1620 1 | MAXVTIM2 | CA | JNDX1 |
| 0750 | REP 7 | LAST 1054 | 15,3453 | 55=617 1 | TS | JNDX | ABOVE VM, SO THRUST DOWN |
| 0751 | REP 3 | LAST 1054 | 15,3454 | 4 1621 1 | CS | TON1 | |
| 0752 | REP 1 | | 15,3455 | 1 3461 0 | TCF | OVRLINE2 +1 | |
| 0753 | REP 12 | LAST 1054 | 15,3456 | 4 1613 0 | OVRLINE1 | CS | -VT/180 |
| 0754 | REP 2 | LAST 1054 | 15,3457 | 55=567 0 | TS | VDT/180 | |
| 0755 | REP 200 | LAST 1048 | 15,3460 | 3 4714 1 | OVRLINE2 | CA | ZERO |
| 0756 | REP 4 | LAST 1055 | 15,3461 | 55=621 1 | TS | TON1 | |
| 0757 | REP 3 | LAST 1055 | 15,3462 | 3 1567 1 | GETON2 | CA | VDT/180 |
| 0758 | | | 15,3463 | 6 0000 1 | DOUBLE | | |
| 0759 | | | 15,3464 | 0 0006 1 | EXTEND | | |
| 0760 | REP 3 | LAST 1054 | 15,3465 | 7 3767 0 | MP | 180/9ATT | |
| 0761 | | | 15,3466 | 6 0000 1 | DOUBLE | | FOR SECOND BURN, A1 |
| 0762 | REP 2 | LAST 110 | 15,3467 | 55=607 0 | TS | TON2 | = TON2 / 4T |
| 0763 | | | 15,3470 | 4 0000 0 | COM | | |
| 0764 | | | 15,3471 | 0 0006 1 | EXTEND | | |
| 0765 | REP 1 | | 15,3472 | 6 3476 1 | BZMP | GETOFF | |
| 0766 | REP 3 | LAST 1055 | 15,3473 | 55=607 0 | TS | TON2 | |
| 07661 | REP 8 | LAST 1055 | 15,3474 | 3 1617 0 | CA | JNDX | |
| 07662 | REP 5 | LAST 1055 | 15,3475 | 55=620 0 | TS | JNDX1 | |
| 0767 | REP 4 | LAST 1055 | 15,3476 | 4 1607 0 | GETOFF | CS | TON2 |
| 0768 | | | 15,3477 | 0 0006 1 | EXTEND | | |
| 0769 | REP 4 | LAST 1055 | 15,3500 | 7 1567 0 | MP | VDT/180 | VDT/180, OR VT/180, OR VMT/180. |
| 0770 | REP 4 | LAST 1054 | 15,3501 | 55=615 0 | TS | XD/360 | USE AS TEMP |
| 0771 | REP 5 | LAST 1055 | 15,3502 | 4 1567 0 | CS | VDT/180 | |
| 07711 | | | 15,3503 | 0 0006 1 | EXTEND | | |
| 07712 | REP 1 | | 15,3504 | 1 3520 1 | BZP | TOPFOVPL | OMIT THE DIVIDE IF DEN = 0. |
| 0772 | REP 13 | LAST 1055 | 15,3505 | 6 1613 1 | AD | -VT/180 | |
| 0773 | | | 15,3506 | 0 0006 1 | EXTEND | | |
| 0774 | REP 5 | LAST 1055 | 15,3507 | 7 1621 1 | MP | TON1 | TON1 / 4T |
| 0775 | REP 5 | LAST 1055 | 15,3510 | 6 1615 1 | AD | XD/360 | TEMP = -VDT/180 / 2 TON2 |
| 0776 | REP 18 | LAST 1054 | 15,3511 | 6 1614 0 | AD | LDX/360 | |
| 0777 | | | 15,3512 | 22 007 0 | ZL | | |
| 0778 | REP 148 | LAST 1053 | 15,3513 | 56 001 0 | XCH | L | TEST THE DIVIDE |
| 0779 | | | 15,3514 | 0 0006 1 | EXTEND | | |
| 0780 | REP 6 | LAST 1055 | 15,3515 | 11=567 0 | DV | VDT/180 | |
| 0781 | | | 15,3516 | 0 0006 1 | EXTEND | | |
| 0782 | REP 1 | | 15,3517 | 1 3522 0 | BZP | GETOFF2 | DIVIDE OK |
| 0787 | REP 1 | | 15,3520 | 3 4740 0 | TOPFOVPL | CA | 2JETT |
| 0788 | REP 1 | | 15,3521 | 1 3527 0 | TCF | TIMSCAL | OVL, USE 2T FOR CONVENIENCE. |



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| | | | | | | | | |
|-------|---------|-----------|---------|----------|---------------------|--------|---------|--|
| 0796 | REP 149 | LAST 1055 | 15,3522 | 56 001 0 | GETOFF ₂ | XCH | L | GET NUMERATOR. |
| 0797 | | | 15,3523 | 0 0006 1 | | EXTEND | | |
| 0798 | REP 7 | LAST 1055 | 15,3524 | 11=567 0 | | DV | VDT/180 | C(A) = TOFF / 2T |
| 0799 | | | 15,3525 | 0 0006 1 | | EXTEND | | |
| 0800 | REP 2 | LAST 1055 | 15,3526 | 7 4740 1 | | MP | 2JETT | |
| 0801 | REP 2 | LAST 110 | 15,3527 | 55=605 1 | TIMSCAL | TS | TOFF | IN CS |
| 0802 | REP 1 | | 15,3530 | 3 3770 1 | | CAP | 4JETT | |
| 0803 | | | 15,3531 | 0 0006 1 | | EXTEND | | |
| 0804 | REP 6 | LAST 1055 | 15,3532 | 7 1621 1 | | MP | TON1 | C(TON1) = TON1 / 4T |
| 0805 | REP 7 | LAST 1056 | 15,3533 | 55=621 1 | | TS | TON1 | IN CS |
| 0806 | REP 2 | LAST 1056 | 15,3534 | 3 3770 1 | | CAP | 4JETT | |
| 0807 | | | 15,3535 | 0 0006 1 | | EXTEND | | |
| 0808 | REP 5 | LAST 1055 | 15,3536 | 7 1607 0 | | MP | TON2 | C(TON2) = TON2 / 4T |
| 0809 | REP 6 | LAST 1056 | 15,3537 | 55=607 0 | | TS | TON2 | IN CS |
| 0810 | REP 201 | LAST 1055 | 15,3540 | 3 4714 1 | | CA | ZERO | CANNOT REDO AFTER TIMETST. TUSED GONE |
| 0811 | REP 9 | LAST 1051 | 15,3541 | 55=711 0 | | TS | JETAG | SET +0 TO SHOW ROLL DAP CALLED. |
| A0812 | | | | | | | | CAUSE THE TM OF BODY RATES VIA UPRUFF TO BE |
| A0813 | | | | | | | | INITIALIZED. ALSO CAUSE NEEDLES TO BE DONE ON NEXT |
| A0814 | | | | | | | | AND ON ALTERNATE PASSES THROUGH CM/DUMPR. |
| 0815 | REP 125 | LAST 1052 | 15,3542 | 3 4712 1 | | CA | ONE | |
| 0816 | REP 2 | LAST 1039 | 15,3543 | 54 305 0 | | TS | SW/NDX | |

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00817 TIMETST SECTION FOR RCS
 00818 ENTER WITH THREE TIME INTERVALS AND THE CORRESPONDING JET CODE INDEXES IN ERASEABLE LOCs TON1, TOPP, TON2, JNDX
 00820 JNDX1. SECTION PROCESSES TIME INTERVALS FOR WILST CALLS AND ASSURES THAT WILST CALLS ARE MADE ONLY
 00822 (1) FOR POS INTERVALS GREATER THAN A SPECIFIED MINIMUM (HERE CHOSEN AS 2 CS) AND
 00824 (2) FOR THE INTERVALS THAT WILL BE EXECUTED WITHIN THE TIME REMAINING IN THE SAMPLE INTERVAL T (2 SEC).
 00826 TIMETST ESTABLISHES 6 LOCs CONTAINING JET CODES AND CORRESPONDING TIME INTERVALS. THUS' TON1, T1BITS,
 00828 TOPP, T2BITS, TON2, T2BITS. OF THESE THE FIRST 2 LOCs ARE TEMPORARY, FOR IMMEDIATE ACTION, IN GENERAL.
 00830 SECTION JETCALL BELOW PROCESSES THIS LIST.

| | | | | | | | | | | |
|-------|-----|-----|------|------|---------|----------|----------|----------|-------|------------------------------------|
| 00831 | REP | 16 | LAST | 1051 | 15,3544 | 3 0025 0 | TIMETST | CA | TIME1 | CORRECT FOR POSSIBLE TIME1 OVFL. |
| 00832 | REP | 6 | LAST | 1052 | 15,3545 | 6 4675 1 | AD | POS1/2 | | |
| 00833 | REP | 7 | LAST | 1057 | 15,3546 | 6 4675 1 | AD | POS1/2 | | OVFL GUARANTEED. |
| 00834 | REP | 3 | LAST | 1051 | 15,3547 | 27=712 0 | ADS | TUSED | | B(TUSED) =-TUSED =-OLTIME1 |
| 00835 | REP | 1 | | | 15,3550 | 3 3765 0 | CA | -T-3 | | =-T +2 -5 (SEE SETJTAC) |
| 00836 | REP | 4 | LAST | 1057 | 15,3551 | 27=712 0 | ADS | TUSED | | THE +2 REQUIRED FOR PROPER BRANCH. |
| 00837 | REP | 4 | LAST | 1057 | 15,3551 | 27=712 0 | ADS | TUSED | | TUSED = TIME(K)-TIME(K-1)-T+2 |
| 00838 | REP | 48 | LAST | 1014 | 15,3552 | 4 4711 0 | CS | TWO | | USE 2 SINCE TIME3 UNCERTAIN TO 1 |
| 00839 | REP | 8 | LAST | 1056 | 15,3553 | 6 1621 0 | AD | TON1 | | |
| 00840 | REP | 1 | | | 15,3554 | 0 0006 1 | EXTEND | | | |
| 00841 | REP | 1 | | | 15,3555 | 6 3567 0 | BZMP | TIMETST1 | | |
| 00842 | REP | 9 | LAST | 1055 | 15,3556 | 51=617 0 | INDEX | JNDX | | |
| 00843 | REP | 3 | LAST | 1049 | 15,3557 | 3 3225 1 | CAP | P/RJCODE | | |
| 00844 | REP | 2 | LAST | 111 | 15,3560 | 55=622 1 | TS | T1BITS | | |
| 00845 | REP | 9 | LAST | 1057 | 15,3561 | 3 1621 0 | CA | TON1 | | |
| 00846 | REP | 5 | LAST | 1057 | 15,3562 | 27=712 0 | ADS | TUSED | | |
| 00847 | REP | 1 | | | 15,3563 | 0 0006 1 | EXTEND | | | |
| 00848 | REP | 1 | | | 15,3564 | 6 3571 1 | BZMP | TOPPTEST | | |
| 00849 | REP | 202 | LAST | 1056 | 15,3565 | 3 4714 1 | CA | ZERO | | |
| 00850 | REP | 1 | | | 15,3566 | 1 3622 0 | TOP | TIMETST3 | | |
| 00851 | REP | 126 | LAST | 1056 | 15,3567 | 4 4712 0 | TIMETST1 | CS | ONE | |
| 00852 | REP | 10 | LAST | 1057 | 15,3570 | 55=621 1 | TS | TON1 | | |
| 00853 | REP | 49 | LAST | 1057 | 15,3571 | 4 4711 0 | TOPPTEST | CS | TWO | |
| 00854 | REP | 3 | LAST | 1056 | 15,3572 | 6 1605 0 | AD | TOPP | | |
| 00855 | REP | 1 | | | 15,3573 | 0 0006 1 | EXTEND | | | |
| 00856 | REP | 1 | | | 15,3574 | 6 3603 1 | BZMP | TIMETST2 | | |
| 00857 | REP | 4 | LAST | 1057 | 15,3575 | 3 1605 0 | CA | TOPP | | |
| 00858 | REP | 6 | LAST | 1057 | 15,3576 | 27=712 0 | ADS | TUSED | | |
| 00859 | REP | 1 | | | 15,3577 | 0 0006 1 | EXTEND | | | |
| 00860 | REP | 1 | | | 15,3600 | 6 3605 1 | BZMP | TON2TEST | | |
| 00861 | REP | 203 | LAST | 1057 | 15,3601 | 3 4714 1 | CA | ZERO | | |
| 00862 | REP | 1 | | | 15,3602 | 1 3624 0 | TOP | TIMETST4 | | |
| 00863 | REP | 127 | LAST | 1057 | 15,3603 | 4 4712 0 | TIMETST2 | CS | ONE | |
| 00864 | REP | 5 | LAST | 1057 | 15,3604 | 55=605 1 | TS | TOPP | | |
| 00865 | REP | 50 | LAST | 1057 | 15,3605 | 4 4711 0 | TON2TEST | CS | TWO | |
| 00866 | REP | 7 | LAST | 1056 | 15,3606 | 6 1607 1 | AD | TON2 | | |
| 00867 | REP | 1 | | | 15,3607 | 0 0006 1 | EXTEND | | | |
| 00868 | REP | 1 | | | 15,3610 | 6 3625 0 | BZMP | TIMETST5 | | |

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| | | | | | | | |
|------|-----|-----|-----------|---------|----------|----------|-------------|
| 0868 | REP | 8 | LAST 1055 | 15,3611 | 51-620 1 | INDEX | JNDX1 |
| 0870 | REP | 4 | LAST 1057 | 15,3612 | 3 3225 1 | CAP | P/RJCODE |
| 0871 | REP | 2 | LAST 110 | 15,3613 | 55-610 0 | TS | T2BITS |
| 0872 | REP | 8 | LAST 1057 | 15,3614 | 3 1607 1 | CA | TON2 |
| 0873 | REP | 7 | LAST 1057 | 15,3615 | 27-712 0 | ADS | TUSED |
| 0874 | | | | 15,3616 | 0 9006 1 | EXTEND | |
| 0875 | REP | 1 | | 15,3617 | 6 3627 1 | BZMP | JETCALL1 |
| 0876 | REP | 204 | LAST 1057 | 15,3620 | 3 4714 1 | CA | ZERO |
| 0877 | REP | 2 | LAST 1057 | 15,3621 | 1 3626 1 | TCF | TIMETST5 +1 |
| 0878 | REP | 11 | LAST 1057 | 15,3622 | 55-621 1 | TIMETST3 | TS |
| 0879 | REP | 128 | LAST 1057 | 15,3623 | 4 4712 0 | CS | ONE |
| 0880 | REP | 6 | LAST 1057 | 15,3624 | 55-605 1 | TIMETST4 | TS |
| 0881 | REP | 129 | LAST 1058 | 15,3625 | 4 4712 0 | TIMETST5 | CS |
| 0882 | REP | 9 | LAST 1058 | 15,3626 | 55-607 0 | TS | TON2 |

0883 SECTION JETCALL EXAMINES CONTENTS OF JET TIMES IN LIST, ESTABLISHES WILST ENTRIES, AND EXECUTES CORRESPONDING
 0885 JET CODES. A POSITIVE NZ NUMBER IN A TIME REGISTER INDICATES THAT A WILST CALL IS TO BE MADE, AND ITS JET BITS
 0887 EXECUTED. A +0 INDICATES THAT THE TIME INTERVAL DOES NOT APPLY, BUT THE CORRESPONDING JET BITS ARE TO BE
 0889 EXECUTED. A NEG NUMBER INDICATES THAT THE TIME INTERVAL HAS BEEN PROCESSED. IN EVENT OF +0 OR -1, THE
 0891 SUBSEQUENT TIME REGISTER IS EXAMINED FOR POSSIBLE ACTION. THUS JET BITS TO BE EXECUTED MAY COME FROM MORE
 0893 THAN ONE REGISTER.

| | | | | | | | | | |
|------|-----|-----|-----------|---------|----------|----------|----------|----------|--|
| 0894 | REP | 205 | LAST 1058 | 15,3627 | 3 4714 1 | JETCALL1 | CA | ZERO | |
| 0895 | REP | 2 | LAST 110 | 15,3630 | 55-611 1 | TS | | OUTTAG | |
| 0896 | REP | 2 | LAST 110 | 15,3631 | 55-612 1 | TS | | MUJET | |
| 0897 | REP | 2 | LAST 110 | 15,3632 | 55-606 1 | TS | | TBITS | |
| 0898 | REP | 12 | LAST 1058 | 15,3633 | 53-622 1 | DXCH | | TON1 | |
| 0899 | REP | 259 | LAST 1052 | 15,3634 | 10 000 0 | CCS | | A | |
| 0900 | REP | 1 | | 15,3635 | 1 3652 1 | TCF | JETCALL2 | | CALL WILST |
| 0901 | REP | 3 | LAST 1058 | 15,3636 | 23-612 0 | JETCALL3 | LXCH | MUJET | WILST ENTRIES COME HERE FROM JETCALL |
| 0902 | REP | 130 | LAST 1058 | 15,3637 | 4 4712 0 | CS | | ONE | |
| 0903 | REP | 7 | LAST 1058 | 15,3640 | 53-606 1 | DXCH | | TOFF | |
| 0904 | REP | 280 | LAST 1058 | 15,3641 | 10 000 0 | CCS | | A | |
| 0905 | REP | 2 | LAST 1058 | 15,3642 | 1 3652 1 | TCF | JETCALL2 | | CALL WILST |
| 0906 | REP | 4 | LAST 1058 | 15,3643 | 23-612 0 | LXCH | | MUJET | |
| 0907 | REP | 131 | LAST 1058 | 15,3644 | 4 4712 0 | CS | | ONE | |
| 0908 | REP | 10 | LAST 1058 | 15,3645 | 53-610 0 | DXCH | | TON2 | |
| 0909 | REP | 281 | LAST 1058 | 15,3646 | 10 000 0 | CCS | | A | |
| 0910 | REP | 3 | LAST 1058 | 15,3647 | 1 3652 1 | TCF | JETCALL2 | | CALL WILST |
| 0911 | REP | 5 | LAST 1058 | 15,3650 | 23-612 0 | LXCH | | MUJET | |
| 0912 | REP | 1 | | 15,3651 | 0 3661 0 | TC | JETACTN | | C(A) = +0 |
| 0913 | REP | 150 | LAST 1058 | 15,3652 | 56 001 0 | JETCALL2 | XCH | L | SAVE JET BITS FOR AFTER WILST CALL |
| 0914 | REP | 6 | LAST 1058 | 15,3653 | 27-612 1 | ADS | | MUJET | |
| 0915 | REP | 151 | LAST 1058 | 15,3654 | 56 001 0 | XCH | | L | |
| 0916 | REP | 132 | LAST 1058 | 15,3655 | 6 4712 1 | AD | | ONE | RESTORE FOR CCS |
| 0917 | REP | 49 | LAST 1048 | 15,3656 | 0 5140 1 | TC | | WAITLIST | |
| 0918 | REP | 40 | LAST 1048 | 16,1661 | | BRANK= | AGC | | |
| 0919 | REP | 1 | | 15,3657 | 03667 0 | ZCADR | JETCALL | | |
| 0919 | REP | 1 | | 15,3660 | 32066 0 | | | | |
| 0920 | REP | 7 | LAST 1058 | 15,3661 | 3 1612 0 | JETACTN | CA | MUJET | COME HERE WHEN DESIRED JET CODE IS KNOWN |

L CM ENTRY DIGITAL AUTOPILOT

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| | | | | | | | | |
|------|-----|----|-----------|------------------|----------|----------|----------|------------------------------|
| 0921 | | | 15,3662 | 0 0006 1 | EXTEND | | | NO NEED TO SAVE OLD CODES |
| 0922 | REP | 4 | LAST 1049 | 15,3663 01 006 0 | WRITE | ROLLJETS | | SET RCHAN TO NEW BIT CONFIG. |
| 0923 | REP | 3 | LAST 1058 | 15,3664 11=611 1 | CCS | OUTTAG | | |
| 0924 | REP | 55 | LAST 1051 | 15,3665 0 5213 1 | TC | TASKOVER | | |
| 0925 | REP | 2 | LAST 1045 | 15,3666 0 3724 0 | ROLLDUMP | TC | CM/PDAIR | |

A0926

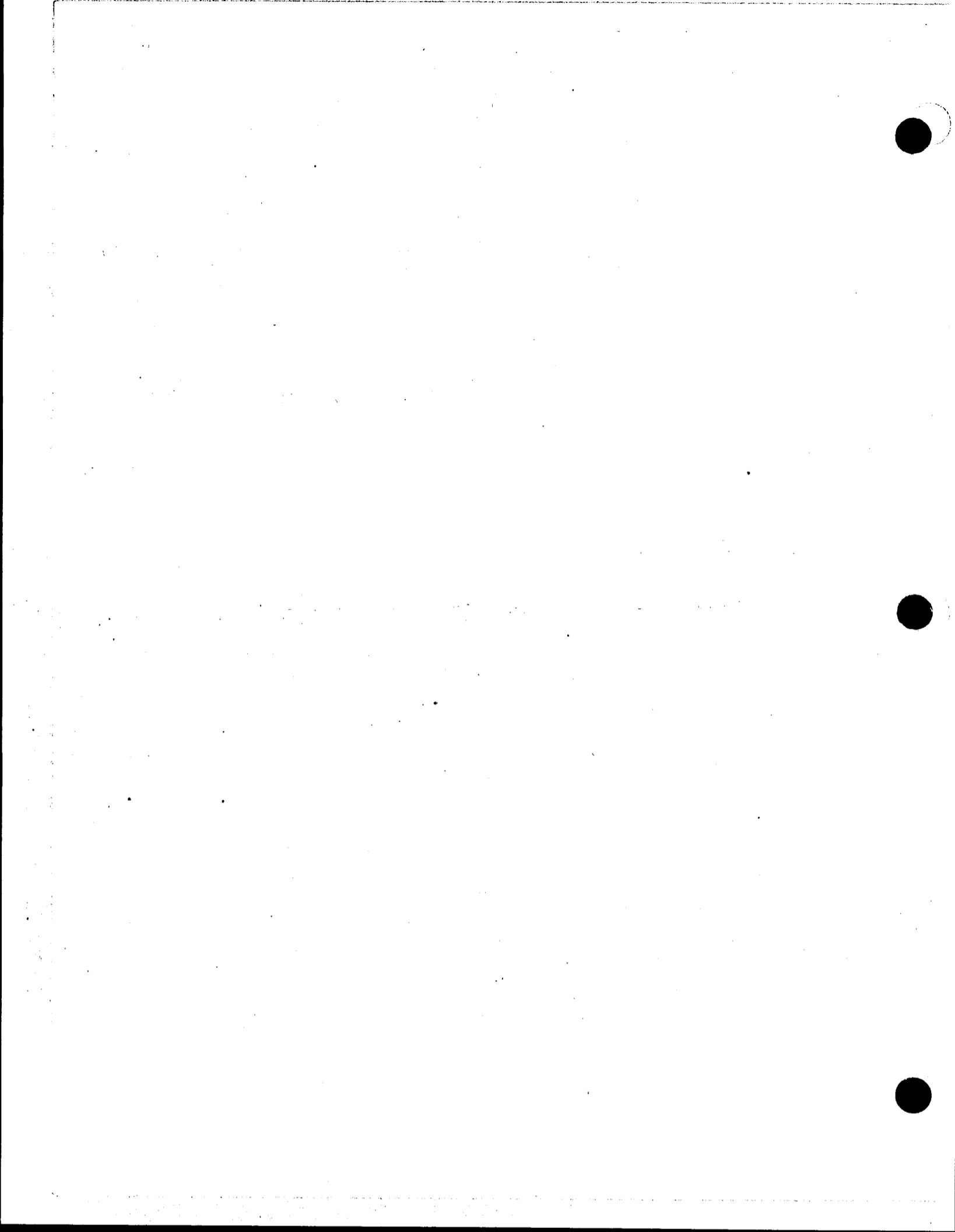
EDIT DUMP AT ABOVE LOCATION.

R0927 WAITLIST ENTRIES COME HERE.

| | | | | | | | | |
|------|-----|----|-----------|------------------|---------|------------|----------|--|
| 0928 | REP | 42 | LAST 982 | 15,3667 3 4711 1 | JETCALL | CAP | BIT2 | CM/DSTBY =103D BIT2 |
| 0929 | REP | 4 | LAST 1059 | 15,3670 55=611 1 | | TS | OUTTAG | SIGNIFY WILST ENTRY |
| 0930 | REP | 23 | LAST 1051 | 15,3671 7 0102 0 | | MASK | CM/FLAGS | IS SYSTEM DISABLED s |
| 0931 | | | | 15,3672 0 0006 1 | EXTEND | | | |
| 0932 | REP | 2 | LAST 1058 | 15,3673 1 3662 1 | RZP | JETACTN +1 | | YES, QUENCH ROLL JETS, IF ON AND EXIT. |
| 0933 | | | | 15,3674 22 007 0 | ZL | | | NO, CONTINUE. |
| 0934 | REP | 1 | | 15,3675 1 3636 0 | TCP | JETCALL3 | | C(A) POS, C(L) =+0 |

R0935 DEAD ZONE ENTRIES COME HERE.

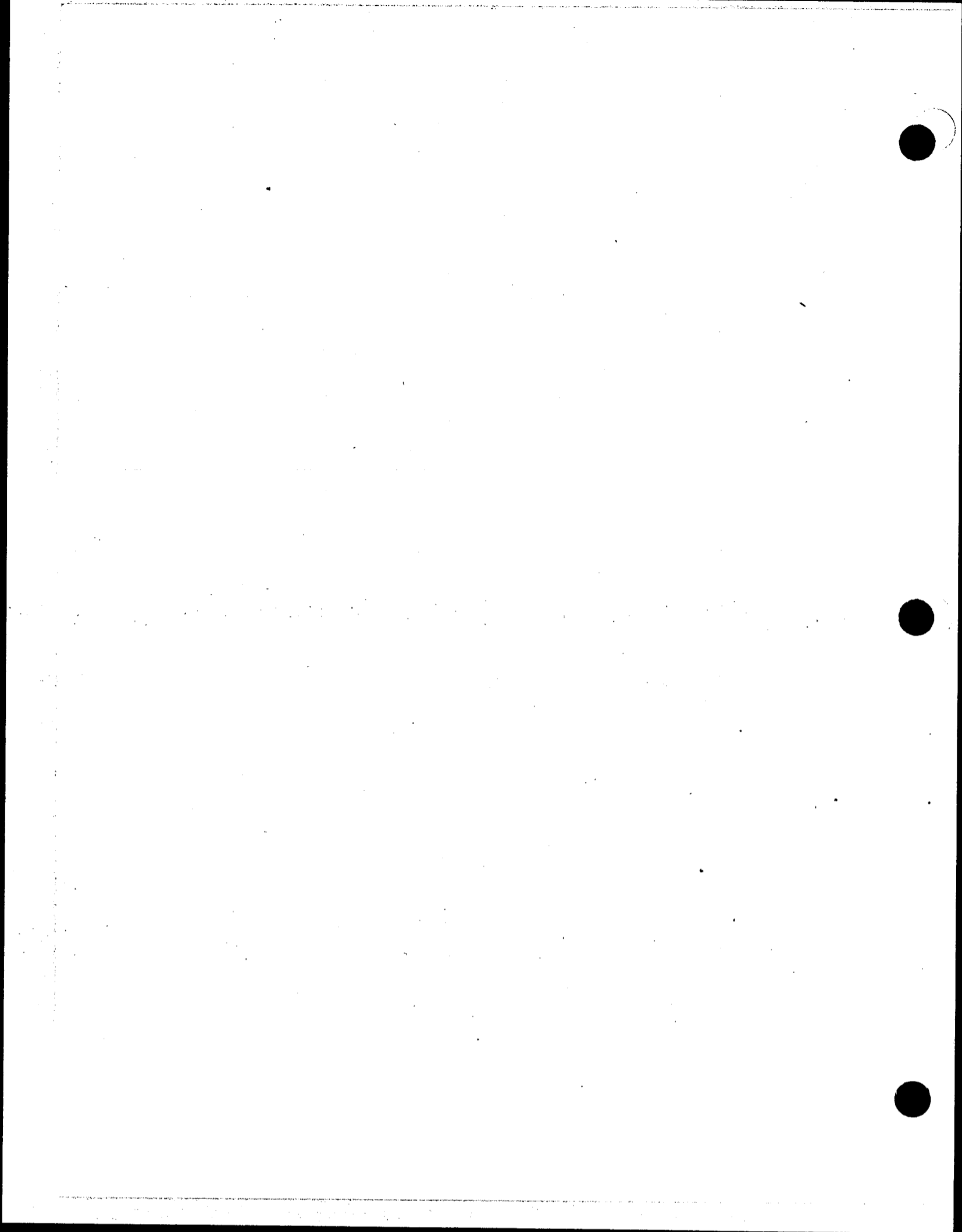
| | | | | | | | | |
|-------|-----|-----|-----------|------------------|--------|------|----------|--|
| 09351 | REP | 11 | LAST 1052 | 15,3676 4 1700 0 | DZCALL | CS | QMDAPMOD | POSSIBLE VALUES OF QMDAPMOD' -1, +0, -0. |
| 09352 | REP | 73 | LAST 1038 | 15,3677 7 4712 0 | | MASK | BIT1 | |
| 09353 | REP | 152 | LAST 1058 | 15,3700 54 001 1 | | TS | L | C(L)=0 FOR -0 |



1059-A

| | | | | | | | | | |
|--------|-----|-----|------|------|---------|----------|--------|----------|--------------------------------------|
| 09354 | REP | 262 | LAST | 1058 | 15,3701 | 50 000 1 | INDEX | A | BRASHE ORDER' ROLLTM,ROLLC,ROLLC +1. |
| 09355 | REP | 4 | LAST | 1045 | 15,3702 | 3 1714 1 | CA | ROLLTM | GET ROLL/180 OR ROLLC (/360). |
| 09356 | REP | 153 | LAST | 1059 | 15,3703 | 50 001 0 | INDEX | L | |
| 09357 | REP | 263 | LAST | 1059 | 15,3104 | 54 000 0 | TS | A | IF C(L)=1, STORE *ROLLC* IN *L*. |
| 08358 | REP | 154 | LAST | 1059 | 15,3705 | 6 0001 0 | AD | L | (BOTH MUST BE SCALED DEG/180) |
| 09359 | REP | 5 | LAST | 1045 | 15,3706 | 0 2542 0 | TC | ANGOVCOR | C(A)=ROLL/180 OR 2 ROLLC |
| 0938 | REP | 4 | LAST | 1049 | 15,3707 | 55*717 0 | TS | ROLLHOLD | IF CMDARMOD =-0, SAVE ROLL ANCHR. |
| A09381 | | | | | | | | | OTHERWISE, SAVE ROLL COMMAND. |
| 09362 | REP | 206 | LAST | 1058 | 15,3710 | 3 4714 1 | CA | ZERO | COME HERE IF IN DZ, AND CANCEL JETS. |
| 0937 | | | | | 15,3711 | 0 0006 1 | EXTEND | | INHINT NOT NEEDED HERE. |
| 0938 | REP | 5 | LAST | 1059 | 15,3712 | 01 008 0 | WRITE | ROLLJETS | TURN OFF ALL ROLL JETS. |
| 0939 | REP | 8 | LAST | 1056 | 15,3713 | 55*567 0 | TS | VDT/180 | SET =0 TO SHOW IN DEAD ZONE. |
| 0040 | REP | 10 | LAST | 1056 | 15,3714 | 55*711 0 | TS | JETAG | COME HERE WITH C(A)=0. |
| 0941 | REP | 1 | | | 15,3115 | 0 3866 1 | TC | ROLLDUMP | |

DZCALL1





P0942 CM ENTRY FDAI DISPLAY

R0943 CALCULATE BY INTEGRATION THE ROLL ERROR BETWEEN THE 2 SEC CM/RCS UPDATES . DISPLAY ATTITUDE ERRORS AS FOLLOWS'
R0945 ATM DAP' DISPLAY ONLY ROLL ATTITUDE ERROR.
R0946 EXT ATM DAP' PRESENT 3 ATTITUDE ERRORS RELATIVE TO THE APPROPRIATE BODY AXES EACH .1 SEC.
R0949 ROLL ROLL-ROLL
R0950 PITCH ALPAC-ALPA
YAW BETAC-BETA

R0951 DURING ENTRY, THE FDAI NEEDLES HAVE FULL SCALE OF 67.5 DEG IN ROLL AND 16.875 DEG IN PITCH AND YAW.
R0953 THE SUBROUTINE NEEDLER EXPECTS (ANGLE/180) AND SCALES TO 16.875 DEG FULL SCALE.

A0958 COME HERE EACH .1 SEC. (CONDAPMOD=+1 COMES BELOW)
0959 RFP 7 LAST 1045 15,3716 4 1705 0 CM/FDAI CS PHIDOT INTEGRATE ROLL ERROR BETWEEN 2SEC UPDATES
0960 15,3717 0 0006 1 EXTEND
0961 RFP 6 LAST 1052 15,3720 7 1506 1 MP CALPA FOR ASSUMED COORDINATION.
0962 15,3721 0 0006 1 EXTEND
0963 RFP 6 LAST 1049 15,3722 7 4675 0 MP HALF
0964 RFP 7 LAST 1052 15,3723 27-713 1 ADS PAXERR1 ROLL ERROR/360. OVFL OK.

A0965 EDIT DUMP AT ABOVE LOCATION.
0966 RFP 7 LAST 1060 15,3724 3 4675 1 CM/FDAIR CA HALF
0967 15,3725 0 0006 1 EXTEND
0968 RFP 8 LAST 1060 15,3726 7 1713 1 MP PAXERR1 FULL SCALE FOR FDAI (ROLL) IS 67.5 D
0969 RFP 1 15,3727 55-476 1 TS PAXERR .25 (ROLL ERROR/180) FOR FDAI NEEDLER.

A0970 PROGRAM TO FILE BODY RATES FOR TM ON ONE PASS AND
A0971 TO UPDATE THE NEEDLE DISPLAY ON THE NEXT.
A0972 SYNCHRONIZATION WITH CM/RCS IS USED SO THAT THE TM
A0973 IS DONE WITH THE ROLL SYSTEM AND NEEDLES START ON
A0974 THE SUBSEQUENT PASS.
A0975

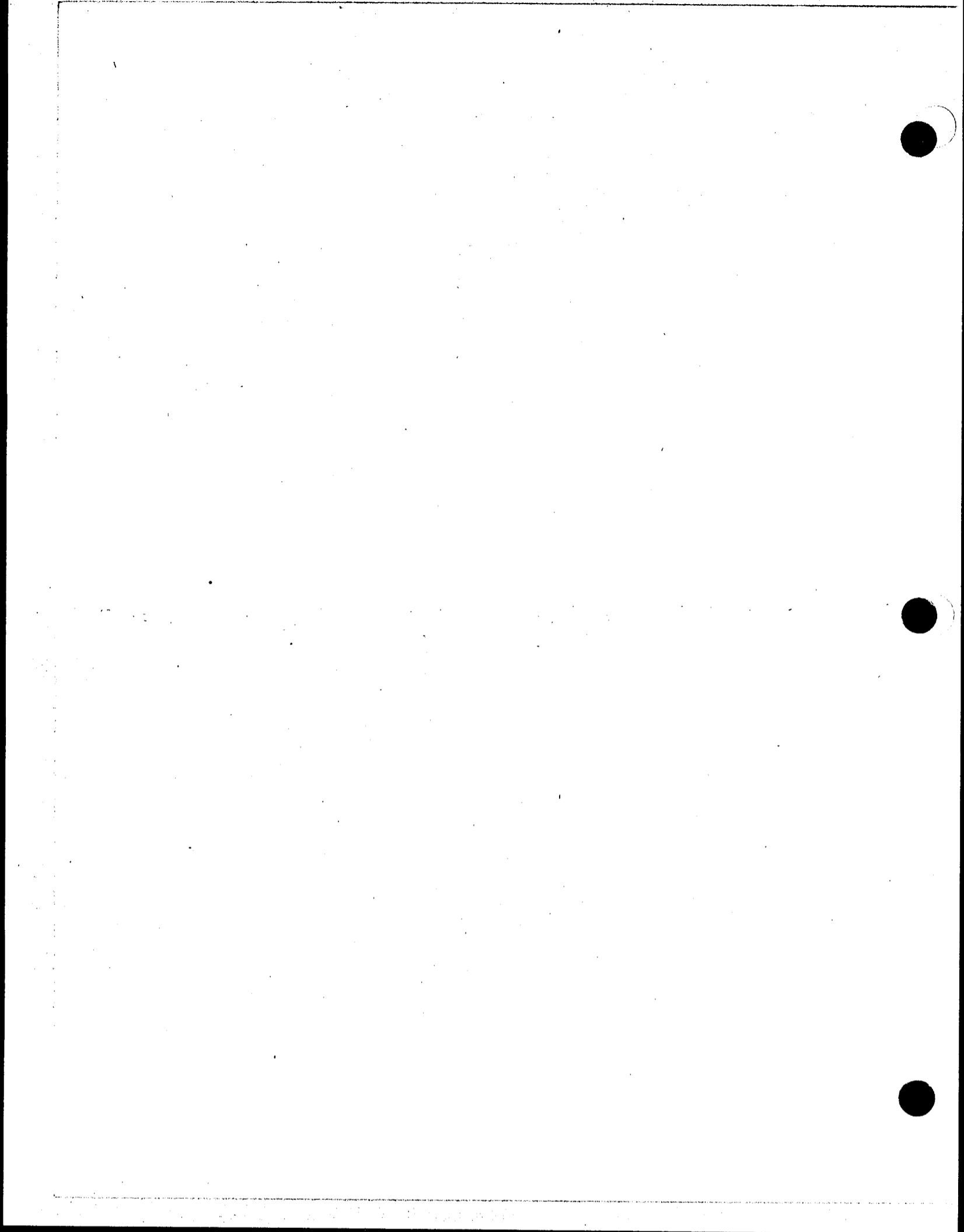
0976 RFP 3 LAST 1056 15,3730 4 0305 0 CM/DUMPR CS SW/NDX COMBINED ALTERNATION SWITCH AND FILE
09761 RFP 4 LAST 1060 15,3731 54 305 0 TS SW/NDX
0977 15,3732 0 0006 1 EXTEND INDEX.
0978 RFP 1 15,3733 6 3737 1 BZMP CM/MPFILE FILE STARTS WITH SW/NDX +1 AND GOES TO
A0979 ENDROP.
A0980 INDEX IS POS FOR NEEDLES

0981 RFP 38 LAST 985 15,3734 0 4633 0 TC TRNKCALL
0982 RFP 9 LAST 983 15,3735 42404 1 CADR NEEDLER

0983 RFP 1 15,3736 0 3755 0 TC CM/END

A0984 INDEX IS NEG FOR TM FILE

0985 RFP 39 LAST 1035 15,3737 6 6214 0 CM/MPFILE AD THREEP
0986 15,3740 0 0006 1 EXTEND
0987 RFP 1 15,3741 6 3745 1 BZMP SAVENDX





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0988 REP 17 LAST 1057 15,3742 3 0025 0
 0989 REP 3 LAST 70 15,3743 54 304 1
 0990 REP 3 LAST 825 15,3744 4 4720 1
 0991 REP 5 LAST 1060 15,3745 54 305 0
 0992 15,3746 0 0006 1
 0993 REP 8 LAST 1051 15,3747 3 1702 0
 0994 REP 6 LAST 1061 15,3750 50 305 1
 0995 REP 2 LAST 70 15,3751 52 324 0
 0996 REP 8 LAST 1048 15,3752 3 1703 1
 0997 REP 7 LAST 1061 15,3753 50 305 1
 0998 REP 3 LAST 1061 15,3754 54 325 1

CA TIME1
 TS CM/TIME
 CS THIRTEEN
 TS SW/NDX
 EXTEND
 DCA PREL
 INDEX SW/NDX
 DXCH ENDBUF -1
 CA RREL
 INDEX SW/NDX
 TS ENDBUF +1

INITIALIZE THE TM LIST IN UPRUFF.
 INITIALIZE COUNTER
 A NEGATIVE NUMBER.

0999 REP 3 LAST 1044 15,3755 3 1623 1
 1000 REP 19 LAST 1054 15,3756 54 021 0

CM/END CA CM/SAVE
 TS SR

DOES NOT PROTECT TRK, SO IN SPSIN/COS

1002 15,3757 0 0006 1
 1003 REP 1 15,3760 3 3764 1
 1004 REP 25 LAST 1043 15,3761 53=313 0
 1005 REP 46 LAST 1033 15,3762 0 5222 0

EXTEND
 DCA TS IDLER2
 DXCH TSLOC
 TC RESUME

1006 REP 26 LAST 1061 1312
 1007 REP 7 LAST 1040 15,3763 03143 1
 1007 15,3764 12062 0

BRANK= TSLOC
 TS IDLER2 2CADR TS IDLOC

A1008
 A1009
 A1010
 A1011
 A1012

DEFINE THE FOLLOWING 17D REGISTERS IN UPRUFF TO BE
 USED TO TELEMETER CM VEHICLE BODY RATE INFORMATION.
 THE INFORMATION IS FILED EACH 0.2 SEC, GIVING 15D
 DATA POINTS EACH 1 SEC. TM LIST IS READ TWICE
 EACH 2 SECONDS.

A1013
 A1014
 A1015
 A1016
 A1017
 A1018

THE SEQUENCE IS:
 SP TIME INITIAL TIME
 SWITCH ALSO INDEX.
 P ROLL RATE
 O PITCH RATE
 R YAW RATE
 ETC.

A1019
 A1020
 A1021

CM/TIME = UPRUFF
 SW/NDX = UPRUFF +1
 ENDBUF = UPRUFF +16D



L ON ENTRY DIGITAL AUTOPILOT

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P10211 SPACER

R1022 CONSTANTS USED IN THE ROLL CONTROL SYSTEM'

R1023 CONSTANTS ARE THE FOLLOWING' A = 9.1 DEG/SECSO, VM = 20 DEG/SEC,
R1025 XMIN = 4 DEG, VMIN = 2 DEG/SEC, K = .25, A1 = 4.55 DEG/SECSO,
R1027 XBLP = 4 DEG

T = 2 SEC, TCDU = .1 SEC,
VI = 1 DEG/SEC, INTERCEPT WITH DZ SIDE

| | | | | | | | |
|--------|-----------------|---------|---------|-----------|-----|---------------|---|
| 1028 | | 15,3765 | 77464 1 | -T-3 | DEC | -203 | CS |
| 1029 | | 15,3766 | 00012 1 | VSCMIN | DEC | .61050061 E-3 | VSO MIN/4 A PI = 4/(4 (9.1) 180) |
| 1030 | REP 3 LAST 265 | 4726 | | 2T/TCDU = | | OCT50 | T/TCDU EXP-14 TCDU = .1 SEC |
| 1031 | | 15,3767 | 23617 0 | 180/8ATT | DEC | .61813187 | 180/(8 (9.1) 4) = (180/ATT) EXP -3 |
| 1032 | REP 2 LAST 1054 | 15,3772 | | -VM/180 = | | -VM/360K | = 20 (2) / 180 |
| 1033 | REP 3 LAST 576 | 4740 | | 2JETT = | | 4SECS | CS 2 (2) 100 INTEGER |
| 1034 | | 15,3770 | 01440 0 | 4JETT | DEC | 600 | CS 4 (2) 100 INTEGER |
| 1035 | | 15,3771 | 00266 0 | XMIN/360 | DEC | 182 | XMIN/360 = 4/ 360 EXP 14 = 182 INTEGER |
| 1036 | | 15,3772 | 70706 1 | -VM/360K | DEC | -.22222222 | = -20/(360 (.25)) |
| 1037 | REP 4 LAST 1055 | 15,3767 | | 1/16A1 = | | 180/8ATT | |
| A10371 | | | | | | | 1/16A1 = 180/(16 A1 TT) |
| A1038 | | | | | | | = 180/(16 4.55 4) |
| 1039 | | 15,3773 | 00133 0 | X5/360 | DEC | 91 | = (XMIN +VI (T-1/K))/360 = 2/360 EXP 14 |
| 1040 | REP 2 LAST 1054 | 15,3773 | | BUPLIM = | | X5/360 | 4/(2 360) |
| 1041 | REP 8 LAST 1060 | 4675 | | KTRCS = | | HALP | KT = (.25) 2 = .5 |

*** END OF DAPCSM .195 ***

L DOWN-TELEMETRY PROGRAM

USER'S PAGE NO. 1 E0 53

R0001 PROGRAM NAME- DOWN TELEMETRY PROGRAM
 R0002 MOD NO.- 0 TO COMPLETELY REWRITE THE DOWN TELEMETRY PROGRAM AND DOWNLINK ERASABLE DUMP PROGRAM FOR THE
 R0004 PURPOSE OF SAVING APPROXIMATELY 150 WORDS OF CORE STORAGE.
 R0006 THIS CHANGE REQUIRES AN ENTIRELY NEW METHOD OF SPECIFYING DOWNLINK LISTS. REFER TO DOWNLINK
 R0008 LISTS LOG SECTION FOR MORE DETAILS. HOWEVER THIS CHANGE WILL NOT AFFECT THE GROUND PROCESSING
 R0010 OF DOWN TELEMETRY DATA.
 R0011 MOD BY- KILROY, SMITH, DEWITT
 R0012 DATE- 02OCT67
 R0013 AUTHORS- KILROY, SMITH, DEWITT, DEWOLF, PAGIN
 R0014 LOG SECTION- DOWN-TELEMETRY PROGRAM
 R0015 FUNCTIONAL DESCRIPTION- THIS ROUTINE IS INITIATED BY TELEMETRY END
 R0016 PULSES FROM THE DOWNLINK TELEMETRY CONVERTER. THIS PULSE OCCURS
 R0017 AT 50 TIMES PER SEC (EVERY 20 MS) THEREFORE DODOWNM IS
 R0018 EXECUTED AT THESE RATES. THIS ROUTINE SELECTS THE APPROPRIATE
 R0019 AGC DATA TO BE TRANSMITTED DOWNLINK AND LOADS IT INTO OUTPUT
 R0020 CHANNELS 34 AND 35. THE INFORMATION IS THEN GATED OUT FROM THE
 R0021 LGC IN SERIAL FASHION.
 R0022 THIS PROGRAM IS CODED FOR A 2 SECOND DOWNLIST. SINCE DOWNRUPTS
 R0023 OCCUR EVERY 20MS AND 2 AGC COMPUTER WORDS CAN BE PLACED IN
 R0024 CHANNELS 34 AND 35 DURING EACH DOWNRUPT THE PROGRAM IS CAPABLE
 R0025 OF SENDING 200 AGC WORDS EVERY 2 SECONDS.
 R0026 CALLING SEQUENCE- NONE
 R0027 PROGRAM IS ENTERED VIA TCP DODOWNM WHICH IS EXECUTED AS A
 R0028 RESULT OF A DOWNRUPT. CONTROL IS RETURNED VIA TCP RESUME WHICH
 R0029 IN EFFECT IS A RESUME.
 R0030 SUBROUTINES CALLED- NONE
 R0031 NORMAL EXIT MODE- TCP RESUME
 R0032 ALARM OR ABORT EXIT MODE- NONE
 R0033 RESTART PROTECTION!
 R0034 ON A FRESH START AND RESTART THE «STARTSR» SUBROUTINE WILL INITIALIZE THE DOWNLIST POINTER (ACTUALLY
 R0036 DNTMOOTO) TO THE BEGINNING OF THE CURRENT DOWNLIST (I.E. CURRENT CONTENTS OF DNLSTADR). THIS HAS THE
 R0038 EFFECT OF IGNORING THE REMAINDER OF THE DOWNLIST WHICH THE DOWN-TELEMETRY PROGRAM WAS WORKING ON WHEN
 R0040 THE RESTART (OR FRESH START) OCCURRED AND RESUME DOWN TELEMETRY FROM THE BEGINNING OF THE CURRENT
 R0042 DOWNLIST.
 R0043 ALSO OF INTEREST IS THE FACT THAT ON A RESTART THE AGC WILL ZERO DOWNLINK CHANNELS 13, 34 AND 35.
 R0047 DOWNLINK LIST SELECTION!
 R0048 THE APPROPRIATE DOWNLINK LISTS ARE SELECTED BY THE FOLLOWING!
 R0049 1. FRESH START
 R0050 2. V37E00E WHERE XX = THE MAJOR MODE BEING SELECTED.
 R0051 3. UPDATE PROGRAM (P27)
 R0052 4. NON-V37 SELECTABLE TYPE PROGRAMS (E.G. AGS INITIALIZATION (SUNDANCE, LIMINARY) AND P61-P62
 R00522 TRANSITION (COLOSSUS) ETC.).
 R00525 DOWNLINK LIST RULES AND LIMITATIONS!
 R00526 READ SECTION(S) WHICH FOLLOW «DEBRIS» WRITEUP.
 R0053 OUTPUT- EVERY 2 SECONDS 100 DOUBLE PRECISION WORDS (I.E. 200 LGC
 R0054 COMPUTER WORDS) ARE TRANSMITTED VIA DOWNLINK.
 R0055 ERASABLE INITIALIZATION REQUIRED- NONE
 R0056 «DNTMOOTO» AND «DNLSTADR» ARE INITIALIZED BY THE FRESH START PROGRAM.
 R0056 DEBRIS (ERASABLE LOCATIONS DESTROYED BY THIS PROGRAM)-
 R0059 LDATALST, DNTMRUFF TO DNTMRUFF +21D, TMINDEX, DNO.



ASSEMBLE REVISION 249 OF AGC PROGRAM COLOSSUS BY NASA 2021111-041

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L DOWN-TELEMETRY PROGRAM

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R0060

L DOWN-TELEMETRY PROGRAM

USBR-8 PAGE NO. 3 50 53

R0065 DOWNTM IS ENTERED EVERY 20 MS BY AN INTERRUPT TRIGGERED BY THE
R0066 RECEIPT OF AN ENDPULSE FROM THE SPACECRAFT TELEMETRY PROGRAMMER.

R0067 NOTES REGARDING DOWNLINK LISTS ASSOCIATED WITH THIS PROGRAM'
R0068 1. DOWNLISTS. - DOWNLISTS MUST BE COMPILED IN THE SAME BANK AS THE
R0069 DOWN-TELEMETRY PROGRAM, THIS IS DONE FOR EASE OF CODING, FASTER
R0070 EXECUTION.
R0075 2. EACH DOWNLINK LIST CONSISTS OF A CONTROL LIST AND A NUMBER OF
R0076 SUBLISTS.
R0077 3. A SUBLIST REFERS TO A SNAPSHOT OR DATA COMMON TO THE SAME OR OTHER
R0078 DOWNLINK LISTS. ANY SUBLIST CONTAINING COMMON DATA NEEDS TO BE
R0079 CODED ONLY ONCE FOR THE APPLICABLE DOWNLINK LISTS.
R0080 4. SNAPSHOT SUBLISTS REFER SPECIFICALLY TO HOMOGENOUS DATA WHICH MUST BE
R0081 SAVED IN A BUFFER DURING ONE DOWNRUPT.
R0082 5. THE 1DNADR FOR THE 1ST WORD OF SNAPSHOT DATA IS FOUND AT THE END
R0083 OF EACH SNAPSHOT SUBLIST, SINCE THE PROGRAM CODING SENDS THIS DP WORD
R0084 IMMEDIATELY AFTER STORING THE OTHERS IN THE SNAPSHOT BUFFER.
R0085 6. ALL LISTS ARE COMBINATIONS OF CODED ERASABLE ADDRESS CONSTANTS
R0086 CREATED FOR THE DOWNLIST PROGRAM.
R0087 A. 1DNADR 1-WORD DOWNLIST ADDRESS.
R0088 SAME AS ECADR, BUT USED WHEN THE WORD ADDRESSED IS THE LEFT
R0089 HALF OF A DOUBLE-PRECISION WORD FOR DOWN TELEMETRY.
R0090 B. 2DNADR - 8DNADR N-WORD DOWNLIST ADDRESS, N = 2 - 8.
R0091 SAME AS 1DNADR, BUT WITH THE 4 UNUSED BITS OF THE ECADR FORMAT
R0092 FILLED IN WITH 0001-0101. USED TO POINT TO A LIST OF N DOUBLE-
R0093 PRECISION WORDS, STORED CONSECUTIVELY, FOR DOWN TELEMETRY.
R0094 C. DNCHAN DOWNLIST CHANNEL ADDRESS.
R0095 SAME AS 1DNADR, BUT WITH PREFIX BITS 0111. USED TO POINT TO
R0096 A PAIR OF CHANNELS FOR DOWN TELEMETRY.
R0097 D. DNPTR DOWN TELEMETRY SUBLIST POINTER.
R0098 SAME AS CAP BUT TAGGED AS A CONSTANT. USED IN CONTROL LIST TO POINT TO A SUBLIST.
R0100 CAUTION--- A DNPTR CANNOT BE USED IN A SUBLIST.
R0101 7. THE WORD ORDER CODE IS SET TO ZERO AT THE BEGINNING OF EACH DOWNLIST (I.E. CONTROL LIST) AND WHEN
R0102 A 1DNADR TIME2= IS DETECTED IN THE CONTROL LIST(ONLY).
R0103 8. IN THE SNAPSHOT SUBLIST ONLY, THE DNADR=S CANNOT POINT TO THE FIRST WORD OF ANY EBANK.
R0104

R0106 DOWNLINK LIST RESTRICTIONS'
R0107 (THE FOLLOWING POINTS MAY BE LISTED ELSEWHERE BUT ARE LISTED HERE SO IT IS CLEAR THAT THESE THINGS CANNOT BE
R0108 DONE)

R0110 1. SNAPSHOT DOWNLIST'
R0111 (A) CANNOT CONTAIN THE FOLLOWING ECADRS(I.E. 1DNADR=S)' 0, 400, 1000, 1400, 2000, 2400, 3000, 3400.
R0112 (B) CAN CONTAIN ONLY 1DNADR=S

R0114 2. ALL DOWNLINKED DATA(EXCEPT CHANNELS) IS PICKED UP BY A 2DCA=SO DOWNLINK LISTS CANNOT CONTAIN THE
R0115 EQUIVALENT OF THE FOLLOWING ECADRS(I.E. 1DNADR=S)' 377, 777, 1377, 1777, 2377, 27777, 3377, 3777.

R0118 (NOTE' THE TERM EQUIVALENT = MEANT THAT THE 1DNADR TO 8DNADR WILL BE PROCESSED LIKE 1 TO 8 ECADRS)

R0120 3. CONTROL LISTS AND SUBLISTS CANNOT HAVE ENTRIES = OCTAL 00000 OR OCTAL 77777



L DOWN-TELEMETRY PROGRAM USER-S PAGE NO. 4 E0 83

- R0122 4. THE "1DNADR TIME2" WHICH WILL CAUSE THE DOWNLINK PROGRAM TO SET THE WORDER CODE TO 3 MUST APPEAR IN THE CONTROL SECTION OF THE DOWNLIST.
- R0124
- R0125 5. "DNCHAN 0" CANNOT BE USED.
- R0126 6. "DNPTR 0" CANNOT BE USED.
- R0127 7. DNPTR CANNOT APPEAR IN A SURLIST.

R0128
R0129 EBANK SETTINGS
R0130 IN THE PROCESS OF SETTING THE EBANK(WHEN PICKING UP DOWNLINK DATA) THE DOWN TELEMETRY PROGRAM PUTS
R0132 "GARBAGE" INTO BITS15-12 OF EBANK. HUGH BLAIR-SMITH WARNS US THAT BITS15-12 OF EBANK MAY BECOME
R0134 SIGNIFICANT SOMEDAY IN THE FUTURE. IF/WHEN THAT HAPPENS, THE PROGRAM SHOULD INSURE(BY MASKING ETC.)
R0136 THAT BITS15-12 OF EBANK ARE ZERO.
R0137 INITIALIZATION REQUIRED- TO INTERRUPT CURRENT LIST AND START A NEW ONE..
R0138 1. ADRES OF DOWNLINK LIST INTO DNLSTADR
R0139 2. NEGONE INTO SURLIST
R0140 3. NEGONE INTO DNECADR

| | | | | | | | | | |
|------|-----|----|------|---------|---------|-------|------|---|-----------------------|
| 0142 | | | | 22,3505 | | | | | BANK 22 |
| 0143 | REP | 2 | LAST | 166 | 05,2000 | | | | SETLOC DOWNTELM |
| 0144 | | | | | 05,3342 | | | | BANK |
| 0145 | REP | 23 | LAST | 175 | 0340 | | | | EBANK= DNTMRUPP |
| 0146 | REP | 1 | | | | | | | COUNT 05/DPROG |
| 0147 | REP | 21 | LAST | 1044 | 05,3342 | 54 | 018 | 1 | DODOWNM TS RANKRUPT |
| 0148 | | | | | 05,3343 | 0 | 0006 | 1 | EXTEND |
| 0149 | REP | 17 | LAST | 1044 | 05,3344 | 22 | 012 | 1 | ORUPT |
| 0150 | REP | 49 | LAST | 1028 | 05,3345 | 3 | 4704 | 0 | CA BIT7 |
| 0151 | | | | | 05,3346 | 0 | 0006 | 1 | EXTEND |
| 0152 | REP | 12 | LAST | 1033 | 05,3347 | 05 | 013 | 0 | WOR CHAN13 |
| 0153 | REP | 3 | LAST | 254 | 05,3350 | 0 | 0335 | 1 | TC DNTMGOTO |
| 0154 | REP | 19 | LAST | 936 | 05,3351 | 3 | 7716 | 0 | DNPHAS1 CA NEGONE |
| 0155 | REP | 1 | | | 05,3352 | 54 | 337 | 1 | TS SURLIST |
| 0156 | REP | 1 | | | 05,3353 | 54 | 336 | 0 | TS DNECADR |
| 0157 | REP | 1 | | | 05,3354 | 3 | 3474 | 0 | CA LDNPHAS2 |
| 0158 | REP | 4 | LAST | 1066 | 05,3355 | 54 | 335 | 0 | TS DNTMGOTO |
| 0159 | REP | 1 | | | 05,3356 | 1 | 3372 | 0 | TCF NEWLIST |
| 0160 | REP | 2 | LAST | 1066 | 05,3357 | 10 | 336 | 0 | DNPHAS2 CCS DNECADR |
| 0161 | REP | 1 | | | 05,3360 | 0 | 3507 | 0 | DODNADR TC FTCH2WD |
| 0162 | REP | 27 | LAST | 786 | 05,3361 | 77753 | | 0 | MINTIME2-1DNADR TIME2 |
| 0163 | | | | | 05,3362 | 1 | 3363 | 0 | TCF +1 |
| 0164 | REP | 2 | LAST | 1066 | 05,3363 | 10 | 337 | 1 | CCS SURLIST |

SAVE 0
SET WORD ORDER CODE TO 1. EXCEPTION- AT
THE BEGINNING OF EACH LIST THE WORD
CODE WILL BE SET BACK TO 0.
GO TO APPROPRIATE PHASE OF PROGRAM

INITIALIZE ALL CONTROL WORDS
WORDS TO MINUS ONE

SET DNTMGOTO =0 ALL SUBSEQUENT DOWNRUPTS
GO TO DNPHAS2

SENDING OF DATA IN PROGRESS
YES - THEN FETCH THE NEXT 2 SP WORDS
NEGATIVE OF TIME2 1DNADR
(BCADR OF 3776 + 74001 = 77777)

IS THE SURLIST IN CONTROL.

L DOWN-TELEMETRY PROGRAM

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| | | | | | | |
|------|-----|-----|---------|----------|----------|----------------|
| 0165 | REP | 1 | 05,3364 | 1 3522 0 | TCP | NEXTINSL |
| 0166 | | | 05,3365 | 74001 0 | DNADRCR | OCT 74001 |
| 0167 | REP | 1 | 05,3366 | 3 0334 0 | CR&LIST | CA CTLIST |
| 0168 | | | 05,3367 | 0 0006 1 | EXTEND | A |
| 0169 | REP | 2 | 05,3370 | 6 3372 1 | BZMP | NEWLIST |
| 0170 | REP | 1 | 05,3371 | 1 3377 0 | TCP | NEXTINCL |
| 0171 | REP | 5 | 05,3372 | 50 332 0 | NEWLIST | INDEX DNLSTCOD |
| 0172 | REP | 1 | 05,3373 | 3 2342 0 | CA | DNTABLE |
| 0173 | REP | 2 | 05,3374 | 54 334 1 | TS | CTLIST |
| 0174 | REP | 6 | 05,3375 | 4 0332 1 | CS | DNLSTCOD |
| 0175 | REP | 1 | 05,3376 | 1 3612 0 | TCP | SENDID +3 |
| 0177 | REP | 3 | 05,3377 | 50 334 0 | NEXTINCL | INDEX CTLIST |
| 0178 | | | 05,3400 | 3 0000 1 | CA | 0 |
| 0179 | REP | 264 | 05,3401 | 10 000 0 | CCS | A |
| 0180 | REP | 4 | 05,3402 | 24 334 0 | INCR | CTLIST |
| 0181 | | | 05,3403 | 1 3407 0 | TCP | +4 |
| 0182 | REP | 5 | 05,3404 | 56 334 0 | XCH | CTLIST |
| 0183 | | | 05,3405 | 4 0000 0 | COM | |
| 0184 | REP | 6 | 05,3406 | 56 334 0 | XCH | CTLIST |
| 0185 | REP | 265 | 05,3407 | 24 000 1 | +4 | INCR A |
| 0186 | REP | 3 | 05,3410 | 54 336 0 | TS | DNECADR |
| 0187 | REP | 1 | 05,3411 | 6 3361 0 | AD | MINTIME2 |
| 0188 | REP | 266 | 05,3412 | 10 000 0 | CCS | A |
| 0189 | REP | 1 | 05,3413 | 1 3417 1 | TCP | SETWO +1 |
| 0190 | | | 05,3414 | 47777 0 | MINB1314 | OCT 47777 |
| 0191 | REP | 2 | 05,3415 | 1 3417 1 | TCP | SETWO +1 |
| 0192 | REP | 1 | 05,3416 | 0 3441 0 | SETWO | TC WOZERO |
| 0193 | REP | 4 | 05,3417 | 3 0336 1 | +1 | CA DNECADR |
| 0194 | REP | 1 | 05,3420 | 6 3414 0 | +2 | AD MINB1314 |
| 0195 | | | 05,3421 | 0 0006 1 | EXTEND | |
| 0196 | REP | 2 | 05,3422 | 6 3507 0 | BZMP | FETCH2WD |
| 0197 | REP | 1 | 05,3423 | 6 7710 0 | AD | MINB12 |
| 0198 | | | 05,3424 | 0 0006 1 | EXTEND | |
| 0199 | REP | 1 | 05,3425 | 6 3445 1 | BZMP | DDNPTR |
| 0200 | | | 05,3426 | 0 0006 1 | DDNCHAN | TC 6 |
| 0201 | REP | 5 | 05,3427 | 50 336 1 | INDEX | DNECADR |
| 0202 | | | 05,3430 | 44=000 1 | INDEX | 0 -4000 |
| 0203 | REP | 155 | 05,3431 | 54 001 1 | TS | L |
| 0204 | | | 05,3432 | 0 0006 1 | TC | 6 |
| 0205 | REP | 6 | 05,3433 | 50 336 1 | INDEX | DNECADR |
| 0206 | | | 05,3434 | 43=777 1 | INDEX | 0 -4001 |
| 0207 | REP | 7 | 05,3435 | 54 336 0 | TS | DNECADR |
| 0208 | REP | 20 | 05,3436 | 3 7716 0 | CA | NEGONE |
| 0209 | REP | 6 | 05,3437 | 56 336 1 | XCH | DNECADR |
| 0210 | REP | 1 | 05,3440 | 1 3535 0 | TCP | DNTMEXIT |
| 0211 | REP | 50 | 05,3441 | 4 4704 1 | WOZERO | CS BIT7 |
| 0212 | | | 05,3442 | 0 0006 1 | EXTEND | |

YES
DNADR COUNT AND ECADR DECREMENTER

IT WILL BE NEGATIVE AT END OF LIST

INITIALIZE CTLIST WITH
STARTING ADDRESS OF NEW LIST

SET POINTER TO PICK UP NEXT CTLIST WORD
ON NEXT ENTRY TO PROG. (A SHOULD NOT =0)
SET CTLIST TO NEGATIVE AND PLACE CODING
UNCOMPLEMENTED DNADR INTO A. (FOR LA)
(ST IN)
(CTLIST)

SAVE DNADR
TEST FOR TIME2 (NEG. OF ECADR)

DON'T SET WORD ORDER CODE
MINUS BIT 13 AND 14 (CAN'T GET HERE)
DON'T SET WORD ORDER CODE
GO SET WORD ORDER CODE TO ZERO.
RELOAD A WITH THE DNADR.
IS THIS A REGULAR DNADR?

YES. (A MUST NEVER BE ZERO)
NO. IS IT A POINTER (DNPTR) OR A
CHANNEL(DNCHAN)
IT'S A POINTER. (A MUST NEVER BE ZERO)

(EXECUTED AS EXTEND) IT'S A CHANNEL

(EXECUTED AS READ)

(EXECUTED AS EXTEND)

(EXECUTED AS READ)

SET DNECADR
TO MINUS
WHILE PRESERVING A.
GO SEND CHANNELS

L DOWN-TELEMETRY PROGRAM

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| | | | | | | | | | |
|-------|--|-----|------|------|---------|----------|----------|----------|--|
| 0213 | REP | 13 | LAST | 1066 | 05,3443 | 03 013 0 | WAND | CHAN13 | SET WORD ORDER CODE TO ZERO |
| 0214 | REP | 210 | LAST | 1055 | 05,3444 | 0 0002 0 | TC | Q | RETURN TO CALLER |
| 0215 | REP | 9 | LAST | 1067 | 05,3445 | 50 336 1 | DDNPNTR | INDEX | DNECADR |
| 0216 | | | | | 05,3446 | 0 0000 1 | | 0 | DNECADR CONTAINS ADRES OF SUBLIST |
| 0217 | REP | 267 | LAST | 1067 | 05,3447 | 10 000 0 | CCS | A | CLEAR AND ADD LIST ENTRY INTO A. |
| 0218 | REP | 10 | LAST | 1068 | 05,3450 | 3 0336 1 | CA | DNECADR | IS THIS A SNAPSHOT SUBLIST |
| 0219 | REP | 1 | | | 05,3451 | 1 3521 0 | TCP | DOSUBLST | NO, IT IS A REGULAR SUBLIST. |
| | | | | | | | | | A MUST NOT BE ZERO. |
| 0220 | REP | 11 | LAST | 1068 | 05,3452 | 56 336 1 | XCH | DNECADR | YES, IT IS A SNAPSHOT SUBLIST. |
| 0221 | REP | 3 | LAST | 1068 | 05,3453 | 54 337 1 | TS | SUBLIST | (DNECADR) INTO SUBLIST |
| 0222 | REP | 207 | LAST | 1059 | 05,3454 | 3 4714 1 | CAP | ZERO | A INTO A |
| 0223 | REP | 2 | LAST | 71 | 05,3455 | 56 336 1 | XCH | TINDEX | (NOTE.. TINDEX = DNECADR) |
| R0224 | THE FOLLOWING CODING (FROM SNAPLOOP TO SNAPEND) IS FOR THE PURPOSE OF TAKING A SNAPSHOT OF 12 DP REGISTERS. | | | | | | | | |
| R0226 | THIS IS DONE BY SAVING 11 DP REGISTERS IN DNTMRUFF AND SENDING THE FIRST DP WORD IMMEDIATELY. | | | | | | | | |
| R0228 | THE SNAPSHOT PROCESSING IS THE MOST TIME CONSUMING AND THEREFORE THE CODING AND LIST STRUCTURE WERE DESIGNED | | | | | | | | |
| R0230 | TO MINIMIZE TIME. THE TIME OPTIMIZATION RESULTS IN RULES UNIQUE TO THE SNAPSHOT PORTION OF THE DOWNLIST. | | | | | | | | |
| R0232 | THESE RULES ARE..... | | | | | | | | |
| R0233 | 1. ONLY 1DNADR'S CAN APPEAR IN THE SNAPSHOT SUBLIST | | | | | | | | |
| R0234 | 2. THE 1DNADR'S CANNOT REFER TO THE FIRST LOCATION IN ANY BANK. | | | | | | | | |
| 0236 | REP | 42 | LAST | 1039 | 05,3456 | 54 003 0 | SNAPLOOP | TS | EBANK |
| 0237 | REP | 3 | LAST | 372 | 05,3457 | 7 4373 0 | MASK | LOW8 | SET EBANK |
| 0238 | | | | | 05,3460 | 0 0006 1 | EXTEND | | ISOLATE RELATIVE ADDRESS |
| 0239 | REP | 268 | LAST | 1068 | 05,3461 | 5 0000 1 | INDEX | A | |
| 0240 | | | | | E3,1401 | | EBANK= | 1401 | |
| 0241 | | | | | 05,3462 | 3 1402 0 | DCA | 1401 | PICK UP 2 SNAPSHOT WORDS. |
| 0242 | REP | 24 | LAST | 1068 | 0340 | | EBANK= | DNTMRUFF | |
| 0243 | REP | 3 | LAST | 1068 | 05,3463 | 50 336 1 | INDEX | TINDEX | |
| 0244 | REP | 25 | LAST | 1068 | 05,3464 | 52 341 0 | DCH | DNTMRUFF | STORE 2 SNAPSHOT WORDS IN BUFFER |
| 0245 | REP | 4 | LAST | 1068 | 05,3465 | 24 336 1 | INCR | TINDEX | SET BUFFER INDEX FOR NEXT 2 WORDS. |
| 0246 | REP | 5 | LAST | 1068 | 05,3466 | 24 336 1 | INCR | TINDEX | |
| 0247 | REP | 4 | LAST | 1068 | 05,3467 | 24 337 0 | SNAPACN | INCR | SUBLIST |
| 0248 | REP | 5 | LAST | 1068 | 05,3470 | 50 337 0 | INDEX | SUBLIST | SET POINTER TO NEXT 2 WORDS OF SNAPSHOT |
| 0249 | | | | | 05,3471 | 0 0000 1 | | 0 | = CA SSSS (SSSS = NEXT ENTRY IN SUBLIST) |
| 0250 | REP | 269 | LAST | 1068 | 05,3472 | 10 000 0 | CCS | A | TEST FOR LAST TWO WORDS OF SNAPSHOT. |
| 0251 | REP | 1 | | | 05,3473 | 1 3456 1 | TCP | SNAPLOOP | NOT LAST TWO. |
| 0252 | REP | 1 | | | 05,3474 | 03357 0 | LDNPHAS2 | GENADR | DNPHAS2 |
| 0253 | REP | 6 | LAST | 1068 | 05,3475 | 54 337 1 | TS | SUBLIST | YES, LAST. SAVE A. |
| 0254 | REP | 21 | LAST | 1067 | 05,3476 | 3 7716 0 | CA | NEGONE | SET DNECADR AND |
| 0255 | REP | 12 | LAST | 1068 | 05,3477 | 54 336 0 | TS | DNECADR | SUBLIST POINTERS |
| 0256 | REP | 7 | LAST | 1068 | 05,3500 | 56 337 0 | XCH | SUBLIST | TO NEGATIVE VALUES. |
| 0257 | REP | 43 | LAST | 1068 | 05,3501 | 54 003 0 | TS | EBANK | |
| 0258 | REP | 4 | LAST | 1068 | 05,3502 | 7 4373 0 | MASK | LOW8 | |
| 0259 | | | | | 05,3503 | 0 0006 1 | EXTEND | | |
| 0260 | REP | 270 | LAST | 1068 | 05,3504 | 5 0000 1 | INDEX | A | |
| 0261 | | | | | E3,1401 | | EBANK= | 1401 | |

L DOWN-TELEMETRY PROGRAM

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| | | | | | | |
|-------|---------|-----------|---------|----------|----------|-----------------|
| 0262 | | | 05,3505 | 3 1402 0 | DCA | 1401 |
| 0263 | REP 26 | LAST 1068 | 0340 | | EBANK= | DNTMELUFF |
| 0264 | REP 2 | LAST 1067 | 05,3506 | 1 3535 0 | SNAPEND | TOP DNTMEXIT |
| 0265 | REP 13 | LAST 1068 | 05,3507 | 3 0336 1 | FETCH2ND | CA DNECADR |
| 0266 | REP 44 | LAST 1068 | 05,3510 | 54 003 0 | TS | EBANK |
| 0267 | REP 5 | LAST 1068 | 05,3511 | 7 4373 0 | MASK | LOW8 |
| 0268 | REP 156 | LAST 1067 | 05,3512 | 54 001 1 | TS | L |
| 0269 | REP 1 | | 05,3513 | 3 3365 1 | CA | DNADNDR |
| 0270 | REP 14 | LAST 1069 | 05,3514 | 26 336 0 | ADS | DNECADR |
| 0271 | | | 05,3515 | 0 0006 1 | EXTEND | |
| 0272 | REP 157 | LAST 1069 | 05,3516 | 5 0001 0 | INDEX | L |
| 0273 | | | 03,1400 | | EBANK= | 1400 |
| 0274 | | | 05,3517 | 3 1401 0 | DCA | 1400 |
| 0275 | REP 27 | LAST 1069 | 0340 | | EBANK= | DNTMELUFF |
| 0276 | REP 3 | LAST 1069 | 05,3520 | 1 3535 0 | TOP | DNTMEXIT |
| 0277 | REP 8 | LAST 1068 | 05,3521 | 54 337 1 | DOSUBLST | TS SURLIST |
| 0278 | REP 9 | LAST 1069 | 05,3522 | 50 337 0 | NEXTINSL | INDEX SURLIST |
| 0279 | | | 05,3523 | 0 0000 1 | | 0 |
| 0280 | REP 271 | LAST 1068 | 05,3524 | 10 000 0 | CCS | A |
| 0281 | REP 10 | LAST 1069 | 05,3525 | 24 337 0 | INCR | SURLIST |
| 0282 | | | 05,3526 | 1 3532 1 | TOP | +4 |
| 0283 | REP 11 | LAST 1069 | 05,3527 | 54 337 1 | TS | SURLIST |
| 0284 | REP 22 | LAST 1068 | 05,3530 | 3 7716 0 | CA | NEGONE |
| 0285 | REP 12 | LAST 1069 | 05,3531 | 56 337 0 | XCH | SURLIST |
| 0286 | REP 272 | LAST 1069 | 05,3532 | 24 000 1 | INCR | A |
| 0287 | REP 15 | LAST 1069 | 05,3533 | 54 336 0 | TS | DNECADR |
| 0288 | REP 3 | LAST 1067 | 05,3534 | 1 3420 0 | TOP | SETWO +2 |
| A0289 | | | | | | |
| A0290 | | | | | | |
| 0291 | | | 05,3535 | 0 0006 1 | DNTMEXIT | EXTEND |
| 0292 | REP 1 | | 05,3536 | 01 034 1 | WRITE | DNTM1 |
| 0293 | REP 158 | LAST 1069 | 05,3537 | 3 0001 0 | CA | L |
| 0294 | | | 05,3540 | 0 0006 1 | TMEXITL | EXTEND |
| 0295 | REP 1 | | 05,3541 | 01 035 0 | WRITE | DNTM2 |
| 0296 | REP 47 | LAST 1061 | 05,3542 | 1 5222 1 | TMRESUME | TOP RESUME |
| 0297 | REP 1 | | 7710 | | MINB12 | EQUALS -1/8 |
| 0298 | REP 6 | LAST 1068 | 0336 | | DNECADR | EQUALS TMINDEX |
| 0299 | REP 1 | | 0334 | | CTLIST | EQUALS LDATALST |
| 0300 | REP 1 | | 0337 | | SURLIST | EQUALS DNO |

PICK UP FIRST 2 WORDS OF SNAPSHOT.
NOW GO SEND THEM.

SET EBANK
ISOLATE RELATIVE ADDRESS
DECREMENT COUNT AND ECADR

PICK UP 2 DATA WORDS
NOW GO SEND THEM.

SET SURLIST POINTER

= CA SSSS (SSSS = NEXT ENTRY IN SURLIST)
IS IT THE END OF THE SURLIST
NO-

SAVE A.
SET SURLIST TO MINUS
RETRIEVE A.

SAVE DNADR
GO USE COMMON CODING (PROBLEMS WOULD
OCCUR IF THE PROGRAM ENCOUNTERED A
DNPTR NOW)

DOWN-TELEMETRY EXIT
TO SEND A + 1. TO CHANNELS 34 + 35
RESPECTIVELY

EXIT TELEMETRY PROGRAM VIA RESUME.



L DOWN-TELEMETRY PROGRAM

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R0301 SUBROUTINE NAME- DNDUMP
R0302 FUNCTIONAL DESCRIPTION - TO SEND(DUMP) ALL ERASABLE STORAGE n TIMES. ($n = 1$ TO 4). BANKS ARE SENT ONE AT A TIME
R0304 EACH BANK IS PRECEDED BY AN ID WORD, SYNCH BITS, ECADR AND TIME1 FOLLOWED BY THE 256D WORDS OF EACH
R0306 ERANK. ERANKS ARE DUMPED IN ORDER (I.E. ERANK 0 FIRST, THEN ERANK1 ETC.)
R0308 CALLING SEQUENCE- THE GROUND OR ASTRONAUT BY KEYING V74E CAN INITIALIZE THE DUMP.
R0310 AFTER KEYING IN V74E THE CURRENT DOWNLIST WILL BE IMMEDIATELY TERMINATED AND THE DOWNLINK ERASABLE DUMP
R0312 WILL BEGIN.
R0313 ONCE INITIATED THE DOWNLINK ERASABLE DUMP CAN BE TERMINATED (AND INTERRUPTED DOWNLIST REINSTATED) ONLY
R0315 BY THE FOLLOWING:
R0316 1. A FRESH START
R0317 2. COMPLETION OF ALL DOWNLINK DUMPS REQUESTED (ACCORDING TO BITS SET IN DUMPCNT). NOTE THAT DUMPCNT
R0319 CAN BE ALTERED BY A V21N01.
R0320 3. AND INVOLUNTARILY BY A RESTART.
R0321 NORMAL EXIT MODE- TCP DMPHASE1
R0322 ALARM OR ABORT MODE- NONE
R0323 *SUBROUTINES CALLED- NONE.
R0324 ERASABLE INITIALIZATION REQUIRED-
R0325 DUMPCNT OCT 20000 IF 4 COMPLETE ERASABLE DUMPS ARE DESIRED
R0326 DUMPCNT OCT 10000 IF 2 COMPLETE ERASABLE DUMPS ARE DESIRED
R0327 DUMPCNT OCT 04000 IF 1 COMPLETE ERASABLE DUMP IS DESIRED
R0328 DEFRIS- DUMPCNT, DUMPSW, DNTMGOTO, ERANK AND CENTRAL REGISTERS
R0329 TIMING- TIME (IN SECS) = ((NO.DUMPS)*(NO.ERANKS)*(WDSPERERANK + NO.IDWDS)) / NO.WDSPERSEC
R0331 TIME (IN SECS) = (4) * (8) * (256 + 4) / 100
R0333 THUS TIME (IN SECS TO SEND DUMP OF ERASABLE 4 TIMES VIA DOWNLINK) = 63.2 SECONDS

R0335 STRUCTURE OF ONE ERANK AS IT IS SENT BY DOWNLINK PROGRAM-
R0336 (REMINDER-THIS ONLY DESCRIBES ONE OF THE 8 ERANKS X 4 (DUMPS) = 32 ERANKS WHICH WILL BE SENT BY DNDUMP)

| DOWNLIST | WORD | TAKEN FROM CONTENTS OF | EXAMPLE | W | COMMENTS |
|----------|------|------------------------|---------|---|---|
| R0340 | 1 | ERASID | 0177X | 0 | DOWNLIST I.D. FOR DOWNLINK ERASABLE DUMP (X=7 CSM, 6 LM) |
| R0342 | 2 | LOWIDCOD | 77340 | 1 | DOWNLINK SYNCH BITS. (SAME ONE USED IN ALL OTHER DOWNLISTS) |
| R0344 | 3 | DUMPCNT | 13400 | 1 | (SEE NOTES ON DUMPCNT) 1= 3RD ERAS DUMP, 3400=ECADR OF 5TH WD |
| R0346 | 4 | TIME1 | 14120 | 1 | TIME IN CENTISECONDS |
| R0347 | 5 | FIRST WORD OF ERANK X | 03400 | 1 | IN THIS EXAMPLE THIS WORD = CONTENTS OF E7,1400 (ECADR 3400) |
| R0349 | 6 | 2ND WORD OF ERANK X | 00142 | 1 | IN THIS EXAMPLE THIS WORD = CONTENTS OF E7,1401 (ECADR 3401) |
| R0351 | 7 | 3RD WORD OF ERANK X | 00142 | 1 | IN THIS EXAMPLE THIS WORD = CONTENTS OF E7,1402 (ECADR 3402) |
| R0353 | . | . | . | 1 | . |
| R0354 | . | . | . | 1 | . |
| R0355 | . | . | . | 1 | . |
| R0356 | 260D | 256TH WORD OF ERANK X | 03777 | 1 | IN THIS EXAMPLE THIS WORD = CONTENTS OF E7,1777 (ECADR 3777) |

R0358 NOTE- DUMPCNT CONTAINS THE COUNTER AND ECADR FOR EACH WORD BEING SENT.
R0359 THE BIT STRUCTURE OF DUMPCNT IS FOLLOWS---
R0360 X = NOT USED
R0361 X ABC EEE RRRRRRRR ABC = ERASABLE DUMP COUNTER (I.E. ABC = 0,1,2 OR 3 WHICH MEANS THAT
R0363 COMPLETE ERASABLE DUMP NUMBER 1,2,3 OR 4 RESPECTIVELY IS IN PROGRESS)
R0365 EEE = ERANK BITS
R0366 RRRRRRRR = RELATIVE ADDRESS WITHIN AN ERANK.

L DOWN-TELEMETRY PROGRAM

USER=3 PAGE NO. 9 E0 S3

| | | | | | | | | | | |
|-------|-----|-----|------|------|---------|----------|---------|--------|------------|--|
| 0366 | REP | 208 | LAST | 1068 | 05,3543 | 3 4714 1 | DNDLMP1 | CA | ZERO | INITIALIZE DOWNLINK |
| 0369 | REP | 1 | | | 05,3544 | 54 338 0 | | TS | DUMPLOC | ERASABLE DUMP |
| 0370 | REP | 2 | LAST | 1067 | 05,3545 | 0 3607 0 | +2 | TC | SENDID | GO SEND ID AND SYNCH BITS |
| 0371 | REP | 1 | | | 05,3546 | 3 3555 1 | | CA | LNDLMP1 | SET DNTMGOTO |
| 0372 | REP | 8 | LAST | 1066 | 05,3547 | 54 335 0 | | TS | DNTMGOTO | TO LOCATION FOR NEXT PASS |
| 0373 | REP | 18 | LAST | 1061 | 05,3550 | 3 0025 0 | | CA | TIME1 | PLACE TIME1 |
| 0374 | REP | 159 | LAST | 1069 | 05,3551 | 56 001 0 | | XCH | L | INTO L |
| 0375 | REP | 2 | LAST | 1071 | 05,3552 | 3 0336 1 | | CA | DUMPLOC | AND ECADR OF THIS EBANK INTO A |
| 0376 | REP | 4 | LAST | 1069 | 05,3553 | 1 3535 0 | | TCF | DNTMEXIT | SEND DUMPLOC AND TIME1 |
| 0377 | REP | 1 | | | 05,3554 | 03556 1 | LNDLMP | ADRES | DNDLMP | |
| 0378 | REP | 1 | | | 05,3555 | 03571 1 | LNDLMP1 | ADRES | DNDLMP1 | |
| 0379 | REP | 51 | LAST | 1057 | 05,3556 | 3 4711 1 | DNDLMP | CA | TWO | INCREMENT ECADR IN DUMPLOC |
| 0380 | REP | 3 | LAST | 1071 | 05,3557 | 26 338 0 | | ADS | DUMPLOC | TO NEXT DP WORD TO BE |
| 0381 | REP | 6 | LAST | 1069 | 05,3560 | 7 4373 0 | | MASK | LOW8 | DUMPED AND SAVE IT. |
| 0382 | REP | 273 | LAST | 1069 | 05,3561 | 10 000 0 | | CCS | A | IS THIS THE BEGINNING OF A NEW EBANK |
| 0383 | REP | 1 | | | 05,3562 | 1 3573 1 | | TCF | DNDLMP2 | NO- THEN CONTINUE DUMPING |
| 0384 | REP | 4 | LAST | 1071 | 05,3563 | 3 0336 1 | | CA | DUMPLOC | YES- IS THIS THE END OF THE |
| 0385 | REP | 1 | | | 05,3564 | 7 0333 0 | | MASK | DUMPCNT | N THEN = 1 TO 4) COMPLETE ERASABLE |
| 0386 | REP | 7 | LAST | 986 | 05,3565 | 7 7671 1 | | MASK | PRIO34 | DUMP(BIT14 FOR 4, BIT13 FOR 2 OR BIT12 |
| 0387 | REP | 274 | LAST | 1071 | 05,3566 | 10 000 0 | | CCS | A | FOR 1 COMPLETE ERASABLE DUMP(S)). |
| 0388 | REP | 2 | LAST | 188 | 05,3567 | 1 3351 1 | | TCF | DNPHASE1 | YES- START SENDING INTERRUPTED DOWNLIST |
| A0389 | | | | | | | | | | AGAIN |
| 0390 | REP | 2 | LAST | 254 | 05,3570 | 1 3545 1 | | TCF | DNDLMP1 +2 | NO- GO BACK AND INITIALIZE NEXT BANK |
| 0391 | REP | 1 | | | 05,3571 | 3 3554 0 | DNDLMP1 | CA | LNDLMP | SET DNTMGOTO |
| 0392 | REP | 6 | LAST | 1071 | 05,3572 | 54 335 0 | | TS | DNTMGOTO | FOR WORDS 3 TO 256D OF CURRENT EBANK |
| 0393 | REP | 5 | LAST | 1071 | 05,3573 | 3 0336 1 | DNDLMP2 | CA | DUMPLOC | SET EBANK |
| 0394 | REP | 45 | LAST | 1069 | 05,3574 | 54 003 0 | | TS | EBANK | ISOLATE RELATIVE ADDRESS. |
| 0395 | REP | 7 | LAST | 1071 | 05,3575 | 7 4373 0 | | MASK | LOW8 | (NOTE' MASK INSTRUCTION IS USED TO PICK |
| 0396 | REP | 211 | LAST | 1068 | 05,3576 | 54 002 1 | | TS | 0 | UP ERASABLE REGISTERS SO THAT EDITING |
| 0397 | REP | 14 | LAST | 695 | 05,3577 | 3 4713 0 | | CA | NRG0 | REGISTERS 20-23 WILL NOT BE ALTERED.) |
| 0398 | REP | 160 | LAST | 1071 | 05,3600 | 54 001 1 | | TS | L | |
| 0399 | REP | 212 | LAST | 1071 | 05,3601 | 50 002 0 | | INDEX | 0 | PICK UP LOW ORDER REGISTER OF PAIR |
| 0400 | | | | | E3,1400 | | | EBANK= | 1400 | OF ERASABLE REGISTERS. |
| 0401 | | | | | 05,3602 | 7 1401 1 | | MASK | 1401 | |
| 0402 | REP | 161 | LAST | 1071 | 05,3603 | 56 001 0 | | XCH | L | |
| 0403 | REP | 213 | LAST | 1071 | 05,3604 | 50 002 0 | | INDEX | 0 | PICK UP HIGH ORDER REGISTER OF PAIR |
| 0404 | | | | | 05,3605 | 7 1400 0 | | MASK | 1400 | OF ERASABLE REGISTERS. |
| 0405 | REP | 28 | LAST | 1069 | 0340 | | | EBANK= | DNTMPLUFF | |
| 0406 | REP | 5 | LAST | 1071 | 05,3606 | 1 3535 0 | | TCF | DNTMEXIT | GO SEND THEM |
| 0407 | | | | | 05,3607 | 0 0006 1 | SENDID | EXTEND | | **ENTRANCE USED BY ERASABLE DUMP PROC.** |
| 0408 | REP | 7 | LAST | 1071 | 05,3610 | 22 335 1 | | XCH | DNTMGOTO | SET DNTMGOTO SO NEXT TIME PROG WILL GO |
| 0409 | REP | 1 | | | 05,3611 | 3 4747 1 | | CAP | BRASID | TO LOCATION FOLLOWING 'TC SENDID' |
| 0410 | REP | 162 | LAST | 1071 | 05,3612 | 54 001 1 | | TS | L | **ENTRANCE USED BY REGULAR DOWNLINK PG** |



L DOWN-TELEMETRY PROGRAM

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| | | | | | | | |
|------|-----|-----|-----------|---------|----------|-----|----------|
| 0411 | REP | 2 | LAST 1067 | 05,3613 | 0 3441 0 | TC | WOZERO |
| 0412 | REP | 1 | | 05,3614 | 3 2000 0 | CAP | LOWIDCOD |
| 0413 | REP | 163 | LAST 1071 | 05,3615 | 56 001 0 | XCH | L |
| 0414 | REP | 6 | LAST 1071 | 05,3616 | 1 3535 0 | TCP | DNTMEXIT |

GO SET WORD ORDER CODE TO ZERO
PLACE SPECIAL ID CODE INTO L
AND ID BACK INTO A
SEND DOWNLIST ID CODE(S).

L INTER-BANK COMMUNICATION

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R0001 THE FOLLOWING ROUTINE CAN BE USED TO CALL A SUBROUTINE IN ANOTHER BANK. IN THE BANKCALL VERSION, THE
 R0003 CADR OF THE SUBROUTINE IMMEDIATELY FOLLOWS THE TC BANKCALL INSTRUCTION, WITH C(A) AND C(L) PRESERVED.

| | | | | | | | |
|-------|---------|-----------|------|----------|---------------|------|--|
| 0005 | | | 4555 | | BLOCK 02 | | |
| 00055 | REP 1 | | | | COUNT 02/BANK | | |
| 0006 | REP 4 | LAST 413 | 4555 | 52 134 0 | BANKCALL DXCH | RUP2 | SAVE INCOMING A,L. |
| 0007 | REP 214 | LAST 1071 | 4556 | 50 002 0 | INDEX 0 | | PICK UP CADR. |
| 0008 | | | 4557 | 3 0000 1 | CA 0 | | |
| 0009 | REP 215 | LAST 1073 | 4560 | 24 002 0 | INCR 0 | | SO WE RETURN TO THE LOC. AFTER THE CADR. |

R0010 SWCALL IS IDENTICAL TO BANKCALL, EXCEPT THAT THE CADR ARRIVES IN A.

| | | | | | | | |
|------|---------|-----------|------|----------|--------------|---------|---|
| 0012 | REP 164 | LAST 1072 | 4561 | 54 001 1 | SWCALL TS | L | |
| 0013 | REP 3 | LAST 376 | 4562 | 22 004 0 | LXCH | FBANK | SWITCH BANKS, SAVING RETURN. |
| 0014 | REP 7 | LAST 613 | 4563 | 7 4747 0 | MASK | LOW10 | GET SUB-ADDRESS OF CADR. |
| 0015 | REP 216 | LAST 1073 | 4564 | 56 002 0 | XCH | Q | A,L NOW CONTAINS DP RETURN. |
| 0016 | REP 5 | LAST 1073 | 4565 | 52 134 0 | DXCH | RUP2 | RESTORING INPUTS IF THIS IS A BANKCALL. |
| 0017 | REP 217 | LAST 1073 | 4566 | 50 002 0 | INDEX | Q | |
| 0018 | | | 4567 | 0 2000 0 | TC | 10000 | SETTING Q TO SWRETURN. |
| 0019 | REP 6 | LAST 1073 | 4570 | 56 134 1 | SWRETURN XCH | RUP2 +1 | COMES HERE TO RETURN TO CALLER. C(A,L) |
| 0020 | REP 4 | LAST 1073 | 4571 | 56 004 0 | XCH | FRANK | ARE PRESERVED FOR RETURN. |
| 0021 | REP 7 | LAST 1073 | 4572 | 56 134 1 | XCH | RUP2 +1 | |
| 0022 | REP 8 | LAST 1073 | 4573 | 0 0133 0 | TC | RUP2 | |

R0023 THE FOLLOWING ROUTINE CAN BE USED AS A UNILATERAL JUMP WITH C(A,L) PRESERVED AND THE CADR IMMEDIATELY
 R0025 FOLLOWING THE TC POSTJUMP INSTRUCTION.

| | | | | | | | |
|------|---------|-----------|------|----------|--------------|---|---------------------|
| 0026 | REP 218 | LAST 1073 | 4574 | 56 002 0 | POSTJUMP XCH | Q | SAVE INCOMING C(A). |
| 0027 | REP 275 | LAST 1071 | 4575 | 50 000 1 | INDEX | A | GET CADR. |
| 0028 | | | 4576 | 3 0000 1 | CA | 0 | |

R0029 BANKJUMP IS THE SAME AS POSTJUMP, EXCEPT THAT THE CADR ARRIVES IN A.

| | | | | | | | |
|------|---------|-----------|------|----------|-------------|-------|------------------------------------|
| 0031 | REP 5 | LAST 1073 | 4577 | 54 004 1 | BANKJUMP TS | FRANK | |
| 0032 | REP 8 | LAST 1073 | 4600 | 7 4747 0 | MASK | LOW10 | |
| 0033 | REP 219 | LAST 1073 | 4601 | 56 002 0 | XCH | Q | RESTORING INPUT C(A) IF THIS WAS A |
| 0034 | REP 220 | LAST 1073 | 4602 | 50 002 0 | Q+10000 | INDEX | POSTJUMP. |
| 0035 | | | 4603 | 1 2000 1 | PRIO12 | TCF | PRIO12 = TCF 10000 = 12000 |



L INTER-BANK COMMUNICATION

P0036 THE FOLLOWING ROUTINE GETS THE RETURN ADDR SAVED BY SWCALL OR BANKCALL AND LEAVES IT IN A.

| | | | | | | | | | | | | |
|-------|-----|-----|------|------|------|----|------|---|----------|-----------|-------|--|
| 0038 | REP | 9 | LAST | 1073 | 4604 | 3 | 4747 | 1 | MAKECADR | CAP | LOW10 | |
| 0039 | REP | 9 | LAST | 1073 | 4605 | 7 | 0133 | 1 | MASK | BUF2 | | |
| 0040 | REP | 10 | LAST | 1074 | 4606 | 6 | 0134 | 1 | AD | BUF2 +1 | | |
| 0041 | REP | 221 | LAST | 1073 | 4607 | 0 | 0002 | 0 | TC | 0 | | |
| 00465 | REP | 4 | LAST | 374 | 4610 | 54 | 135 | 1 | SUPDICAL | TS | MPTMP | |
| 0047 | REP | 6 | LAST | 1073 | 4611 | 56 | 004 | 0 | XCH | FRANK | | SET FRANK FOR DATA. |
| 00475 | | | | | 4612 | 0 | 0006 | 1 | EXTEND | | | |
| 0048 | REP | 10 | LAST | 577 | 4613 | 04 | 007 | 1 | NOR | SUPERBANK | | SAVE FRANK IN BITS 15-11, AND |
| 00485 | REP | 5 | LAST | 1074 | 4614 | 56 | 135 | 0 | XCH | MPTMP | | SUPERBANK IN BITS 7-5. |
| 0049 | REP | 10 | LAST | 1074 | 4615 | 7 | 4747 | 0 | MASK | LOW10 | | |
| 00495 | REP | 165 | LAST | 1073 | 4616 | 56 | 001 | 0 | XCH | L | | SAVE REL. ADR. IN BANK, FETCH SUPERBITS. |
| 0050 | | | | | 4617 | 0 | 0004 | 0 | INHINT | | | BECAUSE RUPT DOES NOT SAVE SUPERBANK. |
| 00505 | | | | | 4620 | 0 | 0006 | 1 | EXTEND | | | |
| 0051 | REP | 11 | LAST | 1074 | 4621 | 01 | 007 | 1 | WRITE | SUPERBANK | | SET SUPERBANK FOR DATA. |
| 0052 | REP | 186 | LAST | 1074 | 4622 | 50 | 001 | 0 | INDEX | L | | |
| 00525 | | | | | 4623 | 3 | 2000 | 0 | CA | 10000 | | PINBALL (FIX MEM DISP) PREVENTS DCA HERE |
| 0053 | REP | 6 | LAST | 1074 | 4624 | 56 | 135 | 0 | XCH | MPTMP | | SAVE 1ST WD, FETCH OLD FRANK AND SRANK. |
| 00534 | | | | | 4625 | 0 | 0006 | 1 | EXTEND | | | |
| 00535 | REP | 12 | LAST | 1074 | 4626 | 01 | 007 | 1 | WRITE | SUPERBANK | | RESTORE SUPERBANK. |
| 0054 | | | | | 4627 | 0 | 0003 | 1 | RELINT | | | |
| 00545 | REP | 7 | LAST | 1074 | 4630 | 54 | 004 | 1 | TS | FRANK | | RESTORE FRANK. |
| 0055 | REP | 7 | LAST | 1074 | 4631 | 3 | 0135 | 0 | CA | MPTMP | | RECOVER FIRST WORD OF DATA. |
| 00555 | | | | | 4632 | 0 | 0002 | 0 | RETURN | | | 24 WDS. DATACALL 516 MJ, SUPDICAL 432 MJ |

L INTER-BANK COMMUNICATION

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P0056 THE FOLLOWING ROUTINES ARE IDENTICAL TO BANKCALL AND SWCALL EXCEPT THAT THEY ARE USED IN INTERRUPT.

| | | | | | | | | | | | | |
|------|-----|-----|------|------|------|----|------|---|----------|-------|----------|--|
| 0058 | REP | 2 | LAST | 415 | 4633 | 52 | 073 | 1 | IBKCALL | DYCH | RUPTREG3 | USES RUPTREG3,4 FOR DP RETURN ADDRESS. |
| 0059 | REP | 222 | LAST | 1074 | 4634 | 50 | 002 | 0 | | INDEX | 0 | |
| 0060 | | | | | 4635 | 3 | 0000 | 1 | | CAF | 0 | |
| 0061 | REP | 223 | LAST | 1075 | 4636 | 24 | 002 | 0 | | INCR | 0 | |
| 0062 | REP | 167 | LAST | 1074 | 4637 | 54 | 001 | 1 | ISWCALL | TS | L | |
| 0063 | REP | 8 | LAST | 1074 | 4640 | 22 | 004 | 0 | | LXCH | FRANK | |
| 0064 | REP | 11 | LAST | 1074 | 4641 | 7 | 4747 | 0 | | MASK | LOW10 | |
| 0065 | REP | 224 | LAST | 1075 | 4642 | 56 | 002 | 0 | | XCH | 0 | |
| 0066 | REP | 3 | LAST | 1075 | 4643 | 52 | 073 | 1 | | DYCH | RUPTREG3 | |
| 0067 | REP | 225 | LAST | 1075 | 4644 | 50 | 002 | 0 | | INDEX | 0 | |
| 0068 | | | | | 4645 | 6 | 2000 | 0 | | TC | 10000 | |
| 0069 | REP | 3 | LAST | 66 | 4646 | 56 | 073 | 0 | ISWRETRN | XCH | RUPTREG4 | |
| 0070 | REP | 9 | LAST | 1075 | 4647 | 56 | 004 | 0 | | XCH | FRANK | |
| 0071 | REP | 4 | LAST | 1075 | 4650 | 56 | 073 | 0 | | XCH | RUPTREG4 | |
| 0072 | REP | 4 | LAST | 1075 | 4651 | 0 | 0072 | 1 | | TC | RUPTREG3 | |

R0090 2. USPRCADR ACCRSSES INTERPRETIVE CODING IN OTHER THAN THE USER'S FRANK. THE CALLING SEQUENCE IS AS FOLLOWS:

| A0092 | | | | | L | TC | USPRCADR | | | | | |
|-------|-----|-----|------|------|------|------|----------|-------------------------------------|----------|-------|---------|---|
| A0093 | | | | | L+1 | CADR | INTPRETX | INTPRETX IS THE INTERPRETIVE CODING | | | | |
| A0094 | | | | | | | | RETURN IS TO L+2 | | | | |
| 0103 | REP | 5 | LAST | 415 | 4652 | 54 | 164 | 0 | USPRCADR | TS | LOC | SAVE A |
| 0104 | REP | 25 | LAST | 918 | 4653 | 3 | 4703 | 1 | | CA | BIT8 | |
| 0105 | REP | 7 | LAST | 365 | 4654 | 54 | 023 | 1 | | TS | EDOP | EXIT INSTRUCTION TO EDOP |
| 0106 | REP | 14 | LAST | 575 | 4655 | 3 | 0008 | 1 | | CA | FRANK | |
| 0107 | REP | 1 | | | 4656 | 54 | 165 | 1 | | TS | BANKSET | USER'S FRANK TO BANKSET |
| 0108 | REP | 226 | LAST | 1075 | 4657 | 50 | 002 | 0 | | INDEX | 0 | |
| 0109 | | | | | 4660 | 3 | 0000 | 1 | | CA | 0 | |
| 0110 | REP | 10 | LAST | 1075 | 4661 | 54 | 004 | 1 | | TS | FRANK | INTERPRETIVE FRANK TO FRANK |
| 0111 | REP | 12 | LAST | 1075 | 4662 | 7 | 4747 | 0 | | MASK | LOW10 | YIELDS INTERPRETIVE RELATIVE ADDRESS |
| 0112 | REP | 227 | LAST | 1075 | 4663 | 56 | 002 | 0 | | XCH | 0 | INTERPRETIVE ADDRESS TO 0, FETCHING L+1 |
| 0113 | REP | 6 | LAST | 1075 | 4664 | 56 | 164 | 1 | | XCH | LOC | L+1 TO LOC, RETRIEVING ORIGINAL A |
| 0114 | REP | 1 | | | 4665 | 1 | 4602 | 0 | | TCF | 0+10000 | |

L INTER-BANK COMMUNICATION

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R0117 THERE ARE FOUR POSSIBLE SETTINGS FOR CHANNEL 07. (CHANNEL 07 CONTAINS THE SUPERBANK SETTING.)

| R0119 | SUPERBANK | SETTING | S-REG. VALUE | PSEUDO-FIXED BANK NUMBERS | OCTAL PSEUDO ADDRESSES | |
|-------|---|---------|--------------|---------------------------|------------------------|---|
| R0120 | --- | --- | --- | --- | --- | |
| R0121 | --- | --- | --- | --- | --- | |
| R0122 | SUPERBANK 3 | 0XX | 2000 - 3777 | 30 - 37 | 70000 - 107777 | (WHERE XX CAN BE ANYTHING AND WILL USUALLY BE SEEN AS 11) |
| R0124 | | | | | | (AS FAR AS IT CAN BE SEEN, ONLY BANKS 40-43 WILL EVER BE AND ARE PRESENTLY AVAILABLE) |
| R0126 | SUPERBANK 4 | 100 | 2000 - 3777 | 40 - 47 | 110000 - 127777 | (PRESENTLY NOT AVAILABLE TO THE USER) |
| R0128 | | | | | | (PRESENTLY NOT AVAILABLE TO THE USER) |
| R0130 | SUPERBANK 5 | 101 | 2000 - 3777 | 50 - 57 | 130000 - 147777 | (PRESENTLY NOT AVAILABLE TO THE USER) |
| R0132 | | | | | | (PRESENTLY NOT AVAILABLE TO THE USER) |
| R0134 | SUPERBANK 6 | 110 | 2000 - 3777 | 60 - 67 | 150000 - 167777 | (PRESENTLY NOT AVAILABLE TO THE USER) |
| R0136 | | | | | | (PRESENTLY NOT AVAILABLE TO THE USER) |
| R0138 | | | | | | |
| R0142 | *** THIS ROUTINE MAYBE CALLED BY ANY PROGRAM LOCATED IN BANKS 00 - 27. I.E., NO PROGRAM LIVING IN ANY | | | | | |
| R0144 | SUPERBANK SHOULD USE SUPERSW. *** | | | | | |

R0145 SUPERSW MAYBE CALLED IN THIS FASHION'

| R0146 | CAP | ARBCON | WHERE -- ARBCON BRCN SOMETHIN -- |
|-------|-----|---------|--------------------------------------|
| R0147 | TCR | SUPERSW | (THE SUPERBANK BITS ARE IN THE BRCN) |
| R0148 | ... | ... | |
| R0149 | ... | ... | |
| R0150 | ... | ... | |

R0151 OR IN THIS FASHION '

| R0152 | CAP | SUPERSET | WHERE SUPERSET IS ONE OF THE FOUR AVAILABLE |
|-------|-----|----------|---|
| R0154 | TCR | SUPERSW | SUPERBANK BIT CONSTANTS' |
| R0155 | ... | ... | |
| R0157 | ... | ... | SUPER011 OCTAL 60 |
| R0159 | ... | ... | SUPER100 OCTAL 100 |
| R0161 | ... | ... | SUPER101 OCTAL 120 |
| | | | SUPER110 OCTAL 140 |

| | | | | | | | | | | |
|-------|-----|-----|------|------|------|----|---------|--------|-------|---|
| 0163 | | | 4666 | 0 | 0008 | 1 | SUPERSW | EXTEND | | |
| 0164 | REP | 13 | LAST | 1074 | 4667 | 01 | 007 | 1 | WRITE | SUPERBANK |
| A0165 | | | | | | | | | | WRITE BITS 7-6-5 OF THE ACCUMULATOR INTO CHANNEL 07 |
| 0166 | REP | 228 | LAST | 1075 | 4670 | 0 | 0002 | 0 | TC | 0 |
| A0167 | | | | | | | | | | TC TO INSTRUCTION FOLLOWING TC SUPERSW |

L INTERPRETER

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R0001 SECTION 1 DISPATCHER

R0002 ENTRY TO THE INTERPRETER. INTPRET SETS LOC TO THE FIRST INSTRUCTION, BANKSET TO THE BANK OF THE
 R0004 OBJECT INTERPRETIVE PROGRAM, AND INBIT15 TO THE BIT15 CONTENTS OF FBANK. INTERPRETIVE PROGRAMS MAY BE IN
 R0006 VIRTUALLY ALL BANKS PRESENT UNDER ANY SUPER-BANK SETTING, WITH THE RESTRICTION THAT PROGRAMS IN HIGH BANKS
 R0008 (BIT15 OF FBANK = 1) DO NOT REFER TO LOWBANKS, AND VICE-VERSA. THE INTERPRETER DOES NOT SWITCH SUPERBANKS.
 R0010 E-BANK SWITCHING OCCURS WHENEVER GENERAL ERASABLE (100 - 3777) IS ADDRESSED.

| | | | | | | | | | | | |
|-------|-----|-----|---|--------|-------|----------|----------|----------|---------------------------------------|--|--|
| 0012 | | | 0006 | | BLOCK | 03 | | | | | |
| 0013 | REP | 1 | | | COUNT | 03/INTER | | | | | |
| 0013S | | | 0006 | 0 0003 | 1 | INTPRET | RELINT | | | | |
| 0014 | | | 0007 | 0 0006 | 1 | | EXTEND | | | | |
| 0015 | REP | 7 | LAST | 1075 | | 0010 | 22 164 1 | QKCH LOC | SET LOC TO THE WORD FOLLOWING THE TC. | | |
| 0016 | REP | 15 | LAST | 1075 | | 0011 | 3 0006 1 | +2 | CA BRANK | INTERPRETIVE BRANCHES FINISH HERE. | |
| 0017 | REP | 2 | LAST | 1075 | | 0012 | 54 165 1 | | TS BANKSET | | |
| 0018 | REP | 43 | LAST | 987 | | 0013 | 7 4674 1 | | MASK BIT15 | GET 15TH BIT FOR INDEXABLE ADDRESSES. | |
| 0019 | REP | 5 | LAST | 67 | | 0014 | 54 115 0 | | TS INBIT15 | | |
| 0020 | REP | 8 | LAST | 1075 | | 0015 | 54 023 1 | | TS EDOP | MAKE SURE NO INSTRUCTIONS LEFT OVER | |
| 0021 | REP | 1 | | | | 0016 | 1 6037 1 | | TCP NEWOPS | PICK UP OP CODE PAIR AND BEGIN. | |
| 0022 | REP | 16 | LAST | 1077 | | 0017 | 22 006 1 | INTRSM | LXCH BRANK | RESUME SUSPENDED INTERPRETIVE JOB | |
| 0023 | REP | 226 | LAST | 891 | | 0020 | 1 6011 0 | | TCP INTPRET +3 | | |
| R0024 | | | DLOAD LOADS MPAC, MPAC +1, LEAVING ZERO IN MPAC +2. | | | | | | | | |
| 0025 | | | 0021 | 0 0006 | 1 | DLOAD | EXTEND | | | | |
| 0026 | REP | 1 | | | | 0022 | 5 0116 1 | | INDEX ADDRWD | | |
| 0027 | | | 0023 | 3 0001 | 0 | | DCA | 0 | | LOAD DP C(C(ADDRWD)) INTO MPAC,MPAX +1 | |
| 0028 | REP | 289 | LAST | 891 | | 0024 | 52 155 1 | SLOAD2 | DXCH MPAC | | |
| 0029 | REP | 209 | LAST | 1071 | | 0025 | 3 4714 1 | | CAP ZERO | ZERO MPAC +2 | |



L INTERPRETER

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P0030 AT THE END OF MOST INSTRUCTIONS, CONTROL IS GIVEN TO DANZIG TO DISPATCH THE NEXT OPERATION.

| | | | | | | | | | | | | |
|-------|-----|-----|------|------|------|-------|------|------|----------|---------|---------------------|--|
| 0032 | REP | 290 | LAST | 1077 | 6026 | 54 | 156 | 1 | TS | MPAC +2 | AND DECLARE DP MODE | |
| 0033 | REP | 4 | LAST | 533 | 6027 | 54 | 163 | 1 | NEWMODE | TS | MODE | PROLOGUE FOR MODE-CHANGING INSTRUCTIONS. |
| 0034 | REP | 3 | LAST | 1077 | 6030 | 3 | 0165 | 0 | DANZIG | CA | BANKSET | SET BANK BEFORE TESTING NEWJOB SO THAT |
| 0035 | REP | 17 | LAST | 1077 | 6031 | 54 | 006 | 0 | TS | TS | BANK | IT MAY BE SAVED DIRECTLY BY CHANJOB. |
| 0036 | REP | 9 | LAST | 1077 | 6032 | 10 | 023 | 1 | NOIBNKSW | CCS | EDOP | SEE IF AN ORDER CODE IS LEFT OVER FROM |
| 0037 | REP | 1 | | | 6033 | 1 | 6046 | 1 | TCP | TCP | OPJUMP | THE LAST PAIR RETRIEVED. IF SO, EXECUTE. |
| A0038 | | | | | | | | | | | | EDOP IS SET TO ZERO ON ITS RE-EDITING. |
| 0039 | REP | 5 | LAST | 828 | 6034 | 10 | 067 | 1 | CCS | NEWJOB | | SEE IF A JOB OF HIGHER PRIORITY IS |
| 0040 | REP | 1 | | | 6035 | 1 | 5063 | 0 | TCP | CHANG2 | | PRESENT, AND IF SO, CHANGE JOBS. |
| 0041 | REP | 8 | LAST | 1077 | 6036 | 24 | 164 | 1 | INCR | LOC | | ADVANCE THE LOCATION COUNTER. |
| R0042 | | | | | | | | | | | | |
| 0043 | REP | 9 | LAST | 1078 | 6037 | 50 | 164 | 1 | NEWOPS | INDEX | LOC | ENTRY TO BEGIN BY PICKING OP CODE PAIR. |
| 0044 | | | | | 6040 | 3 | 0000 | 1 | CA | 0 | | MAY BE AN OPCODE PAIR OR A STORE CODE. |
| 0045 | REP | 276 | LAST | 1073 | 6041 | 10 | 000 | 0 | CCS | A | | TEST SIGN AND GET DABS(A). |
| 0046 | REP | 1 | | | 6042 | 1 | 6331 | 1 | TCP | DOSTORE | | PROCESS STORE CODE. |
| 0047 | | | | | 6043 | 00177 | 0 | LOW7 | OCT | 177 | | |
| 0048 | REP | 10 | LAST | 1078 | 6044 | 54 | 023 | 1 | TS | EDOP | | OP CODE PAIR. LEAVE THE OTHER IN EDOP |
| 0049 | REP | 6 | LAST | 365 | 6045 | 7 | 6043 | 1 | MASK | LOW7 | | WHERE CCS EDOP WILL HONOR IT NEXT. |
| 0050 | REP | 13 | LAST | 372 | 6046 | 54 | 020 | 1 | OPJUMP | TS | CYR | LOWD ENTERS HERE IF A RIGHT-HAND OP |
| 0051 | REP | 14 | LAST | 1078 | 6047 | 10 | 020 | 1 | CCS | CYR | | CODE IS TO BE PROCESSED. TEST PREFIXES. |
| 0052 | REP | 1 | | | 6050 | 1 | 6216 | 0 | TCP | OPJUMP2 | | TEST SECOND PREFIX BIT. |
| 0053 | REP | 1 | | | 6051 | 1 | 6712 | 1 | TCP | EXIT | | +0 OP CODE IS EXIT. |

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P0054 PROCESS ADDRESSES WHICH MAY BE DIRECT, INDEXED, OR REFERENCE THE PUSHDOWN LIST.

| | | | | | | | | |
|------|---------|-----------|------|----------|----------|-------|--------|--|
| 0056 | REP 74 | LAST 1059 | 0052 | 7 4712 0 | ADDRESS | MASK | BIT1 | SEE IF ADDRESS IS INDEXED. CYR CONTAINED |
| 0057 | REP 277 | LAST 1078 | 0053 | 10 000 0 | | CC8 | A | 4000X, SO BIT 1 IS NOW AS IT WAS IN CYR. |
| 0058 | REP 1 | | 0054 | 1 6115 0 | | TCP | INDEX | FORM INDEXED ADDRESS. |
| 0059 | REP 10 | LAST 1078 | 0055 | 50 164 1 | DIRADRES | INDEX | LOC | LOOK AHEAD TO NEXT WORD TO SEE IF |
| 0060 | | | 0056 | 4 0001 1 | OCT40001 | CS | 1 | ADDRESS IS GIVEN. |
| 0061 | REP 278 | LAST 1079 | 0057 | 10 000 0 | | CC8 | A | IF NOT, |
| 0062 | REP 1 | | 0060 | 1 6164 0 | | TCP | PUSHUP | |
| 0063 | | | 0061 | 77773 1 | NEG4 | DEC | -4 | |
| 0064 | REP 11 | LAST 1079 | 0062 | 24 164 1 | | INCR | LOC | IF SO, TO SHOW WE PICKED UP A WORD. |
| 0065 | REP 2 | LAST 1077 | 0063 | 54 116 0 | | TS | ADDRD | |



L INTERPRETER

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P0066 FINAL DIGESTION OF DIRECT ADDRESSES OF OP CODES WITH 01 PREFIX IS DONE HERE. IN EACH CASE, THE
 R0066 REQUIRED 12-BIT SUB-ADDRESS IS LEFT IN ADDRND, WITH ANY REQUIRED E OR F BANK SWITCHING DONE. ADDRESSES LESS
 R0070 THAN 450 ARE TAKEN TO BE RELATIVE TO THE WORK AREA. THE OP CODE IS NOW IN BITS 1-5 OF CYR WITH BIT 14 = 1.

| | | | | | | | | | | |
|------|-----|-----|-----------|------|----|------|---|----------|----------|---|
| 0072 | REF | 1 | | 6064 | 6 | 6220 | 1 | AD | -ENDVAC | SEE IP ADDRESS RELATIVE TO WORK AREA. |
| 0073 | REF | 270 | LAST 1079 | 6065 | 10 | 000 | 0 | CCS | A | |
| 0074 | REF | 1 | | 6066 | 6 | 7712 | 1 | AD | -ENDERAS | IF NOT, SEE IP IN GENERAL ERASABLE. |
| 0075 | REF | 1 | | 6067 | 1 | 8074 | 0 | TCP | IERASTST | |
| 0076 | REF | 18 | LAST 840 | 6070 | 3 | 0120 | 1 | NETZERO | CA | FIXLOC |
| 0077 | REF | 3 | LAST 1079 | 6071 | 26 | 116 | 0 | ADS | ADDRND | IF SO, LEAVE THE MODIFIED ADDRESS IN ADDRND AND DISPATCH. |
| 0078 | REF | 15 | LAST 1078 | 6072 | 50 | 020 | 0 | ITR15 | INDEX | CYR |
| 0079 | REF | 1 | | 6073 | 7 | 6242 | 1 | 7 | INDJUMP | -1 |
| 0080 | | | | 6074 | 0 | 0006 | 1 | IERASTST | EXTEND | |
| 0081 | REF | 1 | | 6075 | 6 | 6105 | 0 | BZMP | GEADDR | GO PROCESS GENERAL-ERASABLE ADDRESS. |
| 0082 | REF | 13 | LAST 1075 | 6076 | 7 | 4747 | 0 | MASK | LOW10 | FIXED BANK ADDRESS. RESTORE AND ADD B15. |
| 0083 | REF | 14 | LAST 1080 | 6077 | 6 | 4747 | 1 | AD | LOW10 | SWITCH BANKS AND LEAVE SUBADDRESS IN ADDRND FOR OPERAND RETRIEVAL. (THIS METHOD PRECLUDES USE OF THE LAST LOCATION IN EACH FBANK.) |
| 0084 | REF | 4 | LAST 1080 | 6100 | 56 | 116 | 1 | XCH | ADDRND | |
| 0085 | REF | 6 | LAST 1077 | 6101 | 6 | 0115 | 1 | AD | INTBIT15 | |
| 0086 | REF | 11 | LAST 1075 | 6102 | 54 | 004 | 1 | TS | FBANK | |
| 0087 | REF | 16 | LAST 1080 | 6103 | 50 | 020 | 0 | ITR12 | INDEX | CYR |
| 0088 | REF | 2 | LAST 1080 | 6104 | 7 | 6242 | 1 | 7 | INDJUMP | -1 |
| 0089 | REF | 4 | LAST 1071 | 6105 | 7 | 4747 | 0 | ORANDP | LOW10 | |
| 0090 | REF | 3 | LAST 372 | 6106 | 6 | 4744 | 1 | AD | OCT1400 | |
| 0091 | REF | 5 | LAST 1080 | 6107 | 56 | 116 | 1 | XCH | ADDRND | |
| 0092 | REF | 40 | LAST 1071 | 6110 | 54 | 003 | 0 | TS | FBANK | |
| 0093 | REF | 17 | LAST 1080 | 6111 | 50 | 020 | 0 | ITR10 | INDEX | CYR |
| 0094 | REF | 3 | LAST 1080 | 6112 | 7 | 6242 | 1 | 7 | INDJUMP | -1 |

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P0095 THE FOLLOWING ROUTINE PROCESSES INTERPRETIVE INDEXED ADDRESSES. AN INTERPRETER INDEX REGISTER MAY
 R0097 CONTAIN THE ADDRESS OF ANY ERASABLE REGISTER (0-42 BEING RELATIVE TO THE VAC AREA) OR ANY INTERPRETIVE PROGRAM
 R0099 BANK, OR ANY INTEGER IN THAT RANGE.

| | | | | | | | | | | |
|------|-----|-----|-----------|------|----------|----------|--------|------------|--|---|
| 0100 | REP | 1 | | 0113 | 3 7702 0 | DODLOAD* | CAP | DLOAD* | | |
| 0101 | REP | 18 | LAST 1080 | 0114 | 54 020 1 | TS | TS | CYR | | STOVL* COMES HERE TO PROCESS LOAD ADR. (STOVL* ENTERS HERE). |
| 0102 | REP | 19 | LAST 1080 | 0115 | 3 0120 1 | INDEX | CA | FIXLOC | | SET UP INDEX LOCATION. |
| 0103 | REP | 1 | | 0116 | 54 130 1 | | TS | INDEXLOC | | |
| 0104 | REP | 12 | LAST 1079 | 0117 | 24 164 1 | | INCR | LOC | | (ADDRESS ALWAYS GIVEN). |
| 0105 | REP | 13 | LAST 1081 | 0120 | 50 164 1 | | INDEX | LOC | | |
| 0106 | | | | 0121 | 4 0000 0 | | CS | 0 | | |
| 0107 | REP | 280 | LAST 1080 | 0122 | 10 000 0 | | CCS | A | | INDEX 2 IF ADDRESS STORED COMPLEMENTED. |
| 0108 | REP | 2 | LAST 1081 | 0123 | 24 130 0 | | INCR | INDEXLOC | | |
| 0109 | | | | 0124 | 16 125 0 | | NOOP | | | |
| 0110 | REP | 6 | LAST 1080 | 0125 | 54 116 0 | | TS | ADDRWD | | 14 BIT ADDRESS TO ADDRWD. |
| 0111 | REP | 2 | LAST 129 | 0126 | 7 7711 0 | | MASK | HIGH4 | | IF ADDRESS GREATER THAN 2K, ADD INTRIT15 |
| 0112 | | | | 0127 | 0 0008 1 | | EXTEND | | | |
| 0113 | REP | 1 | | 0130 | 1 6133 1 | | BZF | INDEX2 | | |
| 0114 | REP | 7 | LAST 1080 | 0131 | 3 0115 1 | | CA | INTRIT15 | | |
| 0115 | REP | 7 | LAST 1081 | 0132 | 26 116 0 | | ADS | ADDRWD | | |
| 0116 | REP | 3 | LAST 1081 | 0133 | 50 130 0 | INDEX2 | INDEX | INDEXLOC | | |
| 0117 | REP | 48 | LAST 882 | 0134 | 4 0046 1 | | CS | X1 | | |
| 0118 | REP | 8 | LAST 1081 | 0135 | 26 116 0 | | ADS | ADDRWD | | DO AUGMENT, IGNORING AND CORRECTING OVP. |
| 0119 | REP | 5 | LAST 737 | 0136 | 7 7713 1 | | MASK | HIGH9 | | SEE IF ADDRESS IS IN WORK AREA. |
| 0120 | | | | 0137 | 0 0008 1 | | EXTEND | | | |
| 0121 | REP | 1 | | 0140 | 1 6153 1 | | BZF | INDWRK | | SEE IF IN FIXED BANK. |
| 0122 | REP | 3 | LAST 1081 | 0141 | 7 7711 0 | | MASK | HIGH4 | | |
| 0123 | | | | 0142 | 0 0008 1 | | EXTEND | | | |
| 0124 | REP | 1 | | 0143 | 1 6155 1 | | BZF | INDERASE | | |
| 0125 | REP | 9 | LAST 1081 | 0144 | 3 0116 1 | | CA | ADDRWD | | IN FIXED - SWITCH BANKS AND CREATE SUB-ADDRESS. |
| 0126 | REP | 12 | LAST 1080 | 0145 | 54 004 1 | | TS | FBANK | | |
| 0127 | REP | 15 | LAST 1080 | 0146 | 7 4747 0 | | MASK | LOW10 | | |
| 0128 | REP | 1 | | 0147 | 6 4700 1 | | AD | 2K | | |
| 0129 | REP | 10 | LAST 1081 | 0150 | 54 116 0 | | TS | ADDRWD | | |
| 0130 | REP | 19 | LAST 1081 | 0151 | 50 020 0 | ITR11 | INDEX | CYR | | |
| 0131 | REP | 4 | LAST 1080 | 0152 | 3 6242 0 | | 3 | INDJUMP -1 | | |
| 0132 | REP | 20 | LAST 1081 | 0153 | 3 0120 1 | INDWRK | CA | FIXLOC | | MAKE ADDRWD RELATIVE TO WORK AREA. |
| 0133 | REP | 1 | | 0154 | 1 6161 0 | | TCP | ITR13 -1 | | |
| 0134 | REP | 4 | LAST 1080 | 0155 | 3 4744 1 | INDERASE | CA | OCT1400 | | |
| 0135 | REP | 11 | LAST 1081 | 0156 | 56 116 1 | | XCH | ADDRWD | | |
| 0136 | REP | 47 | LAST 1080 | 0157 | 54 003 0 | | TS | ERANK | | |
| 0137 | REP | 9 | LAST 1080 | 0160 | 7 4373 0 | | MASK | LOW8 | | |
| 0138 | REP | 12 | LAST 1081 | 0161 | 26 116 0 | -1 | ADS | ADDRWD | | |



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| | | | | | | | | | | | |
|------|-----|----|------|------|------|----|------|---|-------|-------|-----------|
| 0139 | REP | 20 | LAST | 1081 | 0162 | 50 | 020 | 0 | ITR13 | INDEX | CYR |
| 0140 | REP | 5 | LAST | 1081 | 0163 | 3 | 0242 | 0 | | 3 | INDJMP -1 |



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R0141 PUSH-UP ROUTINES. WHEN NO OPERAND ADDRESS IS GIVEN, THE APPROPRIATE OPERAND IS TAKEN FROM THE PUSH-DOWN
R0143 LIST. IN MOST CASES THE MODE OF THE RESULT (VECTOR OR SCALAR) OF THE LAST ARITHMETIC OPERATION PERFORMED
R0145 IS THE SAME AS THE TYPE OF OPERAND DESIRED (ALL ADD/SUBTRACT ETC.). EXCEPTIONS TO THIS GENERAL RULE ARE LISTED
R0147 BELOW (NOTE THAT IN EVERY CASE THE MODE REGISTER IS LEFT INTACT)

R0148 1. VXSC AND V/SC WANT THE OPPOSITE TYPE OF OPERAND, E.G., IF THE LAST OPERATION YIELDED A VECTOR
R0150 RESULT, VXSC WANTS A SCALAR.

R0151 2. THE LOAD CODES SHOULD LOAD THE ACCUMULATOR INDEPENDENT OF THE RESULT OF THE LAST OPERATION. THIS
R0153 INCLUDES VLOAD, DLOAD, TLOAD, PDLL, AND PDVL (NO PUSHUP WITH SLOAD).

R0154 3. SOME ARITHMETIC OPERATIONS REQUIRE A STANDARD TYPE OF OPERAND REGARDLESS OF THE PREVIOUS OPERATION.
R0156 THIS INCLUDES SIGN WANTING DP AND TAD REQUIRING TP.

| | | | | | | | | | | |
|------|-----|-----|-----------|------|----------|--------|-------|------------|--|--|
| 0157 | REP | 1 | | 6164 | 3 4374 0 | PUSHUP | CAP | OCT23 | | IF THE LOW 5 BITS OF CYR ARE LESS THAN |
| 0158 | REP | 21 | LAST 1082 | 6165 | 7 0020 1 | | MASK | CYR | | 20, THIS OP REQUIRES SPECIAL ATTENTION. |
| 0159 | REP | 1 | | 6166 | 6 8171 0 | | AD | -OCT10 | | (NO -0). |
| 0160 | REP | 281 | LAST 1081 | 6167 | 10 000 0 | | CCS | A | | |
| 0161 | REP | 1 | | 6170 | 1 6202 0 | | TCP | REGUP | | FOR ALL CODES GREATER THAN OCT 7. |
| 0162 | | | | 6171 | 77767 1 | -OCT10 | OCT | -10 | | |
| 0163 | REP | 2 | LAST 1020 | 6172 | 6 6061 0 | | AD | NEG4 | | WE NOW HAVE 7 - OP CODE(MOD4). SEE IF |
| 0164 | REP | 282 | LAST 1083 | 6173 | 10 000 0 | | CCS | A | | THE OP CODE (MOD4) IS THREE (REVERSE). |
| 0165 | REP | 283 | LAST 1083 | 6174 | 50 000 1 | | INDEX | A | | NO - THE MODE IS DEFINITE. PICK UP THE |
| 0166 | REP | 1 | | 6175 | 4 6213 0 | | CS | NO.WDS | | |
| 0167 | REP | 2 | LAST 1083 | 6176 | 1 6204 0 | | TCP | REGUP +2 | | |
| 0168 | REP | 5 | LAST 1078 | 6177 | 50 163 0 | | INDEX | MODE | | FOR VXSC AND V/SC WE WANT THE REQUIRED |
| 0169 | REP | 1 | | 6200 | 4 6211 1 | | CS | REVONT | | PUSHLOC DECREMENT WITHOUT CHANGING THE |
| 0170 | REP | 3 | LAST 1083 | 6201 | 1 6204 0 | | TCP | REGUP +2 | | MODE AT THIS TIME. |
| 0171 | REP | 6 | LAST 1083 | 6202 | 50 163 0 | REGUP | INDEX | MODE | | MOST ALL OP CODES PUSHUP HERE. |
| 0172 | REP | 2 | LAST 1083 | 6203 | 4 6213 0 | | CS | NO.WDS | | |
| 0173 | REP | 1 | | 6204 | 26 166 1 | +2 | ADS | PUSHLOC | | |
| 0174 | REP | 13 | LAST 1081 | 6205 | 54 116 0 | | TS | ADDRWD | | |
| 0175 | REP | 22 | LAST 1083 | 6206 | 50 020 0 | ITR14 | INDEX | CYR | | |
| 0176 | REP | 6 | LAST 1082 | 6207 | 7 6242 1 | | 7 | INDJUMP -1 | | (THE INDEX MAKES THIS A TCP.) |
| 0177 | | | | 6210 | 00002 0 | | OCT | 2 | | REVERSE PUSHUP DECREMENT. VECTOR TAKES 2 |
| 0178 | | | | 6211 | 00006 1 | REVONT | OCT | 6 | | WORDS, SCALAR TAKES 6. |
| 0179 | | | | 6212 | 00006 1 | | OCT | 6 | | |
| 0180 | | | | 6213 | 00002 0 | NO.WDS | OCT | 2 | | CONVENTIONAL DECREMENT IS 6 WORDS VECTOR |
| 0181 | | | | 6214 | 00003 1 | OCTAL3 | OCT | 3 | | 2 IN DP, AND 3 IN TP. |
| 0182 | | | | 6215 | 00006 1 | | OCT | 6 | | |



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P0183 TEST THE SECOND PREFIX BIT TO SEE IF THIS IS A MISCELLANEOUS OR A UNARY/SHORT SHIFT OPERATION.

| | | | | | | | | | | | | |
|------|-----|----|------|------|------|----|------|---|---------|---------|-----|--|
| 0185 | REP | 23 | LAST | 1083 | 0216 | 10 | 020 | 1 | OPJUMP2 | CCS | CYR | TEST SECOND PREFIX BIT. |
| 0186 | REP | 1 | | | 0217 | 1 | 0232 | 0 | TCP | OPJUMP3 | | TEST THIRD BIT TO SEE IF UNARY OR SHIFT. |

| | | | | | | | | | | | | |
|------|--|--|--|--|------|-------|---|--|---------|-----|-----|--|
| 0187 | | | | | 0220 | 77722 | 0 | | -ENDVAC | DEC | -45 | |
|------|--|--|--|--|------|-------|---|--|---------|-----|-----|--|

R0188 THE FOLLOWING ROUTINE PROCESSES ADDRESSES OF SUFFIX CLASS 10. THEY ARE BASICALLY WORK AREA ADDRESSES
 R0190 IN THE RANGE 0 - 52, ERASABLE ECADR CONSTANTS FROM 100 - 3777, AND PCADRS ABOVE THAT. ALL 15 BITS ARE AVAILABLE
 R0192 IN CONTRAST TO SUFFIX 1, IN WHICH ONLY THE LOW ORDER 14 ARE AVAILABLE.

| | | | | | | | | | | | | |
|------|-----|-----|------|------|------|----|------|---|----------|-------|----------|-----------------------------------|
| 0193 | REP | 14 | LAST | 1081 | 0221 | 24 | 164 | 1 | 15BITADR | INCR | LOC | (ENTRY HERE FROM STCALL). |
| 0194 | REP | 15 | LAST | 1084 | 0222 | 50 | 164 | 1 | | INDEX | LOC | PICK UP ADDRESS WORD. |
| 0195 | | | | | 0223 | 3 | 0000 | 1 | | CA | 0 | |
| 0196 | REP | 5 | LAST | 67 | 0224 | 54 | 117 | 1 | | TS | POLISH | WE MAY NEED A SUBADDRESS LATER. |
| 0197 | REP | 1 | | | 0225 | 3 | 4750 | 1 | | CAP | LOWY+2K | THESE INSTRUCTIONS ARE IN BANK 1. |
| 0198 | REP | 13 | LAST | 1081 | 0226 | 54 | 004 | 1 | | TS | FRANK | |
| 0199 | REP | 24 | LAST | 1084 | 0227 | 7 | 0020 | 1 | | MARK | CYR | |
| 0200 | REP | 284 | LAST | 1083 | 0230 | 50 | 000 | 1 | ITR7 | INDEX | A | |
| 0201 | REP | 1 | | | 0231 | 1 | 6303 | 0 | | TCP | MISCJUMP | |

L INTERPRETER

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F0202 COMPLETES THE DISPATCHING OF UNARY AND SHORT SHIFT OPERATIONS.

| ADDR | REP | LAST | ADDR | OP | TR | FRANK | COMMENT |
|------|-----|------|------------|-----------|-------|--------|--|
| 0204 | REP | 14 | LAST 1084 | | | | CALL. IN BANK a (BITS 11-18 OF A ARE a.) |
| 0204 | | | ITRACE (6) | REFERS TO | 0204 | | |
| 0205 | REP | 25 | LAST 1084 | | CCS | CYR | TEST THIRD PREFIX BIT. |
| 0206 | REP | 285 | LAST 1084 | | INDEX | A | THE DECREMENTED UNARY CODE IS IN BITS |
| 0207 | REP | 1 | | | TCP | UNAJMP | 1-4 OF A (ZERO, EXIT, HAS BEEN DETECTED) |
| 0208 | REP | 7 | LAST 1083 | | CCS | MODE | ITS A SHORT SHIFT CODE. SEE IF PRESENT |
| 0209 | REP | 1 | | | TCP | SHORTT | SCALAR OR VECTOR. |
| 0210 | REP | 2 | LAST 1085 | | TCP | SHORTT | |
| 0211 | REP | 1 | | | TCP | SHORTV | CALLS THE APPROPRIATE ROUTINE. |
| 0212 | REP | 22 | LAST 1086 | | ADDR | VRIIP | |

L INTERPRETER

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P0214 THE FOLLOWING IS THE JUMP TABLE FOR OP CODES WHICH MAY HAVE INDEXABLE ADDRESSES OR MAY PUSH UP.

| | | | | | | | | |
|------|-----|---|------|----------|----------|-----|--------|--|
| 0216 | REP | 1 | 6243 | 1 6454 0 | INDJMP | TCP | VLOAD | 00 - LOAD MPAC WITH A VECTOR. |
| 0217 | REP | 1 | 6244 | 1 7040 0 | | TCP | DAD | 01 - TRIPLE PRECISION ADD TO MPAC. |
| 0218 | REP | 1 | 6245 | 1 7624 1 | | TCP | SIGN | 02 - COMPLEMENT MPAC (V OR SC) IF X NEG. |
| 0219 | REP | 1 | 6246 | 1 7350 1 | | TCP | VXSC | 03 - VECTOR TIMES SCALAR. |
| 0220 | REP | 1 | 6247 | 1 6652 1 | | TCP | CGOTO | 04 - COMPUTED GO TO. |
| 0221 | REP | 2 | 6250 | 1 6437 0 | LAST 398 | TCP | TLOAD | 05 - LOAD MPAC WITH TRIPLE PRECISION. |
| 0222 | REP | 1 | 6251 | 1 6021 0 | | TCP | DLOAD | 06 - LOAD MPAC WITH A DP SCALAR. |
| 0223 | REP | 1 | 6252 | 1 7573 0 | | TCP | V/SC | 07 - VECTOR DIVIDED BY SCALAR. |
| 0224 | REP | 1 | 6253 | 1 6450 1 | | TCP | SLOAD | 10 - LOAD MPAC IN SINGLE PRECISION. |
| 0225 | REP | 1 | 6254 | 1 6567 1 | | TCP | SSP | 11 - SET SINGLE PRECISION INTO X. |
| 0226 | REP | 1 | 6255 | 1 6472 1 | | TCP | PDDL | 12 - PUSH DOWN MPAC AND RE-LOAD IN DP. |
| 0227 | REP | 1 | 6256 | 1 7303 1 | | TCP | MV | 13 - MATRIX POST-MULTIPLIED BY VECTOR. |
| 0228 | REP | 1 | 6257 | 1 6526 1 | | TCP | POVL | 14 - PUSH DOWN AND VECTOR LOAD. |
| 0229 | REP | 1 | 6260 | 1 6575 1 | | TCP | CCALL | 15 - COMPUTED CALL. |
| 0230 | REP | 1 | 6261 | 1 7306 1 | | TCP | VXM | 16 - MATRIX PRE-MULTIPLIED BY VECTOR. |
| 0231 | REP | 1 | 6262 | 1 7565 1 | | TCP | TSLC | 17 - NORMALIZE MPAC (SCALAR ONLY). |
| 0232 | REP | 1 | 6263 | 1 7543 0 | | TCP | DMPR | 20 - DP MULTIPLY AND ROUND. |
| 0233 | REP | 1 | 6264 | 1 7546 0 | | TCP | DDV | 21 - DP DIVIDE BY. |
| 0234 | REP | 1 | 6265 | 1 7552 0 | | TCP | DDV | 22 - DP DIVIDE INTO. |
| 0235 | REP | 1 | 6266 | 1 7570 0 | | TCP | GSHIFT | 23 - GENERAL SHIFT INSTRUCTION. |
| 0236 | REP | 1 | 6267 | 1 6720 0 | | TCP | VAD | 24 - VECTOR ADD. |
| 0237 | REP | 1 | 6270 | 1 6716 0 | | TCP | VSU | 25 - VECTOR SUBTRACT. |
| 0238 | REP | 1 | 6271 | 1 7005 1 | | TCP | BVSU | 26 - VECTOR SUBTRACT FROM. |
| 0239 | REP | 1 | 6272 | 1 7300 1 | | TCP | DOT | 27 - VECTOR DOT PRODUCT. |
| 0240 | REP | 1 | 6273 | 1 7427 0 | | TCP | VXV | 30 - VECTOR CROSS PRODUCT. |
| 0241 | REP | 1 | 6274 | 1 7374 1 | | TCP | VPROJ | 31 - VECTOR PROJECTION. |
| 0242 | REP | 1 | 6275 | 1 6754 0 | | TCP | DSU | 32 - DP SUBTRACT. |
| 0243 | REP | 1 | 6276 | 1 7031 0 | | TCP | BDSU | 33 - DP SUBTRACT FROM. |
| 0244 | REP | 1 | 6277 | 1 6744 1 | | TCP | DAD | 34 - DP ADD. |
| 0245 | REP | 1 | 6300 | 1 6300 0 | | TCP | | 35 - AVAILABLE |
| 0246 | REP | 1 | 6301 | 1 7541 1 | | TCP | DMP1 | 36 - DP MULTIPLY. |
| 0247 | REP | 1 | 6302 | 1 7562 0 | | TCP | SETPD | 37 - SET PUSH DOWN POINTER (DIRECT ONLY) |

R0248 CODES 10 AND 14 MUST NOT PUSH UP. CODE 04 MAY BE USED FOR VECTOR DECLARE BEFORE PUSHUP IF DESIRED.



L INTERPRETER

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P0250 THE FOLLOWING JUMP TABLE APPLIES TO INDEX, BRANCH, AND MISCELLANEOUS INSTRUCTIONS.

| | | | | | | | | | | |
|------|-----|---|------|---|------|---|----------|-----|----------|--|
| 0252 | REP | 1 | 0303 | 1 | 2371 | 1 | MISCJUMP | TCP | AXT | 00 - ADDRESS TO INDEX TRUE. |
| 0253 | REP | 1 | 0304 | 1 | 2376 | 0 | | TCP | AXC | 01 - ADDRESS TO INDEX COMPLEMENTED. |
| 0254 | REP | 1 | 0305 | 1 | 2401 | 1 | | TCP | LXA | 02 - LOAD INDEX FROM ERASABLE. |
| 0255 | REP | 1 | 0306 | 1 | 2405 | 0 | | TCP | LXC | 03 - LOAD INDEX FROM COMPLEMENT OF ERAS. |
| 0256 | REP | 1 | 0307 | 1 | 2411 | 0 | | TCP | SXA | 04 - STORE INDEX IN ERASABLE. |
| 0257 | REP | 1 | 0310 | 1 | 2417 | 0 | | TCP | XCHX | 05 - EXCHANGE INDEX WITH ERASABLE. |
| 0258 | REP | 1 | 0311 | 1 | 2433 | 0 | | TCP | INCR | 06 - INCREMENT INDEX REGISTER. |
| 0259 | REP | 1 | 0312 | 1 | 2442 | 0 | | TCP | TIX | 07 - TRANSFER ON INDEX. |
| 0260 | REP | 1 | 0313 | 1 | 2425 | 1 | | TCP | XAD | 10 - INDEX REGISTER ADD FROM ERASABLE. |
| 0261 | REP | 1 | 0314 | 1 | 2436 | 0 | | TCP | XSU | 11 - INDEX SUBTRACT FROM ERASABLE. |
| 0262 | REP | 1 | 0315 | 1 | 2514 | 1 | | TCP | BZE/GOTO | 12 - BRANCH ZERO AND GOTO. |
| 0263 | REP | 1 | 0316 | 1 | 2521 | 1 | | TCP | BPL/BMN | 13 - BRANCH PLUS AND BRANCH MINUS. |
| 0264 | REP | 1 | 0317 | 1 | 2474 | 0 | | TCP | RTB/BHIZ | 14 - RETURN TO BASIC AND BRANCH HI ZERO. |
| 0265 | REP | 1 | 0320 | 1 | 2534 | 0 | | TCP | CALL/ITA | 15 - CALL AND STORE QPRET. |
| 0266 | REP | 1 | 0321 | 1 | 2543 | 0 | | TCP | SW/ | 16 - SWITCH INSTRUCTIONS AND AVAILABLE. |
| 0267 | REP | 1 | 0322 | 1 | 2504 | 0 | | TCP | BOV(B) | 17 - BRANCH ON OVERFLOW TO BASIC OR INT. |



L INTERPRETER

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P0288 THE FOLLOWING JUMP TABLE APPLIES TO UNARY INSTRUCTIONS.

| 0269 | REF | 1 | | | COUNT | 00/INTER | | |
|------|-----|---|---------|----------|-------|----------|------|----------|
| 0270 | REF | 1 | 00,0000 | | | | BANK | 0 |
| 0271 | REF | 1 | 00,2000 | 1 3207 0 | | | TCP | SORT |
| 0272 | REF | 1 | 00,2001 | 1 3527 0 | | | TCP | SINE |
| 0273 | REF | 1 | 00,2002 | 1 3516 1 | | | TCP | COSINE |
| 0274 | REF | 1 | 00,2003 | 1 3607 1 | | | TCP | ARCSIN |
| 0275 | REF | 1 | 00,2004 | 1 3611 0 | | | TCP | ARCCOS |
| 0276 | REF | 1 | 00,2005 | 1 3174 1 | | | TCP | D80 |
| 0277 | REF | 1 | 00,2006 | 1 2116 1 | | | TCP | ROUND |
| 0278 | REF | 1 | 00,2007 | 1 7637 0 | | | TCP | COMP |
| 0279 | REF | 1 | 00,2010 | 1 3232 0 | | | TCP | VDEP |
| 0280 | REF | 1 | 00,2011 | 1 3023 1 | | | TCP | UNIT |
| 0281 | REF | 1 | 00,2012 | 1 3176 0 | | | TCP | ARVALABS |
| 0282 | REF | 1 | 00,2013 | 1 3245 0 | | | TCP | VSD |
| 0283 | REF | 1 | 00,2014 | 1 6323 1 | | | TCP | STADR |
| 0284 | REF | 1 | 00,2015 | 1 3274 1 | | | TCP | RVD |
| 0285 | REF | 1 | 00,2016 | 1 3241 1 | | | TCP | PUSH |

- 00 - EXIT - DETECTED EARLIER.
- 01 - SQUARE ROOT.
- 02 - SIN.
- 03 - COS.
- 04 - ARC SIN.
- 05 - ARC COS.
- 06 - DP SQUARE.
- 07 - ROUND TO DP.

- 10 - COMPLEMENT VECTOR OR SCALAR.
- 11 - VECTOR DEFINE.
- 12 - UNIT VECTOR.
- 13 - LENGTH OF VECTOR OR MAG OF SCALAR.
- 14 - SQUARE OF LENGTH OF VECTOR.
- 15 - PUSH UP ON STORE CODE.
- 16 - RETURN VIA OPRET.
- 17 - PUSH MPAC DOWN.

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P0286 SECTION 2 LOAD AND STORE PACKAGE.

R0287 A SET OF EIGHT STORE CODES IS PROVIDED AS THE PRIMARY METHOD OF STORING THE MULTI-PURPOSE
R0288 ACCUMULATOR (MPAC). IF IN THE DANZIG SECTION LOC REFERS TO AN ALGEBRAICALLY POSITIVE WORD, IT IS TAKEN AS A
R0291 STORE CODE WITH A CORRESPONDING ERASABLE ADDRESS. MOST OF THESE CODES ARE TWO ADDRESS, SPECIFYING THAT THE WORD
R0293 FOLLOWING THE STORE CODE IS TO BE USED AS AN ADDRESS FROM WHICH TO RE-LOAD MPAC. FOUR OPTIONS ARE AVAILABLE:

- R0295 1. STORE STORE MPAC. THE B ADDRESS MAY BE INDEXED.
- R0297 2. STOVL STORE MPAC AND RE-LOAD IT IN DP WITH THE NEXT ADDRESS (THE LOAD MAY BE INDEXED).
- R0299 3. STOVL STORE MPAC AND RE-LOAD A VECTOR (AS ABOVE).
- R0301 4. STCALL STORE AND DO A CALL (BOTH ADDRESSES MUST BE DIRECT HERE).

R0303 STOVL AND STOVL WILL TAKE FROM THE PUSH-DOWN LIST IF NO LOAD ADDRESS IS GIVEN.

0305 0323 BLOCK 3

| 0306 | REP | 2 | LAST | 1077 | TO | 1088' | 205 | 205* | COUNT | 03/INTER | | |
|------|-----|-----|------|------|----|-------|------|----------|---------|----------|----------|---|
| 0307 | REP | 4 | LAST | 1078 | | | 0323 | 3 0165 0 | STADR | CA | BANKSET | THE STADR CODE (PUSHUP UP ON STORE ADDRESS) ENTERS HERE. |
| 0308 | REP | 15 | LAST | 1085 | | | 0324 | 54 004 1 | | TS | FRANK | |
| 0309 | REP | 16 | LAST | 1084 | | | 0325 | 24 164 1 | | INCR | LOC | |
| 0310 | REP | 17 | LAST | 1089 | | | 0326 | 50 164 1 | ITR1 | INDEX | LOC | THE STORECODE WAS STORED COMPLEMENTED TO MAKE IT LOOK LIKE AN OPCODE PAIR. |
| 0311 | | | | | | | 0327 | 4 0000 0 | | CS | 0 | (YUL CANT REMOVE 1 BECAUSE OF EARLY CCS) |
| 0312 | REP | 23 | LAST | 1069 | | | 0330 | 6 7716 0 | | AD | NEONE | |
| 0313 | REP | 14 | LAST | 1083 | | | 0331 | 54 116 0 | DOSTORE | TS | ADDRND | |
| 0314 | REP | 7 | LAST | 373 | | | 0332 | 7 4372 1 | | MASK | LOW11 | ENTRY FROM DISPATCHER. SAVE THE ERASABLE ADDRESS AND JUMP ON THE STORE CODE NO. |
| 0315 | REP | 15 | LAST | 1089 | | | 0333 | 56 116 1 | | XCH | ADDRND | |
| 0316 | REP | 1 | | | | | 0334 | 7 7671 1 | | MASK | B12T14 | |
| 0317 | | | | | | | 0335 | 0 0008 1 | | EXTEND | | |
| 0318 | REP | 38 | LAST | 1013 | | | 0336 | 7 4708 0 | | MP | BITS | EACH TRANSFER VECTOR ENTRY IS TWO WORDS. |
| 0319 | REP | 286 | LAST | 1085 | | | 0337 | 50 000 1 | ITR0 | INDEX | A | |
| 0320 | REP | 1 | | | | | 0340 | 1 6341 0 | | TCP | STORJUMP | |

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P0321 STORE CODE JUMP TABLE. CALLS THE APPROPRIATE STORING ROUTINE AND EXITS TO DANZIG OR TO ADDRESS WITH
 R0323 A SUPPLIED OPERATION CODE.

R03231 STORE STORE,1 AND STORE,2 RETURN TO DANZIG, THUS RESETTING THE BANK TO ITS STATE AT INTRST.

| | | | | | | | | | |
|------|-----|----|-----------|------|----------|----------|-----|----------|----------------------------------|
| 0324 | REP | 1 | | 0341 | 0 0371 1 | STORJUMP | TC | STORE | STORE. |
| 0325 | REP | 9 | LAST 754 | 0342 | 1 0030 0 | | TCP | DANZIG | PICK UP NEW OP CODE(S). |
| 0326 | REP | 1 | | 0343 | 0 0363 1 | | TC | STORE,1 | |
| 0327 | REP | 10 | LAST 1090 | 0344 | 1 0030 0 | | TCP | DANZIG | |
| 0328 | REP | 1 | | 0345 | 0 0366 1 | | TC | STORE,2 | |
| 0329 | REP | 11 | LAST 1090 | 0346 | 1 0030 0 | | TCP | DANZIG | |
| 0330 | REP | 2 | LAST 1090 | 0347 | 0 0371 1 | | TC | STORE | STOVL. |
| 0331 | REP | 1 | | 0350 | 1 0427 1 | | TCP | DOLOAD | |
| 0332 | REP | 3 | LAST 1090 | 0351 | 0 0371 1 | | TC | STORE | STOVL WITH INDEXED LOAD ADDRESS. |
| 0333 | REP | 1 | | 0352 | 1 0113 0 | | TCP | DOLOAD* | |
| 0334 | REP | 4 | LAST 1090 | 0353 | 0 0371 1 | | TC | STORE | STOVL. |
| 0335 | REP | 1 | | 0354 | 1 0432 0 | | TCP | DOLOAD | |
| 0336 | REP | 5 | LAST 1090 | 0355 | 0 0371 1 | | TC | STORE | STOVL WITH INDEXED LOAD ADDRESS. |
| 0337 | REP | 1 | | 0356 | 1 0435 1 | | TCP | DOLOAD* | |
| 0338 | REP | 6 | LAST 1090 | 0357 | 0 0371 1 | | TC | STORE | STOVL. |
| 0339 | REP | 1 | | 0360 | 3 4723 0 | | CAP | CALLCODE | |
| 0340 | REP | 26 | LAST 1085 | 0361 | 54 020 1 | | TS | CYR | |
| 0341 | REP | 1 | | 0362 | 1 0221 1 | | TCP | 15BITADR | GET A 15 BIT ADDRESS. |



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P0342 STORE CODE ADDRESS PROCESSOR.

| | | | | | | | | | | | |
|------|-----|-----|------|------|------|----|------|---|----------|-------|----------|
| 0343 | REP | 21 | LAST | 1081 | 6363 | 50 | 120 | 1 | STORE,1 | INDEX | FIXLOC |
| 0344 | REP | 40 | LAST | 1081 | 6364 | 4 | 0046 | 1 | | CS | X1 |
| 0345 | REP | 1 | | | 6365 | 1 | 6370 | 1 | | TCP | PRESTORE |
| 0346 | REP | 22 | LAST | 1091 | 6366 | 50 | 120 | 1 | STORE,2 | INDEX | FIXLOC |
| 0347 | REP | 26 | LAST | 890 | 6367 | 4 | 0047 | 0 | | CS | X2 |
| 0348 | REP | 16 | LAST | 1089 | 6370 | 26 | 116 | 0 | PRESTORE | ADS | ADDRWD |
| 0349 | REP | 17 | LAST | 1091 | 6371 | 4 | 0116 | 0 | STORE | CS | ADDRWD |
| 0350 | REP | 2 | LAST | 941 | 6372 | 6 | 4727 | 1 | | AD | DEC45 |
| 0351 | REP | 267 | LAST | 1089 | 6373 | 10 | 000 | 0 | | CCS | A |
| 0352 | REP | 23 | LAST | 1091 | 6374 | 3 | 0120 | 1 | | CA | FIXLOC |
| 0353 | REP | 1 | | | 6375 | 1 | 6402 | 0 | | TCP | AHEAD5 |
| 0354 | REP | 5 | LAST | 1081 | 6376 | 3 | 4744 | 1 | | CA | OCT1400 |
| 0355 | REP | 18 | LAST | 1091 | 6377 | 56 | 116 | 1 | | XCH | ADDRWD |
| 0356 | REP | 48 | LAST | 1081 | 6400 | 54 | 003 | 0 | | TS | ERANK |
| 0357 | REP | 10 | LAST | 1081 | 6401 | 7 | 4373 | 0 | | MASK | LOW8 |
| 0358 | REP | 19 | LAST | 1091 | 6402 | 26 | 116 | 0 | AHEAD5 | ADS | ADDRWD |

RESULTANT ADDRESS IS IN ERASABLE.

DOES THE ADDRESS POINT TO THE WORK AREA?
YES.

NO. SET ERANK d MAKE UP SUBADDRESS.

L INTERPRETER

PO359 SCHEDULE ROUTINES. STORE DP, TP, OR VECTOR AS INDICATED BY MODE.

MPAC,+1 MUST BE STORED IN ANY EVENT.

| Address | Mode | Label | Value | Store Type | Index | MPAC |
|---------|---------|-----------|---------------|------------|--------|---------|
| 0380 | | | 6403 0 0006 1 | STARTSTO | EXTEND | |
| 0381 | | | | | DCA | MPAC |
| 0382 | REP 201 | LAST 1078 | 6404 3 0155 0 | | INDEX | ADDRWD |
| 0383 | REP 20 | LAST 1091 | 6405 50 116 1 | | DXCH | 0 |
| 0384 | | | 6406 52 001 1 | | | |
| 0385 | REP 8 | LAST 1085 | 6407 10 163 1 | | CCS | MODE |
| 0386 | REP 1 | | 6410 1 6423 0 | | TCF | TSTORE |
| 0387 | REP 229 | LAST 1076 | 6411 0 0002 0 | | TC | 0 |
| 0388 | | | 6412 0 0006 1 | VSTORE | EXTEND | |
| 0389 | REP 202 | LAST 1092 | 6413 3 0160 0 | | DCA | MPAC +3 |
| 0370 | REP 21 | LAST 1092 | 6414 50 116 1 | | INDEX | ADDRWD |
| 0371 | | | 6415 52 003 0 | | DXCH | 2 |
| 0372 | | | 6416 0 0006 1 | | EXTEND | |
| 0373 | REP 203 | LAST 1092 | 6417 3 0162 1 | | DCA | MPAC +5 |
| 0374 | REP 22 | LAST 1092 | 6420 50 116 1 | | INDEX | ADDRWD |
| 0375 | | | 6421 52 005 0 | | DXCH | 4 |
| 0376 | REP 230 | LAST 1092 | 6422 0 0002 0 | | TC | 0 |
| 0377 | REP 204 | LAST 1092 | 6423 3 0156 0 | TSTORE | CA | MPAC +2 |
| 0378 | REP 23 | LAST 1092 | 6424 50 116 1 | | INDEX | ADDRWD |
| 0379 | | | 6425 54 002 1 | | TS | 2 |
| 0380 | REP 231 | LAST 1092 | 6426 0 0002 0 | | TC | 0 |



P0381 ROUTINES TO BEGIN PROCESSING OF THE SECOND ADDRESS ASSOCIATED WITH ALL STORE-TYPE CODES EXCEPT STORE
R0383 ITSELF.

| | | | | | | | | | | | |
|------|-----|----|-----------|------|----|------|---|----------|-----|-------------|----------------------------|
| 0384 | REP | 1 | | 0427 | 3 | 7701 | 0 | DCDL0AD | CAP | DLOADCOD | |
| 0385 | REP | 27 | LAST 1090 | 0430 | 54 | 020 | 1 | | TS | CYR | |
| 0386 | REP | 1 | | 0431 | 1 | 6055 | 0 | | TCP | DIRADRES | GO GET A DIRECT ADDRESS. |
| 0387 | REP | 1 | | 0432 | 3 | 4674 | 0 | DOVLOAD | CAP | VLOADCOD | |
| 0388 | REP | 26 | LAST 1093 | 0433 | 54 | 020 | 1 | | TS | CYR | |
| 0389 | REP | 2 | LAST 1093 | 0434 | 1 | 6055 | 0 | | TCP | DIRADRES | |
| 0390 | REP | 1 | | 0435 | 3 | 6055 | 1 | DOVLOAD* | CAP | VLOAD* | |
| 0391 | REP | 2 | LAST 1090 | 0436 | 1 | 6114 | 1 | | TCP | DCDL0AD* +1 | PROLOGUE TO INDEX ROUTINE. |

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P0392 THE FOLLOWING LOAD INSTRUCTIONS ARE PROVIDED FOR LOADING THE MULTI-PURPOSE ACCUMULATOR MPAC.

| | | | | | | | | |
|------|---------|-----------|------|----------|----------|--------|---------|--|
| 0394 | REF 24 | LAST 1092 | 6437 | 50 116 1 | TLOAD | INDEX | ADDRWD | |
| 0395 | | | 6440 | 3 0002 0 | | CA | 2 | LOAD A TRIPLE PRECISION ARGUMENT INTO THE FIRST THREE MPAC REGISTERS, WITH THE CONTENTS OF THE OTHER FOUR IRRELEVANT. |
| 0396 | REF 295 | LAST 1092 | 6441 | 54 156 1 | | TS | MPAC +2 | |
| 0397 | | | 6442 | 0 0006 1 | | EXTEND | | |
| 0398 | REF 25 | LAST 1094 | 6443 | 5 0116 1 | | INDEX | ADDRWD | |
| 0399 | | | 6444 | 3 0001 0 | | DCA | 0 | |
| 0400 | REF 298 | LAST 1094 | 6445 | 52 155 1 | | DxCH | MPAC | |
| 0401 | REF 133 | LAST 1058 | 6446 | 3 4712 1 | TMODE | CAF | ONE | DECLARES TRIPLE PRECISION MODE. |
| 0402 | REF 1 | | 6447 | 1 6027 0 | | TCF | NEWMODE | |
| 0403 | | | 6450 | 22 007 0 | SLOAD | ZL | | LOAD A SINGLE PRECISION NUMBER INTO MPAC, SETTING MPAC+1,2 TO ZERO. THE CONTENTS OF THE REMAINING MPAC REGISTERS ARE IRRELEVANT. |
| 0404 | REF 26 | LAST 1094 | 6451 | 50 116 1 | | INDEX | ADDRWD | |
| 0405 | | | 6452 | 3 0000 1 | | CA | 0 | |
| 0406 | REF 1 | | 6453 | 1 6024 0 | | TCF | SLOAD2 | |
| 0407 | | | 6454 | 0 0006 1 | VLOAD | EXTEND | | LOAD A DOUBLE PRECISION VECTOR INTO MPAC,+1, MPAC+3,4, AND MPAC+5,6. THE CONTENTS OF MPAC +2 ARE IRRELEVANT. |
| 0408 | REF 27 | LAST 1094 | 6455 | 5 0116 1 | | INDEX | ADDRWD | |
| 0409 | | | 6456 | 3 0001 0 | | DCA | 0 | |
| 0410 | REF 297 | LAST 1094 | 6457 | 52 155 1 | | DxCH | MPAC | |
| 0411 | | | 6460 | 0 0006 1 | ENDVLOAD | EXTEND | | PDVL COMES HERE TO FINISH UP FOR DP, TP. |
| 0412 | REF 28 | LAST 1094 | 6461 | 5 0116 1 | | INDEX | ADDRWD | |
| 0413 | | | 6462 | 3 0003 1 | | DCA | 2 | |
| 0414 | REF 296 | LAST 1094 | 6463 | 52 160 1 | | DxCH | MPAC +3 | |
| 0415 | | | 6464 | 0 0006 1 | +4 | EXTEND | | TPDVL FINISHES HERE. |
| 0416 | REF 29 | LAST 1094 | 6465 | 5 0116 1 | | INDEX | ADDRWD | |
| 0417 | | | 6466 | 3 0005 1 | | DCA | 4 | |
| 0418 | REF 299 | LAST 1094 | 6467 | 52 162 0 | | DxCH | MPAC +5 | |
| 0419 | REF 134 | LAST 1094 | 6470 | 4 4712 0 | VMODE | CS | ONE | DECLARES VECTOR MODE. |
| 0420 | REF 2 | LAST 1094 | 6471 | 1 6027 0 | | TCF | NEWMODE | |

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P0421 THE FOLLOWING INSTRUCTIONS ARE PROVIDED FOR STORING OPERANDS IN THE PUSHDOWN LIST

| R0423 | 1. PUSH | PUSHDOWN AND NO LOAD. |
|-------|-------------------|-------------------------------------|
| R0424 | 2. PDDL | PUSHDOWN AND DOUBLE PRECISION LOAD. |
| R0425 | 3. PDVL | PUSHDOWN AND VECTOR LOAD. |
| 0426 | | 0472 0 0006 1 PDDL EXTEND |
| 0427 | REP 30 LAST 1094 | 0473 5 0116 1 INDEX ADDRWD |
| 0428 | | 0474 3 0001 0 DCA 0 |
| 0429 | REP 300 LAST 1094 | 0475 52 155 1 DXCH MPAC |
| 0430 | REP 2 LAST 1083 | 0476 50 166 0 INDEX PUSHLOC |
| 0431 | | 0477 52 001 1 DXCH 0 |
| 0432 | REP 9 LAST 1092 | 0500 50 163 0 INDEX MODE |
| 0433 | REP 3 LAST 1083 | 0501 3 6213 1 CAP NO.WDS |
| 0434 | REP 3 LAST 1095 | 0502 26 166 1 ADS PUSHLOC |
| 0435 | REP 10 LAST 1095 | 0503 10 163 1 CCS MODE |
| 0436 | REP 1 | 0504 1 6521 0 TCP ENDPUSH |
| 0437 | REP 1 | 0505 1 6517 0 TCP ENDDPUSH |
| 0438 | REP 11 LAST 1095 | 0506 54 163 1 TS MODE |
| 0439 | REP 301 LAST 1095 | 0507 54 156 1 ENDPUSH TS MPAC +2 |
| 0440 | REP 302 LAST 1095 | 0510 52 160 1 DXCH MPAC +3 |
| 0441 | REP 4 LAST 1095 | 0511 50 166 0 INDEX PUSHLOC |
| 0442 | | 0512 51-775 0 DXCH 0 -4 |
| 0443 | REP 303 LAST 1095 | 0513 52 162 0 DXCH MPAC +5 |
| 0444 | REP 5 LAST 1095 | 0514 50 166 0 INDEX PUSHLOC |
| 0445 | | 0515 51-777 1 DXCH 0 -2 |
| 0446 | REP 12 LAST 1090 | 0516 1 6030 0 TCP DANZIG |
| 0447 | REP 304 LAST 1095 | 0517 54 156 1 ENDPUSH TS MPAC +2 |
| 0448 | REP 13 LAST 1095 | 0520 1 6030 0 TCP DANZIG |
| 0449 | REP 12 LAST 1095 | 0521 54 163 1 ENDPUSH TS MODE |
| 0450 | REP 305 LAST 1095 | 0522 56 156 0 XCH MPAC +2 |
| 0451 | REP 6 LAST 1095 | 0523 50 166 0 +2 INDEX PUSHLOC |
| 0452 | | 0524 53-777 0 TS 0 -1 |
| 0453 | REP 14 LAST 1095 | 0525 1 6030 0 TCP DANZIG |

LOAD MPAC,+1, PUSHING THE FORMER CONTENTS DOWN.

ADVANCE THE PUSHDOWN POINTER APPROPRIATELY.

NOW DP.

PUSH DOWN THE REST OF THE VECTOR HERE.

SET MPAC +2 TO ZERO AND EXIT ON DP.

ON TRIPLE, SET MPAC +2 TO ZERO, PUSHING DOWN THE OLD CONTENTS

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P0454 PDVL - PUSHDOWN AND VECTOR LOAD.

| | | | | | | | | |
|------|-----|-----|------|--------|---|-------|--------|-------------|
| 0455 | | | 0526 | 0 0006 | 1 | PDVL | EXTEND | |
| 0456 | REP | 31 | LAST | 1095 | | | INDEX | ADDRWD |
| 0457 | | | 0530 | 3 0001 | 0 | | DCA | 0 |
| 0458 | REP | 306 | LAST | 1095 | | | DACH | MPAC |
| 0459 | REP | 7 | LAST | 1095 | | | INDEX | PUSHLOC |
| 0460 | | | 0533 | 52 001 | 1 | | DACH | 0 |
| 0461 | REP | 13 | LAST | 1095 | | | INDEX | MODE |
| 0462 | REP | 4 | LAST | 1095 | | | CAP | NO.WDS |
| 0463 | REP | 8 | LAST | 1096 | | | ADS | PUSHLOC |
| 0464 | REP | 14 | LAST | 1096 | | | CCS | MODE |
| 0465 | REP | 1 | | | | | TCP | TPDVL |
| 0466 | REP | 1 | | | | | TCP | ENDVLOAD |
| 0467 | | | 0542 | 0 0006 | 1 | VPDVL | EXTEND | |
| 0468 | REP | 32 | LAST | 1096 | | | INDEX | ADDRWD |
| 0469 | | | 0544 | 3 0003 | 1 | | DCA | 2 |
| 0470 | REP | 307 | LAST | 1096 | | | DACH | MPAC +3 |
| 0471 | REP | 9 | LAST | 1096 | | | INDEX | PUSHLOC |
| 0472 | | | 0547 | 51-775 | 0 | | DACH | 0 -4 |
| 0473 | | | 0550 | 0 0006 | 1 | | EXTEND | |
| 0474 | REP | 33 | LAST | 1096 | | | INDEX | ADDRWD |
| 0475 | | | 0552 | 3 0005 | 1 | | DCA | 4 |
| 0476 | REP | 308 | LAST | 1096 | | | DACH | MPAC +5 |
| 0477 | REP | 10 | LAST | 1096 | | | INDEX | PUSHLOC |
| 0478 | | | 0555 | 51-777 | 1 | | DACH | 0 -2 |
| 0479 | REP | 15 | LAST | 1095 | | | TCP | DANZIG |
| 0480 | | | 0557 | 0 0006 | 1 | TPDVL | EXTEND | |
| 0481 | REP | 34 | LAST | 1096 | | | INDEX | ADDRWD |
| 0482 | | | 0561 | 3 0003 | 1 | | DCA | 2 |
| 0483 | REP | 309 | LAST | 1096 | | | DACH | MPAC +3 |
| 0484 | REP | 310 | LAST | 1096 | | | CA | MPAC +2 |
| 0485 | REP | 11 | LAST | 1096 | | | INDEX | PUSHLOC |
| 0486 | | | 0565 | 53-777 | 0 | | TS | 0 -1 |
| 0487 | REP | 2 | LAST | 1096 | | | TCP | ENDVLOAD +4 |

RELOAD MPAC AND PUSH DOWN ITS CONTENTS.

ADVANCE THE PUSHDOWN POINTER.

TEST PAST MODE.

JUST LOAD LAST FOUR REGISTERS ON DP.

PUSHDOWN AND RE-LOAD LAST TWO COMPONENTS

ON TP, WE MUST LOAD THE Y COMPONENT BEFORE STORING MPAC +2 IN CASE THIS IS A PUSHUP.

IN DP.

R0486 SSP (STORE SINGLE PRECISION) IS EXECUTED HERE.

| | | | | | | | | |
|------|-----|----|------|------|--|--------|-------|--------|
| 0489 | REP | 18 | LAST | 1089 | | | INCR | LOC |
| 0490 | REP | 19 | LAST | 1096 | | | INDEX | LOC |
| 0491 | | | | | | | CA | 0 |
| 0492 | REP | 35 | LAST | 1096 | | STORE1 | INDEX | ADDRWD |
| 0493 | | | | | | | TS | 0 |

PICK UP THE WORD FOLLOWING THE GIVEN ADDRESS AND STORE IT AT X.

SOME INDEX AND MISCELLANEOUS OPS END HERE.



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0404 REF 16 LAST 1096 0574 1 0030 0 TCP DANZIG

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P0495 SEQUENCE CHANGING AND SUBROUTINE CALLING OPTIONS.

R0498 THE FOLLOWING OPERATIONS ARE AVAILABLE FOR SEQUENCING CHANGING, BRANCHING, AND CALLING SUBROUTINES'

- | | | |
|-------|----------|-----------------------------------|
| R0498 | 1. GOTO | GO TO. |
| R0499 | 2. CALL | CALL SUBROUTINE SETTING QPRT. |
| R0500 | 3. CGOTO | COMPUTED GO TO. |
| R0501 | 4. CCALL | COMPUTED CALL. |
| R0502 | 7. BPL | BRANCH IF MPAC POSITIVE OR ZERO. |
| R0503 | 8. BZR | BRANCH IF MPAC ZERO. |
| R0504 | 9. BNN | BRANCH IF MPAC NEGATIVE NON-ZERO. |

| | | | | | | | | | | | |
|------|-----|-----|------|------|---------|----|------|---|---------|--------|------------|
| 0505 | REP | 20 | LAST | 1096 | 6575 | 24 | 164 | 1 | CCALL | INCR | LOC |
| 0506 | REP | 21 | LAST | 1098 | 6576 | 50 | 164 | 1 | | INDEX | LOC |
| 0507 | | | | | 6577 | 3 | 0000 | 1 | | CAP | 0 |
| 0508 | REP | 36 | LAST | 1096 | 6600 | 50 | 116 | 1 | | INDEX | ADDRWD |
| 0509 | | | | | 6601 | 6 | 0000 | 1 | | AD | 0 |
| 0510 | REP | 16 | LAST | 1089 | 6602 | 54 | 004 | 1 | | TS | FRANK |
| 0511 | REP | 16 | LAST | 1081 | 6603 | 7 | 4747 | 0 | | MASK | LOW10 |
| 0512 | REP | 288 | LAST | 1091 | 6604 | 50 | 000 | 1 | | INDEX | A |
| 0513 | | | | | 6605 | 3 | 2000 | 0 | | CAP | 10000 |
| 0514 | REP | 6 | LAST | 1084 | 6606 | 54 | 117 | 1 | | TS | POLISH |
| 0515 | REP | 5 | LAST | 1089 | 6607 | 3 | 0165 | 0 | CALL | CA | BANKSET |
| 0516 | REP | 2 | LAST | 1085 | 6610 | 7 | 4364 | 0 | | MASK | BANKMASK |
| 0517 | REP | 3 | LAST | 1098 | 6611 | 6 | 4364 | 1 | | AD | BANKMASK |
| 0518 | REP | 22 | LAST | 1098 | 6612 | 6 | 0164 | 1 | | AD | LOC |
| 0519 | REP | 24 | LAST | 1091 | 6613 | 50 | 120 | 1 | | INDEX | FIXLOC |
| 0520 | REP | 17 | LAST | 748 | 6614 | 54 | 052 | 1 | | TS | QPRT |
| 0521 | REP | 7 | LAST | 1098 | 6615 | 3 | 0117 | 0 | GOTO | CA | POLISH |
| 0522 | REP | 4 | LAST | 1081 | 6616 | 7 | 7711 | 0 | +1 | MASK | HIGH4 |
| 0523 | | | | | 6617 | 0 | 0006 | 1 | | EXTEND | |
| 0524 | REP | 1 | | | 6620 | 1 | 6631 | 1 | | BZF | GOTOERS |
| 0525 | REP | 6 | LAST | 1098 | 6621 | 3 | 0165 | 0 | +4 | CA | BANKSET |
| 0526 | REP | 18 | LAST | 1078 | 6622 | 54 | 006 | 0 | | TS | FRANK |
| 0527 | REP | 8 | LAST | 1098 | 6623 | 3 | 0117 | 0 | | CA | POLISH |
| 0528 | REP | 17 | LAST | 1098 | 6624 | 54 | 004 | 1 | | TS | FRANK |
| 0529 | REP | 17 | LAST | 1098 | 6625 | 7 | 4747 | 0 | | MASK | LOW10 |
| 0530 | REP | 2 | LAST | 1081 | 6626 | 6 | 4700 | 1 | | AD | ZK |
| 0531 | REP | 23 | LAST | 1098 | 6627 | 54 | 164 | 0 | | TS | LOC |
| 0532 | REP | 227 | LAST | 1077 | 6630 | 1 | 6011 | 0 | | TCP | INTPRET +3 |
| 0533 | | | | | B3,1400 | | | | | BRANK= | 1400 |
| 0534 | REP | 9 | LAST | 1098 | 6631 | 3 | 0117 | 0 | GOTOERS | CA | POLISH |
| 0535 | REP | 2 | LAST | 1080 | 6632 | 6 | 6220 | 1 | | AD | -ENDVAC |
| 0536 | REP | 289 | LAST | 1098 | 6633 | 10 | 000 | 0 | | CCS | A |
| 0537 | REP | 10 | LAST | 1098 | 6634 | 3 | 0117 | 0 | | CA | POLISH |
| 0538 | REP | 1 | | | 6635 | 1 | 6644 | 0 | | TCP | GOTOER |

MAINTAIN LOC FOR QPRT COMPUTATION.

GET BASE ADDRESS OF CADR LIST.

ADD INCREMENT.
SELECT DESIRED CADR.

FOR ANY OF THE CALL OPTIONS, MAKE UP THE ADDRESS OF THE NEXT OP-CODE PAIR/STORE CODE AND LEAVE IT IN QPRT. NOTE THAT BANKMASK = -(2000 - 1).

BASIC BRANCHING SEQUENCE.

REP IF ADDRESS POINTS TO FIXED OR ERAS. SET BRANK PART OF BRANK. NEXT, SET UP FRANK. THE COMBINATION IS PICKED UP d PUT INTO BANKSET AT INTPRET +2.

SO YOU DON'T CROSS THE ACA 14000 BELOW.

THE GIVEN ADDRESS IS IN ERASABLE - REP IF RELATIVE TO THE WORK AREA.

GENERAL ERASABLE.

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| | | | | | | | | | | |
|------|-----|-----|------|------|------|----|------|---|----------|------------|
| 0539 | REP | 25 | LAST | 1098 | 0636 | 3 | 0120 | 1 | CA | FIXLOC |
| 0540 | REP | 11 | LAST | 1098 | 0637 | 8 | 0117 | 0 | AD | POLISH |
| 0541 | REP | 290 | LAST | 1098 | 0640 | 50 | 000 | 1 | INDEX | A |
| 0542 | | | | | 0641 | 3 | 0000 | 1 | CA | 0 |
| 0543 | REP | 12 | LAST | 1099 | 0642 | 54 | 117 | 1 | TS | POLISH |
| 0544 | REP | 1 | | | 0643 | 1 | 0616 | 1 | TCP | GOTO +1 |
| 0545 | REP | 49 | LAST | 1091 | 0644 | 54 | 003 | 0 | GOTO | TS EBANK |
| 0546 | REP | 11 | LAST | 1091 | 0645 | 7 | 4373 | 0 | | MASK LOW8 |
| 0547 | REP | 291 | LAST | 1099 | 0646 | 50 | 000 | 1 | INDEX | A |
| 0548 | | | | | 0647 | 3 | 1400 | 1 | CA | 1400 |
| 0549 | REP | 13 | LAST | 1099 | 0650 | 54 | 117 | 1 | TS | POLISH |
| 0550 | REP | 2 | LAST | 1099 | 0651 | 1 | 0616 | 1 | TCP | GOTO +1 |
| 0551 | REP | 24 | LAST | 1098 | 0652 | 50 | 164 | 1 | GOTO | INDEX LOC |
| 0552 | | | | | 0653 | 3 | 0001 | 0 | CA | 1 |
| 0553 | REP | 37 | LAST | 1098 | 0654 | 50 | 116 | 1 | INDEX | ADDRWD |
| 0554 | | | | | 0655 | 6 | 0000 | 1 | AD | 0 |
| 0555 | REP | 18 | LAST | 1098 | 0656 | 54 | 004 | 1 | TS | FRANK |
| 0556 | REP | 18 | LAST | 1098 | 0657 | 7 | 4747 | 0 | MASK | LOW10 |
| 0557 | REP | 292 | LAST | 1099 | 0660 | 50 | 000 | 1 | INDEX | A |
| 0558 | | | | | 0661 | 3 | 2000 | 0 | CA | 10000 |
| 0559 | REP | 14 | LAST | 1099 | 0662 | 54 | 117 | 1 | TS | POLISH |
| 0560 | REP | 3 | LAST | 1099 | 0663 | 1 | 0616 | 1 | TCP | GOTO +1 |
| 0561 | REP | 7 | LAST | 1098 | 0664 | 3 | 0165 | 0 | SWBRANCH | CA BANKSET |
| 0562 | REP | 19 | LAST | 1099 | 0665 | 54 | 004 | 1 | TS | FRANK |
| 0563 | REP | 25 | LAST | 1099 | 0666 | 50 | 164 | 1 | INDEX | LOC |
| 0564 | | | | | 0667 | 3 | 0001 | 0 | CA | 1 |
| 0565 | REP | 15 | LAST | 1099 | 0670 | 54 | 117 | 1 | TS | POLISH |
| 0566 | REP | 4 | LAST | 1099 | 0671 | 1 | 0616 | 1 | TCP | GOTO +1 |

WORK AREA.

USE THE GIVEN ADDRESS AS THE ADDRESS OF THE BRANCH ADDRESS.

ALLOWS ARBITRARY INDIRECTNESS LEVELS.

USE THE GIVEN ADDRESS AS THE ADDRESS OF THE BRANCH ADDRESS.

COMPUTED GO TO. PICK UP ADDRESS OF CADR LIST. ADD MODIFIER.

SELECT GOTO ADDRESS.

WITH ADDRESS IN A.

SWITCH INSTRUCTIONS WHICH ELECT TO BRANCH COME HERE TO DO SO.

L INTERPRETER

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P0567 TRIPLE PRECISION BRANCHING ROUTINE. IF CALLING TC IS AT L, RETURN IS AS FOLLOWS'

R0569 L+1 IF MPAC IS GREATER THAN ZERO.
 R0570 L+2 IF MPAC IS EQUAL TO +0 OR -0.
 R0571 L+3 IF MPAC IS LESS THAN ZERO.

| | | | | | | | |
|------|---------|-----------|---------------|--------|-----|------|----------|
| 0572 | REP 311 | LAST 1096 | 6672 10 154 0 | BRANCH | CCS | MPAC | |
| 0573 | REP 232 | LAST 1092 | 6673 0 0002 0 | | TC | 0 | |
| 0574 | | | 6674 1 6676 1 | | TCF | +2 | ON ZERO. |
| 0575 | REP 1 | | 6675 1 6710 0 | | TCF | NEG | |

| | | | | | | | |
|------|---------|-----------|---------------|--|-----|---------|--|
| 0576 | REP 312 | LAST 1100 | 6676 10 155 1 | | CCS | MPAC +1 | |
| 0577 | REP 233 | LAST 1100 | 6677 0 0002 0 | | TC | 0 | |
| 0578 | | | 6700 1 6702 0 | | TCF | +2 | |
| 0579 | REP 2 | LAST 1100 | 6701 1 6710 0 | | TCF | NEG | |

| | | | | | | | |
|------|---------|-----------|---------------|--|-----|---------|--|
| 0580 | REP 313 | LAST 1100 | 6702 10 156 1 | | CCS | MPAC +2 | |
| 0581 | REP 234 | LAST 1100 | 6703 0 0002 0 | | TC | 0 | |
| 0582 | | | 6704 1 6706 1 | | TCF | +2 | |
| 0583 | REP 3 | LAST 1100 | 6705 1 6710 0 | | TCF | NEG | |

| | | | | | | | |
|------|---------|-----------|---------------|-----|-------|---|--|
| 0584 | REP 235 | LAST 1100 | 6706 50 002 0 | Q+1 | INDEX | 0 | |
| 0585 | | | 6707 0 0001 0 | | TC | 1 | |

| | | | | | | | |
|------|---------|-----------|---------------|-----|-------|-----|--|
| 0586 | REP 236 | LAST 1100 | 6710 50 002 0 | NEG | INDEX | 0 | IF FIRST NON-ZERO REGISTER WAS NEGATIVE. |
| 0587 | | | 6711 0 0002 0 | | TC | 2 | |
| 0588 | REP 4 | LAST 1100 | 6710 | Q+2 | = | NEG | |

R0589 ITRACE (3) REFERS TO EXITS.

| | | | | | | | |
|------|--------|-----------|---------------|------|-------|---------|--|
| 0590 | REP 8 | LAST 1099 | 6712 3 0165 0 | EXIT | CA | BANKSET | |
| 0591 | REP 19 | LAST 1098 | 6713 54 006 0 | | TS | BANK | |
| 0592 | REP 26 | LAST 1099 | 6714 50 164 1 | | INDEX | LOC | |
| 0593 | | | 6715 0 0001 0 | | TC | 1 | |

RESTORE USER'S BANK SETTING, AND LEAVE INTERPRETIVE MODE.

L INTERPRETER

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P0594 SECTION 3 - ADD/SUBTRACT PACKAGE.

P0595 THE FOLLOWING OPERATIONS ARE PROVIDED FOR ADDING TO AND SUBTRACTING FROM THE MULTI-PURPOSE ACCUMULATOR
 P0597 MPAC:

- P0598 1. DAD DOUBLE PRECISION ADD.
- P0599 2. DSU DOUBLE PRECISION SUBTRACT.
- P0600 3. BDSU DOUBLE PRECISION SUBTRACT FROM.
- P0601 4. TAD TRIPLE PRECISION ADD.
- P0602 5. VAD VECTOR ADD.
- P0603 6. VSU VECTOR SUBTRACT.
- P0604 7. BVSU VECTOR SUBTRACT FROM.

P0605 THE INTERPRETIVE OVERFLOW INDICATOR OVFPND IS SET NON-ZERO IF OVERFLOW OCCURS IN ANY OF THE ABOVE.
 P0607 REP 44 LAST 1077 6716 3 4674 0 VSU CAP BIT15 CHANGES 0 TO DCS.
 P0608 6717 1 6721 1 TCF +2

P0609 REP 12 LAST 953 6720 3 4371 0 VAD CAP PRIO30 CHANGES 0 TO DCA.
 P0610 REP 38 LAST 1099 6721 26 116 0 ADS ADDRND
 P0611 6722 0 0006 1 EXTEND

P0612 REP 39 LAST 1101 6723 5 0116 1 INDEX ADDRND
 P0613 REP 2 LAST 424 6724 00 003 1 READ HISCALAR DCA 2 OR DCS 2
 P0614 REP 314 LAST 1100 6725 20 160 1 DAS MPAC +3

P0615 6726 0 0006 1 EXTEND CHECK OVERFLOW.
 P0616 6727 1 6731 0 BZF +2
 P0617 REP 1 6730 0 6763 0 TCF OVERFLWY

P0618 6731 0 0006 1 EXTEND
 P0619 REP 40 LAST 1101 6732 5 0116 1 INDEX ADDRND
 P0620 REP 8 LAST 1033 6733 00 005 1 READ CHAN5 DCA 4 OR DCS 4
 P0621 REP 315 LAST 1101 6734 20 162 0 DAS MPAC +5

P0622 6735 0 0006 1 EXTEND
 P0623 6736 1 6740 0 BZF +2
 P0624 REP 1 6737 0 6760 0 TCF OVERPLWZ

P0625 6740 0 0006 1 EXTEND
 P0626 REP 41 LAST 1101 6741 5 0116 1 INDEX ADDRND
 P0627 REP 15 LAST 1049 6742 00 001 0 READ LCHAN DCA 0 OR DCS 0
 P0628 REP 1 6743 1 6747 1 TCF ENDVXV

P0629 6744 0 0006 1 DAD EXTEND
 P0630 REP 42 LAST 1101 6745 5 0116 1 INDEX ADDRND
 P0631 6746 3 0001 0 DCA 0
 P0632 REP 316 LAST 1101 6747 20 155 1 ENDVXV DAS MPAC VXV FINISHES HERE.
 P0633 6750 0 0006 1 EXTEND
 P0634 REP 17 LAST 1097 6751 1 6030 0 BZF DANZIG



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| | | | | | | | | | | |
|------|-----|----|------|------|------|---|-------|----|----------|--------|
| 0635 | REP | 1 | 0752 | 0 | 0766 | 0 | STOVP | TC | OVERFLOW | |
| 0636 | REP | 16 | LAST | 1101 | 0753 | 1 | 0830 | 0 | TCP | DANZIG |

L INTERPRETER

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| | | | | | | | |
|------|---------|-----------|------|----------|----------|--------|----------|
| 0637 | | | 6754 | 0 0006 1 | DSU | EXTEND | |
| 0638 | REP 43 | LAST 1101 | 6755 | 5 0116 1 | | INDEX | ADDRND |
| 0639 | | | 6756 | 4 0001 1 | | DCS | 0 |
| 0640 | REP 2 | LAST 1101 | 6757 | 1 6747 1 | | TCP | ENDXV |
| 0641 | REP 166 | LAST 1075 | 6760 | 54 001 1 | OVERFLWZ | TS | L |
| 0642 | REP 26 | LAST 1039 | 6761 | 3 4715 0 | | CAP | FIVE |
| 0643 | | | 6762 | 1 6765 1 | | TCP | +3 |
| 0644 | REP 169 | LAST 1103 | 6763 | 54 001 1 | OVERFLWZ | TS | L |
| 0645 | REP 40 | LAST 1060 | 6764 | 3 6214 0 | | CAP | THREE |
| 0646 | REP 170 | LAST 1103 | 6765 | 56 001 0 | | XCH | L |
| 0647 | REP 293 | LAST 1099 | 6766 | 50 000 1 | OVERFLOW | INDEX | A |
| 0648 | REP 5 | LAST 1036 | 6767 | 4 4673 0 | | CS | LIMITS |
| 0649 | REP 44 | LAST 369 | 6770 | 54 130 1 | | TS | BUF |
| 0650 | | | 6771 | 0 0006 1 | | EXTEND | |
| 0651 | REP 294 | LAST 1103 | 6772 | 24 000 1 | | AUG | A |
| 0652 | REP 171 | LAST 1103 | 6773 | 50 001 0 | | INDEX | L |
| 0653 | REP 317 | LAST 1101 | 6774 | 26 155 1 | | ADS | MPAC +1 |
| 0654 | | | 6775 | 54 007 1 | | TS | 7 |
| 0655 | REP 210 | LAST 1077 | 6776 | 3 4714 1 | | CAP | ZERO |
| 0656 | REP 45 | LAST 1103 | 6777 | 8 0130 0 | | AD | BUF |
| 0657 | REP 172 | LAST 1103 | 7000 | 50 001 0 | | INDEX | L |
| 0658 | REP 318 | LAST 1103 | 7001 | 26 154 0 | | ADS | MPAC |
| 0659 | | | 7002 | 54 007 1 | | TS | 7 |
| 0660 | REP 237 | LAST 1100 | 7003 | 0 0002 0 | | TC | 0 |
| 0661 | REP 1 | | 7004 | 1 7121 0 | | TCP | SETOVF2 |
| 0662 | | | 7005 | 0 0006 1 | BVSU | EXTEND | |
| 0663 | REP 44 | LAST 1103 | 7006 | 5 0116 1 | | INDEX | ADDRND |
| 0664 | | | 7007 | 3 0003 1 | | DCA | 2 |
| 0665 | REP 319 | LAST 1103 | 7010 | 52 160 1 | | DACH | MPAC +3 |
| 0666 | | | 7011 | 0 0006 1 | | EXTEND | |
| 0667 | | | 7012 | 4 0001 1 | | DCOM | |
| 0668 | REP 320 | LAST 1103 | 7013 | 20 160 1 | | DAS | MPAC +3 |
| 0669 | | | 7014 | 0 0006 1 | | EXTEND | |
| 0670 | | | 7015 | 1 7017 1 | | BZF | +2 |
| 0671 | REP 2 | LAST 1101 | 7016 | 0 6763 0 | | TC | OVERFLWZ |
| 0672 | | | 7017 | 0 0006 1 | | EXTEND | |
| 0673 | REP 45 | LAST 1103 | 7020 | 5 0116 1 | | INDEX | ADDRND |
| 0674 | | | 7021 | 3 0005 1 | | DCA | 4 |
| 0675 | REP 321 | LAST 1103 | 7022 | 52 162 0 | | DACH | MPAC +5 |
| 0676 | | | 7023 | 0 0006 1 | | EXTEND | |
| 0677 | | | 7024 | 4 0001 1 | | DCOM | |
| 0678 | REP 322 | LAST 1103 | 7025 | 20 162 0 | | DAS | MPAC +5 |
| 0679 | | | 7026 | 0 0006 1 | | EXTEND | |
| 0680 | | | 7027 | 1 7031 0 | | BZF | +2 |
| 0681 | REP 2 | LAST 1101 | 7030 | 0 6760 0 | | TC | OVERFLWZ |

ENTRY FOR THIRD COMPONENT.

ENTRY FOR SECOND COMPONENT.

ENTRY FOR 1ST COMP OR DP (L=0).
PICK UP POSMAX OR NEGMAX.

FORCE OVERFLOW.

NO OVERFLOW EXIT.
SET OVFLND AND EXIT.



| L | INTERPRETER | | | | | |
|------|-------------------|------|----------|------|--------|--------|
| 0462 | | 7031 | 0 0006 1 | EDSU | EXTEND | |
| 0463 | REP 46 LAST 1103 | 7032 | 5 0116 1 | | INDEX | ADDRND |
| 0464 | | 7033 | 3 0001 0 | | DCA | 0 |
| 0465 | REP 323 LAST 1103 | 7034 | 52 155 1 | | DACH | MPAC |
| 0466 | | 7035 | 0 0006 1 | | EXTEND | |
| 0467 | | 7036 | 4 0001 1 | | DCM | |
| 0468 | REP 3 LAST 1103 | 7037 | 1 6747 1 | | TCF | ENDXV |



L INTERPRETER

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P0689 TRIPLE PRECISION ADD ROUTINE.

| | | | | | | | |
|------|---------|-----------|------|----------|-----|--------|---------|
| 0690 | | | 7040 | 0 0000 1 | TAD | EXTEND | |
| 0691 | REF 47 | LAST 1104 | 7041 | 5 0116 1 | | INDEX | ADDRMD |
| 0692 | | | 7042 | 3 0002 0 | | DCA | 1 |
| 0693 | REF 324 | LAST 1104 | 7043 | 20 156 1 | | DAS | MPAC +1 |
| 0694 | REF 48 | LAST 1105 | 7044 | 50 116 1 | | INDEX | ADDRMD |
| 0695 | | | 7045 | 6 0000 1 | | AD | 0 |
| 0696 | REF 325 | LAST 1105 | 7046 | 6 0154 1 | | AD | MPAC |
| 0697 | REF 326 | LAST 1105 | 7047 | 54 154 0 | | TS | MPAC |
| 0698 | REF 19 | LAST 1102 | 7050 | 1 6030 0 | | TCP | DANZIG |
| 0699 | REF 1 | | 7051 | 1 6752 0 | | TCP | SETOVP |

ADD MINOR PARTS FIRST.

SET OVFPD IF SUCH OCCURS.

L INTERPRETER

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P0700 ARITHMETIC SUBROUTINES REQUIRED IN FIXED-FIXED.

| ROUTINE | DESCRIPTION | OPERANDS | INSTRUCTIONS | OPERANDS | DESCRIPTION |
|---------|-------------|--|----------------------|--------------|--|
| R0701 | 1. DMPSUB | DOUBLE PRECISION MULTIPLY. MULTIPLY THE CONTENTS OF MPAC, +1 BY THE DP WORD WHOSE ADDRESS IS IN ADDRWD AND LEAVE A TRIPLE PRECISION RESULT IN MPAC. | 7052 50 002 0 DMP | INDEX 0 | BASIC SUBROUTINE FOR USE BY PINBALL, ETC |
| R0703 | 2. ROUNDSUB | ROUND THE TRIPLE PRECISION CONTENTS OF MPAC TO DOUBLE PRECISION. | 7053 3 0000 1 | CAP 0 | ADRES OF ARGUMENT FOLLOWS TC DMP |
| R0707 | 3. DOTSUB | TAKE THE DOT PRODUCT OF THE VECTOR IN MPAC AND THE VECTOR WHOSE ADDRESS IS IN ADDRWD AND LEAVE THE TRIPLE PRECISION RESULT IN MPAC. | 7054 24 002 0 | INCR 0 | |
| R0709 | | | 7055 54 116 0 -1 | TS ADDRWD | (PROLOGUE FOR SETTING ADDRWD.) |
| R0710 | 4. POLY | USING THE CONTENTS OF MPAC AS A DP ARGUMENT, EVALUATE THE POLYNOMIAL WHOSE DEGREE AND COEFFICIENTS IMMEDIATELY FOLLOW THE TC POLY INSTRUCTION (SEE ROUTINE FOR DETAILS.) | | | |
| R0712 | | | | | |
| 0714 | REF 238 | LAST 1103 | 7056 50 116 1 DMPSUB | INDEX ADDRWD | GET MINOR PART OF OPERAND AT C(ADDRWD). |
| 0715 | | | 7057 3 0001 0 | CA 1 | |
| 0716 | REF 239 | LAST 1106 | 7060 54 156 1 | TS MPAC +2 | THIS WORKS FOR SQUARING MPAC AS WELL. |
| 0717 | REF 49 | LAST 1105 | 7061 3 4714 1 | CAP ZERO | SET MPAC +1 TO ZERO SO WE CAN ACCUMULATE |
| | | | 7062 56 155 0 | XCH MPAC +1 | THE PARTIAL PRODUCTS WITH DAS |
| | | | 7063 54 135 1 | TS MPTEMP | INSTRUCTIONS. |
| | | | 7064 0 0006 1 | EXTEND | |
| | | | 7065 7 0156 1 | MP MPAC +2 | MINOR OF MPAC X MINOR OF C(ADDRWD). |
| 0718 | REF 50 | LAST 1106 | 7066 56 156 0 | XCH MPAC +2 | DISCARD MINOR PART OF ABOVE RESULT AND |
| 0719 | | | 7067 0 0006 1 | EXTEND | FORM MAJOR OF MPAC X MINOR OF C(ADDRWD). |
| 0720 | REF 327 | LAST 1105 | 7070 7 0154 0 | MP MPAC | GUARANTEED NO OVERFLOW. |
| 0721 | REF 211 | LAST 1103 | 7071 20 156 1 | DAS MPAC +1 | |
| 0722 | REF 328 | LAST 1106 | 7072 50 116 1 | INDEX ADDRWD | GET MAJOR PART OF ARGUMENT AT C(ADDRWD). |
| 0723 | REF 8 | LAST 1074 | 7073 3 0000 1 | CA 0 | |
| 0724 | | | 7074 56 135 0 | XCH MPTEMP | SAVE AND BRING OUT MINOR OF MPAC. |
| 0725 | REF 329 | LAST 1106 | 7075 0 0006 1 | EXTEND | |
| | | | 7076 7 0135 1 | MP MPTEMP | MAJOR OF C(ADDRWD) X MINOR OF MPAC. |
| | | | 7077 20 156 1 | DAS MPAC +1 | ACCUMULATE, SETTING A TO NET OVERFLOW. |
| 0726 | REF 330 | LAST 1106 | 7100 56 154 1 | XCH MPAC | SETTING MPAC TO 0 OR +-1. |
| 0727 | | | 7101 0 0006 1 | EXTEND | |
| 0728 | REF 331 | LAST 1106 | 7102 7 0135 1 | MP MPTEMP | MAJOR OF MPAC X MAJOR OF C(ADDRWD). |
| 0729 | REF 332 | LAST 1106 | 7103 20 155 1 | DAS MPAC | GUARANTEED NO OVERFLOW. |
| | | | 7104 0 0002 0 | TC 0 | 49 MCT = .573 MS. INCLUDING RETURN. |

L INTERPRETER

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P0741 ROUND MPAC TO DOUBLE PRECISION, SETTING OVPIND ON THE RARE EVENT OF OVERFLOW.

| | | | | | | | | |
|------|---------|-----------|------|----------|----------|--------|---------|--|
| 0743 | REF 212 | LAST 1106 | 7105 | 3 4714 1 | ROUNDSUB | CAP | ZERO | SET MPAC +2 = 0 FOR SCALARS AND CHANGE |
| 0744 | REF 15 | LAST 1096 | 7106 | 54 163 1 | +1 | TS | MODE | MODE TO DP. |
| 0745 | REF 336 | LAST 1106 | 7107 | 56 156 0 | VROND | XCH | MPAC +2 | BUT WE NEEDNT TAKE THE TIME FOR VECTORS. |
| 0746 | | | 7110 | 6 0000 1 | | DOUBLE | | |
| 0747 | REF 173 | LAST 1103 | 7111 | 54 001 1 | | TS | L | |
| 0748 | REF 241 | LAST 1106 | 7112 | 0 0002 0 | | TC | 0 | |
| 0749 | REF 337 | LAST 1107 | 7113 | 6 0155 0 | | AD | MPAC +1 | ADD ROUNDING BIT IF MPAC +2 WAS GREATER |
| 0750 | REF 338 | LAST 1107 | 7114 | 54 155 1 | | TS | MPAC +1 | THAN .5 IN MAGNITUDE. |
| 0751 | REF 242 | LAST 1107 | 7115 | 0 0002 0 | | TC | 0 | |
| 0752 | REF 339 | LAST 1107 | 7116 | 6 0154 1 | | AD | MPAC | PROPAGATE INTERFLOW. |
| 0753 | REF 340 | LAST 1107 | 7117 | 54 154 0 | | TS | MPAC | |
| 0754 | REF 243 | LAST 1107 | 7120 | 0 0002 0 | | TC | 0 | |
| 0755 | REF 2 | LAST 844 | 7121 | 54 121 1 | SETOVP2 | TS | OVPIND | (RARE). |
| 0756 | REF 244 | LAST 1107 | 7122 | 0 0002 0 | | TC | 0 | |

L INTERPRETER

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P0757 THE DOT PRODUCT SUBROUTINE USUALLY FORMS THE DOT PRODUCT OF THE VECTOR IN MPAC WITH A STANDARD SIX
R0759 REGISTER VECTOR WHOSE ADDRESS IS IN ADDR'D. IN THIS CASE C(DOTINC) ARE SET TO 2. VXM, HOWEVER, SETS C(DOTINC) TO
R0761 6 SO THAT DOTSUB DOTS MPAC WITH A COLUMN VECTOR OF THE MATRIX IN QUESTION IN THIS CASE.
0763 REP 52 LAST 1071 7123 3 4711 1 PREDOT CAP TWO PROLOGUE TO SET DOTINC TO 2.
0764 REP 4 LAST 68 7124 54 138 1 TS DOTINC

0765 7125 0 0008 1 DOTSUB EXTEND
0766 REP 5 LAST 68 7126 22 137 1 QXCH DOTRET SAVE RETURN.
0767 REP 1 7127 0 7058 0 TC DMPSUB DOT X COMPONENTS.
0768 REP 341 LAST 1107 7130 52 160 1 DXCH MPAC +3 POSITION Y COMPONENT OF MPAC FOR
0769 REP 342 LAST 1108 7131 52 155 1 DXCH MPAC MULTIPLICATION WHILE SAVING RESULT IN
0770 REP 46 LAST 1103 7132 52 131 0 DXCH BUF THREE WORD BUFFER, BUF.
0771 REP 343 LAST 1108 7133 3 0156 0 CA MPAC +2
0772 REP 47 LAST 1108 7134 54 132 0 TS BUF +2

0773 REP 5 LAST 1108 7135 3 0138 0 CA DOTINC ADVANCE ADDR'D TO Y COMPONENT OF
0774 REP 52 LAST 1108 7136 28 116 0 ADS ADDR'D OTHER ARGUMENT.
0775 REP 2 LAST 1108 7137 0 7058 0 TC DMPSUB
0776 REP 344 LAST 1108 7140 52 156 1 DXCH MPAC +1 ACCUMULATE PARTIAL PRODUCTS.
0777 REP 48 LAST 1108 7141 20 132 0 DAS BUF +1
0778 REP 345 LAST 1108 7142 6 0154 1 AD MPAC
0779 REP 49 LAST 1108 7143 6 0130 0 AD BUF
0780 REP 50 LAST 1108 7144 54 130 1 TS BUF
0781 7145 1 7147 0 TCP +2
0782 REP 3 LAST 1107 7146 54 121 1 TS OVPIND IF OVERFLOW OCCURS.

0783 REP 346 LAST 1108 7147 52 162 0 DXCH MPAC +5 MULTIPLY Z COMPONENTS.
0784 REP 347 LAST 1108 7150 52 155 1 DXCH MPAC
0785 REP 6 LAST 1108 7151 3 0138 0 CA DOTINC
0786 REP 53 LAST 1108 7152 28 116 0 ADS ADDR'D
0787 REP 3 LAST 1108 7153 0 7058 0 TC DMPSUB
0788 REP 51 LAST 1108 7154 52 132 0 END DOT DXCH BUF +1 LEAVE FINAL ACCUMULATION IN MPAC.
0789 REP 348 LAST 1108 7155 20 156 1 DAS MPAC +1
0790 REP 349 LAST 1108 7156 6 0154 1 AD MPAC
0791 REP 52 LAST 1108 7157 6 0130 0 AD BUF
0792 REP 350 LAST 1108 7160 54 154 0 TS MPAC
0793 REP 6 LAST 1108 7161 0 0137 1 TC DOTRET

0794 REP 2 LAST 1102 7162 0 6766 0 TC OVERFLOW ON OVERFLOW HERE.
0795 REP 7 LAST 1108 7163 0 0137 1 TC DOTRET

L INTERPRETER

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P0706 DOUBLE PRECISION POLYNOMIAL EVALUATOR

R0797 THIS ROUTINE EVALUATES $A X^N + A X^{N-1} + \dots + A X + A$ LEAVING THE DP RESULT IN MPAC ON EXIT.
 R0798
 R0800

R0801 THE ROUTINE HAS TWO ENTRIES

R0802 1. ENTRY THRU POWRSERS. THE COEFFICIENTS MAY BE EITHER IN FIXED OR ERASABLE, THE CALL IS BY
 R0804 TC POWRSERS, AND THE RETURN IS TO LOC(TC POWRSERS)+1. THE ENTERING DATA MUST BE AS FOLLOWS

| | | | | |
|-------|------|----|-------|-------------------------------------|
| A0806 | A | SP | LOC-3 | ADDRESS FOR REFERENCING COEF TABLE |
| A0807 | L | SP | N-1 | N IS THE DEGREE OF THE POWER SERIES |
| A0808 | MPAC | DP | X | ARGUMENT |

| | | | |
|-------|--------|-----|------|
| A0809 | LOC-2N | DP | A(0) |
| A0810 | ... | ... | ... |
| A0811 | LOC | DP | A(N) |

R0812 2. ENTRY THRU POLY. THE CALL TO POLY AND THE ENTERING DATA MUST BE AS FOLLOWS

| | | | | |
|-------|----------|-----|------|-----------------------|
| A0814 | MPAC | DP | X | ARGUMENT |
| A0815 | LOC | TC | POLY | |
| A0816 | LOC+1 | SP | N-1 | |
| A0817 | LOC+2 | DP | A(0) | |
| A0818 | ... | ... | ... | |
| A0819 | LOC+2N+2 | DP | A(N) | RETURN IS TO LOC+2N+4 |

| | | | | | | |
|------|-----|-----|---------------|----------|--------|---------|
| 0820 | | | 7164 0 0006 1 | POWRSERS | EXTEND | |
| 0821 | REF | 1 | 7165 22 141 0 | | QXCH | POLYRET |
| 0822 | REF | 16 | 7166 54 117 1 | | TS | POLISH |
| 0823 | REF | 1 | 7167 22 140 1 | | LXCH | POLYCNT |
| 0824 | REF | 1 | 7170 1 7201 1 | | TCF | POLYCOM |
| 0825 | REF | 245 | 7171 50 002 0 | POLY | INDEX | 0 |
| 0826 | | | 7172 3 0000 1 | | CAP | 0 |
| 0827 | REF | 2 | 7173 54 140 0 | | TS | POLYCNT |
| 0828 | | | 7174 6 0000 1 | | DOUBLE | |
| 0829 | REF | 246 | 7175 6 0002 0 | | AD | 0 |
| 0830 | REF | 17 | 7176 54 117 1 | | TS | POLISH |
| 0831 | REF | 27 | 7177 6 4715 0 | | AD | FIVE |
| 0832 | REF | 2 | 7200 54 141 1 | | TS | POLYRET |
| 0833 | REF | 1 | 7201 3 6242 0 | POLYCOM | CAP | LVRUP |
| 0834 | REF | 54 | 7202 54 116 0 | | TS | ADDRWD |
| 0835 | | | 7203 0 0006 1 | | EXTEND | |
| 0836 | REF | 16 | 7204 5 0117 0 | | INDEX | POLISH |
| 0837 | | | 7205 3 0004 0 | | DCA | 3 |

RETURN ADDRESS
 POWER SERIES ADDRESS
 N-1 TO COUNTER
 SKIP SET UP BY POLY
 N-1 TO COUNTER
 L(A(N))-3 TO POLISH
 STORE RETURN ADDRESS
 INCOMING X WILL BE MOVED TO VRRUP, SO
 SET ADDRWD SO DMPSTR WILL MPY BY VRRUP.

L INTERPRETER

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| | | | | | | | | | | | |
|------|-----|-----|------|------|------|----|------|---|----------|----------|-------------------------------|
| 0038 | REP | 351 | LAST | 1108 | 7208 | 52 | 155 | 1 | DXCH | MPAC | LOAD A(N) INTO MPAC, |
| 0039 | REP | 23 | LAST | 1085 | 7207 | 52 | 123 | 0 | DXCH | VBUP | SAVING X IN VBUP |
| 0040 | REP | 1 | | | 7210 | 1 | 7214 | 0 | TCP | POLY2 | |
| 0041 | REP | 3 | LAST | 1109 | 7211 | 54 | 140 | 0 | POLYLOOP | TS | SAVE DECREMENTED LOOP COUNTER |
| 0042 | REP | 53 | LAST | 1108 | 7212 | 4 | 4711 | 0 | CS | TWO | |
| 0043 | REP | 19 | LAST | 1109 | 7213 | 28 | 117 | 1 | ADS | POLISH | REGRESS COEFFICIENT POINTER |
| 0044 | REP | 4 | LAST | 1108 | 7214 | 0 | 7056 | 0 | POLY2 | TC | MULTIPLY BY X |
| 0045 | | | | | 7215 | 0 | 0006 | 1 | | EXTEND | |
| 0046 | REP | 20 | LAST | 1110 | 7216 | 5 | 0117 | 0 | INDEX | POLISH | |
| 0047 | | | | | 7217 | 3 | 0002 | 0 | DCA | 1 | ADD IN NEXT COEFFICIENT |
| 0048 | REP | 352 | LAST | 1110 | 7220 | 20 | 155 | 1 | DAS | MPAC | |
| 0049 | REP | 4 | LAST | 1110 | 7221 | 10 | 140 | 0 | CCS | POLYCNT | |
| 0050 | REP | 1 | | | 7222 | 1 | 7211 | 0 | TCP | POLYLOOP | |
| 0051 | REP | 3 | LAST | 1109 | 7223 | 0 | 0141 | 0 | IC | POLYRST | RETURN CALLER |



L INTERPRETER

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P0852 MISCELLANEOUS MULTI-PRECISION ROUTINES REQUIRED IN FIXED-FIXED BUT NOT USED BY THE INTERPRETER.

| | | | | | | | | |
|--------|---------|-----------|------|----------|----------|------|----------|---------------------------------------|
| 085398 | REF 213 | LAST D107 | 7224 | 3 4714 1 | DPAGRES | CAP | ZERO | DOUBLE PRECISION ENTRY - |
| 085399 | REF 353 | LAST D110 | 7225 | 54 156 1 | | TS | MPAC +2 | ZERO LOW-ORDER WORD |
| 0854 | REF 247 | LAST D109 | 7226 | 22 002 0 | TPAGRES | LXCH | 0 | FORCE SIGN AGREEMENT AMONG THE TRIPLE |
| 0855 | REF 1 | | 7227 | 0 6672 1 | | TC | BRANCH | PRECISION CONTENTS OF MPAC. RETURNING |
| 0856 | REF 1 | | 7230 | 1 7234 1 | | TCP | ARG+ | WITH SIGNUM OF THE INPUT IN A. |
| 0857 | REF 1 | | 7231 | 1 7254 1 | | TCP | ARGZERO | |
| 0858 | REF 28 | LAST D043 | 7232 | 4 4672 1 | | CS | POS MAX | IF NEGATIVE. |
| 0859 | | | 7233 | 1 7235 0 | | TCP | +2 | |
| 0860 | REF 29 | LAST D111 | 7234 | 3 4672 0 | ARG+ | CAP | POS MAX | |
| 0861 | REF 248 | LAST D111 | 7235 | 54 002 1 | | TS | 0 | |
| 0862 | | | 7236 | 0 0006 1 | | | EXTEND | |
| 0863 | REF 295 | LAST D103 | 7237 | 24 000 1 | | AUG | A | FORMS +-1.0. |
| 0864 | REF 354 | LAST D111 | 7240 | 6 0156 0 | | AD | MPAC +2 | |
| 0865 | REF 355 | LAST D111 | 7241 | 54 156 1 | | TS | MPAC +2 | |
| 0866 | REF 214 | LAST D111 | 7242 | 3 4714 1 | | CAP | ZERO | |
| 0867 | REF 249 | LAST D111 | 7243 | 6 0002 0 | | AD | 0 | |
| 0868 | REF 356 | LAST D111 | 7244 | 6 0155 0 | | AD | MPAC +1 | |
| 0869 | REF 357 | LAST D111 | 7245 | 54 155 1 | | TS | MPAC +1 | |
| 0870 | REF 215 | LAST D111 | 7246 | 3 4714 1 | | CAP | ZERO | |
| 0871 | REF 250 | LAST D111 | 7247 | 6 0002 0 | | AD | 0 | 0 STILL HAS POS MAX OR NEG MAX IN IT. |
| 0872 | REF 358 | LAST D111 | 7250 | 6 0154 1 | | AD | MPAC | |
| 0873 | REF 359 | LAST D111 | 7251 | 54 154 0 | ARGZERO2 | TS | MPAC | ALWAYS SKIPPING UNLESS ARGZERO. |
| 0874 | REF 360 | LAST D111 | 7252 | 54 155 1 | | TS | MPAC +1 | |
| 0875 | REF 174 | LAST D107 | 7253 | 0 0001 0 | | TC | L | RETURN VIA L. |
| 0876 | REF 361 | LAST D111 | 7254 | 54 156 1 | ARGZERO | TS | MPAC +2 | SET ALL THREE MPAC REGISTERS TO ZERO. |
| 0877 | REF 1 | | 7255 | 1 7251 1 | | TCP | ARGZERO2 | |

R0876 SHORTMP MULTIPLIES THE TP CONTENTS OF MPAC BY THE SINGLE PRECISION NUMBER ARRIVING IN A.

| | | | | | | | | |
|------|---------|-----------|------|----------|----------|-----|---------|------------------------------|
| 0880 | REF 12 | LAST D106 | 7256 | 54 135 1 | SHORTMP | TS | MPTMP | |
| 0881 | | | 7257 | 0 0006 1 | | | EXTEND | |
| 0882 | REF 362 | LAST D111 | 7260 | 7 0156 1 | | MP | MPAC +2 | |
| 0883 | REF 363 | LAST D111 | 7261 | 54 156 1 | | TS | MPAC +2 | |
| 0884 | REF 216 | LAST D111 | 7262 | 3 4714 1 | SHORTMP2 | CAP | ZERO | SO SUBSEQUENT DAS WILL WORK. |
| 0885 | REF 364 | LAST D111 | 7263 | 56 155 0 | | XCH | MPAC +1 | |
| 0886 | REF 1 | | 7264 | 1 7075 0 | | TCP | DMPUR2 | |



L INTERPRETER

F0667 DMPNSUB MULTIPLIES THE DP FRACTION ARRIVING IN MPAC BY THE SP
 R0668 INTEGER ARRIVING IN A. THE DP PRODUCT DEPARTS BOTH IN MPAC AND IN
 R0669 A AND L. NOTE THAT DMPNSUB NORMALLY INCREASES THE MAGNITUDE OF THE
 R0690 CONTENTS OF MPAC. THE CUSTOMER MUST INSURE THAT B(A) X B(MPAC,MPAC+1)
 R0691 AND B(A) X B(MPAC) ARE LESS THAN 1 IN MAGNITUDE, WHERE B, AS IS OBVIOUS,
 R0692 INDICATES THE ARRIVING CONTENTS.

| | | | | | | | | | | | |
|------|-----|-----|-----------|------|----|------|---|---------|--------|----------|---------------------------------------|
| 0693 | REP | 1 | | 7265 | 54 | 135 | 1 | DMPNSUB | TS | DMPNTEMP | |
| 0694 | | | | 7266 | 0 | 0006 | 1 | | EXTEND | | |
| 0695 | REP | 365 | LAST 1111 | 7267 | 7 | 0155 | 1 | | MP | MPAC +1 | |
| 0696 | REP | 366 | LAST 1112 | 7270 | 52 | 155 | 1 | | DYCH | MPAC | LOW PRODUCT TO MPAC, HIGH FACTOR TO A |
| 0697 | | | | 7271 | 0 | 0006 | 1 | | EXTEND | | |
| 0698 | REP | 2 | LAST 1112 | 7272 | 7 | 0135 | 1 | | MP | DMPNTEMP | |
| 0699 | REP | 175 | LAST 1111 | 7273 | 3 | 0001 | 0 | | CA | L | |
| 0900 | REP | 367 | LAST 1112 | 7274 | 28 | 154 | 0 | | ADS | MPAC | COMPLETING THE PRODUCT IN MPAC |
| 0901 | | | | 7275 | 0 | 0006 | 1 | | EXTEND | | |
| 0902 | REP | 368 | LAST 1112 | 7276 | 3 | 0155 | 0 | | DCA | MPAC | BRINGING THE PRODUCT INTO A AND L |
| 0903 | REP | 251 | LAST 1111 | 7277 | 0 | 0002 | 0 | | TC | 0 | |



L INTERPRETER

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P0904 MISCELLANEOUS VECTOR OPERATIONS. INCLUDED HERE ARE THE FOLLOWING:

| | | | | | | | | | |
|-------|-------------------|----------|------|----------|-------|---|---------|--|---|
| R0905 | | 1. DOT | | | | DP VECTOR DOT PRODUCT. | | | |
| R0906 | | 2. VKV | | | | DP VECTOR CROSS PRODUCT. | | | |
| R0907 | | 3. VXSC | | | | DP VECTOR TIMES SCALAR. | | | |
| R0908 | | 4. V/SC | | | | DP VECTOR DIVIDED BY SCALAR. | | | |
| R0909 | | 5. VPROJ | | | | DP VECTOR PROJECTION. ((MPAC_X)MPAC). | | | |
| R0910 | | 6. VCM | | | | DP VECTOR POST-MULTIPLIED BY MATRIX. | | | |
| R0911 | | 7. MKV | | | | DP VECTOR PRE-MULTIPLIED BY MATRIX. | | | |
| 0912 | REP 1 | | 7300 | 0 7123 0 | DOT | TC | PREDOT | | DO THE DOT PRODUCT AND EXIT, CHANGING THE MODE TO DP SCALAR. |
| 0913 | REP 217 LAST 1111 | | 7301 | 3 4714 1 | DMODE | CAP | ZERO | | |
| 0914 | REP 3 LAST 1094 | | 7302 | 1 6027 0 | | TCP | NEWMODE | | |
| 0915 | REP 54 LAST 1110 | | 7303 | 3 4711 1 | MKV | CAP | TWO | | SET UP MATINC AND DOTINC FOR ROW VECTORS. |
| 0916 | REP 5 LAST 68 | | 7304 | 54 140 0 | | TS | MATINC | | GO TO COMMON PORTION. |
| 0917 | REP 1 | | 7305 | 1 7311 1 | | TCP | VCM/MKV | | |
| 0918 | REP 9 LAST 1040 | | 7306 | 4 4377 1 | VCM | CS | TEN | | SET MATINC AND DOTINC TO REFER TO MATRIX AS THREE COLUMN VECTORS. |
| 0919 | REP 6 LAST 1113 | | 7307 | 54 140 0 | | TS | MATINC | | |
| 0920 | REP 35 LAST 1028 | | 7310 | 3 6211 0 | | CAP | SIX | | |

L INTERPRETER

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P0921 COMMON PORTION OF MCV AND VM.

| | | | | | | | | | | |
|------|-----|-----|------------------------------|------|----|------|---|--------|--------|----------|
| 0922 | REP | 7 | LAST 1108 | 7311 | 54 | 138 | 1 | VM/MCV | TS | DOTINC |
| 0923 | | | ITRACE (2) REFERS TO VM/MCV. | | | | | | | |
| 0924 | REP | 1 | | 7312 | 0 | 7501 | 1 | | TC | MPAC/BUF |
| 0925 | REP | 1 | | 7313 | 0 | 7125 | 0 | | TC | DOTSUB |
| 0926 | | | | 7314 | 0 | 0005 | 1 | | EXTEND | |
| 0927 | REP | 24 | LAST 1110 | 7315 | 3 | 0123 | 1 | | DCA | VRUF |
| 0928 | REP | 369 | LAST 1112 | 7316 | 52 | 155 | 1 | | DACH | MPAC |
| 0929 | REP | 11 | LAST 1074 | 7317 | 52 | 134 | 0 | | DACH | BUF2 |
| 0930 | | | | 7320 | 0 | 0006 | 1 | | EXTEND | |
| 0931 | REP | 25 | LAST 1114 | 7321 | 3 | 0125 | 1 | | DCA | VRUF +2 |
| 0932 | REP | 370 | LAST 1114 | 7322 | 52 | 160 | 1 | | DACH | MPAC +3 |
| 0933 | | | | 7323 | 0 | 0006 | 1 | | EXTEND | |
| 0934 | REP | 26 | LAST 1114 | 7324 | 3 | 0127 | 0 | | DCA | VRUF +4 |
| 0935 | REP | 371 | LAST 1114 | 7325 | 52 | 162 | 0 | | DACH | MPAC +5 |
| 0936 | REP | 7 | LAST 1113 | 7326 | 3 | 0140 | 1 | | CA | MATING |
| 0937 | REP | 55 | LAST 1109 | 7327 | 26 | 118 | 0 | | ADS | ADDRWD |
| 0938 | REP | 2 | LAST 1114 | 7330 | 0 | 7125 | 0 | | TC | DOTSUB |
| 0939 | REP | 27 | LAST 1114 | 7331 | 52 | 123 | 0 | | DACH | VRUF |
| 0940 | REP | 372 | LAST 1114 | 7332 | 52 | 155 | 1 | | DACH | MPAC |
| 0941 | REP | 28 | LAST 1114 | 7333 | 52 | 125 | 0 | | DACH | VRUF +2 |
| 0942 | REP | 373 | LAST 1114 | 7334 | 52 | 160 | 1 | | DACH | MPAC +3 |
| 0943 | REP | 29 | LAST 1114 | 7335 | 52 | 127 | 1 | | DACH | VRUF +4 |
| 0944 | REP | 374 | LAST 1114 | 7336 | 52 | 162 | 0 | | DACH | MPAC +5 |
| 0945 | REP | 8 | LAST 1114 | 7331 | 3 | 0140 | 1 | | CA | MATING |
| 0946 | REP | 56 | LAST 1114 | 7340 | 26 | 118 | 0 | | ADS | ADDRWD |
| 0947 | REP | 3 | LAST 1114 | 7341 | 0 | 7125 | 0 | | TC | DOTSUB |
| 0948 | REP | 12 | LAST 1114 | 7342 | 52 | 134 | 0 | | DACH | BUF2 |
| 0949 | REP | 375 | LAST 1114 | 7343 | 52 | 155 | 1 | | DACH | MPAC |
| 0950 | REP | 376 | LAST 1114 | 7344 | 52 | 162 | 0 | | DACH | WAC +5 |
| 0951 | REP | 30 | LAST 1114 | 7345 | 52 | 125 | 0 | | DACH | VRUF +2 |
| 0952 | REP | 377 | LAST 1114 | 7346 | 52 | 160 | 1 | | DACH | MPAC +3 |
| 0953 | REP | 20 | LAST 1105 | 7341 | 1 | 6030 | 0 | | TOP | DANZIG |

SAVE VECTOR IN MPAC FOR FURTHER USE.

GO DOT TO GET X COMPONENT OF ANSWER.

MOVE MPAC VECTOR BACK INTO MPAC, SAVING NEW X COMPONENT IN BUF2.

INITIALIZE ADDRWD FOR NEXT DOT PRODUCT. FORMS BASE ADDRESS OF NEXT COLUMN(ROW).

MOVE GIVEN VECTOR BACK TO MPAC, SAVING Y COMPONENT OF ANSWER IN VRUF +2.

FORM ADDRESS OF LAST COLUMN OR ROW.

ANSWER NOW COMPLETE. PUT COMPONENTS INTO PROPER MPAC REGISTERS.

EXIT.

L INTERPRETER

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P0064 VXSC - VECTOR TIMES SCALAR.

| | | | | | | | | | | | |
|------|------|-----|------|------|------|----|------|---|----------|------|---------|
| 0055 | RESP | 10 | LAST | 1107 | 7350 | 10 | 163 | 1 | VXSC | CCS | MODE |
| 0056 | RESP | 1 | | | 7351 | 1 | 7377 | 1 | | TOP | DXVSC |
| 0057 | RESP | 2 | LAST | 1115 | 7352 | 1 | 7377 | 1 | | TOP | DXVSC |
| 0058 | RESP | 5 | LAST | 1110 | 7353 | 0 | 7056 | 0 | VXSC | TC | DMP SUB |
| 0059 | RESP | 1 | | | 7354 | 0 | 7107 | 0 | | TC | VROUND |
| 0060 | RESP | 378 | LAST | 1114 | 7355 | 52 | 160 | 1 | | DXCH | MPAC +3 |
| 0061 | RESP | 379 | LAST | 1115 | 7356 | 52 | 155 | 1 | | DXCH | MPAC |
| 0062 | RESP | 380 | LAST | 1115 | 7357 | 52 | 160 | 1 | | DXCH | MPAC +3 |
| 0063 | RESP | 6 | LAST | 1115 | 7360 | 0 | 7056 | 0 | | TC | DMP SUB |
| 0064 | RESP | 2 | LAST | 1115 | 7361 | 0 | 7107 | 0 | | TC | VROUND |
| 0065 | RESP | 381 | LAST | 1115 | 7362 | 52 | 162 | 0 | | DXCH | MPAC +5 |
| 0066 | RESP | 382 | LAST | 1115 | 7363 | 52 | 155 | 1 | | DXCH | MPAC |
| 0067 | RESP | 383 | LAST | 1115 | 7364 | 52 | 162 | 0 | | DXCH | MPAC +5 |
| 0068 | RESP | 7 | LAST | 1115 | 7365 | 0 | 7056 | 0 | | TC | DMP SUB |
| 0069 | RESP | 3 | LAST | 1115 | 7366 | 0 | 7107 | 0 | | TC | VROUND |
| 0070 | RESP | 384 | LAST | 1115 | 7367 | 52 | 155 | 1 | VROTATEX | DXCH | MPAC |
| 0071 | RESP | 385 | LAST | 1115 | 7370 | 52 | 162 | 0 | | DXCH | MPAC +5 |
| 0072 | RESP | 386 | LAST | 1115 | 7371 | 52 | 160 | 1 | | DXCH | MPAC +3 |
| 0073 | RESP | 387 | LAST | 1115 | 7372 | 52 | 155 | 1 | | DXCH | MPAC |
| 0074 | RESP | 21 | LAST | 1114 | 7373 | 1 | 6030 | 0 | | TOP | DANZIG |

TEST PRESENT MODE.
SEPARATE ROUTINE WHEN SCALAR IS IN MPAC.

COMPUTE X COMPONENT
AND ROUND IT.
PUT Y COMPONENT INTO MPAC SAVING MPAC IN
MPAC +3.

DO SAME FOR Y AND Z COMPONENTS.

EXIT USED TO RESTORE MPAC AFTER THIS
TYPE OF ROTATION. CALLED BY VECTOR SHIPT
RIGHT, V/SC, ETC.

L INTERPRETER

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P0975 DP VECTOR PROJECTION ROUTINE.

| | | | | | | | | | | | |
|------|-----|----|------|------|------|----|------|---|-------|-----|--------|
| 0976 | REP | 2 | LAST | 1113 | 7374 | 0 | 7123 | 0 | VPROJ | TC | FREDOT |
| 0977 | REP | 15 | LAST | 1030 | 7375 | 4 | 4710 | 1 | | CS | FOUR |
| 0978 | REP | 57 | LAST | 1114 | 7378 | 26 | 118 | 0 | | ADS | ADDRND |

(MPAC.X)MPAC IS COMPUTED AND LEFT IN MPAC. DO DOT AND FALL INTO DVXSC.

R0979 VXSC WHEN SCALAR ARRIVES IN MPAC AND VECTOR IS AT X.

| | | | | | | | | | | | |
|------|-----|-----|------|------|------|----|------|---|-------|--------|---------|
| 0980 | | | | | 7377 | 0 | 0006 | 1 | DVXSC | EXTEND | |
| 0981 | REP | 388 | LAST | 1115 | 7400 | 3 | 0155 | 0 | | DCA | MPAC |
| 0982 | REP | 389 | LAST | 1116 | 7401 | 52 | 180 | 1 | | DxCH | MPAC +3 |
| 0983 | REP | 8 | LAST | 1115 | 7402 | 0 | 7056 | 0 | | TC | DMPSUB |
| 0984 | REP | 4 | LAST | 1115 | 7403 | 0 | 7107 | 0 | | TC | VRQND |
| 0985 | REP | 55 | LAST | 1113 | 7404 | 3 | 4711 | 1 | | CAP | TWO |
| 0986 | REP | 58 | LAST | 1116 | 7405 | 26 | 118 | 0 | | ADS | ADDRND |
| 0987 | | | | | 7406 | 0 | 0006 | 1 | | EXTEND | |
| 0988 | REP | 390 | LAST | 1116 | 7407 | 3 | 0160 | 0 | | DCA | MPAC +3 |
| 0989 | REP | 391 | LAST | 1116 | 7410 | 52 | 155 | 1 | | DxCH | MPAC |
| 0990 | REP | 392 | LAST | 1116 | 7411 | 52 | 182 | 0 | | DxCH | MPAC +5 |
| 0991 | REP | 9 | LAST | 1116 | 7412 | 0 | 7056 | 0 | | TC | DMPSUB |
| 0992 | REP | 5 | LAST | 1116 | 7413 | 0 | 7107 | 0 | | TC | VRQND |
| 0993 | REP | 56 | LAST | 1116 | 7414 | 3 | 4711 | 1 | | CAP | TWO |
| 0994 | REP | 59 | LAST | 1116 | 7415 | 26 | 118 | 0 | | ADS | ADDRND |
| 0995 | REP | 393 | LAST | 1116 | 7416 | 52 | 180 | 1 | | DxCH | MPAC +3 |
| 0996 | REP | 394 | LAST | 1116 | 7417 | 52 | 155 | 1 | | DxCH | MPAC |
| 0997 | REP | 395 | LAST | 1116 | 7420 | 52 | 180 | 1 | | DxCH | MPAC +3 |
| 0998 | REP | 10 | LAST | 1116 | 7421 | 0 | 7056 | 0 | | TC | DMPSUB |
| 0999 | REP | 6 | LAST | 1116 | 7422 | 0 | 7107 | 0 | | TC | VRQND |
| 1000 | REP | 396 | LAST | 1116 | 7423 | 52 | 155 | 1 | | DxCH | MPAC |
| 1001 | REP | 397 | LAST | 1116 | 7424 | 52 | 182 | 0 | | DxCH | MPAC +5 |
| 1002 | REP | 398 | LAST | 1116 | 7425 | 52 | 155 | 1 | | DxCH | MPAC |
| 1003 | REP | 1 | | | 7426 | 1 | 6470 | 0 | | TCF | VMODE |

SAVE SCALAR IN MPAC +3 AND GET X COMPONENT OF ANSWER.

ADVANCE ADDRND TO Y COMPONENT OF X.

PUT SCALAR BACK INTO MPAC AND SAVE X RESULT IN MPAC +5.

TO Z COMPONENT. BRING SCALAR BACK, PUTTING Y RESULT IN THE PROPER PLACE.

PUT Z COMPONENT IN PROPER PLACE, ALSO POSITIONING X.

MODE HAS CHANGED TO VECTOR.

L INTERPRETER

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P1004 THE VECTOR CROSS PRODUCT ROUTINE CALCULATES (X M -X M ,X M -X M ,X M -X M) WHERE M IS THE VECTOR IN
 R1008 3 2 2 3 1 3 3 4 2 1 1 2
 R1008 MPAC AND X THE VECTOR AT THE GIVEN ADDRESS.

| | | | | | | | | | | | |
|------|-----|-----|------|------|------|----|------|--------|--------|----------|--|
| 1009 | | | 7427 | 0 | 0006 | 1 | VXV | EXTEND | | | |
| 1010 | REP | 399 | LAST | 1116 | 7430 | 3 | 0162 | 1 | DCA | MPAC +5 | FORM UP M3X1, LEAVING M1 IN VBUP. |
| 1011 | REP | 400 | LAST | 1117 | 7431 | 52 | 155 | 1 | DCH | MPAC | |
| 1012 | REP | 31 | LAST | 1114 | 7432 | 52 | 123 | 0 | DCH | VBUP | |
| 1013 | REP | 11 | LAST | 1116 | 7433 | 0 | 7056 | 0 | TC | DMPSLB | BY X1. |
| 1014 | | | | | 7434 | 0 | 0006 | 1 | EXTEND | | |
| 1015 | REP | 401 | LAST | 1117 | 7435 | 4 | 0160 | 1 | DCS | MPAC +3 | CALCULATE -X1M2, SAVING X1M3 IN VBUP +2. |
| 1016 | REP | 402 | LAST | 1117 | 7436 | 52 | 155 | 1 | DCH | MPAC | |
| 1017 | REP | 32 | LAST | 1117 | 7437 | 52 | 125 | 0 | DCH | VBUP +2 | |
| 1018 | REP | 12 | LAST | 1117 | 7440 | 0 | 7056 | 0 | TC | DMPSLB | |
| 1019 | REP | 57 | LAST | 1116 | 7441 | 3 | 4711 | 1 | CAP | TWO | ADVANCE ADDRWD TO X2. |
| 1020 | REP | 60 | LAST | 1116 | 7442 | 26 | 116 | 0 | ADS | ADDRWD | |
| 1021 | | | | | 7443 | 0 | 0006 | 1 | EXTEND | | |
| 1022 | REP | 403 | LAST | 1117 | 7444 | 4 | 0162 | 0 | DCS | MPAC +5 | PREPARE TO GET -X2M3, SAVING -X1M2 IN MPAC +5. |
| 1023 | REP | 404 | LAST | 1117 | 7445 | 52 | 155 | 1 | DCH | MPAC | |
| 1024 | REP | 405 | LAST | 1117 | 7446 | 52 | 162 | 0 | DCH | MPAC +5 | |
| 1025 | REP | 13 | LAST | 1117 | 7447 | 0 | 7056 | 0 | TC | DMPSLB | |
| 1026 | | | | | 7450 | 0 | 0006 | 1 | EXTEND | | |
| 1027 | REP | 33 | LAST | 1117 | 7451 | 3 | 0123 | 1 | DCA | VBUP | GET X2M1, SAVING -X2M3 IN VBUP +4. |
| 1028 | REP | 406 | LAST | 1117 | 7452 | 52 | 155 | 1 | DCH | MPAC | |
| 1029 | REP | 34 | LAST | 1117 | 7453 | 52 | 127 | 1 | DCH | VBUP +4 | |
| 1030 | REP | 14 | LAST | 1117 | 7454 | 0 | 7056 | 0 | TC | DMPSLB | |
| 1031 | REP | 58 | LAST | 1117 | 7455 | 3 | 4711 | 1 | CAP | TWO | ADVANCE ADDRWD TO X3. |
| 1032 | REP | 61 | LAST | 1117 | 7456 | 26 | 116 | 0 | ADS | ADDRWD | |
| 1033 | | | | | 7457 | 0 | 0006 | 1 | EXTEND | | |
| 1034 | REP | 35 | LAST | 1117 | 7460 | 4 | 0123 | 0 | DCS | VBUP | GET -X3M1, ADDING X2M1 TO MPAC +5 TO COMPLETE THE Z COMPONENT OF THE ANSWER. |
| 1035 | REP | 407 | LAST | 1117 | 7461 | 52 | 155 | 1 | DCH | MPAC | |
| 1036 | REP | 408 | LAST | 1117 | 7462 | 20 | 162 | 0 | DAS | MPAC +5 | |
| 1037 | | | | | 7463 | 0 | 0006 | 1 | EXTEND | | |
| 1038 | | | | | 7464 | 1 | 7466 | 0 | BZF | +2 | |
| 1039 | REP | 3 | LAST | 1103 | 7465 | 0 | 6760 | 0 | TC | OVERPLWZ | |
| 1040 | REP | 15 | LAST | 1117 | 7466 | 0 | 7056 | 0 | TC | DMPSLB | |
| 1041 | REP | 36 | LAST | 1117 | 7467 | 52 | 125 | 0 | DCH | VBUP +2 | MOVE X1M3 TO MPAC +3 SETTING UP FOR X3M2 AND ADD -X3M1 TO MPAC +3 TO COMPLETE THE Y COMPONENT OF THE RESULT. |
| 1042 | REP | 409 | LAST | 1117 | 7470 | 52 | 160 | 1 | DCH | MPAC +3 | |
| 1043 | REP | 410 | LAST | 1117 | 7471 | 52 | 155 | 1 | DCH | MPAC | |
| 1044 | REP | 411 | LAST | 1117 | 7472 | 20 | 160 | 1 | DAS | MPAC +3 | |
| 1045 | | | | | 7473 | 0 | 0006 | 1 | EXTEND | | |
| 1046 | | | | | 7474 | 1 | 7476 | 1 | BZF | +2 | |



L INTERPRETER

| | | | | | | | | | | | |
|-------|--|-----|-----------|------|----|------|---|----------|----------|---|--|
| 1047 | REF | 3 | LAST 1103 | 7475 | 0 | 6763 | 0 | TC | OVERFLWY | | |
| 1048 | REF | 16 | LAST 1117 | 7476 | 0 | 7056 | 0 | TC | DMPSUB | | |
| 1049 | REF | 37 | LAST 1117 | 7477 | 52 | 127 | 1 | DXCH | VRUP +4 | GO ADD -X2M3 TO X3M2 TO COMPLETE THE X COMPONENT (TAIL END OF DAD). | |
| 1050 | REF | 4 | LAST 1104 | 7500 | 1 | 6747 | 1 | TCP | ENDVXV | | |
| R1051 | THE MPACVRUP SUBROUTINE SAVES THE VECTOR IN MPAC IN VRUP WITHOUT CLOBBERING MPAC. | | | | | | | | | | |
| 1053 | | | | 7501 | 0 | 0006 | 1 | MPACVRUP | EXTEND | CALLED BY MKV, VOM, AND UNIT. | |
| 1054 | REF | 412 | LAST 1117 | 7502 | 3 | 0155 | 0 | DCA | MPAC | | |
| 1055 | REF | 38 | LAST 1118 | 7503 | 52 | 123 | 0 | DXCH | VRUP | | |
| 1056 | | | | 7504 | 0 | 0006 | 1 | EXTEND | | | |
| 1057 | REF | 413 | LAST 1118 | 7505 | 3 | 0160 | 0 | DCA | MPAC +3 | | |
| 1058 | REF | 39 | LAST 1118 | 7506 | 52 | 125 | 0 | DXCH | VRUP +2 | | |
| 1059 | | | | 7507 | 0 | 0006 | 1 | EXTEND | | | |
| 1060 | REF | 414 | LAST 1118 | 7510 | 3 | 0162 | 1 | DCA | MPAC +5 | | |
| 1061 | REF | 40 | LAST 1118 | 7511 | 52 | 127 | 1 | DXCH | VRUP +4 | | |
| 1062 | REF | 252 | LAST 1112 | 7512 | 0 | 0002 | 0 | TC | 0 | RETURN TO CALLER. | |
| R1063 | DOUBLE PRECISION SIGN AGREE ROUTINE. ARRIVE WITH INPUT IN A+L. OUTPUT IS IN A + L. | | | | | | | | | | |
| 1065 | REF | 296 | LAST 1111 | 7513 | 10 | 000 | 0 | ALSIGNAG | CCS | A | TEST UPPER PART. |
| 1066 | REF | 1 | | 7514 | 1 | 7520 | 0 | TCP | UPPOS | | IT IS POSITIVE |
| 1067 | REF | 253 | LAST 1118 | 7515 | 0 | 0002 | 0 | TC | 0 | | ZERO |
| 1068 | REF | 1 | | 7516 | 1 | 7530 | 1 | TCP | UPNEG | | NEGATIVE |
| 1069 | REF | 254 | LAST 1118 | 7517 | 0 | 0002 | 0 | TC | 0 | | ZERO |
| 1070 | REF | 176 | LAST 1112 | 7520 | 56 | 001 | 0 | UPPOS | XCH | L | SAVE DECREMENTED UPPER PART. |
| 1071 | REF | 9 | LAST 1062 | 7521 | 6 | 4675 | 1 | AD | HALP | | |
| 1072 | REF | 10 | LAST 1118 | 7522 | 6 | 4675 | 1 | AD | HALP | | |
| 1073 | REF | 297 | LAST 1118 | 7523 | 54 | 000 | 0 | TS | A | | SKIPS ON OVERFLOW |
| 1074 | | | | 7524 | 1 | 7526 | 0 | TCP | +2 | | |
| 1075 | REF | 177 | LAST 1118 | 7525 | 24 | 001 | 0 | INCR | L | | RESTORE UPPER TO ORIGINAL VALUE |
| 1076 | REF | 178 | LAST 1118 | 7526 | 56 | 001 | 0 | XCH | L | | SWAP A + L BACK. |
| 1077 | REF | 255 | LAST 1118 | 7527 | 0 | 0002 | 0 | TC | 0 | | |
| 1078 | REF | 179 | LAST 1118 | 7530 | 56 | 001 | 0 | UPNEG | XCH | L | SAVE COMPLEMENTED + DECREMENTED UPPER PT |
| 1079 | REF | 11 | LAST 1033 | 7531 | 6 | 4674 | 0 | AD | NEGMAX | | |
| 1080 | REF | 24 | LAST 1089 | 7532 | 6 | 7716 | 0 | AD | NEGONE | | |
| 1081 | REF | 298 | LAST 1118 | 7533 | 54 | 000 | 0 | TS | A | | |
| 1082 | | | | 7534 | 1 | 7536 | 1 | TCP | +2 | | DONT INCREMENT IF NO OVERFLOW. |
| 1083 | REF | 180 | LAST 1118 | 7535 | 24 | 001 | 0 | INCR | L | | |
| 1084 | REF | 181 | LAST 1118 | 7536 | 56 | 001 | 0 | XCH | L | | |
| 1085 | | | | 7537 | 4 | 0000 | 0 | COM | | | MAKE NEGATIVE AGAIN. |
| 1086 | REF | 256 | LAST 1118 | 7540 | 0 | 0002 | 0 | TC | 0 | | |

L INTERPRETER

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F1087 INTERPRETIVE INSTRUCTIONS WHOSE EXECUTION CONSISTS OF PRINCIPALLY CALLING SUBROUTINES.

| 1088 | REP | 17 | LAST 1110 | 7541 | 0 | 7000 | 0 | DMR | TC | DMR | DMR | DMR |
|------|-----|-----|-----------|------|----|------|---|--------|--------|------------|--|-----|
| 1090 | REP | 22 | LAST 1115 | 7542 | 1 | 6030 | 0 | | TCP | DANZIG | | |
| 1091 | REP | 18 | LAST 1110 | 7543 | 0 | 7000 | 0 | DMR | TC | DMR | | |
| 1092 | REP | 1 | | 7544 | 0 | 7106 | 1 | | TC | ROUNDUP +1 | (C(A) = +0). | |
| 1093 | REP | 23 | LAST 1110 | 7545 | 1 | 6030 | 0 | | TCP | DANZIG | | |
| 1094 | | | | 7546 | 0 | 0006 | 1 | DDV | EXTEND | | | |
| 1095 | REP | 62 | LAST 1117 | 7547 | 5 | 0116 | 1 | | INDEX | ADDRM | MOVE DIVIDEND INTO BUF. | |
| 1096 | | | | 7550 | 3 | 0001 | 0 | | DCA | 0 | | |
| 1097 | REP | 2 | LAST 1086 | 7551 | 1 | 7556 | 1 | | TCP | BDDV +4 | | |
| 1098 | | | | 7552 | 0 | 0006 | 1 | BDDV | EXTEND | | | |
| 1099 | REP | 63 | LAST 1119 | 7553 | 5 | 0116 | 1 | | INDEX | ADDRM | MOVE DIVISOR INTO MPAC SAVING MPAC, THE DIVISOR, IN BUF. | |
| 1100 | | | | 7554 | 3 | 0001 | 0 | | DCA | 0 | | |
| 1101 | REP | 415 | LAST 1118 | 7555 | 52 | 155 | 1 | | DCH | MPAC | | |
| 1102 | REP | 53 | LAST 1108 | 7556 | 52 | 131 | 0 | +4 | DCH | BUF | | |
| 1103 | REP | 218 | LAST 1113 | 7557 | 3 | 4714 | 1 | | CAP | ZERO | DIVIDE ROUTINES IN BANK 0. | |
| 1104 | REP | 20 | LAST 1099 | 7560 | 54 | 004 | 1 | | TS | FRANK | | |
| 1105 | REP | 1 | | 7561 | 1 | 2353 | 1 | | TCP | DDV/BDDV | | |
| 1106 | REP | 64 | LAST 1119 | 7562 | 3 | 0116 | 1 | SETD | CA | ADDRM | MUST SET TO WORK AREA, OR BRANK TROUBLE. | |
| 1107 | REP | 12 | LAST 1096 | 7563 | 54 | 166 | 1 | | TS | PUSHLOC | | |
| 1108 | REP | 1 | | 7564 | 1 | 6032 | 1 | | TCP | NOFRANK | NO FRANK SWITCH REQUIRED. | |
| 1109 | REP | 219 | LAST 1119 | 7565 | 3 | 4714 | 1 | TSLC | CAP | ZERO | SHIFTING ROUTINES LOCATED IN BANK 00. | |
| 1110 | REP | 21 | LAST 1119 | 7566 | 54 | 004 | 1 | | TS | FRANK | | |
| 1111 | REP | 1 | | 7567 | 1 | 2172 | 0 | | TCP | TSLC2 | | |
| 1112 | REP | 7 | LAST 1078 | 7570 | 3 | 6043 | 0 | GSHIFT | CAP | LOW | USED AS MASK AT GENSHIFT, THIS PROCESSES ANY SHIPT INSTRUCTION (EXCEPT TSLC) WITH AN ADDRESS (CALLED IN BANK 0). | |
| 1113 | REP | 22 | LAST 1119 | 7571 | 54 | 004 | 1 | | TS | FRANK | | |

L INTERPRETER

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P1115 THE FOLLOWING IS THE PROLOGUE TO V/SC. IF THE PRESENT MODE IS VECTOR, IT SAVES THE SCALAR AT X IN BUF
 R1117 AND CALLS THE V/SC ROUTINE IN BANK 0. IF THE PRESENT MODE IS SCALAR, IT MOVES THE VECTOR AT X INTO MPAC, SAVING
 R1119 THE SCALAR IN MPAC IN BUF BEFORE CALLING THE V/SC ROUTINE IN BANK 0.

| | | | | | | | |
|------|--------|-----------|---------------|------|-----|-------|------------------------|
| 1120 | REF 17 | LAST 1115 | 7573 10 163 1 | V/SC | CCS | MODE | |
| 1121 | REF 1 | | 7574 1 7605 1 | | TCP | DV/SC | MOVE VECTOR INTO MPAC. |
| 1122 | REF 2 | LAST 1120 | 7575 1 7605 1 | | TCP | DV/SC | |

| | | | | | | | |
|------|---------|-----------|---------------|-------|--------|--------|--|
| 1123 | | | 7576 0 0006 1 | W/SC | EXTEND | | |
| 1124 | REF 65 | LAST 1119 | 7577 5 0116 1 | | INDEX | ADDRMD | |
| 1125 | | | 7600 3 0001 0 | | DCA | 0 | |
| 1126 | REF 54 | LAST 1119 | 7601 52 131 0 | V/SC1 | DYCH | BUF | IN BOTH CASES, VECTOR IS NOW IN MPAC AND SCALAR IN BUF. |
| 1127 | REF 220 | LAST 1119 | 7602 3 4714 1 | | CAP | ZERO | |
| 1128 | REF 23 | LAST 1119 | 7603 54 004 1 | | TS | FRANK | |
| 1129 | REF 1 | | 7604 1 2654 0 | | TCP | V/SC2 | |

| | | | | | | | |
|------|---------|-----------|---------------|-------|--------|---------|--|
| 1130 | | | 7605 0 0006 1 | DV/SC | EXTEND | | |
| 1131 | REF 66 | LAST 1120 | 7606 5 0116 1 | | INDEX | ADDRMD | |
| 1132 | | | 7607 3 0003 1 | | DCA | 2 | |
| 1133 | REF 416 | LAST 1119 | 7610 52 160 1 | | DYCH | MPAC +3 | |
| 1134 | | | 7611 0 0006 1 | | EXTEND | | |
| 1135 | REF 67 | LAST 1120 | 7612 5 0116 1 | | INDEX | ADDRMD | |
| 1136 | | | 7613 3 0005 1 | | DCA | 4 | |
| 1137 | REF 417 | LAST 1120 | 7614 52 162 0 | | DYCH | MPAC +5 | |

| | | | | | | | |
|------|---------|-----------|---------------|--|----|------|------------------------|
| 1138 | REF 135 | LAST 1094 | 7615 4 4712 0 | | CS | ONE | CHANGE MODE TO VECTOR. |
| 1139 | REF 18 | LAST 1120 | 7616 54 163 1 | | TS | MODE | |

| | | | | | | | |
|------|---------|-----------|---------------|--|--------|--------|------------------------------------|
| 1140 | | | 7617 0 0006 1 | | EXTEND | | |
| 1141 | REF 68 | LAST 1120 | 7620 5 0116 1 | | INDEX | ADDRMD | |
| 1142 | | | 7621 3 0001 0 | | DCA | 0 | |
| 1143 | REF 418 | LAST 1120 | 7622 52 155 1 | | DYCH | MPAC | |
| 1144 | REF 1 | | 7623 1 7601 0 | | TCP | V/SC1 | FINISH PROLOGUE AT COMMON SECTION. |



L INTERPRETER

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P1145 SIGN AND COMPLEMENT INSTRUCTIONS.

| | | | | | | | |
|------|---------|-----------|------|----------|-------|--------|---------|
| 1146 | REF 89 | LAST 1120 | 7624 | 50 116 1 | SIGN | INDEX | ADDRWD |
| 1147 | | | 7625 | 10 000 0 | | CCS | 0 |
| 1148 | REF 24 | LAST 1119 | 7626 | 1 6030 0 | | TCP | DANZIG |
| 1149 | | | 7627 | 1 7631 0 | | TCP | +2 |
| 1150 | REF 2 | LAST 1088 | 7630 | 1 7637 0 | | TCP | COMP |
| 1151 | REF 70 | LAST 1121 | 7631 | 50 116 1 | | INDEX | ADDRWD |
| 1152 | | | 7632 | 10 001 1 | CCSL | CCS | 1 |
| 1153 | REF 25 | LAST 1121 | 7633 | 1 6030 0 | | TCP | DANZIG |
| 1154 | REF 26 | LAST 1121 | 7634 | 1 6030 0 | | TCP | DANZIG |
| 1155 | REF 3 | LAST 1121 | 7635 | 1 7637 0 | | TCP | COMP |
| 1156 | REF 27 | LAST 1121 | 7636 | 1 6030 0 | | TCP | DANZIG |
| 1157 | | | 7637 | 0 0006 1 | COMP | EXTEND | |
| 1158 | REF 419 | LAST 1120 | 7640 | 4 0155 1 | | DCS | MPAC |
| 1159 | REF 420 | LAST 1121 | 7641 | 52 155 1 | | DxCH | MPAC |
| 1160 | REF 19 | LAST 1120 | 7642 | 10 163 1 | | CCS | MODE |
| 1161 | REF 1 | | 7643 | 1 7654 0 | | TCP | DCOMP |
| 1162 | REF 2 | LAST 1121 | 7644 | 1 7654 0 | | TCP | DCOMP |
| 1163 | | | 7645 | 0 0006 1 | | EXTEND | |
| 1164 | REF 421 | LAST 1121 | 7646 | 4 0160 1 | | DCS | MPAC +3 |
| 1165 | REF 422 | LAST 1121 | 7647 | 52 160 1 | | DxCH | MPAC +3 |
| 1166 | | | 7650 | 0 0006 1 | | EXTEND | |
| 1167 | REF 423 | LAST 1121 | 7651 | 4 0162 0 | | DCS | MPAC +5 |
| 1168 | REF 424 | LAST 1121 | 7652 | 52 162 0 | | DxCH | MPAC +5 |
| 1169 | REF 28 | LAST 1121 | 7653 | 1 6030 0 | | TCP | DANZIG |
| 1170 | REF 425 | LAST 1121 | 7654 | 4 0156 1 | DCOMP | CS | MPAC +2 |
| 1171 | REF 426 | LAST 1121 | 7655 | 54 156 1 | | TS | MPAC +2 |
| 1172 | REF 29 | LAST 1121 | 7656 | 1 6030 0 | | TCP | DANZIG |

CALL COMP INSTRUCTION IF WORD AT X IS NEGATIVE NON-ZERO.

DO THE COMPLEMENT.

COMPLEMENT DP MPAC IN EVERY CASE.

EITHER COMPLEMENT MPAC +3 OR THE REST OF THE VECTOR ACCUMULATOR.

VECTOR COMPLEMENT.

L INTERPRETER

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P1173 THE FOLLOWING SHORT SHIPT CODES REQUIRES NO ADDRESS WORD'

- R1174 1. SR1 TO SR4 SCALAR SHIPT RIGHT.
- R1175 2. SR1R TO SR4R SCALAR SHIPT RIGHT AND ROUND.
- R1176 3. SL1 TO SL4 SCALAR SHIPT LEFT.
- R1177 4. SL1R TO SL4R SCALAR SHIPT LEFT AND ROUND.
- R1178 5. VSR1 TO VSR8 VECTOR SHIPT RIGHT (ALWAYS ROUNDS).
- R1179 6. VSL1 TO VSL8 VECTOR SHIPT LEFT (NEVER ROUNDS).

R1180 THE FOLLOWING CODES REQUIRES AN ADDRESS WHICH MAY BE INDEXED'*

- R1181 1. SR SCALAR SHIPT RIGHT.
- R1182 2. SRR SCALAR SHIPT RIGHT AND ROUND.
- R1183 3. SL SCALAR SHIPT LEFT.
- R1184 4. SLR SCALAR SHIPT LEFT AND ROUND.
- R1185 5. VSR VECTOR SHIPT RIGHT.
- R1186 6. VSL VECTOR SHIPT LEFT.

R1187 * IF THE ADDRESS IS INDEXED, AND THE INDEX MODIFICATION RESULTS IN A NEGATIVE SHIPT COUNT, A SHIPT OF THE
R1189 ABSOLUTE VALUE OF THE COUNT IS DONE IN THE OPPOSITE DIRECTION.

| 1190 | 00,2017 | BANK | 00 |
|------|--------------------------|---------|----------|
| 1191 | REF 2 LAST 1088 TO 1089' | 15 | 15* |
| | | COUNT | 00/INTER |
| 1192 | REF 36 LAST 1113 | 00,2017 | 3 6211 0 |
| 1193 | REF 29 LAST 1093 | 00,2020 | 7 0020 1 |
| 1194 | REF 20 LAST 1061 | 00,2021 | 54 021 0 |
| 1195 | REF 30 LAST 1122 | 00,2022 | 10 020 1 |
| 1196 | REF 1 | 00,2023 | 1 2101 1 |
| 1197 | | 00,2024 | 00024 1 |
| 1198 | REF 21 LAST 1122 | 00,2025 | 50 021 1 |
| 1199 | REF 63 LAST 1010 | 00,2026 | 3 4675 1 |
| 1200 | REF 13 LAST 1111 | 00,2027 | 54 135 1 |
| 1201 | REF 31 LAST 1122 | 00,2030 | 10 020 1 |
| 1202 | REF 1 | 00,2031 | 0 2050 0 |
| 1203 | REF 4 LAST 1113 | 00,2032 | 1 6027 0 |
| 1204 | REF 14 LAST 1122 | 00,2033 | 3 0135 0 |
| 1205 | | 00,2034 | 0 0006 1 |
| 1206 | REF 427 LAST 1121 | 00,2035 | 7 0156 1 |
| 1207 | REF 428 LAST 1122 | 00,2036 | 54 156 1 |
| 1208 | REF 15 LAST 1122 | 00,2037 | 3 0135 0 |
| 1209 | | 00,2040 | 0 0006 1 |

SCALAR SHORT SHIPTS COME HERE. THE SHIPT
COUNT-1 IS NOW IN BITS 2-3 OF CYR. THE
ROUNDING BIT IS IN BIT1 AT THIS POINT.

SEE IF RIGHT OR LEFT SHIPT DESIRED.
SHIPT LEFT.

MPTEMP SETTING FOR SR BEFORE DDV.

GET SHIPTING BIT.

SEE IF A ROUND IS DESIRED.
YES - SHIPT RIGHT AND ROUND.
SET MODE TO DP (C(A) = 0).
DO A TRIPLE PRECISION SHIPT RIGHT.

(EXIT FROM SORT AND ARVAL).

L INTERPRETER

| | | | | | | |
|------|---------|-----------|---------|----------|--------|---------|
| 1210 | REP 429 | LAST 1122 | 00,2041 | T 0154 0 | MP | MPAC |
| 1211 | REP 430 | LAST 1123 | 00,2042 | 52 155 1 | DCH | MPAC |
| 1212 | REP 16 | LAST 1122 | 00,2043 | 3 0135 0 | CA | MPTMP |
| 1213 | | | 00,2044 | 0 0000 1 | EXTEND | |
| 1214 | REP 182 | LAST 1118 | 00,2045 | T 0001 1 | MP | L |
| 1215 | REP 431 | LAST 1123 | 00,2046 | 20 155 1 | DAS | MPAC +1 |
| 1216 | REP 30 | LAST 1121 | 00,2047 | 1 6030 0 | SF | DANZIG |

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SHIFT MAJOR PART INTO A,L AND PLACE IN MPAC,+1.

ORIGINAL (MPAC +1).
GUARANTEED NO OVERFLOW.

R1217 MPAC SHIFT RIGHT AND ROUND SUBROUTINES.

| | | | | | | | |
|------|---------|-----------|---------|----------|----------|---------|---------|
| 1218 | REP 432 | LAST 1123 | 00,2050 | 3 0156 0 | MPACSRND | CA | MPAC +2 |
| 1219 | | | 00,2051 | 0 0000 1 | EXTEND | | |
| 1220 | REP 17 | LAST 1123 | 00,2052 | T 0135 1 | MP | MPTMP | |
| 1221 | REP 433 | LAST 1123 | 00,2053 | 56 155 0 | XCH | MPAC +1 | |
| 1222 | | | 00,2054 | 0 0000 1 | EXTEND | | |
| 1223 | REP 18 | LAST 1123 | 00,2053 | T 0135 1 | MP | MPTMP | |
| 1224 | REP 434 | LAST 1123 | 00,2058 | 56 155 0 | XCH | MPAC +1 | |
| 1225 | REP 183 | LAST 1123 | 00,2057 | 6 0001 0 | AD | L | |
| 1226 | | | 00,2060 | 6 0000 1 | DOUBLE | | |
| 1227 | REP 435 | LAST 1123 | 00,2061 | 54 156 1 | TS | MPAC +2 | |
| 1228 | | | 00,2062 | 1 2064 0 | TCF | +2 | |
| 1229 | REP 436 | LAST 1123 | 00,2063 | 26 155 1 | ADS | MPAC +1 | |
| 1230 | REP 221 | LAST 1120 | 00,2064 | 3 4714 1 | CAP | ZERO | |
| 1231 | REP 437 | LAST 1123 | 00,2065 | 54 156 1 | TS | MPAC +2 | |
| 1232 | REP 438 | LAST 1123 | 00,2066 | 56 154 1 | XCH | MPAC | |
| 1233 | | | 00,2067 | 0 0000 1 | EXTEND | | |
| 1234 | REP 19 | LAST 1123 | 00,2070 | T 0135 1 | MP | MPTMP | |
| 1235 | REP 439 | LAST 1123 | 00,2071 | 20 155 1 | DAS | MPAC | |
| 1236 | REP 257 | LAST 1118 | 00,2072 | 0 0002 0 | TC | 0 | |
| 1237 | REP 20 | LAST 1123 | 00,2073 | 3 0135 0 | VSHRND | CA | MPTMP |
| 1238 | | | 00,2074 | 0 0006 1 | EXTEND | | |
| 1239 | REP 440 | LAST 1123 | 00,2075 | T 0155 1 | MP | MPAC +1 | |
| 1240 | REP 441 | LAST 1123 | 00,2076 | 54 155 1 | TS | MPAC +1 | |
| 1241 | REP 184 | LAST 1123 | 00,2077 | 56 001 0 | XCH | L | |
| 1242 | REP 1 | | 00,2100 | 1 2060 1 | TCF | VSHR2 | |

WE HAVE TO DO ALL THREE MULTIPLIES SINCE MPAC +1 AND MPAC +2 MIGHT HAVE SIGN DISAGREEMENT WITH A SHIFT RIGHT OF 1.

TRIAL MINOR PART.

(FINISH VECTOR COMPONENT SHIFT RIGHT AND ROUND.

GUARANTEED NO OVERFLOW.

SETTING TO ZERO SO FOLLOWING DAS WORKS.

AGAIN NO OVERFLOW.

ENTRY TO SHIFT RIGHT AND ROUND MPAC WHEN MPAC CONTAINS A VECTOR COMPONENT.

OO ADD ONE IF NECESSARY AND FINISH.

L INTERPRETER

USER=8 PAGE NO. 46 E3 83

P1243 ROUTINE FOR SHORT SCALAR SHIFT LEFT (AND MAYBE ROUND).

| | | | | | | | | | | |
|-------|-----|-----|------|------|---------|--------|---|-------|--------|----------|
| 1244 | REF | 22 | LAST | 1122 | 00,2101 | 3 0021 | 1 | TSSL | CA | SR |
| 1245 | REF | 21 | LAST | 1123 | 00,2102 | 54 135 | 1 | +1 | TS | MPTMP |
| 1246 | | | | | 00,2103 | 0 0006 | 1 | +2 | EXTEND | |
| 1247 | REF | 442 | LAST | 1123 | 00,2104 | 3 0156 | 0 | | DCA | MPAC +1 |
| 1248 | REF | 443 | LAST | 1124 | 00,2105 | 20 156 | 1 | | DAS | MPAC +1 |
| 1249 | REF | 444 | LAST | 1124 | 00,2106 | 8 0154 | 1 | | AD | MPAC |
| 1250 | REF | 445 | LAST | 1124 | 00,2107 | 8 0154 | 1 | | AD | MPAC |
| 1251 | REF | 446 | LAST | 1124 | 00,2110 | 54 154 | 0 | | TS | MPAC |
| 1252 | | | | | 00,2111 | 1 2113 | 1 | | TCP | +2 |
| 1253 | REF | 4 | LAST | 1108 | 00,2112 | 54 121 | 1 | | TS | OVPIND |
| A1254 | | | | | | | | | | |
| 1255 | REF | 22 | LAST | 1124 | 00,2113 | 10 135 | 1 | | CCS | MPTMP |
| 1256 | REF | 2 | LAST | 1122 | 00,2114 | 1 2102 | 1 | | TCP | TSSL +1 |
| 1257 | REF | 32 | LAST | 1122 | 00,2115 | 10 020 | 1 | | CCS | CYR |
| 1258 | REF | 2 | LAST | 1119 | 00,2116 | 0 7105 | 1 | ROUND | TC | ROUNDSUB |
| 1259 | REF | 31 | LAST | 1123 | 00,2117 | 1 6030 | 0 | | TCP | DANZIG |
| 1260 | REF | 32 | LAST | 1124 | 00,2120 | 1 6030 | 0 | | TCP | DANZIG |

GET SHIFT COUNT FOR SR.

ENTRY HERE FROM SL FOR SCALARS.
SHIFTING LEFT ONE PLACE AT A TIME IS
FASTER THAN DOING THE WHOLE SHIFT WITH
MULTIPLIES ASSUMING THAT FREQUENCY OF
SHIFT COUNTS GOES DOWN RAPIDLY AS A
FUNCTION OF THEIR MAGNITUDE.

OVERFLOW. (LEAVES OVERFLOW-CORRECTED
RESULT ANYWAY).
LOOP ON DECREMENTED SHIFT COUNT.

SEE IF ROUND WANTED.
YES - ROUND AND EXIT.
SL LEAVES A ZERO IN CYR FOR NO ROUND.
NO - EXIT IMMEDIATELY.

L INTERPRETER

P1261 VECTOR SHIFTING ROUTINES.

| | | | | | | | |
|------|---------|-----------|---------|----------|--------|------|---------|
| 1262 | REP 3 | LAST 726 | 00,2121 | 3 4716 0 | SHORTV | CAP | LOW3 |
| 1263 | REP 33 | LAST 1124 | 00,2122 | 7 0020 1 | | MAK | CYR |
| 1264 | REP 23 | LAST 1124 | 00,2123 | 54 135 1 | | TS | MPTRND |
| 1270 | REP 25 | LAST 1125 | 00,2131 | 54 135 1 | | TS | MPTRND |
| 1271 | REP 1 | | 00,2132 | 0 2073 1 | | TC | VSHRRD |
| 1272 | REP 447 | LAST 1124 | 00,2133 | 52 155 1 | | DXCH | MPAC |
| 1273 | REP 448 | LAST 1125 | 00,2134 | 52 160 1 | | DXCH | MPAC +3 |
| 1274 | REP 449 | LAST 1125 | 00,2135 | 52 155 1 | | DXCH | MPAC |
| 1275 | REP 2 | LAST 1125 | 00,2136 | 0 2073 1 | | TC | VSHRRD |
| 1276 | REP 450 | LAST 1125 | 00,2137 | 52 155 1 | | DXCH | MPAC |
| 1277 | REP 451 | LAST 1125 | 00,2140 | 52 162 0 | | DXCH | MPAC +5 |
| 1278 | REP 452 | LAST 1125 | 00,2141 | 52 155 1 | | DXCH | MPAC |

SAVE 3 BIT SHIFT COUNT - 1 WITHOUT EDITING CYR.

SHIFT X COMPONENT.

SWAP X AND Y COMPONENTS.

SHIFT Y COMPONENT.

SWAP Y AND Z COMPONENTS.

L INTERPRETER

USER=8 PAGE NO. 50 E3 83

P1281 VECTOR SHIPT LEFT - DONE ONE PLACE AT A TIME.

| | | | | | | | | | | | | |
|------|-----|-----|------|------|---------|----|------|---|------|--------|----------|------------------------------------|
| 1282 | REP | 26 | LAST | 1125 | 00,2144 | 54 | 135 | 1 | -1 | TS | MPTEMP | SHIPTING LOOP. |
| 1283 | | | | | 00,2145 | 0 | 0008 | 1 | VSSL | EXTEND | | |
| 1284 | REP | 453 | LAST | 1125 | 00,2146 | 3 | 0155 | 0 | | DCA | MPAC | |
| 1285 | REP | 454 | LAST | 1126 | 00,2147 | 20 | 155 | 1 | | DAS | MPAC | |
| 1286 | | | | | 00,2150 | 0 | 0008 | 1 | | EXTEND | | |
| 1287 | | | | | 00,2151 | 1 | 2153 | 0 | | BZP | +2 | |
| 1288 | REP | 3 | LAST | 1108 | 00,2152 | 0 | 6768 | 0 | | TC | OVERFLOW | |
| 1289 | | | | | 00,2153 | 0 | 0008 | 1 | | EXTEND | | |
| 1290 | REP | 455 | LAST | 1126 | 00,2154 | 3 | 0160 | 0 | | DCA | MPAC +3 | |
| 1291 | REP | 456 | LAST | 1126 | 00,2155 | 20 | 160 | 1 | | DAS | MPAC +3 | |
| 1292 | | | | | 00,2156 | 0 | 0008 | 1 | | EXTEND | | |
| 1293 | | | | | 00,2157 | 1 | 2161 | 1 | | BZP | +2 | |
| 1294 | REP | 4 | LAST | 1118 | 00,2160 | 0 | 6763 | 0 | | TC | OVERFLWY | |
| 1295 | | | | | 00,2161 | 0 | 0008 | 1 | | EXTEND | | |
| 1296 | REP | 457 | LAST | 1126 | 00,2162 | 3 | 0162 | 1 | | DCA | MPAC +5 | |
| 1297 | REP | 458 | LAST | 1126 | 00,2163 | 20 | 162 | 0 | | DAS | MPAC +5 | |
| 1298 | | | | | 00,2164 | 0 | 0008 | 1 | | EXTEND | | |
| 1299 | | | | | 00,2165 | 1 | 2167 | 1 | | BZP | +2 | |
| 1300 | REP | 4 | LAST | 1117 | 00,2166 | 0 | 6760 | 0 | | TC | OVERFLWZ | |
| 1301 | REP | 27 | LAST | 1126 | 00,2167 | 10 | 135 | 1 | | CCS | MPTEMP | LOOP ON DECREMENTED SHIPT COUNTER. |
| 1302 | REP | 2 | LAST | 1125 | 00,2170 | 1 | 2144 | 0 | | TCF | VSSL -1 | |
| 1303 | REP | 33 | LAST | 1124 | 00,2171 | 1 | 6030 | 0 | | TCF | DANZIG | EXIT. |

L INTERPRETER

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P1304 TSLC - TRIPLE SHIFT LEFT AND COUNT. SHIFTS MPAC LEFT UNTIL GREATER THAN .5 IN MAGNITUDE, LEAVING
 R1308 THE COMPLEMENT OF THE NUMBER OF SHIFTS REQUIRED IN X.

| | | | | | | | | | | | | |
|------|-----|-----|------|------|---------|----|------|---|----------|--------|----------|--|
| 1307 | REP | 28 | LAST | 1126 | 00,2172 | 54 | 135 | 1 | TSLC2 | TS | MPTEMP | START BY ZEROING SHIPT COUNT (IN A NOW). |
| 1308 | REP | 2 | LAST | 1111 | 00,2173 | 0 | 8672 | 1 | | TC | BRANCH | EXIT WITH NO SHIPTING IF ARGUMENT ZERO. |
| 1309 | | | | | 00,2174 | 1 | 2176 | 1 | | TCF | +2 | |
| 1310 | REP | 1 | | | 00,2175 | 1 | 2212 | 0 | | TCF | ENDTSLC | STORES ZERO SHIPT COUNT IN THIS CASE. |
| 1311 | REP | 8 | LAST | 883 | 00,2176 | 0 | 7226 | 0 | | TC | TPAGRES | MAY CAUSE UPSHIPT OF ONE EXTRA PLACE. |
| 1312 | REP | 459 | LAST | 1126 | 00,2177 | 3 | 0154 | 1 | | CA | MPAC | BEGIN NORMALIZATION LOOP. |
| 1313 | REP | 1 | | | 00,2200 | 1 | 2207 | 1 | | TCF | TSLCTEST | |
| 1314 | REP | 29 | LAST | 1127 | 00,2201 | 24 | 135 | 0 | TSLCLOOP | INCR | MPTEMP | INCREMENT SHIPT COUNTER. |
| 1315 | | | | | 00,2202 | 0 | 0006 | 1 | | EXTEND | | |
| 1316 | REP | 460 | LAST | 1127 | 00,2203 | 3 | 0156 | 0 | | DCA | MPAC +1 | |
| 1317 | REP | 461 | LAST | 1127 | 00,2204 | 20 | 156 | 1 | | DAS | MPAC +1 | |
| 1318 | REP | 462 | LAST | 1127 | 00,2205 | 6 | 0154 | 1 | | AD | MPAC | |
| 1319 | REP | 463 | LAST | 1127 | 00,2206 | 26 | 154 | 0 | | ADS | MPAC | |
| 1320 | | | | | 00,2207 | 6 | 0000 | 1 | TSLCTEST | DOUBLE | | SEE IF (ANOTHER) SHIPT IS REQUIRED. |
| 1321 | | | | | 00,2210 | 54 | 000 | 0 | | OVSF | | |
| 1322 | REP | 1 | | | 00,2211 | 1 | 2201 | 1 | | TCF | TSLCLOOP | YES - INCREMENT COUNT AND SHIPT AGAIN. |
| 1323 | REP | 30 | LAST | 1127 | 00,2212 | 4 | 0135 | 1 | ENDTSLC | CS | MPTEMP | |
| 1324 | REP | 1 | | | 00,2213 | 1 | 6572 | 0 | | TCF | STORE1 | STORE SHIPT COUNT AND RETURN TO DANZIG. |

L INTERPRETER

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P1325 THE FOLLOWING ROUTINES PROCESSES THE GENERAL SHIFT INSTRUCTIONS SR, SRR, SL, AND SLR.
 R1327 THE GIVEN ADDRESS IS DECODED AS FOLLOWS'

R1328 BITS 1-7 SHIFT COUNT (SUBADDRESS) LESS THAN 125 DECIMAL.
 R1329 BIT 8 PSEUDO SIGN BIT (DETECTS CHANGE IN SIGN IN INDEXED SHIFTS).
 R1331 BIT 9 0 FOR LEFT SHIFT, AND 1 FOR RIGHT SHIFT.
 R1332 BIT 10 1 FOR TERMINAL ROUND ON SCALAR SHIFTS, 0 OTHERWISE.
 R1333 BITS 11-13 0.
 R1334 BIT 14 1.
 R1335 BIT 15 0.

R1336 THE ABOVE ENCODING IS DONE BY THE YUL SYSTEM.

| | | | | | | | | | |
|------|-----|-----|------|------|---------|----------|---------------|-----------|--|
| 1337 | REP | 71 | LAST | 1121 | 00,2214 | 7 0116 0 | GENSHIFT MASK | ADDRWD | GET SHIFT COUNT, TESTING FOR ZERO. |
| 1338 | REP | 299 | LAST | 1118 | 00,2215 | 10 000 0 | CCS | A | (ARRIVES WITH C(A) = LOW). |
| 1339 | REP | 1 | | | 00,2216 | 1 2224 0 | TCP | GENSHIFT2 | IF NON-ZERO, PROCEED WITH DECREMENTED CT |
| 1340 | REP | 33 | LAST | 701 | 00,2217 | 3 4701 0 | CAP | BIT10 | ZERO SHIFT COUNT. NO SHIFTS NEEDED BUT |
| 1341 | REP | 72 | LAST | 1128 | 00,2220 | 7 0116 0 | MASK | ADDRWD | WE MIGHT HAVE TO ROUND MPAC ON SLR AND |
| 1342 | REP | 300 | LAST | 1128 | 00,2221 | 10 000 0 | CCS | A | SRR (SCALAR ONLY). |
| 1343 | REP | 3 | LAST | 1124 | 00,2222 | 0 7105 1 | TC | ROUND SUB | |
| 1344 | REP | 34 | LAST | 1126 | 00,2223 | 1 6030 0 | TCP | DANZIG | |
| 1345 | REP | 31 | LAST | 1127 | 00,2224 | 54 135 1 | GENSHIFT2 TS | MPTEMP | DECREMENTED SHIFT COUNT TO MPTEMP. |
| 1346 | REP | 26 | LAST | 1075 | 00,2225 | 3 4703 1 | CAP | BIT8 | TEST MEANING OF LOW SEVEN BIT COUNT IN |
| 1347 | | | | | 00,2226 | 0 0006 1 | EXTEND | | MPTEMP NOW. |
| 1348 | REP | 73 | LAST | 1128 | 00,2227 | 7 0116 0 | MP | ADDRWD | |
| 1349 | REP | 1 | | | 00,2230 | 7 6214 1 | MASK | LOW2 | JUMPS ON SHIFT DIRECTION (BIT8) AND |
| 1350 | REP | 301 | LAST | 1128 | 00,2231 | 50 000 1 | INDEX | A | |
| 1351 | | | | | 00,2232 | 1 2233 0 | TCP | +1 | ORIGINAL SHIFT DIRECTION (BIT 9). |
| 1352 | REP | 1 | | | 00,2233 | 1 2332 0 | TCP | RIGHT- | NEGATIVE SHIFT COUNT FOR SL OR SLR. |
| 1353 | REP | 1 | | | 00,2234 | 1 2342 1 | TCP | LEFT- | SL OR SLR. |
| 1354 | REP | 1 | | | 00,2235 | 1 2336 1 | TCP | LEFT- | NEGATIVE SHIFT COUNT WITH SR OR SRR. |

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P1355 GENERAL SHIPT RIGHT.

| | | | | | | | | |
|-------|-----|-----|-----------|---------|----------|----------|--------|-----------|
| 1356 | REP | 20 | LAST 1121 | 00,2236 | 10 163 1 | RIGHT | CCS | MODE |
| 1357 | REP | 1 | | 00,2237 | 1 2277 0 | | TOP | GENSCR |
| 1358 | REP | 2 | LAST 1129 | 00,2240 | 1 2277 0 | | TOP | GENSCR |
| 1359 | REP | 32 | LAST 1128 | 00,2241 | 3 0135 0 | | CA | MPTMP |
| 1360 | REP | 1 | | 00,2242 | 8 3730 0 | VRIGHT2 | AD | NR012 |
| 1361 | REP | | | 00,2243 | 0 0006 1 | | EXTEND | |
| 1362 | REP | 1 | | 00,2244 | 8 2127 1 | | BZP | VSSR |
| 1363 | REP | 25 | LAST 1118 | 00,2245 | 8 7716 0 | | AD | NR00NE |
| 1364 | REP | 33 | LAST 1129 | 00,2246 | 54 135 1 | | TS | MPTMP |
| 1365 | REP | 222 | LAST 1123 | 00,2247 | 3 4714 1 | | CAP | ZERO |
| 1366 | REP | 165 | LAST 1123 | 00,2250 | 54 001 1 | | TS | L |
| 1367 | REP | 464 | LAST 1127 | 00,2251 | 56 154 1 | | XCH | MPAC |
| 1368 | REP | 465 | LAST 1129 | 00,2252 | 56 155 0 | | XCH | MPAC +1 |
| 1369 | REP | 1 | | 00,2253 | 0 2272 1 | | TC | SETROUND |
| 1370 | REP | 466 | LAST 1129 | 00,2254 | 20 155 1 | | DAS | MPAC |
| A1371 | | | | | | | | |
| 1372 | REP | 467 | LAST 1129 | 00,2255 | 56 157 1 | | XCH | MPAC +3 |
| 1373 | REP | 468 | LAST 1129 | 00,2256 | 56 160 0 | | XCH | MPAC +4 |
| 1374 | REP | 2 | LAST 1129 | 00,2257 | 0 2272 1 | | TC | SETROUND |
| 1375 | REP | 469 | LAST 1129 | 00,2260 | 20 160 1 | | DAS | MPAC +3 |
| 1376 | REP | 470 | LAST 1129 | 00,2261 | 56 161 1 | | XCH | MPAC +5 |
| 1377 | REP | 471 | LAST 1129 | 00,2262 | 56 162 1 | | XCH | MPAC +6 |
| 1378 | REP | 3 | LAST 1129 | 00,2263 | 0 2272 1 | | TC | SETROUND |
| 1379 | REP | 472 | LAST 1129 | 00,2264 | 20 162 0 | | DAS | MPAC +5 |
| 1380 | REP | 34 | LAST 1129 | 00,2265 | 10 135 1 | | CCS | MPTMP |
| 1381 | REP | 35 | LAST 1129 | 00,2266 | 54 135 1 | | TS | MPTMP |
| 1382 | REP | 1 | | 00,2267 | 1 2242 0 | | TOP | VRIGHT2 |
| 1383 | | | | 00,2270 | 04604 1 | BIASLO | DEC | .2974 R-1 |
| 1384 | REP | 35 | LAST 1128 | 00,2271 | 1 6030 0 | | TOP | DANZIG |
| 1385 | | | | 00,2272 | 6 0000 1 | SETROUND | DOUBLE | |
| 1386 | REP | 473 | LAST 1129 | 00,2273 | 54 156 1 | | TS | MPAC +2 |
| 1387 | REP | 223 | LAST 1129 | 00,2274 | 3 4714 1 | | CAP | ZERO |
| 1388 | REP | 166 | LAST 1129 | 00,2275 | 56 001 0 | | XCH | L |
| 1389 | REP | 256 | LAST 1123 | 00,2276 | 0 0002 0 | | TC | 0 |

SEE IF VECTOR OR SCALAR.

SEE IF SHIPT COUNT LESS THAN 14D.

IF SO, BRANCH AND SHIPT IMMEDIATELY.

IF NOT, REDUCE MPTMP BY A TOTAL OF 14, AND DO A SHIPT RIGHT AND ROUND BY 14. THE ROUND AT THIS STAGE MAY INTRODUCE A ONE BIT ERROR IN A SHIPT RIGHT 15D.

X COMPONENT NOW SHIPTED, SO MAKE UP THE ROUNDING QUANTITY (0 IN A AND 0 OR +-1 IN L).

REPEAT THE ABOVE PROCESS FOR Y AND Z.

NO OVERFLOW ON THESE ADDS.

SEE IF DONE, DOING FINAL DECREMENT.

SORT CONSTANT

MAKES UP ROUNDING QUANTITY FROM ARRIVING (A). L IS ZERO INITIALLY.

RETURN AND DO THE DAS, RESSETTING L TO 0.

L INTERPRETER

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P1390 PROCESS SR AND SRR FOR SCALARS.

| | | | | | | | | | | | |
|------|-----|-----|------|-------|---------|-------|------|---|---------|--------|-----------|
| 1391 | REP | 36 | LAST | 1129 | 00,2277 | 3 | 0135 | 0 | GENSCR | CA | MPTEMP |
| 1392 | REP | 2 | LAST | 1129 | 00,2300 | 6 | 3730 | 0 | +1 | AD | NEG12 |
| 1393 | | | | | 00,2301 | 0 | 0006 | 1 | | EXTEND | |
| 1394 | REP | 1 | | | 00,2302 | 6 | 2322 | 0 | | BZMP | DOSSHFT |
| 1395 | REP | 26 | LAST | 1129 | 00,2303 | 6 | 7716 | 0 | +4 | AD | NEQONE |
| 1396 | REP | 37 | LAST | 1130 | 00,2304 | 54 | 135 | 1 | | TS | MPTEMP |
| 1397 | REP | 224 | LAST | 1129 | 00,2305 | 3 | 4714 | 1 | | CAP | ZERO |
| 1398 | REP | 474 | LAST | 1129 | 00,2306 | 56 | 154 | 1 | | XCH | MPAC |
| 1399 | REP | 475 | LAST | 1130 | 00,2307 | 56 | 155 | 0 | | XCH | MPAC +1 |
| 1400 | REP | 476 | LAST | 1130 | 00,2310 | 54 | 156 | 1 | | TS | MPAC +2 |
| 1401 | REP | 38 | LAST | 1130 | 00,2311 | 10 | 135 | 1 | | CCS | MPTEMP |
| 1402 | REP | 39 | LAST | 1130 | 00,2312 | 54 | 135 | 1 | | TS | MPTEMP |
| 1403 | REP | 3 | LAST | 1129 | 00,2313 | 0 | 2300 | 0 | | TC | GENSCR +1 |
| 1404 | | | | | 00,2314 | 22850 | 1 | | SLOPHI | DEC | .5884 |
| 1405 | REP | 34 | LAST | 1128 | 00,2315 | 3 | 4701 | 0 | | CAP | BIT10 |
| 1406 | REP | 74 | LAST | 1128 | 00,2316 | 7 | 0116 | 0 | | MASK | ADDRWD |
| 1407 | REP | 302 | LAST | 1128 | 00,2317 | 10 | 000 | 0 | | CCS | A |
| 1408 | REP | 4 | LAST | 1128 | 00,2320 | 0 | 7105 | 1 | | TC | ROUNDSUR |
| 1409 | REP | 36 | LAST | 1129 | 00,2321 | 1 | 6030 | 0 | | TCP | DANZIG |
| 1410 | REP | 40 | LAST | 1130 | 00,2322 | 50 | 135 | 0 | DOSSHFT | INDEX | MPTEMP |
| 1411 | REP | 65 | LAST | 1125 | 00,2323 | 3 | 4675 | 1 | | CAP | BIT14 |
| 1412 | REP | 41 | LAST | 1130 | 00,2324 | 54 | 135 | 1 | | TS | MPTEMP |
| 1413 | REP | 35 | LAST | 1130 | 00,2325 | 3 | 4701 | 0 | | CAP | BIT10 |
| 1414 | REP | 75 | LAST | 1130 | 00,2326 | 7 | 0116 | 0 | | MASK | ADDRWD |
| 1415 | REP | 303 | LAST | 1130. | 00,2327 | 10 | 000 | 0 | | CCS | A |
| 1416 | REP | 1 | | | 00,2330 | 1 | 2031 | 0 | | TCP | RIGHTR |
| 1417 | REP | 1 | | | 00,2331 | 1 | 2033 | 1 | | TCP | MPACSHR |

SEE IF THE ORIGINAL SHIFT COUNT WAS LESS THAN 14D.

DO THE SHIFT IMMEDIATELY IF SO.

IF NOT, DECREMENT SHIFT COUNT BY 14D AND SHIFT MPAC RIGHT 14 PLACES.

SEE IF FINISHED, DO FINAL DECREMENT.

SORT CONSTANT.
FINISHED WITH SHIFT. SEE IF ROUND WANTED.

DO SO AND/OR EXIT.

PICK UP SHIFTING BIT.

SEE IF TERMINAL ROUND DESIRED.

YES.
JUST SHIFT RIGHT.

L INTERPRETER

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P1437 SCALAR DIVISION INSTRUCTIONS, DDV AND BDDV, ARE EXECUTED HERE. AT THIS POINT, THE DIVIDEND IS IN MPAC
 R1439 AND THE DIVISOR IN RUP.

| | | | | | | | | |
|------|---------|-----------|---------|----------|----------|--------|------------|---|
| 1440 | REP 136 | LAST 1120 | 00,2353 | 4 4712 0 | DDV/BDDV | CS | ONE | INITIALIZATION. |
| 1441 | REP 1 | | 00,2354 | 54 136 1 | | TS | DV SIGN | + -1 FOR POSITIVE QUOTIENT - -0 FOR NEG. |
| 1442 | REP 1 | | 00,2355 | 54 137 0 | | TS | DV NORMCT | DIVIDEND NORMALIZATION COUNT. |
| 1443 | REP 1 | | 00,2356 | 54 140 0 | | TS | MAXDVSZ | NEAR-ONE DIVIDE FLAG. |
| 1444 | REP 55 | LAST 1120 | 00,2357 | 10 130 1 | | CCS | RUP | FORCE RUP POSITIVE WITH THE MAJOR PART |
| 1445 | REP 1 | | 00,2360 | 1 2516 0 | | TCP | RUPPOS | NON-ZERO. |
| 1446 | REP 1 | | 00,2361 | 1 2363 1 | | TCP | +2 | |
| 1447 | REP 1 | | 00,2362 | 1 2531 0 | | TCP | RUPNEG | |
| 1448 | REP 477 | LAST 1130 | 00,2363 | 54 156 1 | RUPZERO | TS | MPAC +2 | ZERO THIS. |
| 1449 | REP 9 | LAST 1127 | 00,2364 | 0 7226 0 | | TC | TPAGRES | FORCE SIGN AGREEMENT BEFORE OVERFLOW |
| 1450 | REP 476 | LAST 1132 | 00,2365 | 10 154 0 | | CCS | MPAC | TEST TO SEE IF MPAC NON-ZERO. (TOO BIG) |
| 1451 | REP 1 | | 00,2366 | 1 2414 0 | | TCP | OVP+ | MAJOR PART OF DIVIDEND IS POSITIVE NON-0 |
| 1452 | REP 1 | | 00,2367 | 1 2371 1 | | TCP | +2 | |
| 1453 | REP 2 | LAST 1132 | 00,2370 | 1 2413 1 | | TCP | OVP+ -1 | MAJOR PART OF DIVIDEND IS NEG. NON-ZERO |
| 1454 | REP 56 | LAST 1132 | 00,2371 | 56 131 1 | | XCH | RUP +1 | SHIFT DIVIDEND AND DIVISOR LEFT 14. |
| 1455 | REP 57 | LAST 1132 | 00,2372 | 56 130 0 | | XCH | RUP | |
| 1456 | REP 479 | LAST 1132 | 00,2373 | 56 155 0 | | XCH | MPAC +1 | |
| 1457 | REP 480 | LAST 1132 | 00,2374 | 56 154 1 | | XCH | MPAC | |
| 1458 | REP 58 | LAST 1132 | 00,2375 | 10 130 1 | | CCS | RUP | TRY AGAIN ON FORMER MINOR PART. |
| 1459 | REP 1 | | 00,2376 | 1 2422 0 | | TCP | RUP+ | |
| 1460 | REP 1 | | 00,2377 | 1 2401 1 | | TCP | +2 | OVERFLOW ON ZERO DIVISOR. |
| 1461 | REP 1 | | 00,2400 | 1 2416 1 | | TCP | RUP- | |
| 1462 | REP 481 | LAST 1132 | 00,2401 | 4 0154 0 | | CS | MPAC | SIGN OF MPAC DETERMINES SIGN OF RESULT. |
| 1463 | | | 00,2402 | 0 0006 1 | SENDVOP | EXTEND | | |
| 1464 | | | 00,2403 | 6 2405 1 | | BZNF | +2 | |
| 1465 | REP 2 | LAST 1132 | 00,2404 | 24 136 0 | | INCR | DV SIGN | NEGMAX IN MPAC PERHAPS. |
| 1466 | REP 30 | LAST 1111 | 00,2405 | 3 4672 0 | DVOVP | CAP | POS MAX | ON DIVISION OVERFLOW OF ANY SORT, SET |
| 1467 | REP 482 | LAST 1132 | 00,2406 | 54 154 0 | | TS | MPAC | SET DP MPAC TO +-POS MAX. |
| 1468 | REP 1 | | 00,2407 | 0 2830 0 | | TC | FINALDV +3 | |
| 1469 | REP 137 | LAST 1132 | 00,2410 | 3 4712 1 | | CAP | ONE | SET OVERFLOW INDICATOR AND EXIT. |
| 1470 | REP 5 | LAST 1124 | 00,2411 | 54 121 1 | | TS | OVPIND | |
| 1471 | REP 37 | LAST 1130 | 00,2412 | 0 6030 1 | | TC | DANZIG | |
| 1472 | REP 3 | LAST 1132 | 00,2413 | 24 136 0 | | -1 | INCR | DV SIGN |
| 1473 | REP 59 | LAST 1132 | 00,2414 | 4 0131 0 | | OVP+ | CS | RUP +1 |
| 1474 | REP 1 | | 00,2415 | 1 2402 1 | | TCP | SENDVOP | LOAD LOWER ORDER PART OF DIVISOR. |
| | | | | | | | | GET SIGN OF RESULT. |
| 1475 | | | 00,2416 | 0 0006 1 | RUP- | EXTEND | | IF RUP IS NEGATIVE, COMPLEMENT IT AND |
| 1476 | REP 60 | LAST 1132 | 00,2417 | 4 0131 0 | | DCS | RUP | MAINTAIN DV SIGN FOR FINAL QUOTIENT SIGN. |
| 1477 | REP 61 | LAST 1132 | 00,2420 | 52 131 0 | | DXCH | RUP | |
| 1478 | REP 4 | LAST 1132 | 00,2421 | 24 136 0 | | INCR | DV SIGN | NOW -0. |

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| | | | | | | | |
|------|---------|-----------|---------|----------|-------|--------|---------|
| 1479 | REP 483 | LAST 1132 | 00,2422 | 10 154 0 | BUF- | CCS | MPAC |
| 1480 | REP 1 | | 00,2423 | 1 2437 1 | | TCP | MPAC+ |
| 1481 | | | 00,2424 | 1 2428 1 | | TCP | +2 |
| 1482 | REP 1 | | 00,2425 | 1 2433 0 | | TCP | MPAC- |
| 1483 | REP 484 | LAST 1133 | 00,2426 | 10 155 1 | | CCS | MPAC +1 |
| 1484 | REP 2 | LAST 1133 | 00,2427 | 1 2437 1 | | TCP | MPAC+ |
| 1485 | REP 38 | LAST 1132 | 00,2430 | 1 6030 0 | | TCP | DANZIG |
| 1486 | REP 2 | LAST 1133 | 00,2431 | 1 2433 0 | | TCP | MPAC- |
| 1487 | REP 39 | LAST 1133 | 00,2432 | 1 6030 0 | | TCP | DANZIG |
| 1488 | | | 00,2433 | 0 0006 1 | MPAC- | EXTEND | |
| 1489 | REP 485 | LAST 1133 | 00,2434 | 4 0155 1 | | DCS | MPAC |
| 1490 | REP 486 | LAST 1133 | 00,2435 | 52 155 1 | | DXCH | MPAC |
| 1491 | REP 5 | LAST 1132 | 00,2436 | 24 136 0 | | INCR | DVSIGN |

FORCE MPAC POSITIVE, CHECKING FOR ZERO DIVIDEND IN THE PROCESS.

EXIT IMMEDIATELY ON ZERO DIVIDEND.

FORCE MPAC POSITIVE AS BUF IN BUF-.

NOW +1 OR -0.

L INTERPRETER

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| | | | | | | | |
|------|---------|-----------|---------|----------|--------|--------|---------|
| 1492 | REP 487 | LAST 1133 | 00,2437 | 4 0154 0 | MPAC+ | CS | MPAC |
| 1493 | REP 27 | LAST 1130 | 00,2440 | 8 7716 0 | | AD | NEQONE |
| 1494 | REP 82 | LAST 1132 | 00,2441 | 8 0130 0 | | AD | RUP |
| 1495 | REP 304 | LAST 1130 | 00,2442 | 10 000 0 | | CCS | A |
| 1496 | REP 1 | | 00,2443 | 1 2505 1 | | TCP | DVNORM |
| 1497 | | | 00,2444 | 60001 0 | -1/2+2 | OCT | 60001 |
| 1498 | | | 00,2445 | 1 2446 1 | | TCP | +1 |
| 1499 | REP 11 | LAST 1118 | 00,2446 | 3 4675 1 | | CAF | HALF |
| 1500 | | | 00,2447 | 8 0000 1 | | DOUBLE | |
| 1501 | REP 488 | LAST 1134 | 00,2450 | 8 0155 0 | | AD | MPAC +1 |
| 1502 | REP 489 | LAST 1134 | 00,2451 | 54 155 1 | | TS | MPAC +1 |
| 1503 | REP 225 | LAST 1130 | 00,2452 | 3 4714 1 | | CAF | ZERO |
| 1504 | REP 31 | LAST 1132 | 00,2453 | 8 4672 0 | | AD | POSMAX |
| 1505 | REP 490 | LAST 1134 | 00,2454 | 28 154 0 | | ADS | MPAC |
| 1506 | REP 12 | LAST 1134 | 00,2455 | 3 4675 1 | | CAF | HALF |
| 1507 | | | 00,2456 | 8 0000 1 | | DOUBLE | |
| 1508 | REP 63 | LAST 1134 | 00,2457 | 8 0131 1 | | AD | RUP +1 |
| 1509 | REP 64 | LAST 1134 | 00,2460 | 54 131 0 | | TS | RUP +1 |
| 1510 | REP 226 | LAST 1134 | 00,2461 | 3 4714 1 | | CAF | ZERO |
| 1511 | REP 32 | LAST 1134 | 00,2462 | 8 4672 0 | | AD | POSMAX |
| 1512 | REP 65 | LAST 1134 | 00,2463 | 28 130 1 | | ADS | RUP |
| 1513 | REP 491 | LAST 1134 | 00,2464 | 4 0154 0 | | CS | MPAC |
| 1514 | REP 66 | LAST 1134 | 00,2465 | 8 0130 0 | | AD | RUP |
| 1515 | REP 305 | LAST 1134 | 00,2466 | 10 000 0 | | CCS | A |
| 1516 | REP 2 | LAST 1134 | 00,2467 | 1 2505 1 | | TCP | DVNORM |
| 1517 | REP 13 | LAST 1114 | 00,2470 | 00133 0 | LRUP2 | ADRES | RUP2 |
| 1518 | REP 1 | | 00,2471 | 1 2405 0 | | TCP | DVOVF |
| 1519 | REP 2 | LAST 1132 | 00,2472 | 54 140 0 | | TS | MAXDVS |
| 1520 | REP 492 | LAST 1134 | 00,2473 | 4 0155 1 | | CS | MPAC +1 |
| 1521 | REP 67 | LAST 1134 | 00,2474 | 8 0131 1 | | AD | RUP +1 |
| 1522 | | | 00,2475 | 8 0006 1 | | EXTEND | |
| 1523 | REP 2 | LAST 1134 | 00,2476 | 8 2405 1 | | BZMP | DVOVF |
| 1524 | REP 3 | LAST 1134 | 00,2477 | 1 2505 1 | | TCP | DVNORM |

CHECK FOR DIVISION OVERFLOW. IF THE MAJOR PART OF THE DIVIDEND IS LESS THAN THE MAJOR PART OF THE DIVISOR BY AT LEAST TWO, WE CAN PROCEED IMMEDIATELY WITHOUT NORMALIZATION PRODUCING A DVMAX. USED IN SORTSUB.

IF THE ABOVE DOES NOT HOLD, FORCE SIGN AGREEMENT IN NUMERATOR AND DENOMINATOR TO FACILITATE OVERFLOW AND NEAR-ONE CHECKING.

SAME FOR RUP.

CHECK MAGNITUDE OF SIGN-CORRECTED OPERANDS.

DIVIDE QK - WILL NOT BECOME MAXDV CASE.

DIVISOR NOT LESS THAN DIVIDEND - OVF.

IF THE MAJOR PARTS OF THE DIVIDEND AND DIVISOR ARE EQUAL, A SPECIAL APPROXIMATION IS USED (PROVIDED THE DIVISION IS POSSIBLE, OF COURSE).

IF NO OVERFLOW.

L INTERPRETER

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| | | | | | | | |
|------|---------|-----------|---------|----------|---------|----------------|--|
| 1525 | | | 00,2500 | 0 0006 1 | BUPNORM | EXTEND | |
| 1526 | REP 2 | LAST 1132 | 00,2501 | 24 137 1 | | AUG DYNORMCT | |
| 1527 | | | 00,2502 | 0 0006 1 | | EXTEND | |
| 1528 | REP 68 | LAST 1134 | 00,2503 | 3 0131 1 | | DCA BUP | |
| 1529 | REP 69 | LAST 1135 | 00,2504 | 20 131 0 | | DAS BUP | |
| 1530 | REP 70 | LAST 1135 | 00,2505 | 3 0130 0 | DYNORM | CA BUP | |
| 1531 | | | 00,2506 | 6 0000 1 | | DOUBLE | |
| 1532 | | | 00,2507 | 54 000 0 | | OVSK | |
| 1533 | REP 1 | | 00,2510 | 1 2500 1 | | TCP BUPNORM | |
| 1534 | REP 493 | LAST 1134 | 00,2511 | 52 155 1 | | DYCH MPAC | |
| 1535 | REP 3 | LAST 1135 | 00,2512 | 50 137 1 | | INDEX DYNORMCT | |
| 1536 | REP 1 | | 00,2513 | 0 2565 0 | | TC MAXTEST | |
| 1537 | REP 494 | LAST 1135 | 00,2514 | 54 156 1 | | TS MPAC +2 | |
| 1538 | REP 40 | LAST 1133 | 00,2515 | 1 6030 0 | | TCP DANZIG | |
| 1539 | REP 306 | LAST 1134 | 00,2516 | 10 000 0 | BUPPOS | CCS A | |
| 1540 | REP 2 | LAST 1132 | 00,2517 | 1 2422 0 | | TCP BUP+ | |
| 1541 | REP 71 | LAST 1135 | 00,2520 | 4 0131 0 | | CS BUP +1 | |
| 1542 | | | 00,2521 | 0 0006 1 | | EXTEND | |
| 1543 | REP 3 | LAST 1135 | 00,2522 | 6 2422 1 | | BZMP BUP+ | |
| 1544 | REP 13 | LAST 1134 | 00,2523 | 3 4675 1 | | CA HALP | |
| 1545 | | | 00,2524 | 6 0000 1 | +6 | DOUBLE | |
| 1546 | REP 72 | LAST 1135 | 00,2525 | 26 131 0 | | ADS BUP +1 | |
| 1547 | REP 227 | LAST 1134 | 00,2526 | 3 4714 1 | | CA ZERO | |
| 1548 | REP 73 | LAST 1135 | 00,2527 | 54 130 1 | | TS BUP | |
| 1549 | REP 1 | | 00,2530 | 1 2363 1 | | TCP BUPZERO | |
| 1550 | REP 307 | LAST 1135 | 00,2531 | 10 000 0 | BUPNEG | CCS A | |
| 1551 | REP 2 | LAST 1132 | 00,2532 | 1 2416 1 | | TCP BUP- | |
| 1552 | REP 74 | LAST 1135 | 00,2533 | 3 0131 1 | | CA BUP +1 | |
| 1553 | | | 00,2534 | 0 0006 1 | | EXTEND | |
| 1554 | REP 3 | LAST 1135 | 00,2535 | 6 2416 0 | | BZMP BUP- | |
| 1555 | REP 14 | LAST 1135 | 00,2536 | 4 4675 0 | | CS HALP | |
| 1556 | REP 2 | LAST 1132 | 00,2537 | 1 2524 1 | | TCP BUPPOS +6 | |

ADD -1 TO AUGMENT SHIPT COUNT AND SHIPT LEFT ONE PLACE.

SEE IF DIVISOR NORMALIZED YET.

NO - SHIPT LEFT ONE AND TRY AGAIN.

CALL DIVIDEND NORMALIZATION SEQUENCE PRIOR TO DOING THE DIVIDE.

RETURNS WITH DIVISION DONE AND C(A) = 0.

TO BUP+ IF BUP IS GREATER THAN +1.

IF BUP IS +1, FORCING SIGN AGREEMENT MAY CAUSE BUP TO BECOME ZERO. BRANCH IF SIGNS AGREE.

SIGNS DISAGREE. FORCE AGREEMENT.

TO BUP- IF BUP IS LESS THAN -1.

IF BUP IS -1, FORCING SIGN AGREEMENT MAY CAUSE BUP TO BECOME ZERO. BRANCH IF SIGNS AGREE.

SIGNS DISAGREE. FORCE AGREEMENT.



L INTERPRETER

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P1557

THE FOLLOWING ARE PROLOGUES TO SHIPT THE DIVIDEND ARRIVING IN A AND L BEFORE THE DIVIDE.

| | | | | | | | | | |
|------|-----|-----|-----------|---------|----------|---------|--------|-----------|---|
| 1559 | REP | 23 | LAST 1124 | 00,2540 | 22 021 1 | -21D | LXCH | SR | SPECIAL PROLOGUE FOR UNIT WHEN THE LENGTH OF THE ARGUMENT WAS NOT LESS THAN .5. IN THIS CASE, EACH COMPONENT MUST BE SHIPTED RIGHT ONE TO PRODUCE A HALF-UNIT VECTOR. |
| 1560 | | | | 00,2541 | 0 0006 1 | | EXTEND | | |
| 1561 | REP | 15 | LAST 1135 | 00,2542 | 1 4675 0 | | MP | HALF | |
| 1562 | REP | 187 | LAST 1129 | 00,2543 | 56 001 0 | | XCH | L | |
| 1W3 | REP | 24 | LAST 1136 | 00,2544 | 6 0021 1 | | AD | SR | |
| 1564 | REP | 188 | LAST 1136 | 00,2545 | SI 001 0 | | XCH | L | WITH DP DIVIDEND IN A,L. |
| 1565 | REP | 1 | | 00,2546 | 1 2571 1 | | TCP | GENDDV +1 | |
| 1566 | | | | 00,2547 | 20 001 1 | | DDOURL | | PROLOGUE WHICH NORMALIZES THE DIVIDEND WHEN IT IS KNOWN THAT NO DIVISION OVERFLOW WILL OCCUR. |
| 1567 | | | | 00,2550 | 20 001 1 | | DDOURL | | |
| 1568 | | | | 00,2551 | 20 001 1 | | DDOURL | | |
| 1569 | | | | 00,2552 | 20 001 1 | | DDOURL | | |
| 1570 | | | | 00,2553 | 20 001 1 | | DDOURL | | |
| 1571 | | | | 00,2554 | 20 001 1 | | DDOURL | | |
| 1572 | | | | 00,2555 | 20 001 1 | | DDOURL | | |
| 1573 | | | | 00,2556 | 20 001 1 | | DDOURL | | |
| 1014 | | | | 00,2557 | 20 001 1 | | DDOURL | | |
| 1575 | | | | 00,2560 | 20 001 1 | | DDOURL | | |
| 1576 | | | | 00,2561 | 20 001 1 | | DDOURL | | |
| 1577 | | | | 00,2562 | 20 001 1 | | DDOURL | | |
| 1578 | | | | 00,2563 | 20 001 1 | | DDOURL | | |
| 1579 | REP | 495 | LAST 1135 | 00,2564 | 52 155 1 | | DXCH | MPAC | |
| 1580 | REP | 3 | LAST 1134 | 00,2565 | 10 140 0 | MAXTEST | CCS | MAXDVS | 0 IF MAJORS MIGHT BE =, -1 OTHERWISE. SORT CONSTANTS |
| 1581 | | | | 00,2566 | 06552 0 | BIASHI | DEC | .4192 R-1 | |
| 1582 | REP | 1 | | 00,2567 | 1 2642 1 | | TCP | MAXDV | CHECK TO SEE IF THEY ARE NOW EQUAL. |

L INTERPRETER

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P1583 THE FOLLOWING IS A GENERAL PURPOSE DOUBLE PRECISION DIVISION ROUTINE. IT DIVIDES MPAC BY RUP AND LEAVES
R1585 THE RESULT IN MPAC. THE FOLLOWING CONDITIONS MUST BE SATISFIED'

R1586 1. THE DIVISOR (RUP) MUST BE POSITIVE AND NOT LESS THAN .5.

R1587 2. THE DIVIDEND (MPAC) MUST BE POSITIVE WITH THE MAJOR PART OF MPAC STRICTLY LESS THAN THAT OF RUP
R1589 (A SPECIAL APPROXIMATION, MNDV, IS USED WHEN THE MAJOR PARTS ARE EQUAL).

R1591 UNDERSTANDING THAT $A/B = Q + S(R/B)$ WHERE $S = 2^{-14}$ AND Q AND R ARE QUOTIENT AND REMAINDER, RESPEC-
R1593 TIVELY, THE FOLLOWING APPROXIMATION IS OBTAINED BY MULTIPLYING ABOVE AND BELOW BY C - SD AND NEGLECTING TERMS OF
R1595 ORDER S-SQUARED (POSSIBLY INTRODUCING ERROR INTO THE LOW TWO BITS OF THE RESULT). SIGN AGREEMENT IS UNNECESSARY.

R1597 $\frac{A + SB}{C + SD} = \frac{(Q + S(R/B))}{(C - SD)}$ WHERE Q AND R ARE QUOTIENT AND REMAINDER OF $\frac{A + SB}{C}$ RESPECTIVELY.
R1599
R1601

| ADDRESS | OPERATION | ADDRESS | DATA | OPERATION | ADDRESS | DATA | OPERATION | ADDRESS | DATA | OPERATION | ADDRESS | DATA | OPERATION | ADDRESS | DATA | OPERATION | ADDRESS | DATA | |
|---------|-----------|-----------|----------|-----------|---------|------|-----------|---------|------|-----------|---------|------|-----------|---------|------|-----------|---------|------|--|
| 1603 | REP 496 | LAST 1136 | 00,22570 | 52 155 1 | GENDDV | | DxCH | MPAC | | | | | | | | | | | |
| 1604 | | | 00,22571 | 0 0006 1 | +1 | | EXTEND | | | | | | | | | | | | |
| 1605 | REP 75 | LAST 1135 | 00,22572 | 10 130 1 | | | DV | RUP | | | | | | | | | | | |
| 1606 | REP 497 | LAST 1137 | 00,22573 | 52 155 1 | | | DxCH | MPAC | | | | | | | | | | | |
| 1607 | REP 498 | LAST 1137 | 00,22574 | 4 0154 0 | | | CS | MPAC | | | | | | | | | | | |
| 1608 | | | 00,22575 | 0 0006 1 | | | EXTEND | | | | | | | | | | | | |
| 1609 | REP 76 | LAST 1137 | 00,22576 | 7 0131 0 | | | MP | RUP +1 | | | | | | | | | | | |
| 1610 | REP 499 | LAST 1137 | 00,22577 | 6 0155 0 | | | AD | MPAC +1 | | | | | | | | | | | |
| 1611 | | | 00,22578 | 54 000 0 | | | OVSK | | | | | | | | | | | | |
| 1612 | | | 00,22579 | 1 2006 1 | | | TCP | +5 | | | | | | | | | | | |
| 1613 | | | 00,22580 | 0 0006 1 | | | EXTEND | | | | | | | | | | | | |
| 1614 | REP 77 | LAST 1137 | 00,22581 | 60 130 0 | | | SU | RUP | | | | | | | | | | | |
| 1615 | REP 500 | LAST 1137 | 00,22582 | 24 154 1 | | | INCR | MPAC | | | | | | | | | | | |
| 1616 | REP 1 | | 00,22583 | 1 2010 0 | | | TCP | DOWN | | | | | | | | | | | |
| 1617 | | | 00,22584 | 0 0006 1 | +5 | | EXTEND | | | | | | | | | | | | |
| 1618 | REP 1 | | 00,22585 | 6 2020 1 | | | BZUP | UP | | | | | | | | | | | |
| A1619 | | | | | | | | | | | | | | | | | | | |

WE NEED A AND B ONLY FOR FIRST DV.
(SPECIAL UNIT PROLOGUE ENTERS HERE).
A NOW CONTAINS Q AND L, R.

FORM DIVIDEND FOR MINOR PART OF RESULT.

OVERFLOW AT THIS POINT IS POSITIVE SINCE
R IS POSITIVE IN EVERY CASE.

OVERFLOW CAN BE REMOVED BY SUBTRACTING C
(RUP) ONCE SINCE R IS ALWAYS LESS THAN C
IN THIS CASE. INCR COMPENSATES SUBTRACT.
(SINCE C(A) IS STILL POSITIVE).

C(A) CAN BE MADE LESS THAN C IN MAGNI-
TUDE BY DIMINISHING IT BY C (SINCE C IS
NOT LESS THAN .5) UNLESS C(A) = 0.



L INTERPRETER

| | | | | | | | | |
|------|---------|-----------|---------|----------|-------|----------|------------|--|
| 1620 | | | 00,2610 | 0 0006 1 | -DOWN | EXTEND | | |
| 1021 | REP 78 | LAST 1137 | 00,2611 | 60 130 0 | | SU | RUP | IF POSITIVE, REDUCE ONLY IF NECESSARY |
| 1022 | | | 00,112 | 0 0000 1 | | EXTEND | | SINCE THE COMPENSATING INCR MIGHT CAUSE |
| 1623 | | | 00,2613 | 1 2616 0 | | BZF | +3 | OVERFLOW. |
| 1624 | | | 00,114 | 0 0000 1 | | EXTEND | | DONT SUBTRACT UNLESS RESULT IS POSITIVE |
| 1625 | REP 1 | | 00,2615 | 6 2624 0 | | BZF | ENDMAXDV | OR ZERO. |
| 1626 | REP 501 | LAST 1137 | 00,2616 | 24 154 1 | +3 | INCR | MPAC | KEEP SUBTRACT HERE AND COMPENSATE. |
| 1627 | REP 2 | LAST 1132 | 00,2617 | 1 2625 0 | | TCP | FINALDV | |
| 1628 | | | 00,2620 | 0 0006 1 | -UP | EXTEND | | IF ZERO, SET MINOR PART OF RESULT TO |
| 1629 | REP 3 | LAST 1138 | 00,2621 | 1 2630 1 | | BZF | FINALDV +3 | ZERO. |
| 1630 | | | 00,2622 | 0 0000 1 | | EXTEND | | IF NEGATIVE, ADD C TO A, SUBTRACTING ONE |
| 1031 | REP 502 | LAST 1138 | 00,2023 | 26 154 0 | | DIM | MPAC | TO COMPENSATE. DIM IS OK HERE SINCE THE |
| 1632 | REP 79 | LAST 1138 | 00,2624 | 6 0130 0 | | ENDMAXDV | AD RUP | MAJOR PART NEVER GOES NEGATIVE. |

L INTERPRETER

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| | | | | | | | |
|------|----------|-----------|---------|----------|---------|--------|---------|
| 1633 | | | 00,2625 | 22 007 0 | FINALDV | ZL | |
| 1634 | | | 00,2626 | 0 0006 1 | | EXTEND | |
| 1635 | RESP 80 | LAST 1138 | 00,2627 | 10 130 1 | | DV | BUF |
| 1636 | RESP 503 | LAST 1138 | 00,2630 | 54 155 1 | +3 | TS | MPAC +1 |
| 1637 | RESP 6 | LAST 1133 | 00,2631 | 10 136 1 | | CCS | DVSIGN |
| 1638 | RESP 259 | LAST 1129 | 00,2632 | 0 0002 0 | | TC | 0 |
| 1639 | RESP 260 | LAST 1139 | 00,2633 | 0 0002 0 | | TC | 0 |
| 1640 | RESP 261 | LAST 1139 | 00,2634 | 0 0002 0 | | TC | 0 |
| 1641 | | | 00,2635 | 0 0006 1 | | EXTEND | |
| 1642 | RESP 504 | LAST 1139 | 00,2636 | 4 0155 1 | | DCS | MPAC |
| 1643 | RESP 505 | LAST 1139 | 00,2637 | 52 155 1 | | DCH | MPAC |
| 1644 | RESP 226 | LAST 1135 | 00,2640 | 3 4714 1 | | CAP | ZERO |
| 1645 | RESP 262 | LAST 1139 | 00,2641 | 0 0002 0 | | TC | 0 |

DO DV TO OBTAIN MINOR PART OF RESULT.

LEAVE RESULT POSITIVE UNLESS C(DVSIGN)=-
-0.

SO WE ALWAYS RETURN WITH C(A) = 0.

L INTERPRETER

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P1646 IF THE MAJOR PARTS OF THE DIVISOR AND DIVIDEND ARE EQUAL, BUT THE MINOR PARTS ARE SUCH THAT THE
 R1646 DIVIDEND IS STRICTLY LESS THAN THE DIVISOR IN MAGNITUDE, THE FOLLOWING APPROXIMATION IS USED. THE ASSUMPTIONS
 R1650 ARE THE SAME AS THE GENERAL ROUTINE WITH THE ADDITION THAT SIGN AGREEMENT IS NECESSARY (B, C, d D POSITIVE).

$$\frac{C + SD}{C + SD} = \frac{C + SD}{C + SD} \cdot \frac{(C + B - D)}{C} = 37777 + \frac{B(C + B - D)}{C}$$

R1655 THE DIVISION MAY BE PERFORMED IMMEDIATELY SINCE B IS STRICTLY LESS THAN D AND C IS NOT LESS THAN .5.
 1657 REP 506 LAST 1139 00,2642 4 0154 0 MAXDV CS MPAC SEE IF MAXDV CASE STILL HOLDS AFTER
 1658 REP 81 LAST 1139 00,2643 6 0130 0 AD BUF NORMALIZATION.
 1659 00,2644 0 0006 1 EXTEND
 1660 00,2645 1 2647 1 BZF +2
 1661 REP 2 LAST 1136 00,2646 1 2570 0 TCP GENDDV MPAC NOW LESS THAN BUF - DIVIDE AS USUAL

 1662 REP 33 LAST 1134 00,2647 3 4672 0 +2 CAP POSMAX SET MAJOR PART OF RESULT.
 1663 REP 507 LAST 1140 00,2650 54 154 0 TS MPAC

 1664 REP 82 LAST 1140 00,2651 4 0131 0 CS BUF +1 FORM DIVIDEND OF MINOR PART OF RESULT.
 1665 REP 506 LAST 1140 00,2652 6 0155 0 AD MPAC +1
 1666 REP 2 LAST 1138 00,2653 1 2624 1 TCP ENDMAXDV GO ADD C AND DO DIVIDE, ATTACHING SIGN
 A1667 BEFORE EXITING.

L INTERPRETER

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P1668 VECTOR DIVIDED BY SCALAR, V/SC, IS EXECUTED HERE. THE VECTOR IS NOW IN MPAC WITH SCALAR IN RUP.

| | | | | | | | | | | |
|------|-----|-----|------|------|---------|----------|-------|--------|----------|---|
| 1670 | REP | 138 | LAST | 1132 | 00,2654 | 4 4712 0 | V/SC2 | CS | ONS | INITIALIZE DIVIDEND NORMALIZATION COUNT AND DIVISION SIGN REGISTER. |
| 1671 | REP | 4 | LAST | 1135 | 00,2655 | 54 137 0 | | TS | DVNORMCT | |
| 1672 | REP | 41 | LAST | 1118 | 00,2656 | 54 127 1 | | TS | VRUP +5 | |
| 1673 | REP | 1 | | | 00,2657 | 0 3010 0 | | TC | VECAORSE | FORCE SIGN AGREEMENT IN VECTOR |
| 1674 | REP | 83 | LAST | 1140 | 00,2660 | 52 131 0 | | DXCH | RUP | |
| 1675 | REP | 1 | | | 00,2661 | 0 7513 1 | | TC | ALSIGNAG | SIGN ACREE RUP |
| 1676 | REP | 84 | LAST | 1141 | 00,2662 | 52 131 0 | | DXCH | RUP | |
| 1677 | REP | 85 | LAST | 1141 | 00,2663 | 10 130 1 | | CCS | RUP | FORCE DIVISOR POSITIVE WITH MAJOR PART NON-ZERO (IF POSSIBLE). |
| 1678 | REP | 1 | | | 00,2664 | 1 2721 0 | | TCP | /RUP+ | |
| 1679 | REP | 1 | | | 00,2665 | 1 2667 0 | | TCP | +2 | |
| 1680 | REP | 1 | | | 00,2666 | 1 2715 1 | | TCP | /RUP- | |
| 1681 | REP | 86 | LAST | 1141 | 00,2667 | 56 131 1 | | XCH | RUP +1 | SHIPT VECTOR AND SCALAR LEFT 14. |
| 1682 | REP | 87 | LAST | 1141 | 00,2670 | 56 130 0 | | XCH | RUP | |
| 1683 | REP | 509 | LAST | 1140 | 00,2671 | 56 155 0 | | XCH | MPAC +1 | |
| 1684 | REP | 510 | LAST | 1141 | 00,2672 | 56 154 1 | | XCH | MPAC | |
| 1685 | | | | | 00,2673 | 0 0006 1 | | EXTEND | | CHECK FOR OVERFLOW IN EACH CASE. |
| 1686 | | | | | 00,2674 | 1 2676 0 | | RZF | +2 | |
| 1687 | REP | 3 | LAST | 1134 | 00,2675 | 1 2405 0 | | TCP | DVOVP | |
| 1688 | REP | 511 | LAST | 1141 | 00,2676 | 56 160 0 | | XCH | MPAC +4 | |
| 1689 | REP | 512 | LAST | 1141 | 00,2677 | 56 157 1 | | XCH | MPAC +3 | |
| 1690 | | | | | 00,2700 | 0 0006 1 | | EXTEND | | |
| 1691 | | | | | 00,2701 | 1 2703 0 | | RZF | +2 | |
| 1692 | REP | 4 | LAST | 1141 | 00,2702 | 1 2405 0 | | TCP | DVOVP | |
| 1693 | REP | 513 | LAST | 1141 | 00,2703 | 56 162 1 | | XCH | MPAC +6 | |
| 1694 | REP | 514 | LAST | 1141 | 00,2704 | 56 161 1 | | XCH | MPAC +5 | |
| 1695 | | | | | 00,2705 | 0 0006 1 | | EXTEND | | |
| 1696 | | | | | 00,2706 | 1 2710 1 | | RZF | +2 | |
| 1697 | REP | 5 | LAST | 1141 | 00,2707 | 1 2405 0 | | TCP | DVOVP | |
| 1698 | REP | 88 | LAST | 1141 | 00,2710 | 10 130 1 | | CCS | RUP | |
| 1699 | REP | 2 | LAST | 1141 | 00,2711 | 1 2721 0 | | TCP | /RUP+ | |
| 1700 | REP | 6 | LAST | 1141 | 00,2712 | 1 2405 0 | | TCP | DVOVP | ZERO DIVISOR - OVERFLOW. |
| 1701 | REP | 2 | LAST | 1141 | 00,2713 | 1 2715 1 | | TCP | /RUP- | |
| 1702 | REP | 7 | LAST | 1141 | 00,2714 | 1 2405 0 | | TCP | DVOVP | |
| 1703 | | | | | 00,2715 | 0 0006 1 | /RUP- | EXTEND | | ON NEGATIVE, COMPLEMENT RUP AND MAINTAIN DVSIGN IN VRUP +5. |
| 1704 | REP | 89 | LAST | 1141 | 00,2716 | 4 0131 0 | | DCS | RUP | |
| 1705 | REP | 90 | LAST | 1141 | 00,2717 | 52 131 0 | | DXCH | RUP | |
| 1706 | REP | 42 | LAST | 1141 | 00,2720 | 24 127 0 | | INCR | VRUP +5 | |

L INTERPRETER

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| | | | | | | | |
|------|---------|-----------|---------|----------|--------|--------|----------|
| 1707 | | | 00,2721 | 0 0006 1 | /BUF+ | EXTEND | |
| 1708 | REP 91 | LAST 1141 | 00,2722 | 3 0131 1 | | DCA | BUF |
| 1709 | REP 14 | LAST 1134 | 00,2723 | 52 134 0 | | DxCH | BUF2 |
| 1710 | REP 1 | | 00,2724 | 1 2732 1 | | TCP | /NORM |
| 1711 | | | 00,2725 | 0 0006 1 | /NORM2 | EXTEND | |
| 1712 | REP 5 | LAST 1141 | 00,2726 | 24 137 1 | | AUG | DVNORMCT |
| 1713 | | | 00,2727 | 0 0006 1 | | EXTEND | |
| 1714 | REP 92 | LAST 1142 | 00,2730 | 3 0131 1 | | DCA | BUF |
| 1715 | REP 93 | LAST 1142 | 00,2731 | 20 131 0 | | DAS | BUF |
| 1716 | REP 94 | LAST 1142 | 00,2732 | 3 0130 0 | /NORM | CA | BUF |
| 1717 | | | 00,2733 | 6 0000 1 | | DOUBLE | |
| 1718 | | | 00,2734 | 54 000 0 | | O/SK | |
| 1719 | REP 1 | | 00,2735 | 1 2725 1 | | TCP | /NORM2 |
| 1720 | REP 1 | | 00,2736 | 0 2750 1 | | TC | V/SCDV |
| 1721 | REP 515 | LAST 1141 | 00,2737 | 52 160 1 | | DxCH | MPAC +3 |
| 1722 | REP 516 | LAST 1142 | 00,2740 | 52 155 1 | | DxCH | MPAC |
| 1723 | REP 517 | LAST 1142 | 00,2741 | 52 160 1 | | DxCH | MPAC +3 |
| 1724 | REP 2 | LAST 1142 | 00,2742 | 0 2750 1 | | TC | V/SCDV |
| 1725 | REP 518 | LAST 1142 | 00,2743 | 52 162 0 | | DxCH | MPAC +5 |
| 1726 | REP 519 | LAST 1142 | 00,2744 | 52 155 1 | | DxCH | MPAC |
| 1727 | REP 520 | LAST 1142 | 00,2745 | 52 162 0 | | DxCH | MPAC +5 |
| 1728 | REP 3 | LAST 1142 | 00,2746 | 0 2750 1 | | TC | V/SCDV |
| 1729 | REP 2 | LAST 1125 | 00,2747 | 1 7387 0 | | TCP | VROBATEX |

LEAVE ABS(ORIG DIVISOR) IN BUF2
FOR OVERFLOW TESTING
NORMALIZE DIVISOR IN BUF.

IF LESS THAN .5, AUGMENT DVNORMCT AND
DOUBLE DIVISOR.

SEE IF DIVISOR NORMALIZED.

DOUBLE AND TRY AGAIN IF NOT.

DO X COMPONENT DIVIDE.
SUPPLY ARGUMENTS IN USUAL SEQUENCE.

Y COMPONENT.

Z COMPONENT.
GO RE-ARRANGE COMPONENTS BEFORE EXIT.

L INTERPRETER

P1730 SUBROUTINE USED BY V/SC TO DIVIDE VECTOR COMPONENT IN MPAC,+1 BY THE SCALAR GIVEN IN BUF.

| | | | | | | | | | | |
|------|-----|-----|------|------|---------|----------|---------|--------|----------|--|
| 1732 | REP | 43 | LAST | 1141 | 00,2750 | 3 0127 0 | V/SCDV | CA | VBUF +5 | REFLECTS SIGN OF SCALAR. |
| 1733 | REP | 7 | LAST | 1139 | 00,2751 | 54 136 1 | | TS | DVSIGN | |
| 1734 | REP | 521 | LAST | 1142 | 00,2752 | 10 154 0 | | CCS | MPAC | FORCES MPAC POSITIVE, EXITING ON ZERO. |
| 1735 | REP | 1 | | | 00,2753 | 1 2767 1 | | TCP | /MPAC+ | |
| 1736 | | | | | 00,2754 | 1 2756 0 | | TCP | +2 | |
| 1737 | REP | 1 | | | 00,2755 | 1 2763 0 | | TCP | /MPAC- | |
| 1738 | REP | 522 | LAST | 1143 | 00,2756 | 10 155 1 | | CCS | MPAC +1 | |
| 1739 | REP | 2 | LAST | 1143 | 00,2757 | 1 2767 1 | | TCP | /MPAC+ | |
| 1740 | REP | 263 | LAST | 1139 | 00,2760 | 0 0002 0 | | TC | 0 | |
| 1741 | REP | 2 | LAST | 1143 | 00,2761 | 1 2763 0 | | TCP | /MPAC- | |
| 1742 | REP | 264 | LAST | 1143 | 00,2762 | 0 0002 0 | | TC | 0 | |
| 1743 | | | | | 00,2763 | 0 0006 1 | /MPAC- | EXTEND | | USUAL COMPLEMENTING AND SETTING OF SIGN. |
| 1744 | REP | 523 | LAST | 1143 | 00,2764 | 4 0155 1 | | DCS | MPAC | |
| 1745 | REP | 524 | LAST | 1143 | 00,2765 | 52 155 1 | | DVCH | MPAC | |
| 1746 | REP | 8 | LAST | 1143 | 00,2766 | 24 136 0 | | INCR | DVSIGN | |
| 1747 | REP | 139 | LAST | 1141 | 00,2767 | 4 4712 0 | /MPAC+ | CS | ONE | INITIALIZE NEAR-ONE SWITCH. |
| 1748 | REP | 4 | LAST | 1136 | 00,2770 | 54 140 0 | | TS | MAXDVS | |
| 1749 | REP | 525 | LAST | 1143 | 00,2771 | 4 0154 0 | | CS | MPAC | CHECK POSSIBLE OVERFLOW. |
| 1750 | REP | 15 | LAST | 1142 | 00,2772 | 6 0133 0 | | AD | BUF2 | UNNORMALIZED INPUT DIVISOR. |
| 1751 | REP | 306 | LAST | 1135 | 00,2773 | 10 000 0 | | CCS | A | |
| 1752 | REP | 1 | | | 00,2774 | 1 3004 1 | | TCP | DDVCALL | NOT NEAR-ONE |
| 1753 | | | | | 00,2775 | 1 2777 0 | | TCP | +2 | +0 IS JUST POSSIBLE |
| 1754 | REP | 8 | LAST | 1141 | 00,2776 | 1 2405 0 | | TCP | DVOVP | NO HOPE |
| 1755 | REP | 5 | LAST | 1143 | 00,2777 | 54 140 0 | | TS | MAXDVS | SIGNAL POSSIBLE NEAR-ONE CASE |
| 1756 | REP | 526 | LAST | 1143 | 00,3000 | 4 0155 1 | | CS | MPAC +1 | SEE IF DIVISION CAN BE DONE |
| 1757 | REP | 16 | LAST | 1143 | 00,3001 | 6 0134 1 | | AD | BUF2 +1 | |
| 1758 | | | | | 00,3002 | 0 0006 1 | | EXTEND | | |
| 1759 | REP | 9 | LAST | 1143 | 00,3003 | 6 2405 1 | | BZMP | DVOVP | |
| 1760 | REP | 527 | LAST | 1143 | 00,3004 | 52 155 1 | DDVCALL | DVCH | MPAC | CALL PRE-DIVIDE NORMALIZATION. |
| 1761 | REP | 6 | LAST | 1142 | 00,3005 | 50 137 1 | | INDEX | DVNORMCT | |
| 1762 | REP | 2 | LAST | 1135 | 00,3006 | 1 2565 1 | | TCP | MAXTEST | |

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| | | | | | | | | |
|------|---------|-----------|---------|----------|---------|------|----------|--------------------|
| 1763 | | | 00,3007 | 32506 0 | SLOPELO | DEC | .8324 | |
| 1764 | REP 265 | LAST 1143 | 00,3010 | 56 002 0 | VEAGREE | XCH | 0 | SAVE 0 IN A |
| 1765 | REP 528 | LAST 1143 | 00,3011 | 52 155 1 | | DxCH | MPAC | |
| 1766 | REP 2 | LAST 1141 | 00,3012 | 0 7513 1 | | TC | ALSIGNAG | SIGNAGREE MPAC |
| 1767 | REP 529 | LAST 1144 | 00,3013 | 52 155 1 | | DxCH | MPAC | |
| 1768 | REP 530 | LAST 1144 | 00,3014 | 52 160 1 | | DxCH | MPAC +3 | |
| 1769 | REP 3 | LAST 1144 | 00,3015 | 0 7513 1 | | TC | ALSIGNAG | SIGN AGREE MPAC +3 |
| 1770 | REP 531 | LAST 1144 | 00,3016 | 52 160 1 | | DxCH | MPAC +3 | |
| 1111 | REP 532 | LAST 1144 | 00,3017 | 52 162 0 | | DxCH | MPAC +5 | |
| 1772 | REP 4 | LAST 1144 | 00,3020 | 0 7513 1 | | TC | ALSIGNAG | SIGNAGREE MPAC +5 |
| 1773 | REP 533 | LAST 1144 | 00,3021 | 52 162 0 | | DxCH | MPAC +5 | |
| 1774 | REP 309 | LAST 1143 | 00,3022 | 0 0000 1 | | TC | A | |



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| P1175 THE FOLLOWING ROUTINE EXECUTES THE UNIT INSTRUCTION, WHICH TAKES THE UNIT OF THE VECTOR IN MPAC. | | | | | | | | | |
|--|-----|-----|-----------|---------|----------|---------|--------|----------|--|
| 1777 | REP | 2 | LAST 1141 | 00,3023 | 0 3010 0 | UNIT | TC | VBCAGRES | FORCE SIGN AGREEMENT IN VECTOR |
| 1778 | REP | 2 | LAST 1114 | 00,3024 | 0 7501 1 | | TC | MPACVBLP | SAVE ARGUMENT IN VBLP |
| 1779 | REP | 229 | LAST 1139 | 00,3025 | 3 4714 1 | | CAP | ZERO | MUST SENSE OVERFLOW IN FOLLOWING DOT. |
| 1780 | REP | 6 | LAST 1132 | 00,3026 | 56 121 0 | | XCH | OV/PIND | |
| 1781 | REP | 3 | LAST 68 | 00,3027 | 54 141 1 | | TS | TEM1 | |
| 1782 | REP | 1 | | 00,3030 | 0 3317 1 | | TC | VBSQSUB | DOT MPAC WITH ITSELF. |
| 1783 | REP | 4 | LAST 1145 | 00,3031 | 3 0141 0 | | CA | TEM1 | |
| 1784 | REP | 7 | LAST 1145 | 00,3032 | 56 121 0 | | XCH | OV/PIND | |
| 1785 | | | | 00,3033 | 0 0006 1 | | EXTEND | | |
| 1786 | | | | 00,3034 | 1 3036 0 | | BZF | +2 | |
| 1787 | REP | 10 | LAST 1143 | 00,3035 | 1 2405 0 | | TCF | DVOVP | |
| 1788 | | | | 00,3036 | 0 0006 1 | | EXTEND | | |
| 1789 | REP | 534 | LAST 1144 | 00,3037 | 3 0155 0 | | DCA | MPAC | LEAVE THE SQUARE OF THE LENGTH OF THE ARGUMENT IN LVSQUARE. |
| 1790 | REP | 26 | LAST 1099 | 00,3040 | 50 120 1 | | INDEX | FIXLOC | |
| 1791 | REP | 1 | | 00,3041 | 52 043 1 | | DXCH | LVSQUARE | |
| 1792 | REP | 1 | | 00,3042 | 0 3343 0 | | TC | SORTSUR | GO TAKE THE NORMALIZED SQUARE ROOT. |
| 1793 | REP | 535 | LAST 1145 | 00,3043 | 10 154 0 | | CCS | MPAC | CHECK FOR UNIT OVERFLOW. |
| 1794 | | | | 00,3044 | 1 3051 1 | | TCF | +5 | MPAC IS NOT LESS THAN .5 UNLESS |
| 1795 | REP | 189 | LAST 1136 | 00,3045 | 54 001 1 | | TS | L | |
| 1796 | REP | 27 | LAST 1145 | 00,3046 | 50 120 1 | | INDEX | FIXLOC | |
| 1797 | REP | 1 | | 00,3047 | 52 045 1 | | DXCH | LV | |
| 1798 | REP | 11 | LAST 1145 | 00,3050 | 1 2405 0 | | TCF | DVOVP | INPUT TO SORTSUR WAS 0. |
| 1799 | REP | 1 | | 00,3051 | 4 4333 1 | | CS | FOURTEEN | SEE IF THE INPUT WAS SO SMALL THE THE FIRST TWO REGISTERS OF THE SQUARE WERE |
| 1800 | REP | 46 | LAST 1131 | 00,3052 | 6 0135 0 | | AD | MPTMP | |
| 1801 | REP | 310 | LAST 1144 | 00,3053 | 10 000 0 | | CCS | A | IF SO, SAVE THE NEGATIVE OF THE SHIFT COUNT -15D. |
| 1802 | | | | 00,3054 | 4 0000 0 | | CCM | | |
| 1803 | REP | 1 | | 00,3055 | 1 3133 1 | | TCF | SMALL | (THIS IS USUALLY THE CASE.) |
| 1804 | REP | 1 | | 00,3056 | 1 3065 0 | | TCF | LARGE | |
| 1805 | REP | 4 | LAST 1061 | 00,3057 | 4 4720 1 | | CS | THIRTEEN | IF THE SHIFT COUNT WAS EXACTLY 14, SET THE PRE-DIVIDE NORM COUNT TO -13D. |
| 1806 | REP | 47 | LAST 1145 | 00,3060 | 54 135 1 | | TS | MPTMP | |
| 1807 | REP | 536 | LAST 1145 | 00,3061 | 3 0154 1 | | CA | MPAC | SHIFT THE LENGTH RIGHT 14 BEFORE STORING (SMALL EXITS TO THIS POINT). |
| 1808 | REP | 190 | LAST 1145 | 00,3062 | 54 001 1 | SMALL,2 | TS | L | |
| 1809 | REP | 230 | LAST 1145 | 00,3063 | 3 4714 1 | | CAP | ZERO | GO TO STORE LENGTH AND PROCEED. |
| 1810 | REP | 1 | | 00,3064 | 1 3112 1 | | TCF | LARGE2 | |
| 1811 | REP | 48 | LAST 1145 | 00,3065 | 10 135 1 | LARGE | CCS | MPTMP | MOST ALL CASES COME HERE. |
| 1812 | REP | 1 | | 00,3066 | 1 3074 0 | | TCF | LARGE3 | SEE IF NO NORMALIZATION WAS REQUIRED BY |
| 1813 | REP | 1 | | 00,3067 | 4 2024 1 | | CS | SRODV | SORT, AND IF SO, SET UP FOR A SHIFT RIGHT 1 BEFORE DIVIDING TO PRODUCE THE DESIRED HALF UNIT VECTOR. |
| 1814 | REP | 49 | LAST 1145 | 00,3070 | 54 135 1 | | TS | MPTMP | |
| 1815 | | | | 00,3071 | 0 0006 1 | | EXTEND | | |
| 1816 | REP | 537 | LAST 1145 | 00,3072 | 3 0155 0 | | DCA | MPAC | |



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1817 REP 2 LAST 1145 00,3073 1 3112 1

TCP LARGE2



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| | | | | | | | |
|------|---------|-----------|---------|----------|--------|--------|----------|
| 1818 | | | 00,3074 | 4 0000 0 | LARGE3 | CON | |
| 1819 | REP 50 | LAST 1145 | 00,3075 | 54 135 1 | | TS | MPTRM |
| 1820 | | | 00,3076 | 4 0000 0 | | CON | |
| 1821 | REP 311 | LAST 1145 | 00,3077 | 50 000 1 | | INDEX | A |
| 1822 | REP 86 | LAST 1130 | 00,3100 | 3 4675 1 | | CAP | BIT14 |
| 1823 | REP 95 | LAST 1142 | 00,3101 | 54 130 1 | | TS | RUP |
| 1824 | | | 00,3102 | 0 0006 1 | | EXTEND | |
| 1825 | REP 538 | LAST 1145 | 00,3103 | 7 0155 1 | | MP | MPAC +1 |
| 1826 | REP 94 | LAST 1147 | 00,3104 | 58 130 0 | | XCH | RUP |
| 1827 | | | 00,3105 | 0 0006 1 | | EXTEND | |
| 1828 | REP 539 | LAST 1147 | 00,3106 | 7 0154 0 | | MP | MPAC |
| 1829 | REP 191 | LAST 1145 | 00,3107 | 56 001 0 | | XCH | L |
| 1830 | REP 97 | LAST 1147 | 00,3110 | 6 0130 0 | | AD | RUP |
| 1831 | REP 192 | LAST 1147 | 00,3111 | 56 001 0 | | XCH | L |
| 1832 | REP 28 | LAST 1145 | 00,3112 | 50 120 1 | LARGE2 | INDEX | FIXLOC |
| 1833 | REP 2 | LAST 1145 | 00,3113 | 52 045 1 | | DxCH | LV |
| 1834 | REP 140 | LAST 1143 | 00,3114 | 4 4712 0 | | CS | ONE |
| 1835 | REP 6 | LAST 1143 | 00,3115 | 54 140 0 | | TS | MAXDVS |
| 1836 | REP 44 | LAST 1143 | 00,3116 | 52 123 0 | | DxCH | VRUP |
| 1837 | REP 540 | LAST 1147 | 00,3117 | 52 155 1 | | DxCH | MPAC |
| 1838 | REP 98 | LAST 1147 | 00,3120 | 52 131 0 | | DxCH | RUP |
| 1839 | REP 1 | | 00,3121 | 0 3151 1 | | TC | UNITDV |
| 1840 | REP 45 | LAST 1147 | 00,3122 | 52 125 0 | | DxCH | VRUP +2 |
| 1841 | REP 541 | LAST 1147 | 00,3123 | 52 155 1 | | DxCH | MPAC |
| 1842 | REP 542 | LAST 1147 | 00,3124 | 52 160 1 | | DxCH | MPAC +3 |
| 1843 | REP 2 | LAST 1147 | 00,3125 | 0 3151 1 | | TC | UNITDV |
| 1844 | REP 46 | LAST 1147 | 00,3126 | 52 127 1 | | DxCH | VRUP +4 |
| 1845 | REP 543 | LAST 1147 | 00,3127 | 52 155 1 | | DxCH | MPAC |
| 1846 | REP 544 | LAST 1147 | 00,3130 | 52 162 0 | | DxCH | MPAC +5 |
| 1847 | REP 3 | LAST 1147 | 00,3131 | 0 3151 1 | | TC | UNITDV |
| 1848 | REP 3 | LAST 1142 | 00,3132 | 1 7367 0 | | TCF | VRotateX |

LEAVE NEGATIVE OF SHIFT COUNT-1 FOR
PREDIVIDE LEFT SHIFT.

PICK UP REQUIRED SHIFTING BIT TO UNNORM-
ALIZE THE SORT RESULT.

(UNNORMALIZE THE SORT FOR LV).

LENGTH NOW STORED IN WORK AREA.

NO MAXDV CASES IN UNIT.

PREPARE X COMPONENT FOR DIVIDE, SETTING
LENGTH OF VECTOR AS DIVISOR IN RUP.

DO Y AND Z IN USUAL FASHION SO WE CAN
EXIT THROUGH VROTATEX.

AND EXIT.

L INTERPRETER

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P1649 IF THE LENGTH OF THE ARGUMENT VECTOR WAS LESS THAN 2(-28), EACH COMPONENT MUST BE SHIFTED LEFT
 R1651 14 PLACES BEFORE THE DIVIDE. NOTE THAT IN THIS CASE, THE MAJOR PART OF EACH COMPONENT IS ZERO.

| | | | | | | | | | | |
|------|-----|-----|------|------|---------|----------|-------|------------|---------|-------------------------------------|
| 1653 | REP | 51 | LAST | 1147 | 00,3133 | 54 135 1 | SMALL | TS | MPTEMP | Negative of pre-divide shift count. |
| 1654 | REP | 231 | LAST | 1145 | 00,3134 | 3 4714 1 | | CAP | ZERO | SHIFT EACH COMPONENT LEFT 14. |
| 1655 | REP | 47 | LAST | 1147 | 00,3135 | 56 123 1 | | XCH | VBUP +1 | |
| 1656 | REP | 48 | LAST | 1148 | 00,3136 | 56 122 0 | | XCH | VBUP | |
| 1657 | REP | 49 | LAST | 1148 | 00,3137 | 56 125 1 | | XCH | VBUP +3 | |
| 1658 | REP | 50 | LAST | 1148 | 00,3140 | 56 124 0 | | XCH | VBUP +2 | |
| 1659 | REP | 51 | LAST | 1148 | 00,3141 | 56 127 0 | | XCH | VBUP +5 | |
| 1660 | REP | 52 | LAST | 1148 | 00,3142 | 56 126 1 | | XCH | VBUP +4 | |
| 1661 | REP | 52 | LAST | 1148 | 00,3143 | 4 0135 1 | | CS | MPTEMP | |
| 1662 | REP | 312 | LAST | 1147 | 00,3144 | 50 000 1 | | INDEX | A | |
| 1663 | REP | 67 | LAST | 1147 | 00,3145 | 3 4675 1 | | CAP | BIT14 | |
| 1664 | REP | | | | 00,3146 | 0 0006 1 | | EXTEND | | |
| 1665 | REP | 545 | LAST | 1147 | 00,3147 | 7 0154 0 | | MP | MPAC | |
| 1666 | REP | 1 | | | 00,3150 | 1 3062 1 | | TCP | SMALL2 | |
| 1667 | REP | 4 | LAST | 724 | 4720 | | | THIRTEEN = | OCT15 | |
| 1668 | REP | 2 | LAST | 736 | 4333 | | | FOURTEEN = | OCT16 | |
| 1669 | REP | 14 | LAST | 369 | 4333 | | | OCT16 = | R1D1 | |

L INTERPRETER

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P1870 THE FOLLOWING ROUTINE SETS UP THE CALL TO THE DIVIDE ROUTINES.

| | | | | | | | | |
|------|---------|-----------|---------|----------|--------|--------|------------|--|
| 1871 | REP 546 | LAST 1148 | 00,3151 | 10 154 0 | UNITDV | CCS | MPAC | FORCE MPAC POSITIVE IF POSSIBLE, SETTING |
| 1872 | REP 1 | | 00,3152 | 1 3170 0 | | TCP | UMPAC+ | DVSN ACCORDING TO THE SIGN OF MPAC |
| 1873 | | | 00,3153 | 1 3155 1 | | TCP | +2 | SINCE THE DIVISOR IS ALWAYS POSITIVE |
| 1874 | REP 1 | | 00,3154 | 1 3162 0 | | TCP | UMPAC- | HERE. |
| 1875 | REP 547 | LAST 1149 | 00,3155 | 10 155 1 | | CCS | MPAC +1 | |
| 1876 | REP 2 | LAST 1149 | 00,3156 | 1 3170 0 | | TCP | UMPAC+ | |
| 1877 | REP 266 | LAST 1144 | 00,3157 | 0 0002 0 | | TC | 0 | EXIT IMMEDIATELY ON ZERO. |
| 1878 | REP 2 | LAST 1149 | 00,3160 | 1 3162 0 | | TCP | UMPAC- | |
| 1879 | REP 267 | LAST 1149 | 00,3161 | 0 0002 0 | | TC | 0 | |
| 1880 | REP 232 | LAST 1148 | 00,3162 | 4 4714 0 | UMPAC- | CS | ZERO | IF NEGATIVE, SET -0 IN DVSN FOR FINAL |
| 1881 | REP 9 | LAST 1143 | 00,3163 | 54 136 1 | | TS | DVSN | COMPLEMENT. |
| 1882 | | | 00,3164 | 0 0006 1 | | EXTEND | | |
| 1883 | REP 548 | LAST 1149 | 00,3165 | 4 0155 1 | | DCS | MPAC | PICK UP ABSOLUTE VALUE OF ARG AND JUMP. |
| 1884 | REP 53 | LAST 1148 | 00,3166 | 50 135 0 | | INDEX | MPTMP | |
| 1885 | REP 3 | LAST 1143 | 00,3167 | 1 2564 0 | | TCP | MAXTEST -1 | |
| 1886 | REP 10 | LAST 1149 | 00,3170 | 54 136 1 | UMPAC+ | TS | DVSN | SET DVSN FOR POSITIVE QUOTIENT. |
| 1887 | REP 549 | LAST 1149 | 00,3171 | 52 155 1 | | DxCH | MPAC | |
| 1888 | REP 54 | LAST 1149 | 00,3172 | 50 135 0 | | INDEX | MPTMP | |
| 1889 | REP 4 | LAST 1149 | 00,3173 | 1 2564 0 | | TCP | MAXTEST -1 | |



L INTERPRETER

P1890 MISCELLANEOUS UNARY OPERATIONS.

| | | | | | | | | | |
|------|-----|-----|-----------|---------|----------|----------|-------|----------|-------------------------------------|
| 1891 | REP | 1 | | 00,3174 | 0 3300 1 | DSO | TC | DSQSUB | SQUARE THE DP CONTENTS OF MPAC. |
| 1892 | REP | 41 | LAST 1135 | 00,3175 | 1 6030 0 | | TCP | DANZIG | |
| 1893 | REP | 22 | LAST 1131 | 00,3176 | 10 163 1 | ABVALARS | CCS | MODE | ABVAL OR ABS INSTRUCTION. |
| 1894 | REP | 1 | | 00,3177 | 1 3228 0 | | TCP | ABS | DO ABS ON SCALAR. |
| 1895 | REP | 2 | LAST 1150 | 00,3200 | 1 3228 0 | | TCP | ABS | |
| 1896 | REP | 2 | LAST 1145 | 00,3201 | 0 3317 1 | ABVAL | TC | VSQSUB | DOT MPAC WITH ITSELF. |
| 1897 | REP | 23 | LAST 1150 | 00,3202 | 22 163 0 | | LXCH | MODE | MODE IS NOW DP (L ZERO AFTER DAS). |
| 1898 | | | | 00,3203 | 0 0006 1 | | | EXTEND | STORE SQUARE OF LENGTH IN WORK AREA |
| 1899 | REP | 550 | LAST 1149 | 00,3204 | 3 0155 0 | | DCA | MPAC | |
| 1900 | REP | 29 | LAST 1147 | 00,3205 | 50 120 1 | | INDEX | FIXLOC | |
| 1901 | REP | 2 | LAST 1145 | 00,3206 | 52 043 1 | | DXCH | LWSQUARE | |



L INTERPRETER

P1902 PROGRAM DESCRIPTION- SUBROUTINE SORT
 R1903 FUNCTIONAL DESCRIPTION-DOUBLE PRECISION SQUARE ROOT ROUTINE
 R1904 THIS PROGRAM TAKES THE SQUARE ROOT OF THE 27 OR 28 MOST SIGNIFICANT BITS IN THE TRIPLE PRECISION SET OF
 R1906 NUMBERS-MPAC,MPAC+1,AND MPAC+2. THE ROOT IS RETURNED DOUBLE PRECISION IN MPAC AND MPAC+1.
 R1908 WARNING- THIS SUBROUTINE USES A TRIPLE PRECISION INPUT. THE PROGRAMMER MUST ASSURE THE CONTENTS OF MPAC+2
 R1910 ESPECIALLY IF THE CONTENTS OF MPAC IS SMALL OR ZERO. FOR DETAILS SEE STG MEMO NO.949.
 R1912 CALLING SEQUENCE- IN INTERPRETIVE MODE I.E., FOLLOWING TC INTPRST,SORT NO ADDRESS IS ALLOWED
 R1914 INPUT SCALING THE BINARY POINT IS ASSUMED TO THE RIGHT OF BIT 15. THE ANSWER IS RETURNED WITH THE SAME SCALING
 R1916 SUBROUTINES- GENSCR,MPACSHR, SORTSUB,ABORT
 R1917 ABORT EXIT MODE- ABORTS ON NEGATIVE INPUT -1.2×10^{-4} (77775 OCTAL) OR LESS.
 R1919 DISPLAYS ERROR CODES 1302
 R1920 TC ABORT
 R1921 OCT 1302
 R1922 DEPRIS - LOCATIONS BUF,MPTEMP,ADDRWD ARE USED

| LOC | OP | COND | LOC | BUF | MPTEMP | ADDRWD | ARE USED | TC | SORTSUB | DESCRIPTION |
|------|-----|------|-----------|---------|----------|--------|----------|----------|------------|---|
| 1923 | REP | 2 | LAST 1145 | 00,3207 | 0 3343 0 | | | SORT | | TAKES THE SQUARE ROOT OF MPAC. |
| 1924 | REP | 55 | LAST 1149 | 00,3210 | 10 135 1 | | | CCS | MPTEMP | RETURNED NORMALIZED SQUARE ROOT. SEE IF |
| 1925 | | | | 00,3211 | 1 3213 0 | | | TCF | +2 | ANY UN-NORMALIZATION REQUIRED AND EXIT |
| 1926 | REP | 42 | LAST 1150 | 00,3212 | 1 6030 0 | | | TCF | DANZIG | IF NOT. |
| 1927 | REP | 3 | LAST 1130 | 00,3213 | 6 3730 0 | | | AD | NEG12 | A RIGHT SHIFT OF MORE THAN 13 COULD BE |
| 1928 | | | | 00,3214 | 0 0006 1 | | | EXTEND | | REQUIRED IF INPUT WAS ZERO IN MPAC,+1. |
| 1929 | REP | 1 | | 00,3215 | 6 3221 0 | | | BZMP | SORTSHFT | GOES HERE IN MOST CASES. |
| 1930 | | | | 00,3216 | 22 007 0 | | | ZL | | IF A LONG SHIFT IS REQUIRED, GO TO |
| 1931 | REP | 77 | LAST 1131 | 00,3217 | 22 116 1 | | | LXCH | ADDRWD | GENERAL RIGHT SHIFT ROUTINES. |
| 1932 | REP | 4 | LAST 1130 | 00,3220 | 1 2303 1 | | | TCF | GENSCR +4 | ADDRWD WAS ZERO TO PREVENT ROUND. |
| 1933 | REP | 56 | LAST 1151 | 00,3221 | 50 135 0 | | | SORTSHFT | INDEX | SELECT SHIFTING BIT AND EXIT THROUGH |
| 1934 | REP | 45 | LAST 1101 | 00,3222 | 3 4674 0 | | | CAP | BIT15 | SHIFT ROUTINES. |
| 1935 | REP | 57 | LAST 1151 | 00,3223 | 54 135 1 | | | TS | MPTEMP | |
| 1936 | REP | 233 | LAST 1149 | 00,3224 | 3 4714 1 | | | CAP | ZERO | TO ZERO MPAC +2 IN THE PROCRSS. |
| 1937 | REP | 2 | LAST 1130 | 00,3225 | 1 2036 1 | | | TCF | MPACSHR +3 | |
| 1938 | REP | 3 | LAST 1127 | 00,3226 | 0 6672 1 | | | ABS | TC | TEST SIGN OF MPAC AND COMPLEMENT IF |
| 1939 | REP | 43 | LAST 1151 | 00,3227 | 1 6030 0 | | | TCF | DANZIG | |
| 1940 | REP | 44 | LAST 1151 | 00,3230 | 1 6030 0 | | | TCF | DANZIG | |
| 1941 | REP | 4 | LAST 1121 | 00,3231 | 1 7637 0 | | | TCF | COMP | |

L INTERPRETER

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| | | | | | | | | | | |
|------|-----|-----|------|------|---------|--------|---|-------|--------|-------------|
| 1942 | REP | 16 | LAST | 1116 | 00,3232 | 4 4710 | 1 | VDEF | CS | FOUR |
| 1943 | REP | 13 | LAST | 1119 | 00,3233 | 28 166 | 1 | | ADS | PUSHLOC |
| 1944 | | | | | 00,3234 | 0 0006 | 1 | | EXTEND | |
| 1945 | REP | 313 | LAST | 1146 | 00,3235 | 5 0000 | 1 | | INDEX | A |
| 1946 | | | | | 00,3236 | 3 0003 | 1 | | DCA | 2 |
| 1947 | REP | 551 | LAST | 1150 | 00,3237 | 52 160 | 1 | | DACH | MPAC +3 |
| 1948 | | | | | 00,3240 | 0 0006 | 1 | | EXTEND | |
| 1949 | REP | 14 | LAST | 1152 | 00,3241 | 5 0166 | 0 | | INDEX | PUSHLOC |
| 1950 | | | | | 00,3242 | 3 0001 | 0 | | DCA | 0 |
| 1951 | REP | 552 | LAST | 1152 | 00,3243 | 52 162 | 0 | | DACH | MPAC +5 |
| 1952 | REP | 2 | LAST | 1116 | 00,3244 | 1 6470 | 0 | | TCP | VMODE |
| 1953 | REP | 3 | LAST | 1150 | 00,3245 | 0 3317 | 1 | VSO | TC | VSOUSR |
| 1954 | REP | 1 | | | 00,3246 | 1 7301 | 0 | | TCP | DMODE |
| 1955 | | | | | 00,3247 | 0 0006 | 1 | PUSH | EXTEND | |
| 1956 | REP | 553 | LAST | 1152 | 00,3250 | 3 0155 | 0 | | DCA | MPAC |
| 1957 | REP | 15 | LAST | 1152 | 00,3251 | 50 166 | 0 | | INDEX | PUSHLOC |
| 1958 | | | | | 00,3252 | 52 001 | 1 | | DACH | 0 |
| 1959 | REP | 24 | LAST | 1150 | 00,3253 | 50 163 | 0 | | INDEX | MODE |
| 1960 | REP | 5 | LAST | 1096 | 00,3254 | 3 6213 | 1 | | CAP | NO.WDS |
| 1961 | REP | 16 | LAST | 1152 | 00,3255 | 28 166 | 1 | | ADS | PUSHLOC |
| 1962 | REP | 25 | LAST | 1152 | 00,3256 | 10 163 | 1 | | CCS | MODE |
| 1963 | REP | 1 | | | 00,3257 | 1 3272 | 1 | | TCP | TPUSH |
| 1964 | REP | 45 | LAST | 1151 | 00,3260 | 1 6030 | 0 | | TCP | DANZIG |
| 1965 | | | | | 00,3261 | 0 0006 | 1 | | EXTEND | |
| 1966 | REP | 554 | LAST | 1152 | 00,3262 | 3 0160 | 0 | | DCA | MPAC +3 |
| 1967 | REP | 17 | LAST | 1152 | 00,3263 | 50 166 | 0 | | INDEX | PUSHLOC |
| 1968 | | | | | 00,3264 | 51=775 | 0 | | DACH | 0 -4 |
| 1969 | | | | | 00,3265 | 0 0006 | 1 | | EXTEND | |
| 1970 | REP | 555 | LAST | 1152 | 00,3266 | 3 0162 | 1 | | DCA | MPAC +5 |
| 1971 | REP | 18 | LAST | 1152 | 00,3267 | 50 166 | 0 | | INDEX | PUSHLOC |
| 1972 | | | | | 00,3270 | 51=777 | 1 | | DACH | 0 -2 |
| 1973 | REP | 46 | LAST | 1152 | 00,3271 | 1 6030 | 0 | | TCP | DANZIG |
| 1974 | REP | 556 | LAST | 1152 | 00,3272 | 3 0156 | 0 | TPUSH | CA | MPAC +2 |
| 1975 | REP | 2 | LAST | 1095 | 00,3273 | 1 6523 | 1 | | TCP | ENDTPUSH +2 |
| 1976 | REP | 30 | LAST | 1150 | 00,3274 | 50 120 | 1 | RVO | INDEX | FIXLOC |
| 1977 | REP | 18 | LAST | 1096 | 00,3275 | 3 0052 | 0 | | CA | OPRET |
| 1978 | REP | 21 | LAST | 1110 | 00,3276 | 54 117 | 1 | | TS | POLISH |
| 1979 | REP | 5 | LAST | 1099 | 00,3277 | 1 6621 | 0 | | TCP | GOTO +4 |

VECTOR DEFINE - ESSENTIALLY TREATS SCALAR IN MPAC AS X COMPONENT, PUSHES UP FOR Y AND THEN AGAIN FOR Z.

MODE IS NON VECTOR.

DOT MPAC WITH ITSELF. MODE IS NOW DP.

PUSH DOWN MPAC LEAVING IT LOADED.

PUSH DOWN FIRST TWO REGISTERS IN EACH

INCREMENT PUSHDOWN POINTER.

PUSH DOWN MPAC +2. DONE FOR DP.

ON VECTOR, PUSH DOWN Y AND Z COMPONENTS.

RVO - RETURN IVA OPRET.

(ASSUME OPRET POINTS TO FIXED ONLY.)



L INTERPRETER

P1980 THE FOLLOWING SUBROUTINES ARE USED IN SQUARING MPAC, IN BOTH THE SCALAR AND VECTOR SENSE. THEY ARE
 R1982 SPECIAL CASES OF DMPSUB AND DOTSUB, PUT IN TO SAVE SOME TIME.

| | | | | | | | | |
|------|---------|-----------|---------|----------|--------|--------|---------|--------------------------------------|
| 1983 | REP 557 | LAST 1152 | 00,3300 | 3 0155 0 | DSQSUB | CA | MPAC +1 | SQUARES THE SCALAR CONTENTS OF MPAC. |
| 1984 | | | 00,3301 | 0 0006 1 | | EXTEND | | |
| 1985 | | | 00,3302 | 7 0000 0 | | SQUARE | | |
| 1986 | REP 558 | LAST 1153 | 00,3303 | 54 156 1 | | TS | MPAC +2 | |
| 1987 | REP 234 | LAST 1151 | 00,3304 | 3 4714 1 | | CAF | ZERO | FORM 2(CROSS TERM). |
| 1988 | REP 559 | LAST 1153 | 00,3305 | 58 155 0 | | XCH | MPAC +1 | |
| 1989 | | | 00,3306 | 0 0006 1 | | EXTEND | | |
| 1990 | REP 560 | LAST 1153 | 00,3307 | 7 0154 0 | | MP | MPAC | |
| 1991 | | | 00,3310 | 20 001 1 | | DDOURL | | AND MAYBE OVERFLOW. |
| 1992 | REP 561 | LAST 1153 | 00,3311 | 20 156 1 | | DAS | MPAC +1 | AND SET A TO NET OVERFLOW. |
| 1993 | REP 562 | LAST 1153 | 00,3312 | 56 154 1 | | XCH | MPAC | |
| 1994 | | | 00,3313 | 0 0006 1 | | EXTEND | | |
| 1995 | | | 00,3314 | 7 0000 0 | | SQUARE | | |
| 1996 | REP 563 | LAST 1153 | 00,3315 | 20 155 1 | | DAS | MPAC | |
| 1997 | REP 268 | LAST 1149 | 00,3316 | 0 0002 0 | | TC | 0 | |
| 1998 | | | 00,3317 | 0 0006 1 | VSQSUB | EXTEND | | DOTS THE VECTOR IN MPAC WITH ITSELF. |
| 1999 | REP 8 | LAST 1108 | 00,3320 | 22 137 1 | | QXCH | DOTRET | |
| 2000 | REP 2 | LAST 1150 | 00,3321 | 0 3300 1 | | TC | DSQSUB | SQUARE THE X COMPONENT. |
| 2001 | REP 564 | LAST 1153 | 00,3322 | 52 160 1 | | DXCH | MPAC +3 | |
| 2002 | REP 565 | LAST 1153 | 00,3323 | 52 155 1 | | DXCH | MPAC | |
| 2003 | REP 99 | LAST 1147 | 00,3324 | 52 131 0 | | DXCH | RUP | SO WE CAN END IN DOTSUB. |
| 2004 | REP 566 | LAST 1153 | 00,3325 | 3 0156 0 | | CA | MPAC +2 | |
| 2005 | REP 100 | LAST 1153 | 00,3326 | 54 132 0 | | TS | RUP +2 | |
| 2006 | REP 3 | LAST 1153 | 00,3327 | 0 3300 1 | | TC | DSQSUB | SQUARE Y COMPONENT. |
| 2007 | REP 567 | LAST 1153 | 00,3330 | 52 156 1 | | DXCH | MPAC +1 | |
| 2008 | REP 101 | LAST 1153 | 00,3331 | 20 132 0 | | DAS | RUP +1 | |
| 2009 | REP 568 | LAST 1153 | 00,3332 | 6 0154 1 | | AD | MPAC | |
| 2010 | REP 102 | LAST 1153 | 00,3333 | 6 0130 0 | | AD | RUP | |
| 2011 | REP 103 | LAST 1153 | 00,3334 | 54 130 1 | | TS | RUP | |
| 2012 | | | 00,3335 | 1 3337 1 | | TCP | +2 | |
| 2013 | REP 8 | LAST 1145 | 00,3336 | 54 121 1 | | TS | OVPIND | IF OVERFLOW. |
| 2014 | REP 569 | LAST 1153 | 00,3337 | 52 162 0 | | DXCH | MPAC +5 | |
| 2015 | REP 570 | LAST 1153 | 00,3340 | 52 155 1 | | DXCH | MPAC | |
| 2016 | REP 4 | LAST 1153 | 00,3341 | 0 3300 1 | | TC | DSQSUB | SQUARE Z COMPONENT. |
| 2017 | REP 1 | | 00,3342 | 1 7154 1 | | TCP | ENDDOT | END AS IN DOTSUB. |



L INTERPRETER

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P2018      DOUBLE PRECISION SQUARE ROOT ROUTINE. TAKE THE SQUARE ROOT OF THE TRIPLE PRECISION (MPAC +2 USED ONLY
R2020      IN NORMALIZATION) CONTENTS OF MPAC AND LEAVE THE NORMALIZED RESULT IN MPAC (CIMPAC) GREATER THAN OR EQUAL TO
R2022      .5). THE RIGHT SHIFT COUNT (TO UNNORMALIZE) IS LEFT IN MPTEMP.
2023      RESP 235 LAST 1153 00,3343 3 4714 1 SORTSUB CAP ZERO          START BY ZEROING RIGHT SHIFT COUNT.
2024      RESP 58  LAST 1151 00,3344 54 135 1      TS      MPTEMP

2025      RESP 571 LAST 1153 00,3345 10 154 0      CCS      MPAC          CHECK FOR POSITIVE ARGUMENT, SHIFTING
2026      RESP 1      LAST 1154 00,3346 1 3404 0      TCP      SMPAC+      FIRST SIGNIFICANT MPAC REGISTER INTO
2027      RESP 1      LAST 1154 00,3347 1 3351 1      TCP      +2          MPAC ITSELF.
2028      RESP 1      LAST 1154 00,3350 1 3373 1      TCP      SORTNEG     SEE IF MAG OF ARGUMENT LESS THAN 10(-4).

2029      RESP 572 LAST 1154 00,3351 58 156 0      XCH      MPAC +2     MPAC IS ZERO - SHIFT LEFT 14.
2030      RESP 573 LAST 1154 00,3352 58 155 0      XCH      MPAC +1
2031      RESP 574 LAST 1154 00,3353 54 154 0      TS       MPAC
2032      RESP 15  LAST 905  00,3354 3 4716 0      CAP      SEVEN      AUGMENT RIGHT SHIFT COUNTER.
2033      RESP 59  LAST 1154 00,3355 54 135 1      TS       MPTEMP

2034      RESP 575 LAST 1154 00,3356 10 154 0      CCS      MPAC          SEE IF MPAC NOW PNZ.
2035      RESP 2  LAST 1154 00,3357 1 3404 0      TCP      SMPAC+
2036      RESP 1      LAST 1154 00,3360 1 3362 1      TCP      +2          NEGATIVE BUT LESS THAN 10(-4) IN MAG.
2037      RESP 1      LAST 1154 00,3361 1 3376 1      TCP      ZEROANS     ZERO - SHIFT LEFT 14 AGAIN.

2038      RESP 576 LAST 1154 00,3362 58 155 0      XCH      MPAC +1
2039      RESP 577 LAST 1154 00,3363 54 154 0      TS       MPAC
2040      RESP 16  LAST 1154 00,3364 3 4716 0      CAP      SEVEN      AUGMENT RIGHT SHIFT COUNTER.
2041      RESP 60  LAST 1154 00,3365 28 135 1      ADS      MPTEMP

2042      RESP 578 LAST 1154 00,3366 10 154 0      CCS      MPAC
2043      RESP 3  LAST 1154 00,3367 1 3404 0      TCP      SMPAC+
2044      RESP 269  LAST 1153 00,3370 0 0002 0      TC       0          SQR(0) = 0.
2045      RESP 2  LAST 1154 00,3371 1 3376 1      TCP      ZEROANS
2046      RESP 1      LAST 1154 00,3372 1 3452 0      TCP      FIXROOT
2047      RESP 314  LAST 1152 00,3373 10 000 0      SORTNEG CCS      A          DO NOT LEAVE SORTSUB WITH -0 IN MPAC.
2048      RESP 1      LAST 1154 00,3374 1 3402 0      TCP      SORTABRT   ARGUMENT IS NEGATIVE, BUT SEE IF SIGN-
CORRECTED ARGUMENT IS LESS THAN 10(-4)

2049      RESP 579 LAST 1154 00,3375 10 155 1      CCS      MPAC +1     IN MAGNITUDE. IF SO, CALL ANSWER ZERO.
2050      RESP 236  LAST 1154 00,3376 3 4714 1      ZEROANS CAP      ZERO      FORCE ANSWER TO ZERO HERE.
2051      RESP 2  LAST 1154 00,3377 1 3452 0      TCP      FIXROOT
2052      RESP 2  LAST 1154 00,3400 1 3402 0      TCP      SORTABRT
2053      RESP 3  LAST 1154 00,3401 1 3452 0      TCP      FIXROOT

2054      RESP 3  LAST 367  00,3402 0 5622 1      SORTABRT TC      POCDOO
2055      RESP 3  LAST 367  00,3403 01302 1      OCT      1302
    
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L INTERPRETER

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| | | | | | | | | |
|------|-----|-----|---------|--------|---|----------|--------|----------|
| 2056 | REP | 1 | 00,3404 | 6 2444 | 1 | SMPAC+ | AD | -1/2+2 |
| 2057 | | | 00,3405 | 0 0006 | 1 | | EXTEND | |
| 2058 | REP | 1 | 00,3406 | 6 3455 | 0 | | BZMP | SRTBST |
| 2059 | REP | 580 | 00,3407 | 52 155 | 1 | | DXCH | MPAC |
| 2060 | REP | 25 | 00,3410 | 22 021 | 1 | | LXCH | SR |
| 2061 | | | 00,3411 | 0 0006 | 1 | | EXTEND | |
| 2062 | REP | 16 | 00,3412 | 7 4675 | 0 | | MP | HALF |
| 2063 | REP | 581 | 00,3413 | 52 155 | 1 | | DXCH | MPAC |
| 2064 | REP | 26 | 00,3414 | 56 021 | 1 | | XCH | SR |
| 2065 | REP | 582 | 00,3415 | 26 155 | 1 | | ADS | MPAC +1 |
| 2066 | REP | 1 | 00,3416 | 3 2314 | 0 | ARCHI | CAP | SLOPEHI |
| 2067 | | | 00,3417 | 0 0006 | 1 | | EXTEND | |
| 2068 | REP | 583 | 00,3420 | 7 0154 | 0 | | MP | MPAC |
| 2069 | REP | 1 | 00,3421 | 6 2566 | 0 | | AD | BIASHI |
| 2070 | REP | 104 | 00,3422 | 54 130 | 1 | +4 | TS | BUF |
| 2071 | REP | 584 | 00,3423 | 3 0154 | 1 | | CA | MPAC |
| 2072 | | | 00,3424 | 22 007 | 0 | | ZL | |
| 2073 | | | 00,3425 | 0 0006 | 1 | | EXTEND | |
| 2074 | REP | 105 | 00,3426 | 10 130 | 1 | | DV | BUF |
| 2075 | | | 00,3427 | 0 0006 | 1 | | EXTEND | |
| 2076 | REP | 17 | 00,3430 | 7 4675 | 0 | | MP | HALF |
| 2077 | REP | 106 | 00,3431 | 26 130 | 1 | | ADS | BUF |
| 2078 | | | 00,3432 | 0 0006 | 1 | | EXTEND | |
| 2079 | REP | 18 | 00,3433 | 7 4675 | 0 | | MP | HALF |
| 2080 | REP | 585 | 00,3434 | 52 155 | 1 | | DXCH | MPAC |
| 2081 | | | 00,3435 | 0 0006 | 1 | | EXTEND | |
| 2082 | REP | 107 | 00,3436 | 10 130 | 1 | | DV | BUF |
| 2083 | REP | 108 | 00,3437 | 54 131 | 0 | | TS | BUF +1 |
| 2084 | REP | 237 | 00,3440 | 3 4714 | 1 | | CAP | ZERO |
| 2085 | REP | 193 | 00,3441 | 56 001 | 0 | | XCH | L |
| 2086 | | | 00,3442 | 0 0006 | 1 | | EXTEND | |
| 2087 | REP | 109 | 00,3443 | 10 130 | 1 | | DV | BUF |
| 2088 | REP | 194 | 00,3444 | 54 001 | 1 | | TS | L |
| 2089 | REP | 110 | 00,3445 | 3 0131 | 1 | | CA | BUF +1 |
| 2090 | REP | 586 | 00,3446 | 20 155 | 1 | | DAS | MPAC |
| 2091 | | | 00,3447 | 0 0006 | 1 | | EXTEND | |
| 2092 | REP | 1 | 00,3450 | 1 3454 | 0 | | BZP | TCORNK00 |
| 2093 | REP | 34 | 00,3451 | 3 4672 | 0 | | CAP | POS MAX |
| 2094 | REP | 587 | 00,3452 | 54 154 | 0 | FIXROOT | TS | MPAC |
| 2095 | REP | 588 | 00,3453 | 54 155 | 1 | | TS | MPAC +1 |
| 2096 | REP | 270 | 00,3454 | 0 0002 | 0 | TCORNK00 | TC | 0 |

SEE IF ARGUMENT GREATER THAN OR EQUAL TO .5.
IF SO, SEE IF LESS THAN .25.

WE WILL TAKE THE SQUARE ROOT OF MPAC/2.
SHIFT RIGHT 1 AND GO TO THE SORT ROUTINE

QUARANTEED NO OVERFLOW.

ARGUMENT BETWEEN .25 AND .5. GET A
LINEAR APPROXIMATION FOR THIS RANGE.

$X0/2 = (MPAC/2)(SLOPEHI) + BIASHI/2.$

$X0/2$ (ARGUMENT ENTERS HERE).
SINGLE-PRECISION THROUGHOUT.

$(MPAC/2)/(X0/2)$

$X1 = X0/2 + .5(MPAC/2)/(X0/2).$

FORM UP $X1/2$.
SAVE AND BRING OUT ARGUMENT.
TAKE DP QUOTIENT WITH $X1$.

SAVE MAJOR PART OF QUOTIENT.
FORM MINOR PART OF QUOTIENT USING
(REMAINDER, 0).

IN PREPARATION FOR DAS.

$X2 = X1/2 + (MPAC/2)X1$

OVERFLOWS IF ARG. NEAR POSMAX.

RETURN TO CALLER TO UNNORMALIZE, ETC.

L INTERPRETER

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| | | | | | | | | | | | |
|------|-----|-----|------|------|---------|----|------|---|----------|--------|----------|
| 2097 | REP | 6 | LAST | 992 | 00,3455 | 6 | 4678 | 1 | SRTBST | AD | QUARTER |
| 2098 | | | | | 00,3456 | 0 | 0006 | 1 | | EXTEND | |
| 2099 | REP | 1 | | | 00,3457 | 6 | 3501 | 0 | | BZPF | SQRTNORM |
| 2100 | REP | 589 | LAST | 1155 | 00,3460 | 52 | 155 | 1 | | DYCH | MPAC |
| 2101 | REP | 27 | LAST | 1155 | 00,3461 | 22 | 021 | 1 | | LXCH | SR |
| 2102 | | | | | 00,3462 | 0 | 0006 | 1 | | EXTEND | |
| 2103 | REP | 19 | LAST | 1155 | 00,3463 | 7 | 4875 | 0 | | MP | HALF |
| 2104 | REP | 590 | LAST | 1156 | 00,3464 | 52 | 155 | 1 | | DYCH | MPAC |
| 2105 | REP | 28 | LAST | 1156 | 00,3465 | 56 | 021 | 1 | | XCH | SR |
| 2106 | REP | 591 | LAST | 1156 | 00,3466 | 26 | 155 | 1 | | ADS | MPAC +1 |
| 2107 | REP | 1 | | | 00,3467 | 3 | 3007 | 0 | ARGLO | CAP | SLOPELO |
| 2108 | | | | | 00,3470 | 0 | 0006 | 1 | | EXTEND | |
| 2109 | REP | 592 | LAST | 1156 | 00,3471 | 7 | 0154 | 0 | | MP | MPAC |
| 2110 | REP | 1 | | | 00,3472 | 6 | 2270 | 0 | | AD | BIASLO |
| 2111 | REP | 1 | | | 00,3473 | 1 | 3422 | 1 | | TCP | ARGHI +4 |
| 2112 | | | | | 00,3474 | 0 | 0006 | 1 | SQRTNM2 | EXTEND | |
| 2113 | REP | 593 | LAST | 1156 | 00,3475 | 3 | 0156 | 0 | | DCA | MPAC +1 |
| 2114 | REP | 594 | LAST | 1156 | 00,3476 | 20 | 156 | 1 | | DAS | MPAC +1 |
| 2115 | REP | 595 | LAST | 1156 | 00,3477 | 6 | 0154 | 1 | | AD | MPAC |
| 2116 | REP | 596 | LAST | 1156 | 00,3500 | 26 | 154 | 0 | | ADS | MPAC |
| 2117 | REP | 61 | LAST | 1154 | 00,3501 | 24 | 135 | 0 | SQRTNORM | INCR | MPTEMP |
| 2118 | | | | | 00,3502 | 0 | 0006 | 1 | | EXTEND | |
| 2119 | REP | 597 | LAST | 1156 | 00,3503 | 3 | 0156 | 0 | | DCA | MPAC +1 |
| 2120 | REP | 598 | LAST | 1156 | 00,3504 | 20 | 156 | 1 | | DAS | MPAC +1 |
| 2121 | REP | 599 | LAST | 1156 | 00,3505 | 6 | 0154 | 1 | | AD | MPAC |
| 2122 | REP | 600 | LAST | 1156 | 00,3506 | 26 | 154 | 0 | | ADS | MPAC |
| 2123 | | | | | 00,3507 | 6 | 0000 | 1 | | DOLRLE | |
| 2124 | REP | 19 | LAST | 373 | 00,3510 | 54 | 022 | 0 | | TS | CYL |
| 2125 | REP | 20 | LAST | 1156 | 00,3511 | 10 | 022 | 0 | NORVTEST | CCS | CYL |
| 2126 | REP | 21 | LAST | 1156 | 00,3512 | 10 | 022 | 0 | | CCS | CYL |
| 2127 | REP | 1 | | | 00,3513 | 1 | 3474 | 1 | | TCP | SQRTNM2 |
| 2128 | REP | 2 | LAST | 1156 | 00,3514 | 1 | 3416 | 0 | | TCP | ARGHI |
| 2129 | REP | 1 | | | 00,3515 | 1 | 3467 | 0 | | TCP | ARGLO |

ARGUMENT WAS LESS THAN .5, SEE IF LESS THAN .25. IF SO, BEGIN NORMALIZATION.

IF BETWEEN .5 AND .25, SHIFT RIGHT 1 AND START AT ARGLO.

NO OVERFLOW.

(NORMALIZED) ARGUMENT BETWEEN .125 AND .25

BEGIN SQUARE ROOT.

SHIFT LEFT 2 AND INCREMENT RIGHT SHIFT COUNT (FOR TERMINAL UNNORMALIZATION).

(NO OVERFLOW).

FIRST TIME THROUGH, JUST SHIFT LEFT 1 (PUTS IN EFFECTIVE RIGHT SHIFT SINCE WE WANT MPAC/2).

(AGAIN NO OVERFLOW).

SEE IF ARGUMENT NOW NORMALIZED AT GREATER THAN .125. NO - SHIFT LEFT 2 MORE AND TRY AGAIN. YES - NOW BETWEEN .5 AND .25. ARGUMENT NOW BETWEEN .25 AND .125.



L INTERPRETER

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P2130 TRIGONOMETRIC FUNCTION PACKAGE.

R2131 THE FOLLOWING TRIGONOMETRIC FUNCTIONS ARE AVAILABLE AS INTERPRETIVE OPERATIONS'

- R2133 1. SIN COMPUTES (1/2)SINE(2 PI MPAC).
- R2134 2. COS COMPUTES (1/2)COSINE(2 PI MPAC).
- R2135 3. ASIN COMPUTES (1/2PI)ARCSINE(2 MPAC).
- R2136 4. ACOS COMPUTES (1/2PI)ARCCOSINE(2 MPAC).

R2137 SIN-ASIN AND COS-ACOS ARE MUTUALLY INVERSE, IE SIN(ASIN(X)) = X.

| | | | | | | | |
|-------|---------|-----------|---------|----------|---------|--------|-----------|
| 2138 | REP 4 | LAST 1151 | 00,3516 | 0 6872 1 | COSINE | TC | BRANCH |
| 2139 | | | 00,3517 | 1 3522 0 | | TCP | +3 |
| 2140 | REP 1 | | 00,3520 | 1 3525 1 | | TCP | PRESINE |
| 2141 | REP 2 | LAST 1157 | 00,3521 | 1 3525 1 | | TCP | PRESINE |
| 2142 | | | 00,3522 | 0 0008 1 | +3 | EXTEND | |
| 2143 | REP 601 | LAST 1156 | 00,3523 | 4 0155 1 | | DCS | MPAC |
| 2144 | REP 602 | LAST 1157 | 00,3524 | 52 155 1 | | DXCH | MPAC |
| 2145 | REP 7 | LAST 1156 | 00,3525 | 3 4676 1 | PRESINE | CAP | QUARTER |
| 2146 | REP 603 | LAST 1157 | 00,3526 | 26 154 0 | | ADS | MPAC |
| 2147 | REP 604 | LAST 1157 | 00,3527 | 52 155 1 | SINE | DXCH | MPAC |
| 2148 | | | 00,3530 | 20 001 1 | | DDOUBL | |
| 2149 | | | 00,3531 | 54 000 0 | | OVSK | |
| 2150 | | | 00,3532 | 1 3535 0 | | TCP | +3 |
| 2151 | | | 00,3533 | 0 0008 1 | | EXTEND | |
| 2152 | | | 00,3534 | 4 0001 1 | | DCOM | |
| A2153 | | | | | | | |
| 2154 | REP 605 | LAST 1157 | 00,3535 | 52 155 1 | +3 | DXCH | MPAC |
| 2155 | REP 606 | LAST 1157 | 00,3536 | 3 0154 1 | | CA | MPAC |
| 2156 | | | 00,3537 | 6 0000 1 | | DOUBLE | |
| 2157 | REP 195 | LAST 1155 | 00,3540 | 54 001 1 | | TS | L |
| 2158 | REP 1 | | 00,3541 | 1 3552 1 | | TCP | SN1 |
| 2159 | REP 315 | LAST 1154 | 00,3542 | 50 000 1 | | INDEX | A |
| 2160 | REP 7 | LAST 1052 | 00,3543 | 3 4674 0 | | CAP | NEG1/2 +1 |
| 2161 | | | 00,3544 | 6 0000 1 | | DOUBLE | |
| 2162 | | | 00,3545 | 0 0008 1 | | EXTEND | |
| 2163 | REP 607 | LAST 1157 | 00,3546 | 60 154 1 | | SU | MPAC |
| 2164 | REP 608 | LAST 1157 | 00,3547 | 54 154 0 | | TS | MPAC |
| 2165 | REP 609 | LAST 1157 | 00,3550 | 4 0155 1 | | CS | MPAC +1 |
| 2166 | REP 610 | LAST 1157 | 00,3551 | 54 155 1 | | TS | MPAC +1 |

FINDS COSINE USING THE IDENTITY
COS(X) = SIN(PI/2 - ABS(X)).

PI/2 SCALED.

DOUBLE ARGUMENT.

SEE IF OVERFLOW PRESENT.
IF NOT, ARGUMENT OK AS IS.

IF SO, WE LOST (OR GAINED) PI, SO
COMPLEMENT MPAC USING THE IDENTITY
SIN(X-(+)PI) = SIN(-X).

SEE IF ARGUMENT GREATER THAN .5 IN
MAGNITUDE. IF SO, REDUCE IT TO LESS THAN
.5 (+-PI/2 SCALED) AS FOLLOWS'

IF POSITIVE, FORM PI - X, IF NEGATIVE
USE -PI - X.

GUARANTEED NO OVERFLOW.

L INTERPRETER

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2167 00,3552 0 0008 1 SN1
 2168 REP 611 LAST 1157 00,3553 3 0155 0
 2169 REP 17 LAST 1143 00,3554 52 134 0
 2170 REP 5 LAST 1153 00,3555 0 3300 1

 2171 REP 5 LAST 849 00,3556 0 7171 1
 2172 00,3557 00003 1
 2173 00,3558 14441 0
 2173 00,3561 37325 1
 2174 00,3562 53250 0
 2174 00,3563 80764 1
 2175 00,3564 12146 1
 2175 00,3565 21276 1
 2176 00,3566 75466 1
 2176 00,3567 71471 0
 2177 00,3570 00236 0
 2177 00,3571 32757 0

 2178 REP 1 00,3572 3 2470 0
 2179 REP 19 LAST 1119 00,3573 0 7055 0

 2180 00,3574 0 0006 1
 2181 REP 612 LAST 1158 00,3575 3 0156 0
 2182 REP 613 LAST 1158 00,3576 20 156 1
 2183 REP 614 LAST 1158 00,3577 6 0154 1
 2184 REP 615 LAST 1158 00,3600 26 154 0
 2185 00,3601 0 0006 1
 2186 REP 616 LAST 1158 00,3602 3 0156 0
 2187 REP 617 LAST 1158 00,3603 20 156 1
 2188 REP 618 LAST 1158 00,3604 6 0154 1
 2189 REP 619 LAST 1158 00,3605 26 154 0
 2190 REP 47 LAST 1152 00,3606 1 6030 0

EXTEND
 DCA MPAC
 DXCH RUF2
 TC DSQSUB

 TC POLY
 DEC 3
 ZDEC +.3926990795

 ZDEC -.8459637111
 ZDEC +.316756717
 ZDEC -.074780249
 ZDEC +.009694988

 CAP LRUF2
 TC DMPSUB -1

 EXTEND
 DCA MPAC +1
 DAS MPAC +1
 AD MPAC
 ADS MPAC
 EXTEND
 DCA MPAC +1
 DAS MPAC +1
 AD MPAC
 ADS MPAC
 TCP DANZIG

SET UP TO EVALUATE HASTINGS POLYNOMIAL

 SQUARE MPAC.

 EVALUATE FOURTH ORDER POLYNOMIAL.

 MULTIPLY BY ARGUMENT AND SHIFT LEFT 2.

NEITHER SHIFT OVERFLOWS.

L INTERPRETER

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P2101 ARCSIN/ARCCOS ROUTINE.

| | | | | | | | | | | |
|------|-----|-----|-----------|---------|--------|---|---------|--------|----------|---|
| 2192 | REP | 1 | | 00,3607 | 3 3630 | 1 | ARCSIN | CAP | LASINEX | COMPUTE ARCSIN BY USING THE IDENTITY |
| 2193 | | | | 00,3610 | 1 3612 | 0 | | TCP | +2 | ARCSIN(X) = PI/2 - ARCCOS(X). |
| 2194 | REP | 1 | | 00,3611 | 3 3712 | 0 | ARCCOS | CAP | LDANZIG | (EXITS IMMEDIATELY). |
| 2195 | REP | 1 | | 00,3612 | 54 136 | 1 | | TS | ESCAPE | |
| 2196 | REP | 5 | LAST 1157 | 00,3613 | 0 6672 | 1 | | TC | BRANCH | TEST SIGN OF INPUT. |
| 2197 | REP | 1 | | 00,3614 | 1 3624 | 0 | | TCP | ACOSST | START IMMEDIATELY IF POSITIVE. |
| 2198 | REP | 1 | | 00,3615 | 1 3720 | 0 | | TCP | ACOSZERO | ARCCOS(0) = PI/2 = .25. |
| 2199 | | | | 00,3616 | 0 0006 | 1 | | EXTEND | | IF NEGATIVE, USE THE IDENTITY |
| 2200 | REP | 620 | LAST 1158 | 00,3617 | 4 0155 | 1 | | DCS | MPAC | ARCCOS(X) = PI - ARCCOS(-X), FORCING |
| 2201 | REP | 621 | LAST 1159 | 00,3620 | 52 155 | 1 | | DxCH | MPAC | ARGUMENT POSITIVE. |
| 2202 | REP | 1 | | 00,3621 | 3 3731 | 1 | | CAP | TCSUBTR | SET EXIT TO DO ABOVE BEFORE |
| 2203 | REP | 2 | LAST 1159 | 00,3622 | 56 136 | 0 | | XCH | ESCAPE | ARCSIN/ARCCOS CONSIDERATIONS. |
| 2204 | REP | 1 | | 00,3623 | 54 137 | 0 | | TS | ESCAPE2 | |
| 2205 | REP | 20 | LAST 1156 | 00,3624 | 4 4675 | 0 | ACOSST | CS | HALP | TEST MAGNITUDE OF INPUT. |
| 2206 | REP | 622 | LAST 1159 | 00,3625 | 6 0154 | 1 | | AD | MPAC | |
| 2207 | REP | 316 | LAST 1157 | 00,3626 | 10 000 | 0 | | CCS | A | |
| 2208 | REP | 1 | | 00,3627 | 1 3720 | 0 | | TCP | ACOSOVF | THIS IS PROBABLY AN OVERFLOW CASE. |
| 2209 | REP | 1 | | 00,3630 | 1 3706 | 1 | LASINEX | TCP | ASINEX | |
| 2210 | REP | 1 | | 00,3631 | 1 3641 | 0 | | TCP | ACOSST2 | NO OVERFLOW - PROCEED. |
| 2211 | REP | 623 | LAST 1159 | 00,3632 | 10 155 | 1 | | CCS | MPAC +1 | IF MAJOR PART IS .5, CALL ANSWER 0 |
| 2212 | REP | 236 | LAST 1155 | 00,3633 | 3 4714 | 1 | | CAP | ZERO | UNLESS MINOR PART NEGATIVE. |
| 2213 | REP | 1 | | 00,3634 | 1 3636 | 0 | | TCP | ACOS=0 | |
| 2214 | REP | 2 | LAST 1159 | 00,3635 | 1 3641 | 0 | | TCP | ACOSST2 | |
| 2215 | REP | 624 | LAST 1159 | 00,3636 | 54 155 | 1 | ACOS=0 | TS | MPAC +1 | |
| 2216 | REP | 625 | LAST 1159 | 00,3637 | 54 154 | 0 | | TS | MPAC | |
| 2217 | REP | 3 | LAST 1159 | 00,3640 | 0 0136 | 0 | | TC | ESCAPE | |
| 2218 | | | | 00,3641 | 0 0006 | 1 | ACOSST2 | EXTEND | | NOW THAT ARGUMENT IS IN PROPER RANGE, |
| 2219 | REP | 626 | LAST 1159 | 00,3642 | 4 0155 | 1 | | DCS | MPAC | BEGIN COMPUTATION. USE HASTINGS |
| 2220 | REP | 21 | LAST 1159 | 00,3643 | 6 4675 | 1 | | AD | HALP | APPROXIMATION ARCCOS(X) = SQRT(1-X)P(X) |
| 2221 | REP | 627 | LAST 1159 | 00,3644 | 52 155 | 1 | | DxCH | MPAC | IN A SCALED VERSION WHERE P(X) IS A |
| 2222 | REP | 16 | LAST 1158 | 00,3645 | 52 134 | 0 | | DxCH | RUF2 | SEVENTH ORDER POLYNOMIAL. |
| 2223 | REP | 3 | LAST 1151 | 00,3646 | 0 3343 | 0 | | TC | SRQTSUB | RETURNS WITH NORMALIZED SQUARE ROOT. |
| 2224 | REP | 62 | LAST 1156 | 00,3647 | 10 135 | 1 | | CCS | MPTMP | SEE IF UN-NORMALIZATION REQUIRED. |
| 2225 | REP | 1 | | 00,3650 | 1 3713 | 0 | | TCP | ACOSHR | IF SO. |

L INTERPRETER

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| | | | | | | | | |
|------|---------|-----------|---------|----------|---------|--------|----------------------|---|
| 2226 | REP 628 | LAST 1159 | 00,3651 | 52 155 1 | ACOS3 | DxCH | MPAC | SET UP FOR POLYNOMIAL EVALUATION. |
| 2227 | REP 19 | LAST 1159 | 00,3652 | 52 134 0 | | DxCH | BUF2 | |
| 2228 | REP 629 | LAST 1160 | 00,3653 | 52 155 1 | | DxCH | MPAC | |
| 2229 | REP 6 | LAST 1158 | 00,3654 | 0 7171 1 | | TC | POLY | |
| 2230 | | | 00,3655 | 00006 1 | | DEC | 6 | |
| 2231 | | | 00,3656 | 13240 0 | | 2DEC | + .353553385 | COEFFICIENTS ARE C 2(+I)/PI SQRT(2) WHERE |
| 2232 | | | 00,3657 | 23630 0 | | | | |
| 2232 | | | 00,3660 | 74721 0 | | 2DEC* | - .0483017008 B+1* | I |
| 2232 | | | 00,3661 | 47775 1 | | | | |
| 2233 | | | 00,3662 | 02440 0 | | 2DEC* | + .0200273085 B+2* | WHERE C STANDS FOR ORIGINAL COEPPS. |
| 2233 | | | 00,3663 | 20237 0 | | | | |
| 2234 | | | 00,3664 | 75067 1 | | 2DEC* | - .0112931863 B+3* | |
| 2234 | | | 00,3665 | 70742 1 | | | | |
| 2235 | | | 00,3666 | 03438 0 | | 2DEC* | + .00695311612 B+4* | |
| 2235 | | | 00,3667 | 26756 1 | | | | |
| 2236 | | | 00,3670 | 74037 0 | | 2DEC* | - .00384617957 B+5* | |
| 2236 | | | 00,3671 | 57640 1 | | | | |
| 2237 | | | 00,3672 | 03046 0 | | 2DEC* | + .001501297738 B+6* | |
| 2237 | | | 00,3673 | 07143 0 | | | | |
| 2238 | | | 00,3674 | 76654 1 | | 2DEC* | - .000284160334 B+7* | |
| 2238 | | | 00,3675 | 42244 0 | | | | |
| 2239 | REP 2 | LAST 1158 | 00,3676 | 3 2470 0 | | CAP | LRUF2 | DO FINAL MULTIPLY AND GO TO ANY |
| 2240 | REP 20 | LAST 1158 | 00,3677 | 0 7055 0 | | TC | DMP SUB -1 | EPILOGUE SEQUENCES. |
| 2241 | REP 4 | LAST 1159 | 00,3700 | 0 0136 0 | | TC | ESCAPE | |
| 2242 | | | 00,3701 | 0 0008 1 | SUBTR | EXTEND | | EPILOGUE FOR NEGATIVE INPUTS TO ARCCOS. |
| 2243 | REP 630 | LAST 1160 | 00,3702 | 4 0155 1 | | DCS | MPAC | |
| 2244 | REP 22 | LAST 1159 | 00,3703 | 6 4675 1 | | AD | HALP | FORMS PI - ARCCOS(-X) = ARCCOS(X). |
| 2245 | REP 631 | LAST 1160 | 00,3704 | 52 155 1 | | DxCH | MPAC | |
| 2246 | REP 2 | LAST 1159 | 00,3705 | 0 0137 1 | | TC | ESCAPE2 | GO TO POSSIBLE ARCSIN EPILOGUE. |
| 2247 | | | 00,3706 | 0 0006 1 | ASINEX | EXTEND | | |
| 2248 | REP 632 | LAST 1160 | 00,3707 | 4 0155 1 | | DCS | MPAC | ARCSIN EPILOGUE - GET ARCSIN(X) |
| 2249 | REP 8 | LAST 1157 | 00,3710 | 6 4676 1 | | AD | QUARTER | = PI/2 - ARCCOS(X). |
| 2250 | REP 633 | LAST 1160 | 00,3711 | 52 155 1 | | DxCH | MPAC | |
| 2251 | REP 48 | LAST 1158 | 00,3712 | 1 6030 0 | LDANZIG | TOP | DANZIG | |



L INTERPRETER

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| | | | | | | | | | |
|-------|-----|-----|------|------|---------|----------|----------|--------|---------|
| 2252 | REP | 317 | LAST | 1159 | 00,3713 | 50 000 1 | ACOSSHR | INDEX | A |
| 2253 | REP | 68 | LAST | 1148 | 00,3714 | 3 4875 1 | CAP | BIT14 | |
| 2254 | REP | 63 | LAST | 1159 | 00,3715 | 54 135 1 | TS | MPTMP | |
| 2255 | REP | 4 | LAST | 1125 | 00,3716 | 0 2073 1 | TC | VSHRND | |
| 2256 | REP | 1 | | | 00,3717 | 1 3651 1 | TCP | ACOS3 | |
| 2257 | | | | | 00,3720 | 0 0006 1 | ACOSVFP | EXTEND | |
| 2258 | REP | 2 | LAST | 1159 | 00,3721 | 1 3636 0 | RZF | ACOS=0 | |
| 2259 | REP | 33 | LAST | 782 | 00,3722 | 0 5537 0 | ACOSABRT | TC | ALARM |
| 22591 | | | | | 00,3723 | 01301 1 | OCT | 1301 | |
| 2260 | REP | 239 | LAST | 1159 | 00,3724 | 3 4714 1 | CAP | ZERO | |
| 22601 | REP | 3 | LAST | 1161 | 00,3725 | 1 3636 0 | TCP | ACOS=0 | |
| 2261 | REP | 9 | LAST | 1160 | 00,3726 | 3 4676 1 | ACOSZERO | CAP | QUARTER |
| 2262 | REP | 4 | LAST | 1161 | 00,3727 | 1 3637 1 | TCP | ACOS=0 | +1 |
| 2263 | | | | | 00,3730 | 77763 0 | NEO12 | DEC | -12 |
| 2264 | REP | 1 | | | 00,3731 | 1 3701 0 | TCSUBTR | TCP | SUBTR |

THE SHIFT RIGHT IS LESS THAN 14 SINCE THE INPUT WAS NON-ZERO DP.

DP SHIFT RIGHT AND ROUND. PROCEED.

IF MAJOR PART WAS ONLY 1 MORE THAN .5, CALL ANSWER ZERO.

IF OVERFLOW, CALL ANSWER ZERO BUT SOUND AN ALARM.

ACOS(0) = PI/2.
SET MPAC AND EXIT VIA ESCAPE.



1. INTERPRETER
 THE FOLLOWING INSTRUCTIONS ARE AVAILABLE FOR SETTING, MODIFYING, AND BRANCHING ON INDEX REGISTERS.
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2265

1. AXT ADDRESS TO INDEX TRUE.
 2. LXA LOAD INDEX FROM ERASABLE.
 3. LXA LOAD INDEX COMPLEMENTED FROM ERASABLE.
 4. LXC LOAD INDEX COMPLEMENTED FROM ERASABLE.
 5. SKA STORE INDEX IN ERASABLE.
 6. XCHX EXCHANGE INDEX REGISTER WITH ERASABLE.
 7. INCR INCREMENT INDEX REGISTER.
 8. XAD ERASABLE ADD TO INDEX REGISTER.
 9. XSU ERASABLE SUBTRACT FROM INDEX REGISTER.
 10. TIX BRANCH ON INDEX REGISTER AND DECREMENT.

2270
 1. AXT 01,2371 0 2466 1 AXT
 2271
 1. AXT 01,2371 0 2466 1 AXT
 2272
 1. AXT 01,2371 0 2466 1 AXT

2273
 1. INCR 01,2371 0 2466 1 AXT
 2274
 8. XAD 01,2371 0 2466 1 AXT
 2275
 9. XSU 01,2371 0 2466 1 AXT

2276
 10. TIX 01,2371 0 2466 1 AXT
 2277
 1. AXT 01,2371 0 2466 1 AXT
 2278
 1. AXT 01,2371 0 2466 1 AXT

2279
 1. AXT 01,2371 0 2466 1 AXT
 2280
 22. LAST 1182 01,2372 3 0117 0
 2281
 4. LAST 1081 01,2373 50 130 0
 2282
 50. LAST 1091 01,2374 54 046 1
 2283
 49. LAST 1180 01,2375 1 6030 0

2284
 2. LAST 1182 01,2376 0 2466 1 AXT
 2285
 23. LAST 1182 01,2377 4 0117 1
 2286
 1. LAST 1182 01,2400 0 2373 1

2287
 1. LAST 1182 01,2401 0 2454 0 LXA
 2288
 24. LAST 1182 01,2402 50 117 0
 2289
 2. LAST 1182 01,2403 3 0000 1
 2290
 2. LAST 1182 01,2404 1 2373 0

2291
 2. LAST 1182 01,2405 0 2454 0 LXC
 2292
 25. LAST 1182 01,2406 50 117 0
 2293
 3. LAST 1182 01,2407 4 0000 0
 2294
 3. LAST 1182 01,2410 1 2373 0

2295
 3. LAST 1182 01,2411 0 2454 0 SKA
 2296
 5. LAST 1182 01,2412 50 130 0
 2297
 51. LAST 1182 01,2413 3 0046 0
 2298
 26. LAST 1182 01,2414 50 117 0
 2299
 50. LAST 1182 01,2415 54 000 0

2300
 50. LAST 1182 01,2416 1 6030 0
 2301
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| | | | | | | | | | |
|------|------|----|-----------|---------|----------|--------|--------|----------|---|
| 2301 | RESP | 4 | LAST 1162 | 01,2417 | 0 2454 0 | XCHX | TC | 15ADRSRS | EXCHANGE INDEX REGISTER WITH ERASABLE. |
| 2302 | RESP | 27 | LAST 1162 | 01,2420 | 50 117 0 | | INDEX | POLISH | |
| 2303 | | | | 01,2421 | 3 0000 1 | | CA | 0 | |
| 2304 | RESP | 8 | LAST 1162 | 01,2422 | 50 130 0 | | INDEX | INDEXLOC | |
| 2305 | RESP | 52 | LAST 1162 | 01,2423 | 56 046 0 | | XCH | X1 | |
| 2306 | RESP | 1 | | 01,2424 | 1 2414 0 | | TCP | MSTORE1 | |
| 2307 | RESP | 5 | LAST 1163 | 01,2425 | 0 2454 0 | XAD | TC | 15ADRSRS | ADD ERASABLE TO INDEX REGISTER. |
| 2308 | RESP | 26 | LAST 1163 | 01,2426 | 50 117 0 | | INDEX | POLISH | |
| 2309 | | | | 01,2427 | 3 0000 1 | | CA | 0 | |
| 2310 | RESP | 7 | LAST 1163 | 01,2430 | 50 130 0 | XAD2 | INDEX | INDEXLOC | |
| 2311 | RESP | 53 | LAST 1163 | 01,2431 | 26 046 1 | | ADS | X1 | IGNORING OVERFLOWS. |
| 2312 | RESP | 51 | LAST 1162 | 01,2432 | 1 6030 0 | | TCP | DANZIG | |
| 2313 | RESP | 3 | LAST 1162 | 01,2433 | 0 2466 1 | INCR | TC | TAGSUR | INCREMENT INDEX REGISTER. |
| 2314 | RESP | 29 | LAST 1163 | 01,2434 | 3 0117 0 | | CA | POLISH | |
| 2315 | RESP | 1 | | 01,2435 | 1 2430 0 | | TCP | XAD2 | |
| 2316 | RESP | 6 | LAST 1163 | 01,2436 | 0 2454 0 | XSU | TC | 15ADRSRS | SUBTRACT ERASABLE FROM INDEX REGISTER. |
| 2317 | RESP | 30 | LAST 1163 | 01,2437 | 50 117 0 | | INDEX | POLISH | |
| 2318 | | | | 01,2440 | 4 0000 0 | | CS | 0 | |
| 2319 | RESP | 2 | LAST 1163 | 01,2441 | 1 2430 0 | | TCP | XAD2 | |
| 2320 | RESP | 4 | LAST 1163 | 01,2442 | 0 2466 1 | TIX | TC | TAGSUR | BRANCH AND DECREMENT ON INDEX. |
| 2321 | RESP | 8 | LAST 1163 | 01,2443 | 50 130 0 | | INDEX | INDEXLOC | |
| 2322 | RESP | 37 | LAST 891 | 01,2444 | 4 0050 0 | | CS | S1 | |
| 2323 | RESP | 9 | LAST 1163 | 01,2445 | 50 130 0 | | INDEX | INDEXLOC | |
| 2324 | RESP | 54 | LAST 1163 | 01,2446 | 6 0046 0 | | AD | X1 | |
| 2325 | | | | 01,2447 | 0 0006 1 | | EXTEND | | NO OPERATION IF DECREMENTED INDEX IS NEGATIVE OR ZERO. |
| 2326 | RESP | 52 | LAST 1163 | 01,2450 | 6 6030 1 | | BZMF | DANZIG | |
| 2327 | RESP | 10 | LAST 1163 | 01,2451 | 50 130 0 | DOTXBR | INDEX | INDEXLOC | |
| 2328 | RESP | 55 | LAST 1163 | 01,2452 | 56 046 0 | | XCH | X1 | IGNORING OVERFLOWS. |
| 2329 | RESP | 6 | LAST 1152 | 01,2453 | 1 6615 1 | | TCP | GOTO | DO THE BRANCH USING THE CADR IN POLISH. |



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P2330 SUBROUTINE TO CONVERT AN ERASABLE ADDRESS (11 BITS) TO AN EBANK SETTING AND SUBADDRESS.

| | | | | | | | | | | |
|------|-----|-----|------|------|---------|----------|----------|------|---------|--|
| 2332 | REP | 31 | LAST | 1163 | 01,2454 | 4 0117 1 | 15ADRSRS | CS | POLISH | |
| 2333 | REP | 3 | LAST | 1091 | 01,2455 | 6 4727 1 | | AD | DEC45 | |
| 2334 | REP | 318 | LAST | 1161 | 01,2456 | 10 000 0 | | CCS | A | DOES THE ADDRESS POINT TO THE WORK AREA? |
| 2335 | REP | 31 | LAST | 1152 | 01,2457 | 3 0120 1 | | CA | FIXLOC | YES. ADD FIXLOC. EBANK OK AS IS. |
| 2336 | | | | | 01,2460 | 1 2465 0 | | TCF | +5 | |
| 2337 | REP | 8 | LAST | 1091 | 01,2461 | 3 4744 1 | | CA | OCT1400 | NO. SET EBANK & MAKE UP SUBADDRESS. |
| 2338 | REP | 32 | LAST | 1164 | 01,2462 | 56 117 0 | | XCH | POLISH | |
| 2339 | REP | 50 | LAST | 1099 | 01,2463 | 54 003 0 | | TS | EBANK | |
| 2340 | REP | 12 | LAST | 1099 | 01,2464 | 7 4373 0 | | MASK | LOW8 | |
| 2341 | REP | 33 | LAST | 1164 | 01,2465 | 26 117 1 | +5 | ADS | POLISH | FALL INTO TAGSUB, AND RETURN VIA O. |

P2342 SUBROUTINE WHICH SETS THE ADDRESS OF THE SPECIFIED INDEX IN INDEXLOC. (ACTUALLY, THE ADDRESS -38D.)

| | | | | | | | | | | |
|------|-----|-----|------|------|---------|----------|--------|------|----------|-------------------------|
| 2344 | REP | 32 | LAST | 1164 | 01,2466 | 3 0120 1 | TAGSUB | CA | FIXLOC | |
| 2345 | REP | 11 | LAST | 1163 | 01,2467 | 54 130 1 | | TS | INDEXLOC | |
| 2346 | REP | 36 | LAST | 1131 | 01,2470 | 10 020 1 | | CCS | CYR | BIT 15 SPECIFIES INDEX. |
| 2347 | REP | 12 | LAST | 1164 | 01,2471 | 24 130 0 | | INCR | INDEXLOC | 0 MEANS USE X2. |
| 2348 | REP | 271 | LAST | 1155 | 01,2472 | 0 0002 0 | | TC | O | |
| 2349 | REP | 272 | LAST | 1164 | 01,2473 | 0 0002 0 | | TC | O | 1 FOR X1. |



L INTERPRETER

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P2350 MISCELLANEOUS OPERATION CODES WITH DIRECT ADDRESSES, INCLUDED HERE ARE:

- R2352 1. ITA STORE QPRST (RETURN ADDRESS) IN ERASABLE.
- R2354 2. CALL CALL A SUBROUTINE, LEAVING RETURN IN QPRST.
- R2356 3. RTB RETURN TO BASIC LANGUAGE AT THE GIVEN ADDRESS.
- R2358 4. BHIZ BRANCH IF THE HIGH ORDER OF MPAC IS ZERO (SINGLE PRECISION).
- R2360 5. BOV BRANCH ON OVERFLOW.
- R2361 6. GOTO SIMPLE SEQUENCE CHANGE.

| | | | | | | | | | | |
|------|-----|-----|------|------|---------|----------|----------|-----|--------|---|
| 2362 | REP | 37 | LAST | 1164 | 01,2474 | 10 020 1 | RTB/BHIZ | CCS | CYR | |
| 2363 | REP | 34 | LAST | 1164 | 01,2475 | 3 0117 0 | RTB | CA | POLISH | |
| 2364 | REP | 5 | LAST | 731 | 01,2476 | 0 4560 0 | | TC | SMCALL | -1 SO A #TC Q8 FROM ROUTINE LEADS TO DANZIG |
| 2365 | REP | 634 | LAST | 1160 | 01,2477 | 10 154 0 | BHIZ | CCS | MPAC | |
| 2366 | REP | 53 | LAST | 1163 | 01,2500 | 1 6030 0 | | TCP | DANZIG | |
| 2367 | REP | 7 | LAST | 1163 | 01,2501 | 1 6615 1 | | TCP | GOTO | |
| 2368 | REP | 54 | LAST | 1165 | 01,2502 | 1 6030 0 | | TCP | DANZIG | |
| 2369 | REP | 8 | LAST | 1165 | 01,2503 | 1 6615 1 | | TCP | GOTO | |
| 2370 | REP | 9 | LAST | 1153 | 01,2504 | 10 121 1 | BOV(B) | CCS | OVFIND | BRANCH ON OVERFLOW TO BASIC OR INTERP. |
| 2371 | | | | | 01,2505 | 1 2507 0 | | TCP | +2 | |
| 2372 | REP | 55 | LAST | 1165 | 01,2506 | 1 6030 0 | | TCP | DANZIG | |
| 2373 | REP | 10 | LAST | 1165 | 01,2507 | 54 121 1 | | TS | OVFIND | |
| 2374 | REP | 38 | LAST | 1165 | 01,2510 | 10 020 1 | | CCS | CYR | |
| 2375 | REP | 1 | | | 01,2511 | 1 2475 1 | | TCP | RTB | IF BASIC. |
| 2376 | | | | | 01,2512 | 00360 1 | BSTOR8 | OCT | 360 | |
| 2377 | REP | 9 | LAST | 1165 | 01,2513 | 1 6615 1 | | TCP | GOTO | |



L INTERPRETER

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| | | | | | | | | |
|------|-----|----|-----------|---------|----------|----------|-------|---------|
| 2378 | REP | 39 | LAST 1165 | 01,2514 | 10 020 1 | BZE/GOTO | CCS | CYR |
| 2379 | REP | 8 | LAST 1159 | 01,2515 | 0 6672 1 | | TC | BRANCH |
| 2380 | REP | 56 | LAST 1165 | 01,2516 | 1 6030 0 | | TCP | DANZIG |
| 2381 | REP | 10 | LAST 1165 | 01,2517 | 1 6615 1 | | TCP | GOTO |
| 2382 | REP | 57 | LAST 1166 | 01,2520 | 1 6030 0 | | TCP | DANZIG |
| 2383 | REP | 40 | LAST 1166 | 01,2521 | 10 020 1 | BPL/RMN | CCS | CYR |
| 2384 | REP | 1 | | 01,2522 | 1 2530 1 | | TCP | BPL |
| 2385 | | | | 01,2523 | 12000 1 | 5B10 | DEC | 5 B+10 |
| 2386 | REP | 7 | LAST 1166 | 01,2524 | 0 6672 1 | | TC | BRANCH |
| 2387 | REP | 58 | LAST 1166 | 01,2525 | 1 6030 0 | | TCP | DANZIG |
| 2388 | REP | 59 | LAST 1166 | 01,2526 | 1 6030 0 | | TCP | DANZIG |
| 2389 | REP | 11 | LAST 1166 | 01,2527 | 1 6615 1 | | TCP | GOTO |
| 2390 | REP | 8 | LAST 1166 | 01,2530 | 0 6672 1 | BPL | TC | BRANCH |
| 2391 | REP | 12 | LAST 1166 | 01,2531 | 1 6615 1 | | TCP | GOTO |
| 2392 | REP | 13 | LAST 1166 | 01,2532 | 1 6615 1 | | TCP | GOTO |
| 2393 | REP | 60 | LAST 1166 | 01,2533 | 1 6030 0 | | TCP | DANZIG |
| 2394 | REP | 41 | LAST 1166 | 01,2534 | 10 020 1 | CALL/ITA | CCS | CYR |
| 2395 | REP | 1 | | 01,2535 | 1 6607 1 | | TCP | CALL |
| 2396 | REP | 7 | LAST 357 | 01,2536 | 0 5640 0 | | TC | CCSHOLE |
| 2397 | REP | 7 | LAST 1163 | 01,2537 | 0 2454 0 | | TC | 15ADRRS |
| 2398 | REP | 33 | LAST 1164 | 01,2540 | 50 120 1 | | INDRX | FIXLOC |
| 2399 | REP | 19 | LAST 1152 | 01,2541 | 3 0052 0 | | CA | OPRET |
| 2400 | REP | 2 | LAST 1163 | 01,2542 | 1 2414 0 | | TCP | MSTORR1 |

SEE WHICH OP-CODE IS DESIRED.
DO BZE.

DO GOTO.

SHIFTS OP CODE IN SWITCH INSTRUCTION ADR

DO RMN.

ONLY IF NNZ.

IF POSITIVE OR ZERO.

STORE OPRET. (TAGS/R AFTER 15ADRRS IS
SLOW IN THIS CASE, BUT SAVES STORAGE.)

INTERPRETER

1401 THE FOLLOWING OPERATIONS ARE AVAILABLE FOR ALTERING AND TESTING INTERPRETIVE SWITCHES:

- 1403 00 BONSET SET A SWITCH AND DO A GOTO IF IT WAS ON.
- 1404 01 SETGO SET A SWITCH AND DO A GOTO.
- 1405 02 BOPSET SET A SWITCH AND DO A GOTO IF IT WAS OFF
- 1406 03 SET SET A SWITCH.
- 1407 04 BONINV INVERT A SWITCH AND BRANCH IF IT WAS ON.
- 1408 05 INVGO INVERT A SWITCH AND DO A GOTO.
- 1409 06 BOPINV INVERT A SWITCH AND BRANCH IF IT WAS OFF
- 1410 07 INVERT INVERT A SWITCH.

- 2413 13 BOPVLR CLEAR A SWITCH AND BRANCH IF IT WAS OFF.
- 2414 14 BOPVLR BRANCH IF A SWITCH WAS ON.
- 2415 14 BOPVLR BRANCH IF A SWITCH WAS OFF.
- 2416 16 BOPP

2417 THE ADDRESS SUPPLIED WITH THE SWITCH INSTRUCTION IS INTERPRETED AS FOLLOWS:
 2421 BITS 9- SWITCH WORD NUMBER (UP TO 64 SWITCH WORDS).

R2422 THE ADDRESS ITSELF IS MADE UP BY THE YUL SYSTEM ASSEMBLER. THE BRANCH INSTRUCTIONS REQUIRE TWO
 R2424 ADDRESSES, THE SECOND TAKEN AS THE DIRECT (OR INDIRECT IF IN ERASABLE) ADDRESS OF THE BRANCH.

| | | | | | | | |
|------|---------|-----------|---------|----------|--------------|--------|--|
| 2426 | REP 3 | LAST 977 | 01,2543 | 3 4721 1 | SWITCHES CAP | LOW4 | LEAVE THE SWITCH BIT IN SWRIT . |
| 2427 | REP 35 | LAST 1165 | 01,2544 | 7 0117 1 | MASK | POLISH | |
| 2428 | REP 319 | LAST 1164 | 01,2545 | 59 000 1 | INDEX | A | (NUMBER FROM LEFT TO RIGHT.) |
| 2429 | REP 46 | LAST 1151 | 01,2546 | 3 4674 0 | CAP | BIT15 | |
| 2430 | REP 1 | | 01,2547 | 54 131 0 | TS | SWRIT | |
| 2431 | REP 51 | LAST 1067 | 01,2550 | 3 4704 0 | CAP | BIT7 | LEAVE THE SWITCH NUMBER IN SWWORD. |
| 2432 | | | 01,2551 | 0 0006 1 | EXTEND | | |
| 2433 | REP 36 | LAST 1167 | 01,2552 | 7 0117 1 | MP | POLISH | |
| 2434 | REP 1 | | 01,2553 | 54 130 1 | TS | SWWORD | |
| 2435 | | | 01,2554 | 0 0004 0 | INHINT | | DURING SWITCH CHANGE SO RUPY CAN USE TOO |
| 2436 | | | | | | | |
| 2437 | | | | | | | |
| 2438 | | | | | | | |



L. INTERPRETER

| | | | | | | | | | |
|------|-----|-----|-----------|---------|--------|---|-----|---------|---------|
| 2439 | REP | 31 | LAST 1037 | 01,2560 | 3 4700 | 1 | | CAP | BIT11 |
| 2440 | | | | 01,2561 | 0 0006 | 1 | | EXTEND | |
| 2441 | REP | 37 | LAST 1167 | 01,2562 | 7 0117 | 1 | | MP | POLISH |
| 2442 | REP | 1 | | 01,2563 | 7 2623 | 0 | | MASK | B3TOB4 |
| 2443 | REP | 321 | LAST 1167 | 01,2564 | 50 000 | 1 | | INDEX | A |
| 2444 | | | | 01,2565 | 1 2566 | 1 | | TOP | +1 |
| 2445 | REP | 2 | LAST 1167 | 01,2566 | 3 0131 | 1 | +1 | CA | SWBIT |
| 2446 | | | | 01,2567 | 0 0006 | 1 | | EXTEND | |
| 2447 | REP | 1 | | 01,2570 | 04 002 | 1 | | ROR | GCHAN |
| 2448 | REP | 1 | | 01,2571 | 1 2600 | 1 | | TOP | SWSTORE |
| 2449 | REP | 3 | LAST 1168 | 01,2572 | 3 0131 | 1 | +5 | CA | SWBIT |
| 2450 | | | | 01,2573 | 0 0006 | 1 | | EXTEND | |
| 2451 | REP | 2 | LAST 1168 | 01,2574 | 06 002 | 0 | | ROR | GCHAN |
| 2452 | REP | 2 | LAST 1168 | 01,2575 | 1 2600 | 1 | | TOP | SWSTORE |
| 2453 | REP | 4 | LAST 1168 | 01,2576 | 4 0131 | 0 | +9D | CS | SWBIT |
| 2454 | REP | 274 | LAST 1167 | 01,2577 | 7 0002 | 1 | | MASK | 0 |
| 2455 | REP | 2 | LAST 1167 | 01,2600 | 50 130 | 0 | | SWSTORE | INDEX |
| 2456 | REP | 50 | LAST 1167 | 01,2601 | 54 074 | 0 | | TS | STATE |

DISPATCH SWITCH BIT OPERATION AS IN BITS
7-8 OF POLISH.
GETS 4X2-BIT CODE.

00 - SET SWITCH IN QUESTION.

01 - INVERT SWITCH.

10 - CLEAR.

NEW SWITCH WORD.



L INTERPRETER

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| | | | | | | | | |
|------|---------|-----------|---------|----------|--------|--------|----------|---------------------------------------|
| 2457 | | | 01,2602 | 0 0003 1 | +13D | RELINT | | 11 - NOOP. |
| 2458 | REP 41 | LAST 1004 | 01,2603 | 3 4676 1 | | CAP | BIT13 | |
| 2459 | | | 01,2604 | 0 0006 1 | | EXTEND | | DISPATCH SOURCE CHANGING OR BRANCHING |
| 2460 | REP 38 | LAST 1168 | 01,2605 | 7 0117 1 | | MP | POLISH | CODE. |
| 2461 | REP 2 | LAST 1168 | 01,2606 | 7 2623 0 | | MASK | B3TOB4 | |
| 2462 | REP 322 | LAST 1168 | 01,2607 | 50 000 1 | | INDEX | A | ORIGINALLY STORED IN BITS 5-8. |
| 2463 | | | 01,2610 | 1 2611 1 | | TCP | +1 | |
| 2464 | REP 275 | LAST 1168 | 01,2611 | 4 0002 1 | +1 | CS | 0 | 00 - BRANCH IF ON. |
| 2465 | REP 5 | LAST 1168 | 01,2612 | 7 0131 0 | TEST | MASK | SMBIT | |
| 2466 | REP 323 | LAST 1169 | 01,2613 | 10 000 0 | | CCS | A | |
| 2467 | REP 1 | | 01,2614 | 1 2624 1 | | TCP | SWSKIP | |
| 2468 | REP 1 | | 01,2615 | 1 6664 1 | +5 | TCP | SMBRANCH | 01 - GO TO. |
| 2469 | REP 2 | LAST 1169 | 01,2616 | 1 2624 1 | | TCP | SWSKIP | HERE ONLY ON BIT 15. |
| 2470 | REP 8 | LAST 1168 | 01,2617 | 0 5640 0 | | TC | CCSHOLE | |
| 2471 | REP 9 | LAST 1169 | 01,2620 | 0 5640 0 | | TC | CCSHOLE | |
| 2472 | REP 276 | LAST 1169 | 01,2621 | 3 0002 0 | +9D | CA | 0 | 10 - BRANCH IF OFF. |
| 2473 | REP 1 | | 01,2622 | 1 2612 1 | | TCP | TEST | |
| 2474 | | | 01,2623 | 00014 1 | B3TOB4 | OCT | 0014 | |
| 2475 | REP 27 | LAST 1100 | 01,2624 | 24 164 1 | SWSKIP | INCR | LOC | |
| 2476 | REP 1 | | 01,2543 | | SW/ | EQUALS | SWITCHES | |
| 2477 | REP 61 | LAST 1168 | 01,2625 | 1 6030 0 | +13D | TCP | DANZIG | 11 - NOOP. |

L FIXED-FIXED CONSTANT POOL

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| | | | | | | |
|-------|--|-----------|---------|----------|--------|---|
| 0001 | 4871 | | BLOCK | 02 | | |
| 00015 | REP 1 | | COUNT | 02/PCONS | | |
| 00016 | THE FOLLOWING TABLE OF 18 VALUES IS INDEXED. DO NOT INSERT OR REMOVE ANY QUANTITIES. | | | | | |
| 0002 | 4871 | 37777 1 | DPOSMAX | OCT | 37777 | MUST PRECEDE POSMAX |
| 0003 | 4871 | 37777 1 | POSMAX | OCT | 37777 | |
| 0004 | REP 6 | LAST 1157 | LIMITS | = | NEG1/2 | |
| 0007 | 4873 | 57777 1 | NEG1/2 | OCT | -20000 | USED BY SIN ROUTINE (MUST BE TWO LOCATIONS IN FRONT OF BIT15) |
| 0009 | BIT TABLE | | | | | |
| 0010 | 4874 | 40000 0 | BIT15 | OCT | 40000 | |
| 0011 | 4875 | 20000 0 | BIT14 | OCT | 20000 | |
| 0012 | 4876 | 10000 0 | BIT13 | OCT | 10000 | |
| 0013 | 4877 | 04000 0 | BIT12 | OCT | 04000 | |
| 0014 | 4700 | 02000 0 | BIT11 | OCT | 02000 | |
| 0015 | 4701 | 01000 0 | BIT10 | OCT | 01000 | |
| 0016 | 4702 | 00100 0 | BIT9 | OCT | 00100 | |
| 0017 | 4703 | 00200 0 | BIT8 | OCT | 00200 | |
| 0018 | 4704 | 00100 0 | BIT7 | OCT | 00100 | |
| 0019 | 4705 | 00040 0 | BIT6 | OCT | 00040 | |
| 0020 | 4706 | 00020 0 | BIT5 | OCT | 00020 | |
| 0021 | 4707 | 00010 0 | BIT4 | OCT | 00010 | |
| 0022 | 4710 | 00004 0 | BIT3 | OCT | 00004 | |
| 0023 | 4711 | 00002 0 | BIT2 | OCT | 00002 | |
| 0024 | 4712 | 00001 0 | BIT1 | OCT | 00001 | |
| 0025 | DO NOT DESTROY THIS COMBINATION, SINCE IT IS USED IN DOUBLE PRECISION INSTRUCTIONS. | | | | | |
| 0027 | 4713 | 77777 0 | NEGO | OCT | -0 | MUST PRECEDE ZERO |
| 0028 | 4714 | 00000 1 | ZERO | OCT | 0 | MUST FOLLOW NEGO |
| 0029 | | | BIT1 | OCT | 00001 | |
| 0030 | | | NO_WDS | OCT | 2 | INTERPRETER |
| 0031 | | | OCTAL3 | OCT | 3 | INTERPRETER |
| 0032 | | | R2D1 | OCT | 4 | PINBALL |
| 0033 | 4715 | 00005 1 | FIVE | OCT | 5 | |
| 0034 | | | REVCNT | OCT | 6 | INTERPRETER |
| 0035 | 4716 | 00007 0 | SEVEN | OCT | 7 | |
| 0036 | | | BIT4 | OCT | 00010 | |
| 0037 | | | R2D1 | OCT | 11 | PINBALL |
| 00375 | REP 6 | LAST 389 | OCT11 | = | R2D1 | |
| 0038 | | | BINCON | DEC | 10 | |
| 0039 | 4717 | 00013 0 | ELEVEN | DEC | 11 | PINBALL (OCTAL 12) |
| 0040 | | | OCT14 | OCT | 14 | ALARM AND ABORT (FILLER) |
| 00401 | 4720 | 00015 0 | OCT15 | OCT | 15 | |
| 0041 | | | R1D1 | OCT | 16 | PINBALL |



L FIXED-FIXED CONSTANT POOL

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| | | | | | | | | |
|-------|------------------|------|-------|---|------------|------|----------|-------------------------------------|
| 0043 | | 4721 | 00017 | 1 | LOW4 | OCT | 17 | |
| A0044 | | | | | BITS | OCT | 00020 | |
| A0045 | | | | | ND1 | OCT | 21 | PINBALL |
| A0046 | | | | | VD1 | OCT | 23 | PINBALL |
| A0047 | | | | | OCT24 | OCT | 24 | SERVICE ROUTINES |
| A0048 | | | | | MD1 | OCT | 25 | PINBALL |
| 00485 | | 4722 | 00030 | 1 | BITS4d5 | OCT | 30 | |
| A0049 | | | | | OCT31 | OCT | 31 | SERVICE ROUTINES |
| 0050 | | 4723 | 00032 | 0 | CALLCODE | OCT | 00032 | |
| A0051 | | | | | LOW5 | OCT | 37 | PINBALL |
| A0052 | | | | | 33DEC | DEC | 33 | PINBALL (OCTAL 41) |
| A0053 | | | | | 34DEC | DEC | 34 | PINBALL (OCTAL 42) |
| 0054 | | 4724 | 00045 | 0 | TRJILDPX | DEC | 37 | BUILDUP FOR CONVIENCE IN DAPIESTING |
| 0055 | | 4725 | 00046 | 0 | TDECAVPX | DEC | 38 | CONVIENCE FOR DAPIESTING |
| A0056 | | | | | BIT6 | OCT | 00040 | |
| 0057 | | 4726 | 00050 | 1 | OCT50 | OCT | 50 | |
| 0058 | | 4727 | 00055 | 1 | DEC45 | DEC | 45 | |
| 0059 | | 4730 | 00060 | 1 | SUPER011 | OCT | 60 | BITS FOR SUPERBNK SETTING 011. |
| 0060 | | 4731 | 00062 | 0 | .5SEC | DEC | 50 | |
| A0061 | | | | | BIT7 | OCT | 00100 | |
| 0062 | REP 52 LAST 1167 | 4704 | | | SUPER100 = | BIT7 | | BITS FOR SUPERBNK SETTING 100 |
| A0063 | | | | | | | | (LAST 4K OF ROPE) |
| 0064 | | 4732 | 00120 | 1 | SUPER101 | OCT | 120 | BITS FOR SUPERBNK SETTING 101 |
| A0065 | | | | | OCT121 | OCT | 121 | SERVICE ROUTINES |
| A0066 | | | | | | | | (FIRST 8K OF ACM) |
| 0067 | | 4733 | 00140 | 1 | SUPER110 | OCT | 140 | BITS FOR SUPERBNK SETTING 110. |
| A0068 | | | | | | | | (LAST 8K OF ACM) |
| 0069 | | 4734 | 00144 | 0 | 1SEC | DEC | 100 | |
| A0070 | | | | | LOW7 | OCT | 177 | INTERPRETER |
| A0071 | | | | | BIT8 | OCT | 00200 | |
| A0072 | | | | | OT215 | OCT | 215 | ALARM AND ABORT |
| A0073 | | | | | 8.5 | OCT | 00220 | P20-P25 SUNDANCE |
| 0074 | | 4735 | 00310 | 0 | 2SECS | DEC | 200 | |
| A0075 | | | | | LOW8 | OCT | 377 | PINBALL |
| A0076 | | | | | BIT9 | OCT | 00400 | |
| 0077 | | 4736 | 00401 | 1 | ON/CCODE | OCT | 00401 | SET S/C CONTROL SWITCH TO G/N |
| 0079 | | 4737 | 00454 | 1 | 3SECS | DEC | 300 | |
| 0080 | | 4740 | 00620 | 0 | 4SECS | DEC | 400 | |
| 00801 | | 4741 | 00777 | 0 | LOW9 | OCT | 777 | |
| A0081 | | | | | BIT10 | OCT | 01000 | |
| A0082 | | | | | 5.5DECS | DEC | .03056 | P20-P25 SUNDANCE (OCTAL 00765) |
| A0083 | | | | | OCT1103 | OCT | 1103 | ALARM AND ABORT |
| 0084 | | 4742 | 01124 | 1 | C5/2 | DEC | .0363551 | (OCTAL 01124) |
| 0085 | | 4743 | 01211 | 1 | V05N09 | VN | 0509 | (SAME AS OCTAL 1211) |
| 0086 | | 4744 | 01400 | 1 | OCT1400 | OCT | 01400 | |
| 00865 | | 4745 | 01426 | 0 | V06N22 | VN | 0622 | |
| A0087 | | | | | MID5 | OCT | 1740 | PINBALL |
| 00875 | | 4746 | 01776 | 0 | BITS2-10 | OCT | 1776 | |
| 0088 | | 4747 | 01777 | 1 | LOW10 | OCT | 1777 | |



L FIXED-FIXED CONSTANT POOL

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| | | | | | | |
|-------|------|-------|----------|-----|----------|--------------------------------------|
| A0089 | | | BIT11 | OCT | 02000 | |
| A0090 | | | 2K+3 | OCT | 2003 | PINBALL |
| 0091 | 4750 | 02177 | LOWT+2K | OCT | 2177 | OP CODE MASK + BANK 1 FBANK SETTING. |
| 0092 | 4751 | 02400 | EBANK5 | OCT | 02400 | |
| 0093 | 4752 | 03000 | PRIO3 | OCT | 03000 | |
| 0094 | 4753 | 03400 | EBANK7 | OCT | 03400 | |
| A0095 | | | LOW11 | OCT | 3777 | PINBALL |
| A0096 | | | BIT12 | OCT | 04000 | |
| A0097 | | | RELTAB | OCT | 04025 | T4RUPT |
| 0098 | 4754 | 05000 | PRIO5 | OCT | 05000 | |
| 0099 | 4755 | 06000 | PRIO6 | OCT | 06000 | |
| 0100 | 4756 | 07000 | PRIO7 | OCT | 07000 | |
| A0102 | | | BIT13 | OCT | 10000 | |
| A0103 | | | | OCT | 10003 | T4RUPT RELTAB +1D |
| A0104 | | | 13,7,2 | OCT | 10102 | P20-P25 SUNDANCE |
| 0105 | 4757 | 11000 | PRIO11 | OCT | 11000 | |
| A0106 | | | PRIO12 | OCT | 12000 | BANKCALL |
| 0107 | 4760 | 13000 | PRIO13 | OCT | 13000 | |
| 0108 | 4761 | 14000 | PRIO14 | OCT | 14000 | |
| A0109 | | | | OCT | 14031 | T4RUPT RELTAB +2D |
| 0110 | 4762 | 15000 | PRIO15 | OCT | 15000 | |
| 0111 | 4763 | 16000 | PRIO16 | OCT | 16000 | |
| A0112 | | | 85DEGS | DEC | .45556 | P20-P25 SUNDANCE (OCTAL 16450) |
| 0113 | 4764 | 17000 | PRIO17 | OCT | 17000 | |
| 0114 | 4765 | 17770 | OCT17770 | OCT | 17770 | |
| A0115 | | | BIT14 | OCT | 20000 | |
| A0116 | | | | OCT | 20033 | T4RUPT RELTAB +3D |
| 0117 | 4766 | 21000 | PRIO21 | OCT | 21000 | |
| 01175 | 7657 | | BLOCK | | 03 | |
| 01176 | | | COUNT | | 03/PCONS | |
| REF | 1 | | | | | |
| 0118 | 7657 | 22000 | PRIO22 | OCT | 22000 | SERVICE ROUTINES |
| 0119 | 7660 | 23000 | PRIO23 | OCT | 23000 | |
| 0120 | 7661 | 24000 | PRIO24 | OCT | 24000 | |
| A0121 | | | 5/8+1 | OCT | 24001 | SINGLE PRECISION SUBROUTINES |
| A0122 | | | | OCT | 24017 | T4RUPT RELTAB +4D |
| 0123 | 7662 | 25000 | PRIO25 | OCT | 25000 | |
| 0124 | 7663 | 26000 | PRIO26 | OCT | 26000 | |
| 0125 | 7664 | 27000 | PRIO27 | OCT | 27000 | |
| A0126 | | | CHRPRIO | OCT | 30000 | PINBALL |
| A0127 | | | | OCT | 30036 | T4RUPT RELTAB +5D |
| 0128 | 7665 | 31000 | PRIO31 | OCT | 31000 | |
| 0129 | 7666 | 31103 | C1/2 | DEC | .7853134 | (OCTAL 31103) |
| 0130 | 7667 | 32000 | PRIO32 | OCT | 32000 | |
| 0131 | 7670 | 33000 | PRIO33 | OCT | 33000 | |
| 0132 | 7671 | 34000 | PRIO34 | OCT | 34000 | |
| A0133 | | | | OCT | 34034 | T4RUPT RELTAB +6D |
| 0134 | 7672 | 35000 | PRIO35 | OCT | 35000 | |
| 0135 | 7673 | 36000 | PRIO36 | OCT | 36000 | |

L FIXED-FIXED CONSTANT POOL

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| | | | | | | | |
|--------|------|-------|---|----------|-----|------------|---------------------------------|
| 0136 | 7874 | 37000 | 0 | PRIO37 | OCT | 37000 | |
| 0137 | 7875 | 37401 | 0 | 63/64+1 | OCT | 37401 | |
| A0138 | | | | MID7 | OCT | 37600 | PINBALL |
| 0139 | 7876 | 37768 | 1 | OCT37768 | OCT | 37768 | |
| 0140 | 7877 | 37774 | 1 | OCT37774 | OCT | 37774 | |
| 0141 | 7700 | 37776 | 0 | OCT37776 | OCT | 37776 | |
| A01411 | | | | DPOS4X | OCT | 37777 | |
| A0142 | | | | BIT15 | OCT | 40000 | |
| A0143 | | | | OCT40001 | OCT | 40001 | INTERPRETER (CS 1 INSTRUCTION) |
| 0144 | 7701 | 40014 | 0 | DLOADCO | OCT | 40014 | |
| 0145 | 7702 | 40015 | 1 | DLOAD* | OCT | 40015 | |
| A0146 | | | | | OCT | 40023 | T4RUPT RELTAB +7D |
| 01465 | 7703 | 40040 | 1 | BIT15+6 | OCT | 40040 | |
| 01466 | 7704 | 40200 | 1 | OCT40200 | OCT | 40200 | |
| A0147 | | | | | OCT | 44035 | T4RUPT RELTAB +8D |
| A0148 | | | | | OCT | 50037 | T4RUPT RELTAB +9D |
| A0149 | | | | | OCT | 54000 | T4RUPT RELTAB +10D |
| 01495 | 7705 | 57777 | 1 | -BIT14 | OCT | 57777 | |
| A0150 | | | | RELTAB11 | OCT | 60000 | T4RUPT |
| 0151 | 7706 | 65552 | 0 | C3/2 | DEC | - .3216147 | (OCTAL 65552) |
| 0152 | 7707 | 70000 | 0 | 13,14,15 | OCT | 70000 | |
| 0153 | 7710 | 73777 | 1 | -1/8 | OCT | 73777 | |
| 0154 | 7711 | 74000 | 1 | HIGH4 | OCT | 74000 | |
| 0155 | 7712 | 74056 | 1 | -ENDERS | DEC | -2001 | (OCTAL 74056) |
| A0156 | | | | HIS | OCT | 76000 | PINBALL |
| 0157 | 7713 | 77700 | 0 | HIGH9 | OCT | 77700 | |
| A0158 | | | | -ENDVAC | DEC | -45 | INTERPRETER (OCTAL 77722) |
| A0159 | | | | -OCT10 | OCT | -10 | (OCT 77767) |
| A0161 | | | | NEG4 | DEC | -4 | (OCTAL 77773) |
| 0162 | 7714 | 77774 | 0 | NEG3 | DEC | -3 | |
| 0163 | 7715 | 77775 | 1 | NEG2 | OCT | 77775 | |
| 0164 | 7716 | 77776 | 1 | NEGONE | DEC | -1 | |



L FIXED-FIXED CONSTANT POOL

USERS PAGE NO. 5 Pg 53

P0165 DEFINED BY EQUALS

R0166 IT WOULD BE TO THE USERS ADVANTAGE TO OCCASIONALLY CHECK ANY OF THESE SYMBOLS IN ORDER TO PREVENT ANY ACCIDENTAL DEFINITION CHANGES.

| | | | | | | | | |
|-------|-----|----|------|------|------|----------|---|----------|
| 0169 | REP | 5 | LAST | 330 | 7716 | MINUS1 | = | NEG1 |
| 0170 | REP | 28 | LAST | 1134 | 7718 | NEG1 | = | NEGONE |
| 0171 | REP | 75 | LAST | 1079 | 4712 | ONE | = | BIT1 |
| 0172 | REP | 43 | LAST | 1059 | 4711 | TWO | = | BIT2 |
| 0173 | REP | 1 | | | 6214 | THREE | = | OCTAL3 |
| 0174 | REP | 41 | LAST | 1103 | 6214 | LOW2 | = | THREE |
| 0175 | REP | 32 | LAST | 1045 | 4710 | FOUR | = | BIT3 |
| 0176 | REP | 2 | LAST | 1083 | 6211 | SIX | = | REVCNT |
| 0177 | REP | 17 | LAST | 1154 | 4716 | LOW3 | = | SEVEN |
| 0178 | REP | 39 | LAST | 1051 | 4707 | EIGHT | = | BIT4 |
| 0179 | REP | 7 | LAST | 1170 | 4334 | NINE | = | R2D1 |
| 0180 | REP | 3 | LAST | 381 | 4377 | TEN | = | BINCON |
| 0181 | REP | 9 | LAST | 1030 | 4717 | NOOUTCON | = | ELEVEN |
| 0182 | REP | 18 | LAST | 902 | 4374 | OCT23 | = | VD1 |
| 01825 | REP | 2 | LAST | 370 | 4376 | OCT25 | = | MD1 |
| 0183 | REP | 36 | LAST | 1130 | 4701 | PRIO1 | = | BIT10 |
| 0184 | REP | 7 | LAST | 1164 | 4744 | ERANK3 | = | OCT1400 |
| 0185 | REP | 32 | LAST | 1166 | 4700 | PRIO2 | = | BIT11 |
| 0186 | REP | 1 | | | 4732 | OCT120 | = | SUPER101 |
| 0187 | REP | 1 | | | 4733 | OCT140 | = | SUPER110 |
| 0188 | REP | 33 | LAST | 1174 | 4700 | ZK | = | BIT11 |
| 0189 | REP | 34 | LAST | 1174 | 4700 | ERANK4 | = | BIT11 |
| 0190 | REP | 30 | LAST | 1043 | 4677 | PRIO4 | = | BIT12 |
| 0191 | REP | 2 | LAST | 496 | 4752 | ERANK6 | = | PRIO3 |
| 0192 | REP | 42 | LAST | 1169 | 4676 | QUARTER | = | BIT13 |
| 0193 | REP | 43 | LAST | 1174 | 4676 | PRIO10 | = | BIT13 |
| 01935 | REP | 1 | | | 7632 | OCT10001 | = | CSL |
| 0194 | REP | 23 | LAST | 1160 | 4675 | POS1/2 | = | HALF |
| 0195 | REP | 69 | LAST | 1161 | 4675 | PRIO20 | = | BIT14 |
| 0196 | REP | 70 | LAST | 1174 | 4675 | HALF | = | BIT14 |
| 0197 | REP | 5 | LAST | 380 | 4371 | PRIO30 | = | CHRPRIO |
| 0198 | REP | 13 | LAST | 1101 | 4371 | BIT13-14 | = | PRIO30 |
| 01985 | REP | 3 | LAST | 1086 | 6440 | OCT30002 | = | TLOAD +1 |
| 0199 | REP | 8 | LAST | 1071 | 7671 | BIT14 | = | PRIO34 |
| 0200 | REP | 47 | LAST | 1167 | 4674 | NEGMAX | = | BIT15 |
| 0201 | REP | 48 | LAST | 1174 | 4674 | VLOADCOD | = | BIT15 |
| 0202 | REP | 1 | | | 6056 | VLOAD* | = | OCT40001 |
| 0203 | REP | 3 | LAST | 538 | 4105 | OCT80000 | = | RELTAR11 |
| 0204 | REP | 5 | LAST | 328 | 4364 | RANKMASK | = | H15 |

INTERPRETER USES IN PROCESSING STORECODE



L INTERPRETIVE CONSTANTS

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| | | | | | | | |
|------|-----|------------|---------|---------|-----------|----------|-------|
| 0001 | REF | 1 | 26,2000 | | SETLOC | INTPRET1 | |
| 0002 | | | 26,3321 | | BANK | | |
| 0003 | REF | 1 | | | COUNT | 23/ICONS | |
| 0004 | | | 26,3321 | 10000 0 | DP1/4TH | 2DEC | .25 |
| 0004 | | | 26,3322 | 00000 1 | | | |
| 0005 | | | 26,3323 | 00000 1 | UNITZ | 2DEC | 0 |
| 0005 | | | 26,3324 | 00000 1 | | | |
| 0006 | | | 26,3325 | 00000 1 | UNITY | 2DEC | 0 |
| 0006 | | | 26,3326 | 00000 1 | | | |
| 0007 | | | 26,3327 | 20000 0 | UNITX | 2DEC | .5 |
| 0007 | | | 26,3330 | 00000 1 | | | |
| 0008 | | | 26,3331 | 00000 1 | ZEROVECS | 2DEC | 0 |
| 0008 | | | 26,3332 | 00000 1 | | | |
| 0009 | | | 26,3333 | 00000 1 | | 2DEC | 0 |
| 0009 | | | 26,3334 | 00000 1 | | | |
| 0010 | | | 26,3335 | 00000 1 | | 2DEC | 0 |
| 0010 | | | 26,3336 | 00000 1 | | | |
| 0011 | REF | 7 LAST 672 | 26,3327 | | DPHALF | = | UNITX |
| 0012 | | | 26,3337 | 37777 1 | DPPOS MAX | OCT | 37777 |
| 0013 | | | 26,3340 | 37777 1 | | OCT | 37777 |



L INTERPRETIVE CONSTANTS

P0014 INTERPRETIVE CONSTANTS IN THE OTHER HALF-MEMORY

| | | | | | | | |
|------|-----|---|----------|---------|----------|----------|------------|
| 0015 | REF | 1 | 04,2000 | | SETLOC | INTPRET2 | |
| 0016 | | | 04,3447 | | BANK | | |
| 0017 | REF | 1 | | | COUNT | 14/ICONS | |
| 0018 | | | 04,3447 | 00000 1 | ZUNIT | 2DEC | 0 |
| 0018 | | | 04,3450 | 00000 1 | | | |
| 0019 | | | 04,3451 | 00000 1 | YUNIT | 2DEC | 0 |
| 0019 | | | 04,3452 | 00000 1 | | | |
| 0020 | | | 04,3453 | 20000 0 | XUNIT | 2DEC | .5 |
| 0020 | | | 04,3454 | 00000 1 | | | |
| 0021 | | | 04,3455 | 00000 1 | ZEROVEC | 2DEC | 0 |
| 0021 | | | 04,3456 | 00000 1 | | | |
| 0022 | | | 04,3457 | 00000 1 | | 2DEC | 0 |
| 0022 | | | 04,3460 | 00000 1 | | | |
| 0023 | | | 04,3461 | 00000 1 | | 2DEC | 0 |
| 0023 | | | 04,3462 | 00000 1 | | | |
| 0024 | | | 04,3463 | 77777 0 | | OCT | 77777 |
| 0025 | | | 04,3464 | 77771 0 | DEC-6 | DEC | -6 |
| 0026 | | | 04,3465 | 77763 0 | DEC-12 | DEC | -12 |
| 0027 | | | 04,3466 | 37777 1 | LODRMAX | 2OCT | 3777737777 |
| 0027 | | | 04,3467 | 37777 1 | | | |
| 0028 | | | 04,3470 | 37777 1 | LODRMAX1 | 2OCT | 3777737777 |
| 0028 | | | 04,3471 | 37777 1 | | | |
| 0029 | REF | 5 | LAST 722 | 04,3455 | ZERODP | = | ZEROVEC |
| 0030 | REF | 3 | LAST 32 | 04,3453 | HALFDP | = | XUNIT |

-0,-6,-12 MUST REMAIN IN THIS ORDER

THESE TWO CONSTANTS MUST REMAIN

ADJACENT AND THE SAME FOR INTEGRATION

L SINGLE PRECISION SUBROUTINES

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| | | | | | | | | |
|-------|---------|-----------|---|----------|--------|----------------|------------------------|--|
| 0001 | | | 4767 | | | BLOCK 02 | | |
| R0002 | | | SINGLE PRECISION SINE AND COSINE | | | | | |
| 00025 | REP 1 | | | | | COUNT 02/INTER | | |
| 0003 | REP 24 | LAST 1174 | 4767 | 6 4675 1 | SPCOS | AD HALF | ARGUMENTS SCALED AT PI | |
| 0004 | REP 1 | | 4770 | 55-075 0 | SPSIN | TS TENK | | |
| 0005 | REP 1 | | 4771 | 1 4773 1 | | TCP SPT | | |
| 0006 | REP 2 | LAST 1177 | 4772 | 4 1075 0 | | CS TENK | | |
| 0007 | | | 4773 | 6 0000 1 | SPT | DOUBLE | | |
| 0008 | REP 3 | LAST 1177 | 4774 | 55-075 0 | | TS TENK | | |
| 0009 | REP 1 | | 4775 | 1 5006 0 | | TCP POLLEY | | |
| 0010 | REP 4 | LAST 1177 | 4776 | 57-075 1 | | XCH TENK | | |
| 0011 | REP 5 | LAST 1177 | 4777 | 51-075 1 | | INDEX TENK | | |
| 0012 | REP 6 | LAST 1103 | 5000 | 6 4673 1 | | AD LIMITS | | |
| 0013 | | | 5001 | 4 0000 0 | | COM | | |
| 0014 | REP 6 | LAST 1177 | 5002 | 6 1075 1 | | AD TENK | | |
| 0015 | REP 7 | LAST 1177 | 5003 | 55-075 0 | | TS TENK | | |
| 0016 | REP 2 | LAST 1177 | 5004 | 1 5006 0 | | TCP POLLEY | | |
| 0017 | REP 1 | | 5005 | 1 5024 0 | | TCP ARG90 | | |
| 0018 | | | 5006 | 0 0006 1 | POLLEY | EXTEND | | |
| 0019 | REP 6 | LAST 1177 | 5007 | 7 1075 0 | | MP TENK | | |
| 0020 | REP 1 | | 5010 | 55-075 0 | | TS SQ | | |
| 0021 | | | 5011 | 0 0008 1 | | EXTEND | | |
| 0022 | REP 1 | | 5012 | 7 4742 0 | | MP C5/2 | | |
| 0023 | REP 1 | | 5013 | 6 7708 1 | | AD C3/2 | | |
| 0024 | | | 5014 | 0 0008 1 | | EXTEND | | |
| 0025 | REP 2 | LAST 1177 | 5015 | 7 1076 0 | | MP SQ | | |
| 0026 | REP 1 | | 5016 | 6 7666 0 | | AD C1/2 | | |
| 0027 | | | 5017 | 0 0006 1 | | EXTEND | | |
| 0028 | REP 9 | LAST 1177 | 5020 | 7 1075 0 | | MP TENK | | |
| 0029 | | | 5021 | 20 001 1 | | DDOUBL | | |
| 0030 | REP 10 | LAST 1177 | 5022 | 55-075 0 | | TS TENK | | |
| 0031 | REP 277 | LAST 1169 | 5023 | 0 0002 0 | | TC O | | |
| 0032 | REP 324 | LAST 1169 | 5024 | 50 000 1 | ARG90 | INDEX A | | |
| 0033 | REP 7 | LAST 1177 | 5025 | 4 4673 0 | | CS LIMITS | | |
| 0034 | REP 278 | LAST 1177 | 5026 | 0 0002 0 | | TC O | RESULT SCALED AT 1 | |
| R0040 | | | SPROUT WAS DELETED IN REV 51 OF MASTER. ASS. CONT. HAS CARDS. | | | | | |



L EXECUTIVE

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0001          5027          BLOCK 02
R0002          TO ENTER A JOB REQUEST REQUIRING NO VAC AREA'

00025 RESP 1          COUNT 02/EXEC

00029          5027 0 0004 0 NOVAC  INHINT
0003 RESP 1          5030 6 5121 0  AD  FAKOPRET  LOC(MPAC +6) - LOC(OPRET)
00031 RESP 3 LAST 411 5031 54 063 0  TS  NEWPRIO  PRIORITY OF NEW JOB + NOVAC C(FIXLOC)

0004          5032 0 0006 1          EXTEND
0005 RESP 279 LAST 1177 5033 5 0002 0  INDEX 0          0 WILL BE UNDISTURBED THROUGHOUT.
0006          5034 3 0001 0          DCA 0          2CADR OF JOB ENTERED.
0007 RESP 1          5035 52 066 0  DXCH NEWLOC
0008 RESP 1          5036 3 5120 1  CAP  EXECBANK
0009 RESP 24 LAST 1120 5037 56 004 0  XCH  FBANK
0010 RESP 1          5040 54 061 1  TS  EXECTEM1
0011 RESP 1          5041 1 2650 1  TCP  NOVAC2          ENTER EXECUTIVE BANK.

R0012          TO ENTER A JOB REQUEST REQUIRING A VAC AREA - E.G., ALL (PARTIALLY) INTERPRETIVE JOBS.

0014          5042 0 0004 0 FINDVAC  INHINT
00145 RESP 4 LAST 1178 5043 54 063 0  TS  NEWPRIO
0015          5044 0 0006 1          EXTEND
0016 RESP 280 LAST 1178 5045 5 0002 0  INDEX 0
0017          5046 3 0001 0          DCA 0
0018 RESP 2 LAST 1178 5047 52 066 0  SPVACIN DXCH  NEWLOC
0019 RESP 2 LAST 1178 5050 3 5120 1  CAP  EXECBANK
0020 RESP 25 LAST 1178 5051 56 004 0  XCH  FBANK
0021 RESP 1          5052 1 2628 0  TCP  FINDVAC2          OFF TO EXECUTIVE SWITCHED-BANK.

R00211          TO ENTER A FINDVAC WITH THE PRIORITY IN NEWPRIO TO THE 2CADR ARRIVING IN A AND L'

R002125          USERS OF SPVAC MUST INHINT BEFORE STORING IN NEWPRIO.

00213 RESP 281 LAST 1178 5053 56 002 0  SPVAC  XCH  0
00214 RESP 5 LAST 1020 5054 6 7715 0  AD  NEG2
00215 RESP 282 LAST 1178 5055 56 002 0  XCH  0
00216 RESP 1          5056 1 5047 0  TCP  SPVACIN

R0022          TO SUSPEND A BASIC JOB SO A HIGHER PRIORITY JOB MAY BE SERVICED'

0024 RESP 283 LAST 1178 5057 22 002 0  CHANG1  LXCH  0
0025 RESP 3 LAST 1178 5060 3 5120 1  CAP  EXECBANK
0026 RESP 20 LAST 1100 5061 56 006 1  XCH  FBANK
0027 RESP 1          5062 1 2727 0  TCP  CHANJOB

R0030          TO SUSPEND AN INTERPRETIVE JOB'

0031 RESP 26 LAST 1169 5063 4 0164 0  CHANG2  CS  LOC          NEGATIVE LOC SHOWS JOB = INTERPRETIVE.
R00315          ITRACE (4) REFERS TO ACHANG2A.

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L EXECUTIVE

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| | | | | | | | | | | |
|-------|-----|-----|------|------|------|----|------|---|-----|------------|
| 0032 | REP | 196 | LAST | 1157 | 5064 | 54 | 001 | 1 | TS | L |
| 0033 | REP | 4 | LAST | 1178 | 5065 | 3 | 5120 | 1 | CAP | EXCBANK |
| 00335 | REP | 21 | LAST | 1178 | 5066 | 54 | 006 | 0 | TS | BRANK |
| 0034 | REP | 2 | LAST | 1178 | 5067 | 1 | 2726 | 1 | TCP | CHANJOB -1 |

L EXECUTIVE

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R0035 TO VOLUNTARILY SUSPEND A JOB UNTIL THE COMPLETION OF SOME ANTICIPATED EVENT (I/O EVENT ETC.)'

| | | | | | | | | |
|------|-----|----|-----------|------|----------|----------|-----|---------|
| 0037 | REP | 29 | LAST 1178 | 5070 | 54 164 0 | JOBSLEEP | TS | LOC |
| 0038 | REP | 5 | LAST 1179 | 5071 | 3 5120 1 | | CAP | EXCBANK |
| 0039 | REP | 26 | LAST 1178 | 5072 | 54 004 1 | | TS | FBANK |
| 0040 | REP | 1 | | 5073 | 1 3017 0 | | TCP | JOBSLP1 |

R0041 TO AWAKEN A JOB PUT TO SLEEP IN THE ABOVE FASHION'

| | | | | | | | | |
|-------|-----|-----|-----------|------|----------|---------|--------|----------|
| 0042 | | | | 5074 | 0 0004 0 | JOBWAKE | INHINT | |
| 00421 | REP | 3 | LAST 1178 | 5075 | 54 065 0 | | TS | NEWLOC |
| 0043 | REP | 59 | LAST 1117 | 5076 | 4 4711 0 | | CS | TWO |
| 0044 | REP | 284 | LAST 1178 | 5077 | 28 002 1 | | ANS | O |
| 0045 | REP | 6 | LAST 1180 | 5100 | 3 5120 1 | | CAP | EXCBANK |
| 0046 | REP | 27 | LAST 1180 | 5101 | 56 004 0 | | XCH | FBANK |
| 0047 | REP | 1 | | 5102 | 1 3044 0 | | TCP | JOBWAKE2 |

EXIT IS VIA FINDVAC/NOVAC PROCEDURES.

R0046 TO CHANGE THE PRIORITY OF A JOB CURRENTLY UNDER EXECUTION'

| | | | | | | | | |
|------|-----|-----|-----------|------|----------|----------|--------|----------|
| 0049 | | | | 5103 | 0 0004 0 | PRIORCHG | INHINT | |
| 0050 | REP | 5 | LAST 1178 | 5104 | 54 063 0 | | TS | NEWPRIO |
| 0051 | REP | 7 | LAST 1180 | 5105 | 3 5120 1 | | CAP | EXCBANK |
| 0052 | REP | 22 | LAST 1179 | 5106 | 56 006 1 | | XCH | FBANK |
| 0053 | REP | 9 | LAST 1100 | 5107 | 54 165 1 | | TS | BANKSET |
| 0054 | REP | 285 | LAST 1180 | 5110 | 3 0002 0 | | CA | O |
| 0055 | REP | 1 | | 5111 | 1 3113 0 | | TCP | PRIORCH2 |

NEW PRIORITY ARRIVES IN A. RETURNS TO CALLER AS SOON AS NEW JOB PRIORITY IS HIGHEST. PREPARE FOR POSSIBLE BASIC-STYLE CHANGE-JOB.

R0058 TO REMOVE A JOB FROM EXECUTIVE CONSIDERATIONS'

| | | | | | | | | |
|-------|-----|-----|-----------|------|----------|----------|-------|-----------|
| 0059 | REP | 8 | LAST 1180 | 5112 | 3 5120 1 | ENDOFJOB | CAP | EXCBANK |
| 0060 | REP | 28 | LAST 1180 | 5113 | 54 004 1 | | TS | FBANK |
| 0061 | REP | 1 | | 5114 | 1 3124 1 | | TCP | ENDJOB1 |
| 0062 | REP | 2 | LAST 1178 | 5115 | 3 0061 0 | ENDFIND | CA | EXCBANK1 |
| 0063 | REP | 29 | LAST 1180 | 5116 | 54 004 1 | | TS | FBANK |
| 0064 | REP | 1 | | 5117 | 1 6710 0 | | TCP | O-2 |
| 0066 | REP | 2 | LAST 1178 | 5120 | 02626 1 | EXCBANK | CADR | FINDVAC2 |
| 00665 | REP | 635 | LAST 1165 | 5121 | 00110 1 | PAKEPRET | ADRES | MPAC -36D |

RETURN TO CALLER AFTER JOB ENTRY COMPLETE.

LOC(MPAC +6) - LOC(OPRRT)

L EXECUTIVE

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P0067 LOCATE AN AVAILABLE VAC AREA.

| 0066 | | | 01,2626 | | | BANK | 01 |
|-------|-----|-----|-----------|---------|----------|------------------------------------|--|
| 00665 | REP | 1 | | | | COUNT | 01/BK/EC |
| 0069 | REP | 3 | LAST 1180 | 01,2626 | 54 061 1 | PINDVAC ₂ | TS EXECTEM ₁ |
| 0070 | REP | 4 | LAST 217 | 01,2627 | 10 400 1 | | CCS VAC ₁ USE |
| 0071 | REP | 1 | | 01,2630 | 1 2643 0 | | TCP VAC ₁ P ₁ ND |
| 0072 | REP | 3 | LAST 217 | 01,2631 | 10 454 0 | | CCS VAC ₂ USE |
| 0073 | REP | 2 | LAST 1181 | 01,2632 | 1 2643 0 | | TCP VAC ₁ P ₁ ND |
| 0074 | REP | 3 | LAST 217 | 01,2633 | 10 530 0 | | CCS VAC ₃ USE |
| 0075 | REP | 3 | LAST 1181 | 01,2634 | 1 2643 0 | | TCP VAC ₁ P ₁ ND |
| 0076 | REP | 3 | LAST 217 | 01,2635 | 10 604 1 | | CCS VAC ₄ USE |
| 0077 | REP | 4 | LAST 1181 | 01,2636 | 1 2643 0 | | TCP VAC ₁ P ₁ ND |
| 0078 | REP | 3 | LAST 217 | 01,2637 | 10 660 0 | | CCS VAC ₅ USE |
| 0079 | REP | 5 | LAST 1181 | 01,2640 | 1 2643 0 | | TCP VAC ₁ P ₁ ND |
| 0080 | REP | 4 | LAST 561 | 01,2641 | 0 5604 0 | | TC BAILOUT |
| 0081 | | | | 01,2642 | 01201 0 | | OCT 1201 |
| 0082 | REP | 60 | LAST 1180 | 01,2643 | 6 4711 1 | VAC ₁ P ₁ ND | AD TWO |
| 0083 | | | | 01,2644 | 22 007 0 | | ZL |
| 0084 | REP | 325 | LAST 1177 | 01,2645 | 50 000 1 | | INDEX A |
| 0085 | | | | 01,2646 | 21-777 0 | | LXCH 0 -1 |
| 0086 | REP | 6 | LAST 1180 | 01,2647 | 26 063 0 | | ADS NEWPRIO |
| 0087 | REP | 240 | LAST 1161 | 01,2650 | 3 4714 1 | NOVAC ₂ | CAP ZERO |
| 0088 | REP | 5 | LAST 415 | 01,2651 | 54 064 1 | | TS LOCC ₁ TR |
| 0089 | REP | 1 | | 01,2652 | 3 2657 1 | | CAP NO ₁ CORES |
| 0090 | REP | 1 | | 01,2653 | 54 062 1 | NOVAC ₃ | TS EXECTEM ₂ |
| 0091 | REP | 6 | LAST 1181 | 01,2654 | 50 064 0 | | INDEX LOCC ₁ TR |
| 0092 | REP | 8 | LAST 187 | 01,2655 | 10 167 0 | | CCS PRIORITY |
| 0093 | REP | 1 | | 01,2656 | 1 2717 0 | | TCP NEXTCORE |
| 0094 | | | | 01,2657 | 00006 1 | NO ₁ CORES | DEC 6 |
| 0095 | REP | 2 | LAST 1181 | 01,2660 | 1 2717 0 | | TCP NEXTCORE |
| A0096 | | | | | | | |

(SAVE CALLER'S BANK FIRST.)

NO VAC AREAS.

RESERVE THIS VAC AREA BY STORING A ZERO IN ITS VAC USE REGISTER AND STORE THE ADDRESS OF THE FIRST WORD OF IT IN THE LOW NINE BITS OF THE PRIORITY WORD.

NOVAC ENTERS HERE. FIND A CORE SET.

SEVEN SETS OF ELEVEN REGISTERS EACH.

EACH PRIORITY REGISTER CONTAINS -0 IF THE CORRESPONDING CORE SET IS AVAILABLE.

AN ACTIVE JOB HAS A POSITIVE PRIORITY BUT A DORMANT JOB'S PRIORITY IS NEGATIVE.



L EXECUTIVE

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| | | | | | | | | |
|------|-----|----|-----------|---------|----------|----------|-------|----------|
| 0097 | REP | 7 | LAST 1181 | 01,2661 | 3 0063 1 | CORFOUND | CA | NEWPRIO |
| 0098 | REP | 7 | LAST 1181 | 01,2662 | 50 064 0 | | INDEX | LOCCTR |
| 0099 | REP | 9 | LAST 1181 | 01,2663 | 54 167 0 | | TS | PRIORITY |
| 0100 | REP | 4 | LAST 226 | 01,2664 | 7 4741 0 | | MASK | LOWs |
| 0101 | REP | 8 | LAST 1182 | 01,2665 | 50 064 0 | | INDEX | LOCCTR |
| 0102 | REP | 19 | LAST 1152 | 01,2666 | 54 166 1 | | TS | PUSHLOC |
| 0103 | REP | 9 | LAST 1182 | 01,2667 | 10 064 1 | | CCS | LOCCTR |
| 0104 | REP | 1 | | 01,2670 | 1 2704 1 | | TCP | SETLOC |
| 0105 | REP | 11 | LAST 1185 | 01,2671 | 54 121 1 | | TS | OVFINO |
| 0106 | REP | 20 | LAST 1182 | 01,2672 | 3 0166 0 | | CA | PUSHLOC |
| 0107 | REP | 34 | LAST 1166 | 01,2673 | 54 120 0 | | TS | FIXLOC |
| 0108 | REP | 6 | LAST 1076 | 01,2674 | 10 067 1 | SPECTEST | CCS | NEWJOB |
| 0109 | REP | 2 | LAST 1182 | 01,2675 | 1 2704 1 | | TCP | SETLOC |
| 0110 | REP | 10 | LAST 1169 | 01,2676 | 0 5640 0 | | TC | CCSHOLE |
| 0111 | REP | 11 | LAST 1182 | 01,2677 | 0 5640 0 | | TC | CCSHOLE |
| 0112 | REP | 7 | LAST 1182 | 01,2700 | 54 067 1 | | TS | NEWJOB |
| 0113 | REP | 4 | LAST 1180 | 01,2701 | 52 066 0 | | DXCH | NEWLOC |
| 0114 | REP | 30 | LAST 1180 | 01,2702 | 52 165 1 | | DXCH | LOC |
| 0115 | REP | 1 | | 01,2703 | 1 5115 0 | | TCP | ENDFINO |
| 0116 | REP | 5 | LAST 1182 | 01,2704 | 52 066 0 | SETLOC | DXCH | NEWLOC |
| 0117 | REP | 10 | LAST 1182 | 01,2705 | 50 064 0 | | INDEX | LOCCTR |
| 0118 | REP | 31 | LAST 1182 | 01,2706 | 52 165 1 | | DXCH | LOC |
| 0119 | REP | 6 | LAST 1182 | 01,2707 | 50 067 0 | | INDEX | NEWJOB |
| 0120 | REP | 10 | LAST 1182 | 01,2710 | 4 0187 0 | | CS | PRIORITY |
| 0121 | REP | 8 | LAST 1182 | 01,2711 | 6 0063 1 | | AD | NEWPRIO |
| 0122 | REP | | | 01,2712 | 0 0006 1 | EXTEND | | |
| 0123 | REP | 2 | LAST 1182 | 01,2713 | 6 5115 1 | | BZAP | ENDFINO |
| 0124 | REP | 11 | LAST 1182 | 01,2714 | 3 0064 0 | | CA | LOCCTR |
| 0125 | REP | 9 | LAST 1182 | 01,2715 | 54 067 1 | | TS | NEWJOB |
| 0126 | REP | 3 | LAST 1182 | 01,2716 | 1 5115 0 | | TCP | ENDFINO |
| 0127 | REP | 1 | | 01,2717 | 3 3054 0 | NEXTCORE | CAP | COREINC |
| 0128 | REP | 12 | LAST 1182 | 01,2720 | 26 064 1 | | ADS | LOCCTR |
| 0129 | REP | 2 | LAST 1181 | 01,2721 | 10 062 1 | | CCS | EXCTEM2 |
| 0130 | REP | 1 | | 01,2722 | 1 2653 1 | | TCP | NOVAC3 |
| 0131 | REP | 5 | LAST 1181 | 01,2723 | 0 5604 0 | | TC | BAILOUT |
| 0132 | | | | 01,2724 | 01202 0 | | OCT | 1202 |

SET THE PRIORITY OF THIS JOB IN THE CORE SETS PRIORITY REGISTER AND SET THE JOB'S PUSH-DOWN POINTER AT THE BEGINNING OF THE WORK AREA AND OVERFLOW INDICATOR

OFF TO PREPARE FOR INTERPRETIVE PROGRAMS

IF CORE SET ZERO IS BEING LOADED, SET UP OVFINO AND FIXLOC IMMEDIATELY

SEE IF ANY ACTIVE JOBS WAITING (RARE). MUST BE AWAKENED BUT UNCHANGED JOB.

+0 SHOWS ACTIVE JOB ALREADY SET.

SET UP THE LOCATION REGISTERS FOR THIS

THIS INDEX INSTRUCTION INSURES THAT THE HIGHEST ACTIVE PRIORITY WILL BE COMPARED WITH THE NEW PRIORITY TO SEE IF NEWJOB SHOULD BE SET TO SIGNAL A SWITCH.

LOCCTR IS LEFT SET AT THIS CORE SET IF THE CALLER WANTS TO LOAD ANY MPAC REGISTERS, ETC.

NO CORE SETS.

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P0133 THE FOLLOWING ROUTINE SWAPS CORE SET 0 WITH THAT WHOSE RELATIVE ADDRESS IS IN NEWJOB.

| | | | | | | | | | | | | |
|-------|-----|-----|------|------|---------|----|------|---|----|---------|------------|---|
| 01345 | REF | 32 | LAST | 1182 | 01,2725 | 22 | 164 | 1 | -2 | LXCH | LOC | |
| 0135 | REF | 10 | LAST | 1180 | 01,2726 | 30 | 165 | 0 | -1 | CAB | BANKSET | BANKSET, NOT BRANK, HAS RIGHT CONTENTS. |
| 0136 | | | | | 01,2727 | 0 | 0004 | 0 | | CHANJOB | INHINT | |
| 01362 | | | | | 01,2730 | 0 | 0008 | 1 | | | EXTEND | |
| 01364 | REF | 14 | LAST | 1076 | 01,2731 | 04 | 007 | 1 | | ROR | SUPERBK | PICK UP CURRENT BRANK FOR BRCON |
| 01366 | REF | 197 | LAST | 1179 | 01,2732 | 56 | 001 | 0 | | XCH | L | LOC IN A AND BRCON IN L. |
| 01368 | REF | 10 | LAST | 1182 | 01,2733 | 50 | 087 | 0 | +4 | INDEX | NEWJOB | SWAP LOC AND BANKSET. |
| 0137 | REF | 33 | LAST | 1183 | 01,2734 | 52 | 165 | 1 | | DXCH | LOC | |
| 0138 | REF | 34 | LAST | 1183 | 01,2735 | 52 | 165 | 1 | | DXCH | LOC | |
| 01382 | REF | 11 | LAST | 1183 | 01,2736 | 30 | 165 | 0 | | CAB | BANKSET | |
| 01384 | | | | | 01,2737 | 0 | 0008 | 1 | | EXTEND | | |
| 01388 | REF | 15 | LAST | 1183 | 01,2740 | 01 | 007 | 1 | | WRITE | SUPERBK | SET BRANK FOR NEW JOB. |
| 0139 | REF | 638 | LAST | 1180 | 01,2741 | 52 | 155 | 1 | | DXCH | MPAC | SWAP MULTI-PURPOSE ACCUMULATOR AREAS. |
| 0140 | REF | 11 | LAST | 1183 | 01,2742 | 50 | 087 | 0 | | INDEX | NEWJOB | |
| 0141 | REF | 637 | LAST | 1183 | 01,2743 | 52 | 155 | 1 | | DXCH | MPAC | |
| 0142 | REF | 638 | LAST | 1183 | 01,2744 | 52 | 155 | 1 | | DXCH | MPAC | |
| 0143 | REF | 639 | LAST | 1183 | 01,2745 | 52 | 157 | 0 | | DXCH | MPAC +2 | |
| 0144 | REF | 12 | LAST | 1183 | 01,2746 | 50 | 087 | 0 | | INDEX | NEWJOB | |
| 0145 | REF | 840 | LAST | 1183 | 01,2747 | 52 | 157 | 0 | | DXCH | MPAC +2 | |
| 0146 | REF | 641 | LAST | 1183 | 01,2750 | 52 | 157 | 0 | | DXCH | MPAC +2 | |
| 0147 | REF | 642 | LAST | 1183 | 01,2751 | 52 | 161 | 0 | | DXCH | MPAC +4 | |
| 0148 | REF | 13 | LAST | 1183 | 01,2752 | 50 | 087 | 0 | | INDEX | NEWJOB | |
| 0149 | REF | 643 | LAST | 1183 | 01,2753 | 52 | 161 | 0 | | DXCH | MPAC +4 | |
| 0150 | REF | 644 | LAST | 1183 | 01,2754 | 52 | 161 | 0 | | DXCH | MPAC +4 | |
| 0151 | REF | 645 | LAST | 1183 | 01,2755 | 52 | 163 | 1 | | DXCH | MPAC +6 | |
| 0152 | REF | 14 | LAST | 1183 | 01,2756 | 50 | 087 | 0 | | INDEX | NEWJOB | |
| 0153 | REF | 646 | LAST | 1183 | 01,2757 | 52 | 163 | 1 | | DXCH | MPAC +6 | |
| 0154 | REF | 647 | LAST | 1183 | 01,2760 | 52 | 163 | 1 | | DXCH | MPAC +6 | |
| 0155 | REF | 241 | LAST | 1181 | 01,2761 | 3 | 4714 | 1 | | CAP | ZERO | |
| 0156 | REF | 12 | LAST | 1182 | 01,2762 | 56 | 121 | 0 | | XCH | OV/PIND | MAKE PUSHLOC NEGATIVE IF OV/PIND NZ. |
| 0157 | | | | | 01,2763 | 0 | 0008 | 1 | | EXTEND | | |
| 0158 | | | | | 01,2764 | 1 | 2767 | 1 | | BZF | +3 | |
| 0159 | REF | 21 | LAST | 1182 | 01,2765 | 4 | 0166 | 1 | | CS | PUSHLOC | |
| 0160 | REF | 22 | LAST | 1183 | 01,2766 | 54 | 166 | 1 | | TS | PUSHLOC | |
| 0161 | REF | 23 | LAST | 1183 | 01,2767 | 52 | 167 | 0 | | DXCH | PUSHLOC | |
| 0162 | REF | 15 | LAST | 1183 | 01,2770 | 50 | 087 | 0 | | INDEX | NEWJOB | |
| 0163 | REF | 24 | LAST | 1183 | 01,2771 | 52 | 167 | 0 | | DXCH | PUSHLOC | |
| 0164 | REF | 25 | LAST | 1183 | 01,2772 | 52 | 167 | 0 | | DXCH | PUSHLOC | SWAPS PUSHLOC AND PRIORITY. |
| 0165 | REF | 5 | LAST | 1182 | 01,2773 | 3 | 4741 | 1 | | CAP | LOW9 | SET FIXLOC TO BASE OF VAC AREA. |
| 0166 | REF | 11 | LAST | 1182 | 01,2774 | 7 | 0167 | 0 | | MASK | PRIORITY | |
| 0167 | REF | 35 | LAST | 1182 | 01,2775 | 54 | 120 | 0 | | TS | FIXLOC | |
| 0168 | REF | 26 | LAST | 1183 | 01,2776 | 10 | 166 | 1 | | CCS | PUSHLOC | SET OVERFLOW INDICATOR ACCORDING TO |
| 0169 | REF | 242 | LAST | 1183 | 01,2777 | 3 | 4714 | 1 | | CAP | ZERO | |
| 0170 | REF | 1 | | | 01,3000 | 1 | 3005 | 0 | | TOP | ENDPROG -1 | |



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| | | | | | | | | | | |
|------|-----|-----|------|------|---------|----|------|---|---------|---------|
| 0171 | REP | 27 | LAST | 1183 | 01,3001 | 4 | 0166 | 1 | CS | PUSHLOC |
| 0172 | REP | 28 | LAST | 1184 | 01,3002 | 54 | 166 | 1 | TS | PUSHLOC |
| 0173 | REP | 141 | LAST | 1147 | 01,3003 | 3 | 4712 | 1 | CAP | ONE |
| 0174 | REP | 13 | LAST | 1183 | 01,3004 | 56 | 121 | 0 | XCH | OVFIND |
| 0175 | REP | 18 | LAST | 1183 | 01,3005 | 54 | 067 | 1 | TS | NEWJOB |
| 0176 | | | | | 01,3006 | 0 | 0003 | 1 | ENDPROG | RELINT |
| 0177 | REP | 35 | LAST | 1183 | 01,3007 | 52 | 165 | 1 | DYCH | LOC |
| 0178 | | | | | 01,3010 | 0 | 0006 | 1 | EXTEND | |
| 0179 | | | | | 01,3011 | 6 | 3013 | 0 | BZP | +2 |
| 0180 | | | | | 01,3012 | 52 | 006 | 0 | DYCH | |

BASIC JOBS HAVE POSITIVE ADDRESSES, SO DISPATCH WITH A DYCH. IF INTERPRETIVE, SET UP EBANK, ETC.

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| | | | | | | |
|------|---------|-----------|---------|----------|-----|--------|
| 0181 | | | 01,3013 | 4 0000 0 | COM | |
| 0182 | REP 142 | LAST 1184 | 01,3014 | 6 4712 1 | AD | ONE |
| 0183 | REP 36 | LAST 1184 | 01,3015 | 54 164 0 | TS | LOC |
| 0186 | REP 1 | | 01,3016 | 1 6017 0 | TCP | INTRSM |

EPILOGUE TO JOB CHANGE FOR INTERPRETIV
RESUME.

R0187 COMPLETE JOBSLEEP PREPARATIONS.

| | | | | | | |
|--------|---------|-----------|---------|----------|----------|-------------|
| 0188 | | | 01,3017 | 0 0004 0 | JOBSLP1 | INHINT |
| 0189 | REP 12 | LAST 1183 | 01,3020 | 4 0167 0 | CS | PRIORITY |
| 0190 | REP 13 | LAST 1185 | 01,3021 | 54 167 0 | TS | PRIORITY |
| 0191 | REP 8 | LAST 1119 | 01,3022 | 3 6043 0 | CAP | LOW7 |
| 0192 | REP 23 | LAST 1180 | 01,3023 | 7 0006 0 | MARK | BRANK |
| 01921 | | | 01,3024 | 0 0006 1 | EXTEND | |
| 01922 | REP 16 | LAST 1183 | 01,3025 | 04 007 1 | ROR | SUPERBANK |
| 0193 | REP 12 | LAST 1183 | 01,3026 | 54 165 1 | TS | BANKSET |
| 0194 | REP 243 | LAST 1183 | 01,3027 | 4 4714 0 | CS | ZERO |
| 0195 | REP 111 | LAST 1155 | 01,3030 | 54 131 0 | JOBSLP2 | TS BUF +1 |
| 0196 | REP 1 | | 01,3031 | 1 3141 1 | TCP | EJSCAN |
| 01961 | | | 01,3032 | 0 0004 0 | NUCHANG2 | INHINT |
| 019611 | REP 17 | LAST 1184 | 01,3033 | 10 067 1 | CCS | NEWJOB |
| 019612 | | | 01,3034 | 1 3037 1 | TCP | +3 |
| 019613 | | | 01,3035 | 0 0003 1 | RELINT | |
| 019614 | REP 1 | | 01,3036 | 1 3233 1 | TCP | ADVAN +2 |
| 01962 | REP 61 | LAST 1181 | 01,3037 | 3 4711 1 | CAP | TWO |
| 01963 | | | 01,3040 | 0 0006 1 | EXTEND | |
| 01964 | REP 30 | LAST 906 | 01,3041 | 05 011 1 | WOR | DSALMOUT |
| 01965 | REP 37 | LAST 1185 | 01,3042 | 52 165 1 | DXCH | LOC |
| 01966 | REP 3 | LAST 1179 | 01,3043 | 1 2733 0 | TCP | CHANJOB + 4 |

NNZ PRIORITY SHOWS JOB ASLEEP.

SAVE OLD SUPERBANK VALUE.

HOLDS - HIGHEST PRIORITY.
SCAN FOR HIGHEST PRIORITY ALA ENDOPJOB

QUICK... DONT LET NEWJOB CHANGE TO +0

NEWJOB STILL PNZ
NEWJOB HAS CHANGED TO +0. WAKE UP JOB
VIA NUDIRECT. (VERY RARE CASE.)

TURN ON ACTIVITY LIGHT
AND SAVE ADDRESS INFO FOR BENEFIT OF
POSSIBLE SLEEPING JOB.



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P0187 TO WAKE UP A JOB, EACH CORE SET IS FOUND TO LOCATE ALL JOBS WHICH ARE ASLEEP. IF THE PCADR IN THE
 R0190 LOC REGISTER OF ANY SUCH JOB MATCHES THAT SUPPLIED BY THE CALLER, THAT JOB IS AWAKENED. IF NO JOB IS FOUND,
 R0201 LOCCTR IS SET TO -1 AND NO FURTHER ACTION TAKES PLACE.

| | | | | | | | | | | |
|------|-----|-----|------|------|---------|----------|----------|-----|-----------|--|
| 0202 | REP | 4 | LAST | 1181 | 01,3044 | 54 061 1 | JOBWAKE2 | TS | EXECTEM1 | |
| 0203 | REP | 244 | LAST | 1185 | 01,3045 | 3 4714 1 | CAP | | ZERO | BEGIN CORE SET SCAN. |
| 0204 | REP | 13 | LAST | 1182 | 01,3048 | 54 064 1 | TS | | LOCCTR | |
| 0205 | REP | 2 | LAST | 1181 | 01,3047 | 3 2657 1 | CAP | | NO CORES | |
| 0206 | REP | 3 | LAST | 1182 | 01,3050 | 54 062 1 | JOBWAKE4 | TS | EXECTEM2 | |
| 0207 | REP | 14 | LAST | 1186 | 01,3051 | 50 064 0 | INDEX | | LOCCTR | |
| 0208 | REP | 14 | LAST | 1185 | 01,3052 | 10 167 0 | CCS | | PRIORITY | |
| 0209 | REP | 1 | | | 01,3053 | 1 3056 0 | TCP | | JOBWAKE3 | ACTIVE JOB - CHECK NEXT CORE SET. |
| 0210 | REP | | | | 01,3054 | 00014 1 | COREINC | DEC | 12 | 12 REGISTERS PER CORE SET. |
| 0211 | REP | 1 | | | 01,3055 | 1 3065 0 | TCP | | WAKETEST | SLEEPING JOB - SEE IF CADR MATCHES. |
| 0212 | REP | 2 | LAST | 1182 | 01,3056 | 3 3054 0 | JOBWAKE3 | CAP | COREINC | |
| 0213 | REP | 15 | LAST | 1186 | 01,3057 | 28 064 1 | ADS | | LOCCTR | |
| 0214 | REP | 4 | LAST | 1186 | 01,3060 | 10 062 1 | CCS | | EXECTEM2 | |
| 0215 | REP | 1 | | | 01,3061 | 1 3050 0 | TCP | | JOBWAKE4 | |
| 0216 | REP | 143 | LAST | 1185 | 01,3062 | 4 4712 0 | CS | | ONE | EXIT IF SLEEPING JOB NOT FOUND. |
| 0217 | REP | 16 | LAST | 1186 | 01,3063 | 54 064 1 | TS | | LOCCTR | |
| 0218 | REP | 4 | LAST | 1182 | 01,3064 | 1 5115 0 | TCP | | ENDFIND | |
| 0219 | REP | 6 | LAST | 1182 | 01,3065 | 4 0065 0 | WAKETEST | CS | NEWLOC | |
| 0220 | REP | 17 | LAST | 1186 | 01,3066 | 50 064 0 | INDEX | | LOCCTR | |
| 0221 | REP | 36 | LAST | 1185 | 01,3067 | 6 0164 1 | AD | | LOC | |
| 0222 | REP | | | | 01,3070 | 0 0006 1 | EXTEND | | | |
| 0223 | REP | | | | 01,3071 | 1 3073 1 | BZF | | +2 | IF MATCH. |
| 0224 | REP | 2 | LAST | 1186 | 01,3072 | 1 3056 0 | TCP | | JOBWAKE3 | EXAMINE NEXT CORE SET IF NO MATCH. |
| 0225 | REP | 16 | LAST | 1186 | 01,3073 | 50 064 0 | INDEX | | LOCCTR | RE-COMPLEMENT PRIORITY TO SHOW JOB AWAKE |
| 0226 | REP | 15 | LAST | 1186 | 01,3074 | 4 0167 0 | CS | | PRIORITY | |
| 0227 | REP | 9 | LAST | 1182 | 01,3075 | 54 063 0 | TS | | NEWPRIO | |
| 0228 | REP | 19 | LAST | 1186 | 01,3076 | 50 064 0 | INDEX | | LOCCTR | |
| 0229 | REP | 16 | LAST | 1186 | 01,3077 | 54 167 0 | TS | | PRIORITY | |
| 0230 | REP | 1 | | | 01,3100 | 4 4364 0 | CS | | FRANKMSK | MAKE UP THE 2CADR OF THE WAKE ADDRESS |
| 0231 | REP | 7 | LAST | 1186 | 01,3101 | 7 0065 0 | MASK | | NEWLOC | USING THE CADR IN NEWLOC AND THE FRANK |
| 0232 | REP | 3 | LAST | 1098 | 01,3102 | 6 4700 1 | AD | | ZK | HALF OF FRANK SAVED IN BANKSET. |
| 0233 | REP | 6 | LAST | 1186 | 01,3103 | 56 065 1 | XCH | | NEWLOC | |
| 0234 | REP | 2 | LAST | 1186 | 01,3104 | 7 4364 0 | MASK | | FRANKMSK | |
| 0235 | REP | 20 | LAST | 1186 | 01,3105 | 50 064 0 | INDEX | | LOCCTR | |
| 0236 | REP | 13 | LAST | 1185 | 01,3106 | 6 0165 0 | AD | | BANKSET | |
| 0237 | REP | 9 | LAST | 1186 | 01,3107 | 54 066 0 | TS | | NEWLOC +1 | |
| 0238 | REP | 21 | LAST | 1186 | 01,3110 | 10 064 1 | CCS | | LOCCTR | SPECIAL TREATMENT IF THIS JOB WAS |
| 0239 | REP | 3 | LAST | 1182 | 01,3111 | 1 2704 1 | TCP | | SETLOC | ALREADY IN THE RUN (0) POSITION. |
| 0240 | REP | 1 | | | 01,3112 | 1 2674 1 | TCP | | SPECTEST | |



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P0241 PRIORITY CHANGE. CHANGE THE CONTENTS OF PRIORITY AND SCAN FOR THE JOB OF HIGHEST PRIORITY.

| | | | | | | | | | | | | |
|------|-----|-----|------|------|---------|----|------|---|---------|------|----------|---|
| 0243 | REP | 39 | LAST | 1186 | 01,3113 | 54 | 164 | 0 | PRIOCH2 | TS | LOC | |
| 0244 | REP | 245 | LAST | 1186 | 01,3114 | 3 | 4714 | 1 | | CAP | ZERO | SET FLAG TO TELL ENDJOB SCANNER IF THIS |
| 0245 | REP | 112 | LAST | 1185 | 01,3115 | 54 | 130 | 1 | | TS | BUF | JOB IS STILL HIGHEST PRIORITY. |
| 0246 | REP | 6 | LAST | 1183 | 01,3116 | 3 | 4741 | 1 | | CAP | LOW9 | |
| 0247 | REP | 17 | LAST | 1186 | 01,3117 | 7 | 0167 | 0 | | MASK | PRIORITY | |
| 0248 | REP | 10 | LAST | 1186 | 01,3120 | 6 | 0063 | 1 | | AD | NEWPRIO | |
| 0249 | REP | 18 | LAST | 1187 | 01,3121 | 54 | 187 | 0 | | TS | PRIORITY | |
| 0250 | | | | | 01,3122 | 4 | 0000 | 0 | | COM | | |
| 0251 | REP | 1 | | | 01,3123 | 1 | 3030 | 0 | | TCP | JOBSLP2 | AND TO EJSCAN. |



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P0252 RELEASE THIS CORE SET AND VAC AREA AND SCAN FOR THE JOB OF HIGHEST ACTIVE PRIORITY.

| | | | | | | | | |
|--------|---------|-----------|---------|----------|---------|--------|---------------|--|
| 0254 | | | 01,3124 | 0 0004 0 | ENDJOB1 | INHINT | | |
| 0255 | REP 246 | LAST 1187 | 01,3125 | 4 4714 0 | | CS | ZERO | |
| 0256 | REP 113 | LAST 1187 | 01,3126 | 54 131 0 | | TS | BUP +1 | |
| 0257 | REP 19 | LAST 1187 | 01,3127 | 56 167 1 | | XCH | PRIORITY | |
| 0258 | REP 7 | LAST 1187 | 01,3130 | 7 4741 0 | | MASK | LOW0 | |
| 02581 | REP 198 | LAST 1183 | 01,3131 | 54 001 1 | | TS | L | |
| 02582 | REP 2 | LAST 1178 | 01,3132 | 4 5121 1 | | CS | FAKEPRET | |
| 025821 | REP 199 | LAST 1188 | 01,3133 | 6 0001 0 | | AD | L | |
| 02583 | | | 01,3134 | 0 0006 1 | | EXTEND | | |
| 02584 | REP 2 | LAST 1185 | 01,3135 | 6 3141 0 | | BZMP | EJSCAN | NOVAC ENDJOB |
| 0259 | REP 200 | LAST 1188 | 01,3136 | 10 001 1 | | CCS | L | |
| 0260 | REP 326 | LAST 1181 | 01,3137 | 50 000 1 | | INDEX | A | |
| 0261 | | | 01,3140 | 54 000 0 | | TS | 0 | |
| 0262 | REP 20 | LAST 1188 | 01,3141 | 10 203 1 | EJSCAN | CCS | PRIORITY +12D | |
| 0263 | REP 1 | | 01,3142 | 0 3206 0 | | TC | EJ1 | |
| 0264 | REP 12 | LAST 1182 | 01,3143 | 0 5640 0 | | TC | CCSHOLE | |
| 0265 | | | 01,3144 | 1 3145 0 | | TCP | +1 | |
| 0266 | REP 21 | LAST 1188 | 01,3145 | 10 217 1 | | CCS | PRIORITY +24D | EXAMINE EACH PRIORITY REGISTER TO FIND THE JOB OF HIGHEST ACTIVE PRIORITY. |
| 0267 | REP 2 | LAST 1188 | 01,3146 | 0 3206 0 | | TC | EJ1 | |
| 0268 | REP 13 | LAST 1188 | 01,3147 | 0 5640 0 | | TC | CCSHOLE | |
| 0269 | | | 01,3150 | 1 3151 0 | | TCP | +1 | |
| 0270 | REP 22 | LAST 1188 | 01,3151 | 10 233 1 | | CCS | PRIORITY +36D | |
| 0271 | REP 3 | LAST 1188 | 01,3152 | 0 3206 0 | | TC | EJ1 | |
| 0272 | REP 23 | LAST 1188 | 01,3153 | 07610 1 | -CCSPR | -CCS | PRIORITY | |
| 0273 | | | 01,3154 | 1 3155 1 | | TCP | +1 | |
| 0274 | REP 24 | LAST 1188 | 01,3155 | 10 247 1 | | CCS | PRIORITY +48D | |
| 0275 | REP 4 | LAST 1188 | 01,3156 | 0 3206 0 | | TC | EJ1 | |
| 0276 | REP 14 | LAST 1188 | 01,3157 | 0 5640 0 | | TC | CCSHOLE | |
| 0277 | | | 01,3160 | 1 3161 0 | | TCP | +1 | |
| 0278 | REP 25 | LAST 1188 | 01,3161 | 10 263 1 | | CCS | PRIORITY +60D | |
| 0279 | REP 5 | LAST 1188 | 01,3162 | 0 3206 0 | | TC | EJ1 | |
| 0280 | REP 15 | LAST 1188 | 01,3163 | 0 5640 0 | | TC | CCSHOLE | |
| 0281 | | | 01,3164 | 1 3165 1 | | TCP | +1 | |
| 0282 | REP 26 | LAST 1188 | 01,3165 | 10 277 1 | | CCS | PRIORITY +72D | |
| 0283 | REP 6 | LAST 1188 | 01,3166 | 0 3206 0 | | TC | EJ1 | |
| 0284 | REP 16 | LAST 1188 | 01,3167 | 0 5640 0 | | TC | CCSHOLE | |
| 0285 | | | 01,3170 | 1 3171 1 | | TCP | +1 | |

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P0286 EVALUATE THE RESULTS OF THE SCAN.

| | | | | | | | | |
|------|---------|-----------|---------|----------|-----|--------|-------------|--|
| 0287 | REP 114 | LAST 1188 | 01,3171 | 10 131 0 | | CCS | BUF +1 | SEE IF THERE ARE ANY ACTIVE JOBS WAITING |
| 0288 | REP 17 | LAST 1188 | 01,3172 | 0 5640 0 | | TC | CCSHOLE | |
| 0289 | REP 18 | LAST 1189 | 01,3173 | 0 5640 0 | | TC | CCSHOLE | |
| 0290 | | | 01,3174 | 1 3176 0 | | TCP | +2 | |
| 0291 | REP 2 | LAST 181 | 01,3175 | 1 3223 0 | | TCP | DUMMYJOB | |
| 0292 | REP 115 | LAST 1189 | 01,3176 | 10 130 1 | | CCS | BUF | BUF IS ZERO IF THIS IS A PRICING AND |
| 0293 | | | 01,3177 | 1 3201 0 | | TCP | +2 | CHANGED PRIORITY IS STILL HIGHEST. |
| 0294 | REP 2 | LAST 1183 | 01,3200 | 1 3005 0 | | TCP | ENDPRCHG -1 | |
| 0295 | REP 327 | LAST 1188 | 01,3201 | 50 000 1 | | INDEX | A | OTHERWISE, SET NEWJOB TO THE RELATIVE |
| 0296 | | | 01,3202 | 2-7777 0 | | CAP | 0 -1 | ADDRESS OF THE NEW JOB'S CORE SET. |
| 0297 | REP 1 | | 01,3203 | 8 3153 0 | | AD | -CCSPR | |
| 0298 | REP 18 | LAST 1185 | 01,3204 | 54 067 1 | | TS | NEWJOB | |
| 0299 | REP 4 | LAST 1185 | 01,3205 | 1 2725 1 | | TCP | CHANGJOB -2 | |
| 0300 | REP 116 | LAST 1189 | 01,3206 | 54 132 0 | EJ1 | TS | BUF +2 | |
| 0301 | REP 117 | LAST 1189 | 01,3207 | 6 0131 1 | | AD | BUF +1 | - OLD HIGH PRIORITY. |
| 0302 | REP 328 | LAST 1189 | 01,3210 | 10 000 0 | | CCS | A | |
| 0303 | REP 116 | LAST 1189 | 01,3211 | 4 0132 0 | | CS | BUF +2 | NEW HIGH PRIORITY. |
| 0304 | REP 1 | | 01,3212 | 1 3218 0 | | TCP | EJ2 | |
| 0305 | | | 01,3213 | 13 214 1 | | NOOP | | |
| 0306 | REP 286 | LAST 1180 | 01,3214 | 50 002 0 | | INDEX | 0 | |
| 0307 | | | 01,3215 | 0 0002 0 | | TC | 2 | PROCEED WITH SEARCH. |
| 0308 | REP 119 | LAST 1189 | 01,3216 | 54 131 0 | EJ2 | TS | BUF +1 | |
| 0309 | | | 01,3217 | 0 0006 1 | | EXTEND | | |
| 0310 | REP 120 | LAST 1189 | 01,3220 | 22 130 0 | | CHCH | BUF | FOR LOCATING CCS PRIORITY + X INSTR. |
| 0311 | REP 121 | LAST 1189 | 01,3221 | 50 130 0 | | INDEX | BUF | |
| 0312 | | | 01,3222 | 0 0002 0 | | TC | 2 | |

L EXECUTIVE

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R0314 IDLING AND COMPUTER ACTIVITY (GREEN) LIGHT MAINTENANCE. THE IDLING ROUTINE IS NOT A JOB IN ITSELF,
R0316 BUT RATHER A SUBROUTINE OF THE EXECUTIVE.

| | | | | | | | | | | |
|---------|--|-----|------|---------------|---------|----------|----------|---------|--------------|--|
| 0316 | REP | 4 | LAST | 257 | 1361 | | EBANK= | SELFRST | | SELF-CHECK STORAGE IN EBANK. |
| 0319 | REP | 247 | LAST | 1188 | 01,3223 | 4 4714 0 | DUMMYJOB | CS | ZERO | SET NEWJOB TO -0 FOR IDLING. |
| 0320 | REP | 19 | LAST | 1189 | 01,3224 | 54 087 1 | | TS | NEWJOB | |
| 0321 | | | | | 01,3225 | 0 0003 1 | | RELINT | | |
| 0322 | REP | 62 | LAST | 1185 | 01,3226 | 4 4711 0 | | CS | TWO | TURN OFF THE ACTIVITY LIGHT. |
| 0323 | | | | | 01,3227 | 0 0006 1 | | EXTEND | | |
| 0324 | REP | 31 | LAST | 1185 | 01,3228 | 03 011 1 | | WAND | DSALMOUT | |
| 0328 | REP | 20 | LAST | 1190 | 01,3231 | 10 087 1 | ADVAN | CCS | NEWJOB | IS A NEWJOB ACTIVE ? |
| 0329 | REP | 1 | | | 01,3232 | 1 3032 1 | | TCP | MUCHANG2 | YES... ONE REQUIRING A CHANGE JOB. |
| 0330 | REP | 63 | LAST | 1190 | 01,3233 | 3 4711 1 | | CAP | TWO | NEW JOB ALREADY IN POSITION FOR |
| 0331 | REP | 1 | | | 01,3234 | 1 3242 1 | | TCP | MUDIRECT | EXECUTION. |
| 03317 | REP | 5 | LAST | 1190 | 01,3235 | 3 1361 1 | | CA | SELFRST | |
| 03318 | REP | 201 | LAST | 1188 | 01,3238 | 54 001 1 | | TS | L | PUT RETURN ADDRESS IN L. |
| 0332 | REP | 1 | | | 01,3237 | 3 3241 0 | | CAP | SELFRANK | |
| 0333 | REP | 4 | LAST | 622 | 01,3240 | 1 5123 0 | | TCP | SUPDXCHZ + 1 | AND DISPATCH JOB. |
| 03338 | REP | 6 | LAST | 1190 | 1361 | | | EBANK= | SELFRST | |
| 0334 | REP | 3 | LAST | 257 | 01,3241 | 66102 1 | SELFRANK | RBCON | SELFRANK | |
| 0335 | | | | | 01,3242 | 0 0006 1 | MUDIRECT | EXTEND | | TURN THE GREEN LIGHT BACK ON. |
| 0336 | REP | 32 | LAST | 1190 | 01,3243 | 05 011 1 | | WOR | DSALMOUT | |
| 0337 | REP | 40 | LAST | 1187 | 01,3244 | 52 165 1 | | DYCH | LOC | JOB'S STARTED IN THIS FASHION MUST BE |
| 03372 | REP | 5 | LAST | 1190 | 01,3245 | 1 5122 1 | | TCP | SUPDXCHZ | |
| 03378 | | | | | 5122 | | | BLOCK | 2 | IN FIXED-FIXED SO OTHERS MAY USE. |
| 03379 | REP | 2 | LAST | 1176 TO 1181* | 59 | 59* | | COUNT | 02/EXEC | |
| R033791 | SUPDXCHZ - ROUTINE TO TRANSFER TO SUPERBANK. | | | | | | | | | |
| R033792 | CALLING SEQUENCE | | | | | | | | | |
| A033793 | | | | | | | | TCP | SUPDXCHZ | WITH 2CADR OF DESIRED LOCATION IN A + L. |
| 0338 | REP | 202 | LAST | 1190 | 5122 | 56 001 0 | SUPDXCHZ | XCH | L | BASIC. |
| 03381 | | | | | 5123 | 0 0006 1 | +1 | EXTEND | | |
| 03382 | REP | 17 | LAST | 1185 | 5124 | 01 007 1 | | WRITE | SUPERFRK | |
| 03383 | REP | 24 | LAST | 1185 | 5125 | 54 006 0 | | TS | BRANK | |
| 03384 | REP | 203 | LAST | 1190 | 5126 | 0 0001 0 | | TC | L | |
| 0339 | | | | | 5127 | 77677 1 | NEO100 | OCT | 77677 | |

L WAITLIST

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R0001 PROGRAM DESCRIPTION
 R0003 MOD NO - 2
 R0005 MOD BY - MILLER (D1MAX INCREASED TO 162.5 SEC)
 R00072 MOD 3 BY KERNAN (INHINT INSERTED AT WAITLIST) 2/28/68 SKIPPER REV 4
 R00073 MOD 4 BY KERNAN (TWIDDLE IN 54) 3/28/68 SKIPPER REV 13.
 R000799

DATE - 10 OCTOBER 1968
 LOG SECTION - WAITLIST
 ASSEMBLY SUNBURST REV 5

R0008 FUNCTIONAL DESCRIPTION-

R0009 PART OF A SECTION OF PROGRAMS, -WAITLIST, TASKOVER, T3RUPT, USED TO CALL A PROGRAM, (CALLED A TASK),
 R0011 WHICH IS TO BEGIN IN C(A) CENTISECONDS. WAITLIST UPDATES TIME3, LST1 AND LST2. THE MEANING OF THESE LISTS
 R0013 FOLLOW.

R0014 $C(TIME3) = 16384 - (T1 - T)$ CENTISECONDS, (T-PRESENT TIME, T1-TIME FOR TASK1)
 R0016

R0017 $C(LST1) = -(T2 - T1) + 1$
 R0018 $C(LST1 + 1) = -(T3 - T2) + 1$
 R0019 $C(LST1 + 2) = -(T4 - T3) + 1$
 R0020

R0021 $C(LST1 + 6) = -(T9 - T8) + 1$
 R0022
 R0023 $C(LST1 + 7) = -(T9 - T8) + 1$

R0024 $C(LST2) = 2CADR$ OF TASK1
 R0025 $C(LST2 + 2) = 2CADR$ OF TASK2
 R0026

R0027
 R0028 $C(LST2 + 14) = 2CADR$ OF TASK8
 R0029 $C(LST2 + 16) = 2CADR$ OF TASK9

R0030 WARNINGS-

- R0031 -----
 R0032 1) $1 \pm C(A) \pm 16250D$ (1 CENTISECOND TO 162.5 SEC)
 R0033 2) 9 TASKS MAXIMUM
 R0034 3) TASKS CALLED UNDER INTERRUPT INHIBITED
 R0035 4) TASKS END BY TC TASKOVER

R0036 CALLING SEQUENCE-

R0037 L-1 CA DELTAT (TIME IN CENTISECONDS TO TASK START)
 R0039 L TC WAITLIST
 R0040 L+1 2CADR DESIRED TASK
 R0041 L+2 (MINOR OF 2CADR)
 R0042 L+3 RELINT (RETURNS HERE)

R00421 TWIDDLE-

R00422 -----
 R00423 TWIDDLE IS FOR USE WHEN THE TASK BRING SET UP IS IN THE SAME FRANK AND FRANK AS THE USER. IN
 R00425 SUCH CASES, IT IMPROVES UPON WAITLIST BY ELIMINATING THE NEED FOR THE BRCON HALF OF THE 2CADR,

L. WAITLIST

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R00427 SAVING A WORD. TWIDDLE IS LIKE WAITLIST IN EVERY RESPECT EXCEPT CALLING SEQUENCE, TO WIT-

R0043 L-1 CA DELTAT
R00431 L TC TWIDDLE
R00432 L-1 ADRES DESIRED TASK
R00433 L-2 RELINT (RETURNS HERE)

R00439 NORMAL EXIT MODES-

R0044 AT L+3 OF CALLING SEQUENCE

R0045 ALARM OR ABORT EXIT MODES-

R0046 TC ABORT
R0047 OCT 1203 (WAITLIST OVERFLOW - TOO MANY TASKS)

R0048 ERASABLE INITIALIZATION REQUIRED-

R0049 ACCOMPLISHED BY PRESH START,--LST2,...., LST2 +16 =ENDTASK
R0050 LST1,...., LST1 +7 =NEO1/2

R0051 OUTPUT--

R0052 LST1 AND LST2 UPDATED WITH NEW TASK AND ASSOCIATED TIME.
R0053 DEBRIS-

R0054 CENTRALS- A,Q,L
R0055 OTHER - WAITEXIT, WAITADR, WAITTEMP, WAITRANK
R0056 DETAILED ANALYSIS OF TIMING-

R0057 CONTROL WILL NOT BE RETURNED TO THE SPECIFIED ADDRESS (ZCADR) IN EXACTLY DELTA T CENTISECONDS.
R0059 THE APPROXIMATE TIME MAY BE CALCULATED AS FOLLOWS

R0060 LET TO = THE TIME OF THE TC WAITLIST
R0061 LET TS = TO +147U + COUNTER INCREMENTS (SET UP TIME)
R0062 LET X = TS -(100TS)/100 (VARIANCE FROM COUNTERS)
R0063 LET Y = LENGTH OF TIME OF INHIBIT INTERRUPT AFTER T3RUPT
R0064 LET Z = LENGTH OF TIME TO PROCESS TASKS WHICH ARE DUE THIS T3RUPT BUT DISPATCHED EARLIER.
R0066 (Z=0, USUALLY)
R0067 LET DELTD = THE ACTUAL TIME TAKEN TO GIVE CONTROL TO ZCADR
R0068 THEN DELTD = TS+DELTA T -X +Y +Z +1.05MS* +COUNTERS*
R0069 *-THE TIME TAKEN BY WAITLIST ITSELF AND THE COUNTER TICKING DURING THIS WAITLIST TIME.
R0071

R0072 IN SHORT, THE ACTUAL TIME TO RETURN CONTROL TO A ZCADR IS AUGMENTED BY THE TIME TO SET UP THE TASK'S
R0074 INTERRUPT, ALL COUNTERS TICKING, THE T3RUPT PROCESSING TIME, THE WAITLIST PROCESSING TIME AND THE POSSIBILITY
R0076 OF OTHER TASKS INHIBITING THE INTERRUPT.
R0077 0077 5130 BLOCK 02

L WAITLIST

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0078 REP 14 LAST 189 E3,1400 EBANK= LST1
0079 REP 1 COUNT 02/WAIT
00795 5130 0 0004 0 TWIDDLE INHINT
0080 REP 204 LAST 1190 5131 54 001 1 TS L
0081 REP 35 LAST 1155 5132 3 4672 0 CA POSMAX
0082 REP 287 LAST 1189 5133 26 002 1 ADS 0
0083 REP 25 LAST 1190 5134 3 0006 1 CA EBANK
00832 5135 0 0006 1 EXTEND
00834 REP 18 LAST 1190 5136 04 007 1 ROR SUPERBANK
0084 REP 205 LAST 1193 5137 56 001 0 XCH L
00849 5140 0 0004 0 WAITLIST INHINT
0085 REP 288 LAST 1193 5141 56 002 0 XCH 0
0086 REP 1 5142 54 061 1 TS WAITEXIT
0087 5143 0 0006 1 EXTEND
0088 REP 2 LAST 1193 5144 5 0061 0 INDEX WAITEXIT
0089 5145 3 0001 0 DCA 0
0090 REP 1 5146 54 063 0 -1 TS WAITADR
0091 REP 1 5147 3 5155 0 DLY2 CAP WAITBB
0092 REP 26 LAST 1193 5150 56 006 1 XCH EBANK
0093 REP 1 5151 1 3246 0 TCP WAIT2
R0094 RETURN TO CALLER AFTER TASK INSERTION'
0095 REP 3 LAST 1193 5152 52 062 1 LWTLIST DXCH WAITEXIT
0096 REP 64 LAST 1190 5153 6 4711 1 AD TWO
0097 5154 52 006 0 DTCH
0099 REP 15 LAST 1193 E3,1400 EBANK= LST1
0100 REP 2 LAST 1193 5155 02063 0 WAITBB BBCON WAIT2
R0101 RETURN TO CALLER +2 AFTER WAITING DT SPECIFIED AT CALLER +1.
0102 REP 289 LAST 1193 5156 50 002 0 FIXDELAY INDEX 0
0103 5157 3 0000 1 CAP 0
0104 REP 290 LAST 1193 5160 24 002 0 INCR 0
R0105 RETURN TO CALLER +1 AFTER WAITING THE DT AS ARRIVING IN A.
0106 REP 291 LAST 1193 5161 56 002 0 VARDELAY XCH 0
0107 REP 6 LAST 1193 5162 04 003 0 IS WAITADR
0108 REP 27 LAST 1193 5163 3 0000 1 CA DRANK
0109 5164 0 0006 1 EXTEND
0110 REP 19 LAST 1193 5165 04 007 1 ROR SUPERBANK
0111 REP 206 LAST 1193 5166 54 001 1 TS L
0112 REP 1 5167 3 5172 0 CAP DELAYEX
0113 REP 4 LAST 1193 5170 54 061 1 TS WAITEXIT
0114 REP 1 5171 1 5147 1 TCP DLY2
    
```

TASK LISTS IN SWITCHED E BANK.

SAVE DELAY TIME IN L

CREATING OVERFLOW AND Q-1 IN Q

SAVE DELTA T IN Q AND RETURN IN WAITEXIT.

IF TWIDDLING, THE TS SKIPS TO HERE PICK UP 2CADR OF TASK. BBCON WILL REMAIN IN L ENTRY FROM FIXDELAY AND VARDELAY.

BOTH ROUTINES MUST BE CALLED UNDER WAITLIST CONTROL AND TERMINATE THE TASK IN WHICH THEY WERE CALLED.

DT TO Q. TASK ADRES TO WAITADR.

DRANK IS SAVED DURING DELAY.

ADD SRANK TO BBCON.

GO TO TASKOVER AFTER TASK ENTRY.



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0115 REP 56 LAST 1059 5172 1 5211 1 DELAYE TCP TASKOVER -2 RETURNS TO TASKOVER

L WAITLIST

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R0116 ENDTASK MUST BE ENTERED IN FIXED-FIXED SO IT IS DISTINGUISHABLE BY ITS ADRES ALONE.

| | | | | | | | | | | | |
|-------|-----|----|------|------|---------|--------|---|---------|--------|----------|--|
| 0118 | REP | 16 | LAST | 1193 | E3,1400 | | | | EBANK= | LST1 | |
| 0119 | REP | 1 | | | 5173 | 72602 | 0 | ENDTASK | -2CADR | SVCT3 | |
| 0119 | REP | 1 | | | 5174 | 73714 | 1 | | | | |
| 0120 | REP | 16 | LAST | 1038 | 5175 | 10 076 | 1 | SVCT3 | CCS | FLAGWD2 | DRIFT FLAG |
| 0121 | REP | 87 | LAST | 1194 | 5176 | 1 5213 | 0 | | TCP | TASKOVER | |
| 0122 | REP | 58 | LAST | 1195 | 5177 | 1 5213 | 0 | | TCP | TASKOVER | |
| 0123 | | | | | 5200 | 1 5201 | 0 | | TCP | +1 | |
| 01231 | REP | 2 | LAST | 186 | 5201 | 11=322 | 1 | | CCS | IMCADR | DON'T DO NBDONLY IF SOMEONE ELSE IS IN |
| 01232 | REP | 59 | LAST | 1195 | 5202 | 1 5213 | 0 | | TCP | TASKOVER | INUSTALL. |
| 01233 | | | | | 5203 | 1 5206 | 1 | | TCP | +3 | |
| 01234 | REP | 60 | LAST | 1195 | 5204 | 1 5213 | 0 | | TCP | TASKOVER | |
| 01235 | REP | 61 | LAST | 1195 | 5205 | 1 5213 | 0 | | TCP | TASKOVER | |
| 0124 | REP | 1 | | | 5206 | 3 7672 | 0 | +3 | CAP | PRIO35 | COMPENSATE FOR NBD COEFFICIENTS ONLY. |
| 0125 | REP | 30 | LAST | 986 | 5207 | 0 5027 | 1 | | TC | NOVAC | ENABLE EVERY 61.93 SECONDS |
| 0126 | REP | 7 | LAST | 776 | E3,1480 | | | | EBANK= | NBDX | |
| 0127 | REP | 1 | | | 5210 | 03542 | 1 | | 2CADR | NBDONLY | |
| 0127 | REP | 1 | | | 5211 | 14083 | 1 | | | | |
| 0128 | REP | 62 | LAST | 1195 | 5212 | 1 5213 | 0 | | TCP | TASKOVER | |

L WAITLIST

P0129 BEGIN TASK INSERTION.

| | | | | | | |
|-------|---|--|------------------|--------|---------------|--|
| 0130 | | | 01,3246 | | BANK 01 | |
| 0131 | REP 1 | | | | COUNT 01/WAIT | |
| 0132 | REP 1 | | 01,3246 54 062 1 | WAIT2 | TS WAITRANK | BRANK OF CALLING PROGRAM. |
| 0133 | REP 2 LAST 188 | | 01,3247 4 0026 1 | | CS TIME3 | |
| 0134 | REP 27 LAST 1126 | | 01,3250 6 4703 1 | | AD BITS | BIT 6 = OCT 200 |
| 0135 | REP 329 LAST 1189 | | 01,3251 10 000 0 | | CCS A | TEST 200 - C(TIME3). IF POSITIVE, |
| A0136 | | | | | | IT MEANS THAT TIME3 OVERFLOW HAS OCCURRED PRIOR TO CS TIME3 AND THAT |
| A0137 | | | | | | C(TIME3) = T - T1, INSTEAD OF 1.0 - (T1 - T). THE FOLLOWING FOUR |
| A0138 | | | | | | ORDERS SET C(A) = TD - T1 + 1 IN EITHER CASE. |
| 0139 | REP 2 LAST 1174 | | 01,3252 6 6056 1 | AD | OCT40001 | OVERFLOW HAS OCCURRED. SET C(A) = |
| 0140 | REP 330 LAST 1196 | | 01,3253 4 0000 0 | CS | A | T - T1 + 1.0 - 201 |
| R0141 | NORMAL CASE (C(A) NNZ) YIELDS SAME C(A) - (-(1.0-(T1-T)) + 200) - 1 | | | | | |
| 0142 | REP 1 | | 01,3254 6 3402 1 | AD | OCT40201 | |
| 0143 | REP 292 LAST 1193 | | 01,3255 6 0002 0 | AD | 0 | RESULT = TD - T1 + 1. |
| 0144 | REP 331 LAST 1196 | | 01,3256 10 000 0 | CCS | A | TEST TD - T1 + 1 |
| 0145 | REP 17 LAST 1195 | | 01,3257 6 1400 1 | AD | LST1 | IF TD - T1 POS, GO TO WTLSTS WITH |
| 0146 | REP 1 | | 01,3260 1 3322 0 | TCP | WTLSTS | C(A) = (TD - T1) + C(LST1) = TD-T2+1 |
| 0147 | | | 01,3261 13 262 0 | NOOP | | |
| 0148 | REP 293 LAST 1196 | | 01,3262 4 0002 1 | CS | 0 | |
| R0149 | NOTE THAT THIS PROGRAM SECTION IS NEVER ENTERED WHEN T-T1 G/E -1, | | | | | |
| R0150 | SINCE TD-T1+1 = (TD-T) + (T-T1+1), AND DELTA T = TD-T G/E +1. (G/E | | | | | |
| R0151 | SYMBOL MEANS GREATER THAN OR EQUAL TO). THUS THERE NEED BE NO CON- | | | | | |
| R0152 | CERN OVER A PREVIOUS OR IMMINENT OVERFLOW OF TIME3 HERE. | | | | | |
| 0153 | REP 6 LAST 1057 | | 01,3263 6 4675 1 | AD | POS1/2 | WHEN TD IS NEXT, FORM QUANTITY |
| 0154 | REP 9 LAST 1196 | | 01,3264 6 4675 1 | AD | POS1/2 | 1.0 - DELTA T = 1.0 - (TD - T) |
| 0155 | REP 3 LAST 1196 | | 01,3265 56 026 0 | XCH | TIME3 | |
| 0156 | REP 12 LAST 1118 | | 01,3266 6 4674 0 | AD | NEOMAX | |
| 0157 | REP 294 LAST 1196 | | 01,3267 6 0002 0 | AD | 0 | 1.0 - DELTA T NOW COMPLETE. |
| 0158 | | | 01,3270 0 0006 1 | EXTEND | | ZERO INDEX 0. |
| 0159 | | | 01,3271 22 007 0 | QKCH | 7 | (20) |



L WAITLIST

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| | | | | | | | | | | |
|-------|-----|-----|------|------|---------|--------|---|--------|--------|-----------|
| 0160 | REP | 18 | LAST | 1196 | 01,3272 | 57=400 | 1 | WTLST4 | XCH | LST1 |
| 0161 | REP | 19 | LAST | 1197 | 01,3273 | 57=401 | 0 | | XCH | LST1 +1 |
| 0162 | REP | 20 | LAST | 1197 | 01,3274 | 57=402 | 0 | | XCH | LST1 +2 |
| 0163 | REP | 21 | LAST | 1197 | 01,3275 | 57=403 | 1 | | XCH | LST1 +3 |
| 0164 | REP | 22 | LAST | 1197 | 01,3276 | 57=404 | 0 | | XCH | LST1 +4 |
| 0165 | REP | 23 | LAST | 1197 | 01,3277 | 57=405 | 1 | | XCH | LST1 +5 |
| 0166 | REP | 24 | LAST | 1197 | 01,3300 | 57=406 | 1 | | XCH | LST1 +6 |
| 0167 | REP | 25 | LAST | 1197 | 01,3301 | 57=407 | 0 | | XCH | LST1 +7 |
| 0168 | REP | 3 | LAST | 1193 | 01,3302 | 3 0063 | 1 | | CA | WAITADR |
| 0169 | REP | 205 | LAST | 1196 | 01,3303 | 50 002 | 0 | | INDEX | 0 |
| 0170 | | | | | 01,3304 | 1 3305 | 0 | | TCP | +1 |
| 0171 | REP | 19 | LAST | 187 | 01,3305 | 53=411 | 0 | | DXCH | LST2 |
| 0172 | REP | 20 | LAST | 1197 | 01,3306 | 53=413 | 1 | | DXCH | LST2 +2 |
| 0173 | REP | 21 | LAST | 1197 | 01,3307 | 53=415 | 1 | | DXCH | LST2 +4 |
| 0174 | REP | 22 | LAST | 1197 | 01,3310 | 53=417 | 0 | | DXCH | LST2 +6 |
| 0175 | REP | 23 | LAST | 1197 | 01,3311 | 53=421 | 0 | | DXCH | LST2 +8D |
| 0176 | REP | 24 | LAST | 1197 | 01,3312 | 53=423 | 1 | | DXCH | LST2 +10D |
| 0177 | REP | 25 | LAST | 1197 | 01,3313 | 53=425 | 1 | | DXCH | LST2 +12D |
| 0178 | REP | 26 | LAST | 1197 | 01,3314 | 53=427 | 0 | | DXCH | LST2 +14D |
| 0179 | REP | 27 | LAST | 1197 | 01,3315 | 53=431 | 1 | | DXCH | LST2 +16D |
| 0180 | REP | 3 | LAST | 187 | 01,3316 | 6 5173 | 1 | | AD | ENDTASK |
| A0181 | | | | | | | | | | |
| 0182 | | | | | 01,3317 | 0 0006 | 1 | | EXTEND | |
| 0183 | REP | 1 | | | 01,3320 | 1 5152 | 0 | | RZP | LWTLIST |
| 0184 | REP | 1 | | | 01,3321 | 1 3375 | 1 | | TCP | WTABORT |

(MINOR PART OF TASK CADR HAS BEEN IN L.)

AT END, CHECK THAT C(LST2+10) IS STD

END ITEM, AS CHECK FOR EXCEEDING THE LENGTH OF THE LIST. DUMMY TASK ADRES SHOULD BE IN FIXED- FIXED SO ITS ADRES ALONE DISTINGUISHES IT.

L WAITLIST

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| | | | | | | | | |
|------|---------|-----------|---------|----------|--------|-----|---------|------------------|
| 0185 | REP 332 | LAST 1196 | 01,3322 | 10 000 0 | WTLST5 | CCS | A | TEST TD - T2 + 1 |
| 0186 | REP 26 | LAST 1197 | 01,3323 | 6 1401 0 | | AD | LST1 +1 | |
| 0187 | | | 01,3324 | 1 3330 0 | | TCP | +4 | |
| 0188 | REP 144 | LAST 1186 | 01,3325 | 6 4712 1 | | AD | ONE | |
| 0189 | REP 1 | | 01,3326 | 0 3403 0 | | TC | WTLST2 | |
| 0190 | | | 01,3327 | 00001 0 | | OCT | 1 | |
| 0191 | REP 333 | LAST 1198 | 01,3330 | 10 000 0 | +4 | CCS | A | TEST TD - T3 + 1 |
| 0192 | REP 27 | LAST 1198 | 01,3331 | 6 1402 0 | | AD | LST1 +2 | |
| 0193 | | | 01,3332 | 1 3330 0 | | TCP | +4 | |
| 0194 | REP 145 | LAST 1198 | 01,3333 | 6 4712 1 | | AD | ONE | |
| 0195 | REP 2 | LAST 1198 | 01,3334 | 0 3403 0 | | TC | WTLST2 | |
| 0196 | | | 01,3335 | 00002 0 | | OCT | 2 | |
| 0197 | REP 146 | LAST 1198 | 01,3336 | 6 1403 1 | | AD | LST1 +3 | TEST W - T4 + 1 |
| 0198 | REP 28 | LAST 1198 | 01,3337 | 6 1403 1 | | AD | LST1 +3 | |
| 0199 | | | 01,3340 | 1 3344 0 | | TCP | +4 | |
| 0200 | REP 146 | LAST 1198 | 01,3341 | 6 4712 1 | | AD | ONE | |
| 0201 | REP 3 | LAST 1198 | 01,3342 | 0 3403 0 | | TC | WTLST2 | |
| 0202 | | | 01,3343 | 00003 1 | | OCT | 3 | |
| 0203 | REP 147 | LAST 1198 | 01,3344 | 10 000 0 | +4 | CCS | A | TEST TD - T5 + 1 |
| 0204 | REP 29 | LAST 1198 | 01,3345 | 6 1404 0 | | AD | LST1 +4 | |
| 0205 | | | 01,3346 | 1 3352 1 | | TCP | +4 | |
| 0206 | REP 147 | LAST 1198 | 01,3347 | 6 4712 1 | | AD | ONE | |
| 0207 | REP 4 | LAST 1198 | 01,3350 | 0 3403 0 | | TC | WTLST2 | |
| 0208 | | | 01,3351 | 00004 0 | | OCT | 4 | |
| 0209 | REP 336 | LAST 1198 | 01,3352 | 10 000 0 | +4 | CCS | A | TEST TD - T6 + 1 |
| 0210 | REP 30 | LAST 1198 | 01,3353 | 6 1405 1 | | AD | LST1 +5 | |
| 0211 | | | 01,3354 | 1 3360 0 | | TCP | +4 | |
| 0212 | REP 148 | LAST 1198 | 01,3355 | 6 4712 1 | | AD | ONE | |
| 0213 | REP 5 | LAST 1198 | 01,3356 | 0 3403 0 | | TC | WTLST2 | |
| 0214 | | | 01,3357 | 00005 1 | | OCT | 5 | |
| 0215 | REP 337 | LAST 1198 | 01,3360 | 10 000 0 | +4 | CCS | A | TEST TD - T7 + 1 |
| 0216 | REP 31 | LAST 1198 | 01,3361 | 6 1406 1 | | AD | LST1 +6 | |
| 0217 | | | 01,3362 | 1 3366 0 | | TCP | +4 | |
| 0218 | REP 149 | LAST 1198 | 01,3363 | 6 4712 1 | | AD | ONE | |
| 0219 | REP 6 | LAST 1198 | 01,3364 | 0 3403 0 | | TC | WTLST2 | |
| 0220 | | | 01,3365 | 00006 1 | | OCT | 6 | |



L WAITLIST

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| | | | | | | | | |
|------|---------|-----------|---------|----------|----------|-----|---------|---------------------|
| 0221 | REP 338 | LAST 1198 | 01,3366 | 10 000 0 | +4 | CCS | A | |
| 0222 | REP 32 | LAST 1198 | 01,3387 | 8 1407 0 | | AD | LST1 +7 | |
| 0223 | | | 01,3370 | 1 3374 0 | | TCF | +4 | |
| 0224 | REP 150 | LAST 1198 | 01,3371 | 8 4712 1 | | AD | ONE | |
| 0225 | REP 7 | LAST 1198 | 01,3372 | 0 3403 0 | | TC | WTLST2 | |
| 0226 | | | 01,3373 | 00007 0 | | OCT | 7 | |
| 0227 | REP 339 | LAST 1199 | 01,3374 | 10 000 0 | +4 | CCS | A | |
| 0228 | REP 6 | LAST 1162 | 01,3375 | 0 5604 0 | WIMBORT | TC | BALLOUT | NO ROOM IN THE INN. |
| 0229 | | | 01,3376 | 01203 1 | | OCT | 1203 | |
| 0230 | REP 151 | LAST 1199 | 01,3377 | 8 4712 1 | | AD | ONE | |
| 0231 | REP 8 | LAST 1199 | 01,3400 | 0 3403 0 | | TC | WTLST2 | |
| 0232 | | | 01,3401 | 00010 0 | | OCT | 10 | |
| 0233 | | | 01,3402 | 40201 0 | OCT40201 | OCT | 40201 | |

L WAITLIST

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R0234 THE ENTRY TO WILST2 JUST PRECEDING OCT N IS FOR T LE TD LE T -1.
R0235 N N+1

R0236 (LE MEANS LESS THAN OR EQUAL TO). AT ENTRY, C(A) = -(TD - T + 1)
R0237 N+1

R0238 THE LST1 ENTRY -(T - T + 1) IS TO BE REPLACED BY -(TD - T + 1), AND
R0239 N+1 N

R0240 THE ENTRY -(T - TD + 1) IS TO BE INSERTED IMMEDIATELY FOLLOWING.
R0241 N+1

| | | | | | | | | | | | |
|------|-----|-----|-----------|---------|----|------|---|--------|-------|----------|-----------------------|
| 0242 | REP | 1 | | 01,3403 | 54 | 084 | 1 | WILST2 | TS | WAITTEMP | C(A) = -(TD - T + 1) |
| 0243 | REP | 296 | LAST 1197 | 01,3404 | 50 | 002 | 0 | | INDEX | 0 | |
| 0244 | | | | 01,3405 | 3 | 000 | 1 | | CAP | 0 | |
| 0245 | REP | 297 | LAST 1200 | 01,3406 | 54 | 002 | 1 | | TS | 0 | INDEX VALUE INTO Q. |
| 0246 | REP | 152 | LAST 1199 | 01,3407 | 3 | 4712 | 1 | | CAP | ONE | |
| 0247 | REP | 2 | LAST 1200 | 01,3410 | 6 | 0084 | 0 | | AD | WAITTEMP | |
| 0248 | REP | 298 | LAST 1200 | 01,3411 | 50 | 002 | 0 | | INDEX | 0 | C(A) = -(TD - T) + 1. |
| 0249 | REP | 33 | LAST 1199 | 01,3412 | 27 | 377 | 1 | | ADS | LST1 -1 | N |
| 0250 | REP | 3 | LAST 1200 | 01,3413 | 4 | 0084 | 1 | | CS | WAITTEMP | |
| 0251 | REP | 299 | LAST 1200 | 01,3414 | 50 | 002 | 0 | | INDEX | 0 | |
| 0252 | REP | 1 | | 01,3415 | 1 | 3272 | 1 | | TCP | WILST4 | |

R0253 C(TIME3) = 1.0 - (T1 - T)

R0254 C(LST1) = - (T2 - T1) + 1

R0255 C(LST1+1) = - (T3 - T2) + 1

R0256 C(LST1+2) = - (T4 - T3) + 1

R0257 C(LST1+3) = - (T5 - T4) + 1

R0258 C(LST1+4) = - (T6 - T5) + 1

R0259 C(LST2) = 2CADR TASK1

R0260 C(LST2+2) = 2CADR TASK2

R0261 C(LST2+4) = 2CADR TASK3

R0262 C(LST2+6) = 2CADR TASK4

R0263 C(LST2+8) = 2CADR TASK5

R0264 C(LST2+10) = 2CADR TASK6

L WAITLIST

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P0265 ENTERS HERE ON T3 RUPT TO DISPATCH WAITLISTED TASK.

| | | | | | | | |
|------|-----|-----|-----------|---------|--------|--------|--------------------|
| 0266 | | | 01,3416 | 0 0008 | 1 | T3RUPT | EXTEND |
| 0267 | REP | 20 | LAST 1193 | 01,3417 | 04 007 | 1 | ROR SUPERBANK |
| 0268 | REP | 22 | LAST 1066 | 01,3420 | 54 016 | 1 | TS BANKRUPT |
| 0269 | | | | 01,3421 | 0 0008 | 1 | EXTEND |
| 0270 | REP | 18 | LAST 1066 | 01,3422 | 22 012 | 1 | QXCH CRUPT |
| 0271 | REP | 9 | LAST 1170 | 01,3423 | 3 4873 | 1 | T3RUPT2 CAP NEO1/2 |
| 0272 | REP | 34 | LAST 1200 | 01,3424 | 57=407 | 0 | XCH LST1 +7 |
| 0273 | REP | 35 | LAST 1201 | 01,3425 | 57=408 | 1 | XCH LST1 +6 |
| 0274 | REP | 36 | LAST 1201 | 01,3426 | 57=405 | 1 | XCH LST1 +5 |
| 0275 | REP | 37 | LAST 1201 | 01,3427 | 57=404 | 0 | XCH LST1 +4 |
| 0276 | REP | 38 | LAST 1201 | 01,3430 | 57=403 | 1 | XCH LST1 +3 |
| 0277 | REP | 39 | LAST 1201 | 01,3431 | 57=402 | 0 | XCH LST1 +2 |
| 0278 | REP | 40 | LAST 1201 | 01,3432 | 57=401 | 0 | XCH LST1 +1 |
| 0279 | REP | 41 | LAST 1201 | 01,3433 | 57=400 | 1 | XCH LST1 |
| 0280 | REP | 36 | LAST 1193 | 01,3434 | 6 4872 | 0 | AD POSMAX |
| 0281 | REP | 4 | LAST 1196 | 01,3435 | 26 026 | 1 | ADS TIME3 |
| 0282 | REP | 3 | LAST 577 | 01,3436 | 54 734 | 0 | TS RUPTAON |
| 0283 | REP | 248 | LAST 1190 | 01,3437 | 4 4714 | 0 | CS ZERO |
| 0284 | REP | 4 | LAST 1201 | 01,3440 | 54 734 | 0 | TS RUPTAON |
| 0285 | | | | 01,3441 | 0 0008 | 1 | EXTEND |
| 0286 | REP | 4 | LAST 1197 | 01,3442 | 4 5174 | 1 | DCS ENDTASK |
| 0287 | REP | 28 | LAST 1197 | 01,3443 | 53=431 | 1 | DxCH LST2 +16D |
| 0288 | REP | 29 | LAST 1201 | 01,3444 | 53=427 | 0 | DxCH LST2 +14D |
| 0289 | REP | 30 | LAST 1201 | 01,3445 | 53=425 | 1 | DxCH LST2 +12D |
| 0290 | REP | 31 | LAST 1201 | 01,3446 | 53=423 | 1 | DxCH LST2 +10D |
| 0291 | REP | 32 | LAST 1201 | 01,3447 | 53=421 | 0 | DxCH LST2 +8D |
| 0292 | REP | 33 | LAST 1201 | 01,3450 | 53=417 | 0 | DxCH LST2 +6 |
| 0293 | REP | 34 | LAST 1201 | 01,3451 | 53=415 | 1 | DxCH LST2 +4 |
| 0294 | REP | 35 | LAST 1201 | 01,3452 | 53=413 | 1 | DxCH LST2 +2 |
| 0295 | REP | 36 | LAST 1201 | 01,3453 | 53=411 | 0 | DxCH LST2 |
| 0296 | REP | 207 | LAST 1193 | 01,3454 | 56 001 | 0 | XCH L |
| 0297 | | | | 01,3455 | 0 0008 | 1 | EXTEND |
| 0298 | REP | 21 | LAST 1201 | 01,3456 | 01 007 | 1 | WRITE SUPERBANK |
| 0299 | REP | 208 | LAST 1201 | 01,3457 | 56 001 | 0 | XCH L |
| 0300 | | | | 01,3460 | 52 006 | 0 | DTCH |

READ CURRENT SUPERBANK VALUE AND SAVE WITH B AND P BANK VALUES.

DISPATCH WAITLIST TASK.

1. MOVE UP LST1 CONTENTS, ENTERING A VALUE OF 1/2 +1 AT THE BOTTOM FOR T6-T5, CORRESPONDING TO THE INTERVAL 01.91 SEC FOR ENDTASK.

2. SET T3 = 1.0 - T2 -T USING LIST 1. SO T3 WONT TICK DURING UPDATE.

SETS RUPTAON TO +1 ON OVERFLOW.

DISPATCH TASK.

SET SUPERRANK FROM BRCON OF 2CADR RESTORE TO L FOR DxCH Z.



L WAITLIST

P0301 RETURN, AFTER EXECUTION OF T3 OVERFLOW TASK'

| ID | REP | LAST | 5213 | 51 | 51* | BLOCK | 02 |
|-------|-----|----------------------|------|----|------|----------|-------------|
| 0302 | | | | | | COUNT | 02/WAIT |
| 0303 | REP | 2 LAST 1193 TO 1196' | 5213 | | | | |
| 0304 | REP | 5 LAST 1201 | 5213 | 10 | 734 | TASKOVER | CCS RUPTAGN |
| 0305 | REP | 2 LAST 1193 | 5214 | 3 | 5155 | CAP | WAITBB |
| 0306 | REP | 28 LAST 1193 | 5215 | 54 | 008 | TS | BBANK |
| 0307 | REP | 1 | 5216 | 1 | 3423 | TCP | T3RUPT2 |
| 0308 | REP | 23 LAST 1201 | 5217 | 3 | 0016 | CA | BANKRUPT |
| 0309 | | | 5220 | 0 | 0008 | EXTEND | |
| 0310 | REP | 22 LAST 1201 | 5221 | 01 | 007 | WRITE | SUPERBNK |
| 0311 | | | 5222 | 0 | 0006 | RESUME | EXTEND |
| 0312 | REP | 19 LAST 1201 | 5223 | 22 | 012 | QXCH | GRUPT |
| 0313 | REP | 24 LAST 1202 | 5224 | 3 | 0016 | NOGRSM | CA BANKRUPT |
| 0314 | REP | 29 LAST 1202 | 5225 | 56 | 006 | XCH | BBANK |
| 0315 | REP | 11 LAST 128 | 5226 | 52 | 011 | NOGRSM | DXCH ARUPT |
| 03155 | | | 5227 | 0 | 0003 | RELINT | |
| 0316 | | | 5230 | 5 | 0017 | RESUME | |

IF +1 RETURN TO T3RUPT, IF -0 RESUME.

DISPATCH NEXT TASK IF IT WAS DUE.

RESTORE SUPERBANK BEFORE RESUME IS DONE

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P0317 LONGCALL

R0318 PROGRAM DESCRIPTION DATE- 17 MARCH 1967
 R0319 PROGRAM WRITTEN BY W.H. VANDEVER LOO SECTION WAITLIST
 R0320 MOD BY- R. MELANSON TO ADD DOCUMENTATION ASSEMBLY SUNDISK REV. 100

R0321 FUNCTIONAL DESCRIPTION-
 R0322 LONGCALL IS CALLED WITH THE DELTA TIME ARRIVING IN A,L SCALED AS TIME2,TIME1 WITH THE 2CADR OF THE TASK
 R0324 IMMEDIATELY FOLLOWING THE TC LONGCALL. FOR EXAMPLE, IT MIGHT BE DONE AS FOLLOWS WHERE TIMELOC IS THE NAME OF
 R0326 A DP REGISTER CONTAINING A DELTA TIME AND WHERE TASKODO IS THE NAME OF THE LOCATION AT WHICH LONGCALL IS TO
 R0328 START

R0329 CALLING SEQUENCE-
 A0330 EXTEND
 A0331 DCA TIMELOC
 A0332 TC LONGCALL
 A0333 2CADR TASKODO

R0334 NORMAL EXIT MODE-
 R0335 1). TC WAITLIST
 R0336 2). DTCH (TO L+3 OF CALLING ROUTINE 1ST PASS THRU LONGCYCL)
 R0337 3). DTCH (TO TASKOVER ON SUBSEQUENT PASSES THRU LONGCYCL)

R0338 ALARM OR ABORT EXIT MODE-
 R0339 NONE

R0340 OUTPUT-
 R0341 LONGTIME AND LONGTIME+1 = DELTA TIME
 R0342 LONGEXIT AND LONGEXIT+1 = RETURN 2CADR
 R0343 LONGCADR AND LONGCADR+1 = TASK 2CADR
 R0344 A = SINGLE PRECISION TIME FOR WAITLIST

R0345 ERASABLE INITIALIZATION-
 R0346 A = MOST SIGNIFICANT PART OF DELTA TIME
 R0347 L = LEAST SIGNIFICANT PART OF DELTA TIME
 R0348 Q = ADDRESS OF 2CADR TASK VALUE

R0349 DERRIS-
 R0350 A,O,L
 R0351 LONGCADR AND LONGCADR+1
 R0352 LONGEXIT AND LONGEXIT+1
 R0353 LONGTIME AND LONGTIME+1

R0354 *** THE FOLLOWING IS TO BE IN FIXED-FIXED AND UNSWITCHED ERRASIBLE ***

| | | | | | | |
|------|--------|-----------|---------|----------|------------------------|-----------------------|
| 0355 | | | 5231 | | BLOCK 02 | |
| 0356 | REP 42 | LAST 1201 | E3,1400 | | FRANK= LST1 | |
| 0357 | REP 1 | | 5231 | 53=140 1 | LONGCALL DTCH LONGTIME | OBTAIN THE DELTA TIME |
| 0358 | | | 5232 | 0 0006 1 | EXTEND | OBTAIN THE 2CADR |



L WAITLIST

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| | | | | | | | | | |
|------|-----|-----|-----------|---------|--------|------|---|----------|-----------|
| 0359 | REP | 300 | LAST 1200 | 5233 | 5 | 0002 | 0 | NDX | 0 |
| 0360 | | | | 5234 | 3 | 0001 | 0 | DCA | 0 |
| 0361 | REP | 1 | | 5235 | 53=134 | 1 | | DXCH | LONGCADR |
| 0362 | | | | 5236 | 0 | 0006 | 1 | EXTEND | |
| 0363 | REP | 1 | | 5237 | 3 | 5242 | 0 | DCA | LGCL2CDR |
| 0364 | | | | 5240 | 52 | 006 | 0 | DTCB | |
| 0365 | REP | 43 | LAST 1203 | E3,1400 | | | | EBANK= | LST1 |
| 0366 | REP | 1 | | 5241 | 03461 | 1 | | LGCL2CDR | 2CADR |
| 0368 | REP | 1 | | 5242 | 02063 | 0 | | | LONGCALL2 |

NOW GO TO THE APPROPRIATE SWITCHED BANK FOR THE REST OF LONGCALL

R0367 *** THE FOLLOWING MAY BE IN A SWITCHED BANK, INCLUDING ITS ERASABLE ***

| | | | | | | | | | |
|------|-----|-----|--------------------|---------|--------|------|---|-----------|-------------|
| 0368 | | | | 01,3461 | | | | BANK | 01 |
| 0369 | REP | 2 | LAST 1196 TO 1202' | 139 | 139* | | | COUNT | 01/WAIT |
| 0370 | REP | 1 | | 01,3461 | 23=435 | 1 | | LONGCALL2 | LXCH |
| 0371 | REP | 65 | LAST 1193 | 01,3462 | 3 | 4711 | 1 | CA | LONGEXIT +1 |
| 0372 | REP | 301 | LAST 1204 | 01,3463 | 26 | 002 | 1 | ADS | TWO |
| 0373 | REP | 2 | LAST 1204 | 01,3464 | 55=434 | 1 | | TS | LONGEXIT |

SAVE THE CORRECT BB FOR RETURN OBTAIN THE RETURN ADDRESS

R0374 *** WAITLIST TASK LONGCYCL ***

| | | | | | | | | | |
|------|-----|---|-----------|---------|--------|------|---|----------|-------------|
| 0375 | | | | 01,3465 | 0 | 0006 | 1 | LONGCYCL | EXTEND |
| 0376 | REP | 1 | | 01,3466 | 4 | 3477 | 1 | DCS | DPBIT14 |
| 0377 | REP | 2 | LAST 1203 | 01,3467 | 21=140 | 1 | | DAS | LONGTIME |
| 0378 | REP | 3 | LAST 1204 | 01,3470 | 11=140 | 1 | | CCS | LONGTIME +1 |
| 0379 | REP | 1 | | 01,3471 | 1 | 3510 | 1 | TCP | MUCHTIME |

CAN WE SUCCESSFULLY TAKE ABOUT 1.25 MINUTES OFF OF LONGTIME

A0380
A0381
A0382
A0383
A0384

| | | | | | | | | | |
|------|-----|---|-----------|---------|--------|------|---|---------|----------|
| 0385 | | | | 01,3472 | 13 | 473 | 0 | NOOP | |
| 0386 | | | | 01,3473 | 1 | 3474 | 1 | TCP | +1 |
| 0387 | REP | 4 | LAST 1204 | 01,3474 | 11=137 | 1 | | CCS | LONGTIME |
| 0388 | REP | 2 | LAST 1204 | 01,3475 | 1 | 3510 | 1 | TCP | MUCHTIME |
| 0389 | | | | 01,3476 | 00000 | 1 | | DPBIT14 | OCT |
| 0390 | | | | 01,3477 | 20000 | 0 | | OCT | 20000 |

THE REASONING BEHIND THIS PART IS INVOLVED, TAKING INTO ACCOUNT THAT THE WORDS MAY NOT BE SIGNED CORRECTED (DP BASIC INSTRUCTIONS DO NOT SIGN CORRECT) AND THAT WE SUBTRACTED BIT14 (1 OVER HALF THE POS. VALUE REPRESENTIBLE IN SINGLE WORD) CAN'T GET HERE *****

A0391

| | | | | | | | | | |
|------|-----|----|-----------|---------|--------|------|---|----------|-------------|
| 0392 | REP | 71 | LAST 1174 | 01,3500 | 3 | 4675 | 1 | LASTTIME | CA |
| 0393 | REP | 5 | LAST 1204 | 01,3501 | 27=140 | 1 | | ADS | BIT14 |
| 0395 | REP | 50 | LAST 1056 | 01,3502 | 0 | 5140 | 1 | TC | LONGTIME +1 |
| 0396 | REP | 44 | LAST 1204 | E3,1400 | | | | EBANK= | LST1 |
| 0397 | REP | 1 | | 01,3503 | 03515 | 0 | | 2CADR | GETCADR |
| 0397 | REP | 1 | | 01,3504 | 02063 | 0 | | | |
| 0399 | REP | 1 | | 01,3505 | 3 | 3517 | 1 | LONGTRN | CA |

LONGCALL GET BACK THE CORRECT DELTA TFOR WAITLIST

THE ENTRY TO OUR LONGCADR

SET IT UP SO THAT ONLY THE FIRST EXIT IS



L WAITLIST

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```

0400 RESP 3 LAST 1204 01,3506 53=435 0 DXCH LONGEXIT
0401 DTCS 01,3507 52 006 0

0402 RESP 72 LAST 1204 01,3510 3 4675 1 MCHTIME CA BIT14
0404 RESP 51 LAST 1204 01,3511 0 5140 1 TC WAITLIST
0405 RESP 45 LAST 1204 E3,1400 EBANK= LST1
0406 RESP 1 01,3512 03465 0 2CADR LONGCYCL
0406 RESP 1 01,3513 02063 0

0408 RESP 1 01,3514 1 3505 0 TCP LONGRTN

R0409 *** WAITLIST TASK GETCADR ***
0410 RESP 2 LAST 1204 01,3515 53=134 1 GETCADR DXCH LONGCADR
0411 DTCS 01,3516 52 006 0 DTCS

0412 RESP 63 LAST 1195 01,3517 05213 1 TSKOVR GENADR TASKOVR

```

TO THE CALLER OF LONGCALL.
THE REST ARE TO TASKOVR

WE HAVE OVR OUR ABOUT 1.25 MINUTES
SO SET UP FOR ANOTHER CYCLE THROUGH HERE

NOW EXIT PROPERLY

GET THE LONGCALL THAT WE WISHED TO START
AND TRANSFER CONTROL TO IT

L LATITUDE LONGITUDE SUBROUTINES

R0001 SUBROUTINE TO CONVERT RAD VECTOR AT GIVEN TIME TO LAT, LONG AND ALT

R0002 CALLING SEQUENCE

R0003 L-1 CALL
 R0004 L LAT-LONG
 R0005 SUBROUTINES USED

R0006 R-TO-RP, ANCTAN, SETGAMMA, SETRS
 R0007 ERASABLE INIT. REQ.

R0008 AKO, -AYO, AZO, TERHEM (SET AT LAUNCH TIME)
 R0009 ALPHA V = POSITION VECTOR METERS B-29
 R0010 MPAC = TIME (CSECS B-28)
 R0011 ERADFLAG = 1, TO COMPUTE EARTH RADIUS, = 0 FOR FIXED EARTH RADIUS
 R0012 LUNAFLAG = 0 FOR EARTH, 1 FOR MOON
 R0013 OUTPUT

R0014 LATITUDE IN LAT (REVS. B-0)
 R0015 LONGITUDE IN LONG (REVS. B-0)
 R0016 ALTITUDE IN ALT METERS B-29

| ADDRESS | OPERATION | OPERANDS | OPERANDS | OPERANDS | OPERANDS | OPERANDS | OPERANDS | OPERANDS | OPERANDS |
|---------|-----------|-----------|----------|----------|----------|----------|-----------|----------|----------|
| 0017 | | | 30,3776 | | | BANK | 30 | | |
| 0018 | REP 1 | | 13,2000 | | | SETLOC | LAT, LONG | | |
| 0019 | | | 13,2322 | | | BANK | | | |
| 0020 | REP 1 | | | | | COUNT | 13/LT-1.0 | | |
| 0021 | REP 19 | LAST 894 | E4,1551 | | | EBANK= | ALPHAV | | |
| 0022 | | | 13,2322 | 40220 0 | LAT-LONG | STO | SETPD | | |
| 0023 | REP 1 | | 13,2323 | 02242 1 | | | INCORPEX | | |
| 0024 | | | 13,2324 | 00001 0 | | | QD | | |
| 0025 | | | 13,2325 | 24007 0 | | STOVL | 6D | | |
| 0026 | REP 20 | LAST 1206 | 13,2326 | 02152 0 | | | ALPHAV | | |
| 0027 | | | 13,2327 | 51406 1 | | PUSH | ARVAL | | |
| 0028 | REP 2 | LAST 88 | 13,2330 | 16310 1 | | STOVL | ALPHAV | | |
| 0029 | REP 6 | LAST 1176 | 13,2331 | 11456 0 | | | ZEROVEC | | |
| 0030 | | | 13,2332 | 71414 0 | | ROPP | COS | | |
| 0031 | REP 24 | LAST 894 | 13,2333 | 01743 0 | | | LUNAFLAG | | |
| 0032 | REP 1 | | 13,2334 | 26335 0 | | | CALLRTRP | | |
| 0033 | | | 13,2335 | 77624 1 | CALLRTRP | CALL | | | |
| 0034 | REP 3 | LAST 599 | 13,2336 | 55366 1 | | | R-TO-RP | | |
| 0035 | | | 13,2337 | 77656 1 | | UNIT | | | |
| 0036 | REP 21 | LAST 1206 | 13,2340 | 36152 1 | | STCALL | ALPHAV | | |
| 0037 | REP 1 | | 13,2341 | 26523 1 | | | SETGAMMA | | |
| 0038 | | | 13,2342 | 77624 1 | | CALL | | | |
| 0039 | REP 2 | LAST 592 | 13,2343 | 26533 0 | | | SETR | | |
| 0040 | | | 13,2344 | 63545 0 | | DLOAD | DSO | | |
| 0041 | REP 22 | LAST 1206 | 13,2345 | 02152 0 | | | ALPHAV | | |
| 0042 | | | 13,2346 | 63525 0 | | PDDL | DSO | | |
| 0043 | REP 23 | LAST 1206 | 13,2347 | 02154 0 | | | ALPHAV +2 | | |

SAVE TIME IN 6-7D FOR R-TO-RP

Q-SD= R FOR R-TO-RP
 ABS. VALUE OF R FOR ALT FORMULA BELOW
 SET MPAC=0 FOR EARTH, NON-ZERO FOR MOON
 USE COS(Q) TO GET NON-ZERO IN MPAC
 0=EARTH, 1=MOON

RP VECTOR CONVERTED FROM R B-29
 UNIT RP B-1
 U2= 1/2 SINL FOR SETRS SURR BELOW
 SET GAMMA=B2/A2 FOR EARTH, =1 FOR MOON
 SCALED B-1
 CALC RE METERS B-29



L LATITUDE LONGITUDE SUBROUTINES

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| | | | | |
|------|-----|--------------|---------|---------|
| 0044 | | | 13,2350 | 75415 0 |
| 0045 | | | 13,2351 | 76405 1 |
| 0046 | REP | 1 | 13,2352 | 00011 1 |
| 0047 | REP | 5 LAST 838 | 13,2353 | 14021 1 |
| 0048 | REP | 24 LAST 1208 | 13,2354 | 02156 1 |
| 0049 | REP | 5 LAST 838 | 13,2355 | 34023 1 |
| 0050 | REP | 1 | 13,2356 | 26463 1 |
| 0051 | REP | 14 LAST 890 | 13,2357 | 15104 0 |
| 0052 | REP | 25 LAST 1207 | 13,2360 | 02152 0 |
| 0053 | REP | 6 LAST 1207 | 13,2361 | 14021 1 |
| 0054 | REP | 26 LAST 1207 | 13,2362 | 02154 0 |
| 0055 | REP | 6 LAST 1207 | 13,2363 | 34023 1 |
| 0056 | REP | 2 LAST 1207 | 13,2364 | 26463 1 |
| 0057 | REP | 10 LAST 889 | 13,2365 | 15106 1 |
| 0058 | REP | 3 LAST 1206 | 13,2366 | 02310 1 |
| 0059 | | | 13,2367 | 77625 0 |
| 0060 | REP | 7 LAST 764 | 13,2370 | 02241 1 |
| 0061 | REP | 7 LAST 634 | 13,2371 | 35110 1 |
| 0062 | REP | 2 LAST 1206 | 13,2372 | 02242 1 |

| | | |
|--------|-----------|-------------------------------------|
| DAD | SOBT | |
| DMP | SLIR | |
| | GMRP | |
| STOCL | COSTH | COS(LAT) B-1 |
| | ALPHAV +4 | |
| STCALL | SINTH | SIN(LAT) B-1 |
| | ARCTAN | |
| STOCL | LAT | LAT B0 |
| | ALPHAV | |
| STOCL | COSTH | COS(LONG) B-1 |
| | ALPHAV +2 | |
| STCALL | SINTH | SIN(LONG) B-1 |
| | ARCTAN | |
| STOCL | LONG | LONG. REVS B-0 IN RANGE -1/2 TO 1/2 |
| | ALPHAV | |
| DSJ | | ALT= R-RE METERS B-29 |
| | BRADM | |
| STCALL | ALT | EXIT WITH ALT METERS B-29 |
| | INCORPEX | |

L LATITUDE LONGITUDE SUBROUTINES

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R0063 SUBROUTINE TO CONVERT LAT, LONG, ALT AT GIVEN TIME TO RADIUS VECTOR
 R0064 CALLING SEQUENCE

R0065 L-1 CALL
 R0066 L LALOTRV
 R0067 SUBROUTINES USED

R0068 SETGAMMA, SETRE, RP-TO-R
 R0069 REASABLE INIT. REQ.

R0070 AKO, AYO, AZO, TEPHEM SET AT LAUNCH TIME
 R0071 LAT-- LATITUDE (REVS B0)
 R0072 LONG-- LONGITUDE (REVS B0)
 R0073 ALT-- ALTITUDE (METERS) B-29
 R0074 MPAC-- TIME (CSECS B-28)
 R0075 ERADFLAG = 1 TO COMPUTE EARTH RADIUS, = 0 FOR FIXED EARTH RADIUS
 R0076 LUNAPLAG = 0 FOR EARTH, 1 FOR MOON
 R0077 OUTPUT

R0078 R-VECTOR IN ALPHAV (METERS B-29)

| | | | | | | | |
|-------|-----|----|---------|---------|-------------|----------|---|
| R0079 | | | 13,2373 | 40220 0 | LALOTRV STO | SETPD | LAT, LONG, ALT TO R VECTOR |
| R0080 | REP | 3 | 13,2374 | 02242 1 | | INCORPEX | |
| R0081 | | | 13,2375 | 00001 0 | | 0D | |
| R0082 | | | 13,2376 | 34007 1 | STCALL | 6D | 6-7D= TIME FOR RP-TO-R |
| R0083 | REP | 2 | 13,2377 | 26523 1 | | SETGAMMA | GAMMA=B2/A2 FOR EARTH, 1 FOR MOON B-1 |
| R0084 | | | 13,2400 | 73545 1 | DLOAD | SIN | COS(LONG)COS(LAT) IN MPAC |
| R0085 | REP | 15 | 13,2401 | 01104 0 | | LAT | UNIT RP= SIN(LONG)COS(LAT) 2-3D |
| R0086 | | | 13,2402 | 65275 1 | DMPR | PDDL | PD 2 GAMMA*SIN(LAT) 0-1D |
| R0087 | REP | 2 | 13,2403 | 00011 1 | | GAMRP | |
| R0088 | REP | 16 | 13,2404 | 01104 0 | | LAT | 0-1D= GAMMA*SIN(LAT) B-2 |
| R0089 | | | 13,2405 | 65346 0 | COS | PDDL | PD 4 2-3D=COS(LAT) B-1 TEMPORARILY |
| R0090 | REP | 11 | 13,2406 | 01106 1 | | LONG | |
| R0091 | | | 13,2407 | 57356 0 | SIN | DMPR | PD 2 |
| R0092 | | | 13,2410 | 71525 0 | PDDL | COS | PD 4 2-3D=SIN(LONG)COS(LAT) B-2 |
| R0093 | REP | 17 | 13,2411 | 01104 0 | | LAT | |
| R0094 | | | 13,2412 | 71525 0 | PDDL | COS | PD 6 4-5D=COS(LAT) B-1 TEMPORARILY |
| R0095 | REP | 12 | 13,2413 | 01106 1 | | LONG | |
| R0096 | | | 13,2414 | 55475 1 | DMPR | VDEP | PD 4 MPAC= COS(LONG)COS(LAT) B-2 |
| R0097 | | | 13,2415 | 41456 0 | UNIT | PUSH | 0-5D= UNIT RP FOR RP-TO-R SETRE |
| R0098 | REP | 27 | 13,2416 | 36152 1 | STCALL | ALPHAV | ALPHAV +4= SINL FOR SETRE SURF. |
| R0099 | REP | 3 | 13,2417 | 26533 0 | | SETRE | RE METERS B-29 |
| R100 | | | 13,2420 | 43145 0 | DLOAD | ROFF | SET MPAC=0 FOR EARTH, NON-ZERO FOR MOON |
| R101 | REP | 7 | 13,2421 | 11456 0 | | ZEROVEC | |
| R102 | REP | 25 | 13,2422 | 01743 0 | | LUNAPLAG | |
| R103 | REP | 1 | 13,2423 | 26425 0 | | CALLRPRT | |
| R104 | | | 13,2424 | 77746 1 | COS | | USE COS(0) TO GET NON-ZERO IN MPAC |
| R105 | | | 13,2425 | 77624 1 | CALLRPRT | CALL | EXIT WITH UNIT R VECTOR IN MPAC |
| R106 | REP | 7 | 13,2426 | 55341 1 | | RP-TO-R | |
| R107 | REP | 26 | 13,2427 | 16152 0 | STODL | ALPHAV | |
| R108 | REP | 8 | 13,2430 | 02241 1 | | ERADM | |



L LATITUDE LONGITUDE SUBROUTINES

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| | | | | | | |
|-------|------------------------------------|---------|---------|--------|----------|---------------------------------|
| 0109 | | 13,2431 | 74215 1 | DAD | VXSC | (RE + ALT)(LINIT R) METERS B-30 |
| 0110 | REP 8 LAST 1207 | 13,2432 | 01110 0 | | ALT | |
| 0111 | REP 29 LAST 1208 | 13,2433 | 02152 0 | | ALPHAV | |
| 0112 | | 13,2434 | 77772 0 | VSL1 | | R METERS B-29 |
| 0113 | REP 30 LAST 1209 | 13,2435 | 36152 1 | STCALL | ALPHAV | EXIT WITH R IN METERS B-29 |
| 0114 | REP 4 LAST 1208 | 13,2436 | 02242 1 | | INCORPEX | |
| R0115 | SUBROUTINE TO COMPUTE EARTH RADIUS | | | | | |

R0116 INPUT

R0117 1/2 SIN LAT IN ALPHAV +4

R0118 OUTPUT

R0119 EARTH RADIUS IN BRADM AND MPAC (METERS B-29)

| | | | | | | | |
|------|------------------|---------|---------|---------|-------|-----------|-----------|
| 0120 | | 13,2437 | 63545 0 | GETERAD | DLOAD | DSO | |
| 0121 | REP 31 LAST 1209 | 13,2440 | 02156 1 | | | ALPHAV +4 | SIN**2(L) |
| 0122 | | 13,2441 | 44352 0 | SL1 | | BDSJ | |
| 0123 | REP 1 | 13,2442 | 11454 1 | | | DP1/2 | COS**2(L) |
| 0124 | | 13,2443 | 44275 1 | DMPR | | BDSJ | |
| 0125 | REP 1 | 13,2444 | 26460 1 | | | EE | |
| 0126 | REP 2 LAST 1209 | 13,2445 | 11454 1 | | | DP1/2 | |
| 0127 | | 13,2446 | 75465 1 | BDDV | | SCRT | |
| 0128 | REP 1 | 13,2447 | 26454 0 | | | B2XSC | |
| 0129 | | 13,2450 | 77622 1 | SR4R | | | |
| 0130 | REP 9 LAST 1208 | 13,2451 | 02241 1 | STORE | | ERADM | |
| 0131 | | 13,2452 | 77616 0 | RVO | | | |

R01311 THE FOLLOWING CONSTANTS WERE COMPUTED WITH A=6378166, R=6356784 METERS

R01312 B2XSC= B**2 SCALED B-51

R01313 B2/A2= B**2/A**2 SCALED B-1

R01314 EE=(1-B**2/A**2) SCALED B-0

| | | | | | | | |
|------|-----------------|---------|---------|-------|------|-----------------|----------------------|
| 0132 | | 13,2453 | 00446 1 | B2XSC | 2DEC | .0179450689 | B**2 SCALED B-51 |
| 0132 | | 13,2454 | 00305 1 | | | | |
| 0133 | REP 4 LAST 1176 | 04,3453 | | DP1/2 | = | XLUNIT | |
| 0134 | | 13,2455 | 17711 0 | B2/A2 | 2DEC | .9933064884 R-1 | GAMMA= B**2/A**2 B-1 |
| 0134 | | 13,2456 | 05254 1 | | | | |
| 0135 | | 13,2457 | 00155 0 | EE | 2DEC | 6.6935116 E-3 | (1-B**2/A**2) B-0 |
| 0135 | | 13,2460 | 25250 1 | | | | |
| 0136 | | 13,2461 | 00302 0 | ERAD | 2DEC | 6373338 B-29 | PAD RADIUS |
| 0136 | | 13,2462 | 17755 0 | | | | |



L LATITUDE LONGITUDE SUBROUTINES

R0137 ARCTAN SUBROUTINE
R0138 CALLING SEQUENCE

R0139 SIN THETA IN SINTH B-1
R0140 COS THETA IN COSTH B-1
R0141 CALL ARCTAN

R0142 OUTPUT

R0143 ARCTAN THETA IN MPAC AND THETA B-0 IN RANGE -1/2 TO +1/2

| | | | | | | | | |
|------|-----|-------------|---------|---------|----------|-------|----------|----------------------|
| 0144 | | | 13,2463 | 77600 1 | ARCTAN | BOV | | |
| 0145 | REP | 1 | 13,2464 | 26465 1 | | | CLROVFLW | |
| 0146 | | | 13,2465 | 63545 0 | CLROVFLW | DLOAD | DSO | |
| 0147 | REP | 7 LAST 1207 | 13,2466 | 00023 0 | | | SINTH | |
| 0148 | | | 13,2467 | 63525 0 | | | DSO | |
| 0149 | REP | 7 LAST 1207 | 13,2470 | 00021 1 | | FDDL | COSTH | |
| 0150 | | | 13,2471 | 77615 0 | | DAD | | |
| 0151 | | | 13,2472 | 75454 0 | | BZE | SOFT | |
| 0152 | REP | 1 | 13,2473 | 26511 0 | | | ARCTANXX | ATAN=0/0 SET THETA=0 |
| 0153 | | | 13,2474 | 40065 0 | | BDDV | BOV | |
| 0154 | REP | 8 LAST 1210 | 13,2475 | 00023 0 | | | SINTH | |
| 0155 | REP | 1 | 13,2476 | 26516 1 | | | ATAN=90 | |
| 0156 | | | 13,2477 | 67542 0 | | SR1 | ASIN | |
| 0157 | REP | 4 LAST 715 | 13,2500 | 00025 0 | | STORE | THETA | |
| 0158 | | | 13,2501 | 50125 1 | | FDDL | BNN | |
| 0159 | REP | 8 LAST 1210 | 13,2502 | 00021 1 | | | COSTH | |
| 0160 | REP | 1 | 13,2503 | 26505 0 | | | NEOCOS | |
| 0161 | | | 13,2504 | 43545 1 | | DLOAD | RVO | |
| 0162 | | | 13,2505 | 57545 1 | NEOCOS | DLOAD | DCOMP | |
| 0163 | | | 13,2506 | 43244 1 | | BPL | DAD | |
| 0164 | REP | 1 | 13,2507 | 26513 1 | | | NEGOUT | |
| 0165 | REP | 3 LAST 1209 | 13,2510 | 11454 1 | | | DP1/2 | |
| 0166 | REP | 5 LAST 1210 | 13,2511 | 00025 0 | ARCTANXX | STORE | THETA | |
| 0167 | | | 13,2512 | 77616 0 | | RVO | | |
| 0168 | | | 13,2513 | 52025 1 | NEGOUT | DSU | GOTO | |
| 0169 | REP | 4 LAST 1210 | 13,2514 | 11454 1 | | | DP1/2 | |
| 0170 | REP | 2 LAST 1210 | 13,2515 | 26511 0 | | | ARCTANXX | |
| 0171 | | | 13,2516 | 75345 1 | ATAN=90 | DLOAD | SIGN | |
| 0172 | REP | 1 | 13,2517 | 11502 0 | | | LODP1/4 | |
| 0173 | REP | 9 LAST 1210 | 13,2520 | 00023 0 | | | SINTH | |
| 0174 | REP | 6 LAST 1210 | 13,2521 | 00025 0 | | STORE | THETA | |
| 0175 | | | 13,2522 | 77616 0 | | RVO | | |
| 0176 | REP | 2 LAST 708 | 04,3455 | | 2DZERO | = | DPZERO | |



L LATITUDE LONGITUDE SUBROUTINES

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R0177 SETGAMMA SUBROUTINE
R0178 SUBROUTINE TO SET GAMMA FOR THE LAT-LONG AND LALOTRY SUBROUTINES

R0179 GAMMA = B**2/A**2 FOR EARTH (B-1)
R0180 GAMMA = 1 FOR MOON (B-1)

R0181 CALLING SEQUENCE
R0182 L CALL
R0183 L+1 SETGAMMA

R0184 INPUT
R0185 LUNAPLAG=0 FOR EARTH,=1 FOR MOON

R0186 OUTPUT
R0187 GAMMA IN GAMRP (B-1)

| | | | | | | | |
|------|--------|-----------|---------|---------|----------------|----------|------------------|
| 0188 | | | 13,2523 | 43145 0 | SETGAMMA DLOAD | BOFF | BRANCH FOR EARTH |
| 0189 | REP 1 | | 13,2524 | 26456 1 | | B2/A2 | EARTH GAMMA |
| 0190 | REP 26 | LAST 1208 | 13,2525 | 01743 0 | | LUNAPLAG | |
| 0191 | REP 1 | | 13,2526 | 26531 1 | | SETOMEX | |
| 0192 | | | 13,2527 | 77735 0 | SLOAD | | |
| 0193 | REP 1 | | 13,2530 | 11454 1 | | 1B1 | MOON GAMMA |
| 0194 | REP 3 | LAST 1208 | 13,2531 | 00011 1 | SETOMEX | STORE | |
| 0195 | | | 13,2532 | 77616 0 | | RVO | |
| 0196 | | | 0010 | | GAMRP | = | 8D |

L LATITUDE LONGITUDE SUBROUTINES

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R0197SETRE SUBROUTINE
 R0198 SUBROUTINE TO SET RE (EARTH OR MOON RADIUS)

R0199 RE= RM FOR MOON
 R0200 RE= RREF FOR FIXED EARTH RADIUS OR COMPUTED RP FOR FISCHER ELLIPSOID

R0201 CALLING SEQUENCE
 R0202 L CALL
 R0203 L+1 SETRE

R0204 SUBROUTINES USED
 R0205 GETERAD

R0206 INPUT
 R0207 BRADFLAG=0 FOR FIXED RE, 1 FOR COMPUTED RE
 R0208 ALPHAV +4= 1/2 SINL IF GETERAD IS CALLED
 R0209 LINAPLAG=0 FOR EARTH,=1 FOR MOON

R0210 OUTPUT
 R0211 ERADM= 504RM FOR MOON (METERS B-29)
 R0212 ERADM= ERAD OR COMPUTED RP FOR EARTH (METERS B-29)

| | | | | | | | | |
|------|-----|----|---------|---------|----------|--------|--------------|--|
| 0213 | | | 13,2533 | 71220 1 | SETRE | STO | DLOAD | |
| 0214 | REP | 1 | 13,2534 | 00051 0 | | | SETREX | |
| 0215 | REP | 1 | 13,2535 | 26560 0 | | | 504RM | |
| 0216 | | | 13,2536 | 71214 0 | | BCN | DLOAD | BRANCH FOR MOON |
| 0217 | REP | 27 | 13,2537 | 01703 1 | | | LINAPLAG | |
| 0218 | REP | 1 | 13,2540 | 26550 0 | | | TSTRLSRM | |
| 0219 | REP | 1 | 13,2541 | 26462 0 | | | ERAD | |
| 0220 | | | 13,2542 | 45014 0 | | BOFF | CALL | BRADFLAG=0 FOR FIXED RE,1 FOR COMPUTED |
| 0221 | REP | 14 | 13,2543 | 00742 0 | | | BRADFLAG | |
| 0222 | REP | 1 | 13,2544 | 26546 1 | | | SETROX | |
| 0223 | REP | 4 | 13,2545 | 26437 0 | | | GETERAD | |
| 0224 | REP | 10 | 13,2546 | 36241 0 | SETROX | STCALL | ERADM | EXIT WITH RE OR RM METERS B-29 |
| 0225 | REP | 2 | 13,2547 | 00051 0 | | | SETREX | |
| 0226 | | | 13,2550 | 77214 0 | TSTRLSRM | BCN | VLOAD | BRADFLAG=0,SET R0=RLS |
| 0227 | REP | 15 | 13,2551 | 00702 1 | | | BRADFLAG | =1 R0=RM |
| 0228 | REP | 2 | 13,2552 | 26546 1 | | | SETROX | |
| 0229 | REP | 9 | 13,2553 | 02028 1 | | | RLS | |
| 0230 | | | 13,2554 | 64446 0 | | ARVAL | SR2R | SCALE FROM B-27 TO B-29 |
| 0231 | | | 13,2555 | 77650 1 | | GOTO | | |
| 0232 | REP | 3 | 13,2556 | 26546 1 | | | SETROX | |
| 0233 | REP | 12 | 0051 | | SETREX | = | S2 | |
| 0234 | | | 13,2557 | 00065 1 | 504RM | 2DEC | 1738090 B-29 | METERS B-29 (MOON RADIUS) |
| 0234 | | | 13,2560 | 01265 1 | | | | |

L PLANETARY INERTIAL ORIENTATION

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R0001 RP-TO-R SUBROUTINE
 R0002 SUBROUTINE TO CONVERT RP (VECTOR IN PLANETARY COORDINATE SYSTEM, EITHER
 R0003 EARTH-FIXED OR MOON-FIXED) TO R (SAME VECTOR IN THE BASIC REF. SYSTEM)

R0004 $R=MT^T*(RP+LPXRP)$ MT= M MATRIX TRANSPOSE

R0005 CALLING SEQUENCE

R0006 L CALL
 R0007 L+1 RP-TO-R

R0008 SUBROUTINES USED

R0009 EARTHMX,MOONMX,EARTH L

R0010 ITEMS AVAILABLE FROM LAUNCH DATA

R0011 S04LM= THE LIBRATION VECTOR L OF THE MOON AT TIME TIMSURL, EXPRESSED
 R0012 IN THE MOON-FIXED COORD. SYSTEM RADIANS R0
 R0013 ITEMS NECESSARY FOR SUBR. USED (SEE DESCRIPTION OF SUBR.)

R0014 INPUT

R0015 MPAC= 0 FOR EARTH, NON-ZERO FOR MOON
 R0016 0-S0= RP VECTOR
 R0017 0-T0= TIME

R0018 OUTPUT

R0019 MPAC= R VECTOR METERS B-29 FOR EARTH, B-27 FOR MOON

| | | | | | | | | | |
|------|-----|---|-----------|-------|---|---------|--------|----------|-----------------------------------|
| 0020 | REF | 1 | 26,2000 | | | | SETLOC | PLANTIN | |
| 0021 | | | 26,3341 | | | | BANK | | |
| 0022 | REF | 1 | | | | | COUNT* | SS/LIROT | |
| 0023 | | | 26,3341 | 46020 | 1 | RP-TO-R | STO | BHIZ | |
| 0024 | REF | 1 | 26,3342 | 00050 | 1 | | | RPREXIT | |
| 0025 | REF | 1 | 26,3343 | 55356 | 1 | | | RPTORA | |
| 0026 | | | 26,3344 | 77624 | 1 | | CALL | | COMPUTE M MATRIX FOR MOON |
| 0027 | REF | 1 | 26,3345 | 55416 | 1 | | | MOONMX | LP=LM FOR MOON RADIANS R0 |
| 0028 | | | 26,3346 | 77775 | 1 | | LOAD | | |
| 0029 | REF | 1 | 26,3347 | 02012 | 0 | | | S04LM | |
| 0030 | | | 26,3350 | 53235 | 0 | RPTORB | VXV | VAD | |
| 0031 | REF | 1 | 26,3351 | 00001 | 0 | | | S04RPR | |
| 0032 | REF | 2 | LAST 1213 | 00001 | 0 | | | S04RPR | |
| 0033 | | | 26,3353 | 52105 | 1 | | VXM | GOTO | |
| 0034 | REF | 1 | 26,3354 | 00025 | 0 | | | MMATRIX | MPAC=R=MT^T*(RP+LPXRP) |
| 0035 | REF | 1 | 26,3355 | 55404 | 1 | | | RPRPOOX | RESET PUSHLOC TO 0 BEFORE EXITING |
| 0036 | | | 26,3356 | 77624 | 1 | RPTORA | CALL | | EARTH COMPUTATIONS |
| 0037 | REF | 1 | 26,3357 | 55570 | 0 | | | EARTHMX | M MATRIX B-1 |
| 0038 | | | 26,3360 | 77624 | 1 | | CALL | | |
| 0039 | REF | 1 | 26,3361 | 55622 | 1 | | | EARTH L | L VECTOR RADIANS R0 |
| 0040 | | | 26,3362 | 76521 | 0 | | MXV | VSI | LP=M(T)*M. RAD B-0 |
| 0041 | REF | 2 | LAST 1213 | 00025 | 0 | | | MMATRIX | |



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| | | | | |
|------|-------|---------|---------|--------|
| 0042 | | 26,3364 | 77650 1 | GOTO |
| 0043 | REP 1 | 26,3385 | 55350 1 | RPTORB |



L PLANETARY INERTIAL ORIENTATION

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R0044 R-TO-RP SUBROUTINE
 R0045 SUBROUTINE TO CONVERT R (VECTOR IN REFERENCE COORD. SYSTEM) TO RP
 R0046 (VECTOR IN PLANETARY COORD SYSTEM) EITHER EARTH-FIXED OR MOON-FIXED

R0047 $RP=M(T)*(R-LXR)$

R0048 CALLING SEQUENCE
 R0049 L CALL
 R0050 L+1 R-TO-RP

R0051 SUBROUTINES USED
 R0052 EARTHMX,MOONMX,EARTH

R0053 INPUT
 R0054 MPAC= 0 FOR EARTH, NON-ZERO FOR MOON
 R0055 0-SD= R VECTOR
 R0056 6-7D= TIME

R0057 ITEMS AVAILABLE FROM LAUNCH DATA
 R0058 504LM= THE LIBRATION VECTOR L OF THE MOON AT TIME TMSURL, EXPRESSED
 R0059 IN THE MOON-FIXED COORD. SYSTEM RADIANS B0
 R0060 ITEMS NECESSARY FOR SUBROUTINES USED (SEE DESCRIPTION OF SUBR.)

R0061 OUTPUT
 R0062 MPAC=RP VECTOR METERS B-29 FOR EARTH, B-27 FOR MOON

| | | | | | | | | |
|------|-------|-----------|---------|---------|---------|-------|---------|-----------------------------|
| 0083 | | | 26,3366 | 46020 1 | R-TO-RP | STO | RHIZ | |
| 0084 | REP 2 | LAST 1213 | 26,3367 | 00050 1 | | | RPREXIT | |
| 0085 | REP 1 | | 26,3370 | 55410 1 | | | RTORPA | |
| 0086 | | | 26,3371 | 77624 1 | | CALL | | |
| 0087 | REP 2 | LAST 1213 | 26,3372 | 55418 1 | | | MOONMX | |
| 0088 | | | 28,3313 | 81375 1 | | VLOAD | VXM | |
| 0089 | REP 2 | LAST 1213 | 26,3374 | 02012 0 | | | 504LM | LP=LM |
| 0090 | REP 3 | LAST 1213 | 20,3315 | 00026 0 | | | MMATRIX | |
| 0091 | | | 26,3376 | 77772 0 | | VSL1 | | L=M(T)*L P RADIANS B0 |
| 0092 | | | 26,3377 | 51235 1 | RTORPR | VXV | RVSU | |
| 0093 | REP 3 | LAST 1213 | 26,3400 | 00001 0 | | | 504RPR | |
| 0094 | REP 4 | LAST 1215 | 26,3401 | 00001 0 | | | 504RPR | |
| 0095 | | | 28,3402 | 11721 0 | | MOV | | M(T)*(R-LXR) B-2 |
| 0096 | REP 4 | LAST 1215 | 26,3403 | 00025 0 | | | MMATRIX | |
| 0097 | | | 1,3404 | 40372 0 | RPRPOOX | VSL1 | SETPD | |
| 0098 | | | 1,3408 | 00001 0 | | | OD | |
| 0099 | | | 26,3406 | 77650 1 | | GOTO | | |
| 0100 | REP 3 | LAST 1215 | 26,3407 | 00050 1 | | | RPREXIT | |
| 0101 | | | 26,3410 | 77624 1 | RTORPA | CALL | | EARTH COMPUTATIONS |
| 0102 | REP 2 | LAST 1213 | 26,3411 | 55570 0 | | | EARTHMX | |
| 0103 | | | 26,3412 | 77624 1 | | CALL | | |
| 0104 | REP 2 | LAST 1213 | 26,3413 | 85822 1 | | | EARTH | |
| 0105 | | | 26,3414 | 77650 1 | | GOTO | | MPAC=1.2(-AX,-AY,0) RAD B-0 |
| 0106 | REP 1 | | 26,3415 | 55377 1 | | | RTORPR | |



L PLANETARY INERTIAL ORIENTATION

R0087 MOONM SUBROUTINE
 R0088 SUBROUTINE TO COMPUTE THE TRANSFORMATION MATRIX M FOR THE MOON

R0089 CALLING SEQUENCE
 R0090 L CALL MOONM
 R0091 L+1

R0092 SUBROUTINES USED
 R0093 NEWANGLE

R0094 INPUT
 R0095 6-YD= TIME
 R0096 ITEMS AVAILABLE FROM LAUNCH DATA
 R0097 BSUBO,FDOT
 R0098 TMSUBO,NODIO,NODDOT,PSUBO,FDOT
 R0099 COSI= COS(I) B-1
 R0100 SINI= SIN(I) B-1
 R0101 I IS THE ANGLE BETWEEN THE MEAN LUNAR EQUATORIAL PLANE AND THE
 R0102 PLANE OF THE ECLIPTIC (1 DEGREE 32.1 MINUTES)

R0103 OUTPUT
 R0104 MMATRIX= 3X3 M MATRIX B-1 (STORED IN VAC AREA)

| | | | | | | | |
|------|-----------------|---------|---------|-------|-------|-----------|--|
| 0105 | | 26,3416 | 40220 0 | MOONM | STQ | SETPD | |
| 0106 | REP 1 | 26,3417 | 00051 0 | | | EARTHMOX | |
| 0107 | | 26,3420 | 00011 1 | | | 6D | |
| 0108 | | 26,3421 | 77770 1 | | AXT,1 | | B REQUIRES SL 0, SL 5 IN NEWANGLE |
| 0109 | | 26,3422 | 00005 1 | | | 5 | |
| 0110 | | 26,3423 | 65345 0 | | DLOAD | PDDL | PD 10D 6-9D=BSUBO |
| 0111 | REP 1 | 26,3424 | 15652 1 | | | BSUBO | 10-11D=FDOT |
| 0112 | REP 1 | 26,3425 | 15644 0 | | | FDOT | |
| 0113 | | 26,3426 | 45006 0 | | PUSH | CALL | PD 12D |
| 0114 | REP 1 | 26,3427 | 55543 0 | | | NEWANGLE | EXIT WITH PD 6D AND MPAC= B REVS R0 |
| 0115 | | 26,3430 | 71406 0 | | PUSH | COS | PD 10D |
| 0116 | REP 1 | 26,3431 | 14041 1 | | STODL | COB | PD 6D COS(B) B-1 |
| 0117 | | 26,3432 | 77756 0 | | SIN | | SIN(B) B-1 |
| 0118 | REP 1 | 26,3433 | 14043 0 | | STODL | SOB | SETUP INPUT FOR NEWANGLE |
| 0119 | REP 1 | 26,3434 | 15650 0 | | | PSUBO | 6-9D=PSUBO |
| 0120 | | 26,3435 | 41525 0 | | PDDL | PUSH | PD 10D THEN 12D 10-11D=FDOT |
| 0121 | REP 1 | 26,3436 | 15642 0 | | | FDOT | |
| 0122 | | 26,3437 | 45170 0 | | AXT,1 | CALL | F REQUIRES SL 1, SL 6 IN NEWANGLE |
| 0123 | | 26,3440 | 00004 0 | | | 4 | |
| 0124 | REP 2 LAST 1216 | 26,3441 | 55543 0 | | | NEWANGLE | EXIT WITH PD 6D AND MPAC= F REVS R0 |
| 0125 | REP 1 | 26,3442 | 14027 1 | | STODL | AVECTR +2 | SAVE F TEMP |
| 0126 | REP 1 | 26,3443 | 15646 1 | | | NODIO | 6-9D=NODIO |
| 0127 | | 26,3444 | 41525 0 | | PDDL | PUSH | PD 10D THEN 12D 10-11D=NODDOT |
| 0128 | REP 1 | 26,3445 | 15640 1 | | | NODDOT | MPAC=T |
| 0129 | | 26,3446 | 45170 0 | | AXT,1 | CALL | NODE REQUIRES SL 0, SL 5 IN NEWANGLE |
| 0130 | | 26,3447 | 00005 1 | | | 5 | |
| 0131 | REP 3 LAST 1216 | 26,3450 | 55543 0 | | | NEWANGLE | EXIT WITH PD 6D AND MPAC= NODI REVS R0 |

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| | | | | | | | | | | |
|------|-----|----|-----------|---------|---------|-------|--------------|------------|-----------|--|
| 0132 | | | 28,3451 | 71408 0 | PUSH | COS | PD 10D | 8-9D= NODI | REVS | B0 |
| 0133 | | | 28,3452 | 77606 1 | PUSH | | PD 12D | 10-11D= | COS(NODI) | B-1 |
| 0134 | REP | 2 | LAST 1216 | 28,3453 | 00025 0 | STORE | AVECTR | | | |
| 0135 | | | 28,3454 | 76405 1 | DMP | SL1R | | | | |
| 0136 | REP | 2 | LAST 1216 | 28,3455 | 00041 1 | | COB | | | |
| 0137 | REP | 1 | | 28,3456 | 14035 1 | STOVL | BVECTR +2 | PD 10D | 20-25D= | AVECTR= |
| 0138 | | | 28,3457 | 76405 1 | DMP | SL1R | | | | COB*(NODI) B-1 |
| 0139 | REP | 2 | LAST 1216 | 28,3460 | 00043 0 | | SOB | | | COB*SIN(NODI) |
| 0140 | REP | 2 | LAST 1217 | 28,3461 | 14037 0 | STOVL | BVECTR +4 | PD 8D | | SOB*SIN(NODI) |
| 0141 | | | 28,3462 | 41556 1 | SIN | FUSH | | PD 10D | | -SIN(NODI) B-1 |
| 0142 | | | 28,3463 | 77676 0 | DCOMP | | | PD 8D | 26-31D= | BVECTR= |
| 0143 | REP | 3 | LAST 1217 | 28,3464 | 14033 1 | STOVL | BVECTR | PD 8D | | COB*(NODI) |
| 0144 | REP | 3 | LAST 1217 | 28,3465 | 00027 1 | | AVECTR +2 | PD 8D | | SOB*(NODI) |
| 0145 | REP | 1 | | 28,3466 | 14007 0 | STOVL | 504P | | | MOVE P FROM TEMP LOC. TO 504P |
| 0146 | | | 28,3467 | 76405 1 | DMP | SL1R | | | | |
| 0147 | REP | 3 | LAST 1217 | 28,3470 | 00041 1 | | COB | | | |
| 0148 | REP | 4 | LAST 1217 | 28,3471 | 14027 1 | STOVL | AVECTR +2 | | | |
| 0149 | REP | 1 | | 28,3472 | 00011 1 | | SIN(NODI) | | | 8-9D=SIN(NODI) B-1 |
| 0150 | | | 28,3473 | 76405 1 | DMP | SL1R | | | | |
| 0151 | REP | 3 | LAST 1217 | 28,3474 | 00043 0 | | SOB | | | |
| 0152 | REP | 5 | LAST 1217 | 28,3475 | 14031 0 | STOVL | AVECTR +4 | | | |
| 0153 | REP | 26 | LAST 893 | 28,3476 | 15332 1 | | HIGZEROS | PD 10D | 8-13D= | CVECTR= |
| 0154 | | | 28,3477 | 57525 1 | PDDL | DCOMP | | | | 0 -SOB B-1 COB |
| 0155 | REP | 4 | LAST 1217 | 28,3500 | 00043 0 | | SOB | PD 12D | THEN | PD 14D |
| 0156 | | | 28,3501 | 63325 0 | PDDL | PDVL | | | | |
| 0157 | REP | 4 | LAST 1217 | 28,3502 | 00041 1 | | COB | | | |
| 0158 | REP | 4 | LAST 1217 | 28,3503 | 00033 1 | | BVECTR | PD 20D | | BVECTR*SINI B-2 |
| 0159 | | | 28,3504 | 63361 0 | VXSC | PDVL | | | | |
| 0160 | REP | 1 | | 28,3505 | 15636 0 | | SINI | | | |
| 0161 | REP | 1 | | 28,3506 | 00011 1 | | CVECTR | PD 14D | | CVECTR*COBI B-2 |
| 0162 | | | 28,3507 | 53361 0 | VXSC | VAD | | | | |
| 0163 | REP | 1 | | 28,3510 | 15634 1 | | COBI | | | |
| 0164 | | | 28,3511 | 77772 0 | VSL1 | | | | | |
| 0165 | REP | 5 | LAST 1215 | 28,3512 | 24041 1 | STOVL | MMATRIX +12D | PD 8D | M2= | BVECTR*SINI+CVECTR*COBI B-1 |
| 0166 | | | 28,3513 | 63361 0 | VXSC | PDVL | | PD 14D | | CVECTR*SINI B-2 |
| 0167 | REP | 2 | LAST 1217 | 28,3514 | 15636 0 | | SINI | | | |
| 0168 | REP | 5 | LAST 1217 | 28,3515 | 00033 1 | | BVECTR | PD 8D | | BVECTR*COBI B-2 |
| 0169 | | | 28,3516 | 52361 1 | VXSC | VSU | | | | |
| 0170 | REP | 2 | LAST 1217 | 28,3517 | 15634 1 | | COBI | | | |
| 0171 | | | 28,3520 | 65372 1 | VSL1 | PDDL | | PD 14D | | |
| 0172 | REP | 2 | LAST 1217 | 28,3521 | 00007 0 | | 504P | | | 8-13D=DVECTR=BVECTR*COBI-CVECTR*SINI B-1 |
| 0173 | | | 28,3522 | 74346 0 | COS | VXSC | | | | |
| 0174 | REP | 1 | | 28,3523 | 00011 1 | | DVECTR | | | |
| 0175 | | | 28,3524 | 73525 1 | PDDL | SIN | | PD 20D | 14-19D= | DVECTR*COBP B-2 |
| 0176 | REP | 3 | LAST 1217 | 28,3525 | 00007 0 | | 504P | | | |
| 0177 | | | 28,3526 | 52361 1 | VXSC | VSU | | PD 14D | | AVECTR*SINP B-2 |
| 0178 | REP | 6 | LAST 1217 | 28,3527 | 00025 0 | | AVECTR | | | |
| 0179 | | | 28,3530 | 77772 0 | VSL1 | | | | | |
| 0180 | REP | 6 | LAST 1217 | 28,3531 | 14033 1 | STOVL | MMATRIX +6 | | | M1= |
| 0181 | REP | 4 | LAST 1217 | 28,3532 | 00007 0 | | 504P | | | AVECTR*SINP-DVECTR*COBP B-1 |

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| | | | | | | |
|-------|---|---------|---------|----------------|-----------|---|
| 0182 | | 26,3533 | 74356 1 | SIN | VXSC | PD 8D |
| 0183 | | 26,3534 | 71525 0 | FDDL | COS | PD 14D 8-13D=DVECTR*SINF B-2 |
| 0184 | REP 5 LAST 1217 | 26,3535 | 00007 0 | | 504P | |
| 0185 | | 26,3536 | 53361 0 | VXSC | VAD | PD 8D AVECTRACOSF B-2 |
| 0186 | REP 7 LAST 1217 | 26,3537 | 00025 0 | | AVECTR | |
| 0187 | | 26,3540 | 57572 0 | VSL1 | VCOMP | |
| 0188 | REP 7 LAST 1217 | 26,3541 | 34025 1 | STCALL | MMATRIX | M0= -(AVECTRACOSF*DVECTR*SINF) B-1 |
| 0189 | REP 2 LAST 1216 | 26,3542 | 00051 0 | | BARTHCK | |
| R0190 | COMPUTE X=X0+(XDOT)*(T-T0) | | | | | |
| R0191 | 8-9D=X0 (REVS B-0), PUSHLOC SET AT 12D | | | | | |
| R0192 | 10-11D=XDOT (REVS/CSEC) SCALED B+23 FOR WEARTH, B+26 FOR NDDOT AND BDOT | | | | | |
| R0193 | AND B+27 FOR FDOT | | | | | |
| R0194 | X1=DIFFERENCE IN 23 AND SCALING OF XDOT, =0 FOR WEARTH, 5 FOR NDDOT AND | | | | | |
| R0195 | BDOT AND 4 FOR FDOT | | | | | |
| R0196 | 6-7D=T (CSEC B-28), TIMSUB0 (CSEC B-42 TRIPLE PREC.) | | | | | |
| 0197 | | 26,3543 | 54345 1 | NEWANGLE DLOAD | SR | ENTER PD 12D |
| 0198 | | 26,3544 | 00007 0 | | 8D | |
| 0199 | | 26,3545 | 20617 0 | | 14D | |
| 0200 | | 26,3546 | 72371 1 | TAD | TLOAD | CHANGE MODE TO TP |
| 0201 | REP 1 | 26,3547 | 01707 0 | | TIMSUB0 | |
| 0202 | REP 648 LAST 1183 | 26,3550 | 00155 0 | | MPAC | |
| 0203 | REP 1 | 26,3551 | 14017 1 | STODL | TIMSUM | T-T0 CSEC B-42 |
| 0204 | REP 2 LAST 1218 | 26,3552 | 00020 0 | | TIMSUM +1 | |
| 0205 | | 26,3553 | 77605 1 | DMP | | PD 10D MULT BY XDOT IN 10-11D |
| 0206 | | 26,3554 | 43257 0 | SL* | DAD | PD 8D ADD X0 IN 8-9D AFTER SHIFTING |
| 0207 | | 26,3555 | 20206 1 | | 5,1 | SUCH THAT SCALING IS B-0 |
| 0208 | | 26,3556 | 67208 1 | PUSH | SLOAD | PD 10D SAVE PARTIAL (X0+XDOT*T) IN 8-9D |
| 0209 | REP 3 LAST 1218 | 26,3557 | 00017 1 | | TIMSUM | |
| 0210 | | 26,3560 | 41261 1 | SL | DMP | |
| 0211 | | 26,3561 | 20212 1 | | 9D | |
| 0212 | | 26,3562 | 00013 0 | | 10D | XDOT |
| 0213 | | 26,3563 | 43257 0 | SL* | DAD | PD 8D SHIFT SUCH THAT THIS PART OF X |
| 0214 | | 26,3564 | 20213 0 | | 10D,1 | IS SCALED REVS/CSEC B-0 |
| 02141 | | 26,3565 | 77600 1 | BOV | | TURN OFF OVERFLOW IF SET BY SHIFT |
| 02142 | | 26,3566 | 55567 0 | | +1 | INSTRUCTION BEFORE EXITING |
| 0215 | | 26,3567 | 77616 0 | RVO | | MPAC=X= X0+(XDOT)*(T-T0) REVS B0 |



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R0216 EARTHXX SUBROUTINE
 R0217 SUBROUTINE TO COMPUTE THE TRANSFORMATION MATRIX M FOR THE EARTH

R0218 CALLING SEQUENCE
 R0219 L CALL
 R0220 L+1 EARTHXX

R0221 SUBROUTINES USED
 R0222 NEWANGLE

R0223 INPUT
 R0224 INPUT AVAILABLE FROM LAUNCH DATA AZO REVS B-0
 R0225 TERMEM CBSC B-42
 R0226 8-YD= TIME CBSC B-28

R0227 OUTPUT
 R0228 MMATRIX= 3X3 M MATRIX B-1 (STORED IN VAC AREA)

| | | | | | | | |
|------|--------|---------|---------|---------|-------|----------|---|
| 0229 | | 26,3570 | 40220 0 | EARTHXX | STO | SETPD | SET 8-9D=AZO |
| 0230 | REP 3 | 26,3571 | 00051 0 | | | EARTHXX | |
| 0231 | | 26,3572 | 00011 1 | | | 8D | 10-11D=WEARTH |
| 0232 | | 26,3573 | 77770 1 | | AKT,1 | | FOR SL 5, AND SL 10 IN NEWANGLE |
| 0233 | | 26,3574 | 00000 1 | | | 0 | LEAVING PD SET AT 12D FOR NEWANGLE |
| 0234 | | 26,3575 | 65345 0 | | DLOAD | PDDL | |
| 0235 | REP 1 | 26,3576 | 01712 1 | | | AZO | |
| 0236 | REP 1 | 26,3577 | 15654 1 | | | WEARTH | |
| 0237 | | 26,3600 | 45006 0 | | PUSH | CALL | |
| 0238 | REP 4 | 26,3601 | 55543 0 | | | NEWANGLE | |
| 0239 | | 26,3602 | 41401 1 | | SETPD | PUSH | 18-19D=504AZ |
| 0240 | | 26,3603 | 00023 0 | | | 18D | COS(AZ) SIN(AZ) 0 |
| 0241 | | 26,3604 | 65346 0 | | COS | PDDL | 20-37D= MMATRIX= -SIN(AZ) COS(AZ) 0 B-1 |
| 0242 | REP 1 | 26,3605 | 00023 0 | | | 504AZ | 0 0 1 |
| 0243 | | 26,3606 | 65356 1 | | SIN | PDDL | |
| 0244 | REP 27 | 26,3607 | 15332 1 | | | H16ZEROS | |
| 0245 | | 26,3610 | 73525 1 | | PDDL | SIN | |
| 0246 | REP 2 | 26,3611 | 00023 0 | | | 504AZ | |
| 0247 | | 26,3612 | 65276 1 | | DCOMP | PDDL | |
| 0248 | REP 3 | 26,3613 | 00023 0 | | | 504AZ | |
| 0249 | | 26,3614 | 63346 0 | | COS | PDDL | |
| 0250 | REP 28 | 26,3615 | 15332 1 | | | H16ZEROS | |
| 0251 | | 26,3616 | 41525 0 | | PDDL | PUSH | |
| 0252 | REP 11 | 26,3617 | 15330 0 | | | H16PHALF | |
| 0253 | | 26,3620 | 77450 1 | | GOTO | | |
| 0254 | REP 4 | 26,3621 | 00051 0 | | | EARTHXX | |



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R0255 EARTH. SUBROUTINE
R0256 SUBROUTINE TO COMPUTE L VECTOR FOR EARTH

R0257 CALLING SEQUENCE
R0258 L CALL
R0259 L+1 EARTH.

R0260 INPUT
R0261 AX0,AY0 SET AT LAUNCH TIME WITH AYO IMMEDIATELY FOLLOWING AX0 IN CORE

R0262 OUTPUT
R0263 -AX
R0264 MPAC= -AY RADIANS B-0
R0265 0

| | | | | | | | | |
|------|-----|----|-----------|---------|---------|--------|-------|-----------|
| 0266 | | | | 26,3622 | 57545 1 | EARTH. | DLOAD | DCOMP |
| 0267 | REP | 2 | LAST 018 | 26,3623 | 01716 0 | | | AX0 |
| 0268 | REP | 1 | | 26,3624 | 14017 1 | | STOVL | 504LPL |
| 0269 | REP | 2 | LAST 018 | 26,3625 | 01714 1 | | | -AY0 |
| 0270 | REP | 2 | LAST 1220 | 26,3626 | 14021 1 | | STOVL | 504LPL +2 |
| 0271 | REP | 29 | LAST 1219 | 26,3627 | 15332 1 | | | H16ZEROS |
| 0272 | REP | 3 | LAST 1220 | 26,3630 | 24023 0 | | STOVL | 504LPL +4 |
| 0273 | REP | 4 | LAST 1220 | 26,3631 | 00017 1 | | | 504LPL |
| 0274 | | | | 26,3632 | 77616 0 | | RVO | |

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P0275 CONSTANTS AND BRASABLE ASSIGNMENTS

| | | | | | | | |
|------|------------------|---------|---------|----------|-------|-------------|---|
| 0276 | REP 5 LAST 1210 | 04,3453 | 1B1 | = | DP1/2 | 1 | SCALED B-1 |
| 0277 | | 26,3633 | 17775 1 | COSI | 2DEC | .99984115 | B-1 COS(1 DEG 32.1 MIN) B-1 |
| 0278 | | 26,3634 | 01734 0 | | | | |
| 0279 | | 26,3635 | 00333 1 | SINI | 2DEC | .02678760 | B-1 SIN(1 DEG 32.1 MIN) B-1 |
| 0276 | | 26,3636 | 16153 1 | | | | |
| 0279 | REP 38 LAST 1163 | 0050 | | RPRXIT | = | S1 | R-TO-RP AND RP-TO-R SURR EXIT |
| 0280 | REP 13 LAST 1212 | 0051 | | EARTHMOX | = | S2 | EARTHMOX, MOONMOX SURR. EXITS |
| 0281 | | 0000 | | S04RFR | = | 0D | 0 REOS R OR RP VECTOR |
| 0282 | | 0010 | | SINNOI | = | 0D | 2 SIN(NDOI) |
| 0283 | | 0010 | | DVECTR | = | 0D | 6 D VECTOR MOON |
| 0284 | | 0010 | | CVECTR | = | 0D | 6 C VECTOR MOON |
| 0285 | | 0022 | | S04AZ | = | 16D | 2 AZ |
| 0286 | | 0016 | | TIMSLEM | = | 14D | 3 TIME SUB M (MOON) T+T0 IN GSTAZ |
| 0287 | | 0016 | | S04LPL | = | 14D | 6 L OR LP VECTOR |
| 0288 | | 0024 | | AVECTR | = | 20D | 6 A VECTOR (MOON) |
| 0289 | | 0032 | | BVECTR | = | 28D | 6 B VECTOR (MOON) |
| 0290 | | 0024 | | MMATRIX | = | 20D | 16 M MATRIX |
| 0291 | | 0040 | | COB | = | 32D | 2 COS(B) B-1 |
| 0292 | | 0042 | | SOB | = | 34D | 2 SIN(B) B-1 |
| 0293 | | 0006 | | S04P | = | 0D | 2 P (MOON) |
| 0297 | | 26,3637 | 77665 1 | NODDOT | 2DEC | -.457335143 | E-2 REVS/CSEC B+28=-1.07047016 E-6 RAD/SEC |
| 0297 | | 26,3640 | 42175 1 | | | | |
| 0298 | | 26,3641 | 22211 0 | PDOT | 2DEC | .570862491 | REVS/CSEC B+27= 2.67240019 E-6 RAD/SEC |
| 0298 | | 26,3642 | 00285 0 | | | | |
| 0299 | | 26,3643 | 77777 0 | BDOT | 2DEC | -3.07500412 | E-8 REVS/CSEC B+28=-7.19756666 E-14 RAD/SEC |
| 0299 | | 26,3644 | 77767 1 | | | | |
| 0300 | | 26,3645 | 41215 1 | NODIO | 2DEC | -.960101289 | REVS B-0 = -6.03249419 RAD |
| 0300 | | 26,3646 | 66331 0 | | | | |
| 0301 | | 26,3647 | 15237 0 | PSURO | 2DEC | .415998375 | REVS B-0 = 2.61379488 RAD |
| 0301 | | 26,3650 | 26751 0 | | | | |
| 0302 | | 26,3651 | 02052 1 | BSURO | 2DEC | .0651205006 | REVS B-0 = 0.409164173 RAD |
| 0302 | | 26,3652 | 35713 1 | | | | |
| 0303 | | 26,3653 | 37116 0 | WEARTH | 2DEC | .973561855 | REVS/CSEC B+23=7.29211515 E-5 RAD/SEC |
| 0303 | | 26,3654 | 32630 0 | | | | |



L MEASUREMENT INCORPORATION

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P0001 INCORP1--PERFORMS THE SIX DIMENSIONAL STATE VECTOR DEVIATION FOR POSITI
R0002 ON AND VELOCITY OR THE NINE DIMENSIONAL DEVIATION OF POSITION, VELOCITY, A
R0003 ND RADAR OR LANDMARK BIAS. THE OUTPUT OF THE BVVECTOR ROUTINE ALONG WITH T
R0004 HE ERROR TRANSITION MATRIX(W) ARE USED AS INPUT TO THE ROUTINE. THE DEVI
R0005 TION IS OBTAINED BY COMPUTING AN ESTIMATED TRACKING MEASUREMENT FROM THE
R0006 CURRENT STATE VECTOR AND COMPARING IT WITH AN ACTUAL TRACKING MEASUREMENT
R0007 T AND APPLYING A STATISTICAL WEIGHTING VECTOR.
R0008 INPUT
R0009 DIMENPLD = 6 DIMENSIONAL BVVECTOR 1= 9 DIMENSIONAL
R0010 W = ERROR TRANSITION MATRIX 6X6 OR 9X9
R0011 VARIANCE = VARIANCE (SCALAR)
R0012 DELTAQ = MEASURED DEVIATION (SCALAR)
R0013 BVVECTOR = 6 OR 9 DIMENSIONAL BVVECTOR

R0014 OUTPUT
R0015 DELTAX = STATE VECTOR DEVIATIONS 6 OR 9 DIMENSIONAL
R0016 ZI = VECTOR USED FOR THE INCORPORATION 6 OR 9 DIMENSIONAL
R0017 GAMMA = SCALAR
R0018 OMEGA = OMEGA WEIGHTING VECTOR 6 OR 9 DIMENSIONAL
R0019 CALLING SEQUENCE
R0020 L CALL INCORP1

R0021 NORMAL EXIT

R0022 L=1 OF CALLING SEQUENCE

| | | | | | | | |
|------|--------|-----------|---------|---------|---------|----------|--------------------------|
| 0023 | | | 37,3676 | | | | BANK 37 |
| 0024 | REP 1 | | 36,2000 | | | | SETLOC MEASINC |
| 0025 | | | 36,3250 | | | | BANK |
| 0026 | REP 1 | | | | | | COUNT* 88/INCOR |
| 0027 | REP 57 | LAST 624 | ES,1400 | | | | BRANK= W |
| 0028 | | | 36,3250 | 77620 0 | INCORP1 | STO | |
| 0029 | REP 10 | LAST 576 | 36,3251 | 02317 0 | | BORESS | |
| 0030 | | | 36,3252 | 66370 0 | | AXT,1 | SSP |
| 0031 | | | 36,3253 | 00066 1 | | | S4D |
| 0032 | REP 39 | LAST 1221 | 36,3254 | 00051 0 | | | S1 |
| 0033 | | | 36,3255 | 00022 1 | | | 18D IX1 = 54 S1= 18 |
| 0034 | | | 36,3256 | 66374 1 | | AXT,2 | SSP |
| 0035 | | | 36,3257 | 00022 1 | | | 18D |
| 0036 | REP 14 | LAST 1221 | 36,3260 | 00052 0 | | | S2 |
| 0037 | | | 36,3261 | 00006 1 | | | 6 IX2 = 18 S2=6 |
| 0038 | | | 36,3262 | 63775 1 | Z123 | VLOAD | MCV* |
| 0039 | REP 20 | LAST 616 | 36,3263 | 03502 0 | | BVVECTOR | BVVECTOR (0) |
| 0040 | REP 58 | LAST 1222 | 36,3264 | 02467 0 | | | W +54D,1 |
| 0041 | REP 2 | LAST 95 | 36,3265 | 12745 1 | | STORE | ZI +18D,2 |
| 0042 | | | 36,3266 | 77775 1 | | VLOAD | |
| 0043 | REP 21 | LAST 1222 | 36,3267 | 03510 0 | | | BVVECTOR +6 BVVECTOR (1) |



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| | | | | | | | |
|------|-----|----|-----------|-----------------|---------|---------------|--|
| 0044 | | | 36,3270 | 52717 1 | MOV* | W0* | |
| 0045 | REP | 59 | LAST 1222 | 36,3271 02555 0 | | W +108D,1 | |
| 0046 | REP | 3 | LAST 1222 | 36,3272 75032 1 | | ZI +18D,2 | |
| 0047 | REP | 4 | LAST 1223 | 36,3273 12745 1 | STORE | ZI +18D,2 | |
| 0048 | | | 36,3274 | 77775 1 | VLOAD | | |
| 0049 | REP | 22 | LAST 1222 | 36,3275 03516 0 | | BVECTOR +12D | BVECTOR (2) |
| 0050 | | | 36,3276 | 52717 1 | MOV* | W0* | |
| 0051 | REP | 60 | LAST 1223 | 36,3277 02643 1 | | W +162D,1 | |
| 0052 | REP | 5 | LAST 1223 | 36,3300 75032 1 | | ZI +18D,2 | B(0)*W+B(1)*(W+54)+B(2)*(W+108)FIRST PAS |
| 0053 | REP | 6 | LAST 1223 | 36,3301 12745 1 | STORE | ZI +18D,2 | ZI THEN Z2 THEN Z3 |
| 0054 | | | 36,3302 | 77700 0 | TIX,1 | | |
| 0055 | REP | 1 | | 36,3303 75304 1 | INCOR1 | INCOR1 | |
| 0056 | | | 36,3304 | 43104 0 | TIX,2 | INCOR1 | |
| 0057 | REP | 1 | | 36,3305 75282 0 | | ZI23 | LOOP FOR Z1,Z2,Z3 |
| 0058 | REP | 8 | LAST 617 | 36,3306 02706 1 | | EMENFLO | |
| 0059 | REP | 1 | | 36,3307 75313 1 | | INCOR1A | |
| 0060 | | | 36,3310 | 77775 1 | VLOAD | | |
| 0061 | REP | 20 | LAST 624 | 36,3311 15332 1 | | ZEROVCS | |
| 0062 | REP | 7 | LAST 1223 | 36,3312 02737 0 | INCOR1A | STORE ZI +12D | |
| 0063 | | | 36,3313 | 77201 1 | SETFD | VLOAD | |
| 0064 | | | 36,3314 | 00001 0 | | 0 | |
| 0065 | REP | 8 | LAST 1223 | 36,3315 02723 0 | | ZI | |
| 0066 | | | 36,3316 | 47036 1 | VSD | RTS | |
| 0067 | REP | 7 | LAST 873 | 36,3317 45562 1 | | TRMCR | |
| 0068 | | | 36,3320 | 47515 0 | PDVL | VSD | |
| 0069 | REP | 9 | LAST 1223 | 36,3321 02731 0 | | ZI +6 | |
| 0070 | | | 36,3322 | 76234 0 | RTB | TRMCR | |
| 0071 | REP | 8 | LAST 1223 | 36,3323 45562 1 | | TRMCR | |
| 0072 | | | 36,3324 | 47515 0 | PDVL | VSD | |
| 0073 | REP | 10 | LAST 1223 | 36,3325 02737 0 | | ZI +12D | |
| 0074 | | | 36,3326 | 76234 0 | RTB | TRMCR | |
| 0075 | REP | 9 | LAST 1223 | 36,3327 45562 1 | | TRMCR | |
| 0076 | | | 36,3330 | 77171 0 | TAD | ACT,2 | |
| 0077 | REP | 12 | LAST 617 | 36,3331 03526 0 | | VARIANCE | |
| 0078 | | | 36,3332 | 00000 1 | | 0 | |
| 0079 | REP | 1 | | 36,3333 01257 0 | STORE | TRIPA | ZI*2 + Z2*2 + Z3*2 + VARIANCE |
| 0080 | | | 36,3334 | 40151 0 | TLOAD | BOY | |
| 0081 | REP | 13 | LAST 1223 | 36,3335 03526 0 | | VARIANCE | CLEAR OVPIND |
| 0082 | | | 36,3336 | 75337 1 | | +1 | |
| 0083 | REP | 1 | | 36,3337 01262 0 | STORE | TEMPVAR | TEMP STORAGE FOR VARIANCE |
| 0084 | | | 36,3340 | 77654 0 | BZE | | |
| 0085 | REP | 1 | | 36,3341 75350 0 | INCOR1C | INCOR1C | |
| 0086 | | | 36,3342 | 40112 1 | INCOR1B | SL2 | |
| 0087 | REP | 2 | LAST 1223 | 36,3343 75350 0 | | INCOR1C | |
| 0088 | REP | 2 | LAST 1223 | 36,3344 01262 0 | STORE | TEMPVAR | |
| 0089 | | | 36,3345 | 52114 1 | INCR,2 | GOTO | |
| 0090 | | | 36,3346 | 00001 0 | DEC | 1 | |
| 0091 | REP | 1 | | 36,3347 75342 0 | INCOR1B | INCOR1B | |
| 0092 | | | 36,3350 | 81551 1 | INCOR1C | TLOAD | |
| 0093 | REP | 2 | LAST 1223 | 36,3351 01257 0 | | TRIPA | |

L MEASUREMENT INCORPORATION

| | | | | | | |
|-------|-----|-----|---------|---------|--------|------------|
| 0094 | | | 36,3352 | 75405 1 | DMP | SOFT |
| 0095 | REP | 3 | 36,3353 | 01262 0 | | TRMPVAR |
| 0096 | | | 36,3354 | 76257 0 | SL* | TAD |
| 0097 | | | 36,3355 | 57576 1 | | 0,2 |
| 0098 | REP | 3 | 36,3356 | 01257 0 | | TRIPA |
| 0099 | | | 36,3357 | 63101 1 | NORM | INCR,2 |
| 0100 | REP | 27 | 36,3360 | 00050 1 | | X2 |
| 0101 | | | 36,3361 | 77775 1 | DESC | -2 |
| 0102 | | | 36,3362 | 77134 1 | SXA,2 | AXT,2 |
| 0103 | REP | 2 | 36,3363 | 02215 0 | | NORMGAM |
| 0104 | | | 36,3364 | 00242 0 | | 162D |
| 0105 | | | 36,3365 | 40265 1 | RDDV | SETPD |
| 0106 | REP | 4 | 36,3366 | 15322 0 | | DP1/4TH |
| 0107 | | | 36,3367 | 00001 0 | | 0 |
| 0108 | REP | 2 | 36,3370 | 03456 0 | STORE | GAMMA |
| 0109 | | | 36,3371 | 60351 0 | TLOAD | NORM |
| 0110 | REP | 4 | 36,3372 | 01257 0 | | TRIPA |
| 0111 | REP | 56 | 36,3373 | 00047 1 | | X1 |
| 0112 | | | 36,3374 | 65345 0 | DLOAD | PDDL |
| 0113 | REP | 649 | 36,3375 | 00155 0 | | MPAC |
| 0114 | REP | 5 | 36,3376 | 03524 1 | | DELTAQ |
| 0115 | | | 36,3377 | 77701 1 | NORM | |
| 0116 | REP | 40 | 36,3400 | 00051 0 | | S1 |
| 0117 | | | 36,3401 | 70460 1 | XSU,1 | SR1 |
| 0118 | REP | 41 | 36,3402 | 00050 1 | | S1 |
| 0119 | | | 36,3403 | 41471 0 | DDV | PUSH |
| 01193 | | | 36,3404 | 77650 1 | GOTO | |
| 01196 | REP | 1 | 36,3405 | 77676 0 | | NEWZCOMP |
| 0120 | | | 36,3406 | 77731 1 | -3 | SSP |
| 0121 | REP | 15 | 36,3407 | 00052 0 | | S2 |
| 0122 | | | 36,3410 | 00066 1 | INCOR2 | VLOAD |
| 0123 | | | 36,3411 | 60775 1 | | 54D |
| 0124 | REP | 11 | 36,3412 | 02723 0 | | VX** |
| 0125 | REP | 61 | 36,3413 | 75134 0 | | ZI |
| 0126 | | | 36,3414 | 77206 0 | | W +162D,2 |
| 0127 | REP | 12 | 36,3415 | 02731 0 | PUSH | VLOAD |
| 0128 | | | 36,3416 | 53303 1 | | ZI +6 |
| 0129 | REP | 62 | 36,3417 | 75112 1 | VX** | VAD |
| 0130 | | | 36,3420 | 77206 0 | | W +180D,2 |
| 0131 | REP | 13 | 36,3421 | 02737 0 | PUSH | VLOAD |
| 0132 | | | 36,3422 | 53303 1 | | ZI +12D |
| 0133 | REP | 63 | 36,3423 | 75070 1 | VX** | VAD |
| 0134 | | | 36,3424 | 61006 0 | | W +198D,2 |
| 0135 | REP | 1 | 36,3425 | 75411 1 | PUSH | TIX,2 |
| 0136 | | | 36,3426 | 45575 1 | | INCOR2 |
| 0137 | REP | 2 | 36,3427 | 74303 1 | VLOAD | STADR |
| 0138 | | | 36,3430 | 45575 1 | STORE | OMEGA +12D |
| 0139 | REP | 3 | 36,3431 | 74311 1 | VLOAD | STADR |
| 0140 | | | 36,3432 | 45575 1 | STORE | OMEGA +6 |
| 0141 | REP | 4 | 36,3433 | 74317 1 | VLOAD | STADR |
| | | | | | STORE | OMEGA |

NORMALIZATION COUNT -2 FOR GAMMA

PD 0-1 = NORM (A)

PD 0-1 = DELTAQ/A

COMPUTE OMEGA1,2,3

PD 2-7=OMEGA1,8-13=OMEGA2,14-19=OMEGA3



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| | | | | | | | |
|------|-----|----|-----------|---------|----------|----------|---------------|
| 0142 | | | 36,3434 | 77214 0 | BON | VLOAD | |
| 0143 | REP | 9 | LAST 1223 | 36,3435 | 02706 1 | DMENPLG | |
| 0144 | REP | 1 | | 36,3436 | 75441 1 | INCOR2AB | |
| 0145 | REP | 21 | LAST 1223 | 36,3437 | 15332 1 | ZEROVECS | |
| 0146 | REP | 5 | LAST 1224 | 36,3440 | 03474 0 | STORE | OMEGA +12D |
| 0147 | | | 36,3441 | 66374 1 | INCOR2AB | AXT,2 | SSP |
| 0148 | | | 36,3442 | 00022 1 | | | 18D |
| 0149 | REP | 16 | LAST 1224 | 36,3443 | 00052 0 | | 82 |
| 0150 | | | 36,3444 | 00006 1 | | | 8 |
| 0151 | | | 36,3445 | 77773 1 | INCOR3 | VLOAD* | |
| 0152 | REP | 8 | LAST 1225 | 36,3446 | 74275 1 | | OMEGA +18D,2 |
| 0153 | | | 36,3447 | 53761 1 | VXSC | VSL# | |
| 0154 | | | 36,3450 | 00001 0 | | | DELTAQ/A |
| 0155 | | | 36,3451 | 20201 0 | | | 0,1 |
| 0156 | REP | 12 | LAST 617 | 36,3452 | 11301 0 | STORE | DELTAQ +18D,2 |
| 0157 | | | 36,3453 | 77304 0 | TIX,2 | VLOAD | |
| 0158 | REP | 1 | | 36,3454 | 75445 0 | | INCOR3 |
| 0159 | REP | 13 | LAST 1225 | 36,3455 | 01285 1 | | DELTAQ +6 |
| 0160 | | | 36,3456 | 77732 1 | VSL,3 | | |
| 0161 | REP | 14 | LAST 1225 | 36,3457 | 01285 1 | STORE | DELTAQ +6 |
| 0162 | | | 36,3460 | 77650 1 | GOTO | | |
| 0163 | REP | 11 | LAST 1222 | 36,3461 | 02317 0 | | EGRESS |



L MEASUREMENT INCORPORATION

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P0164 INCORP2 - INCORPORATES THE COMPUTED STATE VECTOR DEVIATIONS INTO THE
 R0165 ESTIMATED STATE VECTOR. THE STATE VECTOR UPDATED MAY BE FOR EITHER THE
 R0166 LEM OR THE CSM, DETERMINED BY FLAG VEHUPFLG. (ZERO = LEM) (1 = CSM)
 R0167 INPUT
 R0168 PERMANENT STATE VECTOR FOR EITHER THE LEM OR CSM
 R0169 VEHUPFLG = UPDATE VEHICLE 0=LEM 1=CSM
 R0170 W = ERROR TRANSITION MATRIX
 R0171 DELTAX = COMPUTED STATE VECTOR DEVIATIONS
 R0172 DMENPLG = SIZE OF W MATRIX (ZERO = 6X6) (1 = 8X8)
 R0173 GAMMA = SCALAR FOR INCORPORATION
 R0174 ZI = VECTOR USED IN INCORPORATION
 R0175 OMEGA = WEIGHTING VECTOR

R0176 OUTPUT
 R0177 UPDATED PERMANENT STATE VECTOR

R0178 CALLING SEQUENCE
 R0179 L CALL INCORP2

R0180 NORMAL EXIT
 R0181 L-1 OF CALLING SEQUENCE

| | | | | | | | | | | |
|------|-----|-----|-------------------|---------|--------|------|--------|-------|-----------------|--------------------------------------|
| 0182 | REP | 1 | | 36,2000 | | | | | SETLOC MEASINC1 | |
| 0183 | | | | 36,3462 | | | | | BANK | |
| 0184 | REP | 2 | LAST 1222 TO 1226 | 138 | 138* | | | | COUNT* SS/INCOR | |
| 0185 | | | | 36,3462 | 45020 | 1 | INCRP2 | STO | CALL | |
| 0186 | REP | 12 | LAST 1225 | 36,3463 | 02317 | 0 | | | EGRESS | |
| 0187 | REP | 21 | LAST 868 | 36,3464 | 27371 | 1 | | | INTSTALL | |
| 0188 | | | | 36,3465 | 74375 | 0 | | VLOAD | VXSC | CALC. GAMMA * OMEGA 1,2,3 |
| 0189 | REP | 7 | LAST 1225 | 36,3466 | 03460 | 0 | | | OMEGA | |
| 0190 | REP | 3 | LAST 1224 | 36,3467 | 03456 | 0 | | | GAMMA | |
| 0191 | REP | 2 | LAST 95 | 36,3470 | 26643 | 1 | | STOVL | OMEGAM1 | |
| 0192 | REP | 8 | LAST 1226 | 36,3471 | 03466 | 0 | | | OMEGA +6 | |
| 0193 | | | | 36,3472 | 77761 | 1 | | VXSC | | |
| 0194 | REP | 4 | LAST 1226 | 36,3473 | 03456 | 0 | | | GAMMA | |
| 0195 | REP | 2 | LAST 95 | 36,3474 | 26651 | 1 | | STOVL | OMEGAM2 | |
| 0196 | REP | 9 | LAST 1226 | 36,3475 | 03474 | 0 | | | OMEGA +12D | |
| 0197 | | | | 36,3476 | 77761 | 1 | | VXSC | | |
| 0198 | REP | 5 | LAST 1226 | 36,3477 | 03456 | 0 | | | GAMMA | |
| 0199 | REP | 2 | LAST 95 | 36,3500 | 02857 | 1 | | STORE | OMEGAM3 | |
| 0200 | | | | 36,3501 | 77776 | 1 | | EXIT | | |
| 0201 | REP | 1 | | 36,3502 | 3 | 3763 | 0 | CAP | 54DD | INITIAL IX 1 SETTING FOR W MATRIX |
| 0202 | REP | 2 | LAST 78 | 36,3503 | 55=252 | 1 | | TS | WIXA | |
| 0203 | REP | 2 | LAST 78 | 36,3504 | 55=253 | 0 | | TS | WIXB | |
| 0204 | REP | 240 | LAST 1201 | 36,3505 | 2 | 4714 | 1 | CAP | ZIXA | INITIAL IX 2 SETTING FOR Z COMPONENT |
| 0205 | REP | 2 | LAST 78 | 36,3506 | 55=254 | 1 | | TS | ZIXB | |
| 0206 | REP | 2 | LAST 78 | 36,3507 | 55=255 | 0 | | TS | ZIXC | |
| 0207 | REP | 91 | LAST 1051 | 36,3510 | 0 | 5301 | 0 | PAZA | PHASORNG | |



L MEASUREMENT INCORPORATION

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| | | | | |
|------|---------|-----------|---------|----------|
| 0208 | | | 36,3511 | 04022 0 |
| 0209 | REP 48 | LAST 783 | 36,3512 | 0 5435 0 |
| 0210 | REP 2 | LAST 503 | 36,3513 | 00236 0 |
| 0212 | REP 3 | LAST 1226 | 36,3514 | 3 1253 1 |
| 0213 | REP 3 | LAST 1226 | 36,3515 | 55*252 1 |
| 0214 | REP 3 | LAST 1226 | 36,3516 | 3 1255 1 |
| 0215 | REP 3 | LAST 1226 | 36,3517 | 55*254 1 |
| 0216 | REP 228 | LAST 1098 | 36,3520 | 0 6006 1 |
| 0217 | | | 36,3521 | 73150 1 |
| 0218 | REP 4 | LAST 1227 | 36,3522 | 01252 0 |
| 0219 | REP 4 | LAST 1227 | 36,3523 | 01254 0 |
| 0220 | | | 36,3524 | 70131 0 |
| 0221 | REP 42 | LAST 1224 | 36,3525 | 00051 0 |
| 0222 | | | 36,3526 | 00006 1 |
| 0223 | REP 14 | LAST 1224 | 36,3527 | 75054 1 |
| 0224 | | | 36,3530 | 60276 1 |
| 0225 | REP 17 | LAST 1225 | 36,3531 | 00052 0 |
| 0226 | | | 36,3532 | 65161 1 |
| 0227 | REP 3 | LAST 1226 | 36,3533 | 02843 1 |
| 0228 | REP 18 | LAST 1227 | 36,3534 | 00051 0 |
| 0229 | | | 36,3535 | 57144 1 |
| 0230 | REP 28 | LAST 1224 | 36,3536 | 00041 1 |
| 0231 | REP 3 | LAST 1224 | 36,3537 | 02215 0 |
| 0232 | | | 36,3540 | 65057 0 |
| 0233 | | | 36,3541 | 57576 1 |
| 0234 | REP 19 | LAST 1227 | 36,3542 | 00091 0 |
| 0235 | | | 36,3543 | 77853 1 |
| 0236 | REP 64 | LAST 1224 | 36,3544 | 02467 0 |
| 0237 | REP 2 | LAST 95 | 36,3545 | 02865 0 |
| 0238 | | | 36,3546 | 57543 1 |
| 0239 | REP 15 | LAST 1227 | 36,3547 | 75054 1 |
| 0240 | | | 36,3550 | 14301 0 |
| 0241 | REP 20 | LAST 1227 | 36,3551 | 00052 0 |
| 0242 | REP 3 | LAST 1226 | 36,3552 | 02851 1 |
| 0243 | | | 36,3553 | 11124 0 |
| 0244 | REP 21 | LAST 1227 | 36,3554 | 00051 0 |
| 0245 | REP 29 | LAST 1227 | 36,3555 | 00047 1 |
| 0246 | | | 36,3556 | 53874 1 |
| 0247 | REP 4 | LAST 1227 | 36,3557 | 02215 0 |
| 0248 | | | 36,3560 | 57576 1 |
| 0249 | | | 36,3561 | 52724 1 |
| 0250 | REP 22 | LAST 1227 | 36,3562 | 00051 0 |
| 0251 | REP 65 | LAST 1227 | 36,3563 | 02555 0 |
| 0252 | REP 3 | LAST 1227 | 36,3564 | 02673 1 |
| 0253 | | | 36,3565 | 11614 1 |
| 0254 | REP 10 | LAST 1225 | 36,3566 | 02746 0 |
| 0255 | REP 1 | | 36,3567 | 75607 1 |
| 0256 | | | 36,3570 | 51543 1 |
| 0257 | REP 16 | LAST 1227 | 36,3571 | 15054 1 |
| 0258 | | | 36,3572 | 74301 0 |

PAZA1

| | |
|--------|-----------|
| OCT | 04022 |
| TC | UPPLAG |
| ADRES | RSINTPLG |
| CA | WIXB |
| TS | WIXA |
| CA | ZIXB |
| TS | ZIXA |
| TC | INTPRET |
| LXA,1 | LXA,2 |
| | WIXA |
| | ZIXA |
| SSP | DLOAD* |
| | S1 |
| | S |
| | ZI,2 |
| DCOMP | NORM |
| | S2 |
| VXSC | XCHK,2 |
| | OMEGAM1 |
| | S2 |
| LXC,2 | XAD,2 |
| | X2 |
| | NORMGAM |
| VSL* | XCHK,2 |
| | 0,2 |
| | S2 |
| VAD* | |
| | W +54D,1 |
| STORE | HOLDW |
| DLOAD* | DCOMP |
| | ZI,2 |
| NORM | VXSC |
| | S2 |
| | OMEGAM2 |
| XCHK,2 | LXC,2 |
| | S2 |
| | X2 |
| XAD,2 | VSL* |
| | NORMGAM |
| | 0,2 |
| XCHK,2 | VAD* |
| | S2 |
| | W +108D,1 |
| STORE | HOLDW +6 |
| BOFF | |
| | DMENPLG |
| | PAZR |
| DLOAD* | DCOMP |
| | ZI,2 |
| NORM | VXSC |

START FIRST PHASE OF INCORP2
TO UPDATE 6 OR 9 DIM. W MATRIX IN TEMP

CALC UPPER 3x9 PARTITION OF W MATRIX

CALC MIDDLE 3x9 PARTITION OF W MATRIX

BRANCH IF 6 DIMENSIONAL.

CALC LOWER 3x9 PARTITION OF W MATRIX



L MEASUREMENT INCORPORATION

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| | | | | | | | | | |
|------|------|-----|-----------|---------|----------|-------|--------|------------|--|
| 0259 | RESP | 23 | LAST 1227 | 36,3573 | 00052 0 | | | | |
| 0260 | RESP | 3 | LAST 1226 | 36,3574 | 02657 1 | | | S2 | |
| 0261 | | | | 36,3575 | 71124 0 | | XCRX,2 | OMEGAM3 | |
| 0262 | RESP | 24 | LAST 1223 | 36,3576 | 00051 0 | | | LXC,2 | |
| 0263 | RESP | 30 | LAST 1227 | 36,3577 | 00047 1 | | | S2 | |
| 0264 | | | | 36,3600 | 53674 1 | | XAD,2 | XS | |
| 0265 | RESP | 5 | LAST 1227 | 36,3601 | 02215 0 | | | VSL* | |
| 0266 | | | | 36,3602 | 57576 1 | | | NORMGAM | |
| 0267 | | | | 36,3603 | 52724 1 | | XCRX,2 | 0,2 | |
| 0268 | RESP | 25 | LAST 1228 | 36,3604 | 00041 0 | | | VAD* | |
| 0269 | RESP | 66 | LAST 1227 | 36,3605 | 02643 1 | | | S2 | |
| 0270 | RESP | 4 | LAST 1227 | 36,3606 | 02701 0 | | | W +162D,1 | |
| 0271 | | | | 36,3607 | 77624 1 | FAZB | STORE | HOLDW +12D | |
| 0272 | RESP | 18 | LAST 617 | 36,3610 | 56741 0 | | CALL | | |
| 0273 | | | | 36,3611 | 77776 1 | | | GRP2PC | |
| 0274 | RESP | 5 | LAST 1227 | 36,3612 | 3 1252 0 | FAZB1 | EXIT | | |
| 0275 | RESP | 1 | | 36,3613 | 6 3764 1 | | CA | WIXA | |
| 0276 | RESP | 4 | LAST 1227 | 36,3614 | 55-253 0 | | AD | 6DD | |
| 0277 | RESP | 5 | LAST 1227 | 36,3615 | 3 1254 0 | | TS | WIXB | |
| 0278 | RESP | 2 | LAST 186 | 36,3616 | 6 7715 0 | | CA | ZIXA | |
| 0279 | RESP | 4 | LAST 1227 | 36,3617 | 55-255 0 | | AD | MINUS2 | |
| 0280 | RESP | 229 | LAST 1227 | 36,3620 | 0 6006 1 | | TS | ZIXB | |
| 0281 | | | | 36,3621 | 66350 1 | | TC | INTPRST | |
| 0282 | RESP | 6 | LAST 1228 | 36,3622 | 01252 0 | | LXA,1 | SSP | |
| 0283 | RESP | 43 | LAST 1227 | 36,3623 | 00051 0 | | | WIXA | |
| 0284 | | | | 36,3624 | 00006 1 | | | S1 | |
| 0285 | RESP | 5 | LAST 1228 | 36,3626 | 02665 0 | | | 6 | |
| 0286 | RESP | 67 | LAST 1228 | 36,3627 | 06467 1 | | VLOAD | HOLDW | |
| 0288 | | | | 36,3630 | 77775 1 | | STORE | W +54D,1 | |
| 0290 | RESP | 66 | LAST 1228 | 36,3632 | 06555 1 | | VLOAD | | |
| 0291 | | | | 36,3633 | 77214 0 | | STORE | W +108D,1 | |
| 0292 | RESP | 11 | LAST 1227 | 36,3634 | 02746 0 | | ROPP | VLOAD | |
| 0293 | RESP | 1 | | 36,3635 | 75645 1 | | | DMENPLG | |
| 0294 | RESP | 7 | LAST 1228 | 36,3636 | 02701 0 | | | FAZB6 | |
| 0295 | RESP | 69 | LAST 1228 | 36,3637 | 06643 0 | | | HOLDW +12D | |
| 0296 | | | | 36,3640 | 52100 1 | FAZB2 | STORE | W +162D,1 | |
| 0297 | | | | 36,3641 | 75643 1 | | TIX,1 | GOTO | |
| 0298 | RESP | 1 | | 36,3642 | 75653 0 | | | +2 | |
| 0299 | | | | 36,3643 | 77634 0 | | | FAZC | |
| 0300 | RESP | 1 | | 36,3644 | 75510 1 | | RTB | | |
| 0301 | | | | 36,3645 | 43335 0 | FAZB5 | SLOAD | FAZA | |
| 0302 | RESP | 5 | LAST 1228 | 36,3646 | 01256 1 | | | DAD | |
| 0303 | RESP | 1 | | 36,3647 | 35766 0 | | | ZIXB | |
| 0304 | | | | 36,3650 | 52030 0 | | BHIZ | 12DD | |
| 0305 | RESP | 2 | LAST 1228 | 36,3651 | 75653 0 | | | GOTO | |
| 0306 | RESP | 1 | | 36,3652 | 75640 1 | | | FAZC | |
| 0307 | | | | 36,3653 | 77624 1 | FAZC | CALL | FAZB2 | |
| 0308 | RESP | 19 | LAST 1228 | 36,3654 | 56741 0 | | | GRP2PC | |

START 2ND PHASE OF INCORP2 TO TRANSFER TEMP REG TO PERM W MATRIX

DONE WITH W MATRIX. UPDATE STATE VECTOR

L MEASUREMENT INCORPORATION

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| | | | | | | | | |
|-------|-----|----|---------|---------|---------|---------|-----------|---------------------------------------|
| 0309 | | | 36,3655 | 53375 0 | VLOAD | VAD | | |
| 0310 | REP | 8 | LAST | 600 | 36,3656 | 01701 0 | | START 3RD PHASE OF INCORP2 |
| 0311 | REP | 15 | LAST | 1225 | 36,3657 | 01273 0 | | 7TH,8TH,9TH,COMPONENT OF STATE VECTOR |
| 0312 | REP | 2 | LAST | 119 | 36,3660 | 03450 0 | | INCORPORATION FOR X789 |
| 0313 | | | | | 36,3661 | 47014 1 | STORE | |
| 0314 | REP | 13 | LAST | 617 | 36,3662 | 00707 1 | RCV | |
| 0315 | REP | 1 | | | 36,3663 | 75753 1 | VERHUFFLG | |
| 0316 | REP | 1 | | | 36,3664 | 26745 0 | DCCSM | |
| 0317 | | | | | 36,3665 | 77004 0 | MOVEALFM | |
| 0318 | REP | 9 | LAST | 879 | 36,3666 | 57343 1 | PAZAR | BOVB |
| 0319 | | | | | 36,3667 | 00000 1 | | AXT,2 |
| 0320 | | | | | 36,3670 | 77014 1 | | TCDANZIG |
| 0321 | REP | 8 | LAST | 573 | 36,3671 | 04343 1 | | 0 |
| 0322 | | | | | 36,3672 | 75674 0 | BOFF | AXT,2 |
| 0323 | | | | | 36,3673 | 00002 0 | | MOONHIS |
| 0324 | | | | | 36,3674 | 53775 1 | | +2 |
| 0325 | REP | 16 | LAST | 1229 | 36,3675 | 01257 0 | VLOAD | VSR* |
| 0326 | | | | | 36,3676 | 57205 1 | | DELTA |
| 0327 | | | | | 36,3677 | 40055 0 | | 0 -7,2 |
| 0328 | REP | 4 | LAST | 284 | 36,3700 | 01521 0 | VAD | BOV |
| 0329 | REP | 1 | | | 36,3701 | 75713 0 | | TDELTA |
| 0330 | REP | 5 | LAST | 1229 | 36,3702 | 25521 0 | | PAZAR1 |
| 0331 | REP | 17 | LAST | 1229 | 36,3703 | 01265 1 | STOVL | TDELTA |
| 0332 | | | | | 36,3704 | 53257 1 | | DELTA +6 |
| 0333 | | | | | 36,3705 | 57202 0 | VSR* | VAD |
| 0334 | REP | 4 | LAST | 285 | 36,3706 | 01527 0 | | 0 -4,2 |
| 0335 | | | | | 36,3707 | 77600 1 | | TNUV |
| 0336 | REP | 1 | | | 36,3710 | 75717 1 | BOV | |
| 0337 | REP | 5 | LAST | 1229 | 36,3711 | 35527 1 | | PAZAR2 |
| 0338 | REP | 1 | | | 36,3712 | 75726 0 | STCALL | TNUV |
| 0339 | | | | | 36,3713 | 53375 0 | | PAZAR3 |
| 0340 | REP | 12 | LAST | 868 | 36,3714 | 01535 0 | PAZAR1 | VLOAD |
| 0341 | REP | 18 | LAST | 1229 | 36,3715 | 01257 0 | | VAD |
| 0342 | REP | 13 | LAST | 1229 | 36,3716 | 01535 0 | | RCV |
| 0343 | | | | | 36,3717 | 53375 0 | PAZAR2 | DELTA |
| 0344 | REP | 11 | LAST | 868 | 36,3720 | 01543 1 | | VAD |
| 0345 | REP | 19 | LAST | 1229 | 36,3721 | 01265 1 | | VCV |
| 0346 | REP | 12 | LAST | 1229 | 36,3722 | 01543 1 | | DELTA +6 |
| 0347 | | | | | 36,3723 | 45134 0 | STORE | VCV |
| 0348 | REP | 3 | LAST | 259 | 36,3724 | 02150 1 | SKA,2 | CALL |
| 0349 | REP | 1 | | | 36,3725 | 23344 0 | | PBODY |
| 03491 | | | | | 36,3726 | 77624 1 | PAZAR3 | RECTIFY |
| 03492 | REP | 20 | LAST | 1228 | 36,3727 | 56741 0 | | CALL |
| 0350 | | | | | 36,3730 | 47014 1 | | GRP2PC |
| 0351 | REP | 14 | LAST | 1229 | 36,3731 | 00707 1 | RCV | |
| 0352 | REP | 1 | | | 36,3732 | 75756 1 | | VERHUFFLG |
| 0353 | REP | 1 | | | 36,3733 | 26724 1 | | DCCSM1 |
| 0354 | | | | | 36,3734 | 77624 1 | | MOVEALFM |
| 0355 | REP | 2 | LAST | 259 | 36,3735 | 20263 1 | CALL | |
| 0356 | | | | | 36,3736 | 77624 1 | PAZAR4 | SVDWN2 |

B27 IP MOON ORBIT, B29 IP EARTH

B5 IP MOON ORBIT, B7 IP EARTH

STORE DOWNLINK STATE VECTOR

L MEASUREMENT INCORPORATION

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| | | | | | | | | |
|------|-----|----|-----------|---------|----------|----------|--------------|-----------------------------|
| 0357 | REP | 21 | LAST 1229 | 36,3737 | 56741 0 | | GRP2PC | PHASE CHANGE |
| 0358 | | | | 36,3740 | 77214 0 | BOFP | VLOAD | |
| 0359 | REP | 12 | LAST 1228 | 36,3741 | 02746 0 | | DMENPLG | |
| 0360 | REP | 1 | | 36,3742 | 75745 0 | | FAZAB5 | 6 DIMENSIONAL |
| 0361 | REP | 3 | LAST 1229 | 36,3743 | 03450 0 | | TX789 | 9 DIMENSIONAL |
| 0362 | REP | 9 | LAST 1229 | 36,3744 | 01701 0 | | STORE XT89 | |
| 0363 | | | | 36,3745 | 86150 0 | FAZAB5 | LXA,1 | |
| 0364 | REP | 13 | LAST 1228 | 36,3746 | 02317 0 | | BORESS | |
| 0365 | REP | 20 | LAST 1166 | 36,3747 | 00052 0 | | OPRST | |
| 0366 | | | | 36,3750 | 77776 1 | | EXIT | |
| 0367 | REP | 60 | LAST 1039 | 36,3751 | 0 4574 0 | | TC POSTRUMP | EXIT |
| 0368 | REP | 3 | LAST 624 | 36,3752 | 27406 0 | | CADR INTWAKB | |
| 0369 | | | | 36,3753 | 52034 1 | DOCSM | RTB GOTO | |
| 0370 | REP | 1 | | 36,3754 | 28700 1 | | MOVSPCM | |
| 0371 | REP | 1 | | 36,3755 | 75665 0 | | FAZAB | |
| 0372 | | | | 36,3756 | 45034 1 | DOCSM1 | RTB CALL | |
| 0373 | REP | 2 | LAST 32 | 36,3757 | 26851 1 | | MOVEACSM | |
| 0374 | REP | 2 | LAST 259 | 36,3760 | 20237 0 | | SVDWN1 | STORE DOWNLINK STATE VECTOR |
| 0375 | | | | 36,3761 | 77650 1 | | GOTO | |
| 0376 | REP | 1 | | 36,3762 | 75736 1 | | FAZAB4 | |
| 0377 | REP | 22 | LAST 1225 | 26,3331 | | ZEROO | = ZEROVCS | |
| 0378 | | | | 36,3763 | 00066 1 | 54DD | DEC 54 | |
| 0379 | | | | 36,3764 | 77771 0 | 6DD | DEC -6 | |
| 0380 | | | | 36,3765 | 00014 1 | 12DD | DEC 12 | |
| 0400 | REP | 2 | LAST 062 | 37,2000 | | SETLAL | RENUEZ | |
| 0401 | | | | 37,3676 | | BANK | | |
| 0402 | REP | 1 | | | | COLINT* | SE/INCOR | |
| 0403 | | | | 37,3676 | 51575 1 | NEWZCOMP | VLOAD ARVAL | |
| 0404 | REP | 17 | LAST 1227 | 37,3677 | 06783 0 | | ZI | |
| 0405 | REP | 1 | | 37,3700 | 24045 0 | | STOVL NORMZI | |
| 0406 | REP | 18 | LAST 1230 | 37,3701 | 02731 0 | | ZI +6 | |
| 0407 | | | | 37,3702 | 41446 1 | | ARVAL PUSH | |
| 0408 | | | | 37,3703 | 50025 0 | | DSU RMN | |
| 0409 | REP | 2 | LAST 1230 | 37,3704 | 00045 0 | | NORMZI | |
| 0410 | | | | 37,3705 | 77710 1 | | +3 | |
| 0411 | | | | 37,3706 | 45545 1 | | DLOAD STADR | |
| 0412 | REP | 3 | LAST 1230 | 37,3707 | 77732 1 | | STORE NORMZI | |
| 0413 | | | | 37,3710 | 51575 1 | | VLOAD ARVAL | |
| 0414 | REP | 19 | LAST 1230 | 37,3711 | 02737 0 | | ZI +12D | |
| 0415 | | | | 37,3712 | 45206 1 | | PUSH DSU | |
| 0416 | REP | 4 | LAST 1230 | 37,3713 | 00045 0 | | NORMZI | |
| 0417 | | | | 37,3714 | 71240 1 | | RMN DLOAD | |
| 0418 | | | | 37,3715 | 77720 1 | | +3 | |
| 0419 | | | | 37,3716 | 77626 0 | | STADR | |
| 0420 | REP | 5 | LAST 1230 | 37,3717 | 77732 1 | | STORE NORMZI | LARGEST ARVAL |
| 0421 | | | | 37,3720 | 66145 1 | | DLOAD SKA,1 | |
| 0422 | REP | 6 | LAST 1230 | 37,3721 | 00045 0 | | NORMZI | |
| 0423 | REP | 7 | LAST 1230 | 37,3722 | 00044 1 | | NORMZI | SAVE X1 |
| 0424 | | | | 37,3723 | 62101 0 | NORM | INCR,1 | |

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| | | | | | | | | |
|------|-----|----|-----------|---------|---------|--|--------|-----------|
| 0425 | REP | 57 | LAST 1224 | 37,3724 | 00047 1 | | X1 | |
| 0426 | | | | 37,3725 | 00002 0 | | DEC | 2 |
| 0427 | | | | 37,3726 | 53775 1 | | VLOAD | VSL* |
| 0428 | REP | 20 | LAST 1230 | 37,3727 | 02723 0 | | | ZI |
| 0429 | | | | 37,3730 | 20201 0 | | | 0,1 |
| 0430 | REP | 21 | LAST 1231 | 37,3731 | 26723 0 | | STOVL | ZI |
| 0431 | REP | 22 | LAST 1231 | 37,3732 | 02731 0 | | | ZI +6 |
| 0432 | | | | 37,3733 | 77657 0 | | VSL* | |
| 0433 | | | | 37,3734 | 20201 0 | | | 0,1 |
| 0434 | REP | 23 | LAST 1231 | 37,3735 | 26731 0 | | STOVL | ZI +6 |
| 0435 | REP | 24 | LAST 1231 | 37,3736 | 02737 0 | | | ZI +12D |
| 0436 | | | | 37,3737 | 66057 0 | | VSL* | SKA,1 |
| 0437 | | | | 37,3740 | 20201 0 | | | 0,1 |
| 0438 | REP | 8 | LAST 1230 | 37,3741 | 00045 0 | | | NORMZI +1 |
| 0439 | REP | 25 | LAST 1231 | 37,3742 | 02737 0 | | STORE | ZI +12D |
| 0440 | | | | 37,3743 | 54150 1 | | LXA,1 | XSU,1 |
| 0441 | REP | 8 | LAST 1228 | 37,3744 | 02215 0 | | | NORMGAM |
| 0442 | REP | 9 | LAST 1231 | 37,3745 | 00045 0 | | | NORMZI +1 |
| 0443 | | | | 37,3746 | 77660 1 | | XSU,1 | |
| 0444 | REP | 10 | LAST 1231 | 37,3747 | 00045 0 | | | NORMZI +1 |
| 0445 | | | | 37,3750 | 70130 1 | | SKA,1 | LXC,1 |
| 0446 | REP | 7 | LAST 1231 | 37,3751 | 02215 0 | | | NORMGAM |
| 0447 | REP | 11 | LAST 1231 | 37,3752 | 00045 0 | | | NORMZI +1 |
| 0448 | | | | 37,3753 | 40270 0 | | XAU,1 | SETPD |
| 0449 | REP | 12 | LAST 1231 | 37,3754 | 00044 1 | | | NORMZI |
| 0450 | | | | 37,3755 | 00003 1 | | | 2D |
| 0451 | | | | 37,3756 | 77650 1 | | GOTO | |
| 0452 | REP | 2 | LAST 1224 | 37,3757 | 75406 1 | | | INCOR2 -3 |
| 0453 | | | | 0044 | | | NORMZI | = 36D |

SAVE SHIPT



L CONIC SUBROUTINES

USER'S PAGE NO. 1 R0 83

R0001 PROGRAM DESCRIPTION - ENTIRE CONIC SUBROUTINE LOG SECTION
R0003 MOD NO. - 0
R0005 MOD BY KRAUSE
R0007
R0008 FUNCTIONAL DESCRIPTION -

DATE - 1 SEPTEMBER 1967
LOG SECTION - CONIC SUBROUTINES
ASSEMBLY - COLOSSUS REVISION 88

R0009 THE FOLLOWING SET OF SUBROUTINES SOLVE VARIOUS PROBLEMS INVOLVING THE TRAJECTORY PRODUCED BY A CENTRAL
R0011 INVERSE-SQUARE FORCE ACTING ON A POINT MASS, AS OUTLINED IN THE CMC AND LGC LUNAR LANDING MISSION GSOP, SECTION
R0013 5.5.1.2. A GENERAL USAGE POINT-OF-VIEW WAS TAKEN IN FORMULATING, MECHANIZING, AND SCALING THE SUBROUTINES,
R0015 RATHER THAN OPTIMIZING EACH FOR A PARTICULAR USE. THEREFORE, MULTIPLE USAGE CAN BE MADE OF THE SUBROUTINES
R0017 INVOLVING ANY REALISTIC SET OF CONSTRAINTS. IT SHOULD BE NOTED THAT ONLY ONE SET OF CODING IS USED, WHETHER THE
R0019 EARTH, MOON, OR ANY OTHER CELESTIAL BODY IS SPECIFIED AS THE CENTRAL BODY OF THE PROBLEM, PROVIDED ONE OBSERVES
R0021 THE INHERENT SCALE CHANGE REQUIRED IN POSITION, VELOCITY, MU, AND TIME, AS OUTLINED IN MISSION PROGRAMMING
R0023 DEFINITION MEMO NO. 10. THIS CAN BE ACCOMPLISHED BY SIMPLY ADDING TO THE MUTABLE AND INITIALIZING THE SUBROU-
R0025 TINES APPROPRIATELY.
R0026 DUE TO THE UNIFORMITY OF THE EQUATIONS INVOLVED, CODING WAS MINIMIZED BY TREATING INDIVIDUAL EQUATIONS AND
R0028 BLOCKS OF EQUATIONS AS SUBROUTINES OF LOWER RANK WHENEVER POSSIBLE. AS A RESULT, THREE BY-PRODUCTS SUBROUTINES,
R0030 DIRECTLY USABLE AS INDEPENDENT SUBROUTINES, WERE GENERATED.
R0031 RESTRICTIONS -

R0032 THE ONLY LIMITATION IN THE SCOPE OF PROBLEM WHICH CAN BE SOLVED BY A PARTICULAR SUBROUTINE IS THE SCALING
R0034 LIMIT OF EACH PARAMETER AS SPECIFIED IN THE GSOP. THESE SCALING LIMITS WERE CHOSEN SO THAT ALL FEASIBLE TRAJEC-
R0036 TORIES COULD BE HANDLED.
R0037 SINCE THE SUBROUTINES (EXCEPT KEPLER) USE COMMON SUBROUTINES OF LOWER RANK WHICH USE ERASABLE OTHER THAN
R0039 THE PUSHLIST (DUE TO ITS LIMITED SIZE) AND COMMON INTERPRETIVE SWITCHES, THE CONIC SUBROUTINES CANNOT BE ALLOWED
R0041 TO INTERRUPT EACH OTHER. IT IS UP TO THE USER TO GUARANTEE THIS CONDITION.
R0043



L CONIC SUBROUTINES USER'S PAGE NO. 2 E0 83

R0044 PROGRAM DESCRIPTION - KEPLER SUBROUTINE DATE - 11 OCTOBER 1967
 R0046 MOD NO. -1 LOG SECTION - CONIC SUBROUTINES
 R0048 MOD BY KRAUSE ASSEMBLY - COLOSSUS 103 AND SUNDANCE 222
 R0050

R0051 FUNCTIONAL DESCRIPTION -
 R0052 THIS SUBROUTINE, GIVEN AN INITIAL STATE VECTOR AND THE DESIRED TRANSFER TIME THROUGH WHICH THE STATE IS TO
 R0054 BE UPDATED ALONG A CONIC TRAJECTORY, COMPUTES THE NEW, UPDATED STATE VECTOR. THE TRAJECTORY MAY BE ANY CONIC
 R0056 SECTION - CIRCULAR, ELLIPTIC, PARABOLIC, HYPERBOLIC, OR RECTILINEAR WITH RESPECT TO THE EARTH OR THE MOON. THE
 R0058 USE OF THE SUBROUTINE CAN BE EXTENDED USING OTHER PRIMARY BODIES BY SIMPLE ADDITIONS TO THE MUTABLE WITHOUT
 R0060 INTRODUCING ANY CODING CHANGES, ACCEPTING THE INHERENT SCALE FACTOR CHANGES IN POSITION AND VELOCITY. AN ITERA-
 R0062 TION TECHNIQUE IS UTILIZED IN THE COMPUTATION.
 R0063 IF A NEGATIVE TIME-OF-FLIGHT IS INPUT, THE PROGRAM WILL SOLVE FOR THE STATE WHICH WOULD BE PRODUCED BY
 R0065 EXTRAPOLATING THE POSITION BACKWARD IN TIME.
 R00651 IF THE DESIRED TRANSFER TIME IS POSITIVE AND EXCEEDS THE ORBITAL PERIOD, THE SUBROUTINE, THROUGH A MODULAR
 R00653 TECHNIQUE, WILL COMPUTE THE STATE CORRESPONDING TO THE DESIRED TIME AS USUAL.
 R0066

R0067 THE RESTRICTIONS ARE -
 R0068 1. A NEGATIVE DESIRED TIME MUST BE LESS THAN ONE PERIOD IN MAGNITUDE. IF GREATER, THE ONE-PERIOD- SOLUTION
 R0070 WILL BE RETURNED.
 R0071 2. THE PARAMETERS IN THE PROBLEM CANNOT EXCEED THEIR SCALING LIMITS AS SPECIFIED IN THE GSOP. IF
 R0073 ANY OF THESE LIMITS ARE EXCEEDED, THE RESULTING SOLUTION WILL BE MEANINGLESS.
 R0075

R0076 THE NUMBER OF ITERATIONS AND, THEREFORE, THE COMPUTATION SPEED IS DEPENDENT ON THE ACCURACY OF THE
 R0078 GUESS, XKEPNEW. THE AGC COMPUTATION TIME IS APPROXIMATELY .061 SECONDS FOR INITIALIZATION, .065 SECONDS FOR THE
 R0080 FINAL COMPUTATIONS, PLUS .083 SECONDS FOR EACH ITERATION.
 R0081

R0082 REFERENCES -
 R0083 R-479, MISSION PROGRAMMING DEFINITION MEMO NO. 10, LUNAR LANDING MISSION GSOP, SECTION 5.5, SCA
 R0085 MEMO 67-4.
 R0086

R0087 INPUT - ERASABLE INITIALIZATION REQUIRED

| R0088 | * SCALE FACTOR * | |
|-------|---------------------------|--|
| R0089 | VARIABLE*IN POWERS OF 2* | DESCRIPTION AND REMARKS |
| R0090 | -----* | -----* |
| R0091 | RRECT * +29 FOR EARTH*DP | INITIAL POSITION VECTOR IN METERS |
| R0092 | * +27 FOR MOON * | |
| R0093 | VRRECT * +7 FOR EARTH *DP | INITIAL VELOCITY VECTOR IN METERS/CENTISECOND |
| R0094 | * +5 FOR MOON * | |
| R0095 | X1 (38D)* NONE | *INDEX REGISTER SET TO -20 OR -100 ACCORDING TO WHETHER THE EARTH OR MOON, |
| R0097 | * | *RESPECTIVELY, IS THE CENTRAL BODY |
| R0098 | TAU. * +28 | *DESIRED TRANSFER TIME IN CENTISECONDS (DP) |

L. CONIC SUBROUTINES

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R0099 XKEPNEW * +17 FOR EARTH*GUESS OF X IN METERS-TO-THE-ONE-HALF FROM KEPPREP
R0101 * +16 FOR MOON *(DP)
R0102 TC * +28 *DP PREV. VALUE OF TIME IN CENTISECS FROM KEPPREP
R0103 XPREV * +17 FOR EARTH*PREVIOUS VALUE OF X IN METERS-TO-THE-ONE-HALF POWER FROM KEPPREP (DP)
R0105 * +16 FOR MOON *(DP)
R0106
R0107 SUBROUTINES CALLED -
R0108 DELTIME
R0109
R0110 CALLING SEQUENCE AND NORMAL EXIT MODES -

R0111 KEPRIN-2 GOTO MUST BE IN INTERPRETIVE MODE AND OVPIND MUST BE CLEAR
R0113 KEPRIN-1 KEPLER RETURNS WITH XPREV IN MPAC. PL IS AT 0.
R0114 KEPRIN ... CONTINUE

R0115 KEPLER MUST NOT BE CALLED DIRECTLY SINCE AN INTERRUPTION OF IT WOULD DESTROY THE ERASABLES IT NEEDS TO COMPLETE
R0117 THE INTERRUPTED JOB. THEREFORE THE USER MUST CALL CSMCONIC OR LEMCONIC WHICH GUARANTEES NO INTERRUPTS AND WHICH
R0119 ALSO CALLS KEPPREP TO COMPUTE A GUESS OF XKEPNEW.
R0120
R0121 ABORT EXIT MODES -
R0122 NONE
R0123
R0124 OUTPUT -

R0125 * SCALE FACTOR *
R0126 VARIABLE*IN POWERS OF 2* DESCRIPTION AND REMARKS
R0127 -----*-----
R0128 RCV * +29 FOR EARTH*DP TERMINAL POSITION VECTOR IN METERS
R0129 * +27 FOR MOON *
R0130 VCV * +7 FOR EARTH *DP TERMINAL VELOCITY VECTOR IN METERS/CENTISEC
R0131 * +5 FOR MOON *
R0132 TC * +28 *DP TRANSFER TIME IN CENTISECS TO WHICH KEPLER CONVERGED.
R0134 XPREV * +17 FOR EARTH*DP X IN METERS-TO-THE-ONE-HALF-POWER TO WHICH KEPLER CONVERGED.
R0136 * +16 FOR MOON *(DP)
R0137 FOR OTHER OUTPUT WHICH MAY BE OF USE, SEE DEBRIS.
R0138
R0139 DEBRIS -

R0140 PARAMETERS WHICH MAY BE OF USE -



L CONIC SUBROUTINES

| R0141 | * SCALE FACTOR * | DESCRIPTION AND REMARKS |
|--------|--|--|
| R0142 | VARIABLE IN POWERS OF 2* | |
| R0143 | -----* | -----* |
| R0144 | URRECT * +1 | *DP UNIT VECTOR OF INITIAL POSITION |
| R0145 | R1 * +29 | *DP FOR EARTH*DP MAGNITUDE OF INITIAL POSITION IN METERS |
| R0146 | * +27 | *DP FOR MOON * |
| R0147 | ALPHA * -22 | *DP FOR EARTH*DP INVERSE OF SEMIMAJOR AXIS IN 1/METERS |
| R0148 | * -20 | *DP FOR MOON * |
| R01481 | IMODULO * +28 | *DP INTEGRAL NUMBER OF PERIODS IN CENTISECS. WHICH WAS SUBTRACTED FROM TAU. TO PRODUCE A |
| R01483 | * | *TAU. OF LESS THAN ONE PERIOD. |
| R0149 | PARAMETERS OF NO USE - | |
| R0150 | DP PARAMETERS - EPSILON, DELX, DELT, RCNORM, XMODULO, PLUS PUSHLIST REGISTERS 0 THROUGH 390. | |
| R0152 | | |



L CONIC SUBROUTINES

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R0153 PROGRAM DESCRIPTION - LAMBERT SUBROUTINE
 R0155 MOD NO. - 0
 R0157 MOD BY KRAUSE
 R0159
 R0160 FUNCTIONAL DESCRIPTION -

DATE - 1 SEPTEMBER 1967
 LOG SECTION - CONIC SUBROUTINES
 ASSEMBLY - COLOSSUS REVISION 88

R0161 THIS SUBROUTINE CALCULATES THE INITIAL VELOCITY REQUIRED TO TRANSFER A POINT-MASS ALONG A CONIC TRAJECTORY
 R0163 FROM AN INITIAL POSITION TO A TERMINAL POSITION IN A PRESCRIBED TIME INTERVAL. THE RESULTING TRAJECTORY MAY BE
 R0165 A SECTION OF A CIRCLE, ELLIPSE, PARABOLA, OR HYPERBOLA WITH RESPECT TO THE EARTH OR THE MOON. THE USE OF THE
 R0167 SUBROUTINE CAN BE EXTENDED USING OTHER PRIMARY BODIES BY SIMPLE ADDITIONS TO THE MUTABLE WITHOUT INTRODUCING ANY
 R0169 CODING CHANGES, ACCEPTING THE INHERENT SCALE FACTOR CHANGES IN POSITION AND VELOCITY. AN ITERATION TECHNIQUE IS
 R0171 UTILIZED IN THE COMPUTATION.
 R0172

R0173 THE RESTRICTIONS ARE -

R0174 1. RECTILINEAR TRAJECTORIES CANNOT BE COMPUTED.
 R0175 2. AN ACCURACY DEGRADATION OCCURS AS THE COSINE OF THE TRUE ANOMALY DIFFERENCE APPROACHES +1.0.
 R0177 3. THE ANGLE BETWEEN ANY POSITION VECTOR AND ITS VELOCITY VECTOR MUST BE GREATER THAN 1 DEGREE 47.5 MINUTES
 R0179 AND LESS THAN 178 DEGREES 12.5 MINUTES.
 R0180 4. NEGATIVE TRANSFER TIME IS AMBIGUOUS AND WILL RESULT IN NO SOLUTION.
 R0182 5. THE PARAMETERS IN THE PROBLEM MUST NOT EXCEED THEIR SCALING LIMITS SPECIFIED IN THE GSOP. IF THE
 R0184 LIMITS ARE EXCEEDED, THE RESULTING SOLUTION WILL BE MEANINGLESS.
 R0185 THE NUMBER OF ITERATIONS AND, THEREFORE, THE COMPUTATIONS SPEED IS DEPENDENT ON THE ACCURACY OF THE FIRST
 R0187 GUESS OF THE INDEPENDENT VARIABLE, COCA. THE AGC COMPUTATION TIME IS APPROXIMATE-
 R0189 LY .105 SECONDS FOR INITIALIZATION, .069 SECONDS FOR FINAL COMPUTATIONS, PLUS .205 SECONDS FOR EACH ITERATION.
 R0191

R0192 REFERENCES -

R0193 R-479, MISSION PROGRAMMING DEFINITION MEMO NO. 10, LUNAR LANDING MISSION GSOP-SECTION 5.5, SGA MEMO 67-8,
 R0195 SGA MEMO 67-4.
 R0196

R0197 INPUT - ERASABLE INITIALIZATION REQUIRED

R0198 * SCALE FACTOR *

R0199 VARIABLE*IN POWERS OF 2*

DESCRIPTION AND REMARKS

R0200 -----*

R0201 R1VEC * +29 FOR EARTH*OP INITIAL POSITION VECTOR IN METERS

R0202 * +27 FOR MOON *

R0203 R2VEC * +29 FOR EARTH*OP TARGET OR TERMINAL POSITION VECTOR IN METERS

R0204 * +27 FOR MOON *

R0205 TDESIRE* +28 *OP DESIRED TRANSFER TIME IN CENTISECONDS

R0206 X1 (36D)* NONE *INDEX REGISTER SET TO -2D OR -10D ACCORDING TO WHETHER THE EARTH OR MOON,

R0208 * *RESPECTIVELY, IS THE CENTRAL BODY

R0209 GEOMSON * NONE *SP +.5 IF DESIRED TRANSFER ANGLE IS LESS THAN 180 DEGREES, -.5 IF GREATER THAN 180 DEG.

R0211 GUESS* * NONE *AN INTERPRETER SWITCH TO BE SET IF NO GUESS OF COCA IS AVAILABLE, CLEAR IF A GUESS OF



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R0213 * *COGA IS TO BE USED BY LAMBERT
R0214 COGA * +5 *DP GUESS OF COMPONENT OF FLIGHT PATH ANGLE (MEASURED FROM VERTICAL). THIS WILL BE
R0216 * *IGNORER IF GUESSW IS SET.
R0217 NORMSW * NONE *AN INTERPRETER SWITCH TO BE SET IF UN IS TO BE AN INPUT TO THE SUBROUTINE, CLEAR IF
R0219 * *LAMBERT IS TO COMPUTE ITS OWN NORMAL (UN).
R0220 UN * +1 *DP UNIT NORMAL TO THE DESIRED ORBIT PLANE IN THE DIRECTION OF THE RESULTING ANGULAR
R0222 * *MOMENTUM VECTOR. THIS WILL BE IGNORED IF NORMSW IS CLEAR.
R0224 VTAROTDAG* NONE *A S.P. TAG TO BE SET TO ZERO IF LAMBERT IS TO COMPUTE THE VELOCITY AT R2VEC AS WELL AS
R0226 * *AT R1VEC.
R0227
R0228 SUBROUTINES CALLED -
R0229 GCOM, GETX, DELTIME, ITERATOR, LAMENTER (PART OF NEWSTATE)
R0230
R0231 CALLING SEQUENCE AND NORMAL EXIT MODES -

R0232 L CALL MUST BE IN INTERPRETIVE MODE AND OVPIND MUST BE CLEAR
R0234 L+1 LAMBERT RETURNS WITH PL AT 0 AND WITH WVEC IN MPAC IF VTAROTDAG WAS NON-ZERO OR VTARGET
R0236 IN MPAC IF VTAROTDAG WAS ZERO
R0237 L+2 BON CONTINUE IF SOLNSW CLEAR SINCE SOLUTION IS ACCEPTABLE
R0239 L+3 SOLNSW
R0240 L+4 LAMABORT

R0241 IF A LAMBERT RESULT IS TO BE A FIRST GUESS FOR THE NEXT LAMBERT CALCULATION, COGA MUST BE PRESERVED AND
R0243 GUESSW MUST BE CLEAR FOR EACH SUCCEEDING LAMBERT CALL.
R0244
R0245 ABORT EXIT MODES -
R0246 IF SOLNSW WAS SET UPON EXITING, EITHER LAMBERT WAS ASKED TO COMPUTE A TRANSFER TOO NEAR 0 OR 360 DEG, OR T
R0248 WAS TOO SMALL TO PRODUCE A REALISTIC TRANSFER BETWEEN R1VEC AND R2VEC. IN EITHER CASE THE PIX MUST BE MADE
R0250 ACCORDING TO THE NEEDS OF THE PARTICULAR USER. THE ABORT EXIT MODE MAY BE CODED AS ...
R0252 LAMABORT DLOAD ABS A MEASURE OF PROXIMITY TO 0 OR
R0253 1-CSTH 360 DEGREES.
R0254 DSU BNN
R0255 QNERIT
R0256 CHANGER2 CHANGE R2VEC DIRECTION SLIGHTLY.
R0257 DLOAD DAD
R0258 TDESIRE
R0259 SOMETIME
R0260 STCALL TDESIRE INCREASE TDESIRE
R0261 LAMBERT
R0262
R0263 OUTPUT -
R0264 * SCALE FACTOR *
R0265 VARIABLE*IN POWERS OF 2* DESCRIPTION AND REMARKS

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L. COMIC SUBROUTINES

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R0266 -----*-----
 R0267 VVEC * +7 FOR EARTH *DP INITIAL VELOCITY VECTOR IN METERS/CENTISECOND REQUIRED TO SATISFY THE BOUNDARY VALUE
 R0268 * +5 FOR MOON *PROBLEM.
 R0270 VTARGET * +7 FOR EARTH *DP RESULTANT VELOCITY VECTOR AT R2VEC IN METERS/CENTISECOND.
 R0272 * +5 FOR MOON *
 R0273 SOLNSW * NONE *INTERPRETER SWITCH WHICH IS SET IF THE SUBROUTINE CANNOT SOLVE THE PROBLEM, CLEAR IF THE
 R0275 * *SOLUTION EXISTS.
 R0276 FOR OTHER OUTPUT WHICH MAY BE OF USE, SEE DEBRIS.
 R0277
 R0278 DEBRIS -
 R0279 PARAMETERS WHICH MAY BE OF USE -

R0280 * SCALE FACTOR *
 R0281 VARIABLE IN POWERS OF 2* DESCRIPTION AND REMARKS
 R0282 -----*-----
 R0283 SIN * +1 *DP SIN OF ANGLE BETWEEN R1VEC AND R2VEC
 R0284 CSH * +1 *DP COSINE OF ANGLE
 R0285 1-CSH * +2 *DP 1-CSH
 R0286 COCA * +5 *DP CODAN OF INITIAL REQUIRED FLIGHT PATH ANGLE MEASURED FROM VERTICAL
 R0289 P * +4 *DP RATIO OF SEMILATUS RECTUM TO INITIAL RADIUS
 R0290 R1A * +6 *DP RATIO OF INITIAL RADIUS TO SEMIMAJOR AXIS
 R0291 R1 (32)* +29 FOR EARTH*DP INITIAL RADIUS IN METERS
 R0292 * +27 FOR MOON *
 R0293 UR1 * +1 *DP UNIT VECTOR OF R1VEC
 R0294 U2 * +1 *DP UNIT VECTOR OF R2VEC
 R0295 PARAMETERS OF NO USE
 R0296 DP PARAMETERS - EPSILONL, CSH-RHO, TPREV, TERRLAMB, R2, RTNLAMB (SP), PLUS PUSHLIST REGISTER 0 THROUGH 41D
 R0298 ADDITIONAL INTERPRETIVE SWITCHES USED - INFINFLG, 360SW, SLOPESW, ORDERSW
 R0300



L CONIC SUBROUTINES

USER'S PAGE NO. 8 E0 53

R0301 PROGRAM DESCRIPTION - TIME-THETA SUBROUTINE
 R0303 MOD NO. - 0
 R0305 MOD BY KRAUSE
 R0307
 R0308 FUNCTIONAL DESCRIPTION -

DATE - 1 SEPTEMBER 1967
 LOG SECTION - CONIC SUBROUTINES
 ASSEMBLY - COLOSSUS REVISION 88

R0309 THIS SUBROUTINE, GIVEN AN INITIAL STATE VECTOR AND A DESIRED TRUE-ANOMALY-DIFFERENCE THROUGH WHICH THE
 R0311 STATE IS TO BE UPDATED ALONG A CONIC TRAJECTORY, CALCULATES THE CORRESPONDING TIME-OF-FLIGHT AND, IN ADDITION,
 R0313 PROVIDES THE OPTION OF COMPUTING THE NEW UPDATED STATE VECTOR. THE RESULTING TRAJECTORY MAY BE A SECTION OF A
 R0315 CIRCLE, ELLIPSE, PARABOLA, OR HYPERBOLA WITH RESPECT TO THE EARTH OR THE MOON. THE USE OF THE SUBROUTINE CAN BE
 R0317 EXTENDED USING OTHER PRIMARY BODIES BY SIMPLE ADDITIONS TO THE MUTABLE WITHOUT INTRODUCING ANY CODING CHANGES,
 R0319 ACCEPTING THE INHERENT SCALE FACTOR CHANGES IN POSITION AND VELOCITY.
 R0320

R0321 THE RESTRICTIONS ARE -

- R0322 1. THE ANGLE BETWEEN ANY POSITION VECTOR AND ITS VELOCITY VECTOR MUST BE GREATER THAN 1 DEGREE 47.5 MINUTES
- R0324 AND LESS THAN 178 DEGREES 12.5 MINUTES.
- R0325 2. THE PARAMETERS IN THE PROBLEM MUST NOT EXCEED THEIR SCALING LIMITS SPECIFIED IN THE GSOP. IF THE LIMITS
- R0327 ARE EXCEEDED, THE RESULTING SOLUTION WILL BE MEANINGLESS.

R0328 THE AGC COMPUTATION TIME IS APPROXIMATELY .292 SECONDS.

R0329 REFERENCES -

R0331 R-479, MISSION PROGRAMMING DEFINITION MEMO NO. 10, LUNAR LANDING MISSION GSOP-SECTION 5.5, SGA MEMO 87-8.

R0333 INPUT - ERASABLE INITIALIZATION REQUIRED
 R0334

| R0335 | * SCALE FACTOR * | | DESCRIPTION AND REMARKS |
|-------|--------------------------|--------------------|---|
| R0336 | VARIABLE*IN POWERS OF 2* | | |
| R0337 | -----* | | -----* |
| R0338 | RVEC | * +29 FOR EARTH*DP | INITIAL POSITION VECTOR IN METERS |
| R0339 | | * +27 FOR MOON * | |
| R0340 | VVEC | * +7 FOR EARTH *DP | INITIAL VELOCITY VECTOR IN METERS/CENTISECOND |
| R0341 | | * +5 FOR MOON * | |
| R0342 | SINH | * +1 | *DP SINE OF TRUE-ANOMALY-DIFFERENCE THROUGH WHICH THE STATE IS TO BE UPDATED |
| R0344 | COSH | * +1 | *DP COSINE OF THE ANGLE |
| R0345 | RVS | * NONE | *AN INTERPRETIVE SWITCH TO BE SET IF ONLY TIME IS TO BE AN OUTPUT, CLEAR IF THE NEW STATE |
| R0347 | | * | *IS TO BE COMPUTED ALSO. |
| R0348 | X1 (38D)*NONE | | *INDEX REGISTER TO BE SET TO -2D OR -10D ACCORDING TO WHETHER THE EARTH OR MOON, |
| R0350 | | * | *RESPECTIVELY, IS THE CENTRAL BODY. |
| R0351 | | | |
| R0352 | | | SUBROUTINES CALLED - |



L CONIC SUBROUTINES USERS PAGE NO. 9 E0 83

R0353 PARAM, GEOM, GETX, DELTIME, NEWSTATE
R0354
R0355 CALLING SEQUENCE AND NORMAL EXIT MODES -
R0356 IF ONLY TIME IS DESIRED AS OUTPUT -
R0357 L SET CALL MUST BE IN INTERPRETIVE MODE AND OVFLND MUST BE CLEAR
R0358 L+1 RVSZ
R0359 L+2 TIMESTET RETURN WITH PL AT 0 AND T IN MPAC
R0360 L+3 ... CONTINUE
R0361
R0362
R0363 IF THE UPDATE STATE VECTOR IS DESIRED AS WELL -
R0364 L CLEAR CALL MUST BE IN INTERPRETIVE MODE AND OVFLND MUST BE CLEAR
R0365 L+1 RVSZ
R0366 L+2 TIMESTET RETURNS WITH PL AT 6. THE INITIAL POSITION VECTOR IS IN QD OF THE PUSHLIST AND
R0367 THE INITIAL VELOCITY VECTOR IN MPAC.
R0368 L+3 STOVL NEWVEC
R0369 L+4 STADR
R0370 L+5 STORE NEWVEC NEWVEC AND NEWVEC ARE SYMBOLIC REPRESENTATIONS OF THE USERS LOCATIONS.
R0371 L+6 ... CONTINUE
R0372
R0373
R0374
R0375
R0376 ABORT EXIT MODES -
R0377 L CALL BON
R0378 L+1 TIMESTET
R0379 L+2 COGAPLAG
R0380 L+3 COGABORT RESTRICTION 1 HAS BEEN VIOLATED.
R0381 L+4 BON IF NEITHER FLAG IS SET AND RESTRICTION 2 HAS NOT BEEN VIOLATED, THE SOLUTION IS
R0382 GOOD, SO CONTINUE
R0383
R0384 L+5 INFINPLG
R0385 L+6 IMPOSSL NO SOLUTION EXISTS.
R0386
R0387
R0388
R0389
R0390
R0391 T (300) * +28 *OP TRANSFER TIME IN CENTISECONDS
R0392 INFINPLG* NONE *AN INTERPRETIVE SWITCH WHICH IS SET IF THE TRANSFER ANGLE REQUIRES CLOSURE THROUGH
R0393 * *INFINITY (NO SOLUTION), CLEAR IF A PHYSICAL SOLUTION IS POSSIBLE.
R0394 COGAPLAG* NONE *AN INTERPRETIVE SWITCH WHICH IS SET IF RESTRICTION 1 HAS BEEN VIOLATED (NO SOLUTION),
R0395 * *CLEAR IF NOT.
R0396
R0399 IN ADDITION, IF VIARTAG IS NON-ZERO, THE FOLLOWING ARE OUTPUT -
R0400 MPAC - * +7 FOR EARTH *OP TERMINAL VELOCITY VECTOR IN METERS/CENTISEC.
R0401 MPAC +5* +5 FOR MOON *



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R0402 6D - 3D * +29 FOR EARTHOP TERMINAL POSITION VECTOR IN METERS (PL AT 6D)
 R0403 * +27 FOR MOON *

R0404 FOR OTHER OUTPUT WHICH MAY BE OF USE, SEE DEBRIS.
 R0405
 R0406 DEBRIS -

R0407 PARAMETERS WHICH MAY BE OF USE -

| R0408 | * SCALE FACTOR * | DESCRIPTION AND REMARKS |
|-------|---------------------------|--|
| R0409 | VARIABLES IN POWERS OF 2* | -----* |
| R0410 | -----* | -----* |
| R0411 | R1 (32D)* +29 FOR EARTHOP | MAGNITUDE OF INITIAL POSITION VECTOR, RWEC, IN METERS |
| R0413 | * +27 FOR MOON * | |
| R0414 | R1A * +8 | *DP RATIO OF R1 TO SEMIMAJOR AXIS (NEG. FOR HYPERBOLIC TRAJECTORIES) |
| R0416 | P * +4 | *DP RATIO OF SEMILATUS RECTUM TO R1 |
| R0417 | COCA * +5 | *DP COTAN OF ANGLE BETWEEN RWEC AND VWEC |
| R0419 | UR1 * +1 | *DP UNIT VECTOR OF RWEC |
| R0420 | U2 * +1 | *DP UNIT VECTOR OF VWEC |
| R0421 | LN * +1 | *DP UNIT VECTOR OF UR1+U2 |
| R0422 | | |

R0423 PARAMETERS OF NO USE -
 R0424 SP PARAMETERS - RINTT, GEOMSON, RTNPRM, MAOVEC2=R2 (DP), PLUS PUSHLIST LOCATIONS 0-11D, 14D-21D, 24D-39D, 41D
 R0426 ADDITIONAL INTERPRETIVE SWITCHES USED - NORMSW, 380SW
 R0427

L CONIC SUBROUTINES

USER=5 PAGE NO. 11 Pg 53

R0428 PROGRAM DESCRIPTION - TIME-RADIUS SUBROUTINE
 R0430 MOD NO. -1
 R0432 MOD BY KRAUSE
 R0434
 R0435 FUNCTIONAL DESCRIPTION -

DATE - 11 OCTOBER 1967
 LOG SECTION - CONIC SUBROUTINES
 ASSEMBLY - COLOSSUS REVISION 88

R0436 THIS SUBROUTINE, GIVEN AN INITIAL STATE VECTOR AND A DESIRED RADIUS TO WHICH THE
 R0438 STATE IS TO BE UPDATED ALONG A CONIC TRAJECTORY, CALCULATES THE CORRESPONDING TIME-OF-FLIGHT AND, IN ADDITION,
 R0440 PROVIDES THE OPTION OF COMPUTING THE NEW UPDATED STATE VECTOR. THE RESULTING TRAJECTORY MAY BE A SECTION OF A
 R0442 CIRCLE, ELLIPSE, PARABOLA, OR HYPERBOLA WITH RESPECT TO THE EARTH OR THE MOON. THE USE OF THE SUBROUTINES CAN BE
 R0444 EXTENDED USING OTHER PRIMARY BODIES BY SIMPLE ADDITIONS TO THE MUTABLE WITHOUT INTRODUCING ANY CODING CHANGES,
 R0446 ACCEPTING THE INHERENT SCALE FACTOR CHANGES IN POSITION AND VELOCITY.
 R0447 IF THE DESIRED RADIUS IS BEYOND THE RADIUS OF APOCENTER OF THE CONIC OR BELOW THE RADIUS OF PERICENTER,
 R0449 APSEW WILL BE SET AND THE SUBROUTINE WILL RETURN THE APOCENTER OR PERICENTER SOLUTION, RESPECTIVELY.
 R0451

R0452 THE RESTRICTIONS ARE -
 R0453 1. THE ANGLE BETWEEN ANY POSITION VECTOR AND ITS VELOCITY VECTOR MUST BE GREATER THAN 1 DEGREE 47.5 MINUTES
 R0455 AND LESS THAN 178 DEGREES 12.5 MINUTES.
 R0456 2. THE PARAMETERS IN THE PROBLEM MUST NOT EXCEED THEIR SCALING LIMITS SPECIFIED IN THE GSOP. IF THE LIMITS
 R0458 ARE EXCEEDED, THE RESULTING SOLUTION WILL BE MEANINGLESS.
 R0458 3. AN ACCURACY DEGRADATION OCCURS AS THE SENSITIVITIES OF TIME AND UPDATED STATE VECTOR TO CHANGES IN
 R04583 RDESIRED INCREASE. THIS WILL OCCUR NEAR EITHER APSIS OF THE CONIC AND WHEN THE CONIC IS NEARLY CIRCULAR. IN
 R04585 PARTICULAR, IF THE CONIC IS AN EXACT CIRCLE, THE PROBLEM IS UNDEFINED AND THE SUBROUTINE WILL ABORT.
 R04587

R0459 THE AGC COMPUTATION TIME IS APPROXIMATELY .363 SECONDS

R0460 REFERENCES -
 R0461 R-479, MISSION PROGRAMMING DEFINITION MEMO NO. 10, LUNAR LANDING MISSION GSOP-SECTION 5.5, SGA MEMO 67-8.
 R0462
 R0464
 R0465

INPUT - ERASABLE INITIALIZATION REQUIRED

| SCALE FACTOR * | DESCRIPTION AND REMARKS |
|--------------------------|--|
| VARIABLE*IN POWERS OF 2* | |
| R0468 | |
| R0469 | RVEC * +29 FOR EARTH*OP INITIAL POSITION VECTOR IN METERS |
| R0470 | * +27 FOR MOON * |
| R0471 | VVEC * +7 FOR EARTH *OP INITIAL VELOCITY VECTOR IN METERS/CENTISECOND |
| R0472 | * +5 FOR MOON * |
| R0473 | RDESIRED* +29 FOR EARTH*OP TERMINAL RADIAL DISTANCE ON CONIC TRAJECTORY FOR WHICH TRANSFER TIME IS TO BE |
| R0475 | * +27 FOR MOON *COMPUTED. |
| R0476 | SCNRDOT * NONE *SP TAG SET TO +.5 OR -.5 ACCORDING TO WHETHER THE RADIAL VELOCITY AT RDESIRED IS TO BE |
| R0478 | * *POSITIVE OR NEGATIVE, RESPECTIVELY. THIS TAG REDUCES THE DOUBLE-VALUED PROBLEM TO A |



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R0480 * *SINGLE-VALUED PROBLEM.
 R0481 X1 (38D)*NONE *INDEX REGISTER TO BE SET TO -2D OR -10D ACCORDING TO WHETHER THE EARTH OR MOON,
 R0483 * *RESPECTIVELY, IS THE CENTRAL BODY.
 R0484 RVSW * NONE *AN INTERPRETIVE SWITCH TO BE SET IF ONLY TIME IS TO BE AN OUTPUT, CLEAR IF THE NEW STATE
 R0486 * *IS TO BE COMPUTED ALSO.

R0487 SUBROUTINES CALLED -
 R0489 PARAM, GEOM, GETX, DELTIME, NEWSTATE
 R0490
 R0491 CALLING SEQUENCE AND NORMAL EXIT MODES -

R0492 IF ONLY TIME IS DESIRED AS OUTPUT -
 R0493 L SET CALL MUST BE IN INTERPRETIVE MODE AND O/PIND MUST BE CLEAR
 R0495 L+1 RVSW
 R0496 L+2 TIMERAD RETURN WITH PL AT 0 AND T IN MPAC
 R0497 L+3 ... CONTINUE
 R0498

R0499 IF THE UPDATE STATE VECTOR IS DESIRED AS WELL -
 R0500 L CLEAR CALL MUST BE IN INTERPRETIVE MODE AND O/PIND MUST BE CLEAR
 R0502 L+1 RVSW
 R0503 L+2 TIMERAD RETURNS WITH PL AT 6. THE INITIAL POSITION VECTOR IS IN 0D OF THE PUSHLIST AND
 R0505 THE INITIAL VELOCITY VECTOR IN MPAC.
 R0506 L+3 STOVL NEWVVEC
 R0507 L+4 STADR
 R0508 L+5 STORE NEWRVEC NEWVVEC AND NEWRVEC ARE SYMBOLIC REPRESENTATIONS OF THE USERS LOCATIONS.
 R0510 L+6 ... CONTINUE

R0511
 R0512 ABORT EXIT MODES -
 R0513 L CALL RON
 R0514 L+1 TIMERAD
 R0515 L+2 COGAPLAG
 R0516 L+3 COGABORT RESTRICTION 1 HAS BEEN VIOLATED.
 R0517 L+4 RON
 R0520 L+5 INFINPLG
 R0521 L+6 IMPOSSL NO SOLUTION EXISTS.
 R05211 L+7 SOLNSW
 R05212 L+8 IMPOSSL SOLUTION IS UNDEFINED SINCE CONIC IS A CIRCLE. RESTRICTION 3 HAS BEEN VIOLATED.
 R05214 L+9 ... IF ALL THREE OF THE FLAGS ARE CLEAR, A SOLUTION EXISTS, SO CONTINUE.

R0522
 R0523 OUTPUT -
 R0524 * SCALE FACTOR *

L CONIC SUBROUTINES

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| ADDRESS | VARIABLE*IN POWERS OF 2* | DESCRIPTION AND REMARKS |
|---------|--------------------------|--|
| R0525 | VARIABLE*IN POWERS OF 2* | DESCRIPTION AND REMARKS |
| R0526 | T (32D) * +28 | *DP TRANSFER TIME IN CENTISECONDS |
| R0527 | INFINFL* NONE | *AN INTERPRETIVE SWITCH WHICH IS SET IF RDESIRED AND SONRDOT REQUIRE CLOSURE THROUGH INFINITY (NO SOLUTION), CLEAR IF A PHYSICAL SOLUTION IS POSSIBLE. |
| R0528 | COGAPLAC* NONE | *AN INTERPRETIVE SWITCH WHICH IS SET IF RESTRICTION 1 HAS BEEN VIOLATED (NO SOLUTION), *CLEAR IF NOT. |
| R0529 | APSESW * NONE | *AN INTERPRETIVE SWITCH WHICH IS SET IF RDESIRED WAS GREATER THAN RADIUS OF APOCENTER OR *LESS THAN RADIUS OF PERICENTER. THE APOCENTER OR PERICENTER SOLUTION, RESPECTIVELY, *WILL THEN BE RETURNED. THE SWITCH IS CLEAR IF RDESIRED WAS BETWEEN PERICENTER AND *APOCENTER. |
| R0530 | SOLNSW * NONE | *AN INTERPRETIVE SWITCH WHICH IS SET IF THE CONIC IS SO CLOSE TO A CIRCLE THAT THE TERMIN *POINT IS AMBIGUOUS, VIOLATING RESTRICTION 3. IF ECCENTRICITY IS GREATER THAN 2-TO-THE- *MINUS-18, THE SWITCH IS CLEAR. |

R0543 IN ADDITION, IF VTDROTAG IS NON-ZERO, THE FOLLOWING ARE OUTPUT -

| | |
|-------|--|
| R0544 | MPAC - * +7 FOR EARTH *DP TERMINAL VELOCITY VECTOR IN METERS/CENTISEC. |
| R0545 | MPAC +5* +5 FOR MOON * |
| R0546 | OP - 5D * +20 FOR EARTH*DP TERMINAL POSITION VECTOR IN METERS (PL AT 6D) |
| R0547 | * +27 FOR MOON * |

R0548 FOR OTHER OUTPUT WHICH MAY BE OF USE, SEE DEBRIS.

R0549 DEBRIS -

R0551 PARAMETERS WHICH MAY BE OF USE -

| ADDRESS | VARIABLE*IN POWERS OF 2* | DESCRIPTION AND REMARKS |
|---------|--|--|
| R0552 | * SCALE FACTOR * | |
| R0553 | VARIABLE*IN POWERS OF 2* | DESCRIPTION AND REMARKS |
| R0554 | R1 (32D)* +29 FOR EARTH*DP MAGNITUDE OF INITIAL POSITION VECTOR, RVBC, IN METERS | |
| R0555 | * +27 FOR MOON * | |
| R0556 | R1A * +8 | *DP RATIO OF R1 TO SEMIMAJOR AXIS (NEC. FOR HYPERBOLIC TRAJECTORIES) |
| R0557 | P * +4 | *DP RATIO OF SEMILATUS RECTUM TO R1 |
| R0558 | COGA * +5 | *DP COTAN OF ANGLE BETWEEN RVBC AND VVEC |
| R0559 | UR1 * +1 | *DP UNIT VECTOR OF RVBC |
| R0560 | U2 * +1 | *DP UNIT VECTOR OF VVEC |
| R0561 | UN * +1 | *DP UNIT VECTOR OF UR1*U2 |
| R0562 | CSNH * +1 | *DP COSINE OF TRUE ANOMALY DIFFERENCE BETWEEN RVBC AND RDESIRED. |
| R0563 | SNTH * +1 | *DP SINE OF TRUE ANOMALY DIFFERENCE. |

R0570 PARAMETERS OF NO USE -

R0571 SP PARAMETERS - RINTT, GEOMSON, RINPRM, MAGVEC2=R2 (DP), PLUS PUSHLIST LOCATIONS 0-11D, 14D-21D, 24D-39D, 41D

R0573 ADDITIONAL INTERPRETIVE SWITCHES USED - NORMSW, 360SW

R0574



L CONIC SUBROUTINES

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R0575 PROGRAM DESCRIPTION - APSIDES SUBROUTINE
 R0577 MOD NO. - 0
 R0579 MOD BY KRAUSE

DATE - 1 SEPTEMBER 1967
 LOG SECTION - CONIC SUBROUTINES
 ASSEMBLY - COLOSSUS REVISION 88

R0581 FUNCTIONAL DESCRIPTION -

R0583 THIS SUBROUTINE, GIVEN AN INITIAL STATE VECTOR CALCULATES THE RADIUS OF PERICENTER AND OF APOCENTER AND THE
 R0585 ECCENTRICITY OF THE RESULTING CONIC TRAJECTORY, WHICH MAY BE A STRAIGHT LINE,
 R0587 CIRCLE, ELLIPSE, PARABOLA, OR HYPERBOLA WITH RESPECT TO THE EARTH OR THE MOON. THE USE OF THE SUBROUTINE CAN BE
 R0589 EXTENDED USING OTHER PRIMARY BODIES BY SIMPLE ADDITIONS TO THE MUTABLE WITHOUT INTRODUCING ANY CODING CHANGES,
 R0591 ACCEPTING THE INHERENT SCALE FACTOR CHANGES IN POSITION AND VELOCITY.
 R0592

R0593 THE RESTRICTIONS ARE -

- R0594 1. IF APOCENTER IS BEYOND THE SCALING OF POSITION, THE SCALE FACTOR LIMIT (536,870,910 METERS WITH RESPECT
 R0596 TO THE EARTH OR 134,217,727.5 METERS WITH RESPECT TO THE MOON) WILL BE RETURNED.
- R0598 2. THE PARAMETERS IN THE PROBLEM MUST NOT EXCEED THEIR SCALING LIMITS SPECIFIED IN THE OSOP. IF THE LIMITS
 R0600 ARE EXCEEDED, THE RESULTING SOLUTION WILL BE MEANINGLESS.

R0601 THE AGC COMPUTATION TIME IS APPROXIMATELY .103 SECONDS.

R0602 REFERENCES -

R0603 MISSION PROGRAMMING DEFINITION MEMO NO. 10, LUNAR LANDING MISSION OSOP-SECTION 5.5

R0604 INPUT - ERASABLE INITIALIZATION REQUIRED

| R0608 | * SCALE FACTOR * | | DESCRIPTION AND REMARKS |
|-------|--------------------------|--------------------|--|
| R0609 | VARIABLE*IN POWERS OF 2* | | |
| R0610 | -----* | | -----* |
| R0611 | RVEC | * +29 FOR EARTH*OP | INITIAL POSITION VECTOR IN METERS |
| R0612 | | * +27 FOR MOON * | |
| R0613 | VVEC | * +7 FOR EARTH *OP | INITIAL VELOCITY VECTOR IN METERS/CENTISECOND |
| R0614 | | * +5 FOR MOON * | |
| R0615 | X1 (38D)*NONE | | *INDEX REGISTER TO BE SET TO -2D OR -10D ACCORDING TO WHETHER THE EARTH OR MOON, |
| R0617 | * | | *RESPECTIVELY, IS THE CENTRAL BODY. |

R0618 SUBROUTINES CALLED -

R0619 PARAM, GEOM

R0621 CALLING SEQUENCE AND NORMAL EXIT MODES -

R0622

L CONIC SUBROUTINES

USER'S PAGE NO. 15 E0 53

R0623 IF ONLY TIME IS DESIRED AS OUTPUT -
 R0624 L CALL MUST BE IN INTERPRETIVE MODE AND OVPIND MUST BE CLEAR.
 R0626 L+1 APSIDES RETURNS WITH PL AT 0, RADIUS OF APOCENTER IN MPAC AND RADIUS OF PERICENTER IN GD
 R0628 L+2 STODL APOAPSE
 R0629 L+3 GD
 R0630 L+4 STORE PERIAPSE APOAPSE AND PERIAPSE ARE SYMBOLIC REPRESENTATIONS OF THE USERS LOCATIONS
 R0632 L+5 ... CONTINUE

R0633 OUTPUT -
 R0635 * SCALE FACTOR *
 R0636 VARIABLE*IN POWERS OF 2* DESCRIPTION AND REMARKS
 R0637 -----*
 R0638 MPAC * +29 FOR EARTH*OP RADIUS OF APOCENTER IN METERS
 R0639 * +27 FOR MOON *
 R0640 GD-1D * +29 FOR EARTH*OP RADIUS OF PERICENTER IN METERS
 R0641 * +27 FOR MOON *
 R0642 ECC * +3 *OP ECCENTRICITY OF CONIC TRAJECTORY.

R0643 FOR OTHER OUTPUT WHICH MAY BE OF USE, SEE DEBRIS.
 R0644 DEBRIS -
 R0645

R0646 PARAMETERS WHICH MAY BE OF USE -

R0647 * SCALE FACTOR *
 R0648 VARIABLE*IN POWERS OF 2* DESCRIPTION AND REMARKS
 R0649 -----*
 R0650 R1 (32D)* +29 FOR EARTH*OP MAGNITUDE OF INITIAL POSITION VECTOR, RVEC, IN METERS
 R0652 * +27 FOR MOON *
 R0653 R1A * +6 *OP RATIO OF R1 TO SEMIMAJOR AXIS (NEG. FOR HYPERBOLIC TRAJECTORIES)
 R0655 P * +4 *OP RATIO OF SEMILATUS RECTUM TO R1
 R0656 CODA * +5 *OP CODAN OF ANGLE BETWEEN RVEC AND WVEC
 R0658 UR1 * +1 *OP UNIT VECTOR OF RVEC
 R0659 U2 * +1 *OP UNIT VECTOR OF WVEC
 R0660 UN * +1 *OP UNIT VECTOR OF UR1*U2
 R0661 MROVEC2 * +7 FOR EARTH *OP MAGNITUDE OF WVEC
 R0662 * +5 FOR MOON *
 R0663

R0664 PARAMETERS OF NO USE -
 R0665 SP PARAMETERS - RINAPSE, GEOMSON, RINPRM, PLUS PUSHLIST LOCATIONS 0-5,10D-11D, 14D-21D, 31D-38D.
 R0667 ADDITIONAL INTERPRETIVE SWITCHES USED - NORMSW
 R0668

R0669 SEP 1 12,2000 SETLOC CONICS



L CONIC SUBROUTINES

| | | | | | | | | | |
|------|-----|--------------|---------|---------|----------|-------|----------|------------------------|-----------|
| 0719 | | | 12,2051 | 55366 1 | IRSV | SOBT | EDDV | | |
| 0720 | REP | 2 LAST 549 | 12,2052 | 11520 0 | | | 2PISC | 2PISC (+8) | |
| 0721 | | | 12,2053 | 77600 1 | | BOV | | | |
| 0722 | REP | 3 LAST 1247 | 12,2054 | 24055 1 | | | STOREMAX | | |
| 0723 | | | 12,2055 | 50165 0 | STOREMAX | SIGN | RMN | | |
| 0724 | REP | 2 LAST 86 | 12,2056 | 02312 0 | | | TAU | | |
| 0725 | REP | 1 | 12,2057 | 24272 0 | | | BACKWARD | | |
| 0726 | REP | 1 | 12,2060 | 00013 0 | | STORE | XMAX | | |
| 0727 | | | 12,2061 | 65205 0 | DMP | | PDDL | PL AT 2 | |
| 0728 | REP | 2 LAST 1247 | 12,2062 | 00023 0 | | | 1/ROOTMU | | |
| 0729 | REP | 3 LAST 1247 | 12,2063 | 00011 1 | | | ALPHA | | |
| 0730 | | | 12,2064 | 65301 0 | | NORM | PDDL | DNCH WITH OD. OD=ALPHA | PL AT 0,2 |
| 0731 | REP | 56 LAST 1231 | 12,2065 | 00047 1 | | | X1 | | |
| 0732 | | | 12,2066 | 56257 1 | | SL* | DDV | | PL AT 0 |
| 0733 | | | 12,2067 | 20173 0 | | | 0 -6,1 | | |
| 0734 | | | 12,2070 | 50000 1 | PERIODCH | BOV | RMN | | |
| 0735 | REP | 1 | 12,2071 | 24112 0 | | | MODDNE | | |
| 0736 | REP | 2 LAST 1248 | 12,2072 | 24112 0 | | | MODDNE | | |
| 0737 | | | 12,2073 | 77606 1 | | | | OD=PERIOD (+28) | |
| 0738 | | | 12,2074 | 50021 1 | | PUSH | | | |
| 0739 | REP | 3 LAST 1248 | 12,2075 | 02312 0 | | RDSU | RMN | | |
| 0740 | REP | 3 LAST 1248 | 12,2076 | 24112 0 | | | TAU | | |
| 0741 | REP | 4 LAST 1248 | 12,2077 | 16312 0 | | | MODDNE | | |
| 0742 | REP | 2 LAST 1248 | 12,2100 | 00013 0 | | STODL | TAU | | |
| 0743 | | | 12,2101 | 77615 0 | | | XMAX | | |
| 0744 | REP | 2 LAST 1247 | 12,2102 | 01344 0 | | DAD | | | |
| 0745 | REP | 3 LAST 1248 | 12,2103 | 15344 0 | | | XMODULO | | |
| 0746 | | | 12,2104 | 00001 0 | | STODL | XMODULO | | |
| 0747 | | | 12,2105 | 77615 0 | | | OD | | |
| 0748 | REP | 2 LAST 1247 | 12,2106 | 01346 1 | | DAD | IMODULO | | |
| 0749 | REP | 3 LAST 1248 | 12,2107 | 15346 1 | | STODL | IMODULO | | PL AT 0 |
| 0750 | | | 12,2110 | 77650 1 | | GOTO | | | |
| 0751 | REP | 1 | 12,2111 | 24070 0 | | | PERIODCH | | |
| 0752 | | | 12,2112 | 71201 1 | MODDNE | SETPD | DLOAD | | |
| 0753 | | | 12,2113 | 00001 0 | | | 0 | | |
| 0754 | REP | 2 LAST 1247 | 12,2114 | 11456 0 | | | KSPZERO | | |
| 0755 | REP | 1 | 12,2115 | 14015 0 | | STODL | XMIN | | |
| 0756 | REP | 2 LAST 87 | 12,2116 | 02306 0 | | | XCEPNEW | | |
| 0757 | | | 12,2117 | 77625 0 | | DSU | | | |
| 0758 | REP | 4 LAST 1248 | 12,2120 | 01344 0 | | | XMODULO | | |
| 0759 | REP | 1 | 12,2121 | 00025 0 | | STORE | X | | |
| 0760 | | | 12,2122 | 50054 0 | | BZE | RMN | | |
| 0761 | REP | 1 | 12,2123 | 24265 0 | | | RADY | | |
| 0762 | REP | 2 LAST 1248 | 12,2124 | 24265 0 | | | RADY | | |
| 0763 | | | 12,2125 | 51025 1 | | | RPL | | |
| 0764 | REP | 3 LAST 1248 | 12,2126 | 00013 0 | | DSU | | | |
| 0765 | REP | 3 LAST 1248 | 12,2127 | 24265 0 | | | XMAX | | |
| | | | | | | | RADY | | |



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| | | | | | | | | | |
|-------|------|--------------|---------|---------|---------|-------|--------|----------|---------------------------------|
| 0766 | | | 12,2130 | 57345 1 | DXCOMP | DLOAD | DMPR | | |
| 0767 | RESP | 5 LAST 1248 | 12,2131 | 02312 0 | | | TAU. | | |
| 0768 | RESP | 1 | 12,2132 | 11511 1 | | | BSS22 | | |
| 07685 | | | 12,2133 | 77646 0 | | | ABS | | |
| 0769 | RESP | 1 | 12,2134 | 15350 0 | | | STODL | EPSILON | |
| 0770 | RESP | 2 LAST 83 | 12,2135 | 01551 1 | | | TC | | |
| 0771 | | | 12,2136 | 45254 0 | | | BZE | DSU | |
| 0772 | RESP | 1 | 12,2137 | 24141 0 | | | | NEWTC | |
| 0773 | RESP | 4 LAST 1248 | 12,2140 | 01346 1 | | | | TMODULO | |
| 0774 | RESP | 3 LAST 1249 | 12,2141 | 15551 1 | NEWTC | STODL | TC | | |
| 0775 | RESP | 1 | 12,2142 | 01553 0 | | | | XPREV | |
| 0776 | | | 12,2143 | 45254 0 | | | BZE | DSU | |
| 0777 | RESP | 1 | 12,2144 | 24146 1 | | | | XDIFF | |
| 0778 | RESP | 5 LAST 1248 | 12,2145 | 01344 0 | | | | XMODULO | |
| 0779 | | | 12,2146 | 77621 1 | XDIFF | RDSU | | | |
| 0780 | RESP | 2 LAST 1248 | 12,2147 | 00025 0 | | | | X | |
| 0781 | RESP | 2 LAST 94 | 12,2150 | 02643 1 | | | STORE | DELX | |
| 0782 | | | 12,2151 | 63545 0 | KEPLOOP | DLOAD | DSO | | |
| 0783 | RESP | 3 LAST 1249 | 12,2152 | 00025 0 | | | | X | X=XKEP |
| 0784 | | | 12,2153 | 41501 0 | | | NORM | PUSH | OD=XSO (+34 OR +32 -N1) PL AT 2 |
| 0785 | RESP | 59 LAST 1248 | 12,2154 | 00047 1 | | | | X1 | |
| 0786 | | | 12,2155 | 53805 1 | | | DMP | SRR* | |
| 0787 | RESP | 4 LAST 1248 | 12,2156 | 00011 1 | | | | ALPHA | |
| 0788 | | | 12,2157 | 21573 0 | | | | 0 -6,1 | |
| 0789 | RESP | 1 | 12,2160 | 34031 1 | | | STCALL | XI | XI=ALPHA XSO (+6) |
| 0790 | RESP | 1 | 12,2161 | 24426 1 | | | | DELTIME | |
| 0791 | | | 12,2162 | 44200 0 | | | ROV | RDSU | |
| 0792 | RESP | 1 | 12,2163 | 24312 1 | | | | TIMEOVFL | UNLIKELY |
| 0793 | RESP | 6 LAST 1249 | 12,2164 | 02312 0 | | | | TAU. | |
| 0794 | RESP | 2 LAST 94 | 12,2165 | 02645 1 | | | STORE | DELT | DELT=DELINDEP |
| 0795 | | | 12,2166 | 44246 1 | | | ABS | RDSU | |
| 0796 | RESP | 2 LAST 1249 | 12,2167 | 01350 0 | | | | EPSILON | |
| 0797 | | | 12,2170 | 71244 0 | | | RPL. | DLOAD | |
| 0798 | RESP | 1 | 12,2171 | 24334 0 | | | | KEPCONVG | |
| 0799 | RESP | 10 LAST 893 | 12,2172 | 00037 0 | | | | T | |
| 0800 | | | 12,2173 | 60225 1 | | | DSU | NORM | |
| 0801 | RESP | 4 LAST 1249 | 12,2174 | 01551 1 | | | | TC | |
| 0802 | RESP | 60 LAST 1249 | 12,2175 | 00047 1 | | | | X1 | |
| 0803 | | | 12,2176 | 60325 0 | | | PDDI. | NORM | |
| 0804 | RESP | 3 LAST 1249 | 12,2177 | 02643 1 | | | | DELX | |
| 0805 | RESP | 31 LAST 1228 | 12,2200 | 00050 1 | | | | X2 | |
| 0806 | | | 12,2201 | 41260 0 | | | XSU,1 | DMP | |
| 0807 | RESP | 32 LAST 1249 | 12,2202 | 00047 1 | | | | X2 | |
| 0808 | RESP | 3 LAST 1249 | 12,2203 | 02645 1 | | | | DELT | |
| 0809 | | | 12,2204 | 56257 1 | | | SRR* | DDV | |
| 0810 | | | 12,2205 | 21202 1 | | | | 1,1 | |
| 0811 | | | 12,2206 | 41542 1 | | | SR1 | PUSH | OD=TRIAL DELX PL AT 2 |
| 0812 | | | 12,2207 | 71244 0 | | | RPL. | DLOAD | |

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| | | | | | | | |
|------|-----|--------------|---------|---------|--------------------|--------------------------|---------|
| 0813 | REP | 1 | 12,2210 | 24231 1 | POSDELX | | |
| 0814 | REP | 4 LAST 1249 | 12,2211 | 00025 0 | X | | |
| 0815 | REP | 4 LAST 1248 | 12,2212 | 00013 0 | STORE XMAX | MOVE MAX BOUND IN | |
| 0816 | | | 12,2213 | 45221 1 | BDSU DSU | | PL AT 0 |
| 0817 | REP | 2 LAST 1248 | 12,2214 | 00015 0 | XMIN | | |
| 0818 | | | 12,2215 | 51000 0 | BOV BPL | | |
| 0819 | REP | 1 | 12,2216 | 24223 1 | NDXCHANGE | | |
| 0820 | REP | 2 LAST 1250 | 12,2217 | 24223 1 | NDXCHANGE | | |
| 0821 | | | 12,2220 | 52145 0 | DLOAD GOTO | | |
| 0822 | | | 12,2221 | 00001 0 | GD | | |
| 0823 | REP | 1 | 12,2222 | 24243 1 | NEWDELX | | |
| 0824 | | | 12,2223 | 45345 1 | NDXCHANGE DLOAD | | |
| 0825 | REP | 3 LAST 1250 | 12,2224 | 00015 0 | DSU | | |
| 0826 | REP | 5 LAST 1250 | 12,2225 | 00025 0 | XMIN | | |
| 0827 | | | 12,2226 | 52075 1 | X | | |
| 0828 | REP | 1 | 12,2227 | 11514 1 | DMPR GOTO | TO FORCE MPAC +2 TO ZERO | |
| 0829 | REP | 2 LAST 1250 | 12,2228 | 24243 1 | DP9/10 | | |
| 0830 | | | 12,2230 | 24243 1 | NEWDELX | | |
| 0831 | REP | 6 LAST 1250 | 12,2231 | 77745 1 | POSDELX DLOAD | | |
| 0832 | REP | 4 LAST 1250 | 12,2232 | 00025 0 | X | | |
| 0833 | REP | 4 LAST 1250 | 12,2233 | 00015 0 | STORE XMIN | MOVE MIN BOUND IN | |
| 0834 | REP | 5 LAST 1250 | 12,2234 | 45221 1 | BDSU DSU | | PL AT 0 |
| 0835 | | | 12,2235 | 00013 0 | XMAX | | |
| 0836 | REP | 1 | 12,2236 | 50000 1 | BOV BFN | | |
| 0837 | REP | 2 LAST 1250 | 12,2237 | 24257 1 | FDXCHANGE | | |
| 0838 | | | 12,2240 | 24257 1 | FDXCHANGE | | |
| 0839 | | | 12,2241 | 77745 1 | DLOAD | | |
| 0840 | REP | 4 LAST 1249 | 12,2242 | 00001 0 | GD | | |
| 0841 | | | 12,2243 | 02843 1 | NEWDELX STORE DELX | | |
| 0842 | REP | 2 LAST 1249 | 12,2244 | 43254 0 | BZE DAD | | |
| 0843 | REP | 7 LAST 1250 | 12,2245 | 24334 0 | KEPCONV | | |
| 0844 | REP | 8 LAST 1250 | 12,2246 | 00025 0 | X | | |
| 0845 | REP | 11 LAST 1249 | 12,2247 | 14025 0 | STOPL X | | |
| 0846 | REP | 5 LAST 1249 | 12,2250 | 00037 0 | T | | |
| 0847 | | | 12,2251 | 01551 1 | STORE T | | |
| 0848 | REP | 1 | 12,2252 | 46034 1 | BRNCHCTR RTB | RHIZ | |
| 0849 | REP | 3 LAST 1250 | 12,2253 | 24051 0 | CHECKCTR | | |
| 0850 | | | 12,2254 | 24334 0 | KEPCONV | | |
| 0851 | REP | 1 | 12,2255 | 77650 1 | GOTO | | |
| 0852 | | | 12,2256 | 24151 1 | KEPLOOP | ITERATE | |
| 0853 | REP | 6 LAST 1250 | 12,2257 | 45345 1 | FDXCHANGE DLOAD | | |
| 0854 | REP | 9 LAST 1250 | 12,2260 | 00013 0 | DSU | | |
| 0855 | | | 12,2261 | 00025 0 | XMAX | | |
| 0856 | REP | 2 LAST 1250 | 12,2262 | 52075 1 | X | | |
| | | | 12,2263 | 11514 1 | DMPR GOTO | TO FORCE MPAC +2 TO ZERO | |
| | | | | | DP9/10 | | |



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| | | | | | | | | |
|-------|-----|----|-----------|---------|---------|----------|-------|------------|
| 0857 | REP | 3 | LAST 1250 | 12,2264 | 24243 1 | | | NEWDELX |
| 0858 | | | | 12,2265 | 70545 1 | BACK | DLOAD | SR1 |
| 0859 | REP | 7 | LAST 1250 | 12,2266 | 00013 0 | | | XMAX |
| 0860 | REP | 10 | LAST 1250 | 12,2267 | 00025 0 | | | STORE X |
| 0861 | | | | 12,2270 | 77650 1 | | | GOTO |
| 0862 | REP | 1 | | 12,2271 | 24130 0 | | | DXCOMP |
| 0863 | REP | 5 | LAST 1250 | 12,2272 | 14015 0 | BACKWARD | STOCL | XMIN |
| 0864 | REP | 3 | LAST 1248 | 12,2273 | 11456 0 | | | KEPZERO |
| 0865 | REP | 8 | LAST 1251 | 12,2274 | 14013 0 | | | XMAX |
| 0866 | REP | 3 | LAST 1248 | 12,2275 | 02306 0 | | | XKEPNEW |
| 0867 | REP | 11 | LAST 1251 | 12,2276 | 00025 0 | | | STORE X |
| 0868 | | | | 12,2277 | 51054 1 | | | BZE |
| 0869 | REP | 1 | | 12,2300 | 24305 1 | | | BADRKWDX |
| 0870 | REP | 2 | LAST 1251 | 12,2301 | 24305 1 | | | BADRKWDX |
| 0871 | | | | 12,2302 | 51025 1 | | | DSU |
| 0872 | REP | 6 | LAST 1251 | 12,2303 | 00015 0 | | | BPL |
| 0873 | REP | 2 | LAST 1251 | 12,2304 | 24130 0 | | | XMIN |
| 0874 | | | | 12,2305 | 70545 1 | BADRKWDX | DLOAD | DXCOMP |
| 0875 | REP | 7 | LAST 1251 | 12,2306 | 00015 0 | | | SR1 |
| 0876 | REP | 12 | LAST 1251 | 12,2307 | 00025 0 | | | XMIN |
| 0877 | | | | 12,2310 | 77650 1 | | | STORE X |
| 0878 | REP | 3 | LAST 1251 | 12,2311 | 24130 0 | | | GOTO |
| 0879 | | | | 12,2312 | 50145 1 | TIMEOVPL | DLOAD | DXCOMP |
| 0880 | REP | 13 | LAST 1251 | 12,2313 | 00025 0 | | | RMN |
| 08805 | REP | 1 | | 12,2314 | 24331 0 | | | X |
| 0881 | REP | 9 | LAST 1251 | 12,2315 | 00013 0 | | | NEOTOVPL |
| 0882 | | | | 12,2316 | 70545 1 | | | STORE XMAX |
| 0883 | REP | 5 | LAST 1250 | 12,2317 | 02643 1 | CMTOVPL | DLOAD | SR1 |
| 0884 | REP | 6 | LAST 1251 | 12,2320 | 02643 1 | | | DELX |
| 0885 | | | | 12,2321 | 44254 1 | | | STORE DELX |
| 08855 | REP | 1 | | 12,2322 | 02270 0 | | | BZE |
| 0886 | REP | 14 | LAST 1251 | 12,2323 | 00025 0 | | | RDSJ |
| 0887 | REP | 15 | LAST 1251 | 12,2324 | 14025 0 | | | KEPRIN |
| 0888 | REP | 6 | LAST 1250 | 12,2325 | 01551 1 | | | X |
| 0889 | REP | 12 | LAST 1250 | 12,2326 | 00037 0 | | | STOCL X |
| 0890 | | | | 12,2327 | 77650 1 | | | TC |
| 0891 | REP | 1 | | 12,2330 | 24252 1 | | | STORE T |
| 08911 | REP | 8 | LAST 1251 | 12,2331 | 00015 0 | | | GOTO |
| 08912 | | | | 12,2332 | 77650 1 | NEOTOVPL | STORE | BRNCHCTR |
| 08913 | REP | 1 | | 12,2333 | 24316 0 | | | XMIN |
| 0892 | | | | 12,2334 | 44545 0 | | | GOTO |
| 0893 | REP | 5 | LAST 1247 | 12,2335 | 00041 1 | KEPCQVQ | DLOAD | CMTOVPL |
| 0894 | | | | 12,2336 | 74225 1 | | | SR4R |
| 0895 | REP | 1 | | 12,2337 | 00035 1 | | | R1 |
| | | | | | | DSU | | VXSC |
| | | | | | | | | XSCC(XI) |

RECIPE EXCEEDED X BOUNDS - USE XMAX/2

X WAS TOO BIG



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| | | | | | |
|------|-----|----|-----------|---------|---------|
| 0896 | REP | 3 | LAST 1247 | 12,2340 | 02647 0 |
| 0897 | | | | 12,2341 | 85372 1 |
| 0898 | REP | 16 | LAST 1251 | 12,2342 | 00025 0 |
| 0899 | | | | 12,2343 | 60316 0 |
| 0900 | REP | 61 | LAST 1249 | 12,2344 | 00047 1 |
| 0901 | | | | 12,2345 | 57275 0 |
| 0902 | REP | 3 | LAST 1246 | 12,2346 | 00023 0 |
| 0903 | REP | 17 | LAST 1252 | 12,2347 | 00025 0 |
| 0904 | | | | 12,2350 | 53605 1 |
| 0905 | REP | 1 | | 12,2351 | 00033 1 |
| 0906 | | | | 12,2352 | 21572 1 |
| 0907 | | | | 12,2353 | 77621 1 |
| 0908 | REP | 13 | LAST 1251 | 12,2354 | 00037 0 |
| 0909 | | | | 12,2355 | 74352 0 |
| 0910 | REP | 4 | LAST 1247 | 12,2356 | 01511 0 |
| 0911 | | | | 12,2357 | 53372 1 |
| 0912 | | | | 12,2360 | 77712 0 |
| 0913 | REP | 14 | LAST 1229 | 12,2361 | 01535 0 |
| 0914 | | | | 12,2362 | 60246 1 |
| 0915 | REP | 33 | LAST 1249 | 12,2363 | 00050 1 |
| 0916 | REP | 2 | LAST 94 | 12,2364 | 16655 0 |
| 0917 | REP | 2 | LAST 1249 | 12,2365 | 00031 0 |
| 0918 | | | | 12,2366 | 45275 0 |
| 0919 | REP | 2 | LAST 1252 | 12,2367 | 00033 1 |
| 0920 | REP | 1 | | 12,2370 | 11476 1 |
| 0921 | | | | 12,2371 | 78405 1 |
| 0922 | REP | 1 | | 12,2372 | 00021 1 |
| 0923 | | | | 12,2373 | 53605 1 |
| 0924 | REP | 16 | LAST 1252 | 12,2374 | 00025 0 |
| 0925 | | | | 12,2375 | 56601 0 |
| 0926 | | | | 12,2376 | 74271 0 |
| 0927 | REP | 3 | LAST 1252 | 12,2377 | 02655 0 |
| 0928 | REP | 4 | LAST 1252 | 12,2400 | 02647 0 |
| 0929 | | | | 12,2401 | 65372 1 |
| 0930 | REP | 2 | LAST 1251 | 12,2402 | 00035 1 |
| 0931 | | | | 12,2403 | 56257 1 |
| 0932 | | | | 12,2404 | 56602 0 |
| 0933 | REP | 4 | LAST 1252 | 12,2405 | 02655 0 |
| 0934 | | | | 12,2406 | 74221 0 |
| 0935 | REP | 1 | | 12,2407 | 11512 1 |
| 0936 | REP | 5 | LAST 1252 | 12,2410 | 01511 0 |
| 0937 | | | | 12,2411 | 42455 0 |
| 0938 | | | | 12,2412 | 77626 0 |
| 0939 | REP | 13 | LAST 1229 | 12,2413 | 62234 0 |
| 0940 | REP | 14 | LAST 1252 | 12,2414 | 00037 0 |
| 0941 | | | | 12,2415 | 77615 0 |
| 0942 | REP | 5 | LAST 1249 | 12,2416 | 01346 1 |
| 0943 | REP | 7 | LAST 1251 | 12,2417 | 15551 1 |

| | |
|-------|----------|
| VSL1 | URRECT |
| | PDDL |
| | X |
| DSQ | NORM |
| | X1 |
| DMPR | DMPR |
| | 1/ROOTMU |
| | X |
| DMP | SRM* |
| | S(XI) |
| | 0 -7,1 |
| BDSU | T |
| SL1 | VXSC |
| | VRECT |
| VSL1 | VAD |
| VSL4 | |
| STORE | RCV |
| ABVAL | NORM |
| | X2 |
| STODL | RCNORM |
| | X1 |
| DMPR | DSU |
| | S(XI) |
| | D1/128 |
| DMP | SL1R |
| | ROOTMU |
| DMP | SLR* |
| | X |
| | 0 -3,2 |
| DDV | VXSC |
| | RCNORM |
| | URRECT |
| VSL1 | PDM, |
| | XSCC(XI) |
| SLR* | DDV |
| | 0 -4,2 |
| | RCNORM |
| BDSU | VXSC |
| | D1/256 |
| | VRECT |
| VAD | VSL6 |
| STADR | |
| STODL | VCV |
| | T |
| DAD | |
| | TMODULO |
| STODL | TC |

$GD=(R1-XSCC(XI))URRECT (+33 OR +31)$

PL AT 0

$RCV (+29 OR +27)$

$GD=URRECT(XI S(XI)-1)X ROOTMU/RCV (+15 OR +13)$
PL AT 6

PL AT 0

$VCV (+7 OR +5)$



L CONIC SUBROUTINES

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| | | | | | | | | | | |
|------|-----|----|------|------|---------|-------|---|-------|--|---------|
| 0944 | REP | 10 | LAST | 1252 | 12,2420 | 00025 | 0 | | | X |
| 0945 | | | | | 12,2421 | 77615 | 0 | DAD | | |
| 0946 | REP | 6 | LAST | 1249 | 12,2422 | 01344 | 0 | | | XMODULO |
| 0947 | REP | 2 | LAST | 1249 | 12,2423 | 01553 | 0 | STORE | | XPREV |
| 0948 | | | | | 12,2424 | 77650 | 1 | GOTO | | |
| 0949 | REP | 2 | LAST | 1251 | 12,2425 | 02270 | 0 | | | KEPRIN |



L CONIC SUBROUTINES

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MPAC=XI (+6), QD=XSQ (+34 OR +32 -N1)

| LINE | OPERATION | ADDRESS | DATA | DELTIME | EXIT | VALUE |
|------|-------------------|---------|----------|---------|-------|-------------|
| 0950 | | 12,2428 | 77776 1 | | | |
| 0951 | REP 7 LAST 1160 | 12,2427 | 0 7171 1 | | TC | POLY |
| 0952 | | 12,2430 | 00010 0 | | DEC | 8 |
| 0953 | | 12,2431 | 02525 1 | | 2DEC | .083333334 |
| 0954 | | 12,2432 | 12528 0 | | | |
| 0954 | | 12,2433 | 87356 0 | | 2DEC | -.266666684 |
| 0954 | | 12,2434 | 75666 0 | | | |
| 0955 | | 12,2435 | 15001 1 | | 2DEC | .406349155 |
| 0955 | | 12,2436 | 23771 1 | | | |
| 0956 | | 12,2437 | 04342 0 | | 2DEC | -.381198675 |
| 0956 | | 12,2440 | 43814 0 | | | |
| 0957 | | 12,2441 | 06563 1 | | 2DEC | .210153242 |
| 0957 | | 12,2442 | 04645 1 | | | |
| 0958 | | 12,2443 | 75173 0 | | 2DEC | -.086221951 |
| 0958 | | 12,2444 | 52872 0 | | | |
| 0959 | | 12,2445 | 00656 1 | | 2DEC | .026268812 |
| 0959 | | 12,2446 | 14331 0 | | | |
| 0960 | | 12,2447 | 77633 1 | | 2DEC | -.006163316 |
| 0960 | | 12,2450 | 40512 0 | | | |
| 0961 | | 12,2451 | 00023 0 | | 2DEC | .001177342 |
| 0961 | | 12,2452 | 11210 1 | | | |
| 0962 | | 12,2453 | 11114 0 | | 2DEC | -.000199055 |
| 0962 | | 12,2454 | 61506 0 | | | |
| 0963 | REP 230 LAST 1228 | 12,2455 | 0 6006 1 | | TC | INTPRET |
| 0964 | REP 3 LAST 1252 | 12,2458 | 14033 1 | | STOCL | S(XI) |
| 0965 | REP 3 LAST 1252 | 12,2451 | 00031 0 | | | XI |
| 0966 | | 12,2460 | 77776 1 | | EXIT | |
| 0967 | REP 8 LAST 1254 | 12,2461 | 0 7171 1 | | TC | POLY |
| 0968 | | 12,2462 | 00010 0 | | DEC | 8 |
| 0969 | | 12,2463 | 01000 0 | | 2DEC | .031250001 |
| 0969 | | 12,2464 | 00000 1 | | | |
| 0970 | | 12,2465 | 72525 0 | | 2DEC | -.166666719 |
| 0970 | | 12,2466 | 52506 0 | | | |
| 0971 | | 12,2467 | 13301 1 | | 2DEC | .355555413 |
| 0971 | | 12,2470 | 15331 1 | | | |
| 0972 | | 12,2471 | 62776 0 | | 2DEC | -.406347410 |
| 0972 | | 12,2412 | 54133 1 | | | |
| 0973 | | 12,2473 | 11176 1 | | 2DEC | .288982094 |
| 0973 | | 12,2474 | 13201 0 | | | |
| 0974 | | 12,2475 | 13410 0 | | 2DEC | -.140117894 |
| 0974 | | 12,2476 | 51674 0 | | | |
| 0975 | | 12,2477 | 01446 0 | | 2DEC | .049247387 |
| 0975 | | 12,1500 | 33641 1 | | | |
| 0976 | | 12,2501 | 11451 1 | | 2DEC | -.013081923 |
| 0976 | | 12,1502 | 65233 0 | | | |
| 0977 | | 12,2503 | 00055 1 | | 2DEC | .002806389 |
| 0977 | | 12,2504 | 37266 1 | | | |
| 0978 | | 12,2505 | 77767 1 | | 2DEC | -.000529414 |
| 0978 | | 12,2506 | 52336 0 | | | |
| 0979 | REP 231 LAST 1254 | 12,2507 | 0 6006 1 | | TC | INTPRET |

L CONIC SUBROUTINES

USER-S PAGE NO. 24 E5 S3

| | | | | | | | |
|------|--------|-----------|---------|---------|--------|----------|---|
| 0980 | | 12,2510 | 53605 1 | DMP | SRR* | | PL AT 0 |
| 0981 | | 12,2511 | 00001 0 | | 0D | | |
| 0982 | | 12,2512 | 21574 1 | | 0 -5,1 | | |
| 0983 | REP 3 | LAST 1252 | 12,2513 | 00035 1 | STORE | XSQ(X1) | XSQ(X1) (+33 OR +31) |
| 0984 | | 12,2514 | 72405 0 | DMP | SL1 | | |
| 0985 | REP 2 | LAST 1247 | 12,2515 | 00043 0 | | KSPC1 | |
| 0986 | | 12,2516 | 65234 1 | RTB | FDDL | | XCH WITH PL. 0D=C1 XSO C(X1) (+49 OR +46 PL AT 0,3 |
| 0987 | REP 10 | LAST 1223 | 12,2517 | 45562 1 | | TPMDE | |
| 0988 | | 12,2520 | 53605 1 | DMP | SRR* | | |
| 0989 | REP 4 | LAST 1254 | 12,2521 | 00033 1 | | S(X1) | |
| 0990 | | 12,2522 | 21574 1 | | 0 -5,1 | | |
| 0991 | | 12,2523 | 72405 0 | DMP | SL1 | | |
| 0992 | REP 2 | LAST 1247 | 12,2524 | 00045 0 | | KSPC2 | |
| 0993 | | 12,2525 | 65234 1 | RTB | FDDL | | 3D=C2 XSO S(X1) (+35 OR +33) PL AT 6 |
| 0994 | REP 11 | LAST 1255 | 12,2526 | 45562 1 | | TPMDE | |
| 0995 | REP 6 | LAST 1251 | 12,2527 | 00041 1 | | R1 | |
| 0996 | | 12,2530 | 76261 0 | SR | TAD | | PL AT 3 |
| 0997 | | 12,2531 | 20607 1 | | 6 | | |
| 0998 | | 12,2532 | 41301 0 | NORM | DMP | | TO PRESERVE SIGNIF. |
| 0999 | REP 62 | LAST 1252 | 12,2533 | 00047 1 | | X1 | |
| 1000 | REP 20 | LAST 1253 | 12,2534 | 00025 0 | | X | |
| 1001 | | 12,2535 | 76257 0 | SRR* | TAD | | X(C2 XSO S(X1) +R1) (+49 OR +46) PL AT 0 |
| 1002 | | 12,2536 | 20576 1 | | 0 -3,1 | | |
| 1003 | | 12,2537 | 57232 0 | SLAR | DMP | | |
| 1004 | REP 4 | LAST 1252 | 12,2540 | 00023 0 | | 1/ROOTM1 | |
| 1005 | REP 15 | LAST 1252 | 12,2541 | 00037 0 | STORE | T | |
| 1006 | | 12,2542 | 77616 0 | RVD | | | |



L CONIC SUBROUTINES

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| | | | | | | | |
|------|-----|----|---------|---------|----------|--------|----------|
| 1007 | | | 12,2543 | 71214 0 | ITERATOR | BONCLR | DLOAD |
| 1008 | REP | 1 | 12,2544 | 00614 1 | | | SLOPESW |
| 1009 | REP | 1 | 12,2545 | 24613 0 | | | FIRSTIME |
| 1010 | REP | 1 | 12,2546 | 00037 0 | | | DEF |
| 1011 | | | 12,2547 | 60225 1 | DSU | | NORM |
| 1012 | REP | 2 | 12,2550 | 02764 0 | | | DEPREV |
| 1013 | REP | 63 | 12,2551 | 00047 1 | | | X1 |
| 1014 | | | 12,2552 | 60325 0 | PDDL | | NORM |
| 1015 | REP | 1 | 12,2553 | 00015 0 | | | DELINDEP |
| 1016 | REP | 34 | 12,2554 | 00050 1 | | | X2 |
| 1017 | | | 12,2555 | 41280 0 | XSU,1 | | DMP |
| 1018 | REP | 35 | 12,2556 | 00047 1 | | | X2 |
| 1019 | REP | 3 | 12,2557 | 02762 0 | | | DELDEP |
| 1020 | | | 12,2560 | 56257 1 | SLR* | | DDV |
| 1021 | | | 12,2561 | 21202 1 | | | 1,1 |
| 1022 | | | 12,2562 | 43142 1 | SR1 | | BOFF |
| 1023 | REP | 1 | 12,2563 | 04351 1 | | | ORDERSW |
| 1024 | REP | 1 | 12,2564 | 24567 0 | | | SONCHECK |
| 1025 | | | 12,2565 | 75246 0 | ABS | | SIGN |
| 1026 | REP | 4 | 12,2566 | 02762 0 | | | DELDEP |
| 1027 | | | 12,2567 | 51000 0 | SONCHECK | PUSH | BPL |
| 1028 | REP | 1 | 12,2570 | 24625 0 | | | POSDEL |
| 1029 | | | 12,2571 | 43145 0 | DLOAD | | BCN |
| 1030 | REP | 1 | 12,2572 | 03775 1 | | | INDEP |
| 1031 | REP | 2 | 12,2573 | 04311 0 | | | ORDERSW |
| 1032 | REP | 1 | 12,2574 | 24576 0 | | | MINCHECK |
| 1033 | REP | 1 | 12,2575 | 00017 1 | STORE | | MAX |
| 1034 | | | 12,2576 | 45221 1 | MINCHECK | BDSU | DSU |
| 1035 | REP | 1 | 12,2577 | 00011 1 | | | MIN |
| 1036 | | | 12,2600 | 51000 0 | | BOV | BPL |
| 1037 | REP | 1 | 12,2601 | 24605 1 | | | MODNDEL |
| 1038 | REP | 2 | 12,2602 | 24605 1 | | | MODNDEL |
| 1039 | | | 12,2603 | 77650 1 | GOTO | | |
| 1040 | REP | 1 | 12,2604 | 24637 0 | | | DELAK |
| 1041 | | | 12,2605 | 45345 1 | MODNDEL | DLOAD | DSU |
| 1042 | REP | 2 | 12,2606 | 00011 1 | | | MIN |
| 1043 | REP | 2 | 12,2607 | 03775 1 | | | INDEP |
| 1044 | | | 12,2610 | 52005 0 | DMP | | GOTO |
| 1045 | REP | 3 | 12,2611 | 11514 1 | | | DP9/10 |
| 1046 | REP | 1 | 12,2612 | 24641 1 | | | NEWDEL |
| 1047 | | | 12,2613 | 41345 0 | FIRSTIME | DLOAD | DMP |
| 1048 | REP | 3 | 12,2614 | 00011 1 | | | MIN |
| 1049 | REP | 1 | 12,2615 | 00051 0 | | | TWERKIT |
| 1050 | | | 12,2616 | 41325 0 | PDDL | | DMP |

IN CASE 2ND DERIV. CHANGED SIGN, MUST DISREGARD IT TO FIND MIN.

TRIAL DELINDEP PL DOWN 2

IF NOT 2ND ORDER, CAN MOVE MAX BOUND IN.

TRIAL DELINDEP WOULD EXCEED MIN BOUND

DLOAD TWERKIT(40D) SENSITIVE TO CHANGE. S2(41D) SHOULDNT CONTAIN HI ORDER ONES



L CONIC SUBROUTINES

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| | | | | | | | | |
|------|-----|-----|-----------|---------|----------|----------|-------|----------|
| 1051 | REP | 2 | LAST 1256 | 12,2617 | 00017 1 | | | MAX |
| 1052 | REP | 2 | LAST 1256 | 12,2620 | 00051 0 | | | TRBKIT |
| 1053 | | | | 12,2621 | 77625 0 | | DSU | |
| 1054 | | | | 12,2622 | 52165 1 | | SIGN | GOTO |
| 1055 | REP | 5 | LAST 1256 | 12,2623 | 02762 0 | | | DELDEF |
| 1056 | REP | 2 | LAST 1256 | 12,2624 | 24567 0 | | | SCNCHK |
| 1057 | | | | 12,2625 | 43145 0 | POSDEL | DLOAD | BCN |
| 1058 | REP | 3 | LAST 1256 | 12,2626 | 03775 1 | | | INDEX |
| 1059 | REP | 3 | LAST 1256 | 12,2627 | 04311 0 | | | ORDERSW |
| 1060 | REP | 1 | | 12,2630 | 24632 0 | | | MAXCHK |
| 1061 | REP | 4 | LAST 1256 | 12,2631 | 00011 1 | | STORE | MIN |
| 1062 | | | | 12,2632 | 45221 1 | MAXCHK | RDSU | DSU |
| 1063 | REP | 3 | LAST 1257 | 12,2633 | 00017 1 | | | MAX |
| 1064 | | | | 12,2634 | 50000 1 | | BOV | R-N |
| 1065 | REP | 1 | | 12,2635 | 24643 0 | | | MODPSDEL |
| 1066 | REP | 2 | LAST 1257 | 12,2636 | 24643 0 | | | MODPSDEL |
| 1067 | | | | 12,2637 | 77745 1 | DELCK | DLOAD | |
| 1068 | | | | 12,2640 | 00001 0 | | | OP |
| 1069 | REP | 2 | LAST 1256 | 12,2641 | 00015 0 | NEWDEL | STORE | DELINDEX |
| 1070 | | | | 12,2642 | 77616 0 | | RVO | |
| 1071 | | | | 12,2643 | 45345 1 | MODPSDEL | DLOAD | DSU |
| 1072 | REP | 4 | LAST 1257 | 12,2644 | 00017 1 | | | MAX |
| 1073 | REP | 4 | LAST 1257 | 12,2645 | 03775 1 | | | INDEX |
| 1074 | | | | 12,2646 | 52005 0 | | DMP | GOTO |
| 1075 | REP | 4 | LAST 1256 | 12,2647 | 11514 1 | | | DP9/10 |
| 1076 | REP | 2 | LAST 1256 | 12,2650 | 24641 1 | | | NEWDEL |
| 1077 | REP | 153 | LAST 1200 | 12,2651 | 4 4712 0 | CHECKCTR | CS | ONE |
| 1078 | REP | 36 | LAST 1183 | 12,2652 | 50 120 1 | | INDEX | FIXLOC |
| 1079 | REP | 2 | LAST 1247 | 12,2653 | 6 0026 0 | | AD | ITERCTR |
| 1080 | REP | 37 | LAST 1257 | 12,2654 | 50 120 1 | | INDEX | FIXLOC |
| 1081 | REP | 3 | LAST 1257 | 12,2655 | 54 026 1 | | TS | ITERCTR |
| 1082 | REP | 650 | LAST 1224 | 12,2656 | 54 154 0 | | TS | MPAC |
| 1083 | REP | 62 | LAST 1169 | 12,2657 | 0 6030 1 | | TC | DANZIG |

IF NOT 2ND ORDER, CAN MOVE MIN BOUND IN.



L CONIC SUBROUTINES

| | | | | | | | |
|-------|-----|----|---------|---------|----------------|----------|---|
| 1084 | | | 12,2660 | 44545 0 | NEWSTATE DLOAD | SR4R | |
| 1085 | REP | 7 | 12,2661 | 00041 1 | | R1 | |
| 1089 | | | 12,2662 | 74225 1 | DSU | VXSC | |
| 1090 | REP | 4 | 12,2663 | 00035 1 | | XSCC(XI) | |
| 1091 | REP | 3 | 12,2664 | 02724 1 | | UR1 | |
| 1092 | | | 12,2665 | 65372 1 | VSL1 | PDOL | GD=(R1-XSCC(XI))UR1 (+33 OR 31) PL AT 6 |
| 1093 | REP | 21 | 12,2666 | 00025 0 | | X | |
| 1094 | | | 12,2667 | 60316 0 | DSQ | NORM | |
| 1095 | REP | 64 | 12,2670 | 00047 1 | | X1 | |
| 1096 | | | 12,2671 | 57275 0 | DMPR | DMPR | |
| 1097 | REP | 5 | 12,2672 | 00023 0 | | 1/ROOTMU | |
| 1098 | REP | 22 | 12,2673 | 00025 0 | | X | |
| 1099 | | | 12,2674 | 53605 1 | DMP | SR4* | |
| 1100 | REP | 5 | 12,2675 | 00033 1 | | S(XI) | |
| 1101 | | | 12,2676 | 21572 1 | | 0 -7,1 | |
| 1102 | | | 12,2677 | 77621 1 | BDSU | | |
| 1103 | REP | 16 | 12,2700 | 00037 0 | | T | |
| 1104 | | | 12,2701 | 74352 0 | SL1 | VXSC | |
| 1105 | REP | 15 | 12,2702 | 02746 0 | | VVEC | |
| 1106 | | | 12,2703 | 53372 1 | VSL1 | VAD | PL AT 0 |
| 1107 | | | 12,2704 | 41512 1 | VSL4 | PUSH | |
| 1108 | | | 12,2705 | 77646 0 | ABVAL | | |
| 1109 | | | 12,2706 | 77701 1 | LAMENTER | NORM | |
| 1110 | REP | 65 | 12,2707 | 00047 1 | | X1 | |
| 1111 | REP | 1 | 12,2710 | 16722 1 | STODL | R2 | |
| 1112 | REP | 4 | 12,2711 | 00031 0 | | X1 | |
| 1113 | | | 12,2712 | 45205 1 | DMP | DSU | |
| 1114 | REP | 6 | 12,2713 | 00033 1 | | S(XI) | |
| 1115 | REP | 2 | 12,2714 | 11476 1 | | D1/128 | |
| 1116 | | | 12,2715 | 76405 1 | DMP | SL1R | |
| 1117 | REP | 2 | 12,2716 | 00021 1 | | ROOTMU | |
| 1118 | | | 12,2717 | 53605 1 | DMP | SLR* | |
| 1119 | REP | 23 | 12,2720 | 00025 0 | | X | |
| 1120 | | | 12,2721 | 21176 1 | | 0 -3,1 | |
| 1121 | | | 12,2722 | 74271 0 | DDV | VXSC | |
| 1122 | REP | 2 | 12,2723 | 02722 1 | | R2 | |
| 1123 | REP | 4 | 12,2724 | 02724 1 | | UR1 | |
| 1124 | | | 12,2725 | 65372 1 | VSL1 | PDOL | GD=V2VEC PART (+15 OR 13) PL AT 12 |
| 1125 | REP | 5 | 12,2726 | 00035 1 | | XSCC(XI) | |
| 1126 | | | 12,2727 | 66257 1 | SLR* | DDV | |
| 1127 | | | 12,2730 | 21175 1 | | 0 -4,1 | |
| 1128 | REP | 3 | 12,2731 | 02722 1 | | R2 | |
| 1129 | | | 12,2732 | 77621 1 | BDSU | | |
| 1130 | REP | 2 | 12,2733 | 11512 1 | | D1/256 | |
| 1131 | | | 12,2734 | 53361 0 | VXSC | VAD | PL AT 6 |
| 1132 | REP | 16 | 12,2735 | 02746 0 | | VVEC | |
| 1133 | | | 12,2736 | 43412 1 | VSL4 | RVO | |
| R1134 | | | | | | | |



L CONIC SUBROUTINES

USER=8 PAGE NO. 28 E8 53

| Line | REP | Label | Address | Count | Code | Value | Notes | |
|------|-------|---|---------|-------|---------|----------|----------------|--|
| 1135 | REP 1 | | 04,2000 | | SETLOC | CONICS1 | | |
| 1136 | | | 04,3472 | | BANK | | | |
| 1137 | REP 1 | | | | COUNT | 04/CONIC | | |
| 1138 | | DO NOT DISTURB THE ORDER OF THESE CDS, OVERLAYS HAVE BEEN MADE. | | | | | | |
| 1139 | | | 04,3472 | 00000 | BEE17 | DEC | 0 | |
| 1140 | | | 04,3473 | 04000 | D1/8 | 2DEC | 1.0 B-3 | |
| 1141 | | | 04,3474 | 00000 | | | | |
| 1142 | | | 04,3475 | 00200 | D1/128 | 2DEC | 1.0 B-7 | |
| 1143 | | | 04,3476 | 00000 | | | | |
| 1144 | | | 04,3477 | 00400 | D1/64 | 2DEC | 1.0 B-8 | |
| 1145 | | | 04,3500 | 00000 | | | | |
| 1146 | | | 04,3501 | 10000 | D1/4 | 2DEC | 1.0 B-2 | |
| 1147 | | | 04,3502 | 00000 | | | | |
| 1148 | | | 04,3503 | 02000 | D1/16 | 2DEC | 1.0 B-4 | |
| 1149 | | | 04,3504 | 00000 | | | | |
| 1150 | | | 04,3505 | 01000 | D1/32 | 2DEC | 1.0 B-5 | |
| 1151 | | | 04,3506 | 00000 | | | | |
| 1152 | | | 04,3507 | 00020 | D1/1024 | 2DEC | 1.0 B-10 | |
| 1153 | | | 04,3510 | 00000 | | | | |
| 1154 | | | 04,3511 | 00100 | D1/256 | 2DEC | 1.0 B-8 | |
| 1155 | | | 04,3512 | 00000 | | | | |
| 1156 | | | 04,3513 | 34631 | DP9/10 | 2DEC | .9 | |
| 1157 | | | 04,3514 | 23146 | | | | |
| 1158 | REP 5 | LAST 681 | 04,3455 | | KEPZERO | EQUALS | LOGZEROS | |
| 1159 | | | 04,3515 | 77467 | -50SC | 2DEC | -50.0 B-12 | |
| 1160 | | | 04,3516 | 77777 | | | | |
| 1161 | | | 04,3517 | 03110 | 2PISC | 2DEC | 6.28318530 B-6 | |
| 1162 | | | 04,3520 | 17665 | | | | |
| 1163 | REP 2 | LAST 549 | 04,3504 | | BEE19 | EQUALS | D1/32 -1 | |
| 1164 | REP 3 | LAST 1258 | 04,3510 | | BEE22 | EQUALS | D1/256 -1 | |
| 1165 | | | 04,3521 | 00000 | UNERIT | 2DEC | 1.0 B-28 | |
| 1166 | | | 04,3522 | 00001 | | | | |
| 1167 | | | 04,3523 | 37767 | COOPLIM | 2DEC | .999511597 | |
| 1168 | | | 04,3524 | 37737 | | | | |
| 1169 | | | 04,3525 | 40010 | COOQLIM | 2DEC | -.999511597 | |
| 1170 | | | 04,3526 | 40040 | | | | |

KEEP WITH D1/8 2DEC 1.0B-17 (0000004000)

2DEC 1.0 6-19 (00000 01000)
2DEC 1.0 8-22 (00000 00100)

11167



L CONIC SUBROUTINES

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| LINE | REP | TYPE | START | END | ADDRESS | OPERATION | COMMENT | PL AT 0 |
|------|-----|------|--------------------|----------|---------|---------------|----------|----------------------|
| 1158 | REP | 2 | LAST 1246 | 12,2000 | | SETLOC CONICS | | |
| 1159 | | | | 12,2737 | | BANK | | |
| 1160 | REP | 2 | LAST 1247 TO 1259' | 479 479* | | CONIC | 12/CONIC | |
| 1161 | | | | 12,2737 | 40220 0 | TIMESTRT STO | SETPO | PL AT 0 |
| 1162 | REP | 1 | | 12,2740 | 02712 1 | | RINTT | |
| 1163 | | | | 12,2741 | 00001 0 | | 0 | |
| 1164 | | | | 12,2742 | 03375 0 | VLOAD | FDVL | SETUP FOR PARAM CALL |
| 1165 | REP | 11 | LAST 893 | 12,2743 | 02857 1 | | RWEC | PL AT 0 |
| 1166 | REP | 17 | LAST 1258 | 12,2744 | 02748 0 | | WEC | |
| 1167 | | | | 12,2745 | 77624 1 | CALL | | |
| 1168 | REP | 2 | LAST 861 | 12,2746 | 11527 1 | | PARAM | |
| 1169 | | | | 12,2747 | 45000 0 | BOV | CALL | PL AT 0 |
| 1170 | REP | 1 | | 12,2750 | 24767 1 | | COGAVPL | |
| 1171 | REP | 1 | | 12,2751 | 24772 0 | | GETX | |
| 1172 | | | | 12,2752 | 43145 0 | COMMOUT DLOAD | BN | |
| 1173 | REP | 5 | LAST 1258 | 12,2753 | 00031 0 | | XI | |
| 1174 | REP | 2 | LAST 893 | 12,2754 | 04310 1 | | INFINPLG | |
| 1175 | REP | 2 | LAST 1260 | 12,2755 | 02712 1 | | RINTT | |
| 1176 | | | | 12,2756 | 45014 0 | CLEAR | CALL | |
| 1177 | REP | 2 | LAST 893 | 12,2757 | 04273 0 | | COGAPLAG | |
| 1178 | REP | 2 | LAST 1249 | 12,2760 | 24426 1 | | DELTIME | |
| 1179 | | | | 12,2761 | 45014 0 | BN | CALL | |
| 1180 | REP | 8 | LAST 893 | 12,2762 | 03706 0 | | RWSW | |
| 1181 | REP | 3 | LAST 1260 | 12,2763 | 02712 1 | | RINTT | |
| 1182 | REP | 1 | | 12,2764 | 24660 1 | | NEWSTATE | |
| 1183 | | | | 12,2765 | 77650 1 | GOTO | | |
| 1184 | REP | 4 | LAST 1260 | 12,2766 | 02712 1 | | RINTT | |
| 1185 | | | | 12,2767 | 77614 1 | COGAVPL SETGO | | |
| 1186 | REP | 3 | LAST 1260 | 12,2770 | 04033 0 | | COGAPLAG | |
| 1187 | REP | 5 | LAST 1260 | 12,2771 | 02712 1 | | RINTT | |



L CONIC SUBROUTINES

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| | | | | | | | | | | | |
|-------|-----|----|-------------------|---------|-------|-------|--|--|--|--|--|
| 11872 | | | 04,3527 | | | | | | | | |
| 11874 | REP | 2 | LAST 1259 | 04,2000 | | | | | | | |
| 11876 | | | | 04,3527 | | | | | | | |
| 11878 | REP | 2 | LAST 1259 TO 1260 | 29 | 29* | PARAM | | | | | |
| 1188 | | | | 04,3527 | 43020 | 1 | | | | | |
| 1189 | REP | 2 | LAST 94 | 04,3530 | 02755 | 1 | | | | | |
| 1190 | REP | 7 | LAST 850 | 04,3531 | 03865 | 1 | | | | | |
| 11901 | | | | 04,3532 | 77814 | 1 | | | | | |
| 11902 | REP | 4 | LAST 1260 | 04,3533 | 04273 | 0 | | | | | |
| 1191 | | | | 04,3534 | 45131 | 0 | | | | | |
| 1192 | REP | 3 | LAST 481 | 04,3535 | 02875 | 1 | | | | | |
| 1193 | | | | 04,3536 | 27777 | 0 | | | | | |
| 1194 | REP | 1 | | 04,3537 | 11573 | 0 | | | | | |
| 1195 | | | | 04,3540 | 14045 | 0 | | | | | |
| 1196 | | | | 04,3541 | 58281 | 1 | | | | | |
| 1197 | | | | 04,3542 | 20606 | 0 | | | | | |
| 1198 | | | | 04,3543 | 00045 | 0 | | | | | |
| 1199 | REP | 4 | LAST 861 | 04,3544 | 33775 | 1 | | | | | |
| 1200 | REP | 6 | LAST 1247 | 04,3545 | 11631 | 0 | | | | | |
| 1201 | REP | 2 | LAST 1247 | 04,3546 | 14017 | 1 | | | | | |
| 1202 | REP | 3 | LAST 94 | 04,3547 | 92722 | 1 | | | | | |
| 1203 | | | | 04,3550 | 80316 | 0 | | | | | |
| 1204 | REP | 66 | LAST 1258 | 04,3551 | 00047 | 1 | | | | | |
| 1205 | | | | 04,3552 | 41275 | 1 | | | | | |
| 1206 | REP | 3 | LAST 1261 | 04,3553 | 00017 | 1 | | | | | |
| 1207 | REP | 8 | LAST 1258 | 04,3554 | 00041 | 1 | | | | | |
| 1208 | | | | 04,3555 | 77657 | 0 | | | | | |
| 1209 | | | | 04,3556 | 21576 | 0 | | | | | |
| 1210 | | | | 04,3557 | 44206 | 0 | | | | | |
| 1211 | REP | 3 | LAST 1259 | 04,3560 | 11506 | 1 | | | | | |
| 1212 | REP | 3 | LAST 861 | 04,3561 | 16744 | 1 | | | | | |
| 1213 | | | | 04,3562 | 80205 | 0 | | | | | |
| 1214 | | | | 04,3563 | 00045 | 0 | | | | | |
| 1215 | REP | 67 | LAST 1261 | 04,3564 | 00047 | 1 | | | | | |
| 1216 | | | | 04,3565 | 53805 | 1 | | | | | |
| 1217 | | | | 04,3566 | 00045 | 0 | | | | | |
| 1218 | | | | 04,3567 | 20575 | 1 | | | | | |
| 1219 | REP | 3 | LAST 861 | 04,3570 | 02742 | 1 | | | | | |
| 1220 | | | | 04,3571 | 77650 | 1 | | | | | |
| 1221 | REP | 3 | LAST 1261 | 04,3572 | 02755 | 1 | | | | | |

BANK 4
 SETLOC CONICS1
 BANK
 COUNT# 88/CONIC
 STO CLEAR
 RDNPRM
 NORMSW
 CLEAR
 COGAPLAG
 SSP CALL
 GEOMSON
 37777
 GEOM
 STODL 36D
 SR DDV
 5

MPAC=V1VEC, OD=R1VEC PL AT 6
 GAMMA ALWAYS LESS THAN 180DEG
 MPAC=ENGA (+1), OD=CSGA (+1) PL AT 2
 36D=SIN GAMMA (+1) PL AT 6
 36D
 COGA
 MUTABLE,1
 1/MU
 MAGVEC2
 DSO NORM
 X1
 DMPR DMP
 1/MU
 R1
 SRR*
 0 -3,1
 PUSH RDSU
 D1/32
 STODL R1A
 R1A (+6)
 PL AT 2
 PL AT 6
 DMP NORM
 36D
 X1
 DMP SRR*
 36D
 0 -4,1
 STORE P
 P (+4)
 GOTO
 RDNPRM



L CONIC SUBROUTINES

| | | | | | | | |
|------|-----|---|---------|---------|----------|-------|----------|
| 1225 | | | 04,3573 | 77656 1 | GEOM | UNIT | |
| 1226 | REP | 2 | 04,3574 | 16714 1 | | STOVL | U2 |
| 1227 | | | 04,3575 | 00045 0 | | | 36D |
| 1228 | REP | 4 | 04,3576 | 26722 1 | | STOVL | MAGVBC2 |
| 1229 | | | 04,3577 | 77656 1 | | UNIT | |
| 1230 | REP | 6 | 04,3600 | 02724 1 | | STORE | UR1 |
| 1231 | | | 04,3601 | 72441 0 | | DOT | SL1 |
| 1232 | REP | 3 | 04,3602 | 02714 1 | | | U2 |
| 1233 | | | 04,3603 | 77725 1 | | PODL | |
| 1234 | | | 04,3604 | 00045 0 | | | 36D |
| 1235 | REP | 9 | 04,3605 | 24041 1 | | STOVL | R1 |
| 1236 | REP | 6 | 04,3606 | 02724 1 | | | UR1 |
| 1237 | | | 04,3607 | 76435 1 | | VXV | VSL1 |
| 1238 | REP | 4 | 04,3610 | 02714 1 | | | U2 |
| 1239 | | | 04,3611 | 75214 1 | | BOV | SIGN |
| 1240 | REP | 8 | 04,3612 | 03705 0 | | | NORMSW |
| 1241 | REP | 1 | 04,3613 | 11625 0 | | | HAVENORM |
| 1242 | REP | 4 | 04,3614 | 02675 1 | | | GEOMSON |
| 1243 | | | 04,3615 | 40056 0 | | UNIT | BOV |
| 1244 | REP | 1 | 04,3616 | 11623 0 | | | COLINEAR |
| 1245 | REP | 4 | 04,3617 | 16676 1 | UNITNORM | STOVL | LN |
| 1246 | | | 04,3620 | 00045 0 | | | 36D |
| 1247 | | | 04,3621 | 43565 0 | | SIGN | RVO |
| 1248 | REP | 5 | 04,3622 | 02675 1 | | | GEOMSON |
| 1249 | | | 04,3623 | 52162 0 | COLINEAR | VSR1 | GOTO |
| 1250 | REP | 1 | 04,3624 | 11617 1 | | | UNITNORM |
| 1251 | | | 04,3625 | 75246 0 | HAVENORM | ARVAL | SIGN |
| 1252 | REP | 6 | 04,3626 | 02675 1 | | | GEOMSON |
| 1253 | | | 04,3627 | 77616 0 | | RVO | |

From Lambert 1267

SAME AS 1267

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MPAC=VZVBC, OD=RIVBC
U2 (+1) PL AT 6

PL AT 0

UR1 (+1)

OD=CSNH (+1)

PL AT 2

R1 (+29 OR +27)

LN (+1)

MPAC=SNTH (+1), 34D=SNTH.SNTH (+2)

MPAC=SNTH (+1), 34D=SNTH.SNTH (+2)

L CONIC SUBROUTINES

USBR=8 PAGE NO. 32 B5 83

| Address | Operation | Label | Value | Count | Code | Comment |
|---------|-----------|--------------------|---------|---------|----------------|----------------------------|
| 1254 | | | 12,2772 | | BANK 12 | |
| 1255 | REP 3 | LAST 1260 | 12,2000 | | SETLOC CONICS | |
| 1256 | | | 12,2772 | | BANK | |
| 12565 | REP 3 | LAST 1260 TO 1261* | 27 508* | | COLNT 12/CONIC | |
| 1257 | | | 12,2772 | 66374 1 | GETX | |
| 1258 | | | 12,2773 | 00003 1 | ACT,2 SSP | ASSUMES P (+4) IN MPAC |
| 1259 | REP 26 | LAST 1228 | 12,2774 | 00052 0 | 3 | |
| 1260 | | | 12,2775 | 00001 0 | S2 | |
| 1261 | | | 12,2776 | 77614 1 | 1 | |
| 1262 | REP 1 | | 12,2777 | 04276 0 | CLEAR | |
| 1263 | | | 12,3000 | 65366 1 | 360SW | |
| 1264 | REP 9 | LAST 892 | 12,3001 | 02734 0 | SORT | 0D=SQRT(P) PL AT 2 |
| 1265 | | | 12,3002 | 44342 1 | CSTH | |
| 1266 | REP 2 | LAST 32 | 12,3003 | 11502 0 | SR1 | |
| 1267 | | | 12,3004 | 54325 1 | D1/4 | |
| 1268 | REP 11 | LAST 893 | 12,3005 | 02732 0 | FDDL | PL AT 4D |
| 1269 | | | 12,3006 | 21607 0 | SRR | |
| 1270 | | | 12,3007 | 77671 1 | STH | |
| 1271 | | | 12,3010 | 77600 1 | 6 | PL AT 2 |
| 1272 | REP 1 | | 12,3011 | 25125 0 | DDV | |
| 1273 | | | 12,3012 | 41225 1 | BOV | |
| 1274 | REP 5 | LAST 1261 | 12,3013 | 03775 1 | DSU | 360CHECK |
| 1275 | | | 12,3014 | 40132 0 | DMP | |
| 1276 | REP 2 | LAST 1263 | 12,3015 | 25125 0 | COQA | PL AT 0 |
| 1277 | | | 12,3016 | 63406 0 | BOV | |
| 1278 | | | 12,3017 | 65351 0 | SL2R | 360CHECK |
| 1279 | REP 651 | LAST 1257 | 12,3020 | 00155 0 | WLOOP | PUSH DSO 0D=W (+5) PL AT 2 |
| 1280 | REP 4 | LAST 1261 | 12,3021 | 02744 1 | TLOAD | FDDL 2D=WSQ (+10) PL AT 5 |
| 1281 | | | 12,3022 | 76202 0 | MPAC | |
| 1282 | | | 12,3023 | 75440 0 | RIA | |
| 1283 | REP 1 | | 12,3024 | 25210 0 | SR4 | PL AT 2 |
| 1284 | | | 12,3025 | 43306 0 | RMN | |
| 1285 | | | 12,3026 | 61000 0 | ROUND | |
| 1286 | REP 1 | | 12,3027 | 25123 0 | BOV | PL AT 0D |
| 1287 | REP 1 | | 12,3030 | 25016 1 | DAD | |
| 1288 | | | 12,3031 | 40065 0 | TIX,2 | |
| 1289 | REP 3 | LAST 1258 | 12,3032 | 11476 1 | RESSTX2 | |
| 1290 | REP 2 | LAST 1263 | 12,3033 | 25210 0 | WLOOP | |
| 1291 | | | 12,3034 | 41440 1 | BDDV | |
| 1292 | REP 3 | LAST 1263 | 12,3035 | 25210 0 | BOV | |
| 1293 | | | 12,3036 | 77716 1 | D1/128 | |
| 1294 | | | 12,3037 | 41301 0 | POLYCOEF | RMN INFINITY PL AT 2 |
| 1295 | REP 68 | LAST 1261 | 12,3040 | 00047 1 | DSQ | |
| 1296 | REP 5 | LAST 1263 | 12,3041 | 02744 1 | NORM | |
| 1297 | | | 12,3042 | 77457 1 | DMP | |
| 1298 | | | 12,3043 | 21567 0 | X1 | |
| | | | | | RIA | |
| | | | | | EXIT | |
| | | | | | 0 -10D,1 | |

L CONIC SUBROUTINES

| | | | | | | | | | |
|------|-----|-----|-----------|---------|----------|---------|-------------|-------------------------|----------|
| 1299 | REP | 9 | LAST 1254 | 12,3044 | 0 7171 1 | TC | POLY | | |
| 1300 | | | | 12,3045 | 00005 1 | DEC | 5 | | |
| 1301 | | | | 12,3046 | 20000 0 | ZDEC | .5 | | |
| 1302 | | | | 12,3047 | 00000 1 | | | | |
| 1302 | | | | 12,3050 | 72525 0 | ZDEC | -.166666770 | | |
| 1303 | | | | 12,3051 | 52471 1 | | | | |
| 1303 | | | | 12,3052 | 03146 1 | ZDEC | .100000392 | | |
| 1303 | | | | 12,3053 | 15003 0 | | | | |
| 1304 | | | | 12,3054 | 75556 0 | ZDEC | -.071401086 | | |
| 1304 | | | | 12,3055 | 45210 0 | | | | |
| 1305 | | | | 12,3056 | 01615 1 | ZDEC | .055503292 | | |
| 1306 | | | | 12,3057 | 13553 0 | | | | |
| 1306 | | | | 12,3060 | 76371 0 | ZDEC | -.047264098 | | |
| 1307 | | | | 12,3061 | 63777 0 | | | | |
| 1307 | | | | 12,3062 | 01232 0 | ZDEC | .040694204 | | |
| 1307 | | | | 12,3063 | 27367 0 | | | | |
| 1308 | REP | 232 | LAST 1254 | 12,3064 | 0 6006 1 | TC | INTPRET | | |
| 1309 | | | | 12,3065 | 76405 1 | DMP | SL1R | | PL AT 0D |
| 1310 | | | | 12,3066 | 43006 0 | PUSH | BCN | | |
| 1311 | REP | 2 | LAST 1263 | 12,3067 | 04316 1 | | 360SW | | |
| 1312 | REP | 1 | | 12,3070 | 25175 0 | | TRUE360X | | |
| 1313 | | | | 12,3071 | 60316 0 | XCOMMON | DSO | | |
| 1314 | REP | 69 | LAST 1263 | 12,3072 | 00047 1 | | NORM | | |
| 1315 | | | | 12,3073 | 53605 1 | DMP | X1 | | |
| 1316 | REP | 6 | LAST 1263 | 12,3074 | 02744 1 | | SRR* | | |
| 1317 | | | | 12,3075 | 21565 1 | | R1A | | |
| 1318 | REP | 6 | LAST 1260 | 12,3076 | 14031 0 | STOCL | 0 -12D,1 | | |
| 1319 | REP | 10 | LAST 1262 | 12,3077 | 00041 1 | | XI (+6) | | |
| 1320 | | | | 12,3100 | 75542 0 | SR1 | R1 | | |
| 1321 | | | | 12,3101 | 41306 1 | ROUND | SR1 | | |
| 1322 | | | | 12,3102 | 77632 0 | SLAR | SR1 | | |
| 1323 | REP | 24 | LAST 1258 | 12,3103 | 00025 0 | STORE | SR1 | | PL AT 0 |
| 1324 | | | | 12,3104 | 60316 0 | DSO | X | X (+17 OR +16) | |
| 1325 | REP | 70 | LAST 1264 | 12,3105 | 00047 1 | | NORM | | |
| 1326 | | | | 12,3106 | 41325 0 | POBL | X1 | | |
| 1327 | REP | 4 | LAST 1261 | 12,3107 | 02742 1 | | DMP | 0D=XSQ (+34 OR +32 -N1) | PL AT 2 |
| 1328 | REP | 11 | LAST 1264 | 12,3110 | 00041 1 | | P | | |
| 1329 | | | | 12,3111 | 75452 0 | | R1 | | |
| 1330 | | | | 12,3112 | 56405 0 | SL3 | SR1 | | |
| 1331 | REP | 6 | LAST 1263 | 12,3113 | 03775 1 | DMP | SL3R | | |
| 1332 | REP | 3 | LAST 1255 | 12,3114 | 14043 0 | | COGA | | |
| 1333 | REP | 7 | LAST 1264 | 12,3115 | 02744 1 | STOCL | KEPC1 | | |
| 1334 | | | | 12,3116 | 43021 0 | | R1A | | |
| 1335 | REP | 3 | LAST 1247 | 12,3117 | 11500 1 | BDSJ | CLEAR | | |
| 1336 | REP | 3 | LAST 1260 | 12,3120 | 04270 0 | | D1/64 | | |
| 1337 | REP | 3 | LAST 1255 | 12,3121 | 00045 0 | STORE | INFINFLD | | |
| | | | | | | | KEPC2 | | |

L CONIC SUBROUTINES

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| | | | | | | | |
|------|------------------|---------|---------|----------|----------|----------|---|
| 1338 | | 12,3122 | 77616 0 | RVO | | | |
| 1339 | | 12,3123 | 77774 0 | RESSTX2 | AXT,2 | | |
| 1340 | | 12,3124 | 00003 1 | | | 3 | |
| 1341 | | 12,3125 | 51001 1 | 360CHECK | SETPD | BPL | |
| 1342 | | 12,3126 | 00001 0 | | | GD | |
| 1343 | REP 1 | 12,3127 | 25132 0 | | | INVRSEON | |
| 1344 | | 12,3130 | 77614 1 | | SET | | |
| 1345 | REP 3 LAST 1264 | 12,3131 | 04076 1 | | | 360SW | |
| 1346 | | 12,3132 | 75545 1 | INVRSEON | DLOAD | SQRT | |
| 1347 | REP 5 LAST 1264 | 12,3133 | 02742 1 | | | P | |
| 1348 | | 12,3134 | 41325 0 | | FDOL | DMP | 0D=SQRT(P) (+2) FL AT 2 |
| 1349 | REP 12 LAST 1263 | 12,3135 | 02732 0 | | | SNYH | |
| 1350 | REP 7 LAST 1264 | 12,3136 | 03775 1 | | | COGA | |
| 1351 | | 12,3137 | 65352 0 | SL1 | FDOL | | 2D=SNYH COGA (+5) FL AT 4 |
| 1352 | REP 10 LAST 1263 | 12,3140 | 02734 0 | | CSIH | | |
| 1353 | | 12,3141 | 43202 0 | SR4 | DAD | | |
| 1354 | REP 4 LAST 1261 | 12,3142 | 11506 1 | | D1/32 | | |
| 1355 | | 12,3143 | 41225 1 | DSU | DMP | | FL AT 2,0 |
| 1356 | | 12,3144 | 55301 0 | NORM | BDDV | | |
| 1357 | REP 71 LAST 1264 | 12,3145 | 00047 1 | | X1 | | |
| 1358 | REP 13 LAST 1265 | 12,3146 | 02732 0 | | SNYH | | |
| 1359 | | 12,3147 | 51457 0 | SLR* | ABS | | NOTE' NEAR 360 CASE TREATED DIFFERENTLY |
| 1360 | | 12,3150 | 21174 0 | | 0 -5,1 | | |
| 1361 | | 12,3151 | 63406 0 | PUSH | DSQ | | 0D=1/W (-1) FL AT 2 |
| 1362 | | 12,3152 | 14043 0 | STODL | 34D | | |
| 1363 | REP 1 | 12,3153 | 11504 0 | | D1/16 | | |
| 1364 | | 12,3154 | 63406 0 | 1/WLOOP | PUSH | DSQ | 2D=G (+4) FL AT 4 |
| 1365 | | 12,3155 | 65234 1 | RTR | FDOL | | FL AT 7 |
| 1366 | REP 12 LAST 1255 | 12,3156 | 45562 1 | | TPMODE | | |
| 1367 | REP 8 LAST 1264 | 12,3157 | 02744 1 | | R1A | | |
| 1368 | | 12,3160 | 40405 1 | DMP | SR4 | | |
| 1369 | | 12,3161 | 00043 0 | | 34D | | |
| 1370 | | 12,3162 | 77771 0 | TAD | | | FL AT 4 |
| 1371 | | 12,3163 | 75440 0 | RAN | SQRT | | |
| 1372 | REP 4 LAST 1263 | 12,3164 | 25210 0 | | INFINITY | | |
| 1373 | | 12,3165 | 77616 0 | DAD | | | FL AT 2 |
| 1374 | | 12,3166 | 60304 0 | TIX,2 | NORM | | |
| 1375 | REP 1 | 12,3167 | 25154 0 | | 1/WLOOP | | |
| 1376 | REP 72 LAST 1265 | 12,3170 | 00047 1 | | X1 | | |
| 1377 | | 12,3171 | 77665 1 | BDDV | | | FL AT 0 |
| 1378 | | 12,3172 | 52057 1 | SLR* | GOTO | | |
| 1379 | | 12,3173 | 21172 0 | | 0 -7,1 | | |
| 1380 | REP 1 | 12,3174 | 25034 1 | | POLYCORP | | |

L CONIC SUBROUTINES

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| | | | | | | |
|------|-----|--------------|---------|---------|----------------|----------|
| 1381 | | | 12,3175 | 50145 1 | TRUE360X DLOAD | RW |
| 1382 | REP | 9 LAST 1265 | 12,3176 | 02744 1 | | R1A |
| 1383 | REP | 5 LAST 1265 | 12,3177 | 25210 0 | | INFINITY |
| 1384 | | | 12,3200 | 60386 1 | SOFT | NORM |
| 1385 | REP | 73 LAST 1265 | 12,3201 | 00047 1 | | X1 |
| 1386 | | | 12,3202 | 53885 1 | BDV | SL* |
| 1387 | REP | 3 LAST 1248 | 12,3203 | 11520 0 | | 2PISC |
| 1388 | | | 12,3204 | 20176 0 | | 0 -3,1 |
| 1389 | | | 12,3205 | 41425 1 | DSU | PUSH |
| 1390 | | | 12,3206 | 77650 1 | GOTO | |
| 1391 | REP | 1 | 12,3207 | 25071 0 | | XCOMMON |
| 1392 | | | 12,3210 | 40001 1 | INFINITY SETPD | BOV |
| 1393 | | | 12,3211 | 00001 0 | | 0 |
| 1394 | REP | 1 | 12,3212 | 25213 0 | | OVPLCLR |
| 1395 | | | 12,3213 | 43414 1 | OVPLCLR SET | RVO |
| 1396 | REP | 4 LAST 1264 | 12,3214 | 04070 1 | | INFINPLD |

OD=2PI/SOFT(R1A) -X PL AT 0,2

NO SOLUTION EXISTS SINCE CLOSURE THROUGH INFINITY IS REQUIRED



L CONTIC SUBROUTINES

| | | | | | | | | | |
|-------|-----|----|-----------|---------|---------|-----|-----------|----------|--|
| 1397 | | | 12,3215 | 40220 0 | LAMBERT | STO | SETFO | | |
| 1398 | REP | 5 | LAST 94 | 12,3216 | 02712 1 | | RINLANE | | |
| 1399 | | | | 12,3217 | 00001 0 | | OD | | |
| 1400 | | | | 12,3220 | 78731 0 | | VLOAD* | | |
| 1401 | REP | 4 | LAST 1257 | 12,3221 | 00027 1 | | ITERCTR | | |
| 1402 | | | | 12,3222 | 00024 1 | | 20D | | |
| 1403 | REP | 7 | LAST 1261 | 12,3223 | 11631 0 | | MUTABLE,1 | | |
| 1404 | REP | 4 | LAST 1261 | 12,3224 | 14017 1 | | STOCL | 1/MU | |
| 1405 | REP | 3 | LAST 480 | 12,3225 | 02673 1 | | TDDESIRD | | |
| 1406 | | | | 12,3226 | 77675 0 | | DMPR | | |
| 1407 | REP | 1 | | 12,3227 | 11505 1 | | REP19- | | |
| 1408 | REP | 1 | | 12,3230 | 03777 0 | | STORE | EPSILONL | |
| 1409 | | | | 12,3231 | 77214 0 | | SET | VLOAD | |
| 1410 | REP | 2 | LAST 1256 | 12,3232 | 00474 0 | | SLOPSW | | |
| 1411 | REP | 6 | LAST 481 | 12,3233 | 02657 1 | | R1VEC | | |
| 1412 | | | | 12,3234 | 45115 0 | | PDVL | CALL | OD=R1VEC (+20 OR +27) PL AT 6 |
| 1413 | REP | 10 | LAST 482 | 12,3235 | 02665 0 | | R2VEC | | MPAC=R2VEC (+20 OR +27) |
| 1414 | REP | 2 | LAST 1261 | 12,3236 | 11573 0 | | GEOM | | |
| 1415 | REP | 14 | LAST 1265 | 12,3237 | 16732 0 | | STOCL | SNTH | OD=CSTH (+1) PL AT 2 |
| 1416 | REP | 5 | LAST 1262 | 12,3240 | 02722 1 | | MACVEC2 | | |
| 1417 | | | | 12,3241 | 65301 0 | | NORM | PDDL | PL AT 4 |
| 1418 | REP | 74 | LAST 1266 | 12,3242 | 00047 1 | | X1 | | |
| 1419 | REP | 12 | LAST 1264 | 12,3243 | 00041 1 | | R1 | | |
| 1420 | | | | 12,3244 | 56342 1 | | SR1 | DDV | PL AT 2 |
| 1421 | | | | 12,3245 | 65257 1 | | SL* | PDDL | DXCH WITH OD, OD=R1/R2 (+7) PL AT 0,2 |
| 1422 | | | | 12,3246 | 20173 0 | | | 0 -6,1 | |
| 1423 | | | | 12,3247 | 77626 0 | | STADR | | |
| 1424 | REP | 11 | LAST 1265 | 12,3250 | 75043 1 | | STORE | CSTH | CSTH (+1) |
| 1425 | | | | 12,3251 | 44342 1 | | SR1 | RDSU | |
| 1426 | REP | 3 | LAST 1263 | 12,3252 | 11502 0 | | | D1/4 | |
| 1427 | REP | 2 | LAST 94 | 12,3253 | 02736 1 | | STORE | 1-CSTH | 1-CSTH (+2) |
| 1428 | | | | 12,3254 | 53106 0 | | ROUND | BZE | |
| 1429 | REP | 1 | | 12,3255 | 25465 1 | | | 360LAMB | |
| 1430 | | | | 12,3256 | 65301 0 | | NORM | PDDL | PL AT 4 |
| 1431 | REP | 75 | LAST 1267 | 12,3257 | 00047 1 | | X1 | | |
| 1432 | | | | 12,3260 | 00001 0 | | OD | | |
| 1433 | | | | 12,3261 | 56342 1 | | SR1 | DDV | PL AT 2 |
| 1434 | | | | 12,3262 | 75457 0 | | SL* | SCRT | |
| 1435 | | | | 12,3263 | 20176 0 | | | 0 -3,1 | |
| 1436 | | | | 12,3264 | 54325 1 | | PDDL | SR | 2D=SCRT(2R1/R2(1-CSTH)) (+5) PL AT 4 |
| 1437 | REP | 15 | LAST 1267 | 12,3265 | 02732 0 | | | SNTH | |
| 1438 | | | | 12,3266 | 20607 1 | | 6 | | |
| 1439 | | | | 12,3267 | 43271 1 | | DDV | DAD | PL AT 2 |
| 1440 | REP | 3 | LAST 1267 | 12,3270 | 02736 1 | | | 1-CSTH | |
| 14401 | | | | 12,3271 | 77626 0 | | STADR | | |
| 14402 | REP | 1 | | 12,3272 | 77760 0 | | STORE | COGAMAX | |
| 1441 | | | | 12,3273 | 50000 1 | | ROV | RNN | IF OVFL., COGAMAX=COGUP1.M |
| 1442 | REP | 1 | | 12,3274 | 25301 1 | | | UPLIM | IF NEG, USE R/EN IP LT COG.O1.M, SINCE |
| 14421 | REP | 1 | | 12,3275 | 25304 1 | | | MAXCOGA | THIS WOULD BE RESET IN LAMB1.OOP |



L CONIC SUBROUTINES

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| | | | | | | |
|-------|-----|----|---------|---------|----------|----------|
| 14422 | | | 12,3276 | 50025 0 | DSU | RNN |
| 14423 | REP | 1 | 12,3277 | 11524 1 | | COUPLIM |
| 14424 | REP | 2 | 12,3300 | 25304 1 | | MAXCOGA |
| 14425 | | | 12,3301 | 77745 1 | UPLIM | DLOAD |
| 14426 | REP | 2 | 12,3302 | 11524 1 | | COUPLIM |
| 14427 | REP | 2 | 12,3303 | 00017 1 | | COGAMAX |
| 1443 | | | 12,3304 | 77745 1 | MAXCOGA | DLOAD |
| 1444 | REP | 12 | 12,3305 | 02734 0 | | CSTH |
| 1445 | | | 12,3306 | 45261 0 | SR | DSU |
| 1446 | | | 12,3307 | 20607 1 | | 6 |
| 1447 | | | 12,3310 | 77626 0 | STADR | |
| 1448 | REP | 2 | 12,3311 | 61037 1 | STOOL | CSTH-RHO |
| 1449 | REP | 7 | 12,3312 | 02675 1 | | GEOMSON |
| 1450 | | | 12,3313 | 71240 1 | RNN | DLOAD |
| 1451 | REP | 1 | 12,3314 | 25505 0 | | LCLIM |
| 1452 | REP | 3 | 12,3315 | 02740 0 | | CSTH-RHO |
| 1453 | | | 12,3316 | 56352 0 | SL1 | DDV |
| 1454 | REP | 16 | 12,3317 | 02732 0 | | SNTH |
| 1455 | | | 12,3320 | 77600 1 | BOV | |
| 1456 | REP | 2 | 12,3321 | 25505 0 | | LCLIM |
| 1457 | REP | 1 | 12,3322 | 00011 1 | MINCOGA | COGAMIN |
| 1458 | | | 12,3323 | 66214 0 | BN | SSP |
| 1459 | REP | 4 | 12,3324 | 00715 1 | | GUESSW |
| 1460 | REP | 1 | 12,3325 | 25471 1 | | NOGUESS |
| 1461 | REP | 3 | 12,3326 | 00051 0 | | TWEEKIT |
| 1462 | | | 12,3327 | 00001 0 | | 00001 |
| 1463 | | | 12,3330 | 77745 1 | DLOAD | |
| 1464 | REP | 8 | 12,3331 | 03775 1 | | COGA |
| 1465 | | | 12,3332 | 77605 1 | LAMBLOOP | DMP |
| 1466 | REP | 17 | 12,3333 | 02732 0 | | SNTH |
| 1467 | | | 12,3334 | 45342 0 | SR1 | DSU |
| 1468 | REP | 4 | 12,3335 | 02740 0 | | CSTH-RHO |
| 1469 | | | 12,3336 | 65301 0 | NORM | PDDL |
| 1470 | REP | 76 | 12,3337 | 00047 1 | | X1 |
| 1471 | REP | 4 | 12,3340 | 02736 1 | | 1-CSTH |
| 1472 | | | 12,3341 | 56257 1 | SL* | DDV |
| 1473 | | | 12,3342 | 20170 0 | | 0 -9D,1 |
| 1474 | | | 12,3343 | 53040 0 | RNN | BZE |
| 1475 | REP | 1 | 12,3344 | 25421 1 | | NEGP |
| 1476 | REP | 2 | 12,3345 | 25421 1 | | NECP |
| 1477 | REP | 6 | 12,3346 | 16742 1 | STOOL | P |
| 1478 | REP | 9 | 12,3347 | 03775 1 | | COGA |
| 1479 | | | 12,3350 | 43316 1 | DSO | DAD |
| 1480 | REP | 1 | 12,3351 | 11510 0 | | D1/1024 |
| 1481 | | | 12,3352 | 41301 0 | NORM | DMP |
| 1482 | REP | 77 | 12,3353 | 00047 1 | | X1 |
| 1483 | REP | 7 | 12,3354 | 02742 1 | | P |
| 1484 | | | 12,3355 | 44257 1 | SR* | RDSU |

IF COGAMAX GT COUPLIM, COGAMAX=COUPLIM
OTHERWISE OK, SO GO TO MAXCOGA
COUPLIM=.999511597 = MAX VALUE OF COGA
NOT CAUSING OVPL IN R1A CALCULATION

PL AT 0

COGAMIN (+5)

0D=SNTH COGA-(CSTH-RHO) (+7+C(X1)) PL=2

1-CSTH (+2)

PL AT 0

P=(1-CSTH)/(SNTH COGA-(CSTH-RHO)) (+4)



L CONIC SUBROUTINES

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| | | | | | | | | | | |
|------|-----|-----|-----------|---------|---------|----------|----------|---------|--|--|
| 1485 | | | 12,3358 | 20571 0 | | | | | | |
| 1486 | REP | 5 | LAST 1265 | 12,3357 | 11506 1 | | | | | |
| 1487 | REP | 10 | LAST 1266 | 12,3360 | 16744 1 | STOOL | R1A | | | R1A=2-P(1+COGA COGA) (+6) |
| 1488 | REP | 8 | LAST 1268 | 12,3361 | 02742 1 | | | | | |
| 1489 | | | | 12,3362 | 45000 0 | BOV | P | | | |
| 1490 | REP | 1 | | 12,3363 | 25424 1 | | CALL | | | |
| 1491 | REP | 2 | LAST 1290 | 12,3364 | 24772 0 | | HIENERGY | | | |
| 1492 | | | | 12,3365 | 77745 1 | | GSTD | | | |
| 1493 | REP | 17 | LAST 1258 | 12,3366 | 00037 0 | DLOAD | T | | | |
| 1494 | REP | 1 | | 12,3367 | 16764 0 | STOOL | TPRSV | | | |
| 1495 | REP | 7 | LAST 1264 | 12,3370 | 00031 0 | | XI | | | |
| 1496 | | | | 12,3371 | 45014 0 | BOV | CALL | | | |
| 1497 | REP | 5 | LAST 1266 | 12,3372 | 04310 1 | | INFINPLG | | | |
| 1498 | REP | 3 | LAST 1268 | 12,3373 | 25421 1 | | NEOP | | | HAVE EXCEEDED THEORETICAL BOUNDS |
| 1499 | REP | 3 | LAST 1260 | 12,3374 | 24426 1 | | DELTIME | | | |
| 1500 | | | | 12,3375 | 44200 0 | BOV | BDSJ | | | |
| 1501 | REP | 1 | | 12,3376 | 25441 1 | | BIOTIME | | | |
| 1502 | REP | 4 | LAST 1267 | 12,3377 | 02673 1 | | TDESTRFD | | | |
| 1503 | REP | 1 | | 12,3400 | 02762 0 | STORE | TERRLAMR | | | |
| 1504 | | | | 12,3401 | 44246 1 | ABS | BDSJ | | | |
| 1505 | REP | 2 | LAST 1267 | 12,3402 | 03777 0 | | EPSILONL | | | |
| 1506 | | | | 12,3403 | 47044 1 | BPL | RTB | | | |
| 1507 | REP | 1 | | 12,3404 | 25510 1 | | INITV | | | |
| 1508 | REP | 2 | LAST 1250 | 12,3405 | 24651 0 | | CHECKCTR | | | |
| 1509 | | | | 12,3406 | 45030 0 | RHIZ | CALL | | | |
| 1510 | REP | 1 | | 12,3407 | 25452 0 | | SUPPCHEK | | | |
| 1511 | REP | 1 | | 12,3410 | 24543 0 | | ITERATOR | | | |
| 1512 | | | | 12,3411 | 53145 1 | DLOAD | RZE | | | |
| 1513 | REP | 652 | LAST 1263 | 12,3412 | 00155 0 | | MPAC | | | |
| 1514 | REP | 2 | LAST 1269 | 12,3413 | 25452 0 | | SUPPCHEK | | | |
| 1515 | | | | 12,3414 | 77615 0 | DAD | | | | |
| 1516 | REP | 10 | LAST 1268 | 12,3415 | 03775 1 | | COGA | | | |
| 1517 | REP | 11 | LAST 1269 | 12,3416 | 03775 1 | STORE | COGA | | | |
| 1518 | | | | 12,3417 | 77650 1 | GOTO | | | | |
| 1519 | REP | 1 | | 12,3420 | 25332 1 | | LAMRLOOP | | | |
| 1520 | | | | 12,3421 | 51145 0 | NEOP | DLOAD | | | IMPOSSIBLE TRAJECTORY DUE TO INACCURATE BOUND CALCULATION. TRY NEW COGA. |
| 1521 | REP | 1 | | 12,3422 | 00015 0 | | DCOGA | | | |
| 1522 | REP | 1 | | 12,3423 | 25444 1 | | LCENERGY | | | |
| 1523 | | | | 12,3424 | 71201 1 | HIENERGY | SETPD | | | HIGH ENERGY TRAJECTORY RESULTED |
| 1524 | | | | 12,3425 | 00001 0 | | DLOAD | | | |
| 1525 | REP | 12 | LAST 1269 | 12,3426 | 03775 1 | | 0 | | | |
| 1526 | REP | 2 | LAST 1268 | 12,3427 | 00011 1 | | COGA | | | IN OVFL OF P OR R1A, OR XI EXCEEDING 50. THIS IS THE NEW BOUND. |
| 1527 | | | | 12,3430 | 70545 1 | COMMONLM | STORE | COGAMIN | | |
| 1528 | REP | 2 | LAST 1269 | 12,3431 | 00015 0 | | DLOAD | SR1 | | |
| 1529 | REP | 3 | LAST 1269 | 12,3432 | 00015 0 | | DCOGA | | | USE DCOGA/2 AS DCREMENT |



L CONIC SUBROUTINES

| | | | | | | |
|-------|------|----|-----------|---------|----------|----------|
| 1530 | | | 12,3433 | 44254 1 | BZE | BDSJ |
| 15301 | RESP | 3 | LAST 1269 | 12,3434 | 25452 0 | SUPPCHK |
| 1531 | RESP | 13 | LAST 1269 | 12,3435 | 03775 1 | COGA |
| 1532 | RESP | 14 | LAST 1270 | 12,3436 | 03775 1 | STORE |
| 1533 | | | 12,3437 | 77650 1 | GOTO | COGA |
| 1534 | RESP | 2 | LAST 1269 | 12,3440 | 25332 1 | LAMBLOOP |
| 1535 | | | 12,3441 | 77745 1 | BIOTIME | DLOAD |
| 1536 | RESP | 2 | LAST 1269 | 12,3442 | 02764 0 | TPREV |
| 1537 | RESP | 16 | LAST 1269 | 12,3443 | 00037 0 | T |
| 1538 | | | 12,3444 | 71201 1 | LOENERGY | SETPD |
| 1539 | | | 12,3445 | 00001 0 | DLOAD | 0 |
| 1540 | RESP | 15 | LAST 1270 | 12,3446 | 03775 1 | COGA |
| 1541 | RESP | 3 | LAST 1268 | 12,3447 | 00017 1 | COGAMAX |
| 1542 | | | 12,3450 | 77650 1 | GOTO | |
| 1543 | RESP | 1 | | 12,3451 | 25430 1 | COMMONM |
| 1544 | | | 12,3452 | 51545 1 | SUPPCHK | DLOAD |
| 1545 | RESP | 2 | LAST 1269 | 12,3453 | 02762 0 | ABS |
| 1546 | | | 12,3454 | 41325 0 | PDDL | TERNLAMB |
| 1547 | RESP | 5 | LAST 1269 | 12,3455 | 02673 1 | DMP |
| 1548 | RESP | 4 | LAST 1267 | 12,3456 | 11502 0 | DESIRED |
| 1549 | | | 12,3457 | 45215 0 | DAD | D1/4 |
| 1550 | RESP | 1 | | 12,3460 | 11522 1 | DSJ |
| 1551 | | | 12,3461 | 43044 0 | BPL | ONEBIT |
| 1552 | RESP | 2 | LAST 1269 | 12,3462 | 25510 1 | SETGO |
| 1553 | RESP | 1 | | 12,3463 | 02434 0 | INITV |
| 1554 | RESP | 6 | LAST 1267 | 12,3464 | 02712 1 | SOLNSW |
| 1555 | | | 12,3465 | 43001 1 | 360LAMB | RTNLAMB |
| 1556 | | | 12,3466 | 00001 0 | SETPD | SETGO |
| 1557 | RESP | 2 | LAST 1270 | 12,3467 | 02434 0 | 0 |
| 1558 | RESP | 7 | LAST 1270 | 12,3470 | 02712 1 | SOLNSW |
| 1559 | | | 12,3471 | 71331 0 | RTNLAMB | RTNLAMB |
| 1560 | RESP | 4 | LAST 1268 | 12,3472 | 00051 0 | DLOAD |
| 1561 | | | 12,3473 | 10000 0 | NOGLSS | SSP |
| 1562 | RESP | 3 | LAST 1269 | 12,3474 | 00011 1 | TRKKIT |
| 1563 | | | 12,3475 | 65342 1 | 20000 | COGAMIN |
| 1564 | RESP | 4 | LAST 1270 | 12,3476 | 00017 1 | PDDL |
| 1565 | | | 12,3477 | 43342 0 | SR1 | COGAMAX |
| 1566 | | | 12,3500 | 77628 0 | SR1 | DAD |
| 1567 | RESP | 16 | LAST 1270 | 12,3501 | 74002 0 | STADR |
| 1568 | RESP | 4 | LAST 1269 | 12,3502 | 00015 0 | STORE |
| | | | | | | COGA |
| | | | | | | DCOGA |

RESTART THIS LOOP

LOW ENERGY TRAJECTORY RESULTED

IN OVERFLOW OF TIME.
THIS IS THE NEW BOUND.

PL AT 20

PL AT 60

LAMBERT CANNOT HANDLE C5TH=1

PL AT 2

PL AT 0



L CONIC SUBROUTINES

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| | | | | | | | |
|------|-----|--------------|---------|---------|---------|-----------|-----------------------|
| 1569 | | | 12,3503 | 77650 1 | GOTO | | |
| 1570 | REP | 3 LAST 1270 | 12,3504 | 25332 1 | | LAMBLOOP | |
| 1574 | | | 12,3505 | 52145 0 | LOLIM | DLOAD | GOTO |
| 1575 | REP | 1 | 12,3506 | 11528 0 | | COOLOLIM | COOLOLIM=-.999511597 |
| 1576 | REP | 1 | 12,3507 | 25322 0 | | NINCOGA | |
| 1577 | | | 12,3510 | 80345 0 | INITV | DLOAD | NORM |
| 1578 | REP | 13 LAST 1267 | 12,3511 | 00041 1 | | R1 | |
| 1579 | REP | 78 LAST 1268 | 12,3512 | 00047 1 | | X1 | |
| 1580 | | | 12,3513 | 70525 1 | FDDL | SR1 | PL AT 2 |
| 1581 | REP | 9 LAST 1269 | 12,3514 | 02742 1 | | P | |
| 1582 | | | 12,3515 | 77671 1 | DDV | | PL AT 0 |
| 1583 | | | 12,3516 | 75457 0 | SL* | SORT | |
| 1584 | | | 12,3517 | 20175 0 | | 0 -4,1 | |
| 1585 | | | 12,3520 | 72405 0 | DMP | SL1 | |
| 1586 | REP | 3 LAST 1268 | 12,3521 | 00021 1 | | ROOTMU | |
| 1587 | | | 12,3522 | 41208 0 | PUSH | DMP | OD=VTAN (+7) PL AT 2 |
| 1588 | REP | 17 LAST 1270 | 12,3523 | 03775 1 | | COGA | |
| 1589 | | | 12,3524 | 74261 1 | SL | VXSC | |
| 1590 | | | 12,3525 | 20208 1 | | S | |
| 1591 | REP | 7 LAST 1262 | 12,3526 | 02724 1 | | UR1 | |
| 1592 | | | 12,3527 | 77725 1 | FDDL | | XCH WITH OD PL AT 0,0 |
| 1593 | | | 12,3530 | 76561 1 | VXSC | VSL1 | |
| 1594 | REP | 5 LAST 1262 | 12,3531 | 02676 1 | | UN | |
| 1595 | | | 12,3532 | 53235 0 | VXV | VAD | PL AT 0 |
| 1596 | REP | 8 LAST 1271 | 12,3533 | 02724 1 | | UR1 | |
| 1597 | | | 12,3534 | 43172 1 | VSL1 | CLEAR | |
| 1598 | REP | 3 LAST 1270 | 12,3535 | 02674 0 | | SOLNSW | |
| 1599 | REP | 18 LAST 1260 | 12,3536 | 02746 0 | STORE | VVEC | |
| 1600 | | | 12,3537 | 53135 0 | SLOAD | BZE | |
| 1601 | REP | 5 LAST 482 | 12,3540 | 02704 0 | | VTARGETAG | |
| 1602 | REP | 1 | 12,3541 | 20544 0 | | INRES IV | |
| 1603 | | | 12,3542 | 77650 1 | GOTO | | |
| 1604 | REP | 8 LAST 1270 | 12,3543 | 02712 1 | | RTNLAMB | |
| 1605 | | | 12,3544 | 45145 0 | TARGETV | DLOAD | CALL |
| 1606 | REP | 6 LAST 1267 | 12,3545 | 02722 1 | | MAOVEC2 | |
| 1607 | REP | 1 | 12,3546 | 24708 0 | | LAMENTER | |
| 1608 | REP | 4 LAST 482 | 12,3547 | 02705 1 | STORE | VTARGET | |
| 1609 | | | 12,3550 | 77650 1 | GOTO | | |
| 1610 | REP | 6 LAST 1271 | 12,3551 | 02712 1 | | RTNLAMB | |

from MAX LOG



L CONIC SUBROUTINES

| | | | | | | | | | |
|-------|-----|----|---------|---------|---------|-------|----------|--|--------------|
| 1611 | | | 12,3552 | 40220 0 | TIMBRAD | STQ | SETPD | | |
| 1612 | REP | 1 | 12,3553 | 02712 1 | | | RINTR | | PL AT 0 |
| 1613 | | | 12,3554 | 00001 0 | | | 0 | | |
| 1614 | | | 12,3555 | 63375 0 | | VLOAD | PDVL | | PL AT 6 |
| 1615 | REP | 12 | 12,3556 | 02657 1 | | | RVEC | | |
| 1616 | REP | 19 | 12,3557 | 02748 0 | | | VVBC | | |
| 1617 | | | 12,3560 | 77624 1 | | CALL | | | |
| 1618 | REP | 3 | 12,3561 | 11527 1 | | | PARAM | | |
| 1619 | | | 12,3562 | 71200 0 | | BOV | DLOAD | | PL AT 0 |
| 1620 | REP | 2 | 12,3563 | 24767 1 | | | COGACVPL | | |
| 1621 | REP | 6 | 12,3564 | 11506 1 | | | D1/32 | | |
| 1622 | | | 12,3565 | 41225 1 | | DSU | DMP | | |
| 1623 | REP | 11 | 12,3566 | 02744 1 | | | R1A | | |
| 1624 | REP | 10 | 12,3567 | 02742 1 | | | P | | |
| 1625 | | | 12,3570 | 41366 1 | | SCRT | DMP | | |
| 1626 | REP | 18 | 12,3571 | 03775 1 | | | COXA | | |
| 1627 | | | 12,3572 | 74212 0 | | SL4 | VXSC | | |
| 1628 | REP | 5 | 12,3573 | 02714 1 | | | U2 | | |
| 1629 | | | 12,3574 | 45325 1 | | PDDL | DSU | | PL AT 6 |
| 1630 | REP | 4 | 12,3575 | 11500 1 | | | D1/64 | | |
| 1631 | REP | 12 | 12,3576 | 02744 1 | | | R1A | | |
| 1632 | | | 12,3577 | 52361 1 | | VXSC | VSU | | PL AT 0 |
| 1633 | REP | 9 | 12,3600 | 02724 1 | | | UR1 | | |
| 1634 | | | 12,3601 | 53512 1 | | VSL4 | UNIT | | |
| 16345 | | | 12,3602 | 77600 1 | | ROV | | | |
| 16346 | REP | 2 | 12,3603 | 25465 1 | | | 36DLAMP | | |
| 1635 | | | 12,3604 | 60325 0 | | PDXL | NORM | | |
| 1636 | REP | 5 | 12,3605 | 02760 1 | | | DESIRED | | PL AT 6 |
| 1637 | REP | 79 | 12,3606 | 00047 1 | | | X1 | | |
| 1638 | | | 12,3607 | 41325 0 | | PDDL | DMP | | PL AT 6 |
| 1639 | REP | 14 | 12,3610 | 00041 1 | | | R1 | | |
| 1640 | REP | 11 | 12,3611 | 02742 1 | | | P | | |
| 1641 | | | 12,3612 | 56257 1 | | SL* | DDV | | PL AT 6 |
| 1642 | | | 12,3613 | 20201 0 | | | 0,1 | | |
| 1643 | | | 12,3614 | 56225 1 | | DSU | DDV | | |
| 1644 | REP | 2 | 12,3615 | 11504 0 | | | D1/16 | | |
| 1645 | | | 12,3616 | 00045 0 | | | 36D | | 36D=BCC (+3) |
| 1646 | REP | 1 | 12,3617 | 00031 0 | | STORE | COSP | | |
| 1647 | | | 12,3620 | 63400 0 | | BOV | DSQ | | |
| 1648 | REP | 1 | 12,3621 | 25661 1 | | | RADR2 | | |
| 1649 | | | 12,3622 | 50021 1 | | RDSU | RNN | | |
| 1650 | REP | 5 | 12,3623 | 11502 0 | | | D1/4 | | |
| 16505 | REP | 2 | 12,3624 | 25661 1 | | | RADR2 | | |
| 1651 | | | 12,3625 | 75366 0 | | SCRT | SIGN | | |
| 1652 | REP | 4 | 12,3626 | 02757 0 | | | SCNRDOT | | |
| 16525 | | | 12,3627 | 77614 1 | | CLPAR | | | |
| 1653 | REP | 1 | 12,3630 | 04272 1 | | | APSESW | | |
| 1654 | | | 12,3631 | 76561 1 | TRRNVEC | VXSC | VSL1 | | |
| 1655 | REP | 6 | 12,3632 | 02676 1 | | | LN | | |

NO SOLUTION SINCE CONIC IS A CIRCLE
 0D=UNIT(BCC) (+3)
 36D=BCC (+3)

L CONIC SUBROUTINES

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| | | | | | | | | |
|-------|-----|--------------|---------|---------|---------|----------|-----------------------------------|-----------|
| 1656 | | | 12,3633 | 63235 0 | VXV | FDVL | VXCH WITH 0D | PL AT 0,6 |
| 1657 | | | 12,3634 | 00001 0 | | 0D | | |
| 1658 | | | 12,3635 | 53361 0 | VXSD | VAD | | PL AT 0 |
| 1659 | REP | 2 LAST 1272 | 12,3636 | 00031 0 | | COSP | | |
| 1660 | | | 12,3637 | 41572 1 | VSL1 | PUSH | 0D=U2 | PL AT 6 |
| 1661 | | | 12,3640 | 56241 0 | DOT | DDV | LIMITS RESULT TO POSMAX OR NEGMAX | |
| 1662 | REP | 10 LAST 1272 | 12,3641 | 02724 1 | | UR1 | | |
| 16622 | REP | 1 | 12,3642 | 23701 0 | | DP1/4 | | |
| 16624 | | | 12,3643 | 40142 1 | SR1 | BOV | SCALE BACK DOWN TO NORMAL | |
| 16625 | | | 12,3644 | 25645 1 | | +1 | CLEAR OV/PIND IF SET | |
| 1663 | REP | 13 LAST 1268 | 12,3645 | 26734 0 | STOVL | CSNH | CSNH (+1) | |
| 1664 | REP | 11 LAST 1273 | 12,3646 | 02724 1 | | UR1 | | |
| 1665 | | | 12,3647 | 76435 1 | VXV | VSL1 | | |
| 1666 | | | 12,3650 | 72441 0 | DOT | SL1 | | |
| 1667 | REP | 7 LAST 1272 | 12,3651 | 02676 1 | | UN | | |
| 1668 | REP | 18 LAST 1268 | 12,3652 | 18732 0 | STOVL | SNTH | SNTH (+1) | |
| 1669 | REP | 12 LAST 1272 | 12,3653 | 02742 1 | | P | | |
| 1670 | | | 12,3654 | 77624 1 | CALL | | | |
| 1671 | REP | 3 LAST 1269 | 12,3655 | 24772 0 | | GETX | | |
| 1672 | | | 12,3656 | 77614 1 | CLGO | | | |
| 16725 | REP | 4 LAST 1271 | 12,3657 | 02634 1 | | SOLNSW | | |
| 1673 | REP | 1 | 12,3660 | 24752 1 | | COMMOUT | | |
| 1674 | | | 12,3661 | 75345 1 | RADR2 | SIGN | | |
| 16741 | REP | 2 LAST 676 | 12,3662 | 11454 1 | | LCDPHALP | | |
| 16742 | REP | 3 LAST 1273 | 12,3663 | 00031 0 | | COSP | | |
| 16743 | REP | 4 LAST 1273 | 12,3664 | 14031 0 | STOVL | COSP | | |
| 1675 | REP | 4 LAST 1251 | 12,3665 | 11456 0 | | KBPZERO | | |
| 16755 | | | 12,3666 | 77614 1 | SETOO | | | |
| 1676 | REP | 2 LAST 1272 | 12,3667 | 04032 1 | | APSESW | | |
| 1677 | REP | 1 | 12,3670 | 25631 1 | | TERINVEC | | |
| 1678 | | | 12,3671 | 40220 0 | APSIDES | STO | | PL AT 0 |
| 1679 | REP | 1 | 12,3672 | 02712 1 | | RTNAPSE | | |
| 1680 | | | 12,3673 | 00001 0 | | 0D | | |
| 1681 | | | 12,3674 | 63375 0 | VLOAD | FDVL | | PL AT 6 |
| 1682 | REP | 13 LAST 1272 | 12,3675 | 02657 1 | | RVEC | | |
| 1683 | REP | 20 LAST 1272 | 12,3676 | 02746 0 | | VVEC | | |
| 1684 | | | 12,3677 | 77624 1 | CALL | | | |
| 1685 | REP | 4 LAST 1272 | 12,3700 | 11527 1 | | PARAM | | |
| 1686 | | | 12,3701 | 77600 1 | ROV | | | PL AT 0 |
| 1687 | REP | 1 | 12,3702 | 25703 1 | | GETECC | | |
| 1688 | | | 12,3703 | 42405 0 | GETECC | DMP | | |
| 1689 | REP | 13 LAST 1272 | 12,3704 | 02744 1 | | SL4 | | |
| 1690 | | | 12,3705 | 75421 1 | BDSU | R1A | | |
| 1691 | REP | 5 LAST 1272 | 12,3706 | 11500 1 | | SORT | | |
| 1692 | REP | 2 LAST 94 | 12,3707 | 02754 0 | | D1/64 | | |
| 1693 | | | 12,3710 | 65215 1 | STORE | ECC | | |
| 1694 | REP | 1 | 12,3711 | 11474 0 | DAD | PDDL | | PL AT 2 |
| | | | | | | D1/6 | | |



L CONIC SUBROUTINES

| | | | | | | | | | |
|------|-----|----|-----------|---------|---------|----------------|----------|---|-----------|
| 1695 | REP | 15 | LAST 1272 | 12,3712 | 00041 1 | | R1 | | |
| 1696 | | | | 12,3713 | 72405 0 | DMP | SL1 | | |
| 1697 | REP | 13 | LAST 1273 | 12,3714 | 02742 1 | | P | | |
| 1698 | | | | 12,3715 | 77671 1 | DDV | | | |
| 1699 | | | | 12,3716 | 60325 0 | PDDL | NORM | OD=RP (+29 OR +27) | PL AT 0 |
| 1700 | REP | 14 | LAST 1273 | 12,3717 | 02744 1 | | R1A | | PL AT 2 |
| 1701 | REP | 80 | LAST 1272 | 12,3720 | 00047 1 | | X1 | | |
| 1702 | | | | 12,3721 | 53725 1 | PDDL | SL* | | PL AT 4 |
| 1703 | REP | 16 | LAST 1274 | 12,3722 | 00041 1 | | R1 | | |
| 1704 | | | | 12,3723 | 20174 1 | | 0 -5,1 | | |
| 1705 | | | | 12,3724 | 45271 1 | DDV | DSU | | PL AT 2,0 |
| 1706 | | | | 12,3725 | 50000 1 | BOV | R-N | | |
| 1707 | REP | 1 | | 12,3726 | 25732 0 | | INFINAPO | | |
| 1708 | REP | 2 | LAST 1274 | 12,3727 | 25732 0 | | INFINAPO | | |
| 1709 | | | | 12,3730 | 77650 1 | GOTO | | | |
| 1710 | REP | 2 | LAST 1273 | 12,3731 | 02712 1 | | RTNAPSE | | |
| 1711 | | | | 12,3732 | 52145 0 | INFINAPO DLOAD | GOTO | RETURNS WITH APOPSIS IN MPAC, PERIAPSIS | |
| 1712 | REP | 1 | | 12,3733 | 11467 1 | | LDPOSMAX | THAT PL IS AT 0. | |
| 1713 | REP | 3 | LAST 1274 | 12,3734 | 02712 1 | | RTNAPSE | | |

L CONIC SUBROUTINES

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| | | | | | | | | | |
|------|-----|---|--------------------|---------|-------|---|----------|-------|---|
| 1714 | REF | 3 | LAST 1261 | 04,2000 | | | | | SETLOC CONICS1 |
| 1715 | | | | 04,3630 | | | | | BANK |
| 1716 | REF | 3 | LAST 1261 TO 1263' | 65 | 94* | | | | COUNT 04/CONIC |
| 1717 | | | | 04,3630 | 22437 | 1 | MULTABLE | 2DEC* | 3.986032 E10 B-36* MUE |
| 1717 | | | | 04,3631 | 16067 | 1 | | | |
| 1718 | | | | 04,3632 | 15625 | 1 | | 2DEC* | .25087606 E-10 B+34* 1/MUE |
| 1718 | | | | 04,3633 | 21042 | 1 | | | |
| 1719 | | | | 04,3634 | 30276 | 1 | | 2DEC* | 1.99850495 E5 B-18* SORT(MUE) |
| 1719 | | | | 04,3635 | 04773 | 0 | | | |
| 1720 | | | | 04,3636 | 25004 | 1 | | 2DEC* | .50087529 E-5 B+17* 1/SORT(MUE) |
| 1720 | | | | 04,3637 | 06702 | 1 | | | |
| 1721 | | | | 04,3640 | 16471 | 1 | | 2DEC | 4.902778 E9 B-30 MLM |
| 1721 | | | | 04,3641 | 01352 | 1 | | | |
| 1722 | | | | 04,3642 | 21412 | 0 | | 2DEC | .203966 E-8 B+28 1/MLM |
| 1722 | | | | 04,3643 | 20500 | 0 | | | |
| 1723 | | | | 04,3644 | 25477 | 1 | | 2DEC* | 2.21422176 E4 B-15* SORT(MLM) |
| 1723 | | | | 04,3645 | 03367 | 0 | | | |
| 1724 | | | | 04,3646 | 27533 | 1 | | 2DEC* | .45162595 E-4 B+14* 1/SORT(MLM) |
| 1724 | | | | 04,3647 | 07571 | 0 | | | |
| 1725 | REF | 2 | LAST 495 | 04,3466 | | | | | LDPOSMAX EQUALS LODPMAX DPPOSMAX IN LOW MEMORY. |

R1727 ERASABLE ASSIGNMENTS
R1728 KEPLER SUBROUTINE

R1729 INPUT -

| | | | |
|-------|-------|-------|----|
| R1730 | RRECT | ERASE | +5 |
| R1731 | VRECT | ERASE | +5 |
| R1732 | TAU. | ERASE | +1 |
| R1733 | XCEP | ERASE | +1 |
| R1734 | TC | ERASE | +1 |
| R1735 | XPREV | ERASE | +1 |

0016

1/MU EQUALS 14D

1736

0020

ROOTMU EQUALS 16D

1737

0022

1/ROOTMU EQUALS 18D

R1739 OUTPUT -

| | | | |
|-------|-------|-------|----|
| R1740 | RCV | ERASE | +5 |
| R1741 | VCV | ERASE | +5 |
| R1742 | RC | ERASE | +1 |
| R1743 | XPREV | ERASE | +1 |

R1744 DERRIS -

1745

0010

ALPHA EQUALS 8D

1746

0012

XMAX EQUALS 10D



L CONIC SUBROUTINES

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| | | | | | |
|------|--|------|----------|--------|-----|
| 1747 | | 0014 | XMIN | EQUALS | 12D |
| 1748 | | 0024 | X | EQUALS | 20D |
| 1749 | | 0030 | XI | EQUALS | 24D |
| 1750 | | 0032 | S(XI) | EQUALS | 28D |
| 1751 | | 0034 | XSOC(XI) | EQUALS | 28D |
| 1752 | | 0036 | T | EQUALS | 30D |
| 1753 | | 0040 | R1 | EQUALS | 32D |
| 1754 | | 0042 | KSPC1 | EQUALS | 34D |
| 1755 | | 0044 | KSPC2 | EQUALS | 36D |

R1756 DELX ERASE +1
R1757 DELT ERASE +1
R1758 URRSCT ERASE +5
R1759 RCNORM ERASE +1
R1760 XPRBSV EQUALS XKRP
R1761 LAMBERT SUBROUTINE

R1762 INPUT -
R1763 R1VEC ERASE +5
R1764 R2VEC ERASE +5
R1765 TDESIRE ERASE +1
R1766 GEOMSON ERASE +0
R1767 GUESSW
R1768 COGA ERASE +1
R1769 NORMSW
R1770 UN ERASE +5
R1771 VTAROTAG ERASE +0
R1772 TWBKIT EQUALS 40D

R1773 OUTPUT -
R1774 VDROBT ERASE +5
R1775 V1VEC EQUALS MPAC

R1776 DEBRIS -
R1777 RINLAMB ERASE +0
R1778 UZ ERASE +5
R1779 MAGVEC2 ERASE +1
R1780 UR1 ERASE +5
R1781 R1 EQUALS 31D
R1782 UN ERASE +5
R1783 STH ERASE +1
R1784 CSTH ERASE +1
R1785 1-CSTH ERASE +1
R1786 CSTH-RHO ERASE +1

1787
1788
1789
R1790 TWBKIT EQUALS 40D
R1791 P ERASE +1

0 IF COGA GUESS AVAILABLE, 1 IF NOT
INPUT ONLY IF GUESSW IS ZERO.
0 IF UN TO BE COMPUTED, 1 IF UN INPUT
ONLY USED IF NORMSW IS 1

ONLY USED IF GUESSW IS 0

AVAILABLE ONLY IF VTAROTAG IS ZERO.

| | | | |
|------|--------|--------|-----|
| 0016 | COGMAX | EQUALS | 14D |
| 0010 | COGMIN | EQUALS | 8D |
| 0014 | DCOGA | EQUALS | 12D |

CORRERS 1/MJ



L CONIC SUBROUTINES

R1792 COGA ERASE +1
 R1793 R1A ERASE +1
 R1794 X EQUALS 20D
 R1795 XSO EQUALS 22D
 R1796 XI EQUALS 24D
 R1797 S(XI) EQUALS 26D
 R1798 XSOC(XI) EQUALS 28D
 R1799 T EQUALS 30D
 R1800 KEPC1 EQUALS 34D
 R1801 KEPC2 EQUALS 36D
 R1802 SLOPSW
 R1803 SOLNSW
 R1804 OTHERS -

R1805 RVBC EQUALS R1VBC
 R1806 WVBC ERASE +5
 R1807 COGAPLAG
 R1808 RVSW
 R1809 INPINPLG
 R1810 APSESX
 R1811 360SW
 R1812 RTNTT EQUALS RTNLAMP
 R1813 ECC ERASE +1
 R1814 RTNTR EQUALS RTNLAMP
 R1815 RTNAPSE EQUALS RTNLAMP
 R1816 R2 EQUALS MAOVEC2
 1817
 R1818 RTNPRM ERASE +0
 R1819 SONDOT ERASE +0
 R1820 DESIRED ERASE +1
 R1821 ITERATOR SUBROUTINE

R1822 ORDERSW

1823
 1824
 R1825 INDEP ERASE +1
 1826
 1827
 1828
 R1829 DELDRP ERASE +1
 R1830 DEPREV ERASE +1
 1831
 R1832 MORE KEPLER
 R1833 EPSILONT ERASE +1

0030 COSP EQUALS 24D
 0016 MAX EQUALS 14D
 0010 MIN EQUALS 6D
 0014 DELINDEP EQUALS 12D
 0026 ITERCTR EQUALS 22D
 0036 DEP EQUALS 30D
 0050 TWERKIT EQUALS 40D

CLORPRS 1/MU



ASSEMBLE REVISION 249 OF AGC PROGRAM COLOSSUS BY NASA 2021111-041

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UBER-S PAGE NO. 47 ES 53

- L CONIC SUBROUTINES
- R1834 MORE LAMBERT
- R1835 TERRIAMB EQUALS DELDEP
- R1836 TPREV EQUALS DEPREV
- R1837 EPSILONL EQUALS EPSILONL *2 DOUBLE PRECISION WORD

L INTEGRATION INITIALIZATION

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R0006 1.0 INTRODUCTION

R0007 -----

R0008

R0009

R0010

R0011

R0012

R0013

R0014

R0015

R0016

R0017

R0018

R0019

R0020

R0021

R0022

R0023

R0024

R0025

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R0027

R0028

R0029

R0030

R0031

R0032

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R0035

R0036

R0037

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R0040

R0041

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R0043

R0044

R0045

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R0049

R0050

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R0069

R0070

R0071

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R0073

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R0075

R0076

R0077

R0078

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R0080

R0081

FROM A USER'S POINT OF VIEW, ORBITAL INTEGRATION IS ESSENTIALLY THE SAME AS THE 276 INTEGRATION PROGRAM. THE SAME ENTRANCES TO THE PROGRAM WILL BE MAINTAINED. THE SAME STALLING ROUTINE WILL BE USED AND OUTPUT WILL STILL BE VIA THE PUSHLIST. THE PRIMARY DIFFERENCE TO A USER INVOLVE THE ADDED CAPABILITY OF TERMINATING INTEGRATION AT A SPECIFIC FINAL RADIUS AND THE DIFFERENCE IN STATE VECTOR SCALING INSIDE AND OUTSIDE THE LUNAR SPHERE OF INFLUENCE.

IN ORDER TO MAKE THE CSM(LM)PREC AND CSM(LM)CONIC ENTRANCES SIMILAR TO FLIGHT 276, THE INTEGRATION PROGRAM WILL ITSELF SET THE FINAL RADIUS (RPINAL) TO 0 SO THAT REACHING THE DESIRED TIME ONLY WILL TERMINATE INTEGRATION. THE DP REGISTER RPINAL MUST BE SET BY USERS OF INTEGRVS AND INTEGRV, AND MUST BE DONE AFTER THE CALL TO INTSTALL.

WHEN THE LM IS ON THE LUNAR SURFACE (INDICATED BY LUNAR SURFACE FLAG SET) CALLS TO LEMCONIC, LEMPREC, AND INTEGRV WITH VINFLAG = 0 WILL RESULT IN THE USE OF THE PLANETARY INERTIAL ORIENTATION SUBROUTINES TO PROVIDE BOTH THE LMS POSITION AND VELOCITY IN THE REFERENCE COORDINATE SYSTEM. THE PROGRAM WILL PROVIDE OUTPUT AS IF INTEGRATION WAS USED. THAT IS, THE PUSHLIST WILL BE SET AS NOTED BELOW AND THE PERMANENT STATE VECTOR UPDATED WHEN SPECIFIED BY AN INTEGRV CALL.

USERS OF INTEGRVS DESIRING INTEGRATION (INTYPLO = 0) SHOULD NOTE THAT THE OBLATENESS PERTURBATION COMPUTATION IN LUNAR ORBIT IS TIME DEPENDENT. THEREFORE, THE USER SHOULD SUPPLY AN INITIAL STATE VECTOR VALID AT SOME REAL TIME AND THE DESIRED TIME (TDEC1) ALSO AT SOME REAL TIME. FOR CONIC INTEGRATION, THE USER MAY STILL USE ZERO AS THE INITIAL TIME AND DELTA TIME AS THE DESIRED TIME.

R0044 2.0 GENERAL DESCRIPTION

R0045 -----

R0046

R0047

R0048

R0049

R0050

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R0053

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R0055

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R0057

R0058

R0059

R0060

R0061

R0062

R0063

R0064

R0065

R0066

R0067

R0068

R0069

R0070

R0071

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R0075

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R0080

R0081

THE INTEGRATION PROGRAM OPERATES AS A CLOSED INTERPRETIVE SUBROUTINE AND PERFORMS THESE FUNCTIONS---

- 1) INTEGRATES (PRECISION OR CONIC) EITHER CSM OR LM STATE VECTOR
- 2) INTEGRATES THE W-MATRIX
- 3) PERMANENT OR TEMPORARY UPDATE OF THE STATE VECTOR

THERE ARE SIX ENTRANCES TO THE INTEGRATION PROGRAM. FOUR OF THESE (CSMPREC, LEMPREC, CSMCONIC, LEMCONIC) SET ALL THE FLAGS REQUIRED IN THE INTEGRATION PROGRAM ITSELF TO CAUSE THE PRECISION OR CONIC INTEGRATION (KEPLER) OF THE LM OR CSM STATE VECTOR, AS THE NAMES SUGGEST. ONE ENTRANCE (INTEGRVS) PERMITS THE CALLING PROGRAM TO PROVIDE A STATE VECTOR TO BE INTEGRATED. THE CALLING PROGRAM MUST SET THE FLAGS INDICATING (1) PRECISION OR CONIC INTEGRATION, (2) IN OR OUT OF LUNAR SPHERE, (3) MIDCOURSE OR NOT, AND THE INTEGRATION PROGRAM COMPLETES THE FLAG SETTING TO BYPASS W-MATRIX INTEGRATION. THE LAST ENTRANCE (INTEGRV, USED IN GENERAL BY THE NAVIGATION PROGRAMS) PERMITS THE CALLER TO SET FIVE FLAGS (NOT MOONFLAG OR MIDFLAG) BUT NOT TO INPUT A STATE VECTOR. ANY PROGRAM WHICH CALLS INTEGRVS OR INTEGRV MUST CALL INTSTALL BEFORE IT SETS THE INTEGRATION FLAGS AND/OR STATE VECTOR.

THREE SETS OF 42 REGISTERS AND 2 FLAGS ARE USED FOR THE STATE VECTORS. TWO SETS, WHICH MAY NOT BE OVERLAYED, ARE USED FOR THE PERMANENT STATE VECTORS FOR THE CSM AND LM. THE THIRD SET, WHICH MAY BE OVERLAYED WHEN INTEGRATION IS NOT BEING DONE, IS USED IN THE COMPUTATIONS.

THE PERMANENT STATE VECTORS WILL BE PERIODICALLY UPDATED SO THAT THE VECTORS WILL NOT BE OLDER THAN 4 TIMESTEPS. THE PERMANENT STATE VECTORS WILL ALSO BE UPDATED WHENEVER THE W-MATRIX IS INTEGRATED OR WHEN A CALLER OF INTEGRV SETS STATEPLO (THE NAVIGATION PROGRAMS P20, P22.)

L INTEGRATION INITIALIZATION

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R0082 APPENDIX B OF THE USERS GUIDE LISTS THE STATE VECTOR QUANTITIES.

R0083
R0084 2.1 RESTARTS
R0085

R0086 PHASE CHANGES WILL BE MADE IN THE INTEGRATION PROGRAM ONLY FOR THE INTEGRV ENTRANCE (I.E., WHEN THE W-MATRIX IS
R0088 INTEGRATED OR PERMANENT STATE VECTOR IS UPDATED.) THE GROUP NUMBER USED WILL BE THAT FOR THE P20-25 PROGRAMS
R0090 (I.E., GROUP2) SINCE THE INTEGRV ENTRANCE WILL ONLY BE USED BY THESE PROGRAMS. IF A RESTART OCCURS DURING AN
R0092 INTEGRATION OF THE STATE VECTOR ONLY, THE RECOVERY WILL BE TO THE LAST PHASE IN THE CALLING PROGRAM. CALLING
R0094 PROGRAMS WHICH USE THE INTEGRV OR INTEGRVS ENTRANCE OF INTEGRATION SHOULD ENSURE THAT IF PHASE CHANGING IS DONE
R0096 THAT IT IS PRIOR TO SETTING THE INTEGRATION INPUTS IN THE PUSHLIST.
R0097 THIS IS BECAUSE THE PUSHLIST IS LOST DURING A RESTART.

R0098
R0099 2.2 SCALING
R0100

R0101 THE INTEGRATION ROUTINE WILL MAINTAIN THE PERMANENT MEMORY STATE VECTORS IN THE SCALING AND UNITS DEFINED IN
R0103 APPENDIX B OF THE USERS GUIDE. THE SCALING OF THE OUTPUT POSITION VECTOR DEPENDS ON THE ORIGIN OF THE COORDINATE
R0105 SYSTEM AT THE DESIRED INTEGRATION TIME. THE COORDINATE SYSTEM TRANSFORMATION WILL BE DONE AUTOMATICALLY ON
R0107 MULTIPLE TIMESTEP ENDS INTEGRATION ONLY. THUS IT IS POSSIBLE TO HAVE OUTPUT FROM SUCCESSIVE INTEGRATIONS IN
R0109 DIFFERENT SCALING.
R0110 HOWEVER, RATT, VATT WILL ALWAYS BE SCALED THE SAME.

R0111
R0112 3.0 INPUT/OUTPUT
R0113 -----
R0114

R0115 PROGRAM INPUTS ARE THE FLAGS DESCRIBED IN APPENDIX A AND THE PERMANENT STATE VECTOR QUANTITIES DESCRIBED IN AP-
R0117 PENDIX B OF THE USERS GUIDE, PLUS THE DESIRED TIME TO INTEGRATE TO IN TDEC1 (A PUSH LIST LOCATION).
R0119 FOR INTEGRVS, THE RCV,VCV, TET OF THE TEMPORARY STATE VECTOR MUST BE SET, PLUS MOONFLAG AND MIDFLAG

R0121 FOR SIMULATION THE FOLLOWING QUANTITIES MUST BE PRESET ---

| | | | EARTH | MOON |
|-------|---|--------|-------|------|
| R0124 | | | 29 | 27 |
| R0125 | RRCTCSM(LEM) - RECTIFIED POSITION VECTOR | METERS | 2 | 2 |
| R0126 | | | | |
| R0127 | | | 7 | 5 |
| R0128 | VRECTCSM(LEM) - RECTIFIED VELOCITY VECTOR | M/CSEC | 2 | 2 |
| R0129 | | | | |
| R0130 | | | 28 | 28 |
| R0131 | TETCSM(LEM) - TIME STATE VECTOR IS VALID | CSEC | 2 | 2 |
| R0132 | CUSTOMARILY 0. BUT NOTE LINEAR | | | |
| R0133 | ORBIT DEPENDENCE ON REAL TIME. | | | |
| R0134 | | | | |
| R0135 | | | -- | -- |
| R0136 | DELTA VCSM(LEM) - POSITION DEVIATION | METERS | 2 | 2 |
| R0137 | 0 IF TCCSM(LEM) = 0 | | | |
| R0138 | | | | |
| R0139 | | | 3 | -1 |
| R0140 | NUVCSM(LEM) - VELOCITY DEVIATION | M/CSEC | 2 | 2 |
| R0141 | 0 IF TCCSM(LEM) = 0 | | | |
| R0142 | | | | |
| R0143 | | | | |

1. INTEGRATION INITIALIZATION

| | | | | | | |
|-------|------------|--|-----|--------|-----|----|
| R0144 | NOVCS(LBM) | - CONIC POSITION | 29 | METERS | 2 | 27 |
| R0145 | NOVCS(LBM) | - EQUALS RECTCS(LBM) IF | | | | |
| R0146 | NOVCS(LBM) | TCSC(LBM) = 0 | | | | |
| R0147 | NOVCS(LBM) | | | | | |
| R0148 | NOVCS(LBM) | | | | | |
| R0149 | NOVCS(LBM) | | | | | |
| R0150 | NOVCS(LBM) | - CONIC VELOCITY | 1 | M/CSEC | 2 | 5 |
| R0151 | NOVCS(LBM) | EQUALS VRECTCS(LBM) IF | | | | |
| R0152 | NOVCS(LBM) | TCSC(LBM) = 0 | | | | |
| R0153 | NOVCS(LBM) | | | | | |
| R0154 | NOVCS(LBM) | | | | | |
| R0155 | NOVCS(LBM) | - TIME SINCE RECTIFICATION | 2 | CSEC | 2 | 2 |
| R0156 | NOVCS(LBM) | CUSTOMARILY 0 | | | | |
| R0157 | NOVCS(LBM) | | | | | |
| R0158 | NOVCS(LBM) | | | | | |
| R0159 | NOVCS(LBM) | - ROOT OF KEPLERS EQUATION | 17 | M | 2 | 16 |
| R0160 | NOVCS(LBM) | 0 IF TCSC(LBM) = 0 | | | | |
| R0161 | NOVCS(LBM) | | | | | |
| R0162 | NOVCS(LBM) | - PERMANENT FLAGS CORRESPONDING | | | | |
| R0163 | NOVCS(LBM) | TO MOONFLAG AND MIDFLAG | | | | |
| R0164 | NOVCS(LBM) | C = CSM, L = LM | | | | |
| R0165 | NOVCS(LBM) | LMIDFLAG | | | | |
| R0166 | NOVCS(LBM) | | | | | |
| R0167 | NOVCS(LBM) | - LUNAR SURFACE FLAG | 0.1 | | 0.1 | |
| R0168 | NOVCS(LBM) | | | | | |
| R0169 | NOVCS(LBM) | | | | | |
| R0170 | NOVCS(LBM) | SOLAR EMISSIONS SUBROUTINE AND PLANETARY INERTIAL ORIENTATION SUB- | | | | |
| R0171 | NOVCS(LBM) | ROUTINE MUST BE PRESET. | | | | |
| R0172 | NOVCS(LBM) | | | | | |
| R0173 | NOVCS(LBM) | OUTPUT | | | | |
| R0174 | NOVCS(LBM) | AFTER EVERY CALL TO INTEGRATION | | | | |
| R0175 | NOVCS(LBM) | | | | | |
| R0176 | NOVCS(LBM) | | | | | |
| R0177 | NOVCS(LBM) | 0D RATT POSITION | 2 | METERS | 2 | 2 |
| R0178 | NOVCS(LBM) | | | | | |
| R0179 | NOVCS(LBM) | 0D VATT VELOCITY | 2 | M/CSEC | 2 | 2 |
| R0180 | NOVCS(LBM) | | | | | |
| R0181 | NOVCS(LBM) | 12D TAT TIME | 2 | | 2 | 2 |
| R0182 | NOVCS(LBM) | | | | | |
| R0183 | NOVCS(LBM) | 14D RATT POSITION | 2 | METERS | 2 | 27 |
| R0184 | NOVCS(LBM) | | | | | |
| R0185 | NOVCS(LBM) | 20D VATT VELOCITY | 2 | M/CSEC | 2 | 2 |
| R0186 | NOVCS(LBM) | | | | | |
| R0187 | NOVCS(LBM) | 26D MU(P) MU | 2 | M/CS | 2 | 30 |
| R0188 | NOVCS(LBM) | | | | | |
| R0189 | NOVCS(LBM) | | | | | |
| R0190 | NOVCS(LBM) | | | | | |
| R0191 | NOVCS(LBM) | COORDINAT | | | | |
| R0192 | NOVCS(LBM) | | | | | |
| R0193 | NOVCS(LBM) | | | | | |

(THIS, NOT MOONFLAG, SHOULD BE

METERS 29
EARTH MOON
METERS 29
M/CSEC 2
28
2
1
7
METERS 2
20
27
5
7
M/CSEC 2
2
30
2
2

AFTER EVERY CALL TO INTEGRATION

IN ADDITION, IF (L)MOONFLAG IS SET, THE INITIAL INPUT VALUES FOR LUNAR

SOLAR EMISSIONS SUBROUTINE AND PLANETARY INERTIAL ORIENTATION SUB-

ROUTINE MUST BE PRESET.

OUTPUT

AFTER EVERY CALL TO INTEGRATION

COORDINAT

(THIS, NOT MOONFLAG, SHOULD BE



L INTEGRATION INITIALIZATION

R0194 USED TO DETERMINE ORIGIN.)

R0196 IN ADDITION TO THE ABOVE, THE PERMANENT STATE VECTOR IS UPDATED WHENEVER
 R0197 STATEPLG WAS SET AND WHENEVER A W-MATRIX IS TO BE INTEGRATED, THE PUSH
 R0198 SOLUTION IS SET TO 0 AND OVERFLOW IS CLEARED BEFORE RETURNING TO THE
 R0199 CALLING PROGRAM.

R0201 4.0 CALLING SEQUENCES AND SAMPLE CODE

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R0202 -----
R0203
R0204 A) PRECISION ORBITAL INTEGRATION, CSMPREC, LEMPREC ENTRANCES
R0205 L-X STORE TIME TO 95T5791T5 T 95 PUS L9ST (T4531)
R0206 L CALL
R0207 L+1 CSMPREC (OR LEMPREC)
R0208 L+2 RETURN
R0209 INPUT
R0210 TDEC1 (PD 320) TIME TO INTEGRATE TO...CENTISECONDS SCALED 280
R0211 OUTPUT
R0212 THE DATA LISTED IN SECTION 3.0 PLUS
R0213 ROVV POSITION VECTOR OF VEHICLE WITH RESPECT TO SECONDARY
R0214 BODY... METERS B-29 ONLY IF MIDFLAG = DIMOFLAG = 1
R0215 B) CONIC INTEGRATION, CSMCONIC, LEMCONIC ENTRANCES
R0216 L-X STORE TIME IN PUSH LIST (TDEC1)
R0217 L CALL
R0218 L+1 CSMCONIC (OR LEMCONIC)
R0219 INPUT/OUTPUT
R0220 SAME AS PRECISION INTEGRATION, EXCEPT ROVV NOT SET
R0221 C) INTEGRATE GIVEN STATE VECTOR. INTEGRV3 ENTRANCE
R0222 CALL
R0223 INTSMALL
R0224 VLOAD
R0225 POSITION VECTOR
R0226 STODL ROVV
R0227 VELOCITY VECTOR
R0228 STODL VCV
R0229 THIS STATE VECTOR VALID
R0230 STODL TST
R0231 FINAL RADIUS
R0232 STODL RFINAL
R0233 SET(CLEAR) SET(CLEAR)
R0234 INTYPFLAG
R0235 MOONFLAG
R0236 SET(CLEAR) DLOAD
R0237 ORBITED TIME
R0238 STCALL TDEC1
R0239 INTEGRV3
R0240 INPUT
R0241 ROVV POSITION VECTOR METERS
R0242 VCV VELOCITY VECTOR M/CSEC
R0243 STODL THIS OR STATE VECTOR (ROVV = 0) 0000 0-50
  
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L INTEGRATION INITIALIZATION

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R0244 TDEC1 TIME TO INTEGRATE TO CSEC B-28 (PD 32D)
R0245 (MAY BE INCREMENT IF TET=0)
R0246 OUTPUT
R0247 SAME AS FOR PRECISION OR CONIC INTEGRATION,
R0248 DEPENDING ON INTYPLG.
R0249 D) INTEGRATE STATE VECTOR, INTORV ENTRANCE
R0250 L-X STORE TIME IN PUSH LIST (TDEC1)(MAY BE DONE AFTER CALL TO INTSTALL)
R0252 L-8 CALL
R0253 L-7
R0254 L-6 SET(CLEAR) SET(CLEAR)
R0255 L-5 VINTYPLG 1=CSM, 0=LM
R0256 L-4 INTYPLG 1=CONIC, 0=PRECISION
R0257 L-3 SET(CLEAR) SET(CLEAR)
R0258 L-2 DIMOFLAG 1=W-MATRIX, 0=NO W-MATRIX
R0259 L-1 DORGFLO 1=9X9, 0=6X6
R0260 L SET DLOAD
R0261 L+1 STATEFLO DESIRE PERMANENT UPDATE
R0262 L+2 FINAL RAD. OF STATE VECTOR
R0263 L+3 STCALL RFINAL
R0264 L+4 INTEGROV
R0265 L CALL
R0266 L+1 INTEGROV NORMAL USE-- WILL UPDATE STATE
R0267 L+2 RETURN VECTOR IF DIMOFLAG=1.(STATEFLO IS
ALWAYS RESET IN INTEGRATION AFTER
IT IS USED.)
R0268 INPUT
R0269 TDEC1 (PD 32D) TIME TO INTEGRATE TO CSEC B-28
R0270 OUTPUT
R0271 SAME AS FOR PRECISION OR CONIC INTEGRATION
R0272 THE PROGRAM WILL SET MOONFLAG, MIDFLAG DEPENDING ON
R0273 THE PERMANENT STATE VECTOR REPRESENTATION.
R0274

```

| | | | | | | | |
|-------|-----|-----|------|---------|---------|----------|----------------------|
| 02741 | | | | 11,2310 | | | BANK 11 |
| 02742 | REP | 2 | LAST | 203 | 13,2000 | | SETLOC INTINIT |
| 02743 | | | | | 13,2561 | | BANK |
| 02744 | REP | 5 | LAST | 207 | E3,1554 | | BRANK= RRECTCSM |
| 02745 | REP | 2 | LAST | 203 TO | 206 | 30 30* | COLNT 13/INTIN |
| 0275 | REP | 92 | LAST | 1226 | 13,2561 | 0 5301 0 | STATEINT TC PHASCHNG |
| 0276 | | | | | 13,2562 | 00052 0 | OCT 00052 |
| 0277 | REP | 7 | LAST | 261 | 13,2563 | 3 4754 0 | CAP PRIC6 |
| 0278 | REP | 30 | LAST | 779 | 13,2564 | 0 5042 1 | TC FINDVAC |
| 0279 | REP | 6 | LAST | 1283 | E3,1554 | | BRANK= RRECTCSM |
| 0280 | REP | 2 | LAST | 207 | 13,2565 | 02570 1 | 2CADR STATINT1 |
| 0280 | | | | | 13,2566 | 26063 0 | |
| 0281 | REP | 64 | LAST | 1205 | 13,2567 | 0 5213 1 | TC TASKOVER |
| 0282 | REP | 233 | LAST | 1264 | 13,2570 | 0 6006 1 | STATINT1 TC INTFRPT |
| 0283 | | | | | 13,2571 | 47014 1 | RQN RTR |
| 02831 | REP | 2 | LAST | 261 | 13,2572 | 04712 1 | QUITFLAG |
| 02832 | REP | 1 | | | 13,2573 | 26630 0 | NOINT |
| 0284 | REP | 26 | LAST | 889 | 13,2574 | 45505 0 | LOADTIME |

NO STATEINT IF V96

L INTEGRATION INITIALIZATION

| | | | | | | | | | | | | | | | | | | | | |
|------|---------|--|------|------|---------|--------|---|--|----------|-------|----------|----|--|--|--|--|--|--|------------------|----------------------|
| 0441 | REP | 3 | LAST | 1230 | 13,2643 | 20237 | 0 | | | | | | | | | | | | | |
| 0442 | | | | | 13,2644 | 43014 | 0 | | | | | | | | | | | | | |
| 0443 | REP | 12 | LAST | 889 | 13,2645 | 00303 | 1 | | BQN | | | | | | | | | | | |
| 0444 | REP | 28 | LAST | 1284 | 13,2646 | 00051 | 0 | | | | | | | | | | | | | |
| 0445 | REP | 22 | LAST | 1284 | 13,2647 | 04223 | 0 | | | | | | | | | | | | | |
| 0446 | REP | 29 | LAST | 1285 | 13,2650 | 00051 | 0 | | | | | | | | | | | | | |
| 0447 | REP | 1 | | | 13,2651 | 0 3015 | 0 | | | | | | | | | | | | | |
| 0448 | REP | 2 | LAST | 83 | 13,2652 | 55=500 | 1 | | MOVEACSM | TC | SETRANK | | | | | | | | | |
| 0449 | REP | 3 | LAST | 1285 | 13,2653 | 51=500 | 0 | | | TS | DIFBQNT | | | | | | | | INITIALIZE INDEX | |
| 0450 | REP | 5 | LAST | 1247 | 13,2654 | 3 1502 | 1 | | | INDEX | DIFBQNT | | | | | | | | | |
| 0451 | REP | 4 | LAST | 1285 | 13,2655 | 51=500 | 0 | | | CA | RRECT | | | | | | | | | |
| 0452 | REP | 7 | LAST | 1283 | 13,2656 | 55=554 | 0 | | | INDEX | DIFBQNT | | | | | | | | | |
| 0453 | REP | 6 | LAST | 1285 | 13,2657 | 11=500 | 1 | | | TS | RRECTCSM | | | | | | | | | IS TRANSFER COMPLETE |
| 0454 | REP | 4 | LAST | 1284 | 13,2660 | 1 2652 | 0 | | | CCS | DIFBQNT | | | | | | | | | NO-LOOP |
| 0455 | REP | 63 | LAST | 1257 | 13,2661 | 0 6030 | 1 | | | TCF | MOVEACSM | +1 | | | | | | | | COMPLETE- RETURN |
| 0456 | PTOACSM | TRANSFERS RRECTCSM TO RRECTCSM +41 TO RRECT TO RRECT +41 | | | | | | | | | | | | | | | | | | |

R0457 CALLING SEQUENCE
R0458 L CALL
R0459 PTOACSM

| | | | | | | | | | | | | | | | | | | | | | |
|-------|--------------------|--|------|------|---------|--------|---|--|---------|---------|----------|----------|---------|--|--|--|--|--|--|--|--|
| R0460 | NORMAL EXIT AT L+2 | | | | | | | | | | | | | | | | | | | | |
| 0461 | | | | | 13,2662 | 43034 | 1 | | PTOACSM | RTB | BQN | | | | | | | | | | |
| 0462 | REP | 2 | LAST | 1230 | 13,2663 | 28700 | 1 | | | | MOVEPCSM | | | | | | | | | | |
| 0463 | REP | 23 | LAST | 1285 | 13,2664 | 04303 | 0 | | | | CMOONFLO | | | | | | | | | | |
| 0464 | REP | 1 | | | 13,2665 | 26673 | 1 | | | | SETRANK | | | | | | | | | | |
| 0465 | | | | | 13,2666 | 60214 | 0 | | | CLRMOON | CLEAR | SSP | | | | | | | | | |
| 0466 | REP | 13 | LAST | 1285 | 13,2667 | 00263 | 0 | | | | MOONFLAG | | | | | | | | | | |
| 0467 | REP | 4 | LAST | 1229 | 13,2670 | 02151 | 0 | | | | PRODY | | | | | | | | | | |
| 0468 | | | | | 13,2671 | 00000 | 1 | | | | 0 | | | | | | | | | | |
| 0469 | | | | | 13,2672 | 77616 | 0 | | | | RVO | | | | | | | | | | |
| 0470 | | | | | 13,2673 | 60214 | 0 | | | | SETRANK | SET | SSP | | | | | | | | |
| 0471 | REP | 14 | LAST | 1285 | 13,2674 | 00063 | 1 | | | | MOONFLAG | | | | | | | | | | |
| 0472 | REP | 5 | LAST | 1285 | 13,2675 | 02151 | 0 | | | | PRODY | | | | | | | | | | |
| 0473 | | | | | 13,2676 | 00002 | 0 | | | | 2 | | | | | | | | | | |
| 0474 | | | | | 13,2677 | 77616 | 0 | | | | RVO | | | | | | | | | | |
| 0475 | REP | 2 | LAST | 1285 | 13,2700 | 0 3015 | 0 | | | | MOVEPCSM | TC | SETRANK | | | | | | | | |
| 0476 | REP | 6 | LAST | 1285 | 13,2701 | 55=500 | 1 | | | | TS | DIFBQNT | | | | | | | | | |
| 0477 | REP | 7 | LAST | 1285 | 13,2702 | 51=500 | 0 | | | | INDEX | DIFBQNT | | | | | | | | | |
| 0478 | REP | 6 | LAST | 1285 | 13,2703 | 3 1554 | 1 | | | | CA | RRECTCSM | | | | | | | | | |
| 0479 | REP | 8 | LAST | 1285 | 13,2704 | 51=500 | 0 | | | | INDEX | DIFBQNT | | | | | | | | | |
| 0480 | REP | 6 | LAST | 1285 | 13,2705 | 55=502 | 0 | | | | TS | RRECT | | | | | | | | | |
| 0481 | REP | 9 | LAST | 1285 | 13,2706 | 11=500 | 1 | | | | CCS | DIFBQNT | | | | | | | | | |
| 0482 | REP | 3 | LAST | 1285 | 13,2707 | 1 2701 | 1 | | | | TCF | MOVEPCSM | +1 | | | | | | | | |
| 0483 | REP | 64 | LAST | 1285 | 13,2710 | 0 6030 | 1 | | | | TC | DANZIG | | | | | | | | | |
| 0484 | ATOPLEM | TRANSFERS RRECT TO RRECT +41 TO RRECTLEM TO RRECTLEM +41 | | | | | | | | | | | | | | | | | | | |

L INTEGRATION INITIALIZATION

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| | | | | | | |
|-------|---------|-----------|---------|----------|----------|-------------------------------|
| 0530 | | | 13,2765 | 77624 1 | CALL | |
| 0531 | REP 8 | LAST 1208 | 13,2768 | 55341 1 | RP-TO-R | |
| 0532 | REP 15 | LAST 1252 | 13,2767 | 25535 0 | STOVL | RCV |
| 0533 | REP 2 | LAST 32 | 13,2770 | 11450 0 | ZINIT | |
| 0534 | | | 13,2771 | 14001 0 | STOVL | 0D |
| 0535 | REP 13 | LAST 1286 | 13,2772 | 01517 0 | TST | |
| 0536 | | | 13,2773 | 14007 0 | STOVL | 0D |
| 0537 | REP 2 | LAST 1286 | 13,2774 | 27758 0 | S/S | |
| 0538 | | | 13,2775 | 45014 0 | SET | CALL |
| 05381 | REP 16 | LAST 1286 | 13,2776 | 00063 1 | MOONFLAG | NEEDED FOR SETTING X1 ON EXIT |
| 0539 | REP 9 | LAST 1287 | 13,2777 | 55341 1 | RP-TO-R | |
| 0540 | | | 13,3000 | 74235 0 | VXV | VXV |
| 0541 | REP 16 | LAST 1287 | 13,3001 | 01535 0 | RCV | |
| 0542 | REP 1 | | 13,3002 | 27014 1 | ONEMOON | |
| 0543 | REP 14 | LAST 1252 | 13,3003 | 25543 1 | STOVL | VCV |
| 0544 | REP 8 | LAST 1208 | 13,3004 | 11458 0 | ZEROVEC | |
| 0545 | REP 6 | LAST 1229 | 13,3005 | 01521 0 | STORE | DELTA V |
| 0546 | | | 13,3006 | 67174 1 | AKT,2 | SKA,2 |
| 0547 | | | 13,3007 | 00002 0 | | 2 |
| 0548 | REP 6 | LAST 1285 | 13,3010 | 02150 1 | PRODY | |
| 0549 | REP 6 | LAST 1229 | 13,3011 | 35527 1 | STCALL | INUV |
| 0550 | REP 1 | | 13,3012 | 27136 0 | A-POK | |
| 0551 | | | 13,3013 | 07112 1 | ONEMOON | ZDEC* 2.66169947 E-8 B+23* |
| 0551 | | | 13,3014 | 08620 0 | | |
| 0552 | REP 1 | | 13,3015 | 3 3021 1 | SETRANK | CAP INTRANK |
| 0553 | REP 30 | LAST 1202 | 13,3016 | 54 008 0 | TS | BRANK |
| 0554 | REP 1 | | 13,3017 | 3 3438 0 | CAP | FORTYONE |
| 0555 | REP 302 | LAST 1204 | 13,3020 | 0 0002 0 | TC | 0 |
| 0556 | REP 9 | LAST 1285 | E3,1554 | | EBANK= | RRECTCSM |
| 0557 | REP 10 | LAST 614 | 13,3021 | 26063 0 | INTRANK | RRCN INTRCV |

R0558 SPECIAL PURPOSE ENTRIES TO ORBITAL INTEGRATION. THESE ROUTINES PROVIDE ENTRANCES TO INTEGRATION WITH
R0560 APPROPRIATE SWITCHES SET OR CLEARED FOR THE DESIRED INTEGRATION.

R0561 CSMPREC AND LEMPREC PERFORM ORBIT INTEGRATION BY THE ENCKE METHOD TO THE TIME INDICATED IN TDEC1
R0563 ACCELERATIONS DUE TO OBLATENESS ARE INCLUDED. NO W-MATRIX INT. IS DONE.
R0564 THE PERMANENT STATE VECTOR IS NOT UPDATED.
R0565 CSMCONIC AND LEMCONIC PERFORM ORBIT INTEG. BY KEPLERS METHOD TO THE TIME INDICATED IN TDEC1
R0567 NO DISTURBING ACCELERATIONS ARE INCLUDED. IN THE PROGRAM FLOW THE GIVEN
R0568 STATE VECTOR IS RECTIFIED BEFORE SOLUTION OF KEPLERS EQUATION

R0569 THE ROUTINES ASSUME THAT THE CSM (LEM) STATE VECTOR IN P-MEM IS VALID.
R0570 SWITCHES SET PRIOR TO ENTRY TO THE MAIN INTEG. PROG ARE AS FOLLOWS

| | | | | | |
|-------|-----------|---------|----------|---------|----------|
| R0571 | | CSMPREC | CSMCONIC | LEMPREC | LEMCONIC |
| R0572 | VINTFLAG | SET | SET | CLEAR | CLEAR |
| R0573 | INTYPFLAG | CLEAR | SET | CLEAR | SET |
| R0574 | DIM0FLAG | CLEAR | CLEAR | CLEAR | CLEAR |



L INTEGRATION INITIALIZATION

00575 CALLING SEQUENCE
 00576 L-X STORE TDEC1
 00577 L CALL (STCALL TDEC1)
 00578 L-1 CEMPREC (CEMCONIC, LEMPREC, LEMCONIC)

00579 NORMAL EXIT TO L-2
 00580 SUBROUTINES CALLED
 00581 INTORV1
 00582 PRECOUT FOR CEMPREC AND LEMPREC
 00583 CONICOUT FOR CEMCONIC AND LEMCONIC
 00584 OUTPUT - SEE PAGE 2 OF THIS LOG SECTION
 00585 INPUT

| 00586 | TDEC1 | TIME TO INTEGRATE TO | CSECS | B-28 | | | | |
|--------|--------|----------------------|---------|-------|---|----------|-------|----------|
| 00587 | | | 13,3022 | 45020 | 1 | CEMPREC | STO | CALL |
| 00588 | REP 01 | LAST 1274 | 13,3023 | 00046 | 0 | | | X1 |
| 00589 | REP 23 | LAST 1284 | 13,3024 | 27371 | 1 | | | INTSTALL |
| 00590 | | | 13,3025 | 43130 | 1 | | SXA,1 | SET |
| 00591 | REP 2 | LAST 87 | 13,3026 | 02214 | 1 | | | IRETURN |
| 00592 | REP 10 | LAST 601 | 13,3027 | 01474 | 1 | | | VINTFLAG |
| 00593 | | | 13,3030 | 43014 | 0 | IPLAGP | SET | CLEAR |
| 00594 | REP 3 | LAST 204 | 13,3031 | 01467 | 0 | | | PRECIPLO |
| 00595 | REP 12 | LAST 1284 | 13,3032 | 01676 | 1 | | | DIM0FLAG |
| 00596 | | | 13,3033 | 77614 | 1 | | CLROO | |
| 005961 | REP 14 | LAST 1284 | 13,3034 | 01633 | 0 | | | INTYPPLG |
| 005962 | REP 1 | | 13,3035 | 27115 | 1 | | | INTORV1 |
| 00597 | | | 13,3036 | 45020 | 1 | LEMPREC | STO | CALL |
| 00598 | REP 02 | LAST 1288 | 13,3037 | 00046 | 0 | | | X1 |
| 00599 | REP 24 | LAST 1288 | 13,3040 | 27371 | 1 | | | INTSTALL |
| 0600 | | | 13,3041 | 43130 | 1 | | SXA,1 | CLROO |
| 0601 | REP 3 | LAST 1288 | 13,3042 | 02214 | 1 | | | IRETURN |
| 0602 | REP 11 | LAST 1288 | 13,3043 | 01634 | 1 | | | VINTFLAG |
| 0603 | REP 1 | | 13,3044 | 27030 | 1 | | | IPLAGP |
| 0604 | | | 13,3045 | 45020 | 1 | CEMCONIC | STO | CALL |
| 0605 | REP 03 | LAST 1288 | 13,3046 | 00046 | 0 | | | X1 |
| 0606 | REP 25 | LAST 1288 | 13,3047 | 27371 | 1 | | | INTSTALL |
| 0607 | | | 13,3050 | 43130 | 1 | | SXA,1 | SET |
| 0608 | REP 4 | LAST 1288 | 13,3051 | 02214 | 1 | | | IRETURN |
| 0609 | REP 12 | LAST 1288 | 13,3052 | 01474 | 1 | | | VINTFLAG |
| 0610 | | | 13,3053 | 43014 | 0 | IPLAGC | CLEAR | SETGO |
| 0611 | REP 13 | LAST 1288 | 13,3054 | 01676 | 1 | | | DIM0FLAG |
| 0612 | REP 15 | LAST 1288 | 13,3055 | 01433 | 1 | | | INTYPPLG |
| 0613 | REP 2 | LAST 1288 | 13,3056 | 27115 | 1 | | | INTORV1 |
| 0614 | | | 13,3057 | 45020 | 1 | LEMCONIC | STO | CALL |
| 0615 | REP 04 | LAST 1288 | 13,3060 | 00046 | 0 | | | X1 |



L INTEGRATION INITIALIZATION

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```

0016 RESP 26 LAST 1288 13,3061 27371 1
0017          13,3062 43130 1
0018 RESP 6 LAST 1288 13,3063 02214 1
0019 RESP 13 LAST 1288 13,3064 01834 1
0020 RESP 1          13,3065 27053 1

```

```

INTSTALL
CLRGO
IRSTRN
VINTFLAG
IFLAG

```

```

0021          13,3066 86214 0
0022 RESP 4 LAST 1288 13,3067 01467 0
0023 RESP 7 LAST 1287 13,3070 02151 0
0024          13,3071 00000 1
0025          13,3072 86214 0
0026 RESP 17 LAST 1287 13,3073 00343 0
0027          13,3074 27077 1
0028 RESP 8 LAST 1289 13,3075 02151 0
00281          13,3076 00002 0
0029          13,3077 77220 1

```

```

INTEGRVS SET
SSP
PRECIPLO
PCODY
0
BOF
SSP
MOONFLAG
+3
PCODY
2

```

```

0030 RESP 6 LAST 1289 13,3100 02214 1
0031 RESP 9 LAST 1287 13,3101 11456 0
0032 RESP 7 LAST 1287 13,3102 01521 0
0033 RESP 7 LAST 1287 13,3103 35527 1
0034 RESP 2 LAST 1229 13,3104 23344 0
0035          13,3105 43014 0
0036 RESP 14 LAST 1288 13,3106 01876 1
0037 RESP 1          13,3107 04062 1
00371          13,3110 77614 1
00372 RESP 1          13,3111 04020 1
0038 RESP 1          13,3112 27127 0

```

```

STQ
VLOAD
IRSTRN
ZERORVC
STORE TDELTA
STCALL TNUV
RECTIFY
CLEAR
SET
DIMOFLAG
NEWIFLO
SETGO
RPOFLAG
ALOADED

```

```

R0039 INTEGRV IS AN ENTRY TO ORBIT INTEGRATION WHICH PERMITS THE CALLER ,
R0040 NORMALLY THE NAVIGATION PROGRAM , TO SET THE INTEG. FLAGS. THE ROUTINE
R0041 IS ENTERED AT INTEGRV1 BY CSMPREC ET.AL. AND AT ALOADED BY INTEGRVS.
R0042 THE ROUTINE SETS UP A-MEMORY IF ENTERED AT INTEGRV,1 AND SETS THE INTEG.
R0043 PROGRAM FOR PRECISION OR CONIC

```

```

R0044 THE CALLER MUST FIRST CALL INTSTALL TO CHECK IF INTEG. IS IN USE BEFORE
R0045 SETTING ANY FLAGS.

```

```

R0046 THE FLAGS WHICH SHOULD BE SET OR CLEARED ARE
R0047 VINTFLAG (IGNORED WHEN ENTERED FROM INTEGRVS)
R0048 INTYPFLAG
R0049 DIMOFLAG
R0050 DSCRIFLO

```

```

R0051 CALLING SEQUENCE
R0052 L-X CALL
R0053 L-Y INTSTALL
R0054 L-1 SET OR CLEAR ALL FOUR FLAGS. ALSO CAN SET STATEFLAG IF DESIRED
R0055 AND DIMOFLAG IS CLEAR.
R0056 L CALL
R0057 L+1 INTEGRV
R0058 INITIALIZATION
R0059 FLAGS AS ABOVE
R0060 STORE TIME TO INTEGRATE TO IN TDEC1

```

L INTEGRATION INITIALIZATION

| ADDRESS | OUTPUT | AS | DEFINED | BEFORE | | | |
|---------|---------|-----------|---------|---------|----------|----------|----------|
| R0661 | OUTPUT | | | | | | |
| R0662 | RATT | | | | | | |
| R0663 | VATT | | | | | | |
| R0664 | TAT | | | | | | |
| 0665 | | | | 13,3113 | 77620 0 | INTEORV | STO |
| 0666 | REP 1 | LAST 1289 | | 13,3114 | 02214 1 | | INSTRN |
| 0667 | | | | 13,3115 | 43014 0 | INTEORV1 | SET |
| 0668 | REP 2 | LAST 1289 | | 13,3116 | 04000 0 | | UPFLAG |
| 0669 | REP 2 | LAST 1289 | | 13,3117 | 04062 1 | | NEWIFLG |
| 0670 | | | | 13,3120 | 77731 1 | INTEORV2 | SSP |
| 0671 | REP 21 | LAST 1230 | | 13,3121 | 00053 1 | | OPRET |
| 0672 | REP 2 | LAST 1289 | | 13,3122 | 27127 0 | | ALOADD |
| 0673 | | | | 13,3123 | 52014 0 | BON | GOTO |
| 0674 | REP 14 | LAST 1289 | | 13,3124 | 01714 1 | | VINTPLAG |
| 0675 | REP 2 | LAST 259 | | 13,3125 | 26662 1 | | PTOACSM |
| 0676 | REP 1 | | | 13,3126 | 26726 1 | | PTOACSM |
| 0677 | | | | 13,3127 | 77745 1 | ALOADD | DLOAD |
| 0678 | REP 50 | LAST 1286 | | 13,3130 | 00041 1 | | TDEC1 |
| 0679 | REP 2 | LAST 76 | | 13,3131 | 01101 0 | STOPP | TDEC |
| 0680 | | | | 13,3132 | 52014 0 | ROFF | GOTO |
| 0681 | REP 16 | LAST 1286 | | 13,3133 | 01753 1 | | INTYPFLG |
| 0682 | REP 1 | | | 13,3134 | 27234 1 | | TESTLOOP |
| 0683 | REP 1 | | | 13,3135 | 27220 1 | | RVCN |
| 0684 | | | | 13,3136 | 77414 0 | A-POK | ROPCLR |
| 0685 | REP 5 | LAST 1284 | | 13,3137 | 01652 1 | | EXIT |
| 0686 | REP 1 | | | 13,3140 | 27157 1 | | STATEPLG |
| 0687 | REP 95 | LAST 1284 | | 13,3141 | 0 5301 0 | TC | PHASCHNG |
| 0688 | | | | 13,3142 | 04022 0 | OCT | 04022 |
| 0689 | REP 49 | LAST 1227 | | 13,3143 | 0 5435 0 | TC | UPFLAG |
| 0690 | REP 3 | LAST 1227 | | 13,3144 | 00236 0 | ADRES | REINTPLG |
| 0692 | REP 234 | LAST 1263 | | 13,3145 | 0 6006 1 | TC | INTPRET |
| 0693 | | | | 13,3146 | 77731 1 | SSP | |
| 0694 | REP 22 | LAST 1290 | | 13,3147 | 00053 1 | | OPRET |
| 0695 | REP 1 | | | 13,3150 | 27155 0 | | PHEXIT |
| 0696 | | | | 13,3151 | 52014 0 | BON | GOTO |
| 0697 | REP 10 | LAST 1290 | | 13,3152 | 01714 1 | | VINTPLAG |
| 0698 | REP 2 | LAST 32 | | 13,3153 | 26638 0 | | ATOPCSM |
| 0699 | REP 2 | LAST 32 | | 13,3154 | 26711 1 | | ATOPLEN |
| 0700 | | | | 13,3155 | 77624 1 | PHEXIT | CALL |
| 0701 | REP 22 | LAST 1230 | | 13,3156 | 56741 0 | | GRP2PC |
| 0702 | | | | 13,3157 | 45001 1 | RECTOUT | SETPD |
| 0703 | | | | 13,3160 | 00001 0 | | 0 |
| 0704 | REP 3 | LAST 1289 | | 13,3161 | 23344 0 | | RECTIFY |
| 0705 | | | | 13,3162 | 53775 1 | VLOAD | VSL* |
| 0706 | REP 9 | LAST 1286 | | 13,3163 | 01503 0 | | RRECT |
| 0707 | | | | 13,3164 | 57576 1 | | 0,2 |
| 0708 | | | | 13,3165 | 53715 1 | PDVL | VSL* |
| 0709 | REP 6 | LAST 1252 | | 13,3166 | 01511 0 | | VRECT |

PHASE CHANGE HAS OCCURRED BETWEEN
INTSTALL AND INTWAKE

RATT TO PDO

L INTEGRATION INITIALIZATION

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| | | | | | | | | |
|-------|---|-----|-----------|---------|----------|-----------|-------------|---------------------------------------|
| 0710 | | | 13,3167 | 57576 1 | | 0,2 | | |
| 0711 | | | 13,3170 | 63325 0 | FDL | FDVL | VATT TO PD6 | TAT TO PD12 |
| 0712 | REP | 14 | LAST 1287 | 13,3171 | 01517 0 | TST | | |
| 0713 | REP | 10 | LAST 1290 | 13,3172 | 01503 0 | RRECT | | |
| 0714 | | | | 13,3173 | 04715 0 | FDL* | | |
| 0715 | REP | 7 | LAST 1290 | 13,3174 | 01511 0 | VRECT | | |
| 0716 | REP | 2 | LAST 480 | 13,3175 | 50041 1 | MUBARTH,2 | | |
| 0717 | | | | 13,3176 | 76006 0 | PUSH | AXT,1 | |
| 0718 | | | | 13,3177 | 77765 0 | DEC | -10 | |
| 0719 | | | | 13,3200 | 76014 0 | BON | AXT,1 | |
| 0720 | REP | 18 | LAST 1289 | 13,3201 | 00303 1 | MOONFLAG | | |
| 0721 | | | | 13,3202 | 27204 1 | +2 | | |
| 0722 | | | | 13,3203 | 77775 1 | DEC | -2 | |
| 0723 | | | | 13,3204 | 40001 1 | INTEXIT | STPD | BOV |
| 0724 | | | | 13,3205 | 00001 0 | | | |
| 0725 | | | | 13,3206 | 27207 1 | | | |
| 07251 | | | | 13,3207 | 43014 0 | CLEAR | CLEAR | |
| 07252 | REP | 2 | LAST 284 | 13,3210 | 04076 1 | AVEMIDSW | | ALLOW UPDATE OF DOWNLINK STATE VECTOR |
| 07253 | REP | 5 | LAST 1289 | 13,3211 | 01667 1 | PRECIFLG | | |
| 0726 | | | | 13,3212 | 77535 1 | SLOAD | EXIT | |
| 0727 | REP | 8 | LAST 1290 | 13,3213 | 02215 0 | IRETURN | | |
| 0728 | REP | 653 | LAST 1289 | 13,3214 | 3 0154 1 | CA | MPAC | |
| 0729 | REP | 38 | LAST 1257 | 13,3215 | 50 120 1 | INDEX | FIXLOC | |
| 0730 | REP | 23 | LAST 1290 | 13,3216 | 54 052 1 | TS | QPRST | |
| 0731 | REP | 4 | LAST 1230 | 13,3217 | 0 3406 0 | TC | INTWAKE | |
| 0732 | RVCON SETS UP ORBIT INTEGRATION TO DO A CONIC SOLUTION FOR POSITION AND | | | | | | | |
| 0733 | VELOCITY FOR THE INTERVAL (TST-TDEC) | | | | | | | |
| 0734 | | | | 13,3220 | 45345 1 | RVCON | DLOAD | DSU |
| 0735 | REP | 3 | LAST 1290 | 13,3221 | 01101 0 | | | TDEC |
| 0736 | REP | 15 | LAST 1291 | 13,3222 | 01517 0 | | | TST |
| 0737 | REP | 7 | LAST 1249 | 13,3223 | 36312 1 | STCALL | TAU | |
| 0738 | REP | 4 | LAST 1290 | 13,3224 | 23344 0 | | | RECTIFY |
| 0739 | | | | 13,3225 | 77624 1 | CALL | | |
| 0740 | REP | 1 | | 13,3226 | 22310 0 | | | KEPPREP |
| 0741 | | | | 13,3227 | 43345 1 | DLOAD | DAD | |
| 0742 | REP | 8 | LAST 1252 | 13,3230 | 01551 1 | | | TC |
| 0743 | REP | 18 | LAST 1291 | 13,3231 | 01517 0 | | | TST |
| 0744 | REP | 17 | LAST 1291 | 13,3232 | 35517 1 | STCALL | TST | |
| 0745 | REP | 2 | LAST 1290 | 13,3233 | 27157 1 | | | RECTOUT |



L INTEGRATION INITIALIZATION

P07455 TESTLOOP

| | | | | | | | |
|-------|-----|---------------|---------|---------|--------------|----------|------------------|
| 0746 | | | 13,3234 | 43014 0 | TESTLOOP BOP | CLROO | |
| 07462 | REP | 4 LAST 1284 | 13,3235 | 04752 0 | | QUITFLAG | |
| 07463 | | | 13,3236 | 27241 0 | | +3 | |
| 07464 | REP | 8 LAST 1290 | 13,3237 | 01832 1 | | STATSPLO | |
| 07465 | REP | 1 | 13,3240 | 27204 1 | | INTEKIT | STOP INTEGRATION |
| 07466 | | | 13,3241 | 73001 1 | +3 | SETPD | LXA,2 |
| 0747 | | | 13,3242 | 00013 0 | | | 10D |
| 0748 | REP | 9 LAST 1289 | 13,3243 | 02150 1 | | VLOAD | MBODY |
| 0749 | | | 13,3244 | 81575 1 | | | ABVAL |
| 0750 | REP | 17 LAST 1287 | 13,3245 | 01535 0 | | | RCV |
| 0751 | | | 13,3246 | 43008 0 | | PUSH | CLEAR |
| 0752 | REP | 1 | 13,3247 | 00262 1 | | | MIDFLAG |
| 0753 | | | 13,3250 | 50023 0 | | DSU* | RNN |
| 0754 | REP | 1 | 13,3251 | 67241 1 | | | RNE,2 |
| 0755 | | | 13,3252 | 27255 0 | | | +3 |
| 0756 | | | 13,3253 | 77614 1 | | SET | |
| 0757 | REP | 2 LAST 1292 | 13,3254 | 00062 0 | | | MIDFLAG |
| 0758 | | | 13,3255 | 41345 0 | NORFINAL | DLOAD | DMP |
| 0759 | | | 13,3256 | 00013 0 | | | 10D |
| 0760 | | | 13,3257 | 00043 0 | | | 34D |
| 0761 | | | 13,3260 | 55762 1 | | SR1R | DDV* |
| 0762 | REP | 3 LAST 1291 | 13,3261 | 50041 1 | | | MUBARTH,2 |
| 0763 | | | 13,3262 | 41386 1 | | SQRT | DMP |
| 0764 | REP | 1 | 13,3263 | 23875 1 | | | .3D |
| 0765 | | | 13,3264 | 40442 1 | | SR3 | SR4 |
| 0766 | | | 13,3265 | 54345 1 | | DLOAD | SL |
| 0767 | REP | 654 LAST 1291 | 13,3266 | 00155 0 | | | MPAC |
| 0768 | | | 13,3267 | 20220 0 | | | 15D |
| 0769 | | | 13,3270 | 40006 0 | | PUSH | BOV |
| 0770 | REP | 1 | 13,3271 | 27316 0 | | | MAXDT |
| 0771 | | | 13,3272 | 50021 1 | | RDSU | RNN |
| 0772 | REP | 1 | 13,3273 | 27370 0 | | | DT/2MAX |
| 0773 | REP | 2 LAST 1292 | 13,3274 | 27316 0 | | | MAXDT |
| 0774 | | | 13,3275 | 45345 1 | DT/2COMP | DLOAD | DSU |
| 0775 | REP | 4 LAST 1291 | 13,3276 | 01101 0 | | | TDEC |
| 0776 | REP | 18 LAST 1291 | 13,3277 | 01517 0 | | | TST |
| 0777 | | | 13,3300 | 54234 0 | | RTB | SL |
| 0778 | REP | 4 LAST 715 | 13,3301 | 45541 0 | | | SONAGREE |
| 0779 | | | 13,3302 | 20211 1 | | | 8D |
| 0780 | REP | 2 LAST 86 | 13,3303 | 02314 0 | | STORE | DT/2 |
| 0781 | | | 13,3304 | 51400 1 | | BOV | ARS |
| 0782 | REP | 1 | 13,3305 | 27322 1 | | | GETMAXDT |
| 0783 | | | 13,3306 | 50025 0 | | DSU | RNN |
| 0784 | | | 13,3307 | 00015 0 | | | 12D |
| 0785 | REP | 1 | 13,3310 | 27326 0 | | | POOHCHK |
| 0786 | | | 13,3311 | 75345 1 | USEMAXDT | DLOAD | SIGN |
| 0787 | | | 13,3312 | 00015 0 | | | 12D |
| 0788 | REP | 3 LAST 1292 | 13,3313 | 02314 0 | | | DT/2 |

STOP INTEGRATION

RC TO 10D

MIDFLAG=0 IF R G.T. RMP

DT IS TRUNCATED TO A MULTIPLE

OF 128 CSECS.

R-19

IS TIME TO INTEG. TO GR THAN MAXTIME



L INTEGRATION INITIALIZATION

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| | | | | | | | | |
|-------|-----|-----|-----------|---------|-------|------|----------|--------------|
| 0789 | REP | 4 | LAST 1292 | 13,3314 | 36314 | 1 | STCALL | DT/2 |
| 0790 | REP | 2 | LAST 1292 | 13,3315 | 27326 | 0 | POOHCHK | |
| 0791 | | | | 13,3316 | 65345 | 0 | MAXDT | DLOAD |
| 0792 | REP | 2 | LAST 1292 | 13,3317 | 27370 | 0 | | PDDL |
| 0793 | | | | 13,3320 | 77650 | 1 | | DT/2MAX |
| 0794 | REP | 1 | | 13,3321 | 27275 | 1 | | GOTO |
| 0795 | | | | 13,3322 | 77634 | 0 | | DT/2COMP |
| 0796 | REP | 15 | LAST 826 | 13,3323 | 45707 | 0 | GETMAXDT | RTB |
| 0797 | REP | 5 | LAST 1293 | 13,3324 | 36314 | 1 | | SIGNPAC |
| 0798 | REP | 1 | | 13,3325 | 27311 | 1 | | STCALL |
| 0799 | | | | 13,3326 | 51545 | 1 | | DT/2 |
| 0800 | REP | 6 | LAST 1293 | 13,3327 | 02314 | 0 | POOHCHK | USEMAXDT |
| 0801 | | | | 13,3330 | 50025 | 0 | | ABS |
| 0802 | REP | 1 | | 13,3331 | 27366 | 1 | | DT/2 |
| 0803 | REP | 2 | LAST 1287 | 13,3332 | 27136 | 0 | | RNN |
| 0804 | | | | 13,3333 | 46135 | 1 | | DT/2MIN |
| 0805 | REP | 13 | LAST 711 | 13,3334 | 01012 | 0 | | A-POK |
| 0806 | | | | 13,3335 | 27340 | 0 | | RHIZ |
| 0807 | | | | 13,3336 | 77650 | 1 | | MODREQ |
| 0808 | REP | 1 | | 13,3337 | 23155 | 1 | | +3 |
| 08081 | | | | 13,3340 | 77614 | 1 | | GOTO |
| 08082 | REP | 6 | LAST 1291 | 13,3341 | 01707 | 0 | BON | TIMESTEP |
| 08083 | REP | 2 | LAST 1293 | 13,3342 | 23155 | 1 | | PRECIPLO |
| 0809 | | | | 13,3343 | 45345 | 1 | | TIMESTEP |
| 0810 | REP | 7 | LAST 1293 | 13,3344 | 02314 | 0 | DLOAD | DSJ |
| 0811 | | | | 13,3345 | 00015 | 0 | | DT/2 |
| 0812 | | | | 13,3346 | 43040 | 1 | | 120 |
| 0813 | REP | 3 | LAST 1293 | 13,3347 | 27136 | 0 | RNN | ROFCLR |
| 0814 | REP | 3 | LAST 1290 | 13,3350 | 04242 | 1 | | A-POK |
| 0815 | REP | 3 | LAST 1293 | 13,3351 | 23155 | 1 | | NEWIFLO |
| 0816 | | | | 13,3352 | 45345 | 1 | DLOAD | TIMESTEP |
| 0817 | REP | 5 | LAST 1292 | 13,3353 | 01101 | 0 | | DSJ |
| 0818 | REP | 19 | LAST 1292 | 13,3354 | 01517 | 0 | | TDEC |
| 08181 | | | | 13,3355 | 77640 | 0 | | TET |
| 08182 | REP | 2 | LAST 1292 | 13,3356 | 27204 | 1 | RNN | INTEKIT |
| 0819 | | | | 13,3357 | 40525 | 1 | | SR4 |
| 0820 | REP | 8 | LAST 1293 | 13,3360 | 02314 | 0 | | DT/2 |
| 0821 | | | | 13,3361 | 44322 | 1 | SR2R | EDSJ |
| 0822 | | | | 13,3362 | 52040 | 1 | RNN | GOTO |
| 0823 | REP | 3 | LAST 1293 | 13,3363 | 27204 | 1 | | INTEKIT |
| 0824 | REP | 4 | LAST 1293 | 13,3364 | 23155 | 1 | | TIMESTEP |
| 0825 | | | | 13,3365 | 00000 | 1 | DT/2MIN | 2DEC |
| 0825 | | | | 13,3366 | 01400 | 1 | | 3 R-20 |
| 0826 | | | | 13,3367 | 14152 | 1 | DT/2MAX | 2DEC |
| 0826 | | | | 13,3370 | 00000 | 1 | | 4000 E2 R-20 |
| 0828 | | | | 13,3371 | 77776 | 1 | INTSTALL | EXIT |
| 0829 | REP | 250 | LAST 1226 | 13,3372 | 3 | 4714 | CAP | ZERO |
| 0830 | REP | 209 | LAST 1201 | 13,3373 | 54 | 001 | ALLSTALL | TS |
| 0831 | REP | 5 | LAST 184 | 13,3374 | 3 | 0106 | CA | L |
| 0832 | REP | 210 | LAST 1293 | 13,3375 | 50 | 001 | INDEX | RASPLAG |
| | | | | | | | | L |

EXCHANGE DT/2MAX WITH COMPUTED MAX.

WAS THIS CALL VIA CS4(LEM)PREC

YES

NO BACKWARD INTEGRATION

IS 4(DT) L3(TDEC - TET)

NO



L INTEGRATION INITIALIZATION

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| | | | | | | | | |
|-------|-----|-----|-----------|---------|----------|----------|----------|--|
| 0633 | REP | 1 | | 13,3376 | 7 3467 0 | MASK | INTBITAB | IS THIS STALL AREA FREE |
| 0634 | | | | 13,3377 | 0 0006 1 | EXTEND | | |
| 0635 | REP | 1 | | 13,3400 | 1 3445 0 | BZF | OKTOORAB | YES |
| 0636 | REP | 211 | LAST 1293 | 13,3401 | 50 001 0 | INDEX | L | |
| 0637 | REP | 1 | | 13,3402 | 3 3484 1 | CAP | WAKESTAL | |
| 0638 | REP | 4 | LAST 417 | 13,3403 | 0 5070 0 | TC | JOBLEBP | |
| 0639 | | | | 13,3404 | 77776 1 | INTWAKE0 | EXIT | |
| 06395 | REP | 2 | LAST 504 | 13,3405 | 1 3426 0 | TCF | INTWAKE1 | |
| 0640 | REP | 6 | LAST 1293 | 13,3406 | 4 0106 1 | INTWAKE | CS | IS THIS INSTALLED ROUTINE TO BE |
| 0641 | REP | 1 | | 13,3407 | 7 4704 1 | MASK | REINIBIT | RESTARTED |
| 0642 | REP | 340 | LAST 1199 | 13,3410 | 10 000 0 | CCS | A | |
| 0643 | REP | 3 | LAST 1294 | 13,3411 | 0 3426 1 | TC | INTWAKE1 | NO |
| 0644 | REP | 39 | LAST 1291 | 13,3412 | 50 120 1 | INDEX | FIXLOC | |
| 0645 | REP | 24 | LAST 1291 | 13,3413 | 3 0052 0 | CA | OPRET | |
| 0646 | REP | 1 | | 13,3414 | 55-055 1 | TS | TRASE2 | YES, DONT RESTART WITH SOMEONE ELSE'S Q |
| 0649 | REP | 96 | LAST 1290 | 13,3415 | 0 5301 0 | TC | PHASCHG | |
| 0650 | | | | 13,3416 | 04022 0 | OCT | 04022 | |
| 0651 | REP | 2 | LAST 1294 | 13,3417 | 3 1055 0 | CA | TRASE2 | |
| 0652 | REP | 40 | LAST 1294 | 13,3420 | 50 120 1 | INDEX | FIXLOC | |
| 0653 | REP | 25 | LAST 1294 | 13,3421 | 54 052 1 | TS | OPRET | |
| 0654 | REP | 2 | LAST 1294 | 13,3422 | 3 4704 0 | CAP | REINIBIT | |
| 0655 | REP | 7 | LAST 1294 | 13,3423 | 7 0106 1 | MASK | RASPLAG | |
| 0656 | | | | 13,3424 | 0 0006 1 | EXTEND | | |
| 0657 | REP | 1 | | 13,3425 | 1 3450 1 | BZF | GORAC | DONT INTWAKE IF WE CAME HERE VIA RESTART |
| 0658 | REP | 251 | LAST 1293 | 13,3426 | 3 4714 1 | INTWAKE1 | CAP | ZERO |
| 0659 | REP | 1 | | 13,3427 | 54 154 0 | WAKE | TS | STALLTEM |
| 0660 | REP | 2 | LAST 1294 | 13,3430 | 50 154 1 | WAKE1 | INDEX | STALLTEM |
| 0661 | REP | 2 | LAST 1294 | 13,3431 | 3 3464 1 | CAP | WAKESTAL | |
| 0662 | | | | 13,3432 | 0 0004 0 | INHINT | | |
| 0663 | REP | 5 | LAST 417 | 13,3433 | 0 5074 1 | TC | JOBWAKE | |
| 0664 | REP | 22 | LAST 1186 | 13,3434 | 10 064 1 | CCS | LOCCTR | |
| 0665 | REP | 1 | | 13,3435 | 1 3430 1 | TCF | WAKE1 | MAY BE MORE TO WAKE UP |
| 0666 | | | | 13,3436 | 00051 0 | PORTYONE | DEC | 41 |
| 0667 | REP | 3 | LAST 1294 | 13,3437 | 50 154 1 | INDEX | STALLTEM | |
| 0668 | REP | 2 | LAST 1294 | 13,3440 | 4 3467 0 | CS | INTBITAB | |
| 0669 | REP | 8 | LAST 1294 | 13,3441 | 7 0106 1 | MASK | RASPLAG | |
| 0670 | REP | 9 | LAST 1294 | 13,3442 | 54 106 1 | TS | RASPLAG | RELEASE STALL AREA |
| 0671 | | | | 13,3443 | 0 0003 1 | RELINT | | |
| 0672 | REP | 2 | LAST 1294 | 13,3444 | 1 3450 1 | TCF | GORAC | |
| 0673 | REP | 212 | LAST 1294 | 13,3445 | 50 001 0 | OKTOORAB | INDEX | L |
| 0674 | REP | 2 | LAST 183 | 13,3446 | 3 4675 1 | CAP | INTFLRIT | |
| 0675 | REP | 10 | LAST 1294 | 13,3447 | 26 106 1 | ADS | RASPLAG | |
| 0676 | REP | 235 | LAST 1290 | 13,3450 | 0 6006 1 | GORAC | TC | INTPRPT |
| 0677 | | | | 13,3451 | 77616 0 | RVO | | |



L INTEGRATION INITIALIZATION

| | | | | | | | |
|------|---------|-----------|---------|----------|----------|--------|-------------|
| 0878 | | | 13,3452 | 77776 1 | ERASTAL1 | EXIT | |
| 0879 | REP 154 | LAST 1257 | 13,3453 | 3 4712 1 | | CAP | ONE |
| 0880 | REP 1 | | 13,3454 | 1 3373 1 | | TCP | ALLSTALL |
| 0881 | | | 13,3455 | 77776 1 | ERASTAL2 | EXIT | |
| 0882 | REP 86 | LAST 1204 | 13,3456 | 3 4711 1 | | CAP | TWO |
| 0883 | REP 2 | LAST 1295 | 13,3457 | 1 3373 1 | | TCP | ALLSTALL |
| 0884 | REP 153 | LAST 1295 | 13,3460 | 3 4712 1 | ERASWAK1 | CAP | ONE |
| 0885 | REP 1 | | 13,3461 | 1 3427 1 | | TCP | WAKE |
| 0886 | REP 87 | LAST 1295 | 13,3462 | 3 4711 1 | ERASWAK2 | CAP | TWO |
| 0887 | REP 2 | LAST 1295 | 13,3463 | 1 3427 1 | | TCP | WAKE |
| 0888 | REP 27 | LAST 1289 | 13,3464 | 27372 1 | WAKESTAL | CADR | INTSTALL +1 |
| 0889 | REP 1 | | 13,3465 | 27453 0 | | CADR | ERASTAL1 +1 |
| 0890 | REP 1 | | 13,3466 | 27456 0 | | CADR | ERASTAL2 +1 |
| 0891 | REP 655 | LAST 1292 | 0154 | | STALTEM | EQUALS | MPAC |
| 0892 | | | 13,3467 | 20100 1 | INTRITAB | OCT | 20100 |
| 0893 | | | 13,3470 | 10040 1 | | OCT | 10040 |
| 0894 | | | 13,3471 | 04020 1 | | OCT | 04020 |



L INTEGRATION INITIALIZATION

0005 AVETOMID

0006 THIS ROUTINE PERFORMS THE TRANSITION FROM A THRUSTING PHASE TO THE COAST
 0007 PHASE BY INITIALIZING THIS VEHICLES PERMANENT STATE VECTOR WITH THE
 0008 VALUES LEFT BY THE AVERAGE ROUTINE IN RN,VN,PIPTIME.

0009 BEFORE THIS IS DONE THE W-MATRIX, IF ITS VALID (ORWFLAG OR RENDWFLG IS
 0010 SET) IS INTEGRATED FORWARD TO PIPTIME WITH THE PRE-THRUST STATE VECTOR.

0011 IN ADDITION, THE OTHER VEHICLE IS INTEGRATED (PERMANENT) TO PIPTIME.

0012 FINALLY TRONKONT IS ZEROED

| | | | | | | | | | |
|-------|-----|----|------|------|---------|----------|----------|----------|----------|
| 0003 | REP | 3 | LAST | 1283 | 13,2000 | | SETLOC | INTINIT | |
| 0004 | | | | | 13,3472 | | BANK | | |
| 0005 | REP | 3 | LAST | 1283 | TO 1296 | 457 487* | COUNT* | SS/INTIN | |
| 0006 | | | | | 13,3472 | 43020 1 | AVETOMID | STO | BON |
| 0007 | REP | 14 | LAST | 1230 | 13,3473 | 02317 0 | | | BORSS |
| 0008 | REP | 10 | LAST | 624 | 13,3474 | 02718 0 | | | RENDWFLG |
| 0009 | REP | 1 | | | 13,3475 | 27550 1 | | | INT/W |
| 0010 | | | | | 13,3476 | 77614 1 | | BON | |
| 0011 | REP | 12 | LAST | 623 | 13,3477 | 01711 1 | | | ORWFLAG |
| 0012 | REP | 2 | LAST | 1286 | 13,3500 | 27550 1 | | | INT/W |
| 0013 | | | | | 13,3501 | 77614 1 | OTHERS | BON | |
| 00131 | REP | 5 | LAST | 1286 | 13,3502 | 04307 1 | | | SURFLAG |
| 00132 | REP | 1 | | | 13,3503 | 27520 0 | | | SETCOAST |
| 00133 | | | | | 13,3504 | 45145 0 | | DLOAD | CALL |
| 0014 | REP | 16 | LAST | 1039 | 13,3505 | 01205 1 | | | PIPTIME |
| 0015 | REP | 26 | LAST | 1295 | 13,3506 | 27371 1 | | | INTSTALL |
| 0016 | | | | | 13,3507 | 45014 0 | | SET | CALL |
| 0017 | REP | 16 | LAST | 1290 | 13,3510 | 01474 1 | | | VINTFLAG |
| 0018 | REP | 3 | LAST | 1284 | 13,3511 | 26621 0 | | | SETIFLOS |
| 0019 | | | | | 13,3512 | 43014 0 | | ROP | CLEAR |
| 0020 | REP | 3 | LAST | 485 | 13,3513 | 02747 1 | | | COMPUTER |
| 0021 | | | | | 13,3514 | 27516 0 | | | +2 |
| 0022 | REP | 17 | LAST | 1296 | 13,3515 | 01674 0 | | | VINTFLAG |
| 0023 | REP | 51 | LAST | 1290 | 13,3516 | 34041 0 | | STCALL | TDEC1 |
| 0024 | REP | 11 | LAST | 1287 | 13,3517 | 27113 1 | | | INTEGRW |
| 0025 | | | | | 13,3520 | 45174 1 | SETCOAST | AXT,2 | CALL |
| 0026 | | | | | 13,3521 | 00002 0 | | | 2 |
| 0027 | REP | 29 | LAST | 1296 | 13,3522 | 27371 1 | | | INTSTALL |
| 0028 | | | | | 13,3523 | 77014 1 | | BON | AXT,2 |
| 0029 | REP | 9 | LAST | 1229 | 13,3524 | 04303 0 | | | MOONTHIS |
| 0030 | | | | | 13,3525 | 27527 1 | | | +2 |
| 0031 | | | | | 13,3526 | 00000 1 | | | 0 |
| 0032 | | | | | 13,3527 | 53775 1 | | VLOAD | VSR* |

W-MATRIX VALID ,GO INTEGRATE IT

W-MATRIX VALID ,GO INTEGRATE IT

FOR CSM

DONT DO LM ONLY
 GET SET FOR NON W-MAT PERMANENT INTEG.
 DESIRED TIME

CM
 SETS UP NONE W-MAT. PERMANENT INTEG.

COMPUTER IS LM , INTEG CM
 COMPUTER IS CM , INTEG LM

NOW MOVE PROPERLY SCALED RN,VN AND
 PIPTIME TO INTEGRATION ERASABLES.

L INTEGRATION INITIALIZATION

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| | | | | | | | | | | | |
|------|------|----|------|------|---------|-------|---|-------|-------|--------|--|
| 0933 | RESP | 18 | LAST | 790 | 13,3530 | 01171 | 1 | | | RN | |
| 0934 | | | | | 13,3531 | 57176 | 0 | | | 0,2 | |
| 0935 | RESP | 11 | LAST | 1291 | 13,3532 | 01503 | 0 | | | STORE | RRECT |
| 0936 | RESP | 18 | LAST | 1292 | 13,3533 | 15535 | 0 | | | STOVL | RCV |
| 0937 | RESP | 17 | LAST | 1296 | 13,3534 | 01205 | 1 | | | | PIPTIME |
| 0938 | RESP | 20 | LAST | 1293 | 13,3535 | 25517 | 0 | | | STOVL | TET |
| 0939 | RESP | 18 | LAST | 841 | 13,3536 | 01177 | 1 | | | | VN |
| 0940 | | | | | 13,3537 | 45057 | 1 | | | VSR* | CALL |
| 0941 | | | | | 13,3540 | 57176 | 0 | | | | 0,2 |
| 0942 | RESP | 2 | LAST | 503 | 13,3541 | 23360 | 0 | | | | MINIRECT |
| 0943 | | | | | 13,3542 | 66234 | 1 | | | RTB | SSP |
| 0944 | RESP | 1 | | | 13,3543 | 26851 | 1 | | | | MOVTHIS |
| 0945 | RESP | 8 | LAST | 850 | 13,3544 | 01127 | 1 | | | | TROKCNT |
| 0946 | | | | | 13,3545 | 00000 | 1 | | | | 0 |
| 0947 | | | | | 13,3546 | 77650 | 1 | | | GOTO | |
| 0948 | RESP | 2 | LAST | 1230 | 13,3547 | 75745 | 0 | | | | FAZAR ₆ |
| 0949 | | | | | 13,3550 | 45145 | 0 | INT/W | DLOAD | CALL | |
| 0950 | RESP | 18 | LAST | 1297 | 13,3551 | 01205 | 1 | | | | PIPTIME |
| 0951 | RESP | 30 | LAST | 1296 | 13,3552 | 27371 | 1 | | | | INTSTALL |
| 0952 | | | | | 13,3553 | 43014 | 0 | | | SET | |
| 0953 | RESP | 15 | LAST | 1289 | 13,3554 | 01476 | 0 | | | SET | DIM0PLAG |
| 0954 | RESP | 3 | LAST | 1291 | 13,3555 | 04476 | 0 | | | | AVEMIDSW |
| 0955 | | | | | 13,3556 | 43014 | 0 | | | SET | CLEAR |
| 0956 | RESP | 6 | LAST | 1284 | 13,3557 | 01475 | 0 | | | | D8OR9PLG |
| 0957 | RESP | 18 | LAST | 1296 | 13,3560 | 01674 | 0 | | | | VINTPLAG |
| 0958 | | | | | 13,3561 | 43014 | 0 | | | ROP | SET |
| 0959 | RESP | 4 | LAST | 1296 | 13,3562 | 02747 | 1 | | | | COMPUTER |
| 0960 | | | | | 13,3563 | 27567 | 0 | | | | +4 |
| 0961 | RESP | 19 | LAST | 1297 | 13,3564 | 01474 | 1 | | | | VINTPLAG |
| 0962 | | | | | 13,3565 | 77614 | 1 | | | CLEAR | |
| 0963 | RESP | 7 | LAST | 1297 | 13,3566 | 01675 | 1 | | | | D8OR9PLG |
| 0964 | RESP | 52 | LAST | 1296 | 13,3567 | 34041 | 0 | | | STCALL | TDEC1 |
| 0965 | RESP | 12 | LAST | 1296 | 13,3570 | 27113 | 1 | | | | INTEGRV |
| 0966 | | | | | 13,3571 | 77650 | 1 | | | GOTO | |
| 0967 | RESP | 1 | | | 13,3572 | 27501 | 0 | | | | OTHERS |
| | | | | | | | | | | | FINISH SETTING UP STATE VECTOR |
| | | | | | | | | | | | PUT TEMP STATE VECTOR INTO PERMANENT |
| | | | | | | | | | | | INTEGRATE W THRU BURN |
| | | | | | | | | | | | DO W-MATRIX SO WONT CLOBBER RN,VN,PIPTIME |
| | | | | | | | | | | | CLEAR 9X9 FOR LM LM |
| | | | | | | | | | | | LM TO DO |
| | | | | | | | | | | | 6X6 FOR CM |
| | | | | | | | | | | | NOW GO DO THE OTHER VEHICLE |



MIDTOV1
 THIS ROUTINE INTEGRATES (PRECISION) TO THE TIME SPECIFIED IN TDC1.
 IF, AT THE END OF AN INTEGRATION TIME STEP, CURRENT TIME PLUS A DELTA
 TIME (SEE TDC1) IS GREATER THAN THE DESIRED TIME, ALARM 1703 IS SET AND THE INTEGRATION
 IS DONE TO THE CURRENT TIME.
 RETURN IS IN BASIC TO THE RETURN ADDRESS PLUS ONE.
 IF THE INTEGRATION IS FINISHED TO THE DESIRED TIME, RETURN IS IN BASIC
 TO THE RETURN ADDRESS
 IN EITHER CASE, BEFORE RETURNING, THE EXTRAPOLATED STATE VECTOR IS TRAN-
 SFERRED FROM R,VATT TO R,VN1-PIPTIME1; IS SET TO THE FINISHING INTRONA-
 TION TIME AND MPAC IS SET TO THE DELTA TIME.
 TION TIME AND MPAC IS SET TO THE DELTA TIME.
 DAT MINUS CURRENT TIME.
 MIDTOV2

0990
 0991
 0992
 0993
 0994
 0995
 0996
 0997
 0998
 0999
 1000
 1001
 1002
 1003
 1004
 1005
 1006
 1007

| | | | | | | | | | | | | |
|-----|----|------|------|---------|-------|---|----------|---------|-------|----------|-------|---------|
| REP | 2 | LAST | 1298 | 13,3573 | 43020 | 1 | MIDTOV2 | STO | CLARG | INSTRN1 | BRANK | INSTRN1 |
| REP | 1 | | | 13,3575 | 04634 | 1 | MIDPLAG | | | INSTRN1 | | |
| REP | 1 | | | 13,3576 | 27612 | 1 | ENTMID2 | | | | | |
| REP | 4 | LAST | 1298 | 13,3600 | 01127 | 1 | MIDTOV1 | STO | SET | INSTRN1 | | |
| REP | 2 | LAST | 1298 | 13,3601 | 04474 | 1 | MIDPLAG | | | INSTRN1 | | |
| REP | 4 | LAST | 1298 | 13,3602 | 43234 | 0 | DAD | | | INSTRN1 | | |
| REP | 27 | LAST | 1293 | 13,3603 | 45505 | 0 | DAD | | | LOADTIME | | |
| REP | 1 | | | 13,3604 | 27114 | 0 | RPL | | | TIMDEL1 | | |
| REP | 53 | LAST | 1297 | 13,3606 | 00041 | 1 | BDSU | | | TDC1 | | |
| REP | 1 | | | 13,3607 | 27616 | 0 | ENTMID1 | | | | | |
| REP | 1 | | | 13,3610 | 77624 | 1 | CALL | | | | | |
| REP | 1 | | | 13,3611 | 27702 | 1 | NOTING | | | | | |
| REP | 26 | LAST | 1298 | 13,3613 | 45505 | 0 | RTB | ENTMID2 | RTB | DAD | | |
| REP | 2 | LAST | 1298 | 13,3614 | 27114 | 0 | LOADTIME | | | LOADTIME | | |
| REP | 54 | LAST | 1298 | 13,3615 | 00041 | 1 | STORE | TDC1 | | TDC1 | | |
| REP | 31 | LAST | 1297 | 13,3617 | 27371 | 1 | CALL | ENTMID1 | CALL | INSTN1 | | |
| REP | 31 | LAST | 1297 | 13,3620 | 45014 | 0 | CLEAR | CALL | | CLEAR | CALL | |

INTEGRATE TO TDC1
 INITIAL CHECK, IS TDC1 IN THE FUTURE
 YES
 NO, SET ALARM, SWITCH TO MIDTOV2

INTEGRATE TO PRESENT TIME PLUS TIMDEL1



L INTEGRATION INITIALIZATION

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| | | | | | | | |
|-------|-----|-----|-----------|---------|----------|--|--|
| 1008 | REP | 16 | LAST 1297 | 13,3621 | 01676 1 | | |
| 1009 | REP | 1 | | 13,3622 | 28034 1 | | |
| 1010 | | | | 13,3623 | 43014 0 | | |
| 1011 | REP | 17 | LAST 1290 | 13,3624 | 01673 1 | | |
| 1012 | REP | 1 | | 13,3625 | 04475 0 | | |
| 1013 | | | | 13,3626 | 77624 1 | | |
| 1014 | REP | 13 | LAST 1297 | 13,3627 | 27113 1 | | |
| 1015 | | | | 13,3630 | 77214 0 | | |
| 1016 | REP | 2 | LAST 1299 | 13,3631 | 04675 1 | | |
| 1017 | REP | 37 | LAST 887 | 13,3632 | 00001 0 | | |
| 1018 | REP | 9 | LAST 790 | 13,3633 | 25232 0 | | |
| 1019 | REP | 24 | LAST 669 | 13,3634 | 00007 0 | | |
| 1020 | REP | 4 | LAST 790 | 13,3635 | 15240 0 | | |
| 1021 | REP | 11 | LAST 889 | 13,3636 | 00015 0 | | |
| 1022 | REP | 8 | LAST 786 | 13,3637 | 01246 0 | | |
| 10221 | | | | 13,3640 | 86134 1 | | |
| 10222 | REP | 15 | LAST 789 | 13,3641 | 03746 1 | | |
| 10223 | REP | 11 | LAST 668 | 13,3642 | 03745 1 | | |
| 1023 | | | | 13,3643 | 77776 1 | | |
| | | | | | | | |
| 1024 | | | | 13,3644 | 0 0004 0 | | |
| 1025 | | | | 13,3645 | 0 0005 1 | | |
| 1026 | REP | 28 | LAST 1066 | 13,3646 | 4 0025 1 | | |
| 1027 | REP | 656 | LAST 1295 | 13,3647 | 20 155 1 | | |
| 1028 | REP | 10 | LAST 1132 | 13,3650 | 0 7226 0 | | |
| | | | | | | | |
| 1029 | REP | 5 | LAST 1298 | 13,3651 | 3 1127 1 | | |
| 1030 | REP | 7 | LAST 565 | 13,3652 | 0 4577 0 | | |
| 1031 | | | | 13,3653 | 47014 1 | | |
| 1032 | REP | 3 | LAST 1298 | 13,3654 | 04754 0 | | |
| 1033 | REP | 1 | | 13,3655 | 27872 1 | | |
| 1034 | REP | 29 | LAST 1298 | 13,3656 | 45505 0 | | |
| 1035 | | | | 13,3657 | 44215 1 | | |
| 1036 | REP | 3 | LAST 1298 | 13,3660 | 27714 0 | | |
| 1037 | REP | 6 | LAST 1293 | 13,3661 | 01101 0 | | |
| 1038 | | | | 13,3662 | 45044 0 | | |
| 1039 | REP | 2 | LAST 1290 | 13,3663 | 27234 1 | | |
| 1040 | REP | 2 | LAST 1298 | 13,3664 | 27702 1 | | |
| | | | | | | | |
| 1041 | | | | 13,3665 | 43234 0 | | |
| 1042 | REP | 30 | LAST 1299 | 13,3666 | 45505 0 | | |
| 1043 | REP | 4 | LAST 1299 | 13,3667 | 27714 0 | | |
| 1044 | REP | 7 | LAST 1299 | 13,3670 | 35101 1 | | |
| 1045 | REP | 3 | LAST 1299 | 13,3671 | 27234 1 | | |
| | | | | | | | |
| 1046 | | | | 13,3672 | 45345 1 | | |
| 1047 | REP | 8 | LAST 1299 | 13,3673 | 01101 0 | | |
| 1048 | REP | 21 | LAST 1297 | 13,3674 | 01517 0 | | |
| 1049 | | | | 13,3675 | 45246 0 | | |
| 1050 | REP | 1 | | 13,3676 | 27712 0 | | |

DIM0FLAG
THISINT
CLEAR SET
INTYPLG
MIDAVPLG
CALL
INTBORV
CLEAR VLOAD
MIDAVPLG
RATT
STOVL RN1
VATT
STODL VN1
TAT
STORE PIPTIME1
SKA,2 SKA,1
RTX2
RTX1
EXIT
INHINT
EXTEND
DCS TIME2
DAS MPAC
TC TPACRSE
CA IRETURN1
TC BANKJUMP
BOF RTB
MID1FLAG
MID2
LOADTIME
DAD RDSJ
TIMEDEL
TDEC
RPL CALL
TESTLOOP
NOTIME
TIMEINC RTB DAD
LOADTIME
TIMEDEL
STCALL TDEC
TESTLOOP
DLOAD DSJ
TDEC
TFT
ARS DSJ
JCSRCS

NO W-MATRIX
LET INTEG. KNOW THE CALL IS FOR MIDTOAV.
OO INTEGRATE
YES

L INTEGRATION INITIALIZATION

| | | | | | | |
|------|-----|---------------|---------|----------|------------|--------------|
| 1051 | | | 13,3677 | 52040 1 | BNN | GOTO |
| 1052 | REP | 4 LAST 1293 | 13,3700 | 27138 0 | | A-PRK |
| 1053 | REP | 1 | 13,3701 | 27665 1 | | TIMING |
| 1054 | | | 13,3702 | 77414 0 | NOTIME | CLEAR |
| 1055 | REP | 4 LAST 1299 | 13,3703 | 04674 0 | | EXIT |
| 1056 | REP | 6 LAST 1299 | 13,3704 | 25=127 1 | | MID1FLAG |
| 1057 | REP | 34 LAST 1161 | 13,3705 | 0 5537 0 | | INCR |
| 1058 | | | 13,3706 | 01703 1 | | IRSTRN1 |
| 1059 | REP | 236 LAST 1294 | 13,3707 | 0 6006 1 | | TC |
| 1060 | | | 13,3710 | 77616 0 | | ALARM |
| | | | | | | 1703 |
| | | | | | | INTPRST |
| | | | | | | RVO |
| 1061 | | | 13,3711 | 00000 1 | 3CSECS | 2DEC |
| 1061 | | | 13,3712 | 00003 1 | | 3 |
| 1062 | | | 13,3713 | 00000 1 | TIMEDELT | 2DEC |
| 1062 | | | 13,3714 | 02342 0 | | 1250 |
| 1063 | | | 27,2662 | | | |
| 1064 | REP | 1 | 27,2660 | | BANK | 27 |
| 1065 | | | 27,2662 | | SETLOC | UPDATE2 |
| 1066 | REP | 1 | 0330 | | BANK | |
| 1067 | REP | 1 | | | EBANK= | INTWAKUO |
| | | | | | COUNT* | 83/INTIN |
| 1068 | REP | 1 | 0330 | | INTWAKUO = | INTWAK10 |
| 1069 | | | 27,2662 | 0 0003 1 | INTWAKUO | RELINT |
| 1070 | | | 27,2663 | 0 0006 1 | | EXTEND |
| 1071 | REP | 2 LAST 1300 | 27,2664 | 22 330 1 | QKCH | INTWAKUO |
| 1072 | REP | 237 LAST 1300 | 27,2665 | 0 6006 1 | TC | INTPRET |
| 1073 | | | 27,2666 | 53135 0 | SLOAD | BZE |
| 1074 | REP | 3 LAST 179 | 27,2667 | 01502 1 | | UPS/FLAG |
| 1075 | REP | 1 | 27,2670 | 56727 0 | | INTWAKUP |
| 1076 | | | 27,2671 | 77775 1 | VLOAD | |
| 1077 | REP | 12 LAST 1297 | 27,2672 | 01503 0 | RRECT | |
| 1078 | REP | 19 LAST 1297 | 27,2673 | 25535 0 | STOVL | RCV |
| 1079 | REP | 6 LAST 1291 | 27,2674 | 01511 0 | | VRECT |
| 1080 | | | 27,2675 | 77624 1 | CALL | |
| 1081 | REP | 5 LAST 1291 | 27,2676 | 23361 1 | | RECTIFY +13D |
| 1082 | | | 27,2677 | 51535 0 | SLOAD | ARS |
| 1083 | REP | 4 LAST 1300 | 27,2700 | 01502 1 | | UPS/FLAG |
| 1084 | | | 27,2701 | 53025 0 | DSU | BZE |
| 1085 | REP | 1 | 27,2702 | 16740 0 | | UPMNSVCD |
| 1086 | REP | 1 | 27,2703 | 56710 1 | | INTWAKEM |
| 1087 | | | 27,2704 | 43174 1 | AKT,2 | CLROO |
| 1088 | | | 27,2705 | 00000 1 | DEC | 0 |
| 1089 | REP | 19 LAST 1291 | 27,2706 | 00223 1 | | MOONFLAG |

TOO LATE

SET ERROR EXIT (CALLOC +2)
INSUFFICIENT TIME FOR INTEGRATION --
TIO WILL BE SLIPPED...

TEMPORARY UNTIL NAME OF INTWAK10 IS CHNG

SAVE 0 FOR RETURN

IS THIS A CSM/LEM STATE VECTOR UPDATE
REQUEST. IF NOT GO TO INTWAKUP.

MOVE RRECT(6) AND VRECT(6) INTO
RCV(6) AND VCV(6) RESPECTIVELY.

NOW GO TO =RECTIFY +13D= TO
STORE VRECT INTO VCV AND ZERO OUT
TDELTA(6), TNUV(6), TC(2) AND XKEP(2)
COMPARE ABSOLUTE VALUE OF =UPS/FLAG=
TO =UPDATE MOON STATE VECTOR CODE=
TO DETERMINE WHETHER THE STATE VECTOR TO
BE UPDATED IS IN THE EARTH OR LUNAR
SPHERE OF INFLUENCE.....
EARTH SPHERE OF INFLUENCE.

L INTEGRATION INITIALIZATION

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| | | | | | | | | |
|-------|-----|-----|-----------|---------|--------|---|----------------|----------|
| 1090 | REP | 1 | | 27,2707 | 56713 | 1 | | INTWAKBC |
| 1091 | | | | 27,2710 | 43174 | 1 | INTWAKEM AXT,2 | SET |
| 1092 | | | | 27,2711 | 00002 | 0 | DEC | 2 |
| 1093 | REP | 20 | LAST 1300 | 27,2712 | 00063 | 1 | | MOONFLAG |
| 1094 | | | | 27,2713 | 50135 | 0 | INTWAKBC SLOAD | BNN |
| A1095 | | | | | | | | |
| 1096 | REP | 5 | LAST 1300 | 27,2714 | 01502 | 1 | | UPSVFLAG |
| 1097 | REP | 1 | | 27,2715 | 56723 | 1 | | INTWAKLM |
| 1098 | | | | 27,2716 | 77624 | 1 | CALL | |
| 1099 | REP | 3 | LAST 1290 | 27,2717 | 26636 | 0 | | ATOPCSM |
| 1100 | | | | 27,2720 | 52014 | 0 | CLEAR | GOTO |
| 1101 | REP | 13 | LAST 1296 | 27,2721 | 01671 | 0 | | ORBNFLAG |
| 1102 | REP | 1 | | 27,2722 | 56725 | 1 | | INTWAKFK |
| 1103 | | | | 27,2723 | 77624 | 1 | INTWAKLM CALL | |
| 1104 | REP | 3 | LAST 1290 | 27,2724 | 26711 | 1 | | ATOPLEM |
| 1105 | | | | 27,2725 | 77614 | 1 | INTWAKEX CLEAR | |
| 1106 | REP | 11 | LAST 1296 | 27,2726 | 02676 | 1 | | RENDWPLG |
| 1107 | | | | 27,2727 | 45131 | 0 | INTWAKUP SSP | CALL |
| 1108 | REP | 6 | LAST 1301 | 27,2730 | 01502 | 1 | | UPSVFLAG |
| 1109 | | | | 27,2731 | 00000 | 1 | | 0 |
| 1110 | REP | 2 | LAST 635 | 27,2732 | 27404 | 1 | | INTWAKEO |
| 1111 | | | | 27,2733 | 77776 | 1 | EXIT | |
| 1112 | REP | 97 | LAST 1294 | 27,2734 | 0 5301 | 0 | TC | PHASCHNG |
| 1113 | | | | 27,2735 | 04026 | 1 | OCT | 04026 |
| 1114 | REP | 3 | LAST 1300 | 27,2736 | 0 0330 | 1 | TC | INTWAKUD |
| 1115 | | | | 27,2737 | 00002 | 0 | UPMNSVCD OCT | 2 |
| 1116 | | | | 27,2740 | 00000 | 1 | OCT | 0 |
| 1117 | | | | 27,2741 | 77420 | 1 | GRP2PC STO | EXIT |
| 1118 | REP | 3 | LAST 120 | 27,2742 | 03536 | 1 | | GRP2SVO |
| 1119 | REP | 98 | LAST 1301 | 27,2743 | 0 5301 | 0 | TC | PHASCHNG |
| 1120 | | | | 27,2744 | 04022 | 0 | OCT | 04022 |
| 1121 | REP | 236 | LAST 1300 | 27,2745 | 0 6006 | 1 | TC | INTPRST |
| 1122 | | | | 27,2746 | 77650 | 1 | GOTO | |
| 1123 | REP | 4 | LAST 1301 | 27,2747 | 03536 | 1 | | GRP2SVO |

LUNAR SPHERE OF INFLUENCE.

COMMON CODING AFTER X2 INITIALIZED AND MOONFLAG SET (OR CLEARED). IS THIS A REQUEST FOR A LEM OR CSM STATE VECTOR UPDATE..... UPDATE CSM STATE VECTOR

UPDATE LM STATE VECTOR

REMOVE 'UPDATE STATE VECTOR INDICATOR'

RELEASE 'GRAB' OF ORBIT INTEG



L ORBITAL INTEGRATION

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| NO | REP | DELETES | ADDRESS | DATA | OPERATION | PARAMETERS | PL |
|------|--------|-----------|---------|---------|----------------|------------|--------|
| 0001 | | DELETES | | | | | |
| 0002 | | | 13,3715 | | | | |
| 0003 | REP 1 | | 11,2000 | | BANK 13 | | |
| 0004 | | | 11,2310 | | SETLOC ORBITAL | | |
| 0005 | REP 1 | | | | BANK | | |
| 0006 | | DELETES | | | COUNT 11/ORBIT | | |
| 0007 | | | 11,2310 | 40354 1 | KEPPREP LXA,2 | SETPD | |
| 0008 | REP 10 | LAST 1292 | 11,2311 | 02150 1 | | PRODY | |
| 0009 | | | 11,2312 | 00001 0 | | 0 | |
| 0010 | | | 11,2313 | 75543 1 | DLOAD* | SCRT | PL 2D |
| 0011 | REP 4 | LAST 1292 | 11,2314 | 50041 1 | | MUEARTH,2 | |
| 0012 | | | 11,2315 | 53515 0 | PDVL | UNIT | PL 8D |
| 0013 | REP 20 | LAST 1300 | 11,2316 | 01535 0 | | RCV | |
| 0014 | | | 11,2317 | 00325 0 | PDDL | NORM | PL 4D |
| 0015 | | | 11,2320 | 00045 0 | | 36D | |
| 0016 | REP 85 | LAST 1288 | 11,2321 | 00047 1 | | X1 | |
| 0017 | | | 11,2322 | 77715 1 | PDVL | | |
| 0018 | | | 11,2323 | 65241 0 | DOT | PDDL | |
| 0019 | REP 15 | LAST 1287 | 11,2324 | 01543 1 | | VCV | PL 6D |
| 0020 | REP 8 | LAST 1291 | 11,2325 | 02312 0 | | TMU | |
| 0021 | | | 11,2326 | 00225 1 | DSU | NORM | |
| 0022 | REP 9 | LAST 1291 | 11,2327 | 01551 1 | | TC | |
| 0023 | REP 44 | LAST 1228 | 11,2330 | 00051 0 | | S1 | |
| 0024 | | | 11,2331 | 77742 0 | SR1 | | |
| 0025 | | | 11,2332 | 65271 0 | DDV | PDDL | |
| 0026 | | | 11,2333 | 00003 1 | | 2D | |
| 0027 | | | 11,2334 | 41405 0 | DMP | PUSH | PL 8D |
| 0028 | | | 11,2335 | 00005 1 | | 4D | |
| 0029 | | | 11,2336 | 65316 0 | DSO | PDDL | PL 10D |
| 0030 | | | 11,2337 | 00005 1 | | 4D | |
| 0031 | | | 11,2340 | 64716 0 | DSO | PDDL* | |
| 0032 | REP 5 | LAST 1302 | 11,2341 | 50041 1 | | MUEARTH,2 | PL 12D |
| 0033 | | | 11,2342 | 40442 1 | SR3 | | |
| 0034 | | | 11,2343 | 47515 0 | PDVL | SR4 | |
| 0035 | REP 16 | LAST 1302 | 11,2344 | 01543 1 | | VSC | PL 14D |
| 0036 | | | 11,2345 | 44205 0 | DMP | RDSU | PL 12D |
| 0037 | | | 11,2346 | 00045 0 | | 36D | |
| 0038 | | | 11,2347 | 41271 0 | DDV | DMP | PL 10D |
| 0039 | | | 11,2350 | 00003 1 | | 2D | |
| 0040 | | | 11,2351 | 53605 1 | DMP | SL* | |
| 0041 | REP 1 | | 11,2352 | 23717 1 | | DP2/3 | |
| 0042 | | | 11,2353 | 20176 0 | | 0 -3,1 | |
| 0043 | | | 11,2354 | 43280 1 | XSU,1 | DAD | |
| 0044 | REP 45 | LAST 1302 | 11,2355 | 00050 1 | | S1 | |
| 0045 | | | 11,2356 | 45257 0 | SL* | DSU | |
| 0046 | | | 11,2357 | 20211 1 | | 8D,1 | |
| 0047 | | | 11,2360 | 41205 0 | DMP | DMP | |
| 0048 | | | 11,2361 | 00001 0 | | 0D | |
| 0049 | | | 11,2362 | 00005 1 | | 4D | |
| 0050 | | | 11,2363 | 53657 0 | SL* | SL* | |

SORT(MJ) (+18 OR +15) 0D PL 2D
 NORM R (+29 OR +27 - N1) 2D PL 4D
 P*SORT(MJ)(+7 OR+5) 4D PL 6D
 (+28)
 FS(+6 +N1-N2) 6D PL 8D
 (FS)SQ(+12 +2(N1-N2)) 8D PL 10D
 SSQ/MJ(-2OR +2(N1-N2)) 10D PL 12D
 PREALIGN MJ (+43 OR +37) 12D PL 14D
 PL 12D
 PL 10D
 -(1/R-ALPHA)(+12 +3N1-2N2)
 10L(1/R-ALPHA)(+13 +2(N1-N2))
 2(FS)SQ - ETCETRA PL 8D
 X1 = N2-N1
 -FS+2(FS)SQ ETC (+6 +N1-N2) PL 6D



L ORBITAL INTEGRATION

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| | | | | |
|------|-----|----|---------|---------|
| 0051 | | | 11,2364 | 20211 1 |
| 0052 | | | 11,2365 | 20201 0 |
| 0053 | | | 11,2366 | 65215 1 |
| 0054 | REP | 2 | LAST | 84 |
| 0055 | | | 11,2387 | 01553 0 |
| 0056 | | | 11,2370 | 63605 1 |
| 0057 | | | 11,2371 | 00001 0 |
| 0058 | | | 11,2372 | 20202 0 |
| 0059 | REP | 10 | LAST | 1229 |
| 0060 | | | 11,2374 | 57343 1 |
| 0061 | REP | 4 | LAST | 1251 |
| 0062 | | | 11,2375 | 77628 0 |
| 0063 | REP | 3 | LAST | 1253 |
| 0064 | | | 11,2376 | 75471 1 |
| 0065 | | | 11,2377 | 74020 0 |
| 0066 | REP | 3 | LAST | 1253 |
| 0067 | | | 11,2400 | 02270 0 |
| 0068 | | | 11,2401 | 00012 1 |
| 0069 | REP | 21 | LAST | 1301 |
| 0070 | REP | 2 | LAST | 1303 |

| | | |
|-------|-----------|----------------------------------|
| | SD,1 | |
| | 0,1 | S(-PS(1-2PS)-1/6...)(+17 OR +16) |
| DAD | FDDL | PL 8D |
| | XKEP | |
| DMP | SL* | S(+17 OR +16) |
| | OD | |
| | 1,1 | |
| BOVB | DAD | |
| | TC DANZIG | |
| STADR | | |
| STORE | XKEPNEW | |
| STO | AXC,1 | |
| | KEPRTN | |
| DEC | 10 | |
| BON | AXC,1 | |
| | MOONFLAG | |
| | KEPLERN | |
| DEC | 2 | |
| GOTO | | |
| | KEPLERN | |



L ORBITAL INTEGRATION

| | | | | | | | |
|------|-----|----|-----------|---------|---------|--------|---------|
| 0071 | | | 11,2410 | 66350 1 | FBR3 | LXA,1 | SSP |
| 0072 | REP | 18 | LAST 1286 | 11,2411 | 01500 0 | | DIFBQNT |
| 0073 | REP | 46 | LAST 1302 | 11,2412 | 00051 0 | | S1 |
| 0074 | | | | 11,2413 | 77762 1 | DEC | -13 |
| 0075 | | | | 11,2414 | 54345 1 | DLOAD | SR |
| 0076 | REP | 9 | LAST 1293 | 11,2415 | 02314 0 | | DT/2 |
| 0077 | | | | 11,2416 | 20612 0 | | 9D |
| 0078 | | | | 11,2417 | 61500 0 | TIX,1 | ROUND |
| 0079 | | | | 11,2420 | 22421 0 | | +1 |
| 0080 | | | | 11,2421 | 43206 1 | PUSH | DAD |
| 0081 | REP | 10 | LAST 1302 | 11,2422 | 01551 1 | | TC |
| 0082 | REP | 9 | LAST 1302 | 11,2423 | 16312 0 | STOCL | TAU. |
| 0083 | | | | 11,2424 | 77615 0 | DAD | |
| 0084 | REP | 22 | LAST 1299 | 11,2425 | 01517 0 | | TST |
| 0085 | REP | 23 | LAST 1304 | 11,2426 | 35517 1 | STCALL | TST |
| 0086 | REP | 2 | LAST 1291 | 11,2427 | 22310 0 | | KEPPREP |

L ORBITAL INTEGRATION

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| PC087 | AGC ROUTINE TO COMPUTE ACCELERATION COMPONENTS. | | | | | | |
|-------|---|---------|-------|---|--------|--------|----------|
| 0088 | | 11,2430 | 73150 | 1 | ACCOMP | LXA,1 | LXA,2 |
| 0089 | REP 11 LAST 1302 | 11,2431 | 02150 | 1 | | | PBODY |
| 0090 | REP 12 LAST 1305 | 11,2432 | 02150 | 1 | | | PBODY |
| 0091 | | 11,2433 | 77775 | 1 | | VLOAD | |
| 0092 | REP 10 LAST 1289 | 11,2434 | 11456 | 0 | | | ZEROVEC |
| 0093 | REP 2 LAST 87 | 11,2435 | 26202 | 0 | | STOVL | PV |
| 0094 | REP 32 LAST 1209 | 11,2436 | 02152 | 0 | | | ALPHAV |
| 0095 | | 11,2437 | 53257 | 1 | | VSL* | VAD |
| 0096 | | 11,2440 | 57605 | 0 | | | 0 -7,2 |
| 0097 | REP 21 LAST 1302 | 11,2441 | 01535 | 0 | | | NOV |
| 0098 | REP 2 LAST 87 | 11,2442 | 02160 | 1 | | STORE | BETAV |
| 0099 | | 11,2443 | 65014 | 1 | | ROP | XCHK,2 |
| 0100 | REP 17 LAST 1299 | 11,2444 | 01756 | 1 | | | DIM0FLAG |
| 0101 | | 11,2445 | 22452 | 1 | | | +5 |
| 0102 | REP 19 LAST 1304 | 11,2446 | 01500 | 0 | | | DIFBQNT |
| 0103 | REP 7 LAST 87 | 11,2447 | 12217 | 0 | | STORE | VECTAB,2 |
| 0104 | | 11,2450 | 77724 | 0 | | XCHK,2 | |
| 0105 | REP 20 LAST 1305 | 11,2451 | 01500 | 0 | | | DIFBQNT |
| 0106 | | 11,2452 | 53575 | 0 | | VLOAD | UNIT |
| 0107 | REP 33 LAST 1305 | 11,2453 | 02152 | 0 | | | ALPHAV |
| 0108 | REP 34 LAST 1305 | 11,2454 | 16152 | 0 | | STOVL | ALPHAV |
| 0109 | | 11,2455 | 00045 | 0 | | | 36D |
| 0110 | REP 4 LAST 1207 | 11,2456 | 02310 | 1 | | STORE | ALPHAM |
| 0111 | | 11,2457 | 77624 | 1 | | CALL | |
| 0112 | REP 1 | 11,2460 | 22562 | 0 | | | GAMCOMP |
| 0113 | | 11,2461 | 66175 | 1 | | VLOAD | SXA,1 |
| 0114 | REP 3 LAST 1305 | 11,2462 | 02160 | 1 | | | BETAV |
| 0115 | REP 33 LAST 1286 | 11,2463 | 00051 | 0 | | | S2 |
| 0116 | REP 35 LAST 1305 | 11,2464 | 16152 | 0 | | STOVL | ALPHAV |
| 0117 | REP 2 LAST 87 | 11,2465 | 02210 | 0 | | | BETAM |
| 0118 | REP 5 LAST 1305 | 11,2466 | 02310 | 1 | | STORE | ALPHAM |
| 0119 | | 11,2467 | 71214 | 0 | | ROP | DLOAD |
| 0120 | REP 3 LAST 1292 | 11,2470 | 00342 | 1 | | | MIDFLAG |
| 0121 | REP 1 | 11,2471 | 22725 | 1 | | | OBLATE |
| 0122 | REP 24 LAST 1304 | 11,2472 | 01517 | 0 | | | TST |
| 0123 | | 11,2473 | 77624 | 1 | | CALL | |
| 0124 | REP 2 LAST 704 | 11,2474 | 54110 | 0 | | | LSPOS |
| 0125 | | 11,2475 | 72174 | 0 | | AXT,2 | LXA,1 |
| 0126 | | 11,2476 | 00002 | 0 | | | 2 |
| 0127 | REP 34 LAST 1305 | 11,2477 | 00051 | 0 | | | S2 |
| 0128 | | 11,2500 | 77614 | 1 | | ROP | |
| 0129 | REP 22 LAST 1303 | 11,2501 | 00343 | 0 | | | MOONFLAG |
| 0130 | | 11,2502 | 22505 | 1 | | | +3 |
| 0131 | | 11,2503 | 77076 | 0 | | VCOMP | AXT,2 |
| 0132 | | 11,2504 | 00000 | 1 | | | 0 |
| 0133 | REP 4 LAST 1305 | 11,2505 | 02160 | 1 | | STORE | BETAV |
| 0134 | REP 3 LAST 87 | 11,2506 | 26283 | 1 | | STOVL | RPOV |

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| | | | | | | |
|------|------|--------------|---------|---------|---------------|-------------|
| 0135 | | | 11,2507 | 00003 1 | | |
| 0136 | RESP | 2 LAST 87 | 11,2510 | 02300 0 | STORE | RPSV |
| 0137 | | | 11,2511 | 45335 0 | SLOAD | DSU |
| 0138 | RESP | 14 LAST 1293 | 11,2512 | 01012 0 | | MODREG |
| 0139 | RESP | 1 | 11,2513 | 23121 1 | | OCT27 |
| 0140 | | | 11,2814 | 43030 0 | BHIZ | BOP |
| 0141 | | | 11,2515 | 22520 0 | | +3 |
| 0142 | RESP | 18 LAST 1305 | 11,2516 | 01156 1 | | DIM0FLAG |
| 0143 | RESP | 1 | 11,2517 | 22534 0 | | GETRPSV |
| 0144 | | | 11,2520 | 14315 0 | VLOAD | VXSC |
| 0145 | RESP | 36 LAST 1305 | 11,2521 | 02152 0 | | ALPHAV |
| 0146 | RESP | 6 LAST 1305 | 11,2522 | 02310 1 | | ALPHAN |
| 0147 | | | 11,2523 | 52257 0 | VSR* | VSU |
| 0148 | | | 11,2524 | 57175 0 | | 1,2 |
| 0149 | RESP | 5 LAST 1305 | 11,2525 | 02160 1 | | BETA |
| 0150 | | | 11,2526 | 17124 0 | XCRX,2 | |
| 0151 | RESP | 21 LAST 1305 | 11,2527 | 01500 0 | | DIPEOCNT |
| 0152 | RESP | 8 LAST 1305 | 11,2530 | 12225 1 | STORE | VECTAR +0,2 |
| 0154 | RESP | 5 LAST 014 | 11,2531 | 02372 1 | STORE | ROVV |
| 0155 | | | 11,2532 | 71724 0 | XCRX,2 | |
| 0156 | RESP | 22 LAST 1306 | 11,2533 | 01500 0 | | DIPEOCNT |
| 0157 | | | 11,2534 | 62175 0 | GETRPSV VLOAD | INCR,1 |
| 0158 | RESP | 4 LAST 1305 | 11,2535 | 02263 1 | | RPOV |
| 0159 | | | 11,2536 | 00004 0 | | 4 |
| 0180 | | | 11,2531 | 43014 0 | CLEAR | BOP |
| 0161 | RESP | 3 LAST 1290 | 11,2540 | 04260 1 | | RPOFLAG |
| 0162 | RESP | 23 LAST 1305 | 11,2541 | 00343 0 | | MOONFLAG |
| 0163 | | | 11,2542 | 22541 1 | | +5 |
| 0164 | | | 11,2543 | 53281 1 | VSR | VAD |
| 0165 | | | 11,2544 | 20812 0 | | 9D |
| 0166 | RESP | 3 LAST 1306 | 11,2545 | 02300 0 | | RPSV |
| 0167 | RESP | 4 LAST 1306 | 11,2548 | 02300 0 | STORE | RPSV |
| 0168 | | | 11,2541 | 17824 1 | CALL | |
| 0169 | RESP | 2 LAST 1305 | 11,2550 | 22502 0 | | GAMCOMP |
| 0110 | | | 11,2551 | 62114 1 | AKT,2 | INCR,1 |
| 0171 | | | 11,2552 | 00004 0 | | 4 |
| 0112 | | | 11,2553 | 00004 0 | | 4 |
| 0113 | | | 11,2554 | 77175 1 | VLOAD | |
| 0114 | RESP | 5 LAST 1306 | 11,2555 | 02300 0 | | RPSV |
| 0115 | RESP | 6 LAST 1306 | 11,2556 | 38160 0 | STCALL | BETA |
| 0116 | RESP | 3 LAST 1306 | 11,2551 | 22562 0 | | GAMCOMP |
| 0177 | | | 11,2560 | 71650 1 | GOTO | |
| 0178 | RESP | 2 LAST 1305 | 11,2561 | 23725 1 | | ORLATE |
| 0179 | | | 11,2562 | 74575 0 | GAMCOMP VLOAD | VSR1 |
| 0180 | RESP | 7 LAST 1306 | 11,2563 | 02180 1 | | BETA |
| 0181 | | | 11,2564 | 40238 1 | VSO | SETPD |
| 0182 | | | 11,2565 | 00001 0 | | 0 |
| 0183 | | | 11,2566 | 61501 1 | NORM | ROUND |
| 0164 | | | 11,2567 | 00040 0 | | 31D |
| 0185 | | | 11,2570 | 60325 0 | PDDL | NORM |

NORMED R SQUARED TO PD LIST



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| | | | | | |
|-------|------|----|-----------|---------|---------|
| 0186 | RESP | 7 | LAST 1306 | 11,2571 | 02310 1 |
| 0187 | | | | 11,2572 | 00041 1 |
| 0188 | | | | 11,2573 | 03342 1 |
| 0189 | RESP | 8 | LAST 1306 | 11,2574 | 02160 1 |
| 0190 | | | | 11,2575 | 77656 1 |
| 0191 | RESP | 9 | LAST 1307 | 11,2576 | 16160 1 |
| 0192 | | | | 11,2577 | 00045 0 |
| 0193 | RESP | 3 | LAST 1305 | 11,2600 | 02210 0 |
| 0194 | | | | 11,2601 | 55301 0 |
| 0195 | | | | 11,2602 | 00042 1 |
| 0196 | | | | 11,2603 | 41562 0 |
| 0197 | | | | 11,2604 | 77743 1 |
| 0198 | RESP | 1 | | 11,2605 | 27730 0 |
| 0199 | RESP | 47 | LAST 1304 | 11,2606 | 00051 0 |
| 0200 | | | | 11,2607 | 57124 1 |
| 0201 | RESP | 46 | LAST 1307 | 11,2610 | 00050 1 |
| 0202 | | | | 11,2611 | 00040 0 |
| 0203 | | | | 11,2612 | 71264 1 |
| 0204 | | | | 11,2613 | 00041 1 |
| 0205 | | | | 11,2614 | 00003 1 |
| 0206 | | | | 11,2615 | 65057 0 |
| 0207 | | | | 11,2616 | 57177 1 |
| 0208 | RESP | 49 | LAST 1307 | 11,2617 | 00050 1 |
| 0209 | | | | 11,2620 | 74406 0 |
| 0210 | | | | 11,2621 | 50315 0 |
| 0211 | RESP | 37 | LAST 1306 | 11,2622 | 02152 0 |
| 0212 | RESP | 10 | LAST 1307 | 11,2623 | 02160 1 |
| 0213 | | | | 11,2624 | 44372 1 |
| 0214 | | | | 11,2625 | 57208 1 |
| 0215 | | | | 11,2626 | 00005 1 |
| 02155 | | | | 11,2627 | 77752 1 |
| 0216 | | | | 11,2630 | 43206 1 |
| 0217 | RESP | 1 | | 11,2631 | 23701 0 |
| 0218 | | | | 11,2632 | 75406 1 |
| 0219 | | | | 11,2633 | 41475 1 |
| 0220 | | | | 11,2634 | 00013 0 |
| 0221 | | | | 11,2635 | 43352 1 |
| 0222 | RESP | 2 | LAST 1307 | 11,2636 | 23701 0 |
| 0223 | | | | 11,2637 | 43325 1 |
| 0224 | | | | 11,2640 | 00013 0 |
| 0225 | RESP | 1 | | 11,2641 | 11454 1 |
| 0226 | | | | 11,2642 | 72475 1 |
| 0227 | | | | 11,2643 | 00011 1 |
| 0228 | | | | 11,2644 | 56215 1 |
| 0229 | RESP | 1 | | 11,2645 | 23673 1 |
| 0230 | | | | 11,2646 | 00017 1 |
| 0231 | | | | 11,2647 | 74275 1 |
| 0232 | | | | 11,2650 | 00007 0 |
| 0233 | RESP | 11 | LAST 1307 | 11,2651 | 02160 1 |
| 0234 | | | | 11,2652 | 64515 1 |

| | |
|--------|----------|
| | ALPHAM |
| | 32D |
| SR1 | PDVL |
| | BETA |
| UNIT | |
| STOCL | BETA |
| | 36D |
| STORE | BETAM |
| NORM | BETA |
| | 33D |
| SR1R | PUSH |
| DLOAD* | |
| | ASCALE,1 |
| STORE | S1 |
| XCHK,2 | XAD,2 |
| | S1 |
| | 32D |
| XSU,2 | DLOAD |
| | 33D |
| | 2D |
| SR* | XCHK,2 |
| | 0 -1,2 |
| | S1 |
| PUSH | SR1R |
| PDVL | DOT |
| | ALPHAV |
| | BETA |
| SL1R | BDSU |
| PUSH | DMPR |
| | 4 |
| SL1 | |
| PUSH | DAD |
| | DQUARTER |
| PUSH | SQRT |
| DMPR | PUSH |
| | 10D |
| SL1 | DAD |
| | DQUARTER |
| PDVL | DAD |
| | 10D |
| | HALFDP |
| DMPR | SL1 |
| | 8D |
| DAD | DDV |
| | THREE/8 |
| | 14D |
| DMPR | VXSC |
| | 6 |
| | BETA |
| PDVL | VSR3 |

NORMALIZE (LESS ONE) LENGTH OF ALPHA
SAVING NORM SCALE FACTOR IN X1

C(PDL+2) = ALMOST NORMED ALPHA

FORM NORMALIZED QUOTIENT ALPHAM/BETAM

C(PDL+2) = ALMOST NORMALIZED RHO.

RHO/4 TO 4D

(RHO/4) - 2(ALPHAV/2.BETA/2)
TO PDL+6

(1/4)+2((0+1)/4) TO PD+14D

(0/2)(C(PD+4))R/2 TO PD+16D



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| | | | | | | | |
|--------|-----|----|-----------|---------|---------|---------|-----------|
| 0235 | REP | 38 | LAST 1307 | 11,2653 | 02152 0 | | |
| 0236 | | | | 11,2654 | 41455 0 | VAD | ALPHAV |
| 0237 | | | | 11,2655 | 41345 0 | DLOAD | PUSH |
| 0238 | | | | 11,2656 | 00001 0 | | DMP |
| 0239 | | | | 11,2657 | 00015 0 | | 0 |
| 0240 | | | | 11,2660 | 61501 1 | NORM | 12D |
| 0241 | | | | 11,2661 | 00037 0 | | ROUND |
| 0242 | | | | 11,2662 | 40865 0 | RDDV | 30D |
| 0243 | | | | 11,2663 | 00003 1 | | DMP* |
| 0244 | REP | 6 | LAST 1302 | 11,2664 | 50041 1 | | 2 |
| 0245 | | | | 11,2665 | 74276 1 | DCOMP | MUBARTH,2 |
| 0246 | | | | 11,2666 | 57124 1 | XCRK,2 | VXSC |
| 0247 | REP | 50 | LAST 1307 | 11,2667 | 00050 1 | | XAD,2 |
| 0248 | REP | 35 | LAST 1305 | 11,2670 | 00051 0 | | S1 |
| 0249 | | | | 11,2671 | 55064 0 | XSU,2 | S2 |
| 0250 | | | | 11,2672 | 00036 1 | | 30D |
| 0251 | | | | 11,2673 | 00037 0 | | 31D |
| 02513 | | | | 11,2674 | 77600 1 | BOV | |
| 02516 | | | | 11,2675 | 22676 0 | | +1 |
| 0252 | | | | 11,2676 | 65057 0 | VSR* | XCRK,2 |
| 0253 | | | | 11,2677 | 57177 1 | | 0 -1,2 |
| 0254 | REP | 51 | LAST 1308 | 11,2700 | 00050 1 | | S1 |
| 0255 | | | | 11,2701 | 77655 1 | VAD | |
| 0256 | REP | 3 | LAST 1305 | 11,2702 | 02202 0 | | PV |
| 0257 | REP | 4 | LAST 1308 | 11,2703 | 02202 0 | STORE | PV |
| 025805 | | | | 11,2704 | 43400 1 | ROV | RVO |
| 02581 | | | | 11,2705 | 22706 0 | | +1 |
| 025815 | | | | 11,2706 | 54345 1 | GORALUE | DLOAD |
| 02582 | REP | 2 | LAST 87 | 11,2707 | 02212 1 | | SR |
| 025825 | | | | 11,2710 | 20612 0 | | H |
| 02583 | | | | 11,2711 | 44206 0 | | 9D |
| 025835 | REP | 11 | LAST 1304 | 11,2712 | 01551 1 | PUSH | ROSU |
| 02584 | REP | 10 | LAST 1304 | 11,2713 | 16312 0 | | TC |
| 025845 | REP | 25 | LAST 1305 | 11,2714 | 01517 0 | STOCL | TAU |
| 02585 | | | | 11,2715 | 45425 0 | | TET |
| 025855 | REP | 26 | LAST 1308 | 11,2716 | 42260 0 | DSU | STADR |
| 02586 | REP | 3 | LAST 1304 | 11,2717 | 22310 0 | STCALL | TET |
| 025865 | | | | 11,2720 | 77624 1 | CALL | KEPPREP |
| 02587 | REP | 6 | LAST 1300 | 11,2721 | 23344 0 | | RECTIFY |
| 025875 | | | | 11,2722 | 77614 1 | STGO | |
| 02588 | REP | 4 | LAST 1308 | 11,2723 | 04020 1 | | RPOFLAG |
| 025885 | REP | 4 | LAST 1299 | 11,2724 | 27234 1 | | TESTLOOP |

A12 + C(PD+16D) TO PD+16D

CLEAR OVIND

RETURN IF NO OVERFLOW



L ORBITAL INTORATION

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P0259 THE OBLATE ROUTINE COMPUTES THE ACCELERATION DUE TO OBLATENESS. IT USES THE UNIT OF THE VEHICLE
 R0261 POSITION VECTOR FOUND IN ALPHAV AND THE DISTANCE TO THE CENTER IN ALPHAM. THIS IS ADDED TO THE SUM OF THE
 R0263 DISTURBING ACCELERATIONS IN PV AND THE PROPER DIPEQ STAGE IS CALLED VIA X1.

| | | | | | | | | |
|------|-----|----|-----------|---------|--------|-------|----------|-------------------------|
| 0265 | | | 11,2725 | 71354 0 | OBLATE | LXA,2 | DLOAD | |
| 0266 | REP | 13 | LAST 1305 | 11,2726 | | | PBODY | |
| 0267 | REP | 8 | LAST 1307 | 11,2727 | | | ALPHAM | |
| 0268 | | | | 11,2730 | | | DSL# | |
| 0269 | | | | 11,2731 | | | 0 | |
| 0270 | REP | 1 | | 11,2732 | | | RE,2 | |
| 0271 | | | | 11,2733 | | BPL | BOP | GET URPV |
| 0272 | REP | 1 | | 11,2734 | | | NBRANCH | |
| 0273 | REP | 24 | LAST 1308 | 11,2735 | | | MOONFLAG | |
| 0274 | REP | 1 | | 11,2736 | | | COSPHI | |
| 0275 | | | | 11,2737 | | VLOAD | PDDL | |
| 0276 | REP | 39 | LAST 1308 | 11,2740 | | | ALPHAV | |
| 0277 | REP | 27 | LAST 1308 | 11,2741 | | | TST | |
| 0278 | | | | 11,2742 | | PDDL | CALL | |
| 0279 | REP | 1 | | 11,2743 | | | 3/5 | |
| 0280 | REP | 4 | LAST 1208 | 11,2744 | | | R-TO-RP | |
| 0284 | REP | 1 | | 11,2745 | | STORE | URPV | |
| 0285 | | | | 11,2746 | | VLOAD | VXV | |
| 0286 | REP | 3 | LAST 1215 | 11,2747 | | | S04LM | |
| 0287 | REP | 3 | LAST 1287 | 11,2750 | | | ZUNIT | |
| 0288 | | | | 11,2751 | | VAD | VXM | |
| 0289 | REP | 4 | LAST 1309 | 11,2752 | | | ZUNIT | |
| 0290 | REP | 8 | LAST 1218 | 11,2753 | | | MMATRIX | |
| 0291 | | | | 11,2754 | | UNIT | | POSSIBLY UNNECESSARY |
| 0292 | REP | 1 | | 11,2755 | | STORE | UZ | |
| 0293 | | | | 11,2756 | | DLOAD | DMPR | |
| 0294 | REP | 1 | | 11,2757 | | | COSPHI/2 | |
| 0295 | REP | 1 | | 11,2760 | | | 3/32 | |
| 0296 | | | | 11,2761 | | PDDL | DSQ | P2/64 TO PD0 |
| 0297 | REP | 2 | LAST 1309 | 11,2762 | | | COSPHI/2 | |
| 0298 | | | | 11,2763 | | DMPR | DSJ | |
| 0299 | REP | 1 | | 11,2764 | | | 15/16 | |
| 0300 | REP | 1 | | 11,2765 | | | 3/64 | |
| 0301 | | | | 11,2766 | | PUSH | DMPR | P3/32 TO PD2 |
| 0302 | REP | 3 | LAST 1309 | 11,2767 | | | COSPHI/2 | |
| 0303 | | | | 11,2770 | | DMP | SL1R | |
| 0304 | REP | 1 | | 11,2771 | | | 7/12 | |
| 0305 | | | | 11,2772 | | PDDL | DMPR | |
| 0306 | | | | 11,2773 | | | 0 | |
| 0307 | REP | 1 | | 11,2774 | | | 2/3 | |
| 0308 | | | | 11,2775 | | BDSJ | PUSH | P4/128 TO PD4 |
| 0309 | | | | 11,2776 | | DMPR | DMPR | |
| 0310 | REP | 4 | LAST 1309 | 11,2777 | | | COSPHI/2 | BEGIN COMPUTING P5/1024 |
| 0311 | REP | 1 | | 11,3000 | | | 9/16 | |
| 0312 | | | | 11,3001 | | PDDL | DMPR | |
| 0313 | | | | 11,3002 | | | 2 | |
| 0314 | REP | 1 | | 11,3003 | | | 5/128 | |



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| | | | |
|------|------------------|---------|---------|
| 0315 | | 11,3004 | 77621 1 |
| 0316 | | 11,3005 | 77603 1 |
| 0317 | REP 1 | 11,3006 | 50035 1 |
| 0318 | | 11,3007 | 43271 1 |
| 0319 | REP 9 LAST 1309 | 11,3010 | 02310 1 |
| 0320 | | 11,3011 | 00005 1 |
| 0321 | | 11,3012 | 58273 1 |
| 0322 | REP 1 | 11,3013 | 50031 0 |
| 0323 | REP 10 LAST 1310 | 11,3014 | 02310 1 |
| 0324 | | 11,3015 | 74215 1 |
| 0325 | | 11,3016 | 00003 1 |
| 0326 | REP 40 LAST 1309 | 11,3017 | 02152 0 |
| 0327 | REP 1 | 11,3020 | 14033 1 |
| 0328 | | 11,3021 | 70403 1 |
| 0329 | REP 2 LAST 1310 | 11,3022 | 50035 1 |
| 0330 | | 11,3023 | 43271 1 |
| 0331 | REP 11 LAST 1310 | 11,3024 | 02310 1 |
| 0332 | | 11,3025 | 50473 1 |
| 0333 | REP 2 LAST 1310 | 11,3026 | 50031 0 |
| 0334 | | 11,3027 | 43271 1 |
| 0335 | REP 12 LAST 1310 | 11,3030 | 02310 1 |
| 0336 | | 11,3031 | 76561 1 |
| 0337 | REP 2 LAST 1309 | 11,3032 | 00025 0 |
| 0338 | | 11,3033 | 77645 0 |
| 0339 | REP 2 LAST 1310 | 11,3034 | 00033 1 |
| 0340 | REP 3 LAST 1310 | 11,3035 | 14033 1 |
| 0341 | REP 13 LAST 1310 | 11,3036 | 02310 1 |
| 0342 | | 11,3037 | 63501 0 |
| 0343 | REP 86 LAST 1302 | 11,3040 | 00047 1 |
| 0344 | | 11,3041 | 60316 0 |
| 0345 | REP 52 LAST 1308 | 11,3042 | 00051 0 |
| 0346 | | 11,3043 | 54606 0 |
| 0347 | REP 1 | 11,3044 | 50025 0 |
| 0348 | | 11,3045 | 77761 1 |
| 0349 | REP 4 LAST 1310 | 11,3046 | 00033 1 |
| 0350 | REP 5 LAST 1310 | 11,3047 | 00033 1 |
| 0351 | | 11,3050 | 58070 0 |
| 0352 | REP 87 LAST 1310 | 11,3051 | 00046 0 |
| 0353 | REP 88 LAST 1310 | 11,3052 | 00046 0 |
| 0354 | | 11,3053 | 43070 1 |
| 0355 | REP 53 LAST 1310 | 11,3054 | 00050 1 |
| 0356 | REP 25 LAST 1309 | 11,3055 | 00343 0 |
| 0357 | REP 1 | 11,3056 | 23125 0 |
| 0358 | | 11,3057 | 63545 0 |
| 0359 | REP 2 LAST 1309 | 11,3060 | 00017 1 |
| 0360 | | 11,3061 | 63525 0 |
| 0361 | REP 3 LAST 1310 | 11,3062 | 00021 1 |
| 0362 | | 11,3063 | 65215 1 |
| 0363 | | 11,3064 | 00003 1 |
| 0364 | | 11,3065 | 45352 1 |

BDSU
DMP* JAREQ/J3,2
DDV DAD
ALPHAM
4
DMPR* DDV
2J3RE/J2,2
ALPHAM
DAD VXSC
2
ALPHAV
STOOL TVEC
DMP* SR1
JAREQ/J3,2
DDV DAD
ALPHAM
DMPR* SR3
2J3RE/J2,2
DDV DAD
ALPHAM
VXSC VSL1
UZ
BVSU TVEC
STOOL TVEC
ALPHAM
NORM DSO
X1
DSO NORM
S1
PUSH BDDV*
J2REBQSQ,2
VXSC TVEC
STORE TVEC
XAD,1 XAD,1
X1
X1
XAD,1 BOP
S1
MOONFLAG
NBRANCH1
DLOAD DSO
URPV
PDDL DSO
URPV +2
DAD PDDL
2D
SL1 DSU

((P5/256)B 2 /R+P4/32) /R+P3/8)ALPHAV
-3
4 3
-3
3 4
NORMED R TO 0D
2
X R-2 TO 2D
2 2
Y +X R-2 TO 2D

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| | | | | | | |
|-------|---------|---------|---------|----------|-----------|--------------------------------------|
| 0365 | | 11,3066 | 00003 1 | | 2D | |
| 0366 | | 11,3067 | 41525 0 | PDDL | PUSH | X -Y B-2 TO 4D COSPHI 2 TO 6D |
| 0367 | REP 5 | 11,3070 | 00023 0 | | COSPHI/2 | |
| 0368 | | 11,3071 | 65361 0 | VXSC | PDDL | 2COSPHI(UZ) B-3 TO 6D |
| 0369 | REP 3 | 11,3072 | 00025 0 | | UZ | |
| 0370 | | 11,3073 | 45316 1 | DSO | DSU | |
| 0371 | REP 2 | 11,3074 | 23671 0 | | 3/5 | 2 2 2 |
| 0372 | | 11,3075 | 52405 1 | DMP | SL3 | (X -Y)((5COS (PHI)-3)UR 2COS(PHI)UZ) |
| 0373 | REP 3 | 11,3078 | 27756 0 | | 5/8 | |
| 0374 | | 11,3077 | 52361 1 | VXSC | VSU | B-3 TO 4D |
| 0375 | REP 41 | 11,3100 | 02152 0 | | ALPHAV | |
| 0376 | | 11,3101 | 72561 0 | VXSC | VSL2 | |
| 0377 | | 11,3102 | 77725 1 | PDDL | | |
| 0378 | REP 4 | 11,3103 | 00017 1 | | URPV | |
| 0379 | | 11,3104 | 63205 0 | DMP | POVL | XY B-2 TO 10D |
| 0380 | REP 6 | 11,3105 | 00021 1 | | URPV +2 | |
| 0381 | REP 42 | 11,3106 | 02152 0 | | ALPHAV | |
| 0382 | | 11,3107 | 74235 0 | VXV | VXSC | |
| 0383 | REP 4 | 11,3110 | 00025 0 | | UZ | |
| 0384 | | 11,3111 | 53332 0 | VSL3 | VAD | 4XY(UR X UZ) + D(4D) B-3 |
| 0385 | | 11,3112 | 77725 1 | PDDL | | |
| 0386 | | 11,3113 | 41301 0 | NORM | DMP | |
| 03861 | REP 36 | 11,3114 | 00050 1 | | X2 | |
| 0387 | | 11,3115 | 00001 0 | | 0D | 3J22R2MU/(X +Y)R |
| 03871 | | 11,3116 | 74265 0 | BDDV | VXSC | |
| 0388 | REP 1 | 11,3117 | 27754 1 | | 3J22R2MU | |
| 0389 | | 11,3120 | 53257 1 | VSL* | VAD | |
| 0390 | | 11,3121 | 57605 0 | | 0 -7,2 | |
| 0391 | REP 6 | 11,3122 | 00033 1 | | TVEC | |
| 03911 | | 11,3123 | 77754 1 | LXA,2 | | |
| 03912 | REP 14 | 11,3124 | 02150 1 | | PRODY | |
| 03913 | | 11,3125 | 77600 1 | NBRANCH1 | BOV | |
| 03916 | | 11,3126 | 23127 1 | | +1 | |
| 0392 | | 11,3127 | 53257 1 | VSL* | VAD | |
| 0393 | | 11,3130 | 20153 1 | | 0 -22D,1 | |
| 0394 | REP 5 | 11,3131 | 02202 0 | | FV | |
| 0395 | REP 6 | 11,3132 | 02202 0 | STORE | FV | |
| 03953 | | 11,3133 | 77600 1 | DOV | | |
| 03956 | REP 1 | 11,3134 | 22708 0 | | CORAJUR | |
| 0396 | | 11,3135 | 72135 0 | NBRANCH | SLOAD | |
| 0397 | REP 23 | 11,3136 | 01501 1 | | LXA,1 | |
| 0398 | REP 657 | 11,3137 | 00154 1 | | DIFBQNT | |
| 0399 | | 11,3140 | 73205 1 | DMP | MPAC | |
| 0400 | REP 1 | 11,3141 | 27760 0 | | CGOTO | |
| 0401 | REP 656 | 11,3142 | 00155 0 | | -1/12 | |
| 0402 | REP 1 | 11,3143 | 23152 0 | | MPAC | |
| 0403 | | 11,3144 | 77745 1 | COSPHI2 | DLOAD | DIFBQNTAR |
| 0404 | REP 43 | 11,3145 | 02156 1 | | ALPHAV +4 | |
| 0405 | REP 6 | 11,3146 | 24023 0 | STOVL | COSPHI/2 | |
| 0406 | REP 5 | 11,3147 | 11450 0 | | ZUNIT | |



L ORBITAL INTEGRATION

| | | | | | | |
|-------|-----|----|-----------|---------|----------|-------------------|
| 0407 | | | 11,3150 | 77650 1 | GOTO | |
| 0408 | REP | 1 | 11,3151 | 22755 0 | | CONTRM |
| 0409 | REP | 1 | 11,3152 | 23371 0 | DIFREQ+0 | CADR DIFREQ+0 |
| 0410 | REP | 1 | 11,3153 | 23375 1 | | CADR DIFREQ+1 |
| 0411 | REP | 1 | 11,3154 | 23406 1 | | CADR DIFREQ+2 |
| 0412 | | | 11,3155 | 77214 0 | TIMESTEP | BOF VLOAD |
| 0413 | REP | 4 | LAST 1305 | 11,3156 | | MIDFLAG |
| 0414 | REP | 1 | | 11,3157 | | RECTEST |
| 0415 | REP | 22 | LAST 1305 | 11,3160 | | RCV |
| 0416 | | | | 11,3161 | DOT | DNP |
| 04162 | REP | 17 | LAST 1302 | 11,3162 | | VCV |
| 04163 | REP | 10 | LAST 1304 | 11,3163 | | DT/2 |
| 04164 | | | | 11,3164 | RMN | (R.V) X (DELTA T) |
| 04166 | REP | 2 | LAST 1312 | 11,3165 | | RECTEST |
| 0417 | | | | 11,3166 | RON | BOF |
| 0418 | REP | 26 | LAST 1310 | 11,3167 | | MOONFLAG |
| 0419 | REP | 1 | | 11,3170 | | LUNSPH |
| 0420 | REP | 5 | LAST 1308 | 11,3171 | | RPOFLAG |
| 0421 | REP | 1 | | 11,3172 | | EARSFH |
| 0422 | | | | 11,3173 | DLOAD | CALL |
| 0423 | REP | 26 | LAST 1309 | 11,3174 | | TST |
| 0424 | REP | 3 | LAST 1305 | 11,3175 | | LSPOS |
| 0425 | REP | 5 | LAST 1306 | 11,3176 | STORE | RPOV IN MPAC |
| 04253 | | | | 11,3177 | LXA,2 | RPOV |
| 04256 | REP | 15 | LAST 1311 | 11,3200 | | PRODY |
| 0426 | | | | 11,3201 | INLNCHK | RVSU ABVAL |
| 0427 | REP | 23 | LAST 1312 | 11,3202 | | RCV |
| 0428 | | | | 11,3203 | DSU | RMN |
| 0429 | REP | 1 | | 11,3204 | | RSPHERE |
| 0430 | REP | 1 | | 11,3205 | | DOSWITCH |
| 0434 | | | | 11,3206 | RECTEST | VLOAD ARVAL |
| 04345 | REP | 6 | LAST 1289 | 11,3207 | | TDELTA V |
| 04346 | | | | 11,3210 | ROV | |
| 04347 | REP | 1 | | 11,3211 | | CALLRECT |
| 0435 | | | | 11,3212 | DSU | RPL |
| 04355 | REP | 2 | LAST 32 | 11,3213 | | 3/4 |
| 0436 | REP | 2 | LAST 1312 | 11,3214 | | CALLRECT |
| 04365 | | | | 11,3215 | DAD | SL* |
| 0437 | REP | 3 | LAST 1312 | 11,3216 | | 3/4 |
| 04375 | | | | 11,3217 | | 0 -7,2 |
| 0438 | | | | 11,3220 | DDV | DSU |
| 04385 | | | | 11,3221 | | 10D |
| 0439 | REP | 1 | | 11,3222 | | RECRATIO |
| 04395 | | | | 11,3223 | BPL | VLOAD |
| 0440 | REP | 3 | LAST 1312 | 11,3224 | | CALLRECT |
| 0441 | REP | 8 | LAST 1289 | 11,3225 | | TNUV |
| 0442 | | | | 11,3226 | ARVAL | DSU |
| 0443 | REP | 4 | LAST 1312 | 11,3227 | | 3/4 |
| 04431 | | | | 11,3230 | ROV | |
| 04432 | REP | 4 | LAST 1312 | 11,3231 | | CALLRECT |

(R.V) X (DELTA T)

RPOV IN MPAC
RPOV

RECTIFY IP

1) EITHER TDELTA V OR TNUV EQUALS OR EXCEEDS 3/4 IN MAGNITUDE

OR

2) ARVAL(TDELTA V) EQUALS OR EXCEEDS .01(ARVAL(RCV))



L ORBITAL INTEGRATION

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| | | | | | | |
|-------|-----|--------------|---------|---------|----------------|----------|
| 0444 | | | 11,3232 | 77640 0 | BNN | |
| 0445 | REP | 1 | 11,3233 | 23236 1 | | INTORATE |
| 04453 | | | 11,3234 | 77624 1 | CALLRECT CALL | |
| 04456 | REP | 7 LAST 1308 | 11,3235 | 23344 0 | | RECTIFY |
| 0446 | | | 11,3236 | 77775 1 | INTORATE VLOAD | |
| 0447 | REP | 9 LAST 1312 | 11,3237 | 01527 0 | | TRUV |
| 0448 | REP | 1 | 11,3240 | 25120 0 | STOVL | ZV |
| 0449 | REP | 9 LAST 1312 | 11,3241 | 01521 0 | | TDELTA V |
| 0450 | REP | 2 LAST 76 | 11,3242 | 01112 1 | STORE | YV |
| 0451 | | | 11,3243 | 77614 1 | CLEAR | |
| 0452 | REP | 1 | 11,3244 | 00281 1 | | JSWITCH |
| 0453 | | | 11,3245 | 86375 0 | DIFEOO VLOAD | SSP |
| 0454 | REP | 3 LAST 1313 | 11,3246 | 01112 1 | | YV |
| 0455 | REP | 24 LAST 1311 | 11,3247 | 01501 1 | | DIFEOCNT |
| 0456 | | | 11,3250 | 00000 1 | | 0 |
| 0457 | REP | 44 LAST 1311 | 11,3251 | 16152 0 | STOVL | ALPHAV |
| 0458 | REP | 3 LAST 1210 | 11,3252 | 11456 0 | | DPZERO |
| 0459 | REP | 3 LAST 1308 | 11,3253 | 02212 1 | STORE | H |
| 0460 | | | 11,3254 | 52014 0 | BON | GOTO |
| 0461 | REP | 2 LAST 1313 | 11,3255 | 00301 0 | | JSWITCH |
| 0462 | REP | 1 | 11,3256 | 23610 1 | | DOW... |
| 0463 | REP | 1 | 11,3257 | 22430 0 | | ACCOMP |
| 0464 | | | 11,3260 | 52175 0 | EARSPH VLOAD | GOTO |
| 04641 | REP | 6 LAST 1312 | 11,3261 | 02263 1 | | RPOV |
| 04642 | REP | 1 | 11,3262 | 23201 0 | | INLINCHK |
| 04643 | | | 11,3263 | 60545 0 | LUNSPH DLOAD | SR2 |
| 04644 | | | 11,3264 | 00013 0 | | 10D |
| 04645 | | | 11,3265 | 50025 0 | DSU | BNN |
| 04646 | REP | 2 LAST 1312 | 11,3266 | 27764 1 | | RSPHERE |
| 04647 | REP | 3 LAST 1312 | 11,3267 | 23206 1 | | RECTEST |
| 04648 | | | 11,3270 | 71214 0 | ROP | DLOAD |
| 04649 | REP | 6 LAST 1312 | 11,3271 | 04340 1 | | RPOFLAG |
| 0465 | REP | 2 LAST 1312 | 11,3272 | 23300 0 | | DOSWITCH |
| 04651 | REP | 29 LAST 1312 | 11,3273 | 01517 0 | | TST |
| 04652 | | | 11,3274 | 77624 1 | CALL | |
| 0466 | REP | 2 LAST 887 | 11,3275 | 54115 0 | | LUNPOS |
| 0467 | | | 11,3276 | 77676 0 | VCOMP | |
| 0468 | REP | 7 LAST 1313 | 11,3277 | 02263 1 | STORE | RPOV |
| 0469 | | | 11,3300 | 77624 1 | DOSWITCH CALL | |
| 0470 | REP | 1 | 11,3301 | 23304 1 | | ORIGONG |
| 0471 | | | 11,3302 | 77650 1 | GOTO | |
| 0472 | REP | 2 LAST 1313 | 11,3303 | 23236 1 | | INTGRATE |
| 0473 | | | 11,3304 | 45020 1 | ORIGONG STO | CALL |
| 0474 | REP | 3 LAST 67 | 11,3305 | 02270 0 | | ORIGX |
| 0475 | REP | 8 LAST 1313 | 11,3306 | 23344 0 | | RECTIFY |
| 0476 | | | 11,3307 | 53775 1 | VLOAD | VSL* |
| 0477 | REP | 24 LAST 1312 | 11,3310 | 01535 0 | | RCV |
| 0478 | | | 11,3311 | 57576 1 | | 0,2 |
| 0479 | | | 11,3312 | 53651 0 | VSU | VSL* |
| 0480 | REP | 8 LAST 1313 | 11,3313 | 02263 1 | | RPOV |

START H AT ZERO, GOES 0(DR1/2)DELT.



L ORBITAL INTEGRATION

| | | | | |
|------|--------|-----------|---------|---------|
| 0481 | | | 11,3314 | 57574 0 |
| 0482 | REP 13 | LAST 1300 | 11,3315 | 01503 0 |
| 0483 | REP 25 | LAST 1313 | 11,3316 | 15535 0 |
| 0484 | REP 30 | LAST 1313 | 11,3317 | 01517 0 |
| 0485 | | | 11,3320 | 77624 1 |
| 0486 | REP 1 | | 11,3321 | 54120 0 |
| 0487 | | | 11,3322 | 57414 1 |
| 0488 | REP 27 | LAST 1312 | 11,3323 | 00343 0 |
| 0489 | | | 11,3324 | 23325 1 |
| 0490 | | | 11,3325 | 53715 1 |
| 0491 | REP 18 | LAST 1312 | 11,3326 | 01543 1 |
| 0492 | | | 11,3327 | 57576 1 |
| 0493 | | | 11,3330 | 77651 0 |
| 0494 | | | 11,3331 | 77657 0 |
| 0495 | | | 11,3332 | 57574 0 |
| 0496 | REP 9 | LAST 1300 | 11,3333 | 01511 0 |
| 0497 | REP 19 | LAST 1314 | 11,3334 | 01543 1 |
| 0498 | | | 11,3335 | 67154 0 |
| 0499 | REP 4 | LAST 1313 | 11,3336 | 02270 0 |
| 0500 | REP 26 | LAST 1294 | 11,3337 | 00052 0 |
| 0501 | | | 11,3340 | 52014 0 |
| 0502 | REP 28 | LAST 1314 | 11,3341 | 00303 1 |
| 0503 | REP 2 | LAST 1286 | 11,3342 | 26666 0 |
| 0504 | REP 3 | LAST 1286 | 11,3343 | 26673 1 |

| | |
|-------|----------|
| | 2,2 |
| STORE | RRBCT |
| STOCL | RCV |
| | TET |
| CALL | |
| | LUNVEL |
| BOF | VCOMP |
| | MOONFLAG |
| | +1 |
| FDVL | VSL* |
| | VCV |
| | 0,2 |
| VSL | |
| VSL* | |
| | 0 +2,2 |
| STORE | VRECT |
| STORE | VCV |
| LKA,2 | SXA,2 |
| | ORIGEX |
| | QPRST |
| RCN | GOTO |
| | MOONFLAG |
| | CLAMOON |
| | SFTMOON |



L ORBITAL INTEGRATION

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P0505 THE RECTIFY SUBROUTINE IS CALLED BY THE INTEGRATION PROGRAM AND OCCASIONALLY BY THE MEASUREMENT INCORPORATION
 R0507 ROUTINES TO ESTABLISH A NEW CONIC.

| | | | | | | | |
|------|-----|----|-----------|---------|---------|----------------|---------|
| 0508 | | | 11,3344 | 77354 0 | RECTIFY | LXA,2 | VLOAD |
| 0509 | REP | 16 | LAST 1312 | 11,3345 | 02150 1 | | PBODY |
| 0510 | REP | 10 | LAST 1313 | 11,3346 | 01521 0 | | TDELTA |
| 0511 | | | | 11,3347 | 53257 1 | VSL* | VAD |
| 0512 | | | | 11,3350 | 57605 0 | | 0 -7,2 |
| 0513 | REP | 26 | LAST 1314 | 11,3351 | 01535 0 | | RCV |
| 0514 | REP | 14 | LAST 1314 | 11,3352 | 01503 0 | STORE | RRECT |
| 0515 | REP | 27 | LAST 1315 | 11,3353 | 25535 0 | STOVL | RCV |
| 0516 | REP | 10 | LAST 1313 | 11,3354 | 01527 0 | | TNU |
| 0517 | | | | 11,3355 | 53257 1 | VSL* | VAD |
| 0518 | | | | 11,3356 | 57602 1 | | 0 -4,2 |
| 0519 | REP | 20 | LAST 1314 | 11,3357 | 01543 1 | | VCV |
| 0520 | REP | 10 | LAST 1314 | 11,3360 | 01511 0 | MINIRECT STORE | VRECT |
| 0521 | REP | 21 | LAST 1315 | 11,3361 | 25543 1 | STOVL | VCV |
| 0522 | REP | 11 | LAST 1305 | 11,3362 | 11456 0 | | ZEROVEC |
| 0523 | REP | 11 | LAST 1315 | 11,3363 | 01521 0 | STORE | TDELTA |
| 0524 | REP | 11 | LAST 1315 | 11,3364 | 15527 0 | STOVL | TNU |
| 0525 | REP | 12 | LAST 1315 | 11,3365 | 11456 0 | | ZEROVEC |
| 0526 | REP | 12 | LAST 1308 | 11,3366 | 01551 1 | STORE | TC |
| 0527 | REP | 3 | LAST 1303 | 11,3367 | 01553 0 | STORE | XREP |
| 0528 | | | | 11,3370 | 77616 0 | RVO | |



L ORBITAL INTEGRATION

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05529 THE THREE DIPEQ ROUTINES - DIPEQ+0, DIPEQ+12, AND DIPEQ+24 - ARE ENTERED TO PROCESS THE CONTRIBUTIONS AT THE
 05531 BEGINNING, MIDDLE, AND END OF THE TIMESTEP, RESPECTIVELY. THE UPDATING IS DONE BY THE NYSTRON METHOD.

| | | | | | | | | |
|------|-----|----|-----------|---------|---------|---------|--------|----------|
| 0533 | | | 11,3371 | 64575 1 | DIPEQ+0 | VLOAD | VSR3 | |
| 0534 | REP | 7 | LAST 1311 | 11,3372 | | | FV | |
| 0535 | REP | 2 | LAST 87 | 11,3373 | | | STCALL | PHIV |
| 0536 | REP | 1 | | 11,3374 | | | | DIPEQCOM |
| 0537 | | | | 11,3375 | 74575 0 | DIPEQ+1 | VLOAD | VSR1 |
| 0538 | REP | 8 | LAST 1316 | 11,3376 | 02202 0 | | | FV |
| 0539 | | | | 11,3377 | 53206 0 | | PUSH | VAD |
| 0540 | REP | 3 | LAST 1316 | 11,3400 | 02166 1 | | | PHIV |
| 0541 | REP | 2 | LAST 87 | 11,3401 | 26174 1 | | STOVL | PSIV |
| 0542 | | | | 11,3402 | 53362 0 | | VSR1 | VAD |
| 0543 | REP | 4 | LAST 1316 | 11,3403 | 02166 1 | | | PHIV |
| 0544 | REP | 5 | LAST 1316 | 11,3404 | 36166 0 | | STCALL | PHIV |
| 0545 | REP | 2 | LAST 1316 | 11,3405 | 23551 1 | | | DIPEQCOM |
| 0546 | | | | 11,3406 | 57345 1 | DIPEQ+2 | DLOAD | DMPR |
| 0547 | REP | 4 | LAST 1313 | 11,3407 | 02212 1 | | | H |
| 0548 | REP | 2 | LAST 1302 | 11,3410 | 23717 1 | | | DP2/3 |
| 0549 | | | | 11,3411 | 74206 0 | | PUSH | VXSC |
| 0550 | REP | 6 | LAST 1316 | 11,3412 | 02166 1 | | | PHIV |
| 0551 | | | | 11,3413 | 53372 1 | | VSL1 | VAD |
| 0552 | REP | 2 | LAST 1313 | 11,3414 | 01120 0 | | | ZV |
| 0553 | | | | 11,3415 | 53361 0 | | VXSC | VAD |
| 0554 | REP | 5 | LAST 1316 | 11,3416 | 02212 1 | | | H |
| 0555 | REP | 4 | LAST 1313 | 11,3417 | 01112 1 | | | YV |
| 0556 | REP | 5 | LAST 1316 | 11,3420 | 25112 1 | | STOVL | YV |
| 0557 | REP | 9 | LAST 1316 | 11,3421 | 02202 0 | | | FV |
| 0558 | | | | 11,3422 | 53322 1 | | VSR3 | VAD |
| 0559 | REP | 3 | LAST 1316 | 11,3423 | 02174 1 | | | PSIV |
| 0560 | | | | 11,3424 | 76561 1 | | VXSC | VSL1 |
| 0561 | | | | 11,3425 | 77655 1 | | VAD | |
| 0562 | REP | 3 | LAST 1316 | 11,3426 | 01120 0 | | | ZV |
| 0564 | REP | 4 | LAST 1316 | 11,3427 | 01120 0 | | STORE | ZV |
| 0565 | | | | 11,3430 | 45014 0 | | BOFF | CALL |
| 0566 | REP | 3 | LAST 1313 | 11,3431 | 00341 1 | | | JSWITCH |
| 0567 | REP | 1 | | 11,3432 | 23502 1 | | | ENDSTATE |
| 0568 | REP | 23 | LAST 1290 | 11,3433 | 56741 0 | | | GRP2PC |
| 0569 | | | | 11,3434 | 77354 0 | | LXA,2 | VLOAD |
| 0570 | REP | 2 | LAST 76 | 11,3435 | 01102 0 | | | COLREG |
| 0571 | REP | 5 | LAST 1316 | 11,3436 | 01120 0 | | | ZV |
| 0572 | | | | 11,3437 | 77732 1 | | VSL3 | |
| 0573 | REP | 10 | LAST 1228 | 11,3440 | 12487 1 | | STORE | W +54D,2 |
| 0574 | | | | 11,3441 | 77775 1 | | VLOAD | |
| 0575 | REP | 6 | LAST 1316 | 11,3442 | 01112 1 | | | YV |
| 0576 | | | | 11,3443 | 40132 0 | | VSL3 | ROY |
| 0577 | REP | 1 | | 11,3444 | 23574 0 | | | WMATEND |
| 0578 | REP | 71 | LAST 1316 | 11,3445 | 12401 1 | | STORE | W,2 |
| 0579 | | | | 11,3446 | 77624 1 | | CALL | |
| 0580 | REP | 24 | LAST 1316 | 11,3447 | 56741 0 | | | GRP2PC |

ADJUST W-POSITION FOR STORAGE



L ORBITAL INTEGRATION

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| | | | | | | |
|-------|---------|-----------|---------|----------|----------|----------|
| 0501 | | | 11,3450 | 66354 0 | LXA,2 | SSP |
| 0502 | REP 3 | LAST 1316 | 11,3451 | 01102 0 | | COLREG |
| 0503 | REP 36 | LAST 1308 | 11,3452 | 00052 0 | | S2 |
| 0504 | | | 11,3453 | 00000 1 | | 0 |
| 0505 | | | 11,3454 | 67114 1 | INCR,2 | SXA,2 |
| 0506 | | | 11,3455 | 00006 1 | | 6 |
| 0507 | REP 7 | LAST 1316 | 11,3456 | 01111 1 | | YV |
| 0508 | | | 11,3457 | 45104 0 | TIX,2 | CALL |
| 0509 | REP 1 | | 11,3460 | 23545 1 | | RELOADSV |
| 0500 | REP 25 | LAST 1316 | 11,3461 | 56741 0 | | GRP2PC |
| 0501 | | | 11,3462 | 67154 0 | LXA,2 | SXA,2 |
| 0502 | REP 8 | LAST 1317 | 11,3463 | 01111 1 | | YV |
| 0503 | REP 4 | LAST 1317 | 11,3464 | 01102 0 | | COLREG |
| 0504 | | | 11,3465 | 77624 1 | NEXTCOL | CALL |
| 0505 | REP 26 | LAST 1317 | 11,3466 | 56741 0 | | GRP2PC |
| 0506 | | | 11,3467 | 76754 0 | LXA,2 | VLOAD* |
| 0507 | REP 8 | LAST 1317 | 11,3470 | 01102 0 | | COLREG |
| 0508 | REP 72 | LAST 1316 | 11,3471 | 75376 1 | | W,2 |
| 0509 | | | 11,3472 | 77722 0 | VSR3 | |
| 0600 | REP 9 | LAST 1317 | 11,3473 | 01112 1 | STORE | YV |
| 0601 | | | 11,3474 | 76173 0 | VLOAD* | AXT,1 |
| 0602 | REP 73 | LAST 1317 | 11,3475 | 75310 1 | | W +54D,2 |
| 0603 | | | 11,3476 | 00000 1 | | 0 |
| 0604 | | | 11,3477 | 77722 0 | VSR3 | |
| 0605 | REP 6 | LAST 1316 | 11,3500 | 35120 1 | STCALL | ZV |
| 0606 | REP 1 | | 11,3501 | 23245 0 | | DIFEG0 |
| 0607 | | | 11,3502 | 77200 0 | ENDSTATE | BOV |
| 06071 | REP 2 | LAST 1311 | 11,3503 | 22706 0 | | VLOAD |
| 0608 | REP 7 | LAST 1317 | 11,3504 | 01120 0 | | GORAGLE |
| 0609 | REP 12 | LAST 1315 | 11,3505 | 25527 0 | | ZV |
| 0610 | REP 10 | LAST 1317 | 11,3506 | 01112 1 | STOVL | TRUV |
| 0611 | REP 12 | LAST 1315 | 11,3507 | 01521 0 | | YV |
| 0612 | | | 11,3510 | 43014 0 | STORE | TDELTAV |
| 06121 | REP 3 | LAST 1299 | 11,3511 | 04715 0 | BOV | ROPP |
| 06122 | REP 1 | | 11,3512 | 27653 1 | | MIDAVPL0 |
| 0613 | REP 19 | LAST 1306 | 11,3513 | 01756 1 | | QOMID2 |
| 0614 | REP 5 | LAST 1308 | 11,3514 | 27234 1 | | DIM0FLAG |
| 06141 | | | 11,3515 | 77776 1 | | TESTLOOP |
| 0615 | REP 99 | LAST 1301 | 11,3516 | 0 5301 0 | EXIT | |
| 0616 | | | 11,3517 | 04022 0 | TC | PHASCHNG |
| 0617 | REP 50 | LAST 1290 | 11,3520 | 0 5435 0 | OCT | 04022 |
| 0618 | REP 4 | LAST 1290 | 11,3521 | 00236 0 | TC | UPFLAG |
| 0620 | REP 239 | LAST 1301 | 11,3522 | 0 6006 1 | ADRES | REINTFLO |
| 0621 | | | 11,3523 | 77731 1 | TC | INTPRST |
| 06215 | REP 27 | LAST 1314 | 11,3524 | 00053 1 | SSP | |
| 0622 | REP 1 | | 11,3525 | 23532 1 | | OPRET |
| 0623 | | | 11,3526 | 52014 0 | | ANOVED |
| 0624 | REP 20 | LAST 1297 | 11,3527 | 01714 1 | BOV | GOTO |
| | | | | | | VINTFLAG |

ADJUST W-POSITION FOR INTEGRATION

ADJUST W-VELOCITY FOR INTEGRATION

CHECK FOR MID2 BEFORE GOING TO TIMEINC

PHASE 1
PHASE CHANGE HAS OCCURRED BETWEEN
INTSTALL AND INTWAKE

| | | | | | | | | |
|------|-----|-----|------|------|---------|-------|---|----------------|
| 0625 | REP | 4 | LAST | 1301 | 11,3530 | 26636 | 0 | ATOPRM |
| 0626 | REP | 4 | LAST | 1301 | 11,3531 | 26711 | 1 | AMOVER |
| 0627 | REP | 4 | LAST | 1316 | 11,3532 | 66214 | 0 | SET |
| 0628 | REP | 6 | LAST | 1317 | 11,3533 | 00061 | 0 | SWTCH |
| 0629 | REP | 6 | LAST | 1317 | 11,3534 | 01103 | 1 | CLRBO |
| 0630 | REP | 6 | LAST | 1317 | 11,3535 | 77410 | 0 | DEC |
| 0631 | REP | 8 | LAST | 1297 | 11,3536 | 66214 | 0 | BOF |
| 0632 | REP | 1 | LAST | 1316 | 11,3537 | 01765 | 1 | DORGFLG |
| 0633 | REP | 1 | LAST | 1316 | 11,3540 | 23465 | 1 | NEXTOL |
| 0634 | REP | 7 | LAST | 1316 | 11,3541 | 01103 | 1 | CLRBO |
| 0635 | REP | 7 | LAST | 1316 | 11,3542 | 77717 | 0 | DEC |
| 0636 | REP | 2 | LAST | 1316 | 11,3543 | 77650 | 1 | GOTO |
| 0637 | REP | 2 | LAST | 1316 | 11,3544 | 23465 | 1 | NEXTOL |
| 0638 | REP | 9 | LAST | 1299 | 11,3545 | 77465 | 1 | RELOADSV DLOAD |
| 0639 | REP | 9 | LAST | 1299 | 11,3546 | 01101 | 0 | TDEC |
| 0640 | REP | 55 | LAST | 1298 | 11,3547 | 34041 | 0 | STCALL |
| 0641 | REP | 1 | LAST | 1298 | 11,3548 | 01101 | 0 | TDEC |
| 0642 | REP | 1 | LAST | 1298 | 11,3550 | 21120 | 1 | INTBRV2 |
| 0643 | REP | 1 | LAST | 1298 | 11,3551 | 43345 | 1 | DLOAD |
| 0644 | REP | 11 | LAST | 1312 | 11,3552 | 02314 | 0 | DAD |
| 0645 | REP | 6 | LAST | 1316 | 11,3553 | 02212 | 1 | DT/2 |
| 0646 | REP | 6 | LAST | 1316 | 11,3554 | 66110 | 0 | INCR,1 |
| 0647 | REP | 25 | LAST | 1313 | 11,3555 | 77763 | 0 | INC,1 |
| 0648 | REP | 7 | LAST | 1316 | 11,3557 | 02212 | 1 | DEC |
| 0649 | REP | 25 | LAST | 1313 | 11,3558 | 01500 | 0 | -12 |
| 0650 | REP | 7 | LAST | 1316 | 11,3559 | 02212 | 1 | DIFCON |
| 0651 | REP | 10 | LAST | 1316 | 11,3560 | 74561 | 0 | STORE |
| 0652 | REP | 10 | LAST | 1316 | 11,3561 | 02202 | 0 | H |
| 0653 | REP | 8 | LAST | 1317 | 11,3562 | 74255 | 0 | VXSC |
| 0654 | REP | 8 | LAST | 1317 | 11,3563 | 01120 | 0 | VXSC |
| 0655 | REP | 8 | LAST | 1317 | 11,3564 | 02212 | 1 | VAD |
| 0656 | REP | 8 | LAST | 1317 | 11,3565 | 77655 | 1 | VAD |
| 0657 | REP | 11 | LAST | 1317 | 11,3566 | 01112 | 1 | VAD |
| 0658 | REP | 45 | LAST | 1313 | 11,3567 | 02152 | 0 | STORE |
| 0659 | REP | 45 | LAST | 1313 | 11,3568 | 02152 | 0 | ALPHA |
| 0660 | REP | 5 | LAST | 1318 | 11,3570 | 52014 | 0 | RON |
| 0661 | REP | 5 | LAST | 1318 | 11,3571 | 00301 | 0 | GOTO |
| 0662 | REP | 2 | LAST | 1313 | 11,3572 | 23610 | 1 | SWTCH |
| 0663 | REP | 1 | LAST | 1313 | 11,3573 | 22410 | 1 | DOM |
| 0664 | REP | 2 | LAST | 1313 | 11,3574 | 00301 | 0 | FRS |
| 0665 | REP | 20 | LAST | 1317 | 11,3575 | 01076 | 1 | CLRBO |
| 0666 | REP | 14 | LAST | 1301 | 11,3576 | 01671 | 0 | DORGFLG |
| 0667 | REP | 12 | LAST | 1301 | 11,3577 | 77614 | 1 | ORWPLAG |
| 0668 | REP | 7 | LAST | 1292 | 11,3601 | 77414 | 0 | CLRBO |
| 0669 | REP | 35 | LAST | 1300 | 11,3602 | 01472 | 1 | EXIT |
| 0670 | REP | 240 | LAST | 1317 | 11,3603 | 02676 | 1 | SET |
| 0671 | REP | 35 | LAST | 1300 | 11,3604 | 00421 | 0 | RNDWPLG |
| 0672 | REP | 35 | LAST | 1300 | 11,3605 | 05370 | 0 | ORWPLAG |
| 0673 | REP | 35 | LAST | 1300 | 11,3606 | 05370 | 0 | CLRBO |
| 0674 | REP | 35 | LAST | 1300 | 11,3607 | 05370 | 0 | ORWPLAG |
| 0675 | REP | 35 | LAST | 1300 | 11,3608 | 05370 | 0 | CLRBO |
| 0676 | REP | 35 | LAST | 1300 | 11,3609 | 05370 | 0 | ORWPLAG |
| 0677 | REP | 35 | LAST | 1300 | 11,3610 | 05370 | 0 | CLRBO |
| 0678 | REP | 35 | LAST | 1300 | 11,3611 | 05370 | 0 | ORWPLAG |
| 0679 | REP | 35 | LAST | 1300 | 11,3612 | 05370 | 0 | CLRBO |
| 0680 | REP | 35 | LAST | 1300 | 11,3613 | 05370 | 0 | ORWPLAG |
| 0681 | REP | 35 | LAST | 1300 | 11,3614 | 05370 | 0 | CLRBO |
| 0682 | REP | 35 | LAST | 1300 | 11,3615 | 05370 | 0 | ORWPLAG |
| 0683 | REP | 35 | LAST | 1300 | 11,3616 | 05370 | 0 | CLRBO |
| 0684 | REP | 35 | LAST | 1300 | 11,3617 | 05370 | 0 | ORWPLAG |
| 0685 | REP | 35 | LAST | 1300 | 11,3618 | 05370 | 0 | CLRBO |
| 0686 | REP | 35 | LAST | 1300 | 11,3619 | 05370 | 0 | ORWPLAG |
| 0687 | REP | 35 | LAST | 1300 | 11,3620 | 05370 | 0 | CLRBO |
| 0688 | REP | 35 | LAST | 1300 | 11,3621 | 05370 | 0 | ORWPLAG |
| 0689 | REP | 35 | LAST | 1300 | 11,3622 | 05370 | 0 | CLRBO |
| 0690 | REP | 35 | LAST | 1300 | 11,3623 | 05370 | 0 | ORWPLAG |
| 0691 | REP | 35 | LAST | 1300 | 11,3624 | 05370 | 0 | CLRBO |
| 0692 | REP | 35 | LAST | 1300 | 11,3625 | 05370 | 0 | ORWPLAG |
| 0693 | REP | 35 | LAST | 1300 | 11,3626 | 05370 | 0 | CLRBO |
| 0694 | REP | 35 | LAST | 1300 | 11,3627 | 05370 | 0 | ORWPLAG |
| 0695 | REP | 35 | LAST | 1300 | 11,3628 | 05370 | 0 | CLRBO |
| 0696 | REP | 35 | LAST | 1300 | 11,3629 | 05370 | 0 | ORWPLAG |
| 0697 | REP | 35 | LAST | 1300 | 11,3630 | 05370 | 0 | CLRBO |
| 0698 | REP | 35 | LAST | 1300 | 11,3631 | 05370 | 0 | ORWPLAG |
| 0699 | REP | 35 | LAST | 1300 | 11,3632 | 05370 | 0 | CLRBO |
| 0700 | REP | 35 | LAST | 1300 | 11,3633 | 05370 | 0 | ORWPLAG |

PICK UP STATE VECTOR UPDATE
 DONT INTRPATE W THIS TIME
 INVALIDATE W
 DIFCON SET FOR NEXT ENTRY.
 BY STARTING AT INTRB2.
 INCREMENT H AND DIFCON.
 FROM PERMANENT IN CASE OF
 RELOAD TEMPORARY STATE VECTOR



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0669 11,3606 77650 1 GOTO
0670 REP 6 LAST 1317 11,3607 27234 1 TESTLOOP FINISH INTEGRATING STATE VECTOR



L ORBITAL INTEGRATION

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P0671 ORBITAL ROUTINE FOR EXTRAPOLATION OF THE W MATRIX. IT COMPUTES THE SECOND DERIVATIVE OF EACH COLUMN POSITION VECTOR OF THE MATRIX AND CALLS THE NYSTROM INTEGRATION ROUTINES TO SOLVE THE DIFFERENTIAL EQUATIONS. THE PROGRAM USES A TABLE OF VEHICLE POSITION VECTORS COMPUTED DURING THE INTEGRATION OF THE VEHICLES POSITION AND VELOCITY.

| | | | | | | | |
|------|--------|-----------|---------|---------|--------|--------|--------------|
| 0677 | | | 11,3610 | 70754 0 | DOW.. | LXA,2 | DLOAD* |
| 0678 | REP 17 | LAST 1315 | 11,3611 | 02150 1 | | | PBODY |
| 0679 | REP 7 | LAST 1308 | 11,3612 | 50041 1 | | | MUEARTH,2 |
| 0680 | REP 4 | LAST 1307 | 11,3613 | 36210 1 | | STCALL | BETAM |
| 0681 | REP 1 | | 11,3614 | 23636 0 | | | DOW..1 |
| 0682 | REP 11 | LAST 1316 | 11,3615 | 02202 0 | | STORE | PV |
| 0683 | | | 11,3616 | 62014 0 | | ROP | INCR,1 |
| 0684 | REP 5 | LAST 1312 | 11,3617 | 00342 1 | | | MIDFLAG |
| 0685 | REP 2 | LAST 1309 | 11,3620 | 23135 1 | | | NBRANCH |
| 0686 | | | 11,3621 | 77771 0 | | DEC | -6 |
| 0687 | | | 11,3622 | 70744 1 | | LXC,2 | DLOAD* |
| 0688 | REP 18 | LAST 1320 | 11,3623 | 02150 1 | | | PBODY |
| 0689 | REP 8 | LAST 1320 | 11,3624 | 50043 0 | | | MUEARTH -2,2 |
| 0690 | REP 5 | LAST 1308 | 11,3625 | 36210 1 | | STCALL | BETAM |
| 0691 | REP 2 | LAST 1320 | 11,3626 | 23636 0 | | | DOW..1 |
| 0692 | | | 11,3627 | 50414 0 | | RON | VSR6 |
| 0693 | REP 29 | LAST 1314 | 11,3630 | 00303 1 | | | MOONFLAG |
| 0694 | | | 11,3631 | 23632 1 | | | +1 |
| 0695 | | | 11,3632 | 77655 1 | | VAD | |
| 0696 | REP 12 | LAST 1320 | 11,3633 | 02202 0 | | | PV |
| 0697 | REP 13 | LAST 1320 | 11,3634 | 36202 1 | | STCALL | PV |
| 0698 | REP 3 | LAST 1320 | 11,3635 | 23135 1 | | | NBRANCH |
| 0699 | | | 11,3636 | 60575 0 | DOW..1 | VLOAD | VSR4 |
| 0700 | REP 46 | LAST 1316 | 11,3637 | 02152 0 | | | ALPHAV |
| 0701 | | | 11,3640 | 53513 0 | | PDVL* | UNIT |
| 0702 | REP 9 | LAST 1306 | 11,3641 | 02217 1 | | | VECTAB,1 |
| 0703 | | | 11,3642 | 46315 1 | | PDVL | VPROJ |
| 0704 | REP 47 | LAST 1320 | 11,3643 | 02152 0 | | | ALPHAV |
| 0705 | | | 11,3644 | 52361 1 | | VXSC | VSI |
| 0706 | REP 5 | LAST 1312 | 11,3645 | 23707 0 | | | 3/4 |
| 0707 | | | 11,3646 | 60325 0 | | PDDL | NORM |
| 0708 | | | 11,3647 | 00045 0 | | | 36D |
| 0709 | REP 37 | LAST 1317 | 11,3650 | 00052 0 | | | S2 |
| 0710 | | | 11,3651 | 63406 0 | | PUSH | DSQ |
| 0711 | | | 11,3652 | 77605 1 | | DMP | |
| 0712 | | | 11,3653 | 65301 0 | | NORM | PDDL |
| 0713 | | | 11,3654 | 00043 0 | | | 34D |
| 0714 | REP 6 | LAST 1320 | 11,3655 | 02210 0 | | | BETAM |
| 0715 | | | 11,3656 | 56342 1 | | SR1 | DDV |
| 0716 | | | 11,3657 | 77761 1 | | VXSC | |
| 0717 | | | 11,3660 | 57154 0 | | LXA,2 | XAD,2 |
| 0718 | REP 38 | LAST 1320 | 11,3661 | 00051 0 | | | S2 |
| 0719 | REP 39 | LAST 1320 | 11,3662 | 00051 0 | | | S2 |
| 0720 | | | 11,3663 | 57074 0 | | XAD,2 | XAD,2 |
| 0721 | REP 40 | LAST 1320 | 11,3664 | 00051 0 | | | S2 |
| 0722 | | | 11,3665 | 00042 1 | | | 34D |
| 0723 | | | 11,3666 | 43457 0 | | VSI* | RVQ |



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| | | | | | |
|-------|--|---------|---------|---------|-----------------------------|
| 0724 | | 11,3667 | 57006 0 | | 0 -8D,2 |
| 0725 | REP 1 | 11,2000 | | | SETLOC ORBITAL ₁ |
| 0726 | | 11,3670 | | | BANK |
| 0727 | | 11,3670 | 04631 1 | 3/5 | 2DEC .6 B-2 |
| 0727 | | 11,3671 | 23148 0 | | |
| 0728 | | 11,3672 | 14000 1 | THREE/8 | 2DEC .375 |
| 0728 | | 11,3673 | 00000 1 | | |
| 0729 | | 11,3674 | 02314 0 | .3D | 2DEC .3 B-2 |
| 0729 | | 11,3675 | 31463 1 | | |
| 0730 | | 11,3676 | 01400 1 | 3/64 | 2DEC 3 B-6 |
| 0730 | | 11,3677 | 00000 1 | | |
| 0731 | | 11,3700 | 10000 0 | DP1/4 | 2DEC .25 |
| 0731 | | 11,3701 | 00000 1 | | |
| 0732 | REP 2 LAST 1273 | 11,3700 | | QUARTER | EQUALS DP1/4 |
| 0733 | REP 3 LAST 1321 | 11,3700 | | POS1/4 | EQUALS DP1/4 |
| 0734 | | 11,3702 | 03000 1 | 3/32 | 2DEC 3 B-5 |
| 0734 | | 11,3703 | 00000 1 | | |
| 0735 | | 11,3704 | 38000 1 | 15/16 | 2DEC 15. B -4 |
| 0735 | | 11,3705 | 00000 1 | | |
| 0736 | | 11,3706 | 30000 1 | 3/4 | 2DEC 3.0 B -2 |
| 0736 | | 11,3707 | 00000 1 | | |
| 0737 | | 11,3710 | 22525 0 | 7/12 | 2DEC .5833333333 |
| 0737 | | 11,3711 | 12525 0 | | |
| 0738 | | 11,3712 | 22000 1 | 9/16 | 2DEC 9 B -4 |
| 0738 | | 11,3713 | 00000 1 | | |
| 0739 | | 11,3714 | 01200 1 | 5/128 | 2DEC 5 B-7 |
| 0739 | | 11,3715 | 00000 1 | | |
| 0740 | REP 13 LAST 1315 | 04,3455 | | DPZERO | EQUALS ZEROVEC |
| 0741 | | 11,3716 | 25252 0 | DP2/3 | 2DEC .6666666667 |
| 0741 | | 11,3717 | 25253 1 | | |
| 0742 | REP 3 LAST 1316 | 11,3716 | | 2/3 | EQUALS DP2/3 |
| 07455 | | 11,3720 | 00027 1 | OCT27 | OCT 27 |
| 07462 | LM504 IS TEMPORARY | 13,3715 | | | BANK 13 |
| 07463 | REP 1 | 13,2000 | | | SETLOC ORBITAL ₂ |
| 07464 | | 13,3715 | | | BANK |
| 0747 | IT IS VITAL THAT THE FOLLOWING CONSTANTS NOT BE SUPPLIED | | | | |
| 0748 | | 13,3715 | 77764 1 | | DEC -11 |
| 0749 | | 13,3716 | 77775 1 | | DEC -2 |
| 0750 | | 13,3717 | 77766 0 | | DEC -9 |
| 0751 | | 13,3720 | 77771 0 | | DEC -6 |
| 0752 | | 13,3721 | 77775 1 | | DEC -2 |
| 0753 | | 13,3722 | 77775 1 | | DEC -2 |
| 0754 | | 13,3723 | 00000 1 | | DEC 0 |
| 0755 | | 13,3724 | 77763 0 | | DEC -12 |
| 0756 | | 13,3725 | 77766 0 | | DEC -9 |
| 0757 | | 13,3726 | 77773 1 | | DEC -4 |
| 0758 | | 13,3727 | 77770 1 | ASCALR | DEC -7 |
| 0759 | | 13,3730 | 77771 0 | | DEC -8 |



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| | | | | | | |
|------|------------------|---------|----------|-----------------------|-----------------------|------------------|
| 0760 | 13,3731 | 27446 1 | ZDEC* | 1.32715445 E16 B-54* | S | |
| 0760 | 13,3732 | 14620 0 | | | | |
| 0761 | 13,3733 | 16471 1 | ZDEC* | 4.9027780 E8 B-30* | M | |
| 0761 | 13,3734 | 01352 1 | | | | |
| 0762 | 13,3735 | 22437 1 | MUEARTH | ZDEC* | 3.986032 E10 B-36* | |
| 0762 | 13,3736 | 10067 1 | | | | |
| 0763 | 13,3737 | 00000 1 | ZDEC | 0 | | |
| 0763 | 13,3740 | 00000 1 | | | | |
| 0764 | 13,3741 | 02302 1 | J4REQ/J3 | ZDEC* | .4991607391 E7 B-26* | |
| 0764 | 13,3742 | 24736 0 | | | | |
| 0765 | 13,3743 | 00000 1 | ZDEC | 0 | | |
| 0765 | 13,3744 | 00000 1 | | | | |
| 0766 | 13,3745 | 77776 1 | J3REQ/J2 | ZDEC* | -.1355426363 E5 B-27* | |
| 0766 | 13,3746 | 53032 0 | | | | |
| 0767 | 13,3747 | 10407 0 | ZDEC* | .3067493316 E18 B-60* | | |
| 0767 | 13,3750 | 05344 1 | | | | |
| 0768 | 13,3751 | 13710 0 | J2REQSO | ZDEC* | 1.75501139 E21 B-72* | |
| 0768 | 13,3752 | 35320 0 | | | | |
| 0769 | 13,3753 | 12160 0 | J22R2MU | ZDEC* | 9.20479048 E16 B-58* | |
| 0769 | 13,3754 | 12124 0 | | | | |
| 0770 | 13,3755 | 24000 1 | 5/8 | ZDEC | 6 B-3 | |
| 0770 | 13,3756 | 00000 1 | | | | |
| 0771 | 13,3757 | 74631 0 | -1/12 | ZDEC | -.1 | |
| 0771 | 13,3760 | 63145 1 | | | | |
| 0772 | RESP 9 LAST 1320 | 13,3733 | MM | = | MUEARTH -2 | |
| 0773 | | 13,3761 | RECRATIO | ZDEC | .01 | |
| 0773 | | 13,3762 | 32703 1 | | | |
| 0774 | | 13,3763 | 03654 0 | RSPIERS | ZDEC | 64373 76 E3 B-29 |
| 0774 | | 13,3764 | 21000 1 | | | |
| 0775 | | 13,3765 | 03654 0 | RDM | ZDEC | 16093.44 E3 B-27 |
| 0775 | | 13,3766 | 21000 1 | | | |
| 0776 | | 13,3767 | 04627 0 | RDS | ZDEC | 80467.20 E3 B-29 |
| 0776 | | 13,3770 | 25200 1 | | | |
| 0777 | | 0000 | RATT | EQUALS | 0D | |
| 0778 | | 0006 | VATT | EQUALS | 6D | |
| 0779 | | 0014 | TAT | EQUALS | 12D | |
| 0780 | | 0016 | RATT1 | EQUALS | 14D | |
| 0781 | | 0024 | VATT1 | EQUALS | 20D | |
| 0782 | | 0032 | MJ(P) | EQUALS | 26D | |
| 0783 | | 0040 | TDEC1 | EQUALS | 32D | |
| 0784 | | 0016 | URPV | EQUALS | 14D | |
| 0785 | RESP 6 LAST 1311 | 0022 | COSP1/2 | EQUALS | URPV +4 | |
| 0786 | | 0024 | UZ | EQUALS | 20D | |
| 0787 | | 0032 | TVBC | EQUALS | 26D | |

L INFLIGHT ALIGNMENT ROUTINES

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0001 23,3505 BANK 22
 0002 REF 1 23,2000 STLOC INFLIGHT
 0003 23,3140 BANK

0004 REF 34 LAST 172 E5,1671 EBANK= XSM
 W005 CALCOTA COMPUTES THE GYRO TORQUE ANGLES REQUIRED TO BRING THE STABLE MEMBER INTO THE DESIRED ORIENTATION.

R0007 THE INPUT IS THE DESIRED STABLE MEMBER COORDINATES REFERRED TO PRESENT STABLE MEMBER COORDINATES. THE THREE
 R0009 HALF-UNIT VECTORS ARE STORED AT XDC, YDC, AND ZDC.

R0010 THE OUTPUTS ARE THE THREE GYRO TORQUING ANGLES TO BE APPLIED TO THE Y, Z, AND X GYROS AND ARE STORED DP AT IGC,
 R0012 MGC, AND UGC RESPECTIVELY.

| 0013 | REF | 1 | | | | COUNT | 23/INFLT | | | |
|------|-----|----|-----------|---------|-------|-------|----------|-----|-----------|--|
| 0014 | | | | 23,3140 | 71220 | 1 | CALCOTA | ITA | DLOAD | PUSHDOWN 00-03,16D-27D,34D-37D |
| 0015 | REF | 41 | LAST 1320 | 23,3141 | 00051 | 0 | | | S2 | XDC = (XD1 XD2 XD3) |
| 0018 | REF | 5 | LAST 124 | 23,3142 | 02714 | 1 | | | XDC | YDC = (YD1 YD2 YD3) |
| 0011 | | | | 23,3143 | 65325 | 0 | | | PDDL | ZDC = (ZD1 ZD2 ZD3) |
| 0016 | | 30 | LAST 1220 | 23,3144 | 15332 | 1 | | | H16ZEROS | |
| 0019 | | 6 | LAST 1323 | 23,3145 | 02720 | 0 | | | XDC +4 | |
| 0020 | | | | 23,3146 | 55476 | 1 | | | DCOMP | VDEF |
| 0021 | | | | 23,3147 | 77656 | 1 | | | UNIT | |
| 0022 | REF | 1 | | 23,3150 | 14027 | 1 | | | STOCL | ZPRIME |
| 0023 | REF | 2 | LAST 1323 | 23,3151 | 00027 | 1 | | | ZPRIME | ZP = UNIT*(XD3 0 XD1) = (ZP1 ZP2 ZP3) |
| 0024 | | | | 23,3152 | 77742 | 0 | | | SR1 | |
| 0025 | REF | 10 | LAST 1210 | 23,3153 | 14023 | 0 | | | STOCL | SINTH |
| 0026 | REF | 3 | LAST 1323 | 23,3154 | 00033 | 1 | | | ZPRIME +4 | SIN(IGC) = ZP1 |
| 0027 | | | | 23,3155 | 77742 | 0 | | | SR1 | |
| 0028 | | 9 | LAST 1210 | 23,3156 | 34021 | 0 | | | STCALL | COSTH |
| 0029 | REF | 5 | LAST 838 | 23,3151 | 47211 | 0 | | | ARCTRIG | COS(IGC) = ZP3 |
| 0030 | REF | 3 | LAST 528 | 23,3160 | 16762 | 0 | | | STOCL | IGC |
| 0031 | | 7 | LAST 1323 | 23,3161 | 03118 | 0 | | | XDC +2 | Y GYRO TORQUING ANGLE FRACTION OF REV. |
| 0032 | | | | 23,3162 | 11742 | 0 | | | SR1 | |
| 0033 | REF | 11 | LAST 1323 | 23,3163 | 14023 | 0 | | | STOCL | SINTH |
| 0034 | REF | 4 | LAST 1323 | 23,3164 | 00027 | 1 | | | ZPRIME | SIN(MGC) = XD2 |
| 0035 | | | | 23,3165 | 85205 | 0 | | | DMP | PDDL |
| 0036 | | 8 | LAST 1323 | 23,3166 | 02720 | 0 | | | XDC +4 | PD00 = (ZP1)(XD3) |
| 0037 | REF | 5 | LAST 1323 | 23,3167 | 00033 | 1 | | | ZPRIME +4 | |
| 0038 | | | | 23,3110 | 45205 | 1 | | | DMP | DSU |
| 0030 | REF | 9 | LAST 1323 | 23,3171 | 02714 | 1 | | | XDC | MPAC = (ZP3)(XD1) |
| 0040 | | | | 23,3172 | 77626 | 0 | | | STADR | |
| 0041 | REF | 10 | LAST 1323 | 23,3113 | 43756 | 1 | | | STCALL | COSTH |
| 0042 | | 6 | LAST 1323 | 23,3174 | 47211 | 0 | | | ARCTRIG | COS(MGC) = MPAC - PD00 |

e.



L INFLIGHT ALIGNMENT ROUTINES

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| | | | | | | | |
|------|-----|----|------|------|---------|-------|---|
| 0043 | REP | 3 | LAST | 528 | 23,3175 | 26764 | 0 |
| 0044 | REP | 8 | LAST | 1323 | 23,3176 | 00027 | 1 |
| 0045 | | | | | 23,3177 | 77641 | 1 |
| 0046 | REP | 4 | LAST | 534 | 23,3200 | 02730 | 1 |
| 0047 | REP | 11 | LAST | 1323 | 23,3201 | 24021 | 1 |
| 0048 | REP | 7 | LAST | 1324 | 23,3202 | 00027 | 1 |
| 0049 | | | | | 23,3203 | 77641 | 1 |
| 0050 | REP | 4 | LAST | 534 | 23,3204 | 02722 | 1 |
| 0051 | REP | 12 | LAST | 1323 | 23,3205 | 34023 | 1 |
| 0052 | REP | 7 | LAST | 1323 | 23,3206 | 47211 | 0 |
| 0053 | REP | 17 | LAST | 714 | 23,3207 | 36760 | 0 |
| 0054 | REP | 42 | LAST | 1323 | 23,3210 | 00051 | 0 |

STOVL MOC
ZPRIME

Z GYRO TORQUING ANGLE FRACTION OF REV.

DOT

ZDC
STOVL COSTH
ZPRIME

COS(OCC) = ZP . ZDC

DOT

YDC
STCALL SINTH
ARCTRG

SIN(OCC) = ZP . YDC

STCALL OCC
S2

X GYRO TORQUING ANGLE FRACTION OF REV.



L INFLIGHT ALIGNMENT ROUTINES

R0055 ARCTRIG COMPUTES AN ANGLE GIVEN THE SINE AND COSINE OF THIS ANGLE.

R0056 THE INPUTS ARE SIN/4 AND COS/4 STORED DP AT SINTH AND COSTH.

R0057 THE OUTPUT IS THE CALCULATED ANGLE BETWEEN +.5 AND -.5 REVOLUTIONS AND STORED AT THETA. THE OUTPUT IS ALSO AVAILABLE AT MPAC.

| | | | | | | | | |
|------|---------|-----------|---------|---------|---------|-------|---------|-------------------------------------|
| 0060 | | | 23,3211 | 51545 1 | ARCTRIG | DLOAD | ABS | PUSHDOWN 16D-21D |
| 0061 | RESP 13 | LAST 1324 | 23,3212 | 00023 0 | | | SINTH | |
| 0062 | | | 23,3213 | 00025 0 | | DSU | R-N | |
| 0063 | RESP 1 | | 23,3214 | 07427 1 | | | QTSN45 | ABS(SIN/4) - SIN(45)/4 |
| 0064 | RESP 1 | | 23,3215 | 47224 0 | | | TRIG1 | IP (-45,45) OR (135,-135) |
| 0065 | | | 23,3216 | 72545 0 | | DLOAD | SL1 | (45,135) OR (-135,-45) |
| 0066 | RESP 12 | LAST 1324 | 23,3217 | 00021 1 | | | COSTH | |
| 0067 | | | 23,3220 | 75326 1 | | ACOS | SIGN | |
| 0068 | RESP 14 | LAST 1325 | 23,3221 | 00023 0 | | | SINTH | |
| 0069 | RESP 7 | LAST 1210 | 23,3222 | 00025 0 | | STORE | THETA | X = ARCCOS(COS) WITH SIGN(SIN) |
| 0070 | | | 23,3223 | 77616 0 | | RVO | | |
| 0071 | | | 23,3224 | 72545 0 | TRIG1 | DLOAD | SL1 | (-45,45) OR (135,-135) |
| 0072 | RESP 15 | LAST 1325 | 23,3225 | 00023 0 | | | SINTH | |
| 0073 | | | 23,3226 | 77736 0 | | ASIN | | |
| 0074 | RESP 8 | LAST 1325 | 23,3227 | 14025 0 | | STODL | THETA | X = ARCSIN(SIN) WITH SIGN(SIN) |
| 0075 | RESP 13 | LAST 1325 | 23,3230 | 00021 1 | | | COSTH | |
| 0076 | | | 23,3231 | 77640 0 | | R-N | | |
| 0077 | RESP 1 | | 23,3232 | 47235 0 | | | TRIG2 | IP (135,-135) |
| 0078 | | | 23,3233 | 43545 1 | | DLOAD | RVO | |
| 0079 | RESP 9 | LAST 1325 | 23,3234 | 00025 0 | | | THETA | X = ARCSIN(SIN) (-45,45) |
| 0080 | | | 23,3235 | 75345 1 | TRIG2 | DLOAD | SIGN | (135,-135) |
| 0081 | RESP 12 | LAST 1219 | 23,3236 | 15330 0 | | | HIDHALF | |
| 0082 | RESP 16 | LAST 1325 | 23,3237 | 00023 0 | | | SINTH | |
| 0083 | | | 23,3240 | 77625 0 | | DSU | | |
| 0084 | RESP 10 | LAST 1325 | 23,3241 | 00025 0 | | | THETA | |
| 0085 | RESP 11 | LAST 1325 | 23,3242 | 00025 0 | | STORE | THETA | X = .5 WITH SIGN(SIN) - ARCSIN(SIN) |
| 0086 | | | 23,3243 | 77616 0 | | RVO | | (+) - (+) OR (-) - (-) |



L INFLIGHT ALIGNMENT ROUTINES

R0087 S*NB, NBSM, AND AXISROT, WHICH USED TO APPEAR HERE, HAVE BEEN
R0088 COMBINED IN A ROUTINE CALLED AX*SRAT, WHICH APPEARS AMONG THE POWERED
R0089 FLIGHT SUBROUTINES.

L INFLIGHT ALIGNMENT ROUTINES

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R0090 CALCOA COMPUTES THE CDU DRIVING ANGLES REQUIRED TO BRING THE STABLE MEMBER INTO THE DESIRED ORIENTATION.

R0092 THE INPUTS ARE 1) THE NAVIGATION BASE COORDINATES REFERRED TO ANY COORDINATE SYSTEM. THE THREE HALF-UNIT
 R0094 VECTORS ARE STORED AT XNB, YNB, AND ZNB. 2) THE DESIRED STABLE MEMBER COORDINATES REFERRED TO THE SAME
 R0096 COORDINATE SYSTEM ARE STORED AT XSM, YSM, AND ZSM.

R0097 THE OUTPUTS ARE THE THREE CDU DRIVING ANGLES AND ARE STORED SP AT THETAD, THETAD +1, AND THETAD +2.

| Address | Response | Label | Value 1 | Value 2 | Operation | Destination | Comment |
|---------|----------|-----------|---------|---------|-----------|-------------|--------------------------------------|
| 0099 | | | 23,3244 | 77601 0 | CALCOA | SETPD | PUSHDOWN 00-05, 16D-21D, 34D-37D |
| 0100 | | | 23,3245 | 00001 0 | | | |
| 0101 | | | 23,3246 | 47375 0 | VLOAD | VXV | |
| 0102 | RESP 10 | LAST 772 | 23,3247 | 02714 1 | | XNB | XNB = OGA (OUTER GIMBAL AXIS) |
| 0103 | RESP 5 | LAST 772 | 23,3250 | 02700 1 | | YSM | YSM = IGA (INNER GIMBAL AXIS) |
| 0104 | | | 23,3251 | 41456 0 | UNIT | PUSH | PD0 = UNIT(OGA X IGA) = MGA |
| 0105 | | | 23,3252 | 44041 1 | DOT | IDA | |
| 0106 | RESP 7 | LAST 772 | 23,3253 | 02730 1 | | ZNB | |
| 0107 | RESP 43 | LAST 1324 | 23,3254 | 00051 0 | | S2 | |
| 0108 | RESP 14 | LAST 1325 | 23,3255 | 24021 1 | STOVL | COSTH | COS(OG) = MGA . ZNB |
| 0109 | | | 23,3256 | 00001 0 | | 0 | |
| 0110 | | | 23,3257 | 77641 1 | DOT | | |
| 0111 | RESP 7 | LAST 772 | 23,3260 | 02722 1 | | YNB | |
| 0112 | RESP 17 | LAST 1325 | 23,3261 | 34023 1 | STCALL | SINTH | SIN(OG) = MGA . YNB |
| 0113 | RESP 8 | LAST 1324 | 23,3262 | 47211 0 | | ARCTRIG | |
| 0114 | RESP 18 | LAST 1324 | 23,3263 | 26760 1 | STOVL | OGC | |
| 0115 | | | 23,3264 | 00001 0 | | 0 | |
| 0116 | | | 23,3265 | 50235 0 | VXV | DOT | PROVISION FOR MG ANGLE OF 90 DEGREES |
| 0117 | RESP 11 | LAST 1327 | 23,3266 | 02714 1 | | XNB | |
| 0118 | RESP 6 | LAST 1327 | 23,3267 | 02700 1 | | YSM | |
| 0119 | | | 23,3270 | 77752 1 | SL1 | | |
| 0120 | RESP 15 | LAST 1327 | 23,3271 | 24021 1 | STOVL | COSTH | COS(MG) = IGA . (MGA X OGA) |
| 0121 | RESP 7 | LAST 1327 | 23,3272 | 02700 1 | | YSM | |
| 0122 | | | 23,3273 | 77641 1 | DOT | | |
| 0123 | RESP 12 | LAST 1327 | 23,3274 | 02714 1 | | XNB | |
| 0124 | RESP 18 | LAST 1327 | 23,3275 | 34023 1 | STCALL | SINTH | SIN(MG) = IGA . OGA |
| 0125 | RESP 9 | LAST 1327 | 23,3276 | 47211 0 | | ARCTRIG | |
| 0126 | RESP 4 | LAST 1324 | 23,3277 | 02764 0 | STORE | MOC | |
| 0127 | | | 23,3300 | 45246 0 | ARS | DSU | |
| 0128 | RESP 1 | | 23,3301 | 07431 0 | | .166... | |
| 0129 | | | 23,3302 | 77644 1 | BPL | | |
| 0130 | RESP 1 | | 23,3303 | 47324 1 | | GIMLOCK1 | IF ANGLE GREATER THAN 60 DEGREES |
| 0131 | | | 23,3304 | 50375 0 | CALCOA1 | VLOAD | DOT |
| 0132 | RESP 4 | LAST 772 | 23,3305 | 02706 1 | | ZSM | |
| 0133 | | | 23,3306 | 00001 0 | | 0 | |
| 0134 | RESP 16 | LAST 1327 | 23,3307 | 24021 1 | STOVL | COSTH | COS(IG) = ZSM . MGA |
| 0135 | RESP 35 | LAST 1323 | 23,3310 | 02672 0 | | XSM | |

L INFLIGHT ALIGNMENT ROUTINES

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| | | | | | | | |
|-------|---------|-----------|---------|----------|----------|-----------|-------------------------|
| 0136 | | | 23,3311 | 45441 1 | DOT | STADR | |
| 0137 | REP 19 | LAST 1327 | 23,3312 | 43754 0 | STCALL | SININ | SIN(IG) = XSM . MGA |
| 0138 | REP 10 | LAST 1327 | 23,3313 | 47211 0 | | ARCTRIG | |
| 0139 | REP 4 | LAST 1323 | 23,3314 | 28762 0 | STOVL | IGC | |
| 0140 | REP 19 | LAST 1327 | 23,3315 | 02760 1 | | OCC | |
| 0141 | | | 23,3316 | 43034 1 | RTB | BONCLR | |
| 01415 | REP 5 | LAST 535 | 23,3317 | 45647 0 | | V1STO25 | |
| 0142 | REP 2 | LAST 772 | 23,3320 | 00200 0 | | CRNIFLAG | |
| 01425 | REP 44 | LAST 1327 | 23,3321 | 00051 0 | | S2 | |
| 0143 | REP 20 | LAST 722 | 23,3322 | 35156 0 | STCALL | THSTAD | |
| 0144 | REP 45 | LAST 1328 | 23,3323 | 00051 0 | | S2 | |
| 0145 | | | 23,3324 | 77776 1 | GIMLOCK1 | EXIT | |
| 0146 | REP 36 | LAST 1318 | 23,3325 | 0 5537 0 | TC | ALARM | |
| 0147 | | | 23,3326 | 00401 1 | OCT | 00401 | |
| 0148 | REP 51 | LAST 1317 | 23,3327 | 0 5435 0 | TC | UPFLAG | GIMRAL LOCK HAS OCCURED |
| 0149 | REP 2 | LAST 417 | 23,3330 | 00056 1 | ADRES | GLOCKFAIL | |
| 0150 | REP 241 | LAST 1318 | 23,3331 | 0 6006 1 | TC | INTPRET | |
| 0151 | | | 23,3332 | 77650 1 | GOTO | | |
| 0152 | REP 1 | | 23,3333 | 47304 0 | | CALOGA1 | |



L INFLIGHT ALIGNMENT ROUTINES USER=8 PAGE NO. 7 E5 53

0153 AXISCEN COMPUTES THE COORDINATES OF ONE COORDINATE SYSTEM REFERRED TO ANOTHER COORDINATE SYSTEM.

0155 THE INPUTS ARE 1) THE STAR1 VECTOR REFERRED TO COORDINATE SYSTEM A STORED AT STARAD. 2) THE STAR2 VECTOR
 0157 REFERRED TO COORDINATE SYSTEM A STORED AT STARAD +8. 3) THE STAR1 VECTOR REFERRED TO COORDINATE SYSTEM B STORED
 0159 AT LOCATION 6 OF THE VAC AREA. 4) THE STAR2 VECTOR REFERRED TO COORDINATE SYSTEM B STORED AT LOCATION 12D OF
 0161 THE VAC AREA.

0162 THE OUTPUT DEFINES COORDINATE SYSTEM A REFERRED TO COORDINATE SYSTEM B. THE THREE HALF-UNIT VECTORS ARE STORED
 0164 AT LOCATIONS XDC, XDC +8, XDC +12D, AND STARAD, STARAD +8, STARAD +12D.

| | | | | | | | |
|------|---------|-----------|---------|---------|-----------------|---------------------|-------------------------------------|
| 0165 | | | 23,3334 | 66370 0 | AXISCEN AXT,1 | SSP | PUSHDOWN 00-30D,34D-37D |
| 0166 | RESP 11 | LAST 738 | 23,3335 | 02743 0 | | STARAD +8 | |
| 0167 | RESP 54 | LAST 1310 | 23,3336 | 00051 0 | | S1 | |
| 0168 | RESP 12 | LAST 1329 | 23,3337 | 02727 1 | | STARAD -8 | |
| 0169 | | | 23,3340 | 77601 0 | | SETPD | |
| 0170 | | | 23,3341 | 00001 0 | | 0 | |
| 0171 | | | 23,3342 | 46773 0 | AXISCEN1 VLOAD* | VXV* | 06D UA = S1 |
| 0172 | RESP 13 | LAST 1329 | 23,3343 | 02752 0 | | STARAD +12D,1 | STARAD +00D UB = S1 |
| 0173 | RESP 14 | LAST 1329 | 23,3344 | 02760 1 | | STARAD +18D,1 | |
| 0174 | | | 23,3345 | 77656 1 | | UNIT | 12D VA = UNITY(S1 X S2) |
| 0175 | RESP 15 | LAST 1329 | 23,3346 | 06760 0 | | STORE STARAD +18D,1 | STARAD +06D VB = UNITY(S1 X S2) |
| 0176 | | | 23,3347 | 77773 1 | | VLOAD* | |
| 0177 | RESP 16 | LAST 1329 | 23,3350 | 02752 0 | | STARAD +12D,1 | |
| 0178 | | | 23,3351 | 76433 1 | | VXV* VSL1 | |
| 0179 | RESP 17 | LAST 1329 | 23,3352 | 02760 1 | | STARAD +18D,1 | 18D WA = UA X VA |
| 0180 | RESP 18 | LAST 1329 | 23,3353 | 06766 0 | | STORE STARAD +24D,1 | STARAD +12D WB = UB X VB |
| 0181 | | | 23,3354 | 77700 0 | | TIX,1 | |
| 0182 | RESP 1 | | 23,3355 | 47342 1 | | AXISCEN1 | |
| 0183 | | | 23,3356 | 66180 0 | | AXC,1 SXA,1 | |
| 0184 | | | 23,3357 | 00006 1 | | 6 | |
| 0185 | | | 23,3360 | 00036 1 | | 30D | |
| 0186 | | | 23,3361 | 66370 0 | | AXT,1 SSP | |
| 0187 | | | 23,3362 | 00022 1 | | 18D | |
| 0188 | RESP 55 | LAST 1329 | 23,3363 | 00051 0 | | S1 | |
| 0189 | | | 23,3364 | 00006 1 | | 6 | |
| 0190 | | | 23,3365 | 66374 1 | | AXT,2 SSP | |
| 0191 | | | 23,3366 | 00006 1 | | 6 | |
| 0192 | RESP 46 | LAST 1328 | 23,3367 | 00052 0 | | S2 | |
| 0193 | | | 23,3370 | 00002 0 | | 2 | |
| 0194 | | | 23,3371 | 76720 0 | AXISCEN2 XCN,1 | VLOAD* | |
| 0195 | | | 23,3372 | 00036 1 | | 30D | X1=-6 X2=+6 X1=-6 X2=+4 X1=-6 X2=+2 |
| 0196 | | | 23,3373 | 00001 0 | | 0,1 | |



L FLIGHT ALIGNMENT ROUTINES

| | | | | |
|------|--------|-----------|---------|---------|
| 0197 | | | 23,3374 | 62757 0 |
| 0198 | REP 19 | LAST 1329 | 23,3375 | 75033 0 |
| 0199 | | | 23,3376 | 00007 0 |
| 0200 | | | 23,3377 | 77757 1 |
| 0201 | REP 20 | LAST 1330 | 23,3400 | 75025 1 |
| 0202 | | | 23,3401 | 30031 0 |
| 0203 | | | 23,3402 | 00015 0 |
| | | | | |
| 0204 | | | 23,3403 | 53357 0 |
| 0205 | REP 21 | LAST 1330 | 23,3404 | 75017 0 |
| 0206 | | | 23,3405 | 76455 1 |
| 0207 | | | 23,3406 | 00031 0 |
| 0208 | | | 23,3407 | 53520 0 |
| 0209 | | | 23,3410 | 00038 1 |
| 0210 | REP 10 | LAST 1323 | 23,3411 | 06738 0 |
| | | | | |
| 0211 | | | 23,3412 | 77700 0 |
| 0212 | REP 1 | | 23,3413 | 47414 0 |
| | | | | |
| 0215 | | | 23,3416 | 77715 1 |
| 0218 | REP 5 | LAST 1324 | 23,3421 | 02722 1 |
| 0219 | REP 23 | LAST 1330 | 23,3422 | 26744 1 |
| 0220 | REP 5 | LAST 1324 | 23,3423 | 02730 1 |
| 0221 | REP 24 | LAST 1330 | 23,3424 | 02752 0 |

| | | | | |
|--------|---------------|-------------|-------------|-------------|
| VXSC* | FDVL* | J=(UA)(UB1) | J=(UA)(UB2) | J=(UA)(UB3) |
| | STARAD +6,2 | | | |
| | 6,1 | | | |
| VXSC* | | | | |
| STOVL* | STARAD +12D,2 | K=(VA)(VB1) | J=(VA)(VB2) | J=(VA)(VB3) |
| | 24D | | | |
| | 12D,1 | | | |
| VXSC* | VAD | | | |
| | STARAD +18D,2 | L=(WA)(WB1) | J=(WA)(WB2) | J=(WA)(WB3) |
| VAD | VSL,1 | | | |
| | 24D | | | |
| XCRK,1 | UNIT | | | |
| | 30D | | | |
| STORE | XDC +18D,1 | XDC = L+J+K | YDC = L+J+K | ZDC = L+J+K |
| | | | | |
| TIX,1 | | | | |
| | AXISGEN3 | | | |
| | | | | |
| VLOAD | | | | |
| | YDC | | | |
| STOVL | STARAD +6 | | | |
| | ZDC | | | |
| STORE | STARAD +12D | | | |



L INFLIGHT ALIGNMENT ROUTINES

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| | | | | | |
|------|---------|---------|---------|------|-------------|
| 0281 | 23,3426 | 05520 0 | GT3N45 | 2DEC | .1768 |
| 0281 | 23,3427 | 26075 1 | | | |
| 0282 | 23,3430 | 05252 1 | .186... | 2DEC | .1666666667 |
| 0282 | 23,3431 | 25253 1 | | | |





L POWERED FLIGHT SUBROUTINES

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| | | | | |
|------|-------|---------|-----------------|--|
| 0001 | | 14,3405 | BANK 14 | SAME FBANK AS THE FINDCOLD SUB-PROGRAM |
| 0002 | REP 1 | 23,2000 | SETLOC POWPLITE | |
| 0003 | | 23,3432 | BANK | |
| 0004 | REP 1 | 0142 | EBANK= DSDDEX | |
| 0005 | REP 1 | | COLTN= 88/POWFL | |

R0006 CDUTRIG, CDUTRIG1, CDUTRIG2, AND CD*TRIGS ALL COMPUTE THE SINES AND
R0007 COSINES OF THREE 2=3 COMPLEMENT ANGLES AND PLACE THE RESULT, DOUBLE
R0008 PRECISION, IN THE SAME ORDER AS THE INPUTS, AT SINCDU AND COSCDU. AN
R0009 ADDITIONAL OUTPUT IS THE 1=3 COMPLEMENT ANGLES AT CDUSPOT. THESE
R0010 ROUTINES GO OUT OF THEIR WAY TO LEAVE THE MPAC AREA AS THEY FIND IT,
R0011 EXCEPT FOR THE GENERALLY UNIMPORTANT MPAC +2. THEY DIFFER ONLY IN
R0012 WHERE THEY GET THE ANGLES, AND IN METHOD OF CALLING.

R0013 CDUTRIG (AND CDUTRIG1, WHICH CAN BE CALLED IN BASIC) COMPUTE THE
R0014 SINES AND COSINES FROM THE CURRENT CONTENTS OF THE CDU REGISTERS.
R0015 THE CONTENTS OF CDUTEMP, ETC., ARE NOT TOUCHED SO THAT THEY MAY
R0016 CONTINUE TO FORM A CONSISTENT SET WITH THE LATEST PIPA READINGS.

R0017 CDUTRIG1 IS LIKE CDUTRIG EXCEPT THAT IT CAN BE CALLED IN BASIC.

R0018 CD*TRIGS FINDS CDU VALUES IN CDUSPOT RATHER THAN IN CDUTEMP. THIS
R0019 ALLOWS USERS TO MAKE TRANSFORMATIONS USING ARBITRARY ANGLES, OR REAL
R0020 ANGLES IN AN ORDER OTHER THAN X Y Z. A CALL TO THIS ROUTINE IS
R0021 NECESSARY IN PREPARATION FOR A CALL TO AX*SR*IT IN EITHER OF ITS TWO
R0022 MODES (SMB OR NBSM). SINCE AX*SR*IT EXPECTS TO FIND THE SINES AND
R0023 COSINES IN THE ORDER Y Z X THE ANGLES MUST HAVE BEEN PLACED IN CDUSPOT
R0024 IN THIS ORDER. CD*TRIGS NEED NOT BE REPEATED WHEN AX*SR*IT IS CALLED
R0025 MORE THAN ONCE, PROVIDED THE ANGLES HAVE NOT CHANGED. NOTE THAT SINCE
R0026 IT CLOBBERS BLP2 (IN THE SINE AND COSINE ROUTINES) CD*TRIGS CANNOT BE
R0027 CALLED USING BANKCALL. SORRY.

R0028 CD*TRIG IS LIKE CD*TRIGS EXCEPT THAT IT CAN BE CALLED IN
R0029 INTERPRETIVE.

| | | | | | | |
|------|-------------------|---------|----------|----------|-------|------------|
| 0030 | | 23,3432 | 77776 1 | CDUTRIG | EXIT | |
| 0031 | REP 1 | 23,3433 | 0 3442 0 | TC | | CDUTRIGS |
| 0032 | REP 242 LAST 1320 | 23,3434 | 0 8006 1 | TC | | INTPRET |
| 0033 | | 23,3435 | 77616 0 | RVO | | |
| 0034 | | 23,3436 | 77776 1 | CD*TRIG | EXIT. | |
| 0035 | REP 1 | 23,3437 | 0 3450 0 | TC | | CD*TRIGS |
| 0036 | REP 243 LAST 1333 | 23,3440 | 0 8006 1 | TC | | INTPRET |
| 0037 | | 23,3441 | 77616 0 | RVO | | |
| 0038 | REP 28 LAST 1034 | 23,3442 | 3 0032 0 | CDUTRIGS | CA | CDLK |
| 0039 | REP 8 LAST 535 | 23,3443 | 54 772 1 | TS | | CDUSPOT +4 |
| 0040 | REP 18 LAST 1034 | 23,3444 | 3 0033 1 | CA | | CDUY |
| 0041 | REP 7 LAST 1333 | 23,3445 | 54 766 1 | TS | | CDUSPOT |



L POWERED FLIGHT SUBROUTINES

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| | | | | | | | |
|------|-----|-----|-----------|---------|----------|----------|------------|
| 0042 | REP | 22 | LAST 1034 | 23,3446 | 3 0034 0 | CA | CDUZ |
| 0043 | REP | 8 | LAST 1333 | 23,3447 | 54 770 0 | TS | CDUSPOT +2 |
| 0044 | | | | 23,3450 | 0 0006 1 | CD*TRMOS | EXTEND |
| 0045 | REP | 4 | LAST 69 | 23,3451 | 22 142 0 | DXCH | TEM2 |
| 0046 | REP | 17 | LAST 1152 | 23,3452 | 3 4710 0 | CAP | FOUR |
| 0047 | REP | 37 | LAST 1122 | 23,3453 | 7 6211 1 | TRMCL**P | SIX |
| 0048 | REP | 3 | LAST 69 | 23,3454 | 54 143 0 | TS | TEM3 |
| 0049 | REP | 4 | LAST 1334 | 23,3455 | 50 143 1 | INDEX | TEM3 |
| 0050 | REP | 9 | LAST 1334 | 23,3456 | 3 0766 0 | CA | CDUSPOT |
| 0051 | REP | 659 | LAST 1311 | 23,3457 | 52 155 1 | DXCH | MPAC |
| 0052 | REP | 53 | LAST 1146 | 23,3460 | 52 127 1 | DXCH | VRUP +4 |
| 0053 | REP | 1 | | 23,3461 | 0 4652 1 | TC | USPRCADR |
| 0054 | REP | 10 | LAST 837 | 23,3462 | 45510 1 | CADR | CDULOGIC |
| 0055 | | | | 23,3463 | 0 0006 1 | EXTEND | |
| 0056 | REP | 660 | LAST 1334 | 23,3464 | 3 0155 0 | DCA | MPAC |
| 0057 | REP | 5 | LAST 1334 | 23,3465 | 50 143 1 | INDEX | TEM3 |
| 0058 | REP | 10 | LAST 1334 | 23,3466 | 52 767 0 | DXCH | CDUSPOT |
| 0059 | REP | 2 | LAST 1334 | 23,3467 | 0 4652 1 | TC | USPRCADR |
| 0060 | REP | 2 | LAST 1088 | 23,3470 | 01516 1 | CADR | COSINE |
| 0061 | REP | 661 | LAST 1334 | 23,3471 | 52 155 1 | DXCH | MPAC |
| 0062 | REP | 6 | LAST 1334 | 23,3472 | 50 143 1 | INDEX | TEM3 |
| 0063 | REP | 4 | LAST 72 | 23,3473 | 52 745 0 | DXCH | COSCDU |
| 0064 | | | | 23,3474 | 0 0006 1 | EXTEND | |
| 0065 | REP | 7 | LAST 1334 | 23,3475 | 5 0143 1 | INDEX | TEM3 |
| 0066 | REP | 11 | LAST 1334 | 23,3476 | 3 0767 1 | DCA | CDUSPOT |
| 0067 | REP | 3 | LAST 1334 | 23,3477 | 0 4652 1 | TC | USPRCADR |
| 0068 | REP | 2 | LAST 1088 | 23,3500 | 01530 0 | CADR | SINE +1 |
| 0069 | REP | 54 | LAST 1334 | 23,3501 | 52 127 1 | DXCH | VRUP +4 |
| 0070 | REP | 662 | LAST 1334 | 23,3502 | 52 155 1 | DXCH | MPAC |
| 0071 | REP | 8 | LAST 1334 | 23,3503 | 50 143 1 | INDEX | TEM3 |
| 0072 | REP | 4 | LAST 72 | 23,3504 | 52 737 0 | DXCH | SINCDU |
| 0073 | REP | 9 | LAST 1334 | 23,3505 | 10 143 0 | CCS | TEM3 |
| 0074 | REP | 1 | | 23,3506 | 1 3453 1 | TC | TRMCL**P |
| 0075 | REP | 5 | LAST 1334 | 23,3507 | 0 0142 0 | TC | TEM2 |

MAKE IT EVEN AND SMALLER

STORING 2=5 COMP ANGLE, LOADING MPAC
STORING MPAC FOR LATER RESTORATION

STORING 1=5 COMPLEMENT ANGLE

STORING COSINE

LOADING 1=5 COMPLEMENT ANGLE

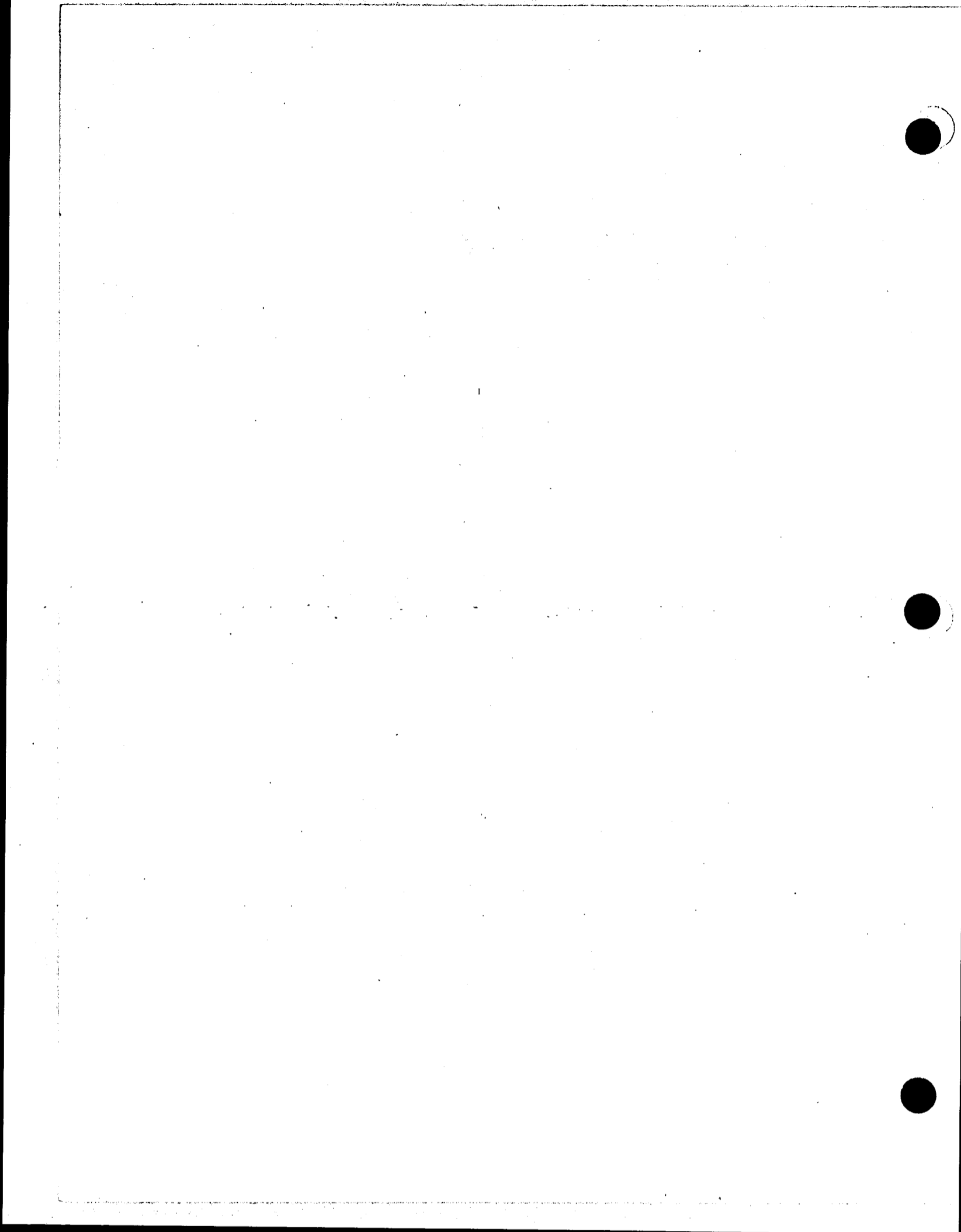
SINE +1 EXPECTS ARGUMENT IN A AND L
BRINGING UP PRIOR MPAC TO BE RESTORED

L POWERED FLIGHT SUBROUTINES

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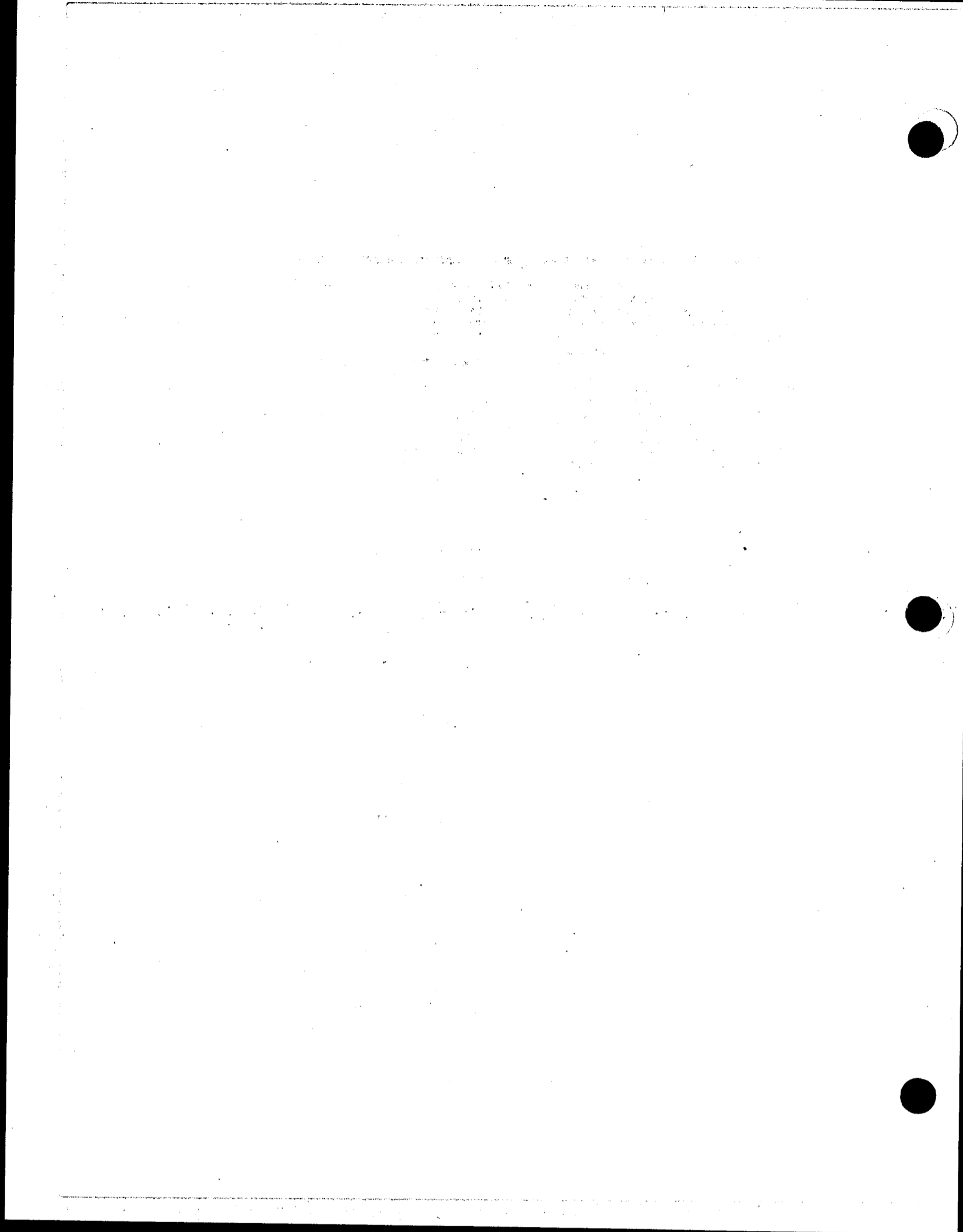
F0076 *****

R0078 QUICTRIG, INTENDED FOR GUIDANCE CYCLE USE WHERE TIME IS CRITICAL, IS A MUCH FASTER VERSION OF CD*TRIGS.
R0080 QUICTRIG COMPUTES AND STORES THE SINES AND COSINES OF THE 2=3 COMPLEMENT ANGLES AT CDUSPOT, CDUSPOT +2,
R0082 AND CDUSPOT +4. UNLIKE CD*TRIGS, QUICTRIG DOES NOT LEAVE THE 1=3 COMPLEMENT VERSIONS OF THE ANGLES IN
R0084 CDUSPOT. QUICTRIG'S EXECUTION TIME IS 4.1 MS



00006 CALLED FROM INTERPRETIVE AS AN RTE OP-CODE, OR FROM BASIC VIA BANKCALL OR IBKCALL.

| | | | | | | | | | |
|-------|-----|-----|------|---------|----------|----------|--------|-------------|---|
| 0090 | | | | 23,3510 | 0 0004 0 | QUICTRIG | INHINT | | |
| 00901 | | | | 23,3511 | 0 0006 1 | EXTEND | | | INHINT SINCE DAP USES THE SAME TEMPS |
| 00902 | REP | 11 | LAST | 225 | 23,3512 | 22 081 0 | ONCH | ITEMP1 | |
| 0091 | REP | 18 | LAST | 1334 | 23,3513 | 3 4710 0 | CAP | FOUR | |
| 0092 | REP | 38 | LAST | 1334 | 23,3514 | 7 6211 1 | + | MASK | SIX |
| 0093 | REP | 10 | LAST | 223 | 23,3515 | 54 062 1 | TS | ITEMP2 | |
| 0094 | REP | 11 | LAST | 1335 | 23,3516 | 50 062 0 | INDEX | ITEMP2 | |
| 0095 | REP | 12 | LAST | 1334 | 23,3517 | 3 0766 0 | CA | CDUSPOT | |
| 0096 | REP | 8 | LAST | 1044 | 23,3520 | 0 4770 0 | TC | SPSIN | |
| 0097 | | | | 23,3521 | 0 0006 1 | EXTEND | | | |
| 0098 | REP | 73 | LAST | 1205 | 23,3522 | 7 4675 0 | MP | BIT14 | SCALE DOWN TO MATCH INTERPRETER OUTPUTS |
| 0099 | REP | 12 | LAST | 1335 | 23,3523 | 50 062 0 | INDEX | ITEMP2 | |
| 0100 | REP | 5 | LAST | 1334 | 23,3524 | 52 737 0 | DXCH | SINCDU | |
| 0101 | REP | 13 | LAST | 1335 | 23,3525 | 50 062 0 | INDEX | ITEMP2 | |
| 0102 | REP | 13 | LAST | 1335 | 23,3526 | 3 0766 0 | CA | CDUSPOT | |
| 0103 | REP | 7 | LAST | 1044 | 23,3527 | 0 4767 0 | TC | SPCOS | |
| 0104 | | | | 23,3530 | 0 0006 1 | EXTEND | | | |
| 0105 | REP | 74 | LAST | 1335 | 23,3531 | 7 4675 0 | MP | BIT14 | |
| 0106 | REP | 14 | LAST | 1335 | 23,3532 | 50 062 0 | INDEX | ITEMP2 | |
| 0107 | REP | 5 | LAST | 1334 | 23,3533 | 52 745 0 | DXCH | COSCDU | |
| 0108 | REP | 15 | LAST | 1335 | 23,3534 | 10 062 1 | CCS | ITEMP2 | |
| 0109 | REP | 2 | LAST | 661 | 23,3535 | 1 3514 0 | TCP | QUICTRIG +4 | |
| 01091 | REP | 12 | LAST | 1335 | 23,3536 | 3 0061 0 | CA | ITEMP1 | |
| 0110 | | | | 23,3537 | 0 0003 1 | RELINT | | | |
| 01101 | REP | 341 | LAST | 1204 | 23,3540 | 0 0000 1 | TC | A | |



L POWERED FLIGHT SUBROUTINES

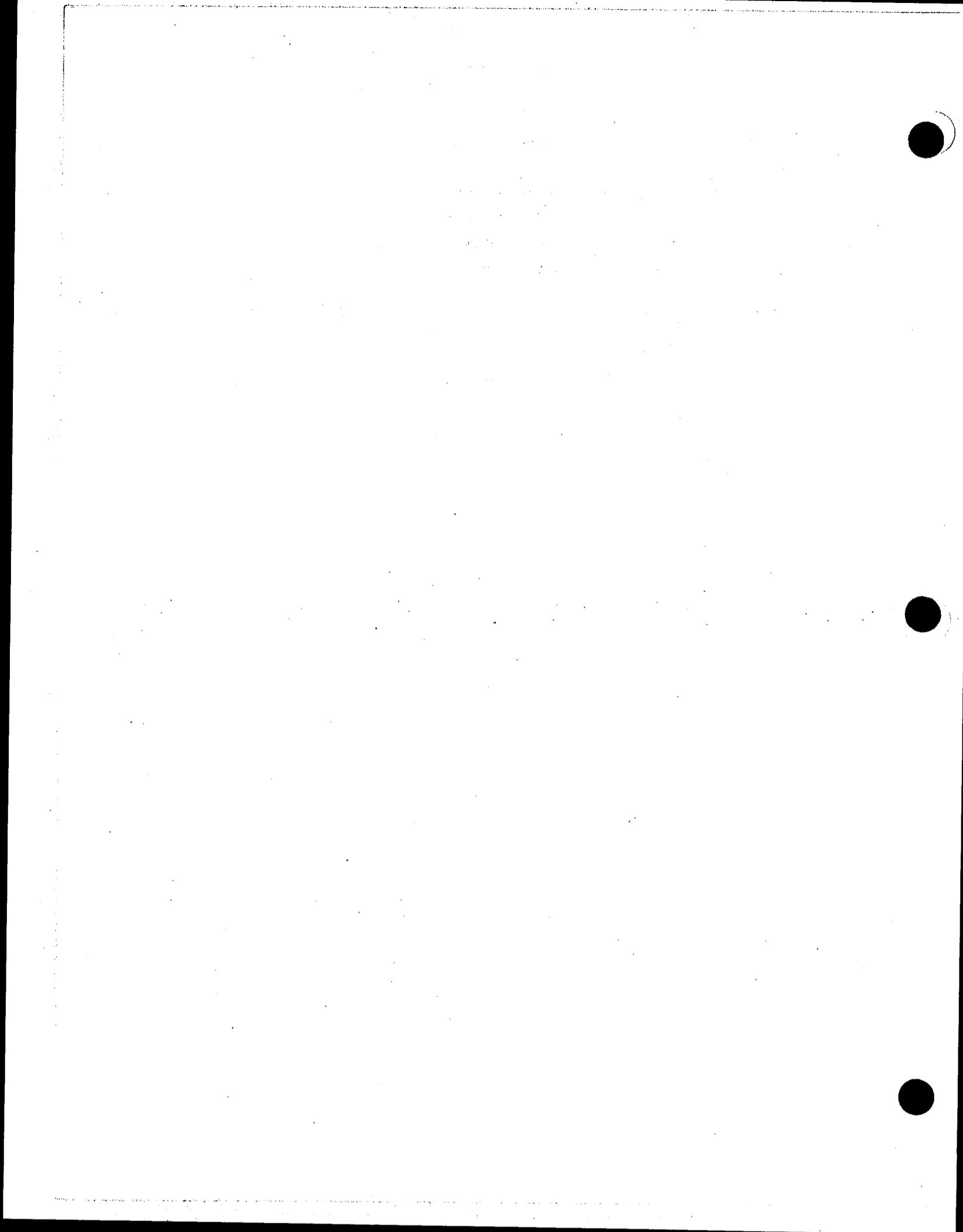
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R0111 *****
 R0113 THESE INTERFACE ROUTINES MAKE IT POSSIBLE TO CALL AX*SRAT, ETC., IN
 R0114 INTERPRETIVE. LATER, WHERE POSSIBLE, THEY WILL BE ELIMINATED.

R0115 NBSM WILL BE THE FIRST TO GO. IT SHOULD NOT BE USED.

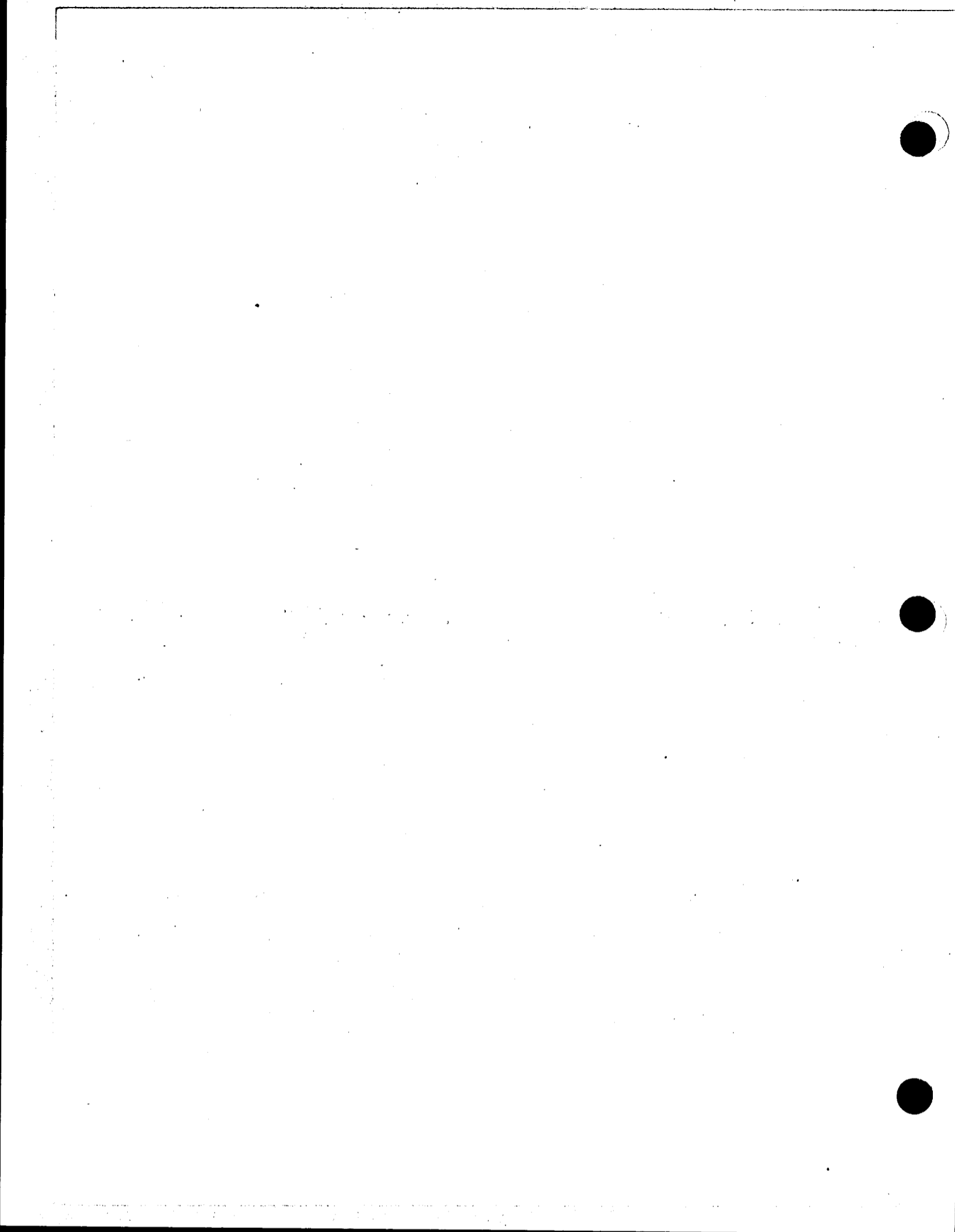
| | | | | | | | | |
|------|-----|----|-----------|---------|---------|--------|---------|---|
| 0116 | | | 23,3541 | 77620 0 | NBSM | STO | | |
| 0117 | NSP | 37 | LAST 1311 | 23,3542 | 00047 1 | | X2 | |
| 0118 | | | | 23,3543 | 76740 0 | LXC,1 | VLOAD* | |
| 0119 | NSP | 56 | LAST 1329 | 23,3544 | 00050 1 | | S1 | BASE ADDRESS OF THE CDU ANGLES IS IN S1 |
| 0120 | | | | 23,3545 | 00001 0 | | 0,1 | |
| 0121 | NSP | 14 | LAST 1335 | 23,3546 | 24767 1 | STOVL | CDUSPOT | VECTOR TO BE TRANSFORMED IS IN 32D |
| 0122 | | | | 23,3547 | 00041 1 | | 32D | |
| 0123 | | | | 23,3550 | 77624 1 | CALL | | |
| 0124 | NSP | 2 | LAST 447 | 23,3551 | 47572 1 | | TRCNBSM | |
| 0125 | | | | 23,3552 | 34041 0 | STCALL | 32D | SINCE THERE'S NO STOOTO |
| 0126 | NSP | 38 | LAST 1336 | 23,3553 | 00047 1 | | X2 | |

R0127 THESE INTERFACE ROUTINES ARE PERMANENT. ALL RESTORE USER'S FRANK
 R0128 SETTING. ALL ARE STRICT INTERPRETIVE SUBROUTINES, CALLED USING #CALL.A,
 R0129 RETURNING VIA QPRET. ALL EXPECT AND RETURN THE VECTOR TO BE TRANSPOR-
 R0130 MED INTERPRETER-STYLE IN MPAC



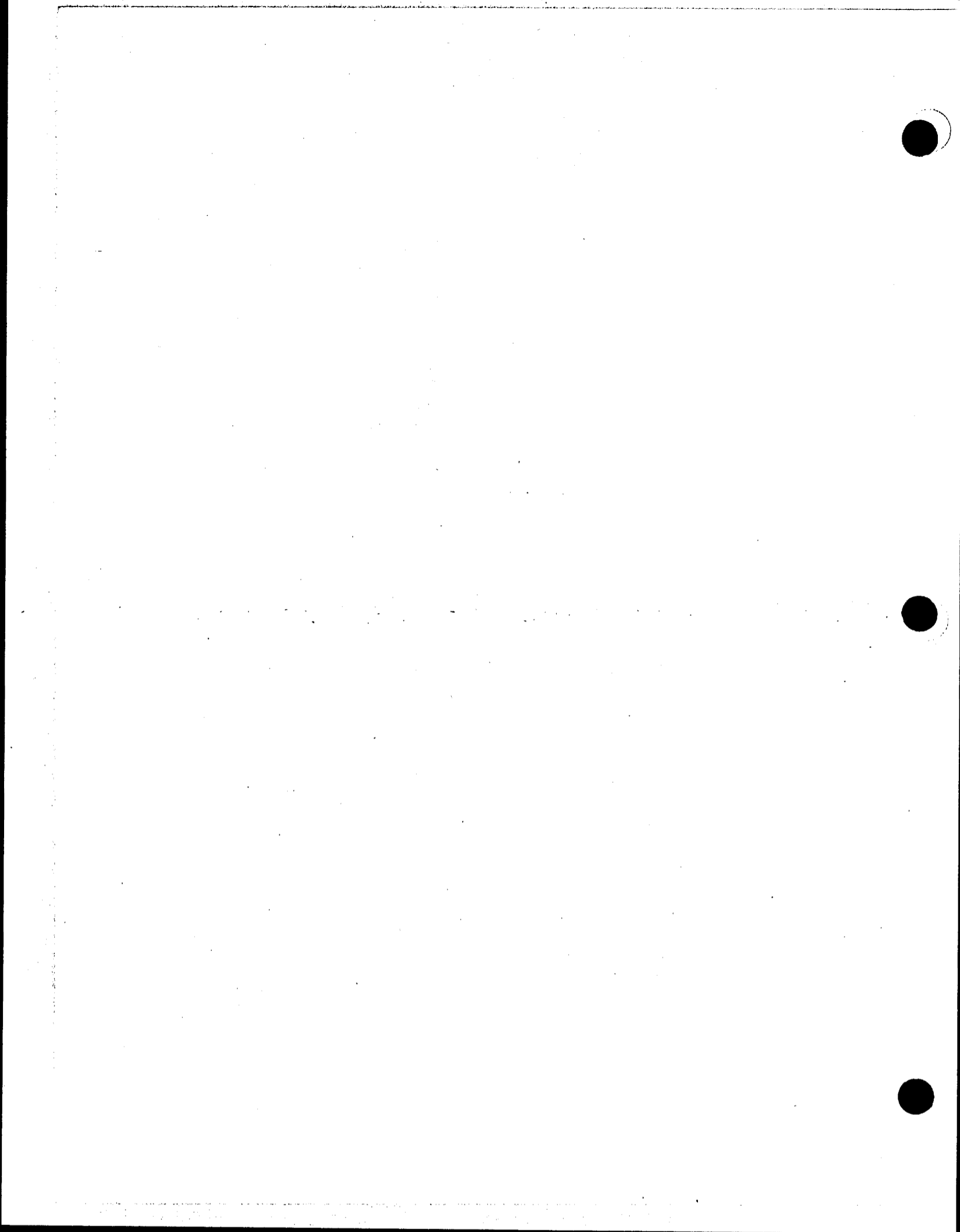
1336-A

R0131 TROMSMB AND TROMBSM BOTH EXPECT TO SEE THE 2-S COMPLEMENT ANGLES
R0132 AT CDUSPOT (ORDER Y Z X, AT CDUSPOT, CDUSPOT +2, AND CDUSPOT +4



1336-B

R0133 LOCATIONS NEED NOT BE ZEROED). TROMBEM DOES THE NB TO SM TRANSFOR-
R0134 MATION



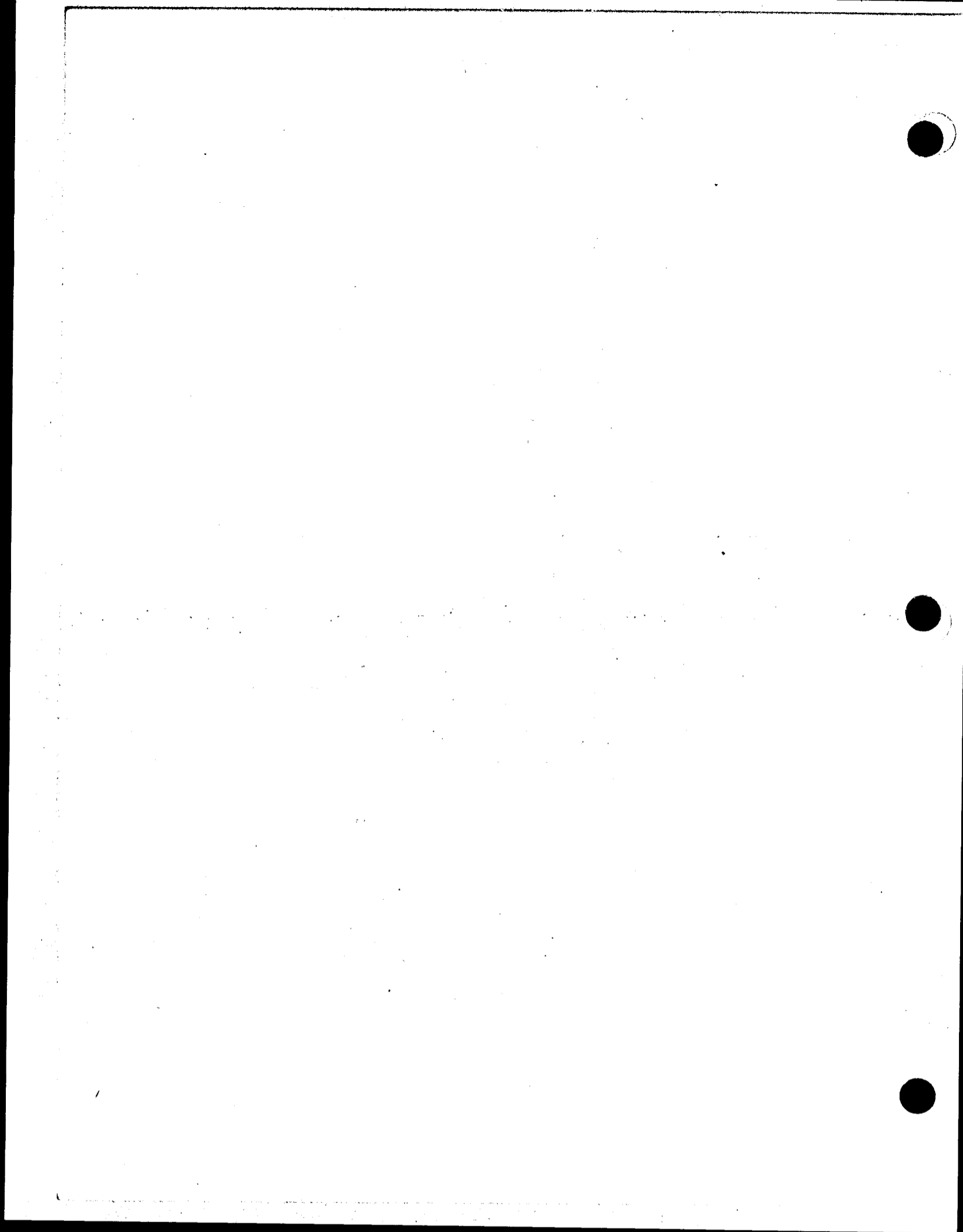
1336-C

R0135 COLUMNBSM DOES ITS TRANSFORMATION USING THE PRESENT CONTENTS OF
R0136 THE CDU COUNTERS. OTHERWISE IT IS LIKE TRCNBSM.

R01361 CDU*SNB IS THE COMPLEMENT OF CDUNBSM.

| | | | | | | | | | |
|-------|-----|-----|-----------|---------|----------|---------|-------|----------|--|
| 01362 | | | 23,3554 | 77776 | 1 | CDU*SNB | EXIT | | |
| 01363 | REP | 2 | LAST 1333 | 23,3555 | 0 3442 0 | | TC | CDUTRIGS | |
| 01364 | REP | 1 | | 23,3556 | 1 3561 1 | | TCF | CKMMN1 | |
| 0137 | | | 23,3557 | 77776 | 1 | TRCNBSM | EXIT | | |
| 0138 | REP | 2 | LAST 1333 | 23,3560 | 0 3450 0 | | TC | CD*TRIGS | |
| 0139 | REP | 3 | LAST 1145 | 23,3561 | 0 7501 1 | CKMMN1 | TC | MPAC/RUP | |
| 0140 | REP | 42 | LAST 1174 | 23,3562 | 4 6214 1 | | CS | THREE | |
| 0141 | REP | 1 | | 23,3563 | 0 3603 1 | CKMMN2 | TC | AX*SR*F | |
| 0142 | REP | 244 | LAST 1333 | 23,3564 | 0 6006 1 | | TC | INTPRET | |
| 0143 | | | 23,3565 | 43575 | 1 | | VLOAD | RVO | |
| 0144 | REP | 55 | LAST 1334 | 23,3566 | 00123 1 | | | VRUF | |
| 0145 | | | 23,3567 | 77776 | 1 | CDUNBSM | EXIT | | |
| 0146 | REP | 3 | LAST 1336 | 23,3570 | 0 3442 0 | | TC | CDUTRIGS | |

AX*SR*F EXPECTS VECTOR IN VRUF
SIGNAL FOR SM TO NR TRANSFORMATION



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| | | | | | | | |
|------|---------|-----------|---------|----------|--------|----------|---|
| 0186 | | | 23,3611 | 0 0006 1 | EXTEND | | |
| 0187 | REP 342 | LAST 1335 | 23,3612 | 5 0000 1 | INDEX | A | |
| 0188 | REP 1 | | 23,3613 | 3 3672 1 | DCA | INDEX1 | |
| 0189 | REP 1 | | 23,3614 | 52 144 1 | DACH | DEX1 | |
| 0190 | REP 156 | LAST 1295 | 23,3615 | 3 4712 1 | CA | ONE | |
| 0191 | REP 122 | LAST 1189 | 23,3616 | 54 130 1 | TS | RUF | |
| 0192 | | | 23,3617 | 0 0006 1 | EXTEND | | |
| 0193 | REP 2 | LAST 89 | 23,3620 | 5 0143 1 | INDEX | DEX1 | |
| 0194 | REP 56 | LAST 1336 | 23,3621 | 4 0123 0 | DCS | VRUF | |
| 0195 | REP 1 | | 23,3622 | 1 3624 0 | TCF | LOOP1 | |
| 0196 | REP 123 | LAST 1338 | 23,3623 | 52 131 0 | LOOP2 | DACH | RUF |
| 0197 | REP 663 | LAST 1334 | 23,3624 | 52 155 1 | LOOP1 | DACH | MPAC |
| 0198 | REP 1 | | 23,3625 | 3 3670 0 | CA | SINBSLOC | |
| 0199 | REP 3 | LAST 1338 | 23,3626 | 6 0143 1 | AD | DEX1 | |
| 0200 | REP 78 | LAST 1151 | 23,3627 | 54 116 0 | TS | ADDRWD | |
| 0201 | REP 21 | LAST 1160 | 23,3630 | 0 7056 0 | TC | DMPSUB | MULTIPLY BY SIN(CDUANGLE) |
| 0202 | REP 5 | LAST 1337 | 23,3631 | 10 142 1 | CCS | DEXDEX | |
| 0203 | REP 664 | LAST 1338 | 23,3632 | 52 155 1 | DACH | MPAC | NBSM CASE |
| 0204 | | | 23,3633 | 1 3636 0 | TCF | +3 | |
| 0205 | | | 23,3634 | 0 0006 1 | EXTEND | | SMR CASE |
| 0206 | REP 665 | LAST 1338 | 23,3635 | 4 0155 1 | DCS | MPAC | |
| 0207 | REP 1 | | 23,3636 | 52 134 0 | DACH | TERM1TMP | |
| 0208 | REP 39 | LAST 1335 | 23,3637 | 3 6211 0 | CA | SIX | SINCDU AND COSCDU (EACH 6 WORDS) MUST |
| 0209 | REP 79 | LAST 1338 | 23,3640 | 26 116 0 | ADS | ADDRWD | BE CONSECUTIVE AND IN THAT ORDER |
| 0210 | | | 23,3641 | 0 0006 1 | EXTEND | | |
| 0211 | REP 124 | LAST 1338 | 23,3642 | 5 0130 0 | INDEX | RUF | |
| 0212 | REP 4 | LAST 1338 | 23,3643 | 5 0143 1 | INDEX | DEX1 | |
| 0213 | REP 57 | LAST 1338 | 23,3644 | 3 0123 1 | DCA | VRUF | |
| 0214 | REP 666 | LAST 1338 | 23,3645 | 52 155 1 | DACH | MPAC | |
| 0215 | REP 22 | LAST 1338 | 23,3646 | 0 7056 0 | TC | DMPSUB | MULTIPLY BY COS(CDUANGLE) |
| 0216 | REP 667 | LAST 1338 | 23,3647 | 52 155 1 | DACH | MPAC | |
| 0217 | REP 2 | LAST 1338 | 23,3650 | 20 134 0 | DAS | TERM1TMP | |
| 0218 | REP 3 | LAST 1338 | 23,3651 | 52 134 0 | DACH | TERM1TMP | |
| 0219 | | | 23,3652 | 20 001 1 | DOOURL | | |
| 0220 | REP 125 | LAST 1338 | 23,3653 | 50 130 0 | INDEX | RUF | |
| 0221 | REP 5 | LAST 1338 | 23,3654 | 50 143 1 | INDEX | DEX1 | |
| 0222 | REP 58 | LAST 1338 | 23,3655 | 52 123 0 | DACH | VRUF | |
| 0223 | REP 126 | LAST 1338 | 23,3656 | 52 131 0 | DACH | RUF | LOADING INDEX, STORING VECTOR COMPONENT |
| 0224 | REP 343 | LAST 1338 | 23,3657 | 10 000 0 | CCS | A | CAUSE THAT'S WHERE THE INDEX NOW IS |
| 0225 | REP 1 | | 23,3660 | 1 3623 1 | TCF | LOOP2 | |
| 0226 | | | 23,3661 | 0 0006 1 | EXTEND | | |
| 0227 | REP 6 | LAST 1338 | 23,3662 | 26 142 1 | DIM | DEXDEX | DECREMENT MAGNITUDE PRESERVING SIGN |



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| | | | | | | | | | | |
|------|-------|---|------|------|---------|----------|----------|----------|--------|-------------------------------------|
| 0228 | REP | 7 | LAST | 1338 | 23,3663 | 10 142 1 | TSTPOINT | CCS | DE/DEX | ONLY THE BRANCHING FUNCTION IS USED |
| 0229 | REP | 1 | | | 23,3664 | 1 3606 0 | TCF | R*TL**P | | |
| 0230 | REP | 2 | LAST | 1337 | 23,3665 | 0 0145 1 | TC | RINSAVER | | |
| 0231 | REP | 2 | LAST | 1339 | 23,3666 | 1 3606 0 | TCF | R*TL**P | | |
| 0232 | REP | 3 | LAST | 1339 | 23,3667 | 0 0145 1 | TC | RINSAVER | | |
| 0233 | REP | 6 | LAST | 1335 | 23,3670 | 00736 0 | SINESLOC | ADRES | SINCDU | FOR USE IN SETTING ADDRND |
| 0234 | | | | | 23,3671 | 00004 0 | INDEXI | DEC | 4 | ***** DONAT ***** |
| 0235 | | | | | 23,3672 | 00002 0 | | DEC | 2 | ***** TOUCH ***** |
| 0236 | | | | | 23,3673 | 00000 1 | | DEC | 0 | ***** THESE ***** |
| 0237 | | | | | 23,3674 | 00004 0 | | DEC | 4 | ***** CONSTANTS ***** |
| 0238 | ***** | | | | | | | | | |



L POWERED FLIGHT SUBROUTINES

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P0240 THIS SUBROUTINE COMPUTES INCREMENTAL CHANGES IN CDU(GIMBAL) ANGLES FROM INCREMENTAL CHANGES ABOUT IM AXES. IT
R0242 REQUIRES SM INCREMENTS AS A DP VECTOR SCALED AT ONE REVOLUTION(DHETASM,+2,+4). SIN,COS(CDUY,Z,X) ARE IN
R0244 SINCDU,+2,+4 AND COSCDU,+2,+4 RESPECTIVELY, SCALED TO ONE HALF. CDU INCREMENTS ARE PLACED IN DCDU,+2,+4 SCALED TO
R0246 ONE REVOLUTION.

| | | | | | |
|-------|---|-------------------|---|--|---------------------|
| R0247 | * | COS(IGA)SBC(MGA) | 0 | | -SIN(IGA)SBC(MGA) * |
| R0248 | * | | | | * |
| R0249 | * | -COS(IGA)TAN(MGA) | 1 | | SIN(IGA)TAN(MGA) * |
| R0250 | * | | | | * |
| R0251 | * | SIN(IGA) | 0 | | COS(IGA) * |

| | | | | | |
|------|-------|----------|---------|---------|---------------------|
| 0252 | | | 14,3405 | | BANK 14 |
| 0253 | REP 1 | | 23,2000 | | SETLOC FORPLITI |
| 0254 | | | 23,3875 | | BANK |
| 0255 | | | 23,3875 | 41345 0 | SINCDURES DLOAD DMP |
| 0256 | REP 7 | LAST 584 | 23,3878 | 03212 0 | DHETASM |
| 0257 | REP 4 | LAST 718 | 23,3877 | 00745 1 | COSCDUY |

| | | | | | |
|------|-------|-----------|---------|---------|------------|
| 0258 | | | 23,3700 | 41325 0 | PDDL DMP |
| 0259 | REP 8 | LAST 1340 | 23,3701 | 03216 1 | DHETASM +4 |
| 0260 | REP 4 | LAST 718 | 23,3702 | 00737 1 | SINCDUY |

| | | | | | |
|------|-------|----------|---------|---------|------------|
| 0261 | | | 23,3703 | 77621 1 | BDSU |
| 0262 | | | 23,3704 | 77671 1 | DDV |
| 0263 | REP 7 | LAST 930 | 23,3705 | 00747 0 | COSCDUZ |
| 0264 | REP 6 | LAST 586 | 23,3706 | 03204 1 | STORE DCDU |

| | | | | | |
|------|-------|----------|---------|---------|---------------|
| 0265 | | | 23,3707 | 72405 0 | DMP SL1 SCALE |
| 0266 | REP 4 | LAST 718 | 23,3710 | 00741 0 | SINCDUZ |
| 0267 | | | 23,3711 | 77621 1 | BDSU |

| | | | | | |
|------|--------|-----------|---------|---------|---------------|
| 0268 | REP 9 | LAST 1340 | 23,3712 | 03214 0 | DHETASM +2 |
| 0269 | REP 7 | LAST 1340 | 23,3713 | 17208 0 | STODL DCDU +2 |
| 0270 | REP 10 | LAST 1340 | 23,3714 | 03212 0 | DHETASM |

| | | | | | |
|------|--------|-----------|---------|---------|------------|
| 0271 | | | 23,3715 | 65205 0 | DMP PDDL |
| 0272 | REP 5 | LAST 1340 | 23,3716 | 00737 1 | SINCDUY |
| 0273 | REP 11 | LAST 1340 | 23,3717 | 03216 1 | DHETASM +4 |

| | | | | | |
|------|-------|-----------|---------|---------|---------------|
| 0274 | | | 23,3720 | 43205 1 | DMP DAD |
| 0275 | REP 5 | LAST 1340 | 23,3721 | 00745 1 | COSCDUY |
| 0276 | | | 23,3722 | 77752 1 | SL1 |
| 0277 | REP 8 | LAST 1340 | 23,3723 | 03210 1 | STORE DCDU +4 |
| 0278 | | | 23,3724 | 77618 0 | RVO |

L TIME OF FREE FALL USER#5 PAGE NO. 1 Pg 53

R0001 THE TFF SUBROUTINES MAY BE USED IN EITHER EARTH OR MOON CENTERED COORDINATES. THE TFF ROUTINES NEVER
 R0003 KNOW WHICH ORIGIN APPLIES. IT IS THE USER WHO KNOWS, AND WHO SUPPLIES RONE, VONE AND 1/SORT(MU) AT THE
 R0005 APPROPRIATE SCALE LEVEL FOR THE PROPER PRIMARY BODY.

R0006 EARTH ORIGIN POSITION(M) -29 METERS
 R0007 VELOCITY -7 METERS/CENTISECOND
 R0009 1/SORT(MU) +17 SORT(CS SQ/METERS CUBED)

R0011 MOON ORIGIN POSITION(M) -27 METERS
 R0012 VELOCITY -5 METERS/CENTISECONDS
 R0014 1/SORT(MU) +14 SORT(CS SQ/METERS CUBED)

R0016 ALL DATA PROVIDED TO AND RECEIVED FROM ANY TFF SUBROUTINE WILL BE AT ONE OF THE LEVELS ABOVE. IN ALL CASES,
 R0018 THE FREE FALL TIME IS RETURNED IN CENTISECONDS AT (-29). PROGRAM TFF/CONIC WILL GENERATE VONE/RTMU AND
 R0020 LEAVE IT IN VONE AT (+10) IF EARTH ORIGIN AND (+9) IF MOON ORIGIN.

R0021 THE USER MUST STORE THE STATE VECTOR IN RONE, VONE AND MU IN THE FORM 1/SORT(MU) IN TFF/RTMU
 R0023 AT THE PROPER SCALE BEFORE CALLING TFF/CONIC. SINCE RONE, VONE ARE IN THE EXTENDED VERB STORAGE AREA,
 R0025 THE USER MUST ALSO LOCK OUT THE EXTENDED VERBS, AND RELEASE THEM WHEN FINISHED.

R0027 PROGRAMS CALC/TFF AND CALC/TPR ASSUME THAT THE TERMINAL RADIUS IS LESS THAN THE PRESENT
 R0029 RADIUS. THIS RESTRICTION CAN BE REMOVED BY A 15 W CODING CHANGE, BUT AT PRESENT IT IS NOT DEEMED NECESSARY.

R0031 THE FOLLOWING BRASABLE QUANTITIES ARE USED BY THE TFF ROUTINES, AND ARE LOCATED IN THE PUSH LIST.
 R0032
 R0034

| ADDRESS | NAME | VALUE | UNIT | DESCRIPTION |
|---------|------|------------|-----------|-------------------------------------|
| A0035 | | | | E' IS USED FOR EARTH ORIGIN SCALE |
| A0036 | | | | M' IS USED FOR MOON ORIGIN SCALE |
| A0037 | | | | 0 = CALCTFF 1 = CALCTPR |
| 0038 | 0012 | TFFSW = | 119D BIT1 | Q2-Q1 E' (-16) M' (-15) |
| 0039 | 0014 | TFFDELO = | 18D | ARVAL(RN) M E' (-29) M' (-27) |
| A0040 | | BRMAG1 = | 12D | PERIGEE RADIUS M E' (-29) M' (-27) |
| 0041 | 0016 | BRMAG = | 14D | R.V / SORT(MUE) E' (-16) M' (-15) |
| A0042 | | TFFQ1 = | 14D | SIN(THETA) /2 |
| 0043 | 0016 | SEELP/2 = | 14D | COS(THETA) /2 |
| A0044 | | SEPO = | 18D | APOGEE RADIUS M E' (-29) M' (-27) |
| 0045 | 0020 | NRTERM = | 18D | TERMINAL RADIUS M E' (-29+NR) |
| A0046 | | | | M' (-27+NR) |
| 0047 | 0022 | RTERM = | 18D | TERMINAL RADIUS M E' (-29) M' (-27) |
| 0048 | 0024 | TFFVSO = | 20D | -(V SQUARED/MU) 1/M E' (20) M' (18) |
| 0049 | 0026 | TFF1/ALP = | 22D | SEMI MAJ AXIS M E' (-22-2 NA) |
| A0050 | | | | M' (-20-2 NA) |
| 0051 | 0030 | TFFRTALP = | 24D | SORT(ALPA) E' (10+NA) M' (9+NA) |
| 0052 | 0032 | TFFPALP = | 26D | ALPA 1/M E' (26-NR) M' (24-NR) |
| 0053 | 0034 | TFFNP = | 28D | SEMI LATUS RECTUM M E' (-38+2 NR) |
| A0054 | | | | M' (-36+2 NR) |
| 0055 | 0036 | TFF/RTMU = | 30D | 1/SORT(MU) E' (17) M' (14) |
| 0056 | 0040 | NRMAG = | 32D | PRESENT RADIUS M E' (-29+NR) |
| A0057 | | | | M' (-27+NR) |
| 0058 | 0042 | TFFX = | 34D | |
| 0059 | 0044 | TFFYEN = | 36D | TEMPORARY |



L TIME OF FREE FALL

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A0060
A0061
A0062
A0063
A0064
A0065

REGISTERS S1, S2 ARE UNTOUCHED BY ANY TFF SUBROUTINE
INDEX REGISTERS X1, X2 ARE USED BY ALL TFF SUBROUTINES. THEY ARE ESTAB-
LISHED IN TFF/CONIC AND MUST BE PRESERVED BETWEEN CALLS TO SUBSEQUENT
SUBROUTINES.

-NR
-NA

C(X1) = NORM COUNT OF RMAG
C(X2) = NORM COUNT OF SORT(ABS(ALPA))

L TIME OF FREE FALL

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P0066

R0067 SUBROUTINE NAME' TFFCONIC DATE' 01.29.67
R0069 MOD NO' 0 LOG SECTION' TIME OF FREE FALL
R0071 MOD BY' RR BAIRNSPATHER
R0072 MOD NO' 1 MOD BY' RR BAIRNSPATHER DATE' 11 APR 67
R0073 MOD NO' 2 MOD BY' RR BAIRNSPATHER DATE' 21 NOV 67 ADD MOON MU.
R0075 MOD NO' 3 MOD BY' RR BAIRNSPATHER DATE' 21 MAR 68 ACCEPT DIFFERENT EARTH/MOON SCALES
R0077 FUNCTIONAL DESCRIPTION' THIS SUBROUTINE IS CALLED TO COMPUTE THOSE CONIC PARAMETERS REQUIRED BY THE TFF
R0079 SUBROUTINES AND TO ESTABLISH THEM IN THE PUSH LIST AREA. THE PARAMETERS ARE LISTED UNDER OUTPUT.
R0081 THE EQUATIONS ARE
R0082
R0083 $N = R^2/VN$ ANGULAR MOMENTUM
R0085
R0086 $LCP = N.H / MU$ SEMI LATUS RECTUM
R0088
R0089 $ALFA = 2/RN - VN.VN / MU$ RECIPROCAL SEMI MAJ AXIS, SIGNED
R0091 AND ALFA IS POS FOR ELLIPTIC ORBITS
R0092 0 FOR PARABOLIC ORBITS
R0093 NEG FOR HYPERBOLIC ORBITS.
R0094 SUBROUTINE ALSO COMPUTES AND SAVES RMAQ.
R0095 CALLING SEQUENCE'
R0096 TFFCONIC EXPECTS CALLER TO ENTER WITH CORRECT GRAVITATIONAL CONSTANT IN MPAC, IN THE FORM
R0098 1/SQRT(MU). PROGRAM WILL SAVE IN TFF/RMU. THE SCALE IS DETERMINED BY WHETHER EARTH OR MOON
R0100 ORIGIN IS USED. THE CALLER MUST LOCK OUT THE EXTENDED VERBS BEFORE PROVIDING STATE VECTOR IN RONE,
R0102 VONE AT PROPER SCALE. THE EXTENDED VERBS MUST BE RESTORED WHEN THE CALLER IS FINISHED USING THE
R0104 TFF ROUTINES.
R0105 ENTRY POINT TFFCONMU EXPECTS THAT TFF/RMU IS ALREADY LOADED.
R0107 TO SPECIFY MU' DLOAD CALL IF MU ALREADY STORED' CALL
R0109 YOURMU 1/RMU B' (17) M' (14) TFFCONMU
R0111 TFFCONIC
R0112 PUSHLOC = PDL+0, ARBITRARY IF LEO 18D
R0113 SUBROUTINES CALLED' NONE
R0114 NORMAL EXIT MODES' RNO
R0115 ALARMS' NONE
R0116 OUTPUT' THE FOLLOWING ARE STORED IN THE PUSH LIST AREA.
R0117 RMAQ1 E'(-29) M'(-27) M RN, PRESENT RADIUS LENGTH.
R0118 RMAQ E'(-29+NR) M RMAQ, NORMALIZED
R0119 M'(-27+NR)
R0120 X1 -NR, NORM COUNT
R0121 TFFNP E'(-38+2NR) M LCP, SEMI LATUS RECTUM, WEIGHTED BY NR. FOR VGANALC
R0123 M'(-38+2NR)
R0124 TFF/RMU E'(17) M'(14) 1/SQRT(MU)
R0125 TFFVSO E'(20) M'(18) 1/M -(V SQ/MU)' PRESENT VELOCITY, NORMALIZED. FOR VGANALC
R0127 TFFALFA E'(28-NR) 1/M ALFA, WEIGHTED BY NR
R0128 M'(24-NR)
R0129 TFFALF E'(10+NA) SQRT(ALFA), NORMALIZED
R0130 M'(9+NA)



L TIME OF FREE FALL

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| Address | Operation | Comments | Bank | Value | Notes |
|---------|------------------|---|---------------|----------|----------------------------------|
| 00131 | X2 | -NA, NORM COUNT | | | |
| 00132 | TFP1/ALP | E' (-22-2NA) SIGNED SEMI MAJ AXIS, WEIGHTED BY NA | | | |
| 00133 | | M' (-20-2NA) | | | |
| 00134 | | PUSHLOC AT PDL+0 | | | |
| 00135 | | THE FOLLOWING IS STORED IN GENERAL ERASABLE | | | |
| 00136 | | VONE= E'(10) M'(9) V/RT(MU), NORMALIZED VELOCITY | | | |
| 00137 | ERASABLE | INITIALIZATION REQUIRED | | | |
| 00138 | | RONE E'(-29) M'(-27) M STATE VECTOR | | | LEFT BY CALLER |
| 00140 | | VONE E'(-7) M'(-5) M/CS STATE VECTOR | | | LEFT BY CALLER |
| 00142 | | TFP/RTMU E'(17) M'(14) 1/RNCS SQ/M CURS | | | IF ENTER VIA TFFCONMU. |
| 00144 | DEBRIS | OPRST, PDL+0 ... PDL+3 | | | |
| 0145 | | | | | |
| 0146 | | 33,3772 | BANK 33 | | |
| 0147 | REP 1 | 27,2000 | SETLOC TOP-PP | | |
| 0148 | | 27,2750 | BANK | | |
| 0149 | REP 1 | | COUNT# 55/TFP | | |
| 0150 | REP 5 LAST 768 | 27,2750 00037 0 | TFPQNIC STORE | TFP/RTMU | 1/SQRT(MU) E'(17) M'(14) |
| 0151 | | 27,2751 53575 0 | TFPQNMU VLOAD | UNIT | COME HERE WITH TFPRTMU LOADED. |
| 0152 | REP 10 LAST 744 | 27,2752 02327 0 | | RONE | SAVED RN. M E'(-29) M'(-27) |
| 0153 | | 27,2753 77725 1 | PDDL | | UR/2 TO PDL+0, +5 |
| 0154 | | 27,2754 00045 0 | | 36D | MAGNITUDE |
| 0155 | REP 1 | 27,2755 00015 0 | STORE | RMAG1 | M E'(-29) M'(-27) |
| 0156 | | 27,2756 77701 1 | | NORM | |
| 0157 | REP 80 LAST 1310 | 27,2757 00047 1 | | X1 | -NR |
| 0158 | REP 4 LAST 769 | 27,2760 24041 1 | STOVL | NRMAG | RMAG M E'(-29+NR) M'(-27+NR) |
| 0159 | REP 11 LAST 744 | 27,2761 02335 0 | | VONE | SAVED VN. M/CS E'(-7) M'(-5) |
| 0160 | | 27,2762 77761 1 | | VXSC | |
| 0161 | REP 6 LAST 1344 | 27,2763 00037 0 | | TFP/RTMU | E'(17) M'(14) |
| 0162 | REP 2 LAST 90 | 27,2764 02372 0 | STORE | VONE= | VN/SQRT(MU) E'(10) M'(9) |
| 0163 | | 27,2765 47361 0 | | VXSC | |
| 0164 | REP 5 LAST 1344 | 27,2766 00041 1 | | NRMAG | E'(-29+NR) M'(-27+NR) |
| A0165 | | | | | UR/2 FROM PDL |
| 0166 | | 27,2767 47572 1 | VSL1 | VSO | BEFORE E'(-19+NR) M'(-18+NR) |
| 0167 | REP 2 LAST 768 | 27,2770 14035 1 | STOVL | TFPMP | LC P M E'(-38+2NR) M'(-36+2NR) |
| A0168 | | | | | SAVE ALSO FOR VGAMCALC |
| 0169 | REP 1 | 27,2771 15322 0 | | TFP1/4 | |
| 0170 | | 27,2772 63271 0 | DOV | FDVL | (2/RMAG) 1/M E'(28-NR) M'(24-NR) |
| 0171 | REP 6 LAST 1344 | 27,2773 00041 1 | | NRMAG | RMAG M E'(-29+NR) M'(-27+NR) |
| 0172 | REP 3 LAST 1344 | 27,2774 02372 0 | | VONE= | SAVED VN. E'(10) M'(9) |
| 0173 | | 27,2775 57438 1 | VSO | DCOMP | KEEP MPAC+2 HONEST FOR SQRT. |
| 0174 | REP 2 LAST 768 | 27,2776 00025 0 | STORE | TFPVSO | -(V SQ/MU) E'(20) M'(18) |
| A0175 | | | | | SAVE FOR VGAMCALC |
| 0176 | | 27,2777 43257 0 | SR* | DAD | |

L TIME OF PRSE FALL

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| | | | | | | |
|-------|------------------|---------|---------|--------------|----------|--------------------------------------|
| 0177 | | 27,3000 | 20573 1 | | 0 -0,1 | GET -VSO/MJ E'(26-NR) M'(24-NR) |
| 0178 | | 27,3001 | 77626 0 | STADR | | |
| A0179 | | | | | | 2/RNAG FROM PDL+2 |
| 0180 | REP 1 | 27,3002 | 77744 0 | STORE | TFFALPA | ALFA 1/M E'(26-NR) M'(24-NR) |
| 0181 | | 27,3003 | 41457 1 | SL* | PUSH | TEMP SAVE ALFA E'(20) M'(18) |
| 0182 | | 27,3004 | 20173 0 | | 0 -0,1 | |
| 0183 | | 27,3005 | 75446 0 | ABS | SORT | E'(10) M'(9) |
| 0184 | | 27,3006 | 77701 1 | NORM | | |
| 0185 | REP 30 LAST 1336 | 27,3007 | 00050 1 | | X2 | X2 = -NA |
| 0186 | REP 1 | 27,3010 | 00031 0 | STORE | TFFRTALP | SORT(ABS(ALFA)) E'(10+NA) M'(9+NA) |
| 0187 | | 27,3011 | 75316 1 | DSO | SIGN | NOT SO ACCURATE, BUT OK |
| A0188 | | | | | | ALFA FROM PDL+2 E'(20) M'(18) |
| 0189 | | 27,3012 | 55254 1 | BZ* | BDDV | SET 1/ALFA =0, TO SHOW SMALL ALFA |
| 0190 | | 27,3013 | 57015 1 | | +2 | |
| 0191 | REP 2 LAST 1344 | 27,3014 | 15322 0 | | TFF1/4 | |
| 0192 | REP 1 | 27,3015 | 00027 1 | +2 STORE | TFF1/ALP | 1/ALFA E'(-22-2 NA) M'(-20-2 NA) |
| 0193 | | 27,3016 | 77616 0 | DUMPCNIC RVO | | |

A0194

39 W



L TIME OF FREE FALL

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R0195 SUBROUTINE NAME' TFFRP/RA DATE' 01.17.67
R0197 MOD NO' 0 LOG SECTION' TIME OF FREE FALL
R0199 MOD BY' RR BAINSPATHER
R0200 MOD NO' 1 MOD BY' RR BAINSPATHER DATE' 11 APR 67
R0201 MOD NO' 2 MOD BY' RR BAINSPATHER DATE' 21 MAR 68 ACCEPT DIFFERENT EARTH/MOON SCALES
R0203 ALSO IMPROVE ACCURACY OF RAPO.
R0205 FUNCTIONAL DESCRIPTION' USED BY CALCTPER AND TFF DISPLAYS TO CALCULATE PERIGEE RADIUS AND ALSO
R0207 APOGEE RADIUS FOR A GENERAL CONIC.
R0208 PROGRAM GIVES PERIGEE RADIUS AS APOGEE RADIUS IS GIVEN BY
R0210 $RP = P / (1+E)$ $RA = (1-E) / ALFA$
R0212 WHERE 2
R0213 $E = 1 - P ALFA$
R0214 IF RA IS NEGATIVE OR SHOWS DIVIDE OVERFLOW, THEN RA = POSMAX BECAUSE
R0216 1. APOGEE RADIUS IS NOT MEANINGFUL FOR HYPERBOLA
R0217 2. APOGEE RADIUS IS NOT DEFINED FOR PARABOLA
R0218 3. APOGEE RADIUS EXCEEDS THE SCALING FOR ELLIPSE.
R0219 THIS SUBROUTINE REQUIRES THE SIGNED RECIPROCAL SEMI MAJ AXIS, ALFA, AND SEMI LATUS RECTUM AS DATA.
R0221 CALLING SEQUENCE' CALL
R0222 TFFRP/RA
R0223 PUSHLOC = PDL+0, ARBITRARY IF LEO 10D
R0224 C(MPAC) UNSPECIFIED
R0225 SUBROUTINES CALLED' NONE
R0226 NORMAL EXIT MODE' RVO
R0227 IF ELLIPSE, WITHIN NORMAL SCALING, RAPO IS CORRECT.
R0228 OTHERWISE, RAPO = POSMAX.
R0229 ALARMS' NONE
R0230 OUTPUT' STORED IN PUSH LIST AREA. SCALE OF OUTPUT AGREES WITH DATA SUPPLIED TO TFF/CONIC.
R0232 RPER E'(-29) M'(-27) M PERIGEE RADIUS DESTROYED BY CALCTFF/CALCTPER, TFFTRIG.
R0234 RAPO E'(-29) M'(-27) M APOGEE RADIUS WILL BE DESTROYED BY CALCTFF/CALCTPER
R0236 PUSHLOC AT PDL+0
R0237 ERASABLE INITIALIZATION REQUIRED'
R0238 TFFALFA E'(26-NR) M 1/SEMI MAJ AXIS LEFT BY TFFCONIC
R0240 M'(-24-NR)
R0241 TFFNP E'(-38+2NR) M LC P, SEMI LATUS RECTUM LEFT BY TFFCONIC
R0243 M'(-38+2NR)
R0244 X1 -NR, NORM COUNT OF RMAG LEFT BY TFFCONIC
R0246 X2 -NA, NORM COUNT OF ALFA LEFT BY TFFCONIC
R0248 DEBRIS' QPRST, PDL+0 ... PDL+1

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| PO249 | | | | | | | | | |
|-------|-----|----|-----------|---------|----------|-------|---------|----------|------|
| 0250 | | | 0020 | | RAPO | = | 1&D | | |
| 0251 | | | 0016 | | RPER | = | 1&D | | |
| A0252 | | | | | | | | | |
| 0253 | | | 27,3017 | 41345 0 | TPFRP/RA | DLOAD | DMP | | |
| 0254 | REP | 2 | LAST 1345 | 27,3020 | | | TPFALFA | | |
| 0255 | REP | 3 | LAST 1344 | 27,3021 | | | TPFNP | | |
| 0256 | | | 27,3022 | 57457 0 | | | DCOMP | | |
| 0257 | | | 27,3023 | 20571 0 | | | 0 -8D,1 | | |
| 0258 | | | 27,3024 | 51415 0 | | | DAD | ABS | |
| A0259 | | | | | | | | | |
| 0260 | REP | 4 | LAST 833 | 27,3025 | | | DP2(-4) | | |
| 0261 | | | 27,3026 | 43366 0 | | | SDRT | DAD | |
| 0262 | REP | 3 | LAST 1345 | 27,3027 | | | | TPF1/4 | |
| 0263 | | | 27,3030 | 55208 0 | | | FUS1 | SDOV | |
| 0264 | REP | 4 | LAST 1347 | 27,3031 | | | | TPFNP | |
| 0265 | | | 27,3032 | 53657 0 | | | SR* | SR* | |
| 0266 | | | 27,3033 | 20601 1 | | | | 0,1 | |
| 0267 | | | 27,3034 | 20572 0 | | | | 0 -7,1 | |
| 0268 | REP | 3 | LAST 514 | 27,3035 | | | STOOL | RPER | |
| A0269 | | | | | | | | | |
| 0270 | | | 27,3036 | 41005 1 | | | DMP | BOVR | |
| 0271 | REP | 2 | LAST 1345 | 27,3037 | | | | TPF1/ALP | |
| 0272 | REP | 11 | LAST 1303 | 27,3040 | | | | TCDANZIG | |
| 0273 | | | 27,3041 | 53654 0 | | | RZS | SL* | |
| 0274 | REP | 1 | | 27,3042 | | | | MAXRA | |
| 0275 | | | 27,3043 | 57603 0 | | | | 0 -5,2 | |
| 0276 | | | 27,3044 | 40057 1 | | | SL* | BOV | |
| 0277 | | | 27,3045 | 57576 1 | | | | 0,2 | |
| 0278 | REP | 2 | LAST 1347 | 27,3046 | | | | MAXRA | |
| 0279 | | | 27,3047 | 77644 1 | | | BPL | | |
| 0280 | | | 27,3050 | 57053 0 | | | | +3 | |
| 0281 | | | 27,3051 | 77745 1 | | | MAXRA | DLOAD | |
| 0282 | REP | 4 | LAST 833 | 27,3052 | | | | NEARONE | |
| 0283 | REP | 1 | | 27,3053 | | | +3 | STORE | RAPO |
| 0284 | | | 27,3054 | 77616 0 | | | DLMPRPA | RVO | |

APOGEE RADIUS M E'(-29) M'(-27)
 PERIGEE RADIUS M E'(-29) M'(-27)

ALPHA 1/M E'(26-NR) M'(24-NR)
 LCP M E'(-38+2NR) M'(-36+2NR)
 ALPHA P (-12+NR)
 ALPHA P (-4)
 (DCOMP GIVES VALID TP RESULT FOR SORT)
 (ABS PROTECTS SORT IF B IS VERY NEAR 0)

B SQ = (1 - P ALPHA) (-4)

(1.8) (-2) TO PDL+0
 LCP M E'(-38+2NR) M'(-36+2NR)
 (DOES SR THEN SL TO AVOID O/P)
 X1=NR
 (EFFECTIVE SL)
 PERIGEE RADIUS M E'(-29) M'(-27)
 (1.8) (-2) FROM PDL+0

E'(-22-2NA) M'(-20-2NA)
 CLEAR O/PIND, IP ON.

SET POSMAX, IF ALPHA=0
 -5+NA

SET POSMAX IF O/P.
 CONTINUE WITH VALID RAPO.

RAPO CALC IS NOT VALID. SET RAPO =
 POSMAX AS A TAG.
 APOGEE RADIUS M E'(-29) M'(-27)

A0285

30 W



L TIME OF FREE FALL

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R0288 SUBROUTINE NAME'   CALCTPR / CALCTFP           DATE'   01.29.67
R0288 MOD NO' 0
R0290 MOD BY' RR BAIRNSPATER                         LOG SECTION' TIME OF FREE FALL
R0291 MOD NO' 1           MOD BY' RR BAIRNSPATER     DATE'   21 MAR 67
R0292 MOD NO' 2           MOD BY' RR BAIRNSPATER     DATE'   14 APR 67
R0293 MOD NO' 3           MOD BY' RR BAIRNSPATER     DATE'   8 JUL 67   NEAR EARTH MLE AND NEG TFP (ONEPAST)
R0295 MOD NO' 4           MOD BY' RR BAIRNSPATER     DATE'   21 NOV 67   ADD VARIABLE MU.
R0297 MOD NO' 5           MOD BY' RR BAIRNSPATER     DATE'   21 MAR 68   ACCEPT DIFFERENT EARTH/MOON SCALES
R0299 FUNCTIONAL DESCRIPTION' PROGRAM CALCULATES THE FREE-FALL TIME OF FLIGHT FROM PRESENT POSITION RN AND
R0301 VELOCITY VN TO A RADIUS LENGTH SPECIFIED BY RTERM, SUPPLIED BY THE USER. THE POSITION VECTOR
R0303 RN MAY BE ON EITHER SIDE OF THE CONIC, BUT RTERM IS CONSIDERED ON THE INBOUND SIDE.
R0305 THE EQUATIONS ARE

R0306           Q2 = -SQRT(RTERM (2-RTERM ALFA) - LCP) (INBOUND SIDE)   LEO +- LCE/SQRT(ALFA)
R0308           -
R0309           Q1 = RN.VN / SQRT(MU)                                   LEO +- LCE/SQRT(ALFA)

R0311           Z = NUM / DEN                                         LEO +- 1/SQRT(ALFA)

R0313 WHERE, IF INBOUND
R0314 NUM = RTERM - RN                                               LEO +- 2 LCE/ALFA
R0316 DEN = Q2+Q1                                                    LEO +- 2 LCE/SQRT(ALFA)

R0318 AND, IF OUTBOUND
R0319 NUM = Q2-Q1                                                     LEO +- 2 LCE/SQRT(ALFA)
R0321 DEN = 2 - ALFA (RTERM + RN) .                                   LEO +- 2 LCE

R0323 IF ALFA ZZ ± 1.0 (FOR ALL CONICS EXCEPT ELLIPSES HAVING ABS(DEG ECC ANOM) G 90 DEG)

R0325 THEN X = ALFA Z Z
R0326 AND TFP = (RTERM +RN -2 ZZ TX) Z/SQRT(MU)

R0327 EXCEPT IF ALFA PNZ, AND IF TFP NEG,
R0328 THEN TFP = 2 PI / (ALFA SQRT(ALFA)) + TFP

R0329 OR IF ALFA ZZ GEO 1.0 (FOR ELLIPSES HAVING ABS(DEG ECC ANOM) GEO 90 DEG)

R0331 THEN X = 1/ALFA Z Z
R0332 AND TFP = (PI/SQRT(ALFA) -Q2 +Q1 +2(X TX) -1) /ALFA Z) /ALFA SQRT(MU)

R0334 WHERE TX) IS A POLYNOMIAL APPROXIMATION TO THE SERIES
R0335           2 3 2
R0336           1/3 -X/5 +X /7 -X /9 ... (X ± 1.0)

R0337 CALLING SEQUENCE' TIME TO RTERM           TIME TO PERIGEE
R0339 CALL CALL CALL
R0340 CALCTFP CALCTPR
R0342 C(MPAC) = TERMINL RAD M C(MPAC) = PERIGEE RAD M
R0344 FOR EITHER, B' (-29) M' (-27)
R0345 FOR EITHER, PUSHLOC = PDL+0, ARBITRARY IF LEO 8D.
    
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R0346 SUBROUTINES CALLED' T(X), VIA RTS
R0347 NORMAL EXIT MODE' RVO
R0348 HOWEVER, PROGRAM EXITS WITH ONE OF THE FOLLOWING VALUES FOR TFF (-28) CS IN MPAC, USER MUST STORE.
R0350 A. TFF= FLIGHT TIME, NORMAL CASE FOR POSITIVE FLIGHT TIME LESS THAN ONE ORBITAL PERIOD.
R0352 B. (THIS OPTION IS NO LONGER USED.)
R0353 C. TFF = POSMAX. THIS INDICATES THAT THE CONIC FROM THE PRESENT POSITION WILL NOT RETURN TO
R0355 THE SPECIFIED ALTITUDE. ALSO INDICATES OUTBOUND PARABOLA OR HYPERBOLA.
R0357 OUTPUT' C(MPAC) (-28) CS TIME OF FLIGHT, OR TIME TO PERIGEE
R0358 TFFX (0) X,
R0360 NRTERM E' (-29+NR) M RTERM, WEIGHTED BY NR LEFT FOR ENTRY DISPLAY TFF ROUTINES
R0362 M' (-27+NR)
R0363 TFFTEM E' (-59+2NR) LCP Z Z SON(SOELP) LEFT FOR ENTRY DISPLAY TFF ROUTINES
R0365 M' (-55+2NR) LCP /ALPA SON(SOELP) LEFT FOR ENTRY DISPLAY TFF ROUTINES
R0367 NOTE' TFFTEM = PDL 38D AND WILL BE DESTROYED BY 'UNIT'.
R0368 RMAG1 E' (-29) M' (-27) PDL 12 NOT TOUCHED.
R0369 TFFQ1 E' (-16) M' (-15) PDL 14D
R0370 TFFDELQ E' (-16) M' (-15) PDL 10D
R0371 PUSHLOC AT PDL+0
R0372 ERASABLE INITIALIZATION REQUIRED'
R0373 RONE E' (-29) M' (-27) M STATE VECTOR LEFT BY USER
R0375 VONE E' (-10) M' (-9) VN/SQRT(MU) LEFT BY TFF/CONIC
R0377 RMAG1 E' (-29) M' (-27) PRESENT RADIUS, M LEFT BY TFF/CONIC
R0379 C(MPAC)E' (-29) M' (-27) RTERM, TERMINAL RADIUS LENGTH, M LEFT BY USER

R0381 THE FOLLOWING ARE STORED IN THE PUSH LIST AREA.
R0382 TFF/RTMU E' (17) M' (14) 1/SQRT(MU) LEFT BY TFF/CONIC.
R0384 NRMAQ E' (-29+NR) M RMAG, NORMALIZED LEFT BY TFF/CONIC
R0386 M' (-27+NR)
R0387 X1 -NR, NORM COUNT LEFT BY TFF/CONIC
R0389 TFFNP E' (-38+2NR) M LCP, SEMI LATUS RECTUM, WEIGHT NR LEFT BY TFF/CONIC
R0391 M' (-36+2NR)
R0392 TFFALPA E' (26-NR) 1/M ALPA, WEIGHT NR LEFT BY TFF/CONIC
R0394 M' (24-NR)
R0395 TFFRDLAP E' (10+NA) SQRT(ALPA), NORMALIZED LEFT BY TFF/CONIC
R0397 M' (9+NA)
R0398 X2 -NA, NORM COUNT LEFT BY TFF/CONIC
R0400 TFF1/ALP E' (-22-2NA) SIGNED SEMIMAJ AXIS, WEIGHTED BY NA LEFT BY TFF/CONIC
R0402 M' (-20-2NA)
R0403 DEBRIS' QPRET, PDL+0 ... PDL+3
R0404 RTERM E' (-29) M' (-27) RTERM, TERMINAL RADIUS LENGTH
R0405 RAPO E' (-29) M' (-27) PDL 16D (=NRTERM)
R0406 RPER E' (-29) M' (-27) PDL 14D (=TFFQ1)



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| | | | | | | | | | | |
|-------|-----|----|-----------|---------|----------|-------|-----------|--------|--|--|
| P0407 | | | | | | | | | | |
| 0408 | | | 27,3055 | 77614 1 | CALCTPER | SETGO | | | | ENTER WITH RPER IN MPAC |
| 0409 | REP | 1 | 27,3056 | 03436 0 | | | TFFSW | | | |
| 0410 | | | 27,3057 | 57082 1 | | | +3 | | | |
| 0411 | | | 27,3060 | 77614 1 | CALCTFF | CLEAR | | | | ENTER WITH RTERM IN MPAC |
| 0412 | REP | 2 | LAST 1350 | 27,3061 | 03876 0 | | TFFSW | | | |
| 0413 | REP | 3 | LAST 764 | 27,3062 | 00023 0 | +3 | STORE | RTERM | | E' (-29) M' (-27) |
| 0414 | | | | 27,3063 | 77657 0 | | SL* | | | |
| 0415 | | | | 27,3064 | 20201 0 | | 0,1 | | | X1 = -NR |
| 0416 | REP | 6 | LAST 769 | 27,3065 | 00021 1 | | STORE | NRTERM | | RTERM E' (-29+NR) M' (-27+NR) |
| 0417 | | | | 27,3066 | 44205 0 | | DMP | RDSU | | |
| 0418 | REP | 3 | LAST 1347 | 27,3067 | 00033 1 | | TFFALPA | | | ALPHA E' (28-NR) M' (24-NR) |
| 0419 | REP | 4 | LAST 1347 | 27,3070 | 15322 0 | | TFF1/4 | | | |
| 0420 | | | | 27,3071 | 41206 0 | | PUSH | DMP | | (2-ALPHA RTERM) (-3) TO PDL+0 |
| 0421 | REP | 7 | LAST 1350 | 27,3072 | 00021 1 | | NRTERM | | | E' (-29+NR) M' (-27+NR) |
| 0422 | | | | 27,3073 | 53725 1 | | PDDL | SR* | | RTERM(2-ALPHA RTERM) TO PDL+2 |
| A0423 | | | | | | | | | | E' (-32+NR) M' (-30+NR) |
| 0424 | REP | 5 | LAST 1347 | 27,3074 | 00035 1 | | TFFNP | | | LC P E' (-38+2NR) M' (-36+2NR) |
| 0425 | | | | 27,3075 | 20573 1 | | 0 -6,; | | | X1 = -NR |
| 0426 | | | | 27,3076 | 43276 0 | | DCOMP | DAD | | DUE TO SHIFTS, KEEP PRECISION FOR SORT |
| A0427 | | | | | | | | | | RTERM(2-ALPHA RTERM) FROM PDL+2 |
| A0428 | | | | | | | | | | E' (-32+NR) M' (-30+NR) |
| 0429 | | | | 27,3077 | 77657 0 | | SR* | | | LEAVE E' (-32) M' (-30) |
| 0430 | | | | 27,3100 | 20601 1 | | 0,1 | | | X1 = -NR |
| 0431 | | | | 27,3101 | 71214 0 | | ROFF | DLOAD | | CHECK TFF / TPER SWITCH |
| 0432 | REP | 3 | LAST 1350 | 27,3102 | 03756 0 | | TFFSW | | | |
| 0433 | | | | 27,3103 | 57105 1 | | +2 | | | IF TFF, CONTINUE |
| 0434 | REP | 1 | | 27,3104 | 15332 1 | | TFFZEROS | | | IF TPER, SET Q2 = 0 |
| 0435 | | | | 27,3105 | 75440 0 | +2 | R-N | SORT | | E' (-16) M' (-15) |
| 0436 | REP | 1 | | 27,3106 | 57240 0 | | MAXTFF1 | | | NO FREE FALL CONIC TO RTERM FROM HERE |
| A0437 | | | | | | | | | | RESET PDL, SET TFF=POS MAX, AND EXIT. |
| 0438 | | | | 27,3107 | 41076 0 | | DCOMP | ROVR | | RT IS ON INBOUND SIDE. ASSURE OVPIND=0 |
| 0439 | REP | 12 | LAST 1347 | 27,3110 | 57343 1 | | TC DANZIG | | | ANY PORT IN A STORM. |
| 0440 | REP | 3 | LAST 770 | 27,3111 | 24045 0 | | STOVL | TFFTEM | | Q2 E' (-16) M' (-15) |
| 0441 | REP | 4 | LAST 1344 | 27,3112 | 02372 0 | | VONE | | | VN/SORT(MU) E' (10) M' (9) |
| 0442 | | | | 27,3113 | 52441 1 | | DOT | SL3 | | |
| 0443 | REP | 17 | LAST 1344 | 27,3114 | 02327 0 | | RONE | | | SAVED RN. E' (-29) M' (-27) |
| 0444 | REP | 1 | | 27,3115 | 00017 1 | | STORE | TFFQ1 | | Q1, SAVE FOR GONEPAST TEST. |
| A0445 | | | | | | | | | | E' (-16) M' (-15) |
| 0446 | | | | 27,3116 | 44240 1 | | R-N | RDSU | | |
| 0447 | REP | 1 | | 27,3117 | 57140 0 | | INBOUND | | | USE ALTERNATE Z |
| 0448 | REP | 4 | LAST 1350 | 27,3120 | 00045 0 | | TFFTEM | | | Q2 E' (-16) M' (-15) |
| A0449 | | | | | | | | | | OUTBOUND Z CALC CONTINUES HERE |
| 0450 | REP | 2 | LAST 769 | 27,3121 | 14043 0 | | STOVL | TFFX | | NR-M-Q2-Q1 E' (-16) M' (-15) |
| 0451 | REP | 4 | LAST 1350 | 27,3122 | 00033 1 | | TFFALPA | | | ALPHA E' (26-NR) M' (24-NR) |
| 0452 | | | | 27,3123 | 44205 0 | | DMP | RDSU | | |

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| Address | Operation | Time | Value | Code | Comment |
|---------|-----------------|---------|---------|-------------------|---|
| 0453 | REP 7 LAST 1344 | 27,3124 | 00041 1 | NR4G | NR4G E' (-29+NR) M' (-27+NR) |
| A0454 | | | | | (2-RTERM ALFA) (-3) FROM PDL+0 |
| 0455 | | 27,3125 | 51408 1 | SAVEDEN PUSH ABS | DEN TO PDL+0 E' (-3) OR (-16) |
| A0456 | | | | | M' (-3) OR (-15) |
| 0451 | | 27,3126 | 40015 1 | DAD BOV | INDETERMINANCY TEST |
| 0456 | REP 1 | 27,3127 | 17351 0 | LDM(-22) | =1.0-B(-22) |
| 0459 | REP 1 | 27,3130 | 57151 0 | TPFXTEST | GO IF DEN 8/2 B(-22) |
| a460 | | 27,3131 | 05345 0 | DLOAD PDDL | SET DEN=0 OTHERWISE |
| 0461 | REP 2 LAST 1350 | 27,3132 | 15332 1 | TPFZEROS | |
| A0462 | | | | | XCH ZERO WITH PDL+0 |
| 0463 | | 27,3133 | 57545 1 | DLOAD DCOMP | |
| 0464 | REP 5 LAST 1350 | 27,3134 | 00033 1 | TPPALPA | ALFA E' (26-NR) M' (24-NR) |
| 0465 | | 27,3135 | 71240 1 | DLOAD | FOR TPER' Z INDET AT DELB/2=0 AND 90. |
| 0466 | REP 1 | 27,3136 | 57245 0 | TPPELL | ASSUME 90, AND LEAVE 0 IN PDL' 1/Z=D/N |
| A0467 | | | | | Z INDET. AT PERICES FOR PARAB OR HYPERB. |
| 0468 | | 27,3137 | 77616 0 | DUMPTPF1 RVO | RETURN TPF =0 |
| A0469 | | | | | INBOUND Z CALC CONTINUES HERE |
| 0410 | | 27,3140 | 77745 1 | INBOUND DLOAD | RESET PDL+0 |
| 0411 | | 27,3141 | 45345 1 | DLOAD DSJ | ALTERNATE Z CALC |
| 0412 | REP 4 LAST 1350 | 27,3142 | 00023 0 | RTRM | E' (-29) M' (-27) |
| 0413 | REP 2 LAST 1344 | 27,3143 | 00015 0 | NR4G1 | E' (-29) M' (-27) |
| 0414 | REP 3 LAST 1350 | 27,3144 | 14043 0 | STOOL TPFX | NUM=RTERM-RN E' (-29) M' (-27) |
| 0475 | REP 5 LAST 1350 | 27,3145 | 00045 0 | TPFTM | Q2 E' (-16) M' (-15) |
| 0416 | | 27,3146 | 52015 1 | DAD GOTO | |
| 0477 | REP 2 LAST 1350 | 27,3147 | 00017 1 | TPFO1 | Q1 E' (-16) M' (-15) |
| 0416 | REP 1 | 27,3150 | 57125 0 | SAVEDEN | DEN = Q2+Q1 E' (-16) M' (-15) |
| 0419 | | 27,3151 | 65215 1 | TPFXTEST DAD PDDL | (ABS(DEN) TO PDL+2) E' (-3) OR (-16) |
| A0480 | | | | | M' (-3) OR (-15) |
| 0481 | REP 1 | 27,3152 | 17353 1 | DP(-22) | RESTORE ARS(DEN) TO MPAC |
| 0482 | REP 4 LAST 1351 | 27,3153 | 00043 0 | TPFX | NUM E' (-16) OR (-29) M' (-15) OR (-27) |
| 0483 | | 27,3154 | 53605 1 | DMP SR* | |
| 0464 | REP 2 LAST 1345 | 27,3155 | 00031 0 | TPFRALP | SQRT(ALPA) E' (10+NA) M' (9+NA) |
| 0485 | | 27,3156 | 57201 0 | | X2=-NA |
| 0486 | | 27,3157 | 77671 1 | DDV | C(MPAC) = NUM SQRT(ALPA) E' (-3) OR (-16) |
| A0487 | | | | | M' (-3) OR (-15) |
| A0488 | | | | | ARS(DEN) FROM PDL+2 E' (-3) OR (-16) |
| A0489 | | | | | M' (-3) OR (-15) |
| 0490 | | 27,3160 | 40145 0 | DLOAD BOV | (THE DLOAD IS SHARED WITH TPFELL.) |
| 0491 | REP 5 LAST 1351 | 27,3161 | 00043 0 | TPFX | NUM E' (-16) OR (-29) M' (-15) OR (-27) |
| 0492 | REP 1 | 27,3162 | 51243 0 | TPPELL | USE EQN FOR DELE GEO 90, LPO -90 |
| A0493 | | | | | OTHERWISE, CONTINUE FOR GENERAL CONIC FOR TPF EQN |
| 0494 | | 27,3163 | 45471 1 | DDV STADR | |
| A0495 | | | | | DEN FROM PDL+0 E' (-3) OR (-16) |
| A0496 | | | | | M' (-3) OR (-15) |
| 0491 | REP 6 LAST 1351 | 27,3164 | 11132 1 | STORE TPFTEM | Z SAVE FOR SIGN OF SDRLP. |

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| | | | | | |
|-------|-------|-----------|---------|---------|--|
| A0498 | | | | | |
| 0499 | | 27,3165 | 63406 0 | | |
| 0500 | | 27,3166 | 41206 0 | | |
| 0501 | REP 6 | LAST 1350 | 27,3167 | 00035 1 | |
| 0502 | | | 27,3170 | 75261 0 | |
| 0503 | | | 27,3171 | 20206 1 | |
| 0504 | REP 7 | LAST 1351 | 27,3172 | 00045 0 | |
| 0505 | REP 8 | LAST 1352 | 27,3173 | 14045 0 | |
| A0506 | | | | | |
| A0507 | | | | | |
| 0508 | | 27,3174 | 41206 0 | | |
| 0509 | REP 6 | LAST 1351 | 27,3175 | 00033 1 | |
| 0510 | | | 27,3176 | 77657 0 | |
| 0511 | | | 27,3177 | 20201 0 | |
| 0512 | REP 6 | LAST 1351 | 27,3200 | 00043 0 | |
| 0513 | | | 27,3201 | 41234 1 | |
| 0514 | REP 1 | | 27,3202 | 57325 1 | |
| A0516 | | | | | |
| 0516 | | 27,3203 | 44302 0 | | |
| 0517 | REP 5 | LAST 1351 | 27,3204 | 00023 0 | |
| 0518 | | | 27,3205 | 41215 1 | |
| 0519 | REP 3 | LAST 1351 | 27,3206 | 00015 0 | |
| A0520 | | | | | |
| 0521 | | 27,3207 | 51042 0 | | |
| 0522 | REP 1 | | 27,3210 | 57231 0 | |
| 0523 | | | 27,3211 | 75206 1 | |
| 0524 | REP 3 | LAST 1351 | 27,3212 | 00017 1 | |
| 0525 | | | 27,3213 | 71244 0 | |
| 0526 | REP 1 | | 27,3214 | 57235 1 | |
| 0527 | REP 3 | LAST 1347 | 27,3215 | 00027 1 | |
| 0528 | | | 27,3216 | 51076 1 | |
| 0529 | REP 2 | LAST 1352 | 27,3217 | 57235 1 | |
| A0530 | | | | | |
| 0531 | | 27,3220 | 77676 0 | | |
| 0532 | | 27,3221 | 56205 0 | | |
| 0533 | REP 1 | | 27,3222 | 17347 1 | |
| 0534 | REP 3 | LAST 1351 | 27,3223 | 00031 0 | |
| 0535 | | | 27,3224 | 53657 0 | |
| 0536 | | | 27,3225 | 57602 1 | |
| 0537 | | | 27,3226 | 57602 1 | |
| 0538 | | | 27,3227 | 43257 0 | |
| 0539 | | | 27,3230 | 57576 1 | |
| A0540 | | | | | |
| 0541 | | 27,3231 | 40005 0 | | |
| 0542 | REP 7 | LAST 1344 | 27,3232 | 00037 0 | |
| 0543 | REP 1 | | 27,3233 | 57241 1 | |
| 0544 | | 27,3234 | 77616 0 | | |

PUSH DSQ
 PUSH DMP
 TFFNP
 SIGN
 S
 TFFTEM
 STODL TFFTEM
 PUSH DMP
 TFFALPA
 SL*
 0,1
 STORE TFFX
 RTB DMP
 T(X)
 SR2 BDSJ
 RTERM
 DMP
 RMAG1
 SR3 BPL
 ENDTFF
 PUSH SIGN
 TFFQ1
 BPL DLOAD
 NEGTFP
 TFF1/ALP
 DCOMP BPL
 NEGTFP

E' (-13) M' (-12)
 Z TO PDL+0
 Z SQ TO PDL+2 E' (-26) M' (-24)
 LC P E' (-38+2NR) M' (-38+2NR)
 AFFIX SIGN FOR SDELF (ENTRY DISPLAY)
 P ZSQ E' (-59+2NR) M' (-55+2NR)
 (ARG IS USED IN TFF/TRIG)
 ZSQ FROM PDL+2 E' (-26) M' (-24)
 RESTORE PUSH LOC
 ALPA E' (26-NR) M' (24-NR)
 X1=-NR
 X
 POLY
 ZSQ FROM PDL+2 E' (-26) M' (-24)
 2 ZSQ T(X) E' (-29) M' (-27)
 RTERM E' (-29) M' (-27)
 E' (-29) M' (-27)
 Z FROM PDL+0 E' (-13) M' (-12)
 TFF SORT(MU) E' (-45) M' (-42)
 (NO PUSH UP)
 TFF SORT(MU) TO PDL+0
 Q1 FOR GONEPAST TEST
 GONE PAST W
 YES. TFF ± 0
 1/ALPA E' (-22-2NA) M' (-20-2NA)
 ALPA 5 0 W
 NO. TFF IS NEGATIVE.
 YES. CORRECT FOR ORB PERIOD.
 2 PI (-5)
 SORT(ALPA) E' (10+NA) M' (9+NA)
 X2=-NA
 TFF SORT(MU) FROM PDL+0 E' (-45) M' (-42)
 TFF SORT(MU) IN MPAC E' (-45) M' (-42)
 E' (17) M' (14)
 SET POSMAX IF OVFL.
 RETURN TFF (-28) CS IN MPAC.

CORRECT FOR ORBITAL PERIOD.

DCOMP
 DMP DDV
 PI/16
 TFFR1ALP
 SL*
 0 -4,2
 0 -4,2
 SL* DAD
 0,2
 ENDTFF DMP
 ROV
 TFF/R1M1
 MAXTFF

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0545 27,3235 77745 1 NEOTFF DLOAD
 A0546 27,3236 77650 1 GOTO
 0547 27,3237 57231 0 ENDIFF
 0548 REP 2 LAST 1352
 0549 27,3240 77745 1 MAXTFF1 DLOAD
 0550 27,3241 43545 1 MAXTFF DLOAD R/O
 0551 REP 5 LAST 1347 27,3242 17363 1 NEARONE

TFF SORT(MU) FROM PDL+0, NEGATIVE.

RESET PDL

B0552 TIME OF FLIGHT ELLIPSE WHEN DEL (ECCENTRIC ANOM) GEO 90 AND LEO -90.

A0553 27,3243 77712 0 TFFELL SL2
 A0554 27,3244 41465 0 BDDV PUSH
 A0555 27,3245 45345 1 TFFEL1 DLOAD DSU
 0556 REP 9 LAST 1352 27,3246 00045 0 TFFTEM
 0557 REP 4 LAST 1352 27,3247 00017 1 TFFO1
 0558 REP 1 27,3250 14013 0 STODL TFFDELO
 A0559 27,3251 77626 0 STADR
 0560 REP 10 LAST 1353 27,3252 77732 1 STORE TFFTEM
 0561 27,3253 53605 1 DMP SL*
 0562 REP 4 LAST 1352 27,3254 00027 1 TFF1/ALP
 0563 27,3255 57576 1 0,2
 0564 27,3256 41206 0 PUSH DMP
 0565 REP 11 LAST 1353 27,3257 00045 0 TFFTEM
 0566 27,3260 41057 0 SL* BOVR
 0567 27,3261 57576 1 0,2
 0568 REP 16 LAST 1293 27,3262 45707 0 SIGNPAC
 0569 REP 7 LAST 1352 27,3263 00043 0 STORE TFFX
 0570 27,3264 41234 1 RTB DMP
 0571 REP 2 LAST 1352 27,3265 57325 1 T(X)
 0572 REP 8 LAST 1353 27,3266 00043 0 TFFX
 0573 27,3267 45242 1 SR3 DSU
 0574 REP 1 27,3270 17355 1 DP2(-3)
 0575 27,3271 41405 0 DMP PUSH
 A0581 27,3272 41345 0 DLOAD DMP
 A0582 27,3273 00045 0 TFFTEM
 A0583 27,3274 00015 0 RMAG1
 0584 REP 12 LAST 1353 27,3275 43312 0 SL2 DAD
 0585 REP 4 LAST 1352 27,3276 00017 1 TFFO1
 0586 REP 5 LAST 1353 27,3277 14045 0 STODL TFFTEM
 0587 REP 13 LAST 1353 27,3300 00035 1 TFFNP
 0588 REP 7 LAST 1352 27,3301 53605 1 DMP SL*

MUM FROM TFFX. E' (-16) OR (-29)
 M' (-16) OR (-27)
 NUM E'(-14) OR (-27) M'(-13) OR (-25)
 TEMP SAYS D/N IN PDL+0
 DEN FROM PDL+0 E'(-3)/(16) M'(-3)/(-15)
 N/D TO PDL+0 E' (11) M' (10)
 (ENTER WITH D/N=0 IN PDL+0)
 Q2 E' (-16) M' (-15)
 Q1 E' (-16) M' (-15)
 Q2-Q1 E' (-16) M' (-15)
 D/N FROM PDL+0
 D/N E' (11) M' (10)
 1/ALPHA E' (-22-2NA) M' (-20-2NA)
 1/ALPHA Z E' (-11-NA) M' (-10-NA)
 TO PDL+0
 1/Z E' (11) M' (10)
 X2= -NA
 IN CASE X= 1.0, CONTINUE
 X=1/ALPHA ZSQ
 POLY
 2(X T(X)-1) /Z ALFA E' (-15-NA)
 M' (-14-NA)
 1/ALPHA Z FROM PDL+0 E' (-11-NA)
 M' (-10-NA)
 GET SIGN FOR SDEL P
 1/Z E' (11) M' (10)
 E' (-29) M' (-27)
 Q1 E' (-16) M' (-15)
 (Q1+R 1/Z) =SQN OF SDEL P E'(-16) M'(-15)
 LC P E' (-36+2NR) M' (-36+2NR)
 CALC FOR ARG FOR TFF/TRIG.



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| | | | | | |
|-------|-----|----|-----------|---------|---------|
| 0592 | REP | 5 | LAST 1353 | 27,3302 | 00027 1 |
| 0593 | | | | 27,3303 | 57575 1 |
| 0594 | | | | 27,3304 | 53765 0 |
| 0595 | REP | 14 | LAST 1353 | 27,3305 | 00045 0 |
| 0596 | | | | 27,3306 | 57576 1 |
| 0597 | REP | 15 | LAST 1354 | 27,3307 | 14045 0 |
| A0598 | | | | | |
| 0599 | REP | 8 | LAST 1354 | 27,3310 | 00027 1 |
| 0600 | | | | 27,3311 | 41366 1 |
| 0601 | REP | 2 | LAST 1352 | 27,3312 | 17347 1 |
| 0602 | | | | 27,3313 | 77615 0 |
| A0603 | | | | | |
| A0604 | | | | | |
| 0605 | | | | 27,3314 | 45257 0 |
| 0606 | | | | 27,3315 | 57577 0 |
| 0607 | REP | 2 | LAST 1353 | 27,3316 | 00013 0 |
| 0608 | | | | 27,3317 | 53605 1 |
| 0609 | REP | 7 | LAST 1354 | 27,3320 | 00027 1 |
| 0610 | | | | 27,3321 | 57601 1 |
| 0611 | | | | 27,3322 | 52057 1 |
| 0612 | | | | 27,3323 | 57602 1 |
| 0613 | REP | 3 | LAST 1353 | 27,3324 | 57231 0 |

TPP1/ALP
1,2
SIGN SL*
TPPTEM
0,2
STDL TPPTEM
TPP1/ALP
DMP
PI/16
DAD
SL* DSU
0 -1,2
TPPDELO
DMP SL*
TPP1/ALP
0 -3,2
SL* GOTO
0 -4,2
ENDTPP

1/ALPA B'(-22-2NA) M'(-20-2NA)
X2=-NA
AFFIX SIGN FOR SDELP
P/ALPA B'(-59+2NR) M'(-55+2NR)
(ARG FOR USE IN TPP/TRIG)
1/ALPA B'(-22-2NA) M'(-20-2NA)
PI (-4)
2(XTX)-1)/Z ALPA FROM PDL B'(-15-NA)
M'(-14-NA)
Q2-Q1 B'(-16) M'(-15)
1/ALPA B'(-22-2NA) M'(-20-2NA)
TPP SORT(MJ) IN MPAC B'(-45) M'(-42)

L TIME OF FREE FALL

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P0614 PROGRAM NAME' T(X) DATE' 01.17.67
 P0616 MOD NO' 0 LOG SECTION' TIME OF FREE FALL
 P0618 MOD BY' RR BAIRNSPATER
 P0619 FUNCTIONAL DESCRIPTION' THE POLYNOMIAL T(X) IS USED BY TIME OF FLIGHT SUBROUTINES CALCTPF AND
 P0621 CALCTPR TO APPROXIMATE THE SERIES
 P0622
$$1/3 - X/5 + X^2/7 - X^3/9 \dots$$

 P0623
 P0624 WHERE X = ALFA Z Z IF ALFA Z Z LEO 1
 P0625 X = 1/(ALFA Z Z) IF ALFA Z Z G 1
 P0626 ALSO X IS NEG FOR HYPERBOLIC ORBITS
 P0627 X = 0 FOR PARABOLIC ORBITS
 P0628 X IS POSITIVE FOR ELLIPTIC ORBITS
 P0629 FOR FLIGHT 278, THE POLYNOMIAL T(X) IS FITTED OVER THE RANGE (0,+1) AND HAS A MAXIMUM
 P0631 DEVIATION FROM THE SERIES OF 2 E-5 (T(X) IS A CHERYCHEV TYPE FIT AND WAS OBTAINED USING
 P0633 MAC PROGRAM AUTOFIT294R88 AND IS VALID TO THE SAME TOLERANCE OVER THE RANGE (-.08,+1).)
 P0635 CALLING SEQUENCE' RTB T(X)
 P0636 C(MPAC) = X
 P0637
 P0638 SUBROUTINES CALLED' NONE
 P0639 NORMAL EXIT MODE' TC DANZIG
 P0640 ALARMS' NONE
 P0641 OUTPUT' C(MPAC) = T(X)
 P0642 ERASABLE INITIALIZATION REQUIRED'
 P0643 C(MPAC) = X
 P0644 DEBRIS' NONE

| | | | | | | | | |
|-------|--------|-----------|---------|----------|-------------|---------|--------------|-------|
| P0645 | REP 10 | LAST 1264 | 27,3325 | 0 7171 1 | T(X) | TC | POLY | |
| P0646 | | | 27,3326 | 00004 0 | | DEC | 4 | N-1 |
| P0647 | | | 27,3327 | 12525 0 | | ZDEC | 3.333333333 | E-1 |
| P0647 | | | 27,3330 | 12525 0 | | | | |
| P0648 | | | 27,3331 | 71463 0 | | ZDEC* | -1.099819135 | E-1 * |
| P0648 | | | 27,3332 | 57703 1 | | | | |
| P0648 | | | 27,3333 | 04423 0 | | ZDEC* | 1.418148487 | E-1 * |
| P0649 | | | 27,3334 | 17845 0 | | | | |
| P0650 | | | 27,3335 | 74604 0 | | ZDEC* | -1.01310997 | E-1 * |
| P0650 | | | 27,3336 | 43687 1 | | | | |
| P0651 | | | 27,3337 | 01626 1 | | ZDEC* | 5.609004986 | E-2 * |
| P0651 | | | 27,3340 | 37256 1 | | | | |
| P0652 | | | 27,3341 | 77404 1 | | ZDEC* | -1.536156925 | E-2 * |
| P0652 | | | 27,3342 | 52071 0 | | | | |
| P0653 | REP 67 | LAST 1286 | 27,3343 | 0 6030 1 | ENDT(X) | TC | DANZIG | |
| P0654 | REP 1 | | 27,3343 | | TC DANZIG = | ENDT(X) | | |



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| | | | | | | | | | |
|-------|---------------|-----------|--------------|-----------|---------|----------------------|-------------------|--|--|
| P0655 | TFP CONSTANTS | | | | | | | | |
| 0656 | | 32,3755 | | | | BANK | 32 | | |
| 0657 | REP 1 | 27,2000 | | | | SETLOC TOP-FF1 | | | |
| 0658 | | 27,3344 | | | | BANK | | | |
| A0659 | | | | | | NOTE | NOTE | ADJUSTED MUE FOR NEAR EARTH TRAJ. | |
| A0660 | | | | | | MUE | = | 3.990 815 471 E10 M CUBE/CS SO | |
| A0661 | | | | | | KBUE | = | 1.997702549 E5 B-18* MODIFIED EARTH MU | |
| 0662 | | 27,3344 | 24775 1 | 1/RDMU | 2DEC* | .5005750271 E-5 B17* | | MODIFIED EARTH MU | |
| 0662 | | 27,3345 | 30424 0 | | | | | | |
| A0663 | | | | | | NOTE | NOTE | ADJUSTED MUE FOR NEAR EARTH TRAJ. | |
| A0664 | | | | | | MUM | = | 4.902 778 E8 M CUBE /CS SO | |
| A0665 | | | | | | KBUM | 2DEC* | 2.21422176 E4 B-18* | |
| 0666 | | 27,3346 | 06220 1 | PI/16 | 2DEC | 3.141592653 B-4 | | | |
| 0666 | | 27,3347 | 37553 0 | | | | | | |
| 0667 | | 27,3350 | 37777 1 | LINK(-22) | 2OCT | 37777 37700 | | 1.0 B(-22) | |
| 0667 | | 27,3351 | 37700 1 | | | | | | |
| 0668 | | 27,3352 | 00000 1 | DP(-22) | 2OCT | 00000 00100 | | B(-22) | |
| 0668 | | 27,3353 | 00100 0 | | | | | | |
| 0669 | | 27,3354 | 04000 0 | DP2(-3) | 2DEC | 1 B-3 | | | |
| 0669 | | 27,3355 | 00000 1 | | | | | | |
| 0670 | | 27,3356 | 02000 0 | DP2(-4) | 2DEC | 1 B-4 | | 1/16 | |
| 0670 | | 27,3357 | 00000 1 | | | | | | |
| R0671 | RPAD1 | 2DEC | 6373338 B-29 | | | M (-29) | =20 909 901.57 FT | | |
| 0672 | REP 5 | LAST 536 | 22,3310 | | | RPAD1 | = | RPAD | |
| 0673 | | | 27,3360 | 00305 1 | R300K | 2DEC | 0464778 B-29 | (-29) M | |
| 0673 | | | 27,3361 | 11205 0 | | | | | |
| 0674 | | | 27,3362 | 37777 1 | NEARONE | 2DEC | .999999999 | | |
| 0674 | | | 27,3363 | 37777 1 | | | | | |
| 0675 | REP 31 | LAST 1323 | 26,3331 | | | TFPZEROS | EQUALS | H16ZEROS | |
| 0676 | REP 4 | LAST 688 | 26,3321 | | | TFP1/4 | EQUALS | H16P1/4 | |



L STAR TABLES

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| | | | |
|------|-------|---------|---------|
| 0001 | | 32,3755 | |
| 0002 | REF 1 | 14,2000 | |
| 0003 | | 14,3405 | |
| 0004 | REF 1 | | |
| 0500 | | 14,3405 | 15281 0 |
| 0500 | | 14,3406 | 27231 1 |
| 0501 | | 14,3407 | 74128 1 |
| 0501 | | 14,3410 | 61161 0 |
| 0502 | | 14,3411 | 70032 1 |
| 0502 | | 14,3412 | 64470 0 |
| 0503 | | 14,3413 | 15013 1 |
| 0503 | | 14,3414 | 10432 0 |
| 0504 | | 14,3415 | 67066 0 |
| 0504 | | 14,3416 | 40370 1 |
| 0505 | | 14,3417 | 02550 0 |
| 0505 | | 14,3420 | 31133 1 |
| 0506 | | 14,3421 | 07207 0 |
| 0506 | | 14,3422 | 24243 1 |
| 0507 | | 14,3423 | 67275 0 |
| 0507 | | 14,3424 | 67544 0 |
| 0508 | | 14,3425 | 13261 0 |
| 0508 | | 14,3426 | 25121 1 |
| 0509 | | 14,3427 | 05075 0 |
| 0509 | | 14,3430 | 16350 0 |
| 0510 | | 14,3431 | 70715 0 |
| 0510 | | 14,3432 | 55404 1 |
| 0511 | | 14,3433 | 62466 1 |
| 0511 | | 14,3434 | 54577 0 |
| 0512 | | 14,3435 | 10650 0 |
| 0512 | | 14,3436 | 17202 1 |
| 0513 | | 14,3437 | 63234 1 |
| 0513 | | 14,3440 | 43704 0 |
| 0514 | | 14,3441 | 73710 0 |
| 0514 | | 14,3442 | 50170 1 |
| 0515 | | 14,3443 | 07203 1 |
| 0515 | | 14,3444 | 13612 0 |
| 0516 | | 14,3445 | 61746 0 |
| 0516 | | 14,3446 | 77370 0 |
| 0517 | | 14,3447 | 02343 1 |
| 0517 | | 14,3450 | 05340 0 |
| 0518 | | 14,3451 | 03235 0 |
| 0518 | | 14,3452 | 14762 1 |
| 0519 | | 14,3453 | 62030 0 |
| 0519 | | 14,3454 | 51212 1 |
| 0520 | | 14,3455 | 70715 0 |
| 0520 | | 14,3456 | 64117 1 |
| 0521 | | 14,3457 | 01744 1 |
| 0521 | | 14,3460 | 11157 1 |

| | |
|--------|-----------------------------|
| BANK | 32 |
| ESTLOC | STARTAB |
| BANK | |
| COUNT | 14/STARS |
| 2DEC | +0.8341953207 B-1 STAR 37 X |
| 2DEC | -0.2394362567 B-1 STAR 37 Y |
| 2DEC | -0.4967780649 B-1 STAR 37 Z |
| 2DEC | +0.8138753897 B-1 STAR 36 X |
| 2DEC | -0.5559063490 B-1 STAR 36 Y |
| 2DEC | +0.1690413589 B-1 STAR 36 Z |
| 2DEC | +0.4540570017 B-1 STAR 35 X |
| 2DEC | -0.5393383149 B-1 STAR 35 Y |
| 2DEC | +0.7091871552 B-1 STAR 35 Z |
| 2DEC | +0.3200014224 B-1 STAR 34 X |
| 2DEC | -0.4436740480 B-1 STAR 34 Y |
| 2DEC | -0.8371095679 B-1 STAR 34 Z |
| 2DEC | +0.5516160037 B-1 STAR 33 X |
| 2DEC | -0.7934422090 B-1 STAR 33 Y |
| 2DEC | -0.2568045150 B-1 STAR 33 Z |
| 2DEC | +0.4535361097 B-1 STAR 32 X |
| 2DEC | -0.8780537171 B-1 STAR 32 Y |
| 2DEC | +0.1527307006 B-1 STAR 32 Z |
| 2DEC | +0.2067145272 B-1 STAR 31 X |
| 2DEC | -0.8720349419 B-1 STAR 31 Y |
| 2DEC | -0.4436486945 B-1 STAR 31 Z |
| 2DEC | +0.1216171923 B-1 STAR 30 X |



L STAR TABLES

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| | | | | | | |
|------|---------|---------|------|-----------------|---------|---|
| 0522 | 14,3461 | 63531 0 | 2DEC | -7703014754 B-1 | STAR 30 | Y |
| 0522 | 14,3462 | 66055 1 | | | | |
| 0523 | 14,3463 | 12007 0 | 2DEC | +6259751556 B-1 | STAR 30 | Z |
| 0523 | 14,3464 | 37503 0 | | | | |
| 0524 | 14,3465 | 76145 0 | 2DEC | -1126265542 B-1 | STAR 29 | X |
| 0524 | 14,3466 | 53477 0 | | | | |
| 0525 | 14,3467 | 60372 1 | 2DEC | -9694679569 B-1 | STAR 29 | Y |
| 0525 | 14,3470 | 43624 0 | | | | |
| 0526 | 14,3471 | 63370 0 | 2DEC | +2178236347 B-1 | STAR 29 | Z |
| 0526 | 14,3472 | 15121 1 | | | | |
| 0527 | 14,3473 | 76123 0 | 2DEC | -1147906312 B-1 | STAR 28 | X |
| 0527 | 14,3474 | 64245 0 | | | | |
| 0528 | 14,3475 | 72437 1 | 2DEC | -3399437395 B-1 | STAR 28 | Y |
| 0528 | 14,3476 | 45823 1 | | | | |
| 0529 | 14,3477 | 61041 0 | 2DEC | -9334138229 B-1 | STAR 28 | Z |
| 0529 | 14,3500 | 57124 1 | | | | |
| 0530 | 14,3501 | 72275 1 | 2DEC | -3518772846 B-1 | STAR 27 | X |
| 0530 | 14,3502 | 55365 1 | | | | |
| 0531 | 14,3503 | 62641 0 | 2DEC | -6239967165 B-1 | STAR 27 | Y |
| 0531 | 14,3504 | 72150 0 | | | | |
| 0532 | 14,3505 | 70712 1 | 2DEC | -4440853383 B-1 | STAR 27 | Z |
| 0532 | 14,3506 | 41542 1 | | | | |
| 0533 | 14,3507 | 67363 0 | 2DEC | -5328042377 B-1 | STAR 26 | X |
| 0533 | 14,3510 | 50441 0 | | | | |
| 0534 | 14,3511 | 64426 0 | 2DEC | -7159448596 B-1 | STAR 26 | Y |
| 0534 | 14,3512 | 77263 0 | | | | |
| 0535 | 14,3513 | 67157 0 | 2DEC | +4511569595 B-1 | STAR 26 | Z |
| 0535 | 14,3514 | 34056 0 | | | | |
| 0536 | 14,3515 | 63326 0 | 2DEC | -7862552143 B-1 | STAR 25 | X |
| 0536 | 14,3516 | 77723 1 | | | | |
| 0537 | 14,3517 | 47614 1 | 2DEC | -5214265404 B-1 | STAR 26 | Y |
| 0537 | 14,3520 | 72566 1 | | | | |
| 0538 | 14,3521 | 65231 1 | 2DEC | +3312227199 B-1 | STAR 25 | Z |
| 0538 | 14,3522 | 14031 0 | | | | |
| 0539 | 14,3523 | 64753 1 | 2DEC | -6899901699 B-1 | STAR 24 | X |
| 0539 | 14,3524 | 63156 0 | | | | |
| 0540 | 14,3525 | 71237 1 | 2DEC | -4180817959 B-1 | STAR 24 | Y |
| 0540 | 14,3526 | 42272 0 | | | | |
| 0541 | 14,3527 | 66427 0 | 2DEC | -5908647707 B-1 | STAR 24 | Z |
| 0541 | 14,3530 | 64260 1 | | | | |
| 0542 | 14,3531 | 66546 0 | 2DEC | -5811943804 B-1 | STAR 23 | X |
| 0542 | 14,3532 | 73302 1 | | | | |
| 0543 | 14,3533 | 73261 0 | 2DEC | -2907877154 B-1 | STAR 23 | Y |
| 0543 | 14,3534 | 73575 1 | | | | |
| 0544 | 14,3535 | 14122 0 | 2DEC | +7600365758 B-1 | STAR 23 | Z |
| 0544 | 14,3536 | 07016 1 | | | | |
| 0545 | 14,3537 | 61247 1 | 2DEC | -9171065276 B-1 | STAR 22 | X |
| 0545 | 14,3540 | 42015 0 | | | | |
| 0546 | 14,3541 | 72314 1 | 2DEC | -3500098785 B-1 | STAR 22 | Y |
| 0546 | 14,3542 | 67004 1 | | | | |



L STAR TABLES

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| | | | | | | | |
|------|---------|---------|------|---------------|-----|---------|---|
| 0547 | 14,3543 | 74744 0 | ZDEC | -.1906106439 | B-1 | STAR 22 | Z |
| 0547 | 14,3544 | 74104 1 | | | | | |
| 0548 | 14,3545 | 70605 0 | ZDEC | -.4524416631 | B-1 | STAR 21 | X |
| 0548 | 14,3546 | 63103 0 | | | | | |
| 0549 | 14,3547 | 77154 1 | ZDEC | -.0482700870 | B-1 | STAR 21 | Y |
| 0549 | 14,3550 | 54113 0 | | | | | |
| 0550 | 14,3551 | 61601 1 | ZDEC | -.8904319187 | B-1 | STAR 21 | Z |
| 0550 | 14,3552 | 62472 1 | | | | | |
| 0551 | 14,3553 | 60604 0 | ZDEC | -.9525633510 | B-1 | STAR 20 | X |
| 0551 | 14,3554 | 63166 0 | | | | | |
| 0552 | 14,3555 | 77033 1 | ZDEC | -.0591313500 | B-1 | STAR 20 | Y |
| 0552 | 14,3556 | 63044 1 | | | | | |
| 0553 | 14,3557 | 73162 0 | ZDEC | -.2985408935 | B-1 | STAR 20 | Z |
| 0553 | 14,3560 | 53261 1 | | | | | |
| 0554 | 14,3561 | 60431 1 | ZDEC | -.9656240240 | B-1 | STAR 19 | X |
| 0554 | 14,3562 | 63350 1 | | | | | |
| 0555 | 14,3563 | 00660 1 | ZDEC | +0.0528067543 | B-1 | STAR 19 | Y |
| 0555 | 14,3564 | 22763 0 | | | | | |
| 0556 | 14,3565 | 04045 1 | ZDEC | +0.2545224762 | B-1 | STAR 19 | Z |
| 0556 | 14,3566 | 01424 1 | | | | | |
| 0557 | 14,3567 | 62165 1 | ZDEC | -.8606970465 | B-1 | STAR 18 | X |
| 0557 | 14,3570 | 45335 0 | | | | | |
| 0558 | 14,3571 | 07327 0 | ZDEC | +0.4638127405 | B-1 | STAR 18 | Y |
| 0558 | 14,3572 | 21564 0 | | | | | |
| 0559 | 14,3573 | 03267 1 | ZDEC | +0.2099484122 | B-1 | STAR 18 | Z |
| 0559 | 14,3574 | 34557 1 | | | | | |
| 0560 | 14,3575 | 63472 0 | ZDEC | -.7741360248 | B-1 | STAR 17 | X |
| 0560 | 14,3576 | 50705 0 | | | | | |
| 0561 | 14,3577 | 11661 0 | ZDEC | +0.6154234025 | B-1 | STAR 17 | Y |
| 0561 | 14,3600 | 21433 0 | | | | | |
| 0562 | 14,3601 | 75501 1 | ZDEC | -.1482142053 | B-1 | STAR 17 | Z |
| 0562 | 14,3602 | 72421 0 | | | | | |
| 0563 | 14,3603 | 70431 0 | ZDEC | -.4656165921 | B-1 | STAR 16 | X |
| 0563 | 14,3604 | 65316 0 | | | | | |
| 0564 | 14,3605 | 07510 1 | ZDEC | +0.4775604724 | B-1 | STAR 16 | Y |
| 0564 | 14,3606 | 12666 1 | | | | | |
| 0565 | 14,3607 | 13727 1 | ZDEC | +0.7450624681 | B-1 | STAR 16 | Z |
| 0565 | 14,3610 | 21520 0 | | | | | |
| 0566 | 14,3611 | 72161 1 | ZDEC | -.3611937602 | B-1 | STAR 15 | X |
| 0566 | 14,3612 | 43161 0 | | | | | |
| 0567 | 14,3613 | 11144 0 | ZDEC | +0.5748077840 | B-1 | STAR 15 | Y |
| 0567 | 14,3614 | 32323 1 | | | | | |
| 0568 | 14,3615 | 64200 1 | ZDEC | -.7342581827 | B-1 | STAR 15 | Z |
| 0568 | 14,3616 | 76476 0 | | | | | |
| 0569 | 14,3617 | 71323 0 | ZDEC | -.4116502629 | B-1 | STAR 14 | X |
| 0569 | 14,3620 | 70264 0 | | | | | |
| 0570 | 14,3621 | 16403 1 | ZDEC | +0.9066367314 | B-1 | STAR 14 | Y |
| 0570 | 14,3622 | 05717 0 | | | | | |
| 0571 | 14,3623 | 01365 0 | ZDEC | +0.0924676785 | B-1 | STAR 14 | Z |
| 0571 | 14,3624 | 17662 0 | | | | | |



L STAR TABLES

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| | | | | | | | |
|------|---------|---------|------|--------------|-----|---------|---|
| 0572 | 14,3625 | 75055 0 | 2DEC | -.1818957154 | B-1 | STAR 13 | X |
| 0572 | 14,3626 | 75101 0 | | | | | |
| 0573 | 14,3627 | 17030 1 | 2DEC | +.9405318128 | B-1 | STAR 13 | Y |
| 0573 | 14,3630 | 32613 1 | | | | | |
| 0574 | 14,3631 | 73321 0 | 2DEC | -.2869039173 | B-1 | STAR 13 | Z |
| 0574 | 14,3632 | 85667 0 | | | | | |
| 0575 | 14,3633 | 77010 0 | 2DEC | -.0614360769 | B-1 | STAR 12 | X |
| 0575 | 14,3634 | 86714 0 | | | | | |
| 0576 | 14,3635 | 11515 0 | 2DEC | +.6031700106 | B-1 | STAR 12 | Y |
| 0576 | 14,3636 | 05314 1 | | | | | |
| 0577 | 14,3637 | 63215 1 | 2DEC | -.7952430739 | B-1 | STAR 12 | Z |
| 0577 | 14,3640 | 53630 1 | | | | | |
| 0578 | 14,3641 | 02145 0 | 2DEC | +.1373948084 | B-1 | STAR 11 | X |
| 0578 | 14,3642 | 21163 0 | | | | | |
| 0579 | 14,3643 | 12715 1 | 2DEC | +.6813398852 | B-1 | STAR 11 | Y |
| 0579 | 14,3644 | 21123 1 | | | | | |
| 0580 | 14,3645 | 13401 0 | 2DEC | +.7189566241 | B-1 | STAR 11 | Z |
| 0580 | 14,3646 | 26125 0 | | | | | |
| 0581 | 14,3647 | 03161 1 | 2DEC | +.2013426456 | B-1 | STAR 10 | X |
| 0581 | 14,3650 | 14610 0 | | | | | |
| 0582 | 14,3651 | 17401 1 | 2DEC | +.9689888101 | B-1 | STAR 10 | Y |
| 0582 | 14,3652 | 36465 0 | | | | | |
| 0583 | 14,3653 | 75552 1 | 2DEC | -.1432544058 | B-1 | STAR 10 | Z |
| 0583 | 14,3654 | 56556 1 | | | | | |
| 0584 | 14,3655 | 05473 1 | 2DEC | +.3509587451 | B-1 | STAR 9 | X |
| 0584 | 14,3656 | 01565 0 | | | | | |
| 0585 | 14,3657 | 16217 1 | 2DEC | +.8925545449 | B-1 | STAR 9 | Y |
| 0585 | 14,3660 | 31643 1 | | | | | |
| 0586 | 14,3661 | 04417 1 | 2DEC | +.2831507435 | B-1 | STAR 9 | Z |
| 0586 | 14,3662 | 22211 0 | | | | | |
| 0587 | 14,3663 | 06444 0 | 2DEC | +.4107492871 | B-1 | STAR 8 | X |
| 0587 | 14,3664 | 33354 0 | | | | | |
| 0588 | 14,3665 | 07765 1 | 2DEC | +.4987190610 | B-1 | STAR 8 | Y |
| 0588 | 14,3666 | 20153 1 | | | | | |
| 0589 | 14,3667 | 14154 1 | 2DEC | +.7632590132 | B-1 | STAR 8 | Z |
| 0589 | 14,3670 | 23613 1 | | | | | |
| 0590 | 14,3671 | 13202 0 | 2DEC | +.7033803645 | B-1 | STAR 7 | X |
| 0590 | 14,3672 | 05024 1 | | | | | |
| 0591 | 14,3673 | 13243 0 | 2DEC | +.7074274193 | B-1 | STAR 7 | Y |
| 0591 | 14,3674 | 07665 0 | | | | | |
| 0592 | 14,3675 | 01067 1 | 2DEC | +.0692188921 | B-1 | STAR 7 | Z |
| 0592 | 14,3676 | 01242 1 | | | | | |
| 0593 | 14,3677 | 10561 1 | 2DEC | +.5450662811 | B-1 | STAR 6 | X |
| 0593 | 14,3700 | 05666 1 | | | | | |
| 0594 | 14,3701 | 10401 0 | 2DEC | +.5313738486 | B-1 | STAR 6 | Y |
| 0594 | 14,3702 | 00357 0 | | | | | |
| 0595 | 14,3703 | 65477 0 | 2DEC | -.6484940879 | B-1 | STAR 6 | Z |
| 0595 | 14,3704 | 81124 1 | | | | | |
| 0596 | 14,3705 | 00154 1 | 2DEC | +.0131955837 | B-1 | STAR 5 | X |
| 0596 | 14,3706 | 03111 0 | | | | | |



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| | | | | | | | |
|------|---------|---------|-------------|---------------|-----|--------|---|
| 0597 | 14,3707 | 00077 1 | 2DEC | +0.0078043793 | B-1 | STAR 5 | Y |
| 0598 | 14,3710 | 35878 0 | | | | | |
| 0598 | 14,3711 | 17777 0 | 2DEC | +0.9998824772 | B-1 | STAR 5 | Z |
| 0598 | 14,3712 | 01142 1 | | | | | |
| 0599 | 14,3713 | 07674 0 | 2DEC | +0.4917355618 | B-1 | STAR 4 | X |
| 0599 | 14,3714 | 11416 1 | | | | | |
| 0600 | 14,3715 | 03415 1 | 2DEC | +0.2203784481 | B-1 | STAR 4 | Y |
| 0600 | 14,3716 | 12707 1 | | | | | |
| 0601 | 14,3717 | 82413 0 | 2DEC | -0.8423950835 | B-1 | STAR 4 | Z |
| 0601 | 14,3720 | 43135 1 | | | | | |
| 0602 | 14,3721 | 07511 0 | 2DEC | +0.4778746280 | B-1 | STAR 3 | X |
| 0602 | 14,3722 | 03423 1 | | | | | |
| 0603 | 14,3723 | 01872 0 | 2DEC | +0.1164935557 | B-1 | STAR 3 | Y |
| 0603 | 14,3724 | 12054 0 | | | | | |
| 0604 | 14,3725 | 15735 1 | 2DEC | +0.8707790771 | B-1 | STAR 3 | Z |
| 0604 | 14,3726 | 15405 1 | | | | | |
| 0605 | 14,3727 | 16745 0 | 2DEC | +0.9342726891 | B-1 | STAR 2 | X |
| 0605 | 14,3730 | 21763 0 | | | | | |
| 0606 | 14,3731 | 02613 1 | 2DEC | +0.1732973829 | B-1 | STAR 2 | Y |
| 0606 | 14,3732 | 24875 0 | | | | | |
| 0607 | 14,3733 | 73007 1 | 2DEC | -0.3116128956 | B-1 | STAR 2 | Z |
| 0607 | 14,3734 | 50430 0 | | | | | |
| 0608 | 14,3735 | 15777 1 | 2DEC | +0.8749183324 | B-1 | STAR 1 | X |
| 0608 | 14,3736 | 12457 1 | | | | | |
| 0609 | 14,3737 | 00324 1 | 2DEC | +0.0258916990 | B-1 | STAR 1 | Y |
| 0609 | 14,3740 | 03265 0 | | | | | |
| 0610 | 14,3741 | 07571 0 | 2DEC | +0.4835778442 | B-1 | STAR 1 | Z |
| 0610 | 14,3742 | 17020 0 | | | | | |
| 0611 | 14,3743 | 15325 1 | CATALOG DEC | 6869 | | | |



L AGC BLOCK TWO SELF-CHECK

USER=8 PAGE NO. 1 R0 83

R0001 PROGRAM DESCRIPTION
 R0003 PROGRAM NAME - SELF-CHECK
 R0005 MOD NO - 1
 R0007 MOD BY - GAUNTT
 R0008 FUNCTIONAL DESCRIPTION

DATE 20 DECEMBER 1967
 LOG SECTION AGC BLOCK TWO SELF-CHECK
 ASSEMBLY SUBROUTINE UTILITYM REV 25

R0009 PROGRAM HAS TWO MAIN PARTS. THE FIRST IS SELF-CHECK WHICH RUNS AS A ZERO PRIORITY JOB WITH NO CORE SET, AS
 R0011 PART OF THE BACK-UP IDLE LOOP. THE SECOND IS SHOW-BANKSUM WHICH RUNS AS A REGULAR EXECUTIVE JOB WITH ITS OWN
 R0013 STARTING VERB.
 R0014 THE PURPOSE OF SELF-CHECK IS TO CHECK OUT VARIOUS PARTS OF THE COMPUTER AS OUTLINED BELOW IN THE OPTIONS.
 R0016 THE PURPOSE OF SHOW-BANKSUM IS TO DISPLAY THE SUM OF EACH BANK, ONE AT A TIME.
 R0020 IN ALL THERE ARE 7 POSSIBLE OPTIONS IN THIS BLOCK II VERSION OF SELF-CHECK. MORE DETAIL DESCRIPTION MAY BE
 R0022 FOUND IN E-2065 BLOCK II AGC SELF-CHECK AND SHOW BANKSUM BY EDWIN D. SMALLY DECEMBER 1966, AND ADDENDA 2 AND 3.
 R0024 THE DIFFERENT OPTIONS ARE CONTROLLED BY PUTTING DIFFERENT NUMBERS IN THE SMODE REGISTER (NOUN 27). BELOW IS
 R0026 A DESCRIPTION OF WHAT PARTS OF THE COMPUTER THAT ARE CHECKED BY THE OPTIONS, AND THE CORRESPONDING NUMBER, IN
 R0028 OCTAL, TO LOAD INTO SMODE.
 R0032 +-4 ERASABLE MEMORY
 R0033 +-5 FIXED MEMORY
 R0034 +-1,2,3,6,7,10 EVERYTHING IN OPTIONS 4 AND 5.
 R0036 -0 SAME AS +-10 UNTIL AN ERROR IS DETECTED.
 R0037 +0 NO CHECK, PUTS COMPUTER INTO THE BACKUP IDLE LOOP.
 R0038 WARNINGS

R0039 USE OF E MEMORY RESERVED FOR SELF-CHECK (EVEN IN IDLE LOOP) AS TEMP STORAGE BY OTHER PROGRAMS IS DANGEROUS.
 R0041 SMODE SET GREATER THAN OCT 10 PUTS COMPUTER INTO BACKUP IDLE LOOP.
 R0042 CALLING SEQUENCE

R0043 TO CALL SELF-CHECK KEY IN
 R0044 V 21 N 27 E OPTION NUMBER 8
 R0047 TO CALL SHOW-BANKSUM KEY IN
 R0048 V 91 E DISPLAYS FIRST BANK
 R0049 V 33 E PROCEED, DISPLAYS NEXT BANK
 R0050 EXIT MODES, NORMAL AND ALARM

R0051 SELF-CHECK NORMALLY CONTINUES INDEFINITELY UNLESS THERE IS AN ERROR DETECTED. IF SO + OPTION NUMBERS PUT
 R0053 COMPUTER INTO BACKUP IDLE LOOP, - OPTION NUMBERS RESTART THE OPTION.
 R0054 THE -0 OPTION PROCEEDS FROM THE LINE FOLLOWING THE LINE WHERE THE ERROR WAS DETECTED.
 R0057 SHOW-BANKSUM PROCEEDS UNTIL A TERMINATE IS KEYED IN (V 34 E). THE COMPUTER IS PUT INTO THE BACKUP IDLE LOOP

R0059
 R0060 OUTPUT

L AGC BLOCK TWO SELF-CHECK

USBR#8 PAGE NO. 2 B0 53

00061 SELF-CHECK UPON DETECTING AN ERROR LOADS THE SELF-CHECK ALARM CONSTANT (01102) INTO THE FAILREQ SET AND
 00063 TURNS ON THE ALARM LIGHT. THE OPERATOR MAY THEN DISPLAY THE THREE FAILREQS BY KEYING IN V 05 N 09 B. FOR FURTHER
 00065 INFORMATION HE MAY KEY IN V 05 N 08 B, THE DSKY DISPLAY IN R1 WILL BE ADDRESS+1 OF WHERE THE ERROR WAS DETECTED,
 00067 IN R2 THE BECON OF SELF-CHECK, AND IN R3 THE TOTAL NUMBER OF ERRORS DETECTED BY SELF-CHECK SINCE THE LAST MAN
 00069 INITIATED FRESH START (SLAP1).
 00073 SHOW-BANKSUM STARTING WITH BANK 0 DISPLAYS IN R1 THE BANK SUM (A +-NUMBER EQUAL TO THE BANK NUMBER), IN R2
 00075 THE BANK NUMBER, AND IN R3 THE BUGGER WORD.
 00076 ERASABLE INITIALIZATION REQUIRED

00077 ACCOMPLISHED BY FRESH START
 00078 SMODE SET TO +0
 00079 DEBRIS

00080 ALL EXITS FROM THE CHECK OF ERASABLE (ERASCHK) RESTORE ORIGINAL CONTENTS TO REGISTERS UNDER CHECK.
 00082 EXCEPTION IS A RESTART. RESTART THAT OCCURS DURING ERASCHK RESTORES ERASABLE, UNLESS THERE IS EVIDENCE TO DOUBT
 00084 E MEMORY, IN WHICH CASE PROGRAM THEN DOES A FRESH START (DGFSTART).

| | | | | | | |
|------|-----|-----|-----------|------|--------|--------------|
| 0005 | | | | | BANK | 25 |
| 0006 | REP | 1 | 43,2000 | | SETLOC | SELFCHCK |
| 0007 | | | 43,3230 | | BANK | |
| 0008 | REP | 1 | | | COUNT | 43/SELF |
| 0009 | REP | 76 | LAST 1174 | 4712 | SBIT1 | EQUALS BIT1 |
| 0090 | REP | 44 | LAST 1174 | 4711 | SBIT2 | EQUALS BIT2 |
| 0091 | REP | 33 | LAST 1174 | 4710 | SBIT3 | EQUALS BIT3 |
| 0092 | REP | 40 | LAST 1174 | 4707 | SBIT4 | EQUALS BIT4 |
| 0093 | REP | 39 | LAST 1089 | 4706 | SBIT5 | EQUALS BIT5 |
| 0094 | REP | 44 | LAST 1131 | 4705 | SBIT6 | EQUALS BIT6 |
| 0095 | REP | 53 | LAST 1171 | 4704 | SBIT7 | EQUALS BIT7 |
| 0096 | REP | 28 | LAST 1196 | 4703 | SBIT8 | EQUALS BIT8 |
| 0097 | REP | 32 | LAST 1010 | 4702 | SBIT9 | EQUALS BIT9 |
| 0098 | REP | 37 | LAST 1174 | 4701 | SBIT10 | EQUALS BIT10 |
| 0099 | REP | 35 | LAST 1174 | 4700 | SBIT11 | EQUALS BIT11 |
| 0100 | REP | 31 | LAST 1174 | 4677 | SBIT12 | EQUALS BIT12 |
| 0101 | REP | 44 | LAST 1174 | 4676 | SBIT13 | EQUALS BIT13 |
| 0102 | REP | 75 | LAST 1335 | 4675 | SBIT14 | EQUALS BIT14 |
| 0103 | REP | 49 | LAST 1174 | 4674 | SBIT15 | EQUALS BIT15 |
| 0104 | REP | 252 | LAST 1294 | 4714 | S+ZERO | EQUALS ZERO |
| 0105 | REP | 77 | LAST 1363 | 4712 | S+1 | EQUALS BIT1 |
| 0106 | REP | 45 | LAST 1363 | 4711 | S+2 | EQUALS BIT2 |
| 0107 | REP | 45 | LAST 1337 | 6214 | S+3 | EQUALS THREE |
| 0108 | REP | 19 | LAST 1335 | 4710 | S+4 | EQUALS FOUR |
| 0109 | REP | 28 | LAST 1109 | 4715 | S+5 | EQUALS FIVE |



L AOC BLOCK TWO SELF-CHECK

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| | | | | | | | | | |
|-------|-----|-----|------|------|---------|----------|----------|----------|-----------|
| 0110 | REP | 40 | LAST | 1338 | 0211 | | S+6 | EQUALS | SIX |
| 0111 | REP | 10 | LAST | 1174 | 4716 | | S+7 | EQUALS | SEVEN |
| 0112 | REP | 13 | LAST | 1104 | 4373 | | S8BITS | EQUALS | LC78 |
| 0113 | REP | 4 | LAST | 1082 | 4728 | | CNTRCON | = | OCT50 |
| 0114 | | | | | 43,3230 | 00081 0 | ERASCON1 | OCTAL | 00081 |
| 0115 | | | | | 43,3231 | 01373 1 | ERASCON2 | OCTAL | 01373 |
| 0116 | REP | 8 | LAST | 1174 | 4744 | | ERASCON6 | = | OCT1400 |
| 0117 | | | | | 43,3232 | 01481 0 | ERASCON3 | OCTAL | 01481 |
| 0118 | | | | | 43,3233 | 01773 0 | ERASCON4 | OCTAL | 01773 |
| 0119 | REP | 19 | LAST | 1099 | 4747 | | S10BITS | EQUALS | LC710 |
| 0120 | REP | 4 | LAST | 019 | 4755 | | SRNK03 | EQUALS | PRIC8 |
| 0121 | REP | 8 | LAST | 1174 | 4384 | | -MAXADRS | = | HIS |
| 0122 | | | | | 43,3234 | 00060 1 | SIXTY | OCTAL | 00060 |
| 0123 | | | | | 43,3235 | 60017 1 | SUPRCON | OCTAL | 60017 |
| 0124 | | | | | 43,3236 | 17777 0 | S13BITS | OCTAL | 17777 |
| 0125 | | | | | 43,3237 | 25252 0 | CNC+S1 | OCTAL | 25252 |
| 0126 | | | | | 43,3240 | 52400 1 | CNC+S2 | OCTAL | 52400 |
| 0127 | | | | | 43,3241 | 76777 1 | ERASCON5 | OCTAL | 76777 |
| 0128 | REP | 2 | LAST | 199 | 5630 | | S-7 | = | OCTTTTT70 |
| 0129 | REP | 3 | LAST | 1083 | 6061 | | S-4 | EQUALS | NEG4 |
| 0130 | REP | 3 | LAST | 569 | 7714 | | S-3 | EQUALS | NEG3 |
| 0131 | REP | 6 | LAST | 1178 | 7715 | | S-2 | EQUALS | NEG2 |
| 0132 | REP | 29 | LAST | 1174 | 7716 | | S-1 | EQUALS | NEGONE |
| 0133 | REP | 15 | LAST | 1071 | 4713 | | S-ZERO | EQUALS | NEG0 |
| 0134 | REP | 46 | LAST | 1205 | 53,1400 | | BRANK= | LST1 | |
| 0135 | REP | 3 | LAST | 257 | 43,3242 | 01371 0 | ADRS1 | ADRES | SKEEP1 |
| 0136 | REP | 4 | LAST | 1190 | 43,3243 | 03334 0 | SELPADRS | ADRES | SELPCHK |
| A0137 | | | | | | | | | |
| A0138 | | | | | | | | | |
| A0139 | | | | | | | | | |
| 0140 | REP | 6 | LAST | 182 | 43,3244 | 3 1360 0 | PRERRORS | CA | ERESTORE |
| 0141 | | | | | 43,3245 | 0 0008 1 | EXTEND | | |
| 0142 | REP | 1 | | | 43,3246 | 1 3255 1 | BZP | ERRORS | |
| 0143 | | | | | 43,3247 | 0 0008 1 | EXTEND | | |
| 0144 | REP | 3 | LAST | 182 | 43,3250 | 3 1376 1 | DCA | SKEEPS | |
| 0145 | REP | 3 | LAST | 182 | 43,3251 | 51+377 0 | INDEX | SKEEPT | |
| 0146 | | | | | 43,3252 | 52 001 1 | DACH | 0000 | |
| 0147 | REP | 2 | LAST | 257 | 43,3253 | 3 4714 1 | CA | S-ZERO | |
| 0148 | REP | 7 | LAST | 1364 | 43,3254 | 55+360 1 | TS | ERESTORE | |
| 0149 | | | | | 43,3255 | 0 0004 0 | ERRORS | INHINT | |
| 0150 | REP | 303 | LAST | 1287 | 43,3256 | 3 0002 0 | CA | 0 | |
| 0151 | REP | 3 | LAST | 382 | 43,3257 | 55+357 0 | TS | SPAIL | |
| 0152 | REP | 3 | LAST | 266 | 43,3260 | 55+363 1 | TS | ALMCADR | |
| 0153 | REP | 3 | LAST | 179 | 43,3261 | 25+365 0 | INCR | ERRCNT | |
| 0154 | REP | 1 | | | 43,3262 | 0 5541 1 | TCALARM2 | ALARM2 | |
| 0155 | | | | | 43,3263 | 0 1102 0 | TC | 01102 | |
| 0156 | REP | 5 | LAST | 266 | 43,3264 | 11+362 0 | CCS | S+008 | |
| 0157 | REP | 3 | LAST | 1364 | 43,3265 | 3 4714 1 | SIDL0OP | CA | S-ZPRO |

00377
 USED IN CNTRONK
 USED IN ERASCHK
 USED IN ERASCHK
 USED IN ERASCHK
 USED IN ERASCHK
 USED IN ERASCHK
 01777, USED IN ERASCHK
 06000, USED IN ROPECHK
 FOR ROPECHK

USED IN ROPECHK

USED IN CYCLSHFT
 USED IN CYCLSHFT

SELPCHK RETURN ADDRESS. SHOULD BE PUT
 IN SELPRT WHEN GOING FROM SELPCHK TO
 SHOWSUM AND PUT IN SKEEP1 WHEN GOING
 FROM SHOWSUM TO SELF-CHECK.

IS IT NECESSARY TO RESTORE ERASABLE

NO

RESTORE THE TWO ERASABLE REGISTERS

SAVE 0 FOR FAILURE LOCATION
 FOR DISPLAY WITH BRANK AND BRCOUNT
 KEEP TRACK OF NUMBER OF MALFUNCTIONS.

SELF-CHECK MALFUNCTION INDICATOR

L AGC BLOCK TWO SELF-CHECK

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| | | | | | | | | |
|-------|---|-----|-----------|---------|----------|-----------|-------------|--|
| 0158 | REP | 6 | LAST 1364 | 43,3206 | 55-362 0 | TS | SMODE | |
| 0159 | REP | 5 | LAST 1364 | 43,3207 | 0 3334 0 | TC | SELFCHK | GO TO IDLE LOOP |
| 0160 | REP | 4 | LAST 1364 | 43,3270 | 0 1357 1 | TC | SPAIL | CONTINUE WITH SELF-CHECK |
| 0161 | REP | 344 | LAST 1338 | 43,3271 | 10 000 0 | -CHK | CCS | A |
| 0162 | REP | 1 | | 43,3272 | 1 3244 1 | TC | PRERRORS | |
| 0163 | REP | 2 | LAST 1365 | 43,3273 | 1 3244 1 | TC | PRERRORS | |
| 0164 | REP | 345 | LAST 1365 | 43,3274 | 10 000 0 | CCS | A | |
| 0165 | REP | 3 | LAST 1365 | 43,3275 | 1 3244 1 | TC | PRERRORS | |
| 0166 | REP | 304 | LAST 1364 | 43,3276 | 0 0002 0 | TC | 0 | |
| 0167 | | | | 43,3277 | 0 0006 1 | SMODECHK | EXTEND | |
| 0168 | REP | 4 | LAST 1364 | 43,3300 | 23-371 0 | CHK | SKEEP1 | |
| 0169 | REP | 1 | | 43,3301 | 0 3330 1 | TC | CHECKNJ | CHECK FOR NEW JOB |
| 0170 | REP | 7 | LAST 1365 | 43,3302 | 11-362 0 | CCS | SMODE | |
| 0171 | REP | 1 | | 43,3303 | 0 3310 0 | TC | SOPTIONS | |
| 0172 | REP | 1 | | 43,3304 | 0 3301 0 | TC | SMODECHK +2 | TO BACKUP IDLE LOOP |
| 0173 | REP | 2 | LAST 1365 | 43,3305 | 0 3310 0 | TC | SOPTIONS | |
| 0174 | REP | 2 | LAST 80 | 43,3306 | 25-366 0 | INCR | SCOUNT | |
| 0175 | REP | 5 | LAST 1365 | 43,3307 | 0 1371 0 | TC | SKEEP1 | CONTINUE WITH SELF-CHECK |
| 0176 | REP | 1 | | 43,3310 | 6 5630 1 | SOPTIONS | AD | S-7 |
| 0177 | | | | 43,3311 | 0 0006 1 | EXTEND | | |
| 0178 | | | | 43,3312 | 6 3314 1 | BZNF | +2 | FOR OPTIONS BELOW NINE. |
| 0179 | REP | 1 | | 43,3313 | 0 3265 0 | BRKOPTN | TC | ILLEGAL OPTION. GO TO IDLE LOOP. |
| 0180 | REP | 3 | LAST 1365 | 43,3314 | 25-366 0 | INCR | SCOUNT | FOR OPTIONS BELOW NINE. |
| 0181 | REP | 1 | | 43,3315 | 6 4716 0 | AD | S-7 | |
| 0182 | REP | 346 | LAST 1365 | 43,3316 | 50 000 1 | INDEX | A | |
| 0183 | REP | 1 | | 43,3317 | 0 3320 0 | TC | SOPTION1 | |
| 0184 | REP | 6 | LAST 1365 | 43,3320 | 0 1371 0 | SOPTION1 | TC | SKEEP1 |
| 0185 | REP | 7 | LAST 1365 | 43,3321 | 0 1371 0 | SOPTION2 | TC | SKEEP1 |
| 0186 | REP | 8 | LAST 1365 | 43,3322 | 0 1371 0 | SOPTION3 | TC | SKEEP1 |
| 0187 | REP | 1 | | 43,3323 | 0 3335 1 | SOPTION4 | TC | BRASCHK |
| 0188 | REP | 1 | | 43,3324 | 0 3516 0 | SOPTION5 | TC | ROPECHK |
| 0189 | REP | 9 | LAST 1365 | 43,3325 | 0 1371 0 | SOPTION6 | TC | SKEEP1 |
| 0190 | REP | 10 | LAST 1365 | 43,3326 | 0 1371 0 | SOPTION7 | TC | SKEEP1 |
| 0191 | REP | 11 | LAST 1365 | 43,3327 | 0 1371 0 | SOPTION10 | TC | SKEEP1 |
| 0192 | | | | 43,3330 | 0 0006 1 | CHECKNJ | EXTEND | |
| 0193 | REP | 7 | LAST 1190 | 43,3331 | 23-361 1 | CHK | SELFPRT | SAVE RETURN ADDRESS WHILE TESTING NEWJOB |
| 0194 | REP | 61 | LAST 1230 | 43,3332 | 0 4574 0 | TC | POSTJUMP | TO SEE IF ANY JOBS HAVE BECOME ACTIVE. |
| 0195 | REP | 2 | LAST 1185 | 43,3333 | 03231 1 | CADR | ADVAN | |
| 0196 | REP | 2 | LAST 1365 | 43,3334 | 0 3277 0 | SELFCHK | TC | SMODECHK |
| R0197 | SKEEP7 HOLDS LOWEST OF TWO ADDRESSES BEING CHECKED. | | | | | | | |
| R0198 | SKEEP6 HOLDS B(X-1). | | | | | | | |
| R0199 | SKEEP5 HOLDS B(X). | | | | | | | |
| R0200 | SKEEP4 HOLDS C(BRANK) DURING BRASLOOP AND CHECKNJ. | | | | | | | |

GO TO IDLE LOOP
CONTINUE WITH SELF-CHECK

CHECK FOR NEW JOB

TO BACKUP IDLE LOOP

CONTINUE WITH SELF-CHECK

FOR OPTIONS BELOW NINE.
ILLEGAL OPTION. GO TO IDLE LOOP.
FOR OPTIONS BELOW NINE.

WAS TC+TCP
WAS IN'OUT1
WAS COUNTCHK

CONTINUE WITH SELF-CHECK

SAVE RETURN ADDRESS WHILE TESTING NEWJOB
TO SEE IF ANY JOBS HAVE BECOME ACTIVE.

** CHARLEY, COME IN HERE

L AGC BLOCK TWO SELF-CHECK

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0201 SKREP3 HOLDS LAST ADDRESS BEING CHECKED (HIGHEST ADDRESS).
0202 SKREP2 CONTROLS CHECKING OF NON-SWITCHABLE ERASABLE MEMORY WITH BANK NUMBERS IN EB.
0204 ERASCHK TAKES APPROXIMATELY 7 SECONDS
0205 REP 2 LAST 257 43,3335 3 4712 1 ERASCHK CA S+1
0206 REP 3 LAST 257 43,3336 55=372 1 TS SKREP2
0207 REP 4 LAST 1364 43,3337 3 4714 1 QBANK CA S+ZERO
0208 REP 51 LAST 1164 43,3340 54 003 0 TS ERANK
0209 REP 1 43,3341 3 3232 1 CA ERASCON3 01461
0210 REP 4 LAST 1364 43,3342 55=377 1 TS SKREP7 STARTING ADDRESS
0211 REP 1 43,3343 3 4747 1 CA S10BITS 01777
0212 REP 3 LAST 257 43,3344 55=373 0 TS SKREP3 LAST ADDRESS CHECKED
0213 REP 1 43,3345 0 3365 1 TC ERASLOOP

0214 REP 1 43,3346 3 4744 1 B134507B CA ERASCON6 01400
0215 REP 5 LAST 1366 43,3347 55=377 1 TS SKREP7 STARTING ADDRESS
0216 REP 2 LAST 1366 43,3350 3 4747 1 CA S10BITS 01777
0217 REP 4 LAST 1366 43,3351 55=373 0 TS SKREP3 LAST ADDRESS CHECKED
0218 REP 2 LAST 1366 43,3352 0 3365 1 TC ERASLOOP

0219 REP 2 LAST 1366 43,3353 3 4744 1 ZERANK CA ERASCON6 01400
0220 REP 6 LAST 1366 43,3354 55=377 1 TS SKREP7 STARTING ADDRESS
0221 REP 1 43,3355 3 3233 0 CA ERASCON4 01773
0222 REP 5 LAST 1366 43,3356 55=373 0 TS SKREP3 LAST ADDRESS CHECKED
0223 REP 3 LAST 1366 43,3357 0 3365 1 TC ERASLOOP

0224 REP 4 LAST 1366 43,3360 55=372 1 NOBRANK TS SKREP2 +0
0225 REP 1 43,3361 3 3230 0 CA ERASCON1 00061
0226 REP 7 LAST 1366 43,3362 55=377 1 TS SKREP7 STARTING ADDRESS
0227 REP 1 43,3363 3 3231 1 CA ERASCON2 01373
0228 REP 6 LAST 1366 43,3364 55=373 0 TS SKREP3 LAST ADDRESS CHECKED

0229 43,3365 0 0004 0 ERASLOOP INHINT
0230 REP 52 LAST 1366 43,3366 3 0003 1 CA ERANK STORES C(ERANK)
0231 REP 3 LAST 182 43,3367 55=374 1 TS SKREP4
0232 43,3370 0 0006 1 EXTEND
0233 REP 8 LAST 1366 43,3371 5 1377 0 NDX SKREP7
0234 43,3372 3 0001 0 DCA 0000
0235 REP 4 LAST 1364 43,3373 53=376 0 DXCH SKREP5 STORES C(X) AND C(X+1) IN SKREP6 AND 5.
0236 REP 9 LAST 1366 43,3374 3 1377 0 CA SKREP7
0237 REP 8 LAST 1364 43,3375 55=360 1 TS ERSTORES IF RESTART, RESTORE C(X) AND C(X+1)
0238 REP 213 LAST 1294 43,3376 54 001 1 TS L
0239 REP 214 LAST 1366 43,3377 24 001 0 INCR L
0240 REP 347 LAST 1365 43,3400 50 000 1 NDX A
0241 43,3401 52 001 1 DXCH 0000 PUTS OWN ADDRESS IN X AND X +1
0242 REP 10 LAST 1366 43,3402 51=377 0 NDX SKREP7
0243 43,3403 4 0001 1 CS 0001 CS X+1
0244 REP 11 LAST 1366 43,3404 51=377 0 NDX SKREP7
0245 43,3405 6 0000 1 AD 0000 AD X
0246 REP 1 43,3406 0 3271 0 TC -1CHK
0247 REP 9 LAST 1366 43,3407 3 1360 0 CA ERSTORE HAS ERASABLE BEEN RESTORED
    
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| | | | | | | | |
|------|---|-----------|---------|----------|----------|----------|---|
| 0248 | | | 43,3410 | 0 0006 1 | EXTEND | | |
| 0249 | REP 1 | | 43,3411 | 1 3435 1 | BZF | ELOOPFIN | YES, EXIT ERASLOOP. |
| 0250 | | | 43,3412 | 0 0006 1 | EXTEND | | |
| 0251 | REP 12 | LAST 1366 | 43,3413 | 5 1377 0 | NDX | SKEEP1 | |
| 0252 | | | 43,3414 | 4 0001 1 | DCS | 0000 | COMPLEMENT OF ADDRESS OF X AND X+1 |
| 0253 | REP 13 | LAST 1367 | 43,3415 | 51=377 0 | NDX | SKEEP1 | |
| 0254 | | | 43,3416 | 52 001 1 | DYCH | 0000 | PUT COMPLEMENT OF ADDRESS OF X AND X+1 |
| 0255 | REP 14 | LAST 1367 | 43,3417 | 51=377 0 | NDX | SKEEP1 | |
| 0256 | | | 43,3420 | 4 0000 0 | CS | 0000 | CS X |
| 0257 | REP 15 | LAST 1367 | 43,3421 | 51=377 0 | NDX | SKEEP1 | |
| 0258 | | | 43,3422 | 6 0001 0 | AD | 0001 | AD X+1 |
| 0259 | REP 2 | LAST 1366 | 43,3423 | 0 3271 0 | TC | -1CHK | |
| 0260 | REP 10 | LAST 1366 | 43,3424 | 3 1360 0 | CA | ERSTORE | HAS ERASABLE BEEN RESTORED |
| 0261 | | | 43,3425 | 0 0006 1 | EXTEND | | |
| 0262 | REP 2 | LAST 1367 | 43,3426 | 1 3435 1 | BZF | ELOOPFIN | YES, EXIT ERASLOOP. |
| 0263 | | | 43,3427 | 0 0006 1 | EXTEND | | |
| 0264 | REP 5 | LAST 1366 | 43,3430 | 3 1376 1 | DCA | SKEEP5 | |
| 0265 | REP 16 | LAST 1367 | 43,3431 | 51=377 0 | NDX | SKEEP1 | |
| 0266 | | | 43,3432 | 52 001 1 | DYCH | 0000 | PUT B(X) AND B(X+1) BACK INTO X AND X+1 |
| 0267 | REP 8 | LAST 1366 | 43,3433 | 3 4714 1 | CA | S+ZERO | |
| 0268 | REP 11 | LAST 1367 | 43,3434 | 55=360 1 | TS | ERSTORE | IF RESTART, DO NOT RESTORE C(X), C(X+1) |
| 0269 | | | 43,3435 | 0 0003 1 | ELOOPFIN | RELINT | |
| 0270 | REP 2 | LAST 1365 | 43,3436 | 0 3330 1 | TC | CHECKNJ | CHECK FOR NEW JOB |
| 0271 | REP 4 | LAST 1366 | 43,3437 | 3 1374 0 | CA | SKEEP4 | REPLACES B(BRANK) |
| 0272 | REP 53 | LAST 1366 | 43,3440 | 54 003 0 | TS | ERANK | |
| 0273 | REP 17 | LAST 1367 | 43,3441 | 25=377 0 | INCR | SKEEP1 | |
| 0274 | REP 18 | LAST 1367 | 43,3442 | 4 1377 1 | CS | SKEEP1 | |
| 0275 | REP 7 | LAST 1366 | 43,3443 | 6 1373 1 | AD | SKEEP3 | |
| 0276 | | | 43,3444 | 0 0006 1 | EXTEND | | |
| 0277 | | | 43,3445 | 1 3447 1 | BZF | +2 | |
| 0278 | REP 4 | LAST 1366 | 43,3446 | 0 3365 1 | TC | ERASLOOP | GO TO NEXT ADDRESS IN SAME BANK |
| 0279 | REP 5 | LAST 1366 | 43,3447 | 11=372 1 | CCS | SKEEP2 | |
| 0280 | REP 1 | | 43,3450 | 0 3360 1 | TC | NOERANK | |
| 0281 | REP 6 | LAST 1367 | 43,3451 | 25=372 0 | INCR | SKEEP2 | PUT +1 IN SKEEP2. |
| 0282 | REP 54 | LAST 1367 | 43,3452 | 3 0003 1 | CA | ERANK | |
| 0283 | REP 1 | | 43,3453 | 6 4702 0 | AD | SBIT9 | |
| 0284 | REP 55 | LAST 1367 | 43,3454 | 54 003 0 | TS | ERANK | |
| 0285 | REP 1 | | 43,3455 | 6 3241 0 | AD | ERASCON5 | 76777, CHECK FOR RANK E2 |
| 0286 | | | 43,3456 | 0 0006 1 | EXTEND | | |
| 0287 | REP 1 | | 43,3457 | 1 3353 0 | BZF | ZERANK | |
| 0288 | REP 56 | LAST 1367 | 43,3460 | 10 003 0 | CCS | ERANK | |
| 0289 | REP 1 | | 43,3461 | 0 3346 0 | TC | E134567B | GO TO ERANKS 1,3,4,5,6, AND 7 |
| 0290 | REP 3 | LAST 1366 | 43,3462 | 3 4744 1 | CA | ERASCON6 | END OF ERASCON |
| 0291 | REP 57 | LAST 1367 | 43,3463 | 54 003 0 | TS | ERANK | |
| 0292 | CNRTRON PERFORMS A CS OF ALL REGISTERS FROM OCT. 60 THROUGH OCT. 10. | | | | | | |
| 0293 | INCLUDED ARE ALL COUNTERS, T8-1, CYCLE AND SHFT, AND ALL RUPT REGISTERS | | | | | | |
| 0294 | REP 1 | | 43,3464 | 3 4726 0 | CNRTRON | CA | CNRTRON 00050 |
| 0295 | REP 7 | LAST 1367 | 43,3465 | 55=372 1 | CNRTRON | TS | SKEEP2 |
| 0296 | REP 1 | | 43,3466 | 6 4707 0 | AD | SBIT4 | +10 OCTAL. |
| 0297 | REP 348 | LAST 1366 | 43,3467 | 50 000 1 | INDEX | A | |



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| | | | | | | | | |
|-------|--|-----------|---------|----------|-------------|-----------|-----------------------------|--|
| 0296 | | | 43,3470 | 4 0000 0 | CS | 0000 | | |
| 0299 | REP 8 | LAST 1367 | 43,3471 | 11=372 1 | CCS | SKEEP2 | | |
| 0300 | REP 1 | | 43,3472 | 0 3465 0 | TC | CNTRLOOP | | |
| R0301 | CYCLSHFT CHECKS THE CYCLE AND SHIPT REGISTERS | | | | | | | |
| 0302 | REP 1 | | 43,3473 | 3 3237 1 | CYCLSHFT CA | CQNC+S1 | 25252 | |
| 0303 | REP 42 | LAST 1166 | 43,3474 | 54 020 1 | TS | CYR | C(CYR) = 12525 | |
| 0304 | REP 22 | LAST 1156 | 43,3475 | 54 022 0 | TS | CYL | C(CYL) = 52524 | |
| 0305 | REP 29 | LAST 1156 | 43,3476 | 54 021 0 | TS | SR | C(SR) = 12525 | |
| 0306 | REP 11 | LAST 1076 | 43,3477 | 54 023 1 | TS | EDOP | C(EDOP) = 00125 | |
| 0307 | REP 43 | LAST 1368 | 43,3500 | 6 0020 0 | AD | CYR | 37777 C(CYR) = 45252 | |
| 0308 | REP 23 | LAST 1368 | 43,3501 | 6 0022 1 | AD | CYL | 00-12524 C(CYL) = 25251 | |
| 0309 | REP 30 | LAST 1368 | 43,3502 | 6 0021 1 | AD | SR | 00-25251 C(SR) = 05252 | |
| 0310 | REP 12 | LAST 1368 | 43,3503 | 6 0023 0 | AD | EDOP | 00-25376 C(EDOP) = +0 | |
| 0311 | REP 1 | | 43,3504 | 6 3240 1 | AD | CQNC+S2 | C(CQNC+S2) = 52400 | |
| 0312 | REP 3 | LAST 1367 | 43,3505 | 0 3271 0 | TC | -1CHK | | |
| 0313 | REP 44 | LAST 1368 | 43,3506 | 6 0020 0 | AD | CYR | 45252 | |
| 0314 | REP 24 | LAST 1368 | 43,3507 | 6 0022 1 | AD | CYL | 72523 | |
| 0315 | REP 31 | LAST 1368 | 43,3510 | 6 0021 1 | AD | SR | 77775 | |
| 0316 | REP 13 | LAST 1368 | 43,3511 | 6 0023 0 | AD | EDOP | 77775 | |
| 0317 | REP 3 | LAST 1368 | 43,3512 | 6 4712 1 | AD | S+1 | 77776 | |
| 0318 | REP 4 | LAST 1368 | 43,3513 | 0 3271 0 | TC | -1CHK | | |
| 0319 | REP 4 | LAST 1365 | 43,3514 | 25=367 1 | INCR | SCOUNT +1 | | |
| 0320 | REP 3 | LAST 1365 | 43,3515 | 0 3277 0 | TC | SMDECHK | | |
| R0321 | SKEEP1 HOLDS SUM | | | | | | | |
| R0322 | SKEEP2 HOLDS PRESENT CONTENTS OF ADDRESS IN ROPECHK AND SHOWSLM ROUTINES | | | | | | | |
| R0323 | SKEEP2 HOLDS BANK NUMBER IN LOW ORDER BITS DURING SHOWSLM DISPLAY | | | | | | | |
| R0324 | SKEEP3 HOLDS PRESENT ADDRESS (00000 TO 01777 IN COMMON FIXED BANKS) | | | | | | | |
| R0325 | (04000 TO 07777 IN FXPX BANKS) | | | | | | | |
| R0326 | SKEEP3 HOLDS BUDDER WORD DURING SHOWSLM DISPLAY | | | | | | | |
| R0327 | SKEEP4 HOLDS BANK NUMBER AND SUPER BANK NUMBER | | | | | | | |
| R0328 | SKEEP5 COUNTS 2 SUCCESSIVE TC SELP WORDS | | | | | | | |
| R0329 | SKEEP6 CONTROLS ROPECHK OR SHOWSLM OPTION | | | | | | | |
| R0330 | SKEEP7 CONTROLS WHEN ROUTINE IS IN COMMON FIXED OR FIXED FIXED BANKS | | | | | | | |
| 0331 | REP 1 | | 43,3516 | 3 4713 0 | ROPECHK CA | S-ZERO | * | |
| 03311 | REP 4 | LAST 257 | 43,3517 | 55=376 0 | TS | SKEEP6 | * -0 FOR ROPECHK. | |
| 03312 | REP 6 | LAST 1367 | 43,3520 | 3 4714 1 | STSHOSLM CA | S+ZERO | * SHOULD BE ROPECHK | |
| 0332 | REP 5 | LAST 1367 | 43,3521 | 55=374 1 | TS | SKEEP4 | BANK NUMBER | |
| 0333 | REP 4 | LAST 1368 | 43,3522 | 3 4712 1 | CA | S+1 | | |
| 0334 | REP 19 | LAST 1367 | 43,3523 | 55=377 1 | COMFV TS | SKEEP7 | | |
| 0335 | REP 7 | LAST 1368 | 43,3524 | 3 4714 1 | CA | S+ZERO | | |
| 0336 | REP 12 | LAST 1365 | 43,3525 | 55=371 1 | TS | SKEEP1 | | |
| 0337 | REP 8 | LAST 1367 | 43,3526 | 55=373 0 | TS | SKEEP3 | | |
| 0338 | REP 5 | LAST 1368 | 43,3527 | 3 4712 1 | CA | S+1 | | |
| 0339 | REP 6 | LAST 1367 | 43,3530 | 55=375 0 | TS | SKEEP5 | COUNTS DOWN 2 TC SELP WORDS | |
| 0340 | REP 6 | LAST 1368 | 43,3531 | 3 1374 0 | COMADRS CA | SKEEP4 | | |
| 0341 | REP 215 | LAST 1366 | 43,3532 | 54 001 1 | TS | L | TO SET SUPER BANK | |

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| | | | | | | | | | | |
|-------|-----|----|-----------|---------|----------|----------|--------|------------|--|--|
| 0388 | REP | 1 | | 43,3612 | 3 7716 0 | | CA | S-1 | | |
| 0389 | REP | 5 | LAST 1369 | 43,3613 | 0 3615 0 | | TC | CONTINU +1 | AD IN THE BUGGER WORD | |
| 0391 | REP | 7 | LAST 1369 | 43,3614 | 3 4712 1 | CONTINU | CA | S+1 | MAKE SURE TWO CONSECUTIVE TC SELF WORDS | |
| 0392 | REP | 10 | LAST 1369 | 43,3615 | 55=375 0 | | TS | SKEEPS | | |
| 03921 | REP | 5 | LAST 1368 | 43,3616 | 11=376 0 | | CCS | SKEEPS | * | |
| 03922 | REP | 21 | LAST 1190 | 43,3617 | 10 067 1 | | CCS | NEWJOB | * +1, SHOWSUM | |
| 03923 | REP | 4 | LAST 626 | 43,3620 | 0 5057 0 | | TC | CHANG1 | * | |
| 03924 | REP | | | 43,3621 | 0 3623 0 | | TC | +2 | * | |
| 0393 | REP | 3 | LAST 1367 | 43,3622 | 0 3330 1 | | TC | CHECKONJ | -0 IN SKEEPS FOR ROPOBK | |
| 0394 | REP | 14 | LAST 1369 | 43,3623 | 25=373 1 | ADRS+1 | INCR | SKEEP3 | | |
| 0395 | REP | 21 | LAST 1369 | 43,3624 | 11=377 1 | | CCS | SKEEP7 | | |
| 0396 | REP | 1 | | 43,3625 | 0 3531 0 | | TC | CONADRS | | |
| 0397 | REP | 2 | LAST 1370 | 43,3626 | 0 3531 0 | | TC | CONADRS | | |
| 0398 | REP | 1 | | 43,3627 | 0 3555 1 | | TC | FXADRS | | |
| 0399 | REP | 2 | LAST 1370 | 43,3630 | 0 3555 1 | | TC | FXADRS | | |
| 0400 | REP | 7 | LAST 1368 | 43,3631 | 4 1374 1 | NXTTRK | CS | SKEEP4 | | |
| 0401 | REP | 1 | | 43,3632 | 6 3721 0 | | AD | LSTRNCKH | LAST BANK TO BE CHECKED | |
| 0402 | REP | | | 43,3633 | 0 0006 1 | | EXTEND | | | |
| 0403 | REP | 1 | | 43,3634 | 1 3000 0 | | BZF | ENDSLMS | END OF SUMMING OF BANKS. | |
| 0404 | REP | 8 | LAST 1370 | 43,3635 | 3 1374 0 | | CA | SKEEP4 | | |
| 0405 | REP | 2 | LAST 1369 | 43,3636 | 6 4700 1 | | AD | SBIT11 | | |
| 0406 | REP | 9 | LAST 1370 | 43,3637 | 55=374 1 | | TS | SKEEP4 | 37 TO 40 INCRMTS SKEEP4 BY END RND CARRY | |
| 0407 | REP | 1 | | 43,3640 | 0 3644 1 | | TC | CHKSUPR | | |
| 0408 | REP | 1 | | 43,3641 | 3 4674 0 | 17TO20 | CA | SBIT15 | | |
| 0409 | REP | 10 | LAST 1370 | 43,3642 | 27=374 1 | | ADS | SKEEP4 | SET FOR BANK 20 | |
| 0410 | REP | 1 | | 43,3643 | 0 3660 1 | | TC | CONXTRNK | | |
| 0411 | REP | 8 | LAST 1369 | 43,3644 | 7 4364 0 | CHKSUPR | MASK | HIS | | |
| 0412 | REP | | | 43,3645 | 0 0006 1 | | EXTEND | | | |
| 0413 | REP | 1 | | 43,3646 | 1 3656 0 | | BZF | NXTSUPR | INCREMENT SUPER RANK | |
| 0414 | REP | 1 | | 43,3647 | 6 3236 0 | 27TO30 | AD | S13BITS | | |
| 0415 | REP | | | 43,3650 | 0 0006 1 | | EXTEND | | | |
| 0416 | REP | | | 43,3651 | 1 3653 0 | | BZF | +2 | BANK SET FOR 30 | |
| 0417 | REP | 2 | LAST 1370 | 43,3652 | 0 3660 1 | | TC | CONXTRNK | FIRST SUPER RANK | |
| 0418 | REP | 1 | | 43,3653 | 3 3234 1 | | CA | SIXTY | | |
| 0419 | REP | 11 | LAST 1370 | 43,3654 | 27=374 1 | | ADS | SKEEP4 | | |
| 0420 | REP | 3 | LAST 1370 | 43,3655 | 0 3660 1 | | TC | CONXTRNK | | |
| 0421 | REP | 1 | | 43,3656 | 6 3235 0 | NXTSUPR | AD | SUPRCN | SET Rnk 30 + INCR SUPR Rnk AND CANCEL | |
| 0422 | REP | 12 | LAST 1370 | 43,3657 | 27=374 1 | | ADS | SKEEP4 | ERC BIT OF THE 37 TO 40 ADVANCE. | |
| 0423 | REP | 22 | LAST 1370 | 43,3660 | 11=377 1 | CONXTRNK | CCS | SKEEP7 | | |
| 0424 | REP | 1 | | 43,3661 | 0 3523 0 | | TC | CONMPX | | |
| 0425 | REP | 8 | LAST 1370 | 43,3662 | 3 4712 1 | | CA | S+1 | | |
| 0426 | REP | 1 | | 43,3663 | 0 3541 1 | | TC | FXPX | HAS TO BE LARGER THAN NO OF FXSW BANKS. | |
| 0427 | REP | 1 | | 43,3664 | 3 4704 0 | | CA | SBITY | | |
| 0428 | REP | 2 | LAST 1370 | 43,3665 | 0 3523 0 | | TC | CONMPX | | |
| 0429 | REP | 13 | LAST 1370 | 43,3666 | 3 1374 0 | SOPTION | CA | SKEEP4 | | |
| 0430 | REP | 9 | LAST 1370 | 43,3667 | 7 4364 0 | | MASK | HIS | = RANK BITS | |
| 0431 | REP | 5 | LAST 349 | 43,3670 | 0 4345 1 | | TC | LEFTS | | |



L AGC BLOCK TWO SELF-CHECK

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| | | | | | | | |
|-------|-----|-----|-----------|---------|----------|---------|----------|
| 0432 | REP | 217 | LAST 1369 | 43,3671 | 54 001 1 | TS | L |
| 0433 | REP | 14 | LAST 1370 | 43,3672 | 3 1374 0 | CA | SKBEP4 |
| 0434 | REP | 1 | | 43,3673 | 7 4373 0 | MARK | SBITS |
| 0435 | | | | 43,3674 | 0 0006 1 | EXTEND | |
| 0436 | REP | 1 | | 43,3675 | 1 3703 1 | BZF | SOFT |
| 0437 | REP | 32 | LAST 1368 | 43,3676 | 54 021 0 | TS | SR |
| 0438 | REP | 218 | LAST 1371 | 43,3677 | 3 0001 0 | CA | L |
| 0439 | REP | 19 | LAST 1364 | 43,3700 | 7 4716 1 | MARK | SEVEN |
| 0440 | REP | 33 | LAST 1371 | 43,3701 | 6 0021 1 | AD | SR |
| 0441 | REP | 219 | LAST 1371 | 43,3702 | 54 001 1 | TS | L |
| 0442 | REP | 8 | LAST 1370 | 43,3703 | 3 1376 1 | CA | SKBEP6 |
| 0443 | | | | 43,3704 | 0 0006 1 | EXTEND | |
| 0444 | | | | 43,3705 | 1 3707 0 | BZF | +2 |
| 0445 | REP | 1 | | 43,3706 | 0 2762 0 | TC | SDISPLAY |
| 0446 | REP | 18 | LAST 1369 | 43,3707 | 11=371 1 | CCS | SKBEP1 |
| 04461 | | | | 43,3710 | 0 3712 0 | TC | +2 |
| 04462 | | | | 43,3711 | 0 3713 1 | TC | +2 |
| 04463 | REP | 9 | LAST 1370 | 43,3712 | 6 4712 1 | AD | S+1 |
| 04464 | REP | 19 | LAST 1371 | 43,3713 | 55=371 1 | TS | SKBEP1 |
| 0447 | REP | 220 | LAST 1371 | 43,3714 | 4 0001 1 | CS | L |
| 0448 | REP | 20 | LAST 1371 | 43,3715 | 6 1371 0 | AD | SKBEP1 |
| 0449 | REP | 2 | LAST 1370 | 43,3716 | 6 7716 0 | AD | S-1 |
| 0450 | REP | 5 | LAST 1368 | 43,3717 | 0 3271 0 | TC | -1CHK |
| 0451 | REP | 2 | LAST 257 | 43,3720 | 0 3631 0 | TC | NXTRK |
| 0454 | REP | 22 | LAST 1370 | 0067 | | BRANK= | NEWJOB |
| 0455 | | | | 43,3721 | 66100 0 | LSTRKCH | RBCON* |

BANK NUMBER BEFORE SUPER BANK

= SUPER BANK BITS

BEFORE SUPER BANK
SUPER BANK NECESSARY

BANK NUMBER WITH SUPER BANK

*
* ON -0 CONTINUE WITH ROPE CHECK.
* ON +1 GO TO DISPLAY OF SUM.
FORCE SUM TO ABSOLUTE VALUE.

= - BANK NUMBER

CHECK SUM

* CONSTANT, LAST BANK.

L PHASE TABLE MAINTENANCE

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P0001 SUBROUTINE TO UPDATE THE PROGRAM NUMBER DISPLAY ON THE DSKY.

| | | | | | | | | |
|------|-----|-----|------------------|------|----------|----------|----------|--------|
| 0002 | REP | 2 | LAST 215 TO 216' | 20 | 20* | COUNT | 02/PHASE | |
| 0003 | | | | 5243 | | BLOCK | 02 | |
| 0004 | REP | 2 | LAST 215 | 4000 | | SETLOC | PFTAG1 | |
| 0005 | | | | 5243 | | BANK | | |
| 0006 | REP | 306 | LAST 1369 | 5243 | 50 002 0 | NEWMODEX | INDEX | 0 |
| 0007 | | | | 5244 | 3 0000 1 | CAP | | 0 |
| 0008 | REP | 307 | LAST 1372 | 5245 | 24 002 0 | INCR | | 0 |
| 0009 | REP | 15 | LAST 1306 | 5246 | 55=011 1 | NEWMODEA | TS | MODREG |
| 0014 | | | | 5247 | 3 5252 1 | NEWMODEA | CAP | +3 |
| 0015 | REP | 31 | LAST 1287 | 5250 | 22 006 1 | PREJUMP | LXCH | BRANK |
| 0016 | REP | 8 | LAST 1299 | 5251 | 1 4577 1 | TCF | BANKJUMP | |
| 0017 | REP | 1 | | 5252 | 20344 0 | CADR | SETUPDSP | |

UPDATE MODREG. ENTRY FOR MODE IN FIXED.
ENTRY FOR MODE IN A.
DISPLAY MAJOR MODE.
PUTS BRANK IN L.
PUTS 0 INTO A

P0016 RETURN TO CALLER +3 IF MODE = THAT AT CALLER +1. OTHERWISE RETURN TO CALLER +2.

| | | | | | | | | |
|------|-----|-----|-----------|---------|----------|----------|----------|---------|
| 0020 | REP | 308 | LAST 1372 | 5253 | 50 002 0 | CHECKM | INDEX | 0 |
| 0021 | | | | 5254 | 4 0000 0 | CS | | 0 |
| 0022 | REP | 10 | LAST 1372 | 5255 | 6 1011 0 | AD | MODREG | |
| 0023 | | | | 5256 | 0 0006 1 | EXTEND | | |
| 0024 | REP | 2 | LAST 1180 | 5257 | 1 6710 0 | BZF | | 0+2 |
| 0025 | REP | 3 | LAST 244 | 5260 | 1 6706 1 | TCF | | 0+1 |
| 0026 | REP | 3 | LAST 1372 | 6711 | | TCO | = | 0+2 +1 |
| 0027 | | | | 14,3744 | | BANK | 14 | |
| 0028 | REP | 1 | | 10,2000 | | SETLOC | PHASSTAB | |
| 0029 | | | | 10,2344 | | BANK | | |
| 0030 | REP | 1 | | | | COUNT | 10/PHASE | |
| 0031 | | | | 10,2344 | 0 0004 0 | SETUPDSP | INHINT | |
| 0032 | REP | 25 | LAST 782 | 10,2345 | 52 071 0 | DXCH | RUPTRG1 | |
| 0033 | REP | 14 | LAST 1174 | 10,2346 | 3 4371 0 | CAP | PRI030 | |
| 0034 | REP | 31 | LAST 1195 | 10,2347 | 0 5027 1 | TC | NOVAC | |
| 0035 | REP | 17 | LAST 1372 | 1011 | | BRANK= | MODREG | |
| 0036 | REP | 1 | | 10,2350 | 03435 0 | 2CADR | DSPMAJOR | |
| 0036 | REP | 1 | | 10,2351 | 60102 1 | | | |
| 0037 | REP | 26 | LAST 1372 | 10,2352 | 52 071 0 | DXCH | RUPTRG1. | |
| 0038 | | | | 10,2353 | 0 0003 1 | RELINT | | |
| 0039 | REP | 16 | LAST 783 | 10,2354 | 52 006 0 | DXCH | Z | RETURN |
| 0040 | REP | 2 | LAST 369 | 40,3435 | | DSPMAJOR | EQUALS | DSPMAJR |
| 0041 | | | | 5261 | | BLOCK | 02 | |

NO MATCH

SAVE CALLER-S RETURN 2CADR
EITHER A TASK OR JOB CAN COME TO
NEWMODEX



L PHASE TABLE MAINTENANCE

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0042 REP 3 LAST 1372 4000
0043 5261

STLOC PPDA01
BANK



L PHASE TABLE MAINTENANCE

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R0044 PHASCRNG IS THE MAIN WAY OF MAKING PHASE CHANGES FOR RESTARTS. THERE ARE THREE FORMS OF PHASCRNG, KNOWN AS TYPE
R0046 A, TYPE B, AND TYPE C. THEY ARE ALL CALLED AS FOLLOWS, WHERE OCT XXXXX CONTAINS THE PHASE INFORMATION,

A0048 TC PHASCRNG
A0049 OCT XXXXX

R0050 TYPE A IS CONCERNED WITH FIXED PHASE CHANGES, THAT IS, PHASE INFORMATION THAT IS STORED PERMANENTLY. THESE
R0052 OPTIONS ARE, WHERE G STANDS FOR A GROUP AND .X FOR THE PHASE,

R0053 G.0 INACTIVE, WILL NOT PERMIT A GROUP G RESTART
R0055 G.1 WILL CAUSE THE LAST DISPLAY TO BE REACTIVATED, USED MAINLY IN MANNED FLIGHTS
R0057 G.BVEN A DOUBLE TABLE RESTART, CAN CAUSE ANY COMBINATION OF TWO JOBS, TASKS, AND/OR
R0059 LONGCALL TO BE RESTARTED.
R0060 G.OOD NOT .1 A SINGLE TABLE RESTART, CAN CAUSE EITHER A JOB, TASK, OR LONGCALL RESTART

R0062 THIS INFORMATION IS PUT INTO THE OCTAL WORD AFTER TC PHASCRNG AS FOLLOWS

R0063 TL0 00P PPP PPP 000

R0065 WHERE EACH LETTER OR NUMBER STANDS FOR A BIT. THE G'S STAND FOR THE GROUP, OCTAL 1 - 7, THE P'S FOR THE PHASE,
R0067 OCTAL 0 - 127. G'S MUST BE 0. IF ONE WISHES TO HAVE THE TRASE OF GROUP G TO BE SET AT THIS TIME,
R0069 T IS SET TO 1, OTHERWISE IT IS SET TO 0. SIMILARLY IF ONE WISHES TO SET LONGBASE, THEN L IS SET TO 1, OTHERWISE
R0071 IT IS SET TO 0. SOME EXAMPLES,

| | | | |
|-------|-----|----------|--|
| A0072 | TC | PHASCRNG | THIS WILL CAUSE GROUP 3 TO BE SET TO 0, |
| A0073 | OCT | 00003 | MAKING GROUP 3 INACTIVE |
| A0074 | TC | PHASCRNG | IF A RESTART OCCURS THIS WOULD CAUSE |
| A0075 | OCT | 00012 | GROUP 2 TO RESTART THE LAST DISPLAY |
| A0076 | TC | PHASCRNG | THIS SETS THE TRASE OF GROUP 4 AND IN |
| A0077 | OCT | 40064 | CASE OF A RESTART WOULD START UP THE TWO |
| A0078 | | | THINGS LOCATED IN THE DOUBLE 4.8 RESTART |
| A0079 | | | LOCATION |
| A0080 | TC | PHASCRNG | THIS SETS LONGBASE AND UPON A RESTART |
| A0081 | OCT | 20135 | CAUSES 5.13 TO BE RESTARTED (SINCE |
| A0082 | | | LONGBASE WAS SET THIS SINGLE ENTRY |
| A0083 | | | SHOULD BE A LONGCALL) |
| A0084 | TC | PHASCRNG | SINCE BOTH TRASE4 AND LONGBASE ARE SET, |
| A0085 | OCT | 60124 | 4.12 SHOULD CONTAIN BOTH A TASK AND A |
| A0086 | | | LONGCALL TO BE RESTARTED |

R0087 TYPE C PHASCRNG CONTAINS THE VARIABLE TYPE OF PHASCRNG INFORMATION. INSTEAD OF THE INFORMATION BEING IN A
R0089 PERMANENT FORM, ONE STORES THE DESIRED RESTART INFORMATION IN A VARIABLE LOCATION. THE BITS ARE AS FOLLOWS,

R0091 TL0 1AD XXX CJW 000

R0092 WHERE EACH LETTER OR NUMBER STANDS FOR A BIT. THE G'S STAND FOR THE GROUP, OCTAL 1 - 7. IF THE RESTART IS TO
R0094 BE BY WAITLIST, W IS SET TO 1, IF IT IS A JOB, J IS SET TO 1, IF IT IS A LONGCALL, C IS SET TO 1. ONLY ONE OF
R0096 THESE THREE BIT S MAY BE SET. X'S ARE IGNORED 1 MUST BE 1, AND 0 MUST BE 0. AGAIN T STANDS FOR THE TRASE,



L PHASE TABLE MAINTENANCE

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R0098 AND L FOR LONGBASE. THE BITS A AND D ARE CONCERNED WITH THE VARIABLE INFORMATION. IF D IS SET TO 1, A PRIORITY
 R0100 OR DELTA TIME WILL BE READ FROM THE NEXT LOCATION AFTER THE OCTAL INFORMATION, IF THIS IS TO BE INDIRECT, THAT
 R0102 IS, THE NAME OF A LOCATION CONTAINING THE INFORMATION (DELTA TIME ONLY), THEN THIS IS GIVEN AS THE -GENADR OF
 R0104 THAT LOCATION WHICH CONTAINS THE DELTA TIME. IF THE OLD PRIORITY OR DELTA TIME IS TO BE USED, THAT WHICH IS
 R0106 ALREADY IN THE VARIABLE STORAGE, THEN D IS SET TO 0. NEXT THE A BIT IS USED. IF IT IS SET TO 0, THE ADDRESS
 R0108 THAT WOULD BE RESTARTED DURING A RESTART IS THE NEXT LOCATION AFTER THE PHASE INFORMATION, THAT IS, EITHER
 R0110 (TC PHASCHNG) +2 OR +3, DEPENDING ON WHETHER D HAD BEEN SET OR NOT. IF A IS SET TO 1, THEN THE ADDRESS THAT
 R0112 WOULD BE RESTARTED IS THE 2CADR THAT IS READ FROM THE NEXT TWO LOCATIONS. EXAMPLES,

| | | | | |
|-------|------|---------|----------|--|
| A0114 | AD | TC | PHASCHNG | THIS WOULD CAUSE LOCATION AD +3 TO BE |
| A0115 | AD+1 | OCT | 05023 | RESTARTED BY GROUP THREE WITH A PRIORITY |
| A0116 | AD+2 | OCT | 23000 | OF 23. NOTE UPON RETURNING IT WOULD |
| A0117 | AD+3 | | | ALSO GO TO AD+3 |
| A0118 | AD | TC | PHASCHNG | GROUP 1 WOULD CAUSE CALLCALL TO |
| A0119 | AD+1 | OCT | 27441 | BE STARTED AS A LONGCALL FROM THE TIME |
| A0120 | AD+2 | -GENADR | DELTIME | STORED IN LONGBASE (LONGBASE WAS SET) BY |
| A0121 | AD+3 | 2CADR | CALLCALL | A DELTATIME STORED IN DELTIME. THE |
| A0122 | AD+4 | | | BECON OF THE 2CADR SHOULD CONTAIN THE B |
| A0123 | AD+5 | | | BANK OF DELTIME. PHASCHNG RETURNS TO |
| A0124 | | | | LOCATION AD+5 |

R0125 NOTE THAT IF A VARIABLE PRIORITY IS GIVEN FOR A JOB, THE JOB WILL BE RESTARTED AS A NOVAC IF THE PRIORITY IS
 R0127 NEGATIVE, AS A FINDVAC IF THE PRIORITY IS POSITIVE.
 R0128 TYPE B PHASCHNG IS A COMBINATION OF VARIABLE AND FIXED PHASE CHANGES. IT WILL START UP A JOB AS INDICATED
 R0130 BELOW AND ALSO START UP ONE FIXED RESTART, THAT IS EITHER AN G.1 OR A G.ODD OR THE FIRST ENTRY OF G.EVEN
 R0132 DOUBLE ENTRY. THE BIT INFORMATION IS AS FOLLOWS,

R0133 TL1 DAP PPP PPP GGG

R0134 WHERE EACH LETTER OR NUMBER STANDS FOR A BIT. THE G'S STAND FOR THE GROUP, OCTAL 1 - 7. THE P'S FOR THE FIXED
 R0136 PHASE INFORMATION, OCTAL 0 - 127. 1 MUST BE 1. AND AGAIN T STANDS FOR THE TRASE AND L FOR LONGBASE. D THIS
 R0138 TIME STANDS ONLY FOR PRIORITY SINCE THIS WILL BE CONSIDERED A JOB, AND IT MUST BE GIVEN DIRECTLY IF GIVEN.
 R0140 AGAIN A STANDS FOR THE ADDRESS OF THE LOCATION TO BE RESTARTED, 1 IF THE 2CADR IS GIVEN, OR 0 IF IT IS TO BE
 R0142 THE NEXT LOCATION. (THE RETURN LOCATION OF PHASCHNG) EXAMPLES,

| | | | | |
|-------|------|-------|----------|--|
| A0143 | AD | TC | PHASCHNG | TRASE IS SET AND RESTART CAUSE GROUP 3 |
| A0144 | AD+1 | OCT | 56043 | TO START THE JOB AJORAJOB WITH PRIORITY |
| A0145 | AD+2 | OCT | 31000 | 31 AND THE FIRST ENTRY OF 3.4SPOT(WR CAN |
| A0146 | AD+3 | 2CADR | AJORAJOB | ASSUME IT IS A TASK SINCE WE SET TRASE3) |
| A0147 | AD+4 | | | UPON RETURN FROM PHASCHNG CONTROL WOULD |
| A0148 | AD+5 | | | GO TO AD+5 |

| | | | | |
|-------|------|-----|----------|--|
| A0149 | AD | TC | PHASCHNG | UPON A RESTART THE LAST DISPLAY WOULD BE |
| A0150 | AD+1 | OCT | 10015 | RESTARTED AND A JOB WITH THE PREVIOUSLY |
| A0151 | AD+2 | | | STORED PRIORITY WOULD BE REGRN AT AD+2 |
| A0152 | | | | BY MEANS OF GROUP 5 |



L PHASE TABLE MAINTENANCE

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R0153 THE NOVAC-FINDVAC CHOICE FOR JOBS HOLDS HERE ALSO - NEGATIVE PRIORITY CAUSES A NOVAC CALL, POSITIVE A FINDVAC.
R0155 SUMMARY OF BITS

R0156 TYPE A TL0 00P PPP PPP 000

R0157 TYPE B TL1 DAP PPP PPP 000

R0158 TYPE C TL0 1AD XXX CJW 000



L PHASE TABLE MAINTENANCE

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P0159 2PHSQRNG IS USED WHEN ONE WISHES TO START UP A GROUP OR CHANGE A GROUP WHILE UNDER THE CONTROL OF A DIFFERENT
 P0161 GROUP. FOR EXAMPLE, CHANGE THE PHASE OF GROUP 3 WHILE THE PORTION OF THE PROGRAM IS UNDER GROUP 5. ALL 2PHSQRNG
 P0163 CALLS ARE MADE IN THE FOLLOWING MANNER,

A0164 TC 2PHSQRNG
 A0165 OCT XXXXX
 A0166 OCT YYYY

P0167 WHERE OCT XXXXX MUST BE OF TYPE A AND OCT YYYY MAY BE OF EITHER TYPE A OR TYPE B OR TYPE C. THERE IS ONE
 P0169 DIFFERENCE --- NOTE- IF LONGBASE IS TO BE SET THIS INFORMATION IS GIVEN IN THE OCT YYYY INFORMATION, IT WILL
 P0171 BE DISREGARDED IF GIVEN WITH THE OCT XXXXX INFORMATION. A COUPLE OF EXAMPLES MAY HELP,

A0173 AD TC 2PHSQRNG SET TRASE3 AND IF A RESTART OCCURS START
 A0174 AD+1 OCT 40003 THE TWO ENTRIES IN 3.8 TABLE LOCATION
 A0175 AD+2 OCT 05025 THIS IS OF TYPE C, SET THE JOB TO BE
 A0176 AD+3 OCT 18000 TO BE LOCATION AD+4, WITH A PRIORITY 18,
 A0177 AD+4 FOR GROUP 5 PHASE INFORMATION

| 0176 | REP | 3 LAST 1372 TO 1372' | 14 | 34* | COUNT | 02/PHASE | |
|------|-----|----------------------|------|----------|----------|-----------------|--|
| 0179 | | | 5261 | 0 0004 0 | 2PHSQRNG | INHINT | THE ENTRY FOR A DOUBLE PHASE CHANGE |
| 0180 | REP | 309 LAST 1372 | 5262 | 50 002 0 | | NDX 0 | |
| 0181 | | | 5263 | 3 0000 1 | | CA 0 | |
| 0182 | REP | 310 LAST 1377 | 5264 | 24 002 0 | | INCR 0 | |
| 0183 | REP | 1 | 5265 | 54 072 0 | | TS TEMPP2 | |
| 0184 | REP | 1 | 5266 | 7 4716 1 | | MASK OCT7 | |
| 0185 | | | 5267 | 6 0000 1 | | DOUBLE | |
| 0186 | REP | 1 | 5270 | 54 071 0 | | TS TEMPO2 | |
| 0187 | REP | 2 LAST 1377 | 5271 | 3 0072 1 | | CA TEMPP2 | |
| 0188 | REP | 1 | 5272 | 7 4765 0 | | MASK OCT17770 | NEED ONLY 1770, BUT WHY GET A NEW CONST. |
| 0189 | | | 5273 | 0 0006 1 | | EXTEND | |
| 0190 | REP | 32 LAST 1363 | 5274 | 7 4677 1 | | MP BIT12 | |
| 0191 | REP | 3 LAST 1377 | 5275 | 56 072 1 | | XCH TEMPP2 | |
| 0192 | REP | 50 LAST 1363 | 5276 | 7 4674 1 | | MASK BIT15 | |
| 0193 | REP | 1 | 5277 | 54 066 0 | | TS TEMPSW2 | INDICATES WHETHER TO SET TRASE OR NOT |
| 0194 | REP | 100 LAST 1317 | 5300 | 1 5304 1 | | TCF PHASQRNG +3 | |
| 0195 | | | 5301 | 0 0004 0 | PHASQRNG | INHINT | |
| 0196 | REP | 157 LAST 1338 | 5302 | 3 4712 1 | | CA ONE | INDICATESMR CAME FROM A PHASQRNG ENTRY |
| 0197 | REP | 2 LAST 1377 | 5303 | 54 066 0 | | TS TEMPSW2 | |
| 0198 | REP | 311 LAST 1377 | 5304 | 50 002 0 | | NDX 0 | |
| 0199 | | | 5305 | 3 0000 1 | | CA 0 | |
| 0200 | REP | 312 LAST 1377 | 5306 | 24 002 0 | | INCR 0 | |
| 0201 | REP | 1 | 5307 | 54 065 0 | | TS TEMPSW | |

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| | | | | | | | | | | | |
|------|-----|-----|------|------|---------|----|------|---|----------|----------|----------|
| 0239 | REP | 316 | LAST | 1376 | 5355 | 5 | 0002 | 0 | INDEX | 0 | |
| 0240 | | | | | 5356 | 3 | 0001 | 0 | DCA | 0 | |
| 0241 | REP | 2 | LAST | 1376 | 5357 | 52 | 084 | 1 | DACH | TEMPM | |
| 0242 | REP | 66 | LAST | 1295 | 5360 | 3 | 4711 | 1 | CA | TWO | |
| 0243 | REP | 317 | LAST | 1379 | 5361 | 26 | 002 | 1 | ADS | 0 | |
| 0244 | REP | 1 | | | 5362 | 1 | 5344 | 0 | TCP | TOCON2 | |
| 0245 | REP | 6 | LAST | 665 | 4761 | | | | OCT14000 | EQUALS | PRIO14 |
| 0246 | REP | 13 | LAST | 1335 | 0061 | | | | TEMPG | EQUALS | ITEMP1 |
| 0247 | REP | 16 | LAST | 1335 | 0062 | | | | TEMPF | EQUALS | ITEMP2 |
| 0248 | REP | 4 | LAST | 66 | 0063 | | | | TEMPM | EQUALS | ITEMP3 |
| 0249 | REP | 3 | LAST | 66 | 0064 | | | | TEMPB | EQUALS | ITEMP4 |
| 0250 | REP | 2 | LAST | 66 | 0065 | | | | TEMPSW | EQUALS | ITEMP5 |
| 0251 | REP | 3 | LAST | 154 | 0066 | | | | TEMPSW2 | EQUALS | ITEMP6 |
| 0252 | REP | 27 | LAST | 1372 | 0070 | | | | TEMPPR | EQUALS | RUPTRG1 |
| 0253 | REP | 8 | LAST | 145 | 0071 | | | | TEMPG2 | EQUALS | RUPTRG2 |
| 0254 | REP | 5 | LAST | 1075 | 0072 | | | | TEMPF2 | EQUALS | RUPTRG3 |
| 0255 | REP | 5 | LAST | 1075 | 0073 | | | | TEMPRCN | EQUALS | RUPTRG4 |
| 0256 | REP | 33 | LAST | 1378 | 0006 | | | | BB | EQUALS | EBANK |
| 0257 | | | | | 14,3744 | | | | | | BANK |
| 0258 | REP | 2 | LAST | 1372 | 10,2000 | | | | | | SETLOC |
| 0259 | | | | | 10,2355 | | | | | | PHASETAB |
| 0260 | REP | 1 | | | B3,1436 | | | | EBANK= | PHNAME1 | |
| 0261 | REP | 2 | LAST | 1372 | TO 1377 | 9 | 9* | | COUNT | 10/PHASE | |
| 0262 | REP | 4 | LAST | 1378 | 10,2355 | 22 | 073 | 0 | PHSRNG2 | LXCH | TEMPRCN |
| 0263 | REP | 2 | LAST | 1377 | 10,2356 | 3 | 0065 | 1 | | CA | TEMPSW |
| 0264 | REP | 2 | LAST | 1377 | 10,2357 | 7 | 4716 | 1 | | MASK | OCTY |
| 0265 | | | | | 10,2360 | 6 | 0000 | 1 | | DOUBLE | |
| 0266 | REP | 5 | LAST | 1378 | 10,2361 | 54 | 061 | 1 | | TS | TEMPG |
| 0267 | REP | 3 | LAST | 1379 | 10,2362 | 3 | 0065 | 1 | | CA | TEMPSW |
| 0268 | REP | 2 | LAST | 1377 | 10,2363 | 7 | 4765 | 0 | | MASK | OCT17770 |
| 0269 | | | | | 10,2364 | 0 | 0006 | 1 | | EXTEND | |
| 0270 | REP | 33 | LAST | 1377 | 10,2365 | 7 | 4677 | 1 | | MP | BIT12 |
| 0271 | REP | 3 | LAST | 1378 | 10,2366 | 54 | 062 | 1 | | TS | TEMPF |
| 0272 | REP | 4 | LAST | 1379 | 10,2367 | 3 | 0065 | 1 | | CA | TEMPSW |
| 0273 | REP | 14 | LAST | 904 | 10,2370 | 7 | 4105 | 0 | | MASK | OCT60000 |
| 0274 | REP | 5 | LAST | 1379 | 10,2371 | 56 | 085 | 1 | | XCH | TEMPSW |
| 0275 | REP | 2 | LAST | 1378 | 10,2372 | 7 | 4761 | 1 | | MASK | OCT14000 |
| 0276 | REP | 354 | LAST | 1378 | 10,2373 | 10 | 000 | 0 | | CCS | A |
| 0277 | REP | 1 | | | 10,2374 | 1 | 5315 | 1 | | TCP | ONEORTWO |

OBTAIN RETURN ADDRESS



L PHASE TABLE MAINTENANCE

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| | | | | | | | | |
|------|-----|-----|-----------|---------|----------|----------|------------|---|
| 0270 | REP | 4 | LAST 1379 | 10,2375 | 3 0062 0 | CA | TEMPP | START STORING THE PHASE INFORMATION |
| 0270 | REP | 6 | LAST 1379 | 10,2376 | 50 061 0 | NDX | TEMPO | |
| 0280 | REP | 2 | LAST 185 | 10,2377 | 54 751 0 | TS | PHASE1 -2 | |
| 0281 | REP | 3 | LAST 1377 | 10,2400 | 10 066 0 | BELOW1 | CCS | IS IT A PHASCHNG OR A 2PHSCHNG |
| 0282 | REP | 1 | | 10,2401 | 1 2415 1 | TCP | BELOW2 | IT'S A PHASCHNG |
| 0283 | | | | 10,2402 | 1 2403 0 | TCP | +1 | IT'S A 2PHSCHNG |
| 0284 | REP | 4 | LAST 1377 | 10,2403 | 4 0072 0 | CS | TEMPP2 | |
| 0285 | REP | 5 | LAST 1380 | 10,2404 | 22 072 1 | LXCH | TEMPP2 | |
| 0286 | REP | 2 | LAST 1377 | 10,2405 | 50 071 1 | NDX | TEMPO2 | |
| 0287 | REP | 5 | LAST 215 | 10,2406 | 52 751 0 | DXCH | -PHASE1 -2 | |
| 0288 | REP | 4 | LAST 1380 | 10,2407 | 10 055 0 | CCS | TEMPP2 | |
| 0289 | | | | 10,2410 | 12 411 0 | NOOP | | CAN'T GET HERE |
| 0290 | REP | 2 | LAST 1380 | 10,2411 | 1 2415 1 | TCP | BELOW2 | |
| 0291 | REP | 10 | LAST 1071 | 10,2412 | 4 0025 1 | CS | TIME1 | |
| 0292 | REP | 3 | LAST 1380 | 10,2413 | 50 071 1 | NDX | TEMPO2 | |
| 0293 | REP | 4 | LAST 385 | 10,2414 | 55=051 0 | TS | TRASE1 -2 | |
| 0294 | REP | 4 | LAST 1370 | 10,2415 | 10 044 0 | BELOW2 | CCS | GET TO BE SURE TO SET TRASE ON LONGBASE |
| 0295 | REP | 1 | | 10,2416 | 1 2431 1 | TCP | BELOW3 | SET LONGBASE ONLY |
| 0296 | REP | 1 | | 10,2417 | 1 2434 1 | TCP | BELOW4 | SET NEITHER |
| 0297 | REP | 20 | LAST 1380 | 10,2420 | 4 0025 1 | CS | TIME1 | SET TRASE TO BEGIN WITH |
| 0298 | REP | 7 | LAST 1380 | 10,2421 | 50 061 0 | NDX | TEMPO | |
| 0299 | REP | 5 | LAST 1380 | 10,2422 | 55=051 0 | TS | TRASE1 -2 | |
| 0300 | REP | 7 | LAST 1380 | 10,2423 | 3 0065 1 | CA | TEMPSW | SHALL WE NOW SET LONGBASE |
| 0301 | REP | 1 | | 10,2424 | 6 2427 1 | AD | BIT14COM | |
| 0302 | REP | 355 | LAST 1379 | 10,2425 | 10 000 0 | CCS | A | |
| 0303 | | | | 10,2426 | 12 427 0 | NOOP | | **** CANT GET HERE **** |
| 0304 | | | | 10,2427 | 17777 0 | OCT | 17777 | **** CANT GET HERE **** |
| 0305 | REP | 2 | LAST 1380 | 10,2430 | 1 2434 1 | BIT14COM | TCP | NO WE NEED ONLY SET TRASE |
| 0306 | | | | 10,2431 | 0 0006 1 | BELOW3 | EXTEND | SET LONGBASE |
| 0307 | REP | 29 | LAST 1299 | 10,2432 | 3 0025 0 | DCA | TIME2 | |
| 0308 | REP | 1 | | 10,2433 | 53=136 0 | DXCH | LONGBASE | |
| 0309 | REP | 5 | LAST 1380 | 10,2434 | 4 0062 1 | BELOW4 | CS | AND STORE THE FINAL PART OF THE PHASE |
| 0310 | REP | 8 | LAST 1380 | 10,2435 | 50 061 0 | NDX | TEMPO | |
| 0311 | REP | 6 | LAST 1380 | 10,2436 | 54 750 1 | TS | -PHASE1 -2 | |
| 0312 | REP | 318 | LAST 1379 | 10,2437 | 3 0002 0 | CA | 0 | |
| 0313 | REP | 5 | LAST 1379 | 10,2440 | 22 073 0 | LXCH | TEMPRCN | |
| 0314 | | | | 10,2441 | 0 0003 1 | REL.INT | | |
| 0315 | | | | 10,2442 | 52 006 0 | DTCH | | |
| 0316 | REP | 6 | LAST 1380 | 10,2443 | 22 073 0 | CON2 | LXCH | TEMPRCN |

L PHASE TABLE MAINTENANCE

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| | | | | | | | | |
|------|-----|-----|--------------------|---------|----------|--------|-------------|--|
| 0317 | REP | 6 | LAST 1380 | 10,2444 | 3 0062 0 | CA | TEMPP | |
| 0318 | REP | 9 | LAST 1380 | 10,2445 | 50 081 0 | NDX | TEMPO | |
| 0319 | REP | 3 | LAST 1380 | 10,2446 | 54 751 0 | TS | PHASE1 -2 | |
| 0320 | REP | 2 | LAST 1378 | 10,2447 | 3 0070 0 | CA | TEMPPR | |
| 0321 | REP | 10 | LAST 1381 | 10,2450 | 50 081 0 | NDX | TEMPO | |
| 0322 | REP | 2 | LAST 1378 | 10,2451 | 55-052 0 | TS | PHSPDT1 -2 | |
| 0323 | | | | 10,2452 | 0 0008 1 | EXTEND | | |
| 0324 | REP | 3 | LAST 1379 | 10,2453 | 3 0084 0 | DCA | TEMPPM | |
| 0325 | REP | 11 | LAST 1381 | 10,2454 | 50 081 0 | NDX | TEMPO | |
| 0326 | REP | 2 | LAST 1379 | 10,2455 | 53-435 0 | DRCH | PHSNAME1 -2 | |
| 0327 | REP | 1 | | 10,2456 | 1 2400 0 | TCP | BELOW1 | |
| 0328 | | | | 5363 | | BLOCK | 02 | |
| 0329 | REP | 4 | LAST 1373 | 4000 | | SETLOC | PPDAG1 | |
| 0330 | | | | 5363 | | BANK | | |
| 0331 | REP | 4 | LAST 1377 TO 1379' | 66 | 100* | COUNT | 02/PHASE | |
| 0332 | REP | 34 | LAST 1379 | 5363 | 7 4677 1 | CHECKB | BIT12 | SINCE THIS IS OF TYPE B, THIS BIT SHOULD |
| 0333 | REP | 358 | LAST 1380 | 5364 | 10 000 0 | CCS | A | BE HERE IF WE ARE TO GET A NEW PRIORITY |
| 0334 | REP | 2 | LAST 1378 | 5365 | 1 5350 0 | TCP | GETPRIO | IT IS, SO GET NEW PRIORITY |
| 0335 | REP | 1 | | 5366 | 1 5327 0 | TCP | OLDPRIO | IT ISN'T, USE THE OLD PRIORITY |



L RESTARTS ROUTINE

| Line | REP | LAST | Address | Count | Restart | Code | Comment |
|------|-----|------|---------|----------|----------------------|------|---|
| 0001 | | | 01,3520 | | BANK 01 | | |
| 0002 | 2 | 206 | 01,2000 | | SETLOC RESTART | | |
| 0003 | | | 01,3520 | | BANK | | |
| 0004 | 3 | 1381 | E3,1438 | | EBANK= PHSNAME1 | | GOPROC MUST SWITCH TO THIS EBANK |
| 0005 | 1 | | | | COUNT 01/RSROU | | |
| 0006 | 668 | 1338 | 01,3520 | 3 0161 1 | RESTARTS CA MPAC +5 | | GET GROUP NUMBER -1 |
| 0007 | | | 01,3521 | 6 0000 1 | DOUBLE | | SAVE FOR INDEXING |
| 0008 | 1 | | 01,3522 | 54 155 1 | TS TEMP2G | | |
| 0009 | 1 | | 01,3523 | 3 3762 1 | CA PHS2CADR | | SET UP EXIT IN CASE IT IS AN EVEN |
| 0010 | 1 | | 01,3524 | 54 157 0 | TS TEMPSWCH | | TABLE PHASE |
| 0011 | 1 | | 01,3525 | 3 3557 0 | CA RTRNCADR | | TO SAVE TIME ASSUME IT WILL GET NEXT |
| 0012 | 1 | | 01,3526 | 54 707 0 | TS GCLOC +2 | | GROUP AFTER THIS |
| 0013 | 1 | | 01,3527 | 3 0154 1 | CA TEMPHS | | |
| 0014 | 9 | 1364 | 01,3530 | 7 4744 0 | MASK OCT1400 | | |
| 0015 | 357 | 1381 | 01,3531 | 10 000 0 | CCS A | | IS IT A VARIABLE OR TABLE RESTART |
| 0016 | 1 | | 01,3532 | 1 3543 1 | TCP ITSAVAR | | IT'S A VARIABLE RESTART |
| 0017 | 2 | 1382 | 01,3533 | 10 154 0 | GETPART2 CCS TEMPHS | | IS IT AN X.1 RESTART |
| 0018 | 358 | 1382 | 01,3534 | 10 000 0 | CCS A | | |
| 0019 | 1 | | 01,3535 | 1 3643 1 | TCP ITSATBL | | NO, ITS A TABLE RESTART |
| 0020 | 7 | 1379 | 01,3536 | 3 4761 0 | CA PRIO14 | | IT IS AN X.1 RESTART, THEREFORE START |
| 0021 | 31 | 1283 | 01,3537 | 0 5042 1 | TC FINDVAC | | THE DISPLAY RESTART JOB |
| 0022 | 48 | 1378 | E3,1400 | | EBANK= LST1 | | |
| 0023 | 1 | | 01,3540 | 03165 0 | 2CADR INITDSP | | |
| 0023 | 1 | | 01,3541 | 20103 1 | | | |
| 0024 | 2 | 1382 | 01,3542 | 0 3557 0 | TC RTRNCADR | | FINISHED WITH THIS GROUP, GET NEXT ONE |
| 0025 | 10 | 1382 | 01,3543 | 7 4744 0 | ITSAVAR MASK OCT1400 | | IS IT TYPE R ? |
| 0026 | 359 | 1382 | 01,3544 | 10 000 0 | CCS A | | |
| 0027 | 1 | | 01,3545 | 1 3614 0 | TCP ITSLIKER | | YES, IT IS TYPE R |
| 0028 | | | 01,3546 | 0 0006 1 | EXTEND | | STORE THE JOB (OR TASK) 2CADR FOR EXIT |
| 0029 | 2 | 1382 | 01,3547 | 5 0155 0 | NDX TEMP2G | | |
| 0030 | 4 | 1382 | 01,3550 | 3 1437 0 | DCA PHSNAME1 | | |
| 0031 | 2 | 1382 | 01,3551 | 52 706 1 | DXCH GCLOC | | |
| 0032 | 3 | 1382 | 01,3552 | 3 0154 1 | CA TEMPHS | | SEE IF THIS IS A JOB, TASK, OR A LONGCALL |
| 0033 | 3 | 1379 | 01,3553 | 7 4716 1 | MASK OCT7 | | |
| 0034 | 3 | 1228 | 01,3554 | 6 7715 0 | AD MINUS2 | | |
| 0035 | 360 | 1382 | 01,3555 | 10 000 0 | CCS A | | |
| 0036 | 1 | | 01,3556 | 1 3726 0 | TCP ITSINGCL | | ITS A LONGCALL. |



L RESTARTS ROUTINE

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| | | | | | | | | | |
|--|-----|-----|--------------------|---------|----------|----------|--------|----------------|--|
| 0037 | REP | 6 | LAST 296 | 01,3557 | 0 4570 1 | RTRNCADR | TC | SWRETURN | CANT GET HERE |
| 0038 | REP | 1 | | 01,3560 | 1 3562 1 | | TCP | ITSAWAIT | |
| 0039 | REP | 1 | | 01,3561 | 1 3627 0 | | TCP | ITSAJOB | ITS A JOB |
| 0040 | REP | 1 | | 01,3562 | 3 3766 0 | ITSAWAIT | CA | WLTTCADR | SET UP WAITLIST CALL |
| 0041 | REP | 3 | LAST 1382 | 01,3563 | 64 704 0 | | TS | GOLOC -1 | |
| 0042 | REP | 3 | LAST 1382 | 01,3564 | 50 155 0 | | NDX | TEMP2G | DIRECTLY STORED |
| 0043 | REP | 3 | LAST 1381 | 01,3565 | 3 1054 1 | | CA | FHSPTD1 | |
| 0044 | REP | 361 | LAST 1382 | 01,3566 | 10 000 0 | TIMTEST | CCS | A | IS IT AN IMMEDIATE RESTART |
| 0045 | REP | 362 | LAST 1383 | 01,3567 | 24 000 1 | | INCR | A | NO, |
| 0046 | REP | 1 | | 01,3570 | 1 3573 1 | | TCP | FINDTIME | FIND OUT WHEN IT SHOULD BEGIN |
| 0047 | REP | 1 | | 01,3571 | 1 5367 1 | | TCP | ITSINDIR | STORED INDIRECTLY |
| 0048 | REP | 1 | | 01,3572 | 1 3612 0 | | TCP | IMEDIATE | IT WANTS AN IMMEDIATE RESTART |
| R0049 ***** THIS MUST BE IN FIXED FIXED ***** | | | | | | | | | |
| 0050 | | | | 5367 | | | | BLOCK 02 | |
| 0051 | REP | 2 | LAST 622 | 4000 | | | | SETLOC PPTAG2 | |
| 0052 | | | | 5367 | | | | BANK | |
| 0053 | REP | 1 | | | | | | COUNT 02/RSROU | |
| 0054 | REP | 4 | LAST 1383 | 5367 | 22 706 0 | ITSINDIR | LXCH | GOLOC +1 | GET THE CORRECT B BANK IN CASE THIS IS |
| 0055 | REP | 2 | LAST 1378 | 5370 | 22 008 1 | | LXCH | BB | SWITCHED ERRASIBLE |
| 0056 | REP | 363 | LAST 1383 | 5371 | 50 000 1 | | NDX | A | GET THE TIME INDIRECTLY |
| 0057 | | | | 5372 | 3 0001 0 | | CA | 1 | |
| 0058 | REP | 3 | LAST 1383 | 5373 | 22 008 1 | | LXCH | BB | RESTORE THE BB AND GOLOC |
| 0059 | REP | 5 | LAST 1383 | 5374 | 22 706 0 | | LXCH | GOLOC +1 | |
| 0060 | REP | 2 | LAST 1383 | 5375 | 1 3573 1 | | TCP | FINDTIME | FIND OUT WHEN IT SHOULD BEGIN |
| R0061 ***** YOU MAY RETURN TO SWITCHED FIXED ***** | | | | | | | | | |
| 0062 | | | | 01,3573 | | | | BANK 01 | |
| 0063 | REP | 3 | LAST 1382 | 01,2000 | | | | SETLOC RESTART | |
| 0064 | | | | 01,3573 | | | | BANK | |
| 0065 | REP | 2 | LAST 1382 TO 1383' | 43 | 43* | | | COUNT 01/RSROU | |
| 0066 | | | | 01,3573 | 4 0000 0 | FINDTIME | COM | | MAKE NEGITIVE SINCE IT WILL BE SUBTRACTD |
| 0067 | REP | 221 | LAST 1371 | 01,3574 | 54 001 1 | | TS | L | AND SAVE |
| 0068 | REP | 4 | LAST 1383 | 01,3575 | 50 155 0 | | NDX | TEMP2G | |
| 0069 | REP | 6 | LAST 1380 | 01,3576 | 4 1053 1 | | CS | TRASE1 | |
| 0070 | | | | 01,3577 | 0 0008 1 | | EXTEND | | |



L RESTARTS ROUTINE

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| | | | | | | | |
|------|-----|-----|-----------|---------|----------|--------------|----------|
| 0071 | REP | 21 | LAST 1380 | 01,3600 | 60 025 0 | SU | TIMS1 |
| 0072 | REP | 364 | LAST 1383 | 01,3601 | 10 000 0 | CCS | A |
| 0073 | | | | 01,3602 | 4 0000 0 | CON | |
| 0074 | REP | 4 | LAST 916 | 01,3603 | 6 7700 1 | AD | OCT37776 |
| 0075 | REP | 156 | LAST 1377 | 01,3604 | 6 4712 1 | AD | ONE |
| 0076 | REP | 222 | LAST 1383 | 01,3605 | 6 0001 0 | AD | L |
| 0077 | REP | 365 | LAST 1384 | 01,3606 | 10 000 0 | CCS | A |
| 0078 | REP | 253 | LAST 1383 | 01,3607 | 3 4714 1 | CA | ZERO |
| 0079 | | | | 01,3610 | 1 3612 0 | TCP | +2 |
| 0080 | | | | 01,3611 | 1 3612 0 | TCP | +1 |
| 0081 | REP | 159 | LAST 1384 | 01,3612 | 6 4712 1 | IMMEDIATE AD | ONE |
| 0082 | REP | 6 | LAST 1383 | 01,3613 | 0 0704 1 | TC | GOLOC -1 |
| 0083 | REP | 3 | LAST 1382 | 01,3614 | 3 3557 0 | ITS LIKE R | RTRNCADR |
| 0084 | REP | 2 | LAST 1382 | 01,3615 | 54 157 0 | TS | TEMPSWCH |
| 0085 | REP | 1 | | 01,3616 | 3 3763 0 | CA | PRT2CADR |
| 0086 | REP | 7 | LAST 1384 | 01,3617 | 54 707 0 | TS | GOLOC +2 |
| 0087 | REP | 4 | LAST 1382 | 01,3620 | 3 0154 1 | CA | TEMPPHS |
| 0088 | REP | 1 | | 01,3621 | 7 6043 1 | MASK | OCT177 |
| 0089 | REP | 5 | LAST 1384 | 01,3622 | 54 154 0 | TS | TEMPPHS |
| 0090 | | | | 01,3623 | 0 0006 1 | EXTEND | |
| 0091 | REP | 5 | LAST 1383 | 01,3624 | 5 0155 0 | NDX | TEMP2G |
| 0092 | REP | 5 | LAST 1382 | 01,3625 | 3 1437 0 | DCA | PHSNAME1 |
| 0093 | REP | 8 | LAST 1384 | 01,3626 | 52 706 1 | DXCH | GOLOC |
| 0094 | REP | 6 | LAST 1384 | 01,3627 | 50 155 0 | ITSAJOB | NDX |
| 0095 | REP | 4 | LAST 1383 | 01,3630 | 3 1054 1 | CA | PHSPROT1 |
| 0096 | REP | 9 | LAST 1384 | 01,3631 | 54 704 0 | CHNOVAC | TS |
| 0097 | | | | 01,3632 | 0 0006 1 | EXTEND | |
| 0098 | REP | 1 | | 01,3633 | 6 3637 0 | BZNF | ITSNVAC |
| 0099 | REP | 1 | | 01,3634 | 3 3765 0 | CAP | FVACCADR |
| 0100 | REP | 10 | LAST 1384 | 01,3635 | 56 704 1 | XCH | GOLOC -1 |
| 0101 | REP | 11 | LAST 1384 | 01,3636 | 0 0704 1 | TC | GOLOC -1 |
| 0102 | REP | 1 | | 01,3637 | 3 3767 1 | ITSNVAC | CAP |
| 0103 | REP | 12 | LAST 1384 | 01,3640 | 56 704 1 | XCH | GOLOC -1 |
| 0104 | | | | 01,3641 | 4 0000 0 | CON | |
| 0105 | REP | 13 | LAST 1384 | 01,3642 | 0 0704 1 | TC | GOLOC -1 |
| 0106 | REP | 45 | LAST 1368 | 01,3643 | 54 020 1 | ITSATRL | TS |
| 0107 | REP | 46 | LAST 1384 | 01,3644 | 10 020 1 | CCS | CYR |
| 0108 | | | | 01,3645 | 1 3646 1 | TCP | +1 |
| 0109 | REP | 1 | | 01,3646 | 1 3744 1 | TCP | ITSEVEN |
| 0110 | REP | 4 | LAST 1384 | 01,3647 | 3 3557 0 | CA | RTRNCADR |
| 0111 | REP | 14 | LAST 1384 | 01,3650 | 54 707 0 | TS | GOLOC +2 |

TYPE B, SO STORE RETURN IN
TEMPSWCH IN CASE OF AN EVEN PHASE

SET UP EXIT TO GET TABLE PART OF THIS
VARIABLE TYPE OF PHASE

MAKE THE PHASE LOOK RIGHT FOR THE TABLE
PART OF THIS VARIABLE PHASE

OBTAIN THE JOB'S 2CADR

NOW ADD THE PRIORITY AND LET'S GO

SAVE PRIO UNTIL WE SEE IF ITS
A FINDVAC OR A NOVAC

POSITIVE, SET UP FINDVAC CALL,
PICK UP PRIO,
AND GO

NEGATIVE,
SET UP NOVAC CALL,
CORRECT PRIO,
AND GO

FIND OUT IF THE PHASE IS ODD OR EVEN

IT'S EVEN

IN CASE THIS IS THE SECOND PART OF A
TYPE B RESTART, WE NEED PROPER EXIT



L RESTARTS ROUTINE

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| | | | | | | | | |
|-------|-----|-----|--------------------|---------|----------|----------|------------|--|
| 0112 | REP | 6 | LAST 1384 | 01,3851 | 3 0154 1 | CA | TEMPHS | SET UP POINTER FOR FINDING OUR PLACE IN |
| 0113 | REP | 24 | LAST 1371 | 01,3852 | 54 021 0 | TS | RR | THE RESTART TABLES |
| 0114 | REP | 35 | LAST 1385 | 01,3853 | 6 0021 1 | AD | SR | |
| 0115 | REP | 7 | LAST 1384 | 01,3854 | 50 155 0 | NDX | TEMP20 | |
| 0116 | REP | 1 | | 01,3855 | 6 2001 1 | AD | SIZETAB +1 | |
| 0117 | REP | 1 | | 01,3856 | 54 156 1 | TS | POINTER | |
| 0118 | | | | 01,3857 | 0 0006 1 | CONTRL2 | EXTEND | FIND OUT WHAT'S IN THE TABLE |
| 0119 | REP | 2 | LAST 1385 | 01,3860 | 5 0156 0 | NDX | POINTER | |
| 0120 | REP | 1 | | 01,3861 | 3 2002 1 | DCA | CADRTAB | GET THE 2CADR |
| 0121 | REP | 15 | LAST 1384 | 01,3862 | 22 706 0 | LXCH | GOLOC +1 | STORE THE RR INFORMATION |
| 0122 | REP | 368 | LAST 1384 | 01,3863 | 10 000 0 | CCS | A | IS IT A JOB OR IS IT TIMED |
| 0123 | REP | 367 | LAST 1385 | 01,3864 | 24 000 1 | INCR | A | POSITIVE, MUST BE A JOB |
| 0124 | REP | 1 | | 01,3865 | 1 3740 0 | TCF | ITSAJOB2 | |
| 0125 | REP | 368 | LAST 1385 | 01,3866 | 24 000 1 | INCR | A | MUST BE EITHER A WAITLIST OR LONGCALL |
| 0126 | REP | 16 | LAST 1385 | 01,3867 | 54 705 1 | TS | GOLOC | LET-S STORE THE CORRECT CADR |
| 0127 | REP | 2 | LAST 1383 | 01,3870 | 3 3766 0 | CA | WLTICADR | SET UP OUR EXIT TO WAITLIST |
| 0128 | REP | 17 | LAST 1385 | 01,3871 | 54 704 0 | TS | GOLOC -1 | |
| 0129 | REP | 18 | LAST 1385 | 01,3872 | 3 0706 0 | CA | GOLOC +1 | NOW FIND OUT IF IT IS A WAITLIST CALL. |
| 0130 | REP | 368 | LAST 1383 | 01,3873 | 7 4701 1 | MASK | BIT10 | THIS SHOULD BE ONE IF WE HAVE -RR |
| 0131 | REP | 369 | LAST 1385 | 01,3874 | 10 000 0 | CCS | A | FOR THAT MATTER SO SHOULD BE BITS 9,8,7, |
| A0132 | | | | | | | | 6,5, AND LAST BUT NOT LEAST (PERHAPS NOT |
| A0133 | | | | | | | | IN IMPORTANCE ANYWAY. BIT 4 |
| 0134 | REP | 1 | | 01,3875 | 1 3733 1 | TCF | ITSWLST | IT IS A WAITLIST CALL |
| 0135 | REP | 3 | LAST 1385 | 01,3876 | 50 156 0 | NDX | POINTER | OBTAIN THE ORIGINAL DELTA T |
| 0136 | REP | 1 | | 01,3877 | 3 2000 0 | CA | PROTTAB | ADDRESS FOR THIS LONGCALL |
| 0137 | REP | 1 | | 01,3700 | 1 5376 1 | TCF | ITSLOCL1 | NOW GO GET THE DELTA TIME |
| 0138 | | | | | | | | ***** THIS MUST BE IN FIXED FIXED ***** |
| 0139 | | | | | 5376 | BLOCK | 02 | |
| 0140 | REP | 3 | LAST 1383 | | 4000 | SETLOC | PPTAG2 | |
| 0141 | | | | | 5376 | BANK | | |
| 0142 | REP | 2 | LAST 1383 TO 1383' | | 7 | 7* | COUNT | 02/RSROU |
| 0143 | REP | 19 | LAST 1385 | 5376 | 22 706 0 | ITSLOCL1 | LXCH | GOLOC +1 |
| 0144 | REP | 4 | LAST 1383 | 5377 | 22 006 1 | LXCH | RR | OBTAIN THE CORRECT R RANK |
| 0145 | REP | 20 | LAST 1385 | 5400 | 22 706 0 | LXCH | GOLOC +1 | AND PRESERVE OUR E AND F RANKS |
| 0146 | | | | 5401 | 0 0006 1 | EXTEND | | GET THE DELTA TIME |
| 0147 | REP | 370 | LAST 1385 | 5402 | 5 0000 1 | NDX | A | |
| 0148 | | | | 5403 | 3 0001 0 | DCA | 0 | |

L RESTARTS ROUTINE

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0149 RESP 21 LAST 1385 5404 22 706 0 LXCH GOLOC +1
0150 RESP 5 LAST 1385 5405 22 006 1 LXCH BB
0151 RESP 22 LAST 1386 5406 22 706 0 LXCH GOLOC +1

0152 RESP 1 5407 1 3701 0 TCP ITSLOCL2

R0153 ***** YOU MAY RETURN TO SWITCHED FIXED *****

0154 RESP 4 LAST 1383 01,3701 BANK 01
0155 RESP 4 LAST 1383 01,2000 SETLOC RESTART
0156 RESP 4 LAST 1383 01,3701 BANK

0157 RESP 3 LAST 1383 TO 1385' 70 113* COUNT 01/RSROU

0158 RESP 6 LAST 1204 01,3701 53=140 1 ITSLOCL2 DXCH LONGTIME

0159 RESP 30 LAST 1380 01,3702 0 0006 1 EXTEND
0160 RESP 7 LAST 1386 01,3703 4 0025 1 DCS TIME2
0161 RESP 7 LAST 1386 01,3704 21=140 1 DAS LONGTIME
0162 RESP 2 LAST 1380 01,3705 0 0006 1 EXTEND
0163 RESP 8 LAST 1386 01,3706 3 1136 1 DCA LONGBASE
0164 RESP 8 LAST 1386 01,3707 21=140 1 DAS LONGTIME

0165 RESP 9 LAST 1386 01,3710 11=137 1 CCS LONGTIME
0166 RESP 1 01,3711 1 3721 1 TCP LONGCLCL
0167 RESP 1 01,3712 1 3714 1 TCP +2
0168 RESP 2 LAST 1383 01,3713 1 3607 1 TCP IMMEDIATE -3
0169 RESP 10 LAST 1386 01,3714 11=140 1 CCS LONGTIME +1
0170 RESP 2 LAST 1386 01,3715 1 3721 1 TCP LONGCLCL
0171 RESP 2 LAST 1386 01,3716 13 717 1 NOOP
0172 RESP 3 LAST 1386 01,3717 1 3607 1 TCP IMMEDIATE -3
0173 RESP 4 LAST 1386 01,3720 1 3612 0 TCP IMMEDIATE

0174 RESP 1 01,3721 3 3764 1 LONGCLCL CA LOCLCADR
0175 RESP 23 LAST 1386 01,3722 54 704 0 TS GOLOC -1

0176 RESP 11 LAST 1386 01,3723 0 0006 1 EXTEND
0177 RESP 24 LAST 1386 01,3724 3 1140 0 DCA LONGTIME
0178 RESP 24 LAST 1386 01,3725 0 0704 1 TC GOLOC -1

0179 RESP 3 LAST 1385 01,3726 3 3766 0 ITSLNOCL CA WILTCADR
0180 RESP 25 LAST 1386 01,3727 54 704 0 TS GOLOC -1

0181 RESP 6 LAST 1385 01,3730 50 155 0 NDY TEMP20
0182 RESP 5 LAST 1384 01,3731 4 1054 0 CS PHSPROT1

0183 RESP 2 LAST 1385 01,3732 1 5376 1 TCP ITSLOCL1

0184 RESP 26 LAST 1386 01,3733 4 0706 1 ITSWLST CS GOLOC +1
0185 RESP 27 LAST 1386 01,3734 54 706 1 TS GOLOC +1
    
```

RESTORE OUR E AND F BANK
 RESTORE THE TASKS E AND F BANKS
 AND PRESERVE OUR L
 NOW LET'S PROCESS THIS LONGCALL

CALCULATE TIME LEFT

FIND OUT HOW THIS SHOULD BE RESTARTED

CAN'T GET HERE *****

WE WILL GO TO LONGCALL

PREPARE OUR ENTRY TO LONGCALL

ASSUME IT WILL GO TO WAITLIST

GET THE DELTA T ADDRESS

NOW GET THE DELTA TIME

CORRECT THE RRCON INFORMATION

L RESTARTS ROUTINE

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| | | | | | | | |
|-------|-----|-----|-----------|---------|----------|----------|------------------|
| 0186 | REP | 4 | LAST 1385 | 01,3735 | 50 156 0 | NDX | POINTER |
| 0187 | REP | 2 | LAST 1385 | 01,3736 | 3 2000 0 | CA | PRDTAB |
| 0188 | REP | 1 | | 01,3737 | 1 3566 0 | TCP | TIMESTEST |
| 0189 | REP | 28 | LAST 1386 | 01,3740 | 56 705 0 | ITSAJOB2 | XCH GOLOC |
| 0190 | REP | 5 | LAST 1387 | 01,3741 | 50 156 0 | NDX | POINTER |
| 0191 | REP | 3 | LAST 1387 | 01,3742 | 3 2000 0 | CA | PRDTAB |
| 0192 | REP | 1 | | 01,3743 | 1 3631 1 | TCP | CRNOVAC |
| 0193 | REP | 3 | LAST 1384 | 01,3744 | 3 0157 1 | ITSEVEN | CA TEMPSWCH |
| 0194 | REP | 29 | LAST 1387 | 01,3745 | 54 707 0 | TS | GOLOC +2 |
| 0195 | REP | 9 | LAST 1386 | 01,3746 | 50 155 0 | NDX | TEMP2G |
| 0196 | REP | 2 | LAST 1385 | 01,3747 | 3 2000 0 | CA | SIZE2AB |
| 0197 | REP | 7 | LAST 1385 | 01,3750 | 6 0154 1 | AD | TEMPPHS |
| 0198 | REP | 8 | LAST 1387 | 01,3751 | 6 0154 1 | AD | TEMPPHS |
| 0199 | REP | 9 | LAST 1387 | 01,3752 | 6 0154 1 | AD | TEMPPHS |
| 0200 | REP | 6 | LAST 1387 | 01,3753 | 54 156 1 | TS | POINTER |
| 0201 | REP | 1 | | 01,3754 | 1 3657 1 | TCP | CONTRL2 |
| 0202 | REP | 46 | LAST 1363 | 01,3755 | 3 6214 0 | RHSPART2 | CA THREE |
| 0203 | REP | 7 | LAST 1387 | 01,3756 | 26 156 1 | ADS | POINTER |
| 0204 | REP | 5 | LAST 1384 | 01,3757 | 3 3557 0 | CA | RTRNCADR |
| 0205 | REP | 30 | LAST 1387 | 01,3760 | 54 707 0 | TS | GOLOC +2 |
| A0206 | | | | | | | |
| 0207 | REP | 2 | LAST 1387 | 01,3761 | 1 3657 1 | TCP | CONTRL2 |
| 0208 | REP | 669 | LAST 1382 | 0154 | | TEMPPHS | EQUALS MPAC |
| 0209 | REP | 670 | LAST 1387 | 0155 | | TEMP2G | EQUALS MPAC +1 |
| 0210 | REP | 671 | LAST 1387 | 0156 | | POINTER | EQUALS MPAC +2 |
| 0211 | REP | 672 | LAST 1387 | 0157 | | TEMPSWCH | EQUALS MPAC +3 |
| 0212 | REP | 1 | | 0705 | | GOLOC | EQUALS VAC5 +20D |
| 0213 | REP | 7 | LAST 1364 | 7715 | | MINUS2 | EQUALS NEG2 |
| 0214 | REP | 9 | LAST 1165 | 8043 | | OCT177 | EQUALS LOW7 |
| 0215 | REP | 1 | | 01,3762 | 03755 0 | RHS2CADR | GENADR RHSPART2 |
| 0216 | REP | 1 | | 01,3763 | 03533 1 | PRT2CADR | GENADR GETPART2 |
| 0217 | REP | 4 | LAST 1284 | 01,3764 | 05231 1 | LOCLCADR | GENADR LONGCALL |
| 0218 | REP | 32 | LAST 1382 | 01,3765 | 05042 1 | RVACCADR | GENADR FINDVAC |
| 0219 | REP | 52 | LAST 1205 | 01,3766 | 05140 1 | WILTCADR | GENADR WAITLIST |
| 0220 | REP | 32 | LAST 1372 | 01,3767 | 05027 1 | NOVACADR | GENADR NOVAC |

GET THE DT AND FIND OUT IF IT WAS STORED DIRECTLY OR INDIRECTLY

FIND OUT HOW THE TIME IS STORED

STORE THE CADR

ADD THE PRIORITY AND LET'S GO

SET UP FOR EITHER THE SECOND PART OF THE TABLE, OR A RETURN FOR THE NEXT GROUP

SET UP POINTER FOR OUR LOCATION WITHIN THE TABLE
THIS MAY LOOK BAD BUT LET'S SEE YOU DO BETTER IN TIME OR NUMBER OF LOCATIONS

NOW PROCESS WHAT IS IN THE TABLE

SET THE POINTER FOR THE SECOND HALF OF THE TABLE

THIS WILL BE OUR LAST TIME THROUGH THE EVEN TABLE, SO AFTER IT GET THE NEXT GROUP

SO LET'S GET THE SECOND ENTRY IN THE TAB.



L IMJ MODE SWITCHING ROUTINES

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| | | | | | |
|------|-------|--|---------|--|----------------|
| 0001 | | | 5410 | | BLOCK 02 |
| 0002 | REP 1 | | 4000 | | SETLOC PFDAG3 |
| 0003 | | | 5410 | | BANK |
| 0004 | REP 1 | | E3,1471 | | BRANK= COMMAND |

0005 FIXED-FIXED ROUTINES.

| | | | | | |
|------|---------|-----------|------|----------|-------------------|
| 0006 | REP 1 | | | | COUNT 02/IMODE |
| 0007 | REP 254 | LAST 1384 | 5410 | 3 4714 1 | ZEROICDU CAP ZERO |
| 0008 | REP 29 | LAST 1333 | 5411 | 54 032 1 | TS CDUK |
| 0009 | REP 17 | LAST 1333 | 5412 | 54 033 0 | TS CDUY |
| 0010 | REP 23 | LAST 1334 | 5413 | 54 034 1 | TS CDUZ |
| 0011 | REP 319 | LAST 1380 | 5414 | 0 0002 0 | TC O |
| 0012 | REP 33 | LAST 1363 | 4702 | | SPSCODE = BITS |

ZERO ICPU COUNTERS.



L IMU MODE SWITCHING ROUTINES

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P0013 IMU ZEROING ROUTINE.

| | | | | | | | | |
|-------|-----|-----|-----------|---------|----------|------------------|-------------|--|
| 0014 | | | | 11,3721 | | BANK 11 | | |
| 0015 | REP | 1 | | 07,2000 | | SETLOC MODESW | | |
| 0016 | | | | 07,2516 | | BANK | | |
| 0017 | REP | 1 | | | | COUNT 07/IMODE | | |
| 0018 | | | | 07,2516 | 0 0004 0 | IMUZERO | INHINT | ROUTINE TO ZERO ICDS. |
| 0019 | REP | 41 | LAST 382 | 07,2517 | 4 1036 1 | CS | DSPTAB +11D | DONT ZERO CDUS IF IMU IN GIMBAL LOCK AND |
| 0020 | REP | 4 | LAST 180 | 07,2520 | 7 4726 1 | MASK | BITS4d6 | COARSE ALIGN (GIMBAL RUNAWAY PROTECTION) |
| 0021 | REP | 371 | LAST 1385 | 07,2521 | 10 000 0 | CCS | A | |
| 0022 | REP | 1 | | 07,2522 | 1 2526 0 | TCF | IMUZEROA | |
| 0023 | REP | 37 | LAST 1326 | 07,2523 | 0 5537 0 | TC | ALARM | IF SO. |
| 0024 | | | | 07,2524 | 00206 0 | OCT | 00206 | |
| 0025 | REP | 1 | | 07,2525 | 1 3461 0 | TCF | CAGETSTJ +4 | IMMEDIATE FAILURE. |
| 0032 | REP | 2 | LAST 1389 | 07,2526 | 0 3455 0 | IMUZEROA | TC CAGETSTJ | |
| 0033 | | | | | | DO ALL THE WORK. | | |
| 0034 | REP | 29 | LAST 1034 | 07,2527 | 4 1321 1 | CS | IMODES33 | DISABLE DAP AUTO AND HOLD MODES |
| 0035 | REP | 2 | LAST 526 | 07,2530 | 7 4730 0 | MASK | SUPER011 | BITS FOR GROUND |
| 0036 | REP | 30 | LAST 1389 | 07,2531 | 27*321 1 | ADS | IMODES33 | |
| 0037 | REP | 43 | LAST 721 | 07,2532 | 4 1320 0 | CS | IMODES30 | INHIBIT ICDFAIL AND IMUPAIL (IN CASE WE |
| 0038 | REP | 1 | | 07,2533 | 7 5656 0 | MASK | BITS3d4 | JUST CAME OUT OF COARSE ALIGN). |
| 0039 | REP | 44 | LAST 1389 | 07,2534 | 27*320 0 | ADS | IMODES30 | |
| 0040 | REP | 5 | LAST 1389 | 07,2535 | 4 4726 1 | CS | BITS4d6 | SEND ZERO ENCODE WITH COARSE AND ERROR |
| 0041 | | | | 07,2536 | 0 0006 1 | EXTEND | | COUNTER DISABLED. |
| 0042 | REP | 37 | LAST 963 | 07,2537 | 03 012 1 | WAND | CHAN12 | |
| 0043 | REP | 3 | LAST 140 | 07,2540 | 0 3070 0 | TC | NOATTOPP | TURN OFF NO ATT LAMP. |
| 0044 | REP | 40 | LAST 1383 | 07,2541 | 3 4706 1 | CAP | BITS | |
| 0045 | | | | 07,2542 | 0 0006 1 | EXTEND | | |
| 0046 | REP | 38 | LAST 1389 | 07,2543 | 05 012 1 | WOR | CHAN12 | |
| 00461 | REP | 3 | LAST 140 | 07,2544 | 0 5410 1 | TC | ZEROICDU | |
| 0047 | REP | 45 | LAST 1383 | 07,2545 | 3 4705 1 | CAP | BITS | WAIT 320 MS TO GIVE AGS ADEQUATE TIME TO |
| 0048 | REP | 53 | LAST 1387 | 07,2546 | 0 5140 1 | TC | WAITLIST | RECEIVE ITS PULSE TRAIN. |
| 0049 | REP | 5 | LAST 183 | 03,1474 | | BRANK= | CDUIND | |
| 0050 | REP | 1 | | 07,2547 | 02561 1 | 2CADR | IMUZERO2 | |
| 0050 | REP | 1 | | 07,2550 | 16103 1 | | | |
| 0051 | REP | 45 | LAST 1389 | 07,2551 | 4 1320 0 | CS | IMODES30 | SEE IF IMU OPERATING AND ALARM IF NOT. |
| 0052 | REP | 34 | LAST 1388 | 07,2552 | 7 4702 1 | MASK | BITS | |
| 0053 | REP | 372 | LAST 1389 | 07,2553 | 10 000 0 | CCS | A | |
| 0054 | REP | 1 | | 07,2554 | 1 2557 0 | TCF | MODEEXIT | |



L IMU MODE SWITCHING ROUTINES

| | | | | | | | | |
|------|-----|----|------|------|---------|----------|----------|----------|
| 0055 | REF | 30 | LAST | 1389 | 07,2555 | 0 5537 0 | TC | ALARM |
| 0056 | | | | | 07,2556 | 00210 1 | OCT | 210 |
| 0057 | | | | | 07,2557 | 0 0003 1 | MODEEXIT | RELINT |
| 0058 | REF | 7 | LAST | 1383 | 07,2560 | 1 4570 0 | TCP | SWRTURN |
| 0059 | REF | 1 | | | 07,2561 | 0 3443 1 | IMUZERO2 | CAGSTEST |
| 0061 | REF | 4 | LAST | 1389 | 07,2562 | 0 5410 1 | TC | ZEROICDU |
| 0062 | REF | 41 | LAST | 1389 | 07,2563 | 4 4706 0 | CS | BITS |
| 0063 | | | | | 07,2564 | 0 0006 1 | EXTEND | |
| 0064 | REF | 39 | LAST | 1389 | 07,2565 | 03 012 1 | WAND | CHAN12 |
| 0065 | REF | 38 | LAST | 1383 | 07,2566 | 3 4700 1 | CAP | BIT11 |
| 0066 | REF | 4 | LAST | 159 | 07,2567 | 0 5161 1 | TC | VARDELAY |
| 0067 | REF | 2 | LAST | 1390 | 07,2570 | 0 3443 1 | IMUZERO3 | TC |
| 0068 | REF | 2 | LAST | 1389 | 07,2571 | 4 5656 0 | CS | CAGSTEST |
| 0070 | REF | 46 | LAST | 1389 | 07,2572 | 7 1320 0 | MASK | BITS3d4 |
| 0071 | REF | 47 | LAST | 1390 | 07,2573 | 55=320 0 | TS | INDEXS30 |
| 0072 | REF | 3 | LAST | 1389 | 07,2574 | 4 4730 0 | CS | SUPER011 |
| 0073 | REF | 31 | LAST | 1389 | 07,2575 | 7 1321 1 | MASK | INDEXS33 |
| 0074 | REF | 32 | LAST | 1390 | 07,2576 | 55=321 1 | TS | INDEXS33 |
| 0075 | REF | 39 | LAST | 1060 | 07,2577 | 0 4633 0 | TC | IRKCALL |
| 0076 | REF | 5 | LAST | 154 | 07,2600 | 14665 1 | CADR | SETISSW |
| 0077 | REF | 1 | | | 07,2601 | 1 3433 1 | TCP | ENDIMU |

GENERAL MODE-SWITCHING EXIT.

ZERO CDUX, CDUY, CDUZ

REMOVE ZERO DISCRETE.

WAIT 10 SECS FOR CTRS TO FIND GIMBALS

REMOVE IMUFIL AND ICDUFIL INHIBIT.

ENABLE DAP AUTO AND HOLD MODES
BITS FOR GROUND

SET ISS WARNING IF EITHER OF ABOVE ARE
PRESENT.



L IMU MODE SWITCHING ROUTINES

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POSTS IMU COARSE ALIGN MODE.

| | | | | | | |
|------|---------|-----------|---------|----------|----------|-------------|
| 0079 | | | 07,2602 | 0 0004 0 | IMUCOARS | INHINT |
| 0080 | REP 3 | LAST 1389 | 07,2603 | 0 3455 0 | TC | CAGSTSTJ |
| 0081 | REP 3 | LAST 183 | 07,2604 | 0 2746 0 | TC | SETCOARS |
| 0082 | REP 41 | LAST 1364 | 07,2605 | 3 6211 0 | CAP | SIX |
| 0083 | REP 84 | LAST 1389 | 07,2606 | 0 5140 1 | TC | WAITLIST |
| 0084 | REP 6 | LAST 1389 | 03,1474 | | EBANK= | CDUIND |
| 0085 | REP 1 | | 07,2607 | 02612 0 | 2CADR | COARS |
| 0085 | REP 1 | | 07,2610 | 16103 1 | | |
| 0086 | REP 2 | LAST 1389 | 07,2611 | 1 2557 0 | TCP | MODEEXIT |
| 0087 | REP 3 | LAST 1390 | 07,2612 | 0 3443 1 | COARS | TC CAGSTEST |
| 0088 | REP 46 | LAST 1389 | 07,2613 | 3 4705 1 | CAP | BIT6 |
| 0089 | | | 07,2614 | 0 0006 1 | EXTEND | |
| 0090 | REP 40 | LAST 1390 | 07,2615 | 05 012 1 | WOR | CHAN12 |
| 0091 | REP 69 | LAST 1379 | 07,2616 | 3 4711 1 | CAP | TWO |
| 0092 | REP 7 | LAST 1391 | 07,2617 | 55=474 0 | COARS1 | TS CDUIND |
| 0093 | REP 8 | LAST 1391 | 07,2620 | 51=474 1 | INDEX | CDUIND |
| 0094 | REP 21 | LAST 1328 | 07,2621 | 3 1155 1 | CA | THETAD |
| 0095 | | | 07,2622 | 0 0006 1 | EXTEND | |
| 0096 | REP 9 | LAST 1391 | 07,2623 | 5 1474 1 | INDEX | CDUIND |
| 0097 | REP 30 | LAST 1388 | 07,2624 | 20 032 1 | MSJ | CDUX |
| 0098 | | | 07,2625 | 0 0006 1 | EXTEND | |
| 0099 | REP 45 | LAST 1363 | 07,2626 | 7 4676 0 | MP | BIT13 |
| 0100 | REP 223 | LAST 1384 | 07,2627 | 56 001 0 | XCH | L |
| 0101 | | | 07,2630 | 8 0000 1 | DOUBLE | |
| 0102 | REP 14 | LAST 1379 | 07,2631 | 54 081 1 | TS | ITMP1 |
| 0103 | | | 07,2632 | 1 2634 0 | TCP | +2 |
| 0104 | REP 224 | LAST 1391 | 07,2633 | 26 001 1 | ADS | L |
| 0105 | REP 10 | LAST 1391 | 07,2634 | 51=474 1 | INDEX | CDUIND |
| 0106 | REP 2 | LAST 1386 | 07,2635 | 23=471 1 | LXCH | COMMAND |
| 0107 | REP 11 | LAST 1391 | 07,2636 | 11=474 0 | CCS | CDUIND |
| 0108 | REP 1 | | 07,2637 | 0 2617 0 | TC | COARS1 |
| 0109 | REP 70 | LAST 1391 | 07,2640 | 3 4711 1 | CAP | TWO |
| 0110 | REP 5 | LAST 1390 | 07,2641 | 0 5161 1 | TC | VARDELAY |

ENABLE ALL THREE ISS CDU ERROR COUNTERS

SET CDU INDICATOR

COMPUTE THETAD - THETA IN 1'S
COMPLEMENT FORM

SHIFT RIGHT 2
ROUND

DIFFERENCE TO BE COMPUTED

MINIMUM OF 4 MS WAIT



L IMU MODE SWITCHING ROUTINES

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| | | | | | | | | | |
|------|-----|-----|-----------|---------|----------|---------|--------|------------|---|
| 0111 | REP | 4 | LAST 1391 | 07,2642 | 0 3443 1 | COARS2 | TC | CAGTSST | DONT CONTINUE IF CAGED. |
| 0112 | REP | 15 | LAST 1391 | 07,2643 | 54 061 1 | | TS | ITEMP1 | SETS TO +0. |
| 0113 | REP | 71 | LAST 1391 | 07,2644 | 3 4711 1 | | CAP | TWO | SET CDU INDICATOR |
| 0114 | REP | 12 | LAST 1391 | 07,2645 | 55-474 0 | +3 | TS | CDUIND | |
| 0115 | REP | 13 | LAST 1392 | 07,2646 | 51-474 1 | | INDEX | CDUIND | |
| 0116 | REP | 3 | LAST 1391 | 07,2647 | 11-471 0 | | CCS | COMMAND | NUMBER OF PULSES REQUIRED |
| 0117 | REP | 1 | | 07,2650 | 0 2354 1 | | TC | COMPOS | GREATER THAN MAX ALLOWED |
| 0118 | REP | 1 | | 07,2651 | 0 2663 0 | | TC | NEXTCDU +1 | |
| 0119 | REP | 1 | | 07,2652 | 0 2721 1 | | TC | COMNEG | |
| 0120 | REP | 2 | LAST 1392 | 07,2653 | 0 2663 0 | | TC | NEXTCDU +1 | |
| 0121 | REP | 1 | | 07,2654 | 8 3544 1 | COMPOS | AD | -COMMAX | COMMAX = MAX NUMBER OF PULSES ALLOWED |
| 0122 | REP | 1 | | 07,2655 | 0 0006 1 | | EXTEND | | MINUS ONE |
| 0123 | REP | 1 | | 07,2656 | 8 2731 0 | | BZMP | COMZRO | |
| 0124 | REP | 14 | LAST 1392 | 07,2657 | 51-474 1 | | INDEX | CDUIND | |
| 0125 | REP | 4 | LAST 1392 | 07,2660 | 55-471 0 | | TS | COMMAND | REDUCE COMMAND BY MAX NUMBER OF PULSES |
| 0126 | REP | 1 | | 07,2661 | 4 3545 1 | | CS | -COMMAX- | ALLOWED |
| 0127 | REP | 16 | LAST 1392 | 07,2662 | 24 061 0 | NEXTCDU | INCR | ITEMP1 | |
| 0128 | REP | 16 | LAST 1364 | 07,2663 | 8 4713 0 | | AD | NEG0 | |
| 0129 | REP | 15 | LAST 1392 | 07,2664 | 51-474 1 | | INDEX | CDUIND | |
| 0130 | REP | 4 | LAST 983 | 07,2665 | 54 050 0 | | TS | CDUIND | SET UP COMMAND REGISTER. |
| 0131 | REP | 16 | LAST 1392 | 07,2666 | 11-474 0 | | CCS | CDUIND | |
| 0132 | REP | 1 | | 07,2667 | 0 2645 1 | | TC | COARS2 +3 | |
| 0133 | REP | 17 | LAST 1392 | 07,2670 | 10 061 1 | | CCS | ITEMP1 | SEE IF ANY PULSES TO GO OUT. |
| 0134 | REP | 1 | | 07,2671 | 1 2735 0 | | TCP | SENDPULS | |
| 0135 | REP | 13 | LAST 781 | 07,2672 | 0 5156 0 | | TC | FIXDELAY | WAIT FOR GIMBALS TO SETTLE. |
| 0136 | REP | 1 | | 07,2673 | 00228 1 | | DEC | 150 | |
| 0137 | REP | 72 | LAST 1392 | 07,2674 | 3 4711 1 | | CAP | TWO | AT END OF COMMAND, CHECK TO SEE THAT |
| 0138 | REP | 18 | LAST 1392 | 07,2675 | 54 061 1 | CRCCORS | TS | ITEMP1 | GIMBALS ARE WITHIN 2 DEGREES OF THRTAD. |
| 0139 | REP | 373 | LAST 1389 | 07,2676 | 50 000 1 | | INDEX | A | |
| 0140 | REP | 31 | LAST 1391 | 07,2677 | 3 0032 0 | | CA | CDUX | |
| 0141 | REP | 1 | | 07,2700 | 0 0006 1 | | EXTEND | | |
| 0142 | REP | 19 | LAST 1392 | 07,2701 | 5 0061 0 | | INDEX | ITEMP1 | |
| 0143 | REP | 22 | LAST 1391 | 07,2702 | 21-155 0 | | MSU | THETAD | |
| 0144 | REP | 374 | LAST 1392 | 07,2703 | 10 000 0 | | CCS | A | |
| 0145 | REP | 1 | | 07,2704 | 1 2712 0 | | TCP | COARSERR | |
| 0146 | REP | 1 | | 07,2705 | 1 2707 1 | | TCP | CORSCHK2 | |
| 0147 | REP | 2 | LAST 1392 | 07,2706 | 1 2712 0 | | TCP | COARSERR | |

L IMU MODE SWITCHING ROUTINES

| | | | | | | | | |
|------|-----|-----|-----------|---------|----------|----------|-----------|----------|
| 0148 | REP | 20 | LAST 1392 | 07,2707 | 10 081 1 | CORSCHK2 | CCS | ITEMP1 |
| 0149 | REP | 1 | | 07,2710 | 1 2675 0 | TCP | CHKCORS | |
| 0150 | REP | 2 | LAST 1390 | 07,2711 | 1 3433 1 | TCP | ENDIMU | |
| 0151 | REP | 1 | | 07,2712 | 6 2720 0 | COARSERR | AD | COARSTOL |
| 0152 | REP | 1 | | 07,2713 | 0 0006 1 | EXTEND | | |
| 0153 | REP | 2 | LAST 1392 | 07,2714 | 6 2707 0 | BZMP | CORSCHK2 | |
| 0154 | REP | 39 | LAST 1390 | 07,2715 | 0 5537 0 | TC | ALARM | |
| 0155 | REP | 1 | | 07,2716 | 00211 0 | OCT | 211 | |
| 0156 | REP | 2 | LAST 139 | 07,2717 | 1 3441 1 | TCP | IMBAD | |
| 0157 | REP | 1 | | 07,2720 | 77511 1 | COARSTOL | DEC | -.01111 |
| 0158 | REP | 2 | LAST 1392 | 07,2721 | 6 3544 1 | COMBEO | AD | -COMMAX |
| 0159 | REP | 1 | | 07,2722 | 0 0006 1 | EXTEND | | |
| 0160 | REP | 2 | LAST 1392 | 07,2723 | 6 2731 0 | BZMP | COMZERO | |
| 0161 | REP | 1 | | 07,2724 | 4 0000 0 | COM | | |
| 0162 | REP | 17 | LAST 1392 | 07,2725 | 51=474 1 | INDEX | CDUIND | |
| 0163 | REP | 5 | LAST 1392 | 07,2726 | 55=471 0 | TS | COMMAND | |
| 0164 | REP | 2 | LAST 1392 | 07,2727 | 3 3545 0 | CA | -COMMAX- | |
| 0165 | REP | 3 | LAST 1392 | 07,2730 | 0 2662 1 | TC | NEXTODU | |
| 0166 | REP | 255 | LAST 1388 | 07,2731 | 3 4714 1 | COMZERO | CAP | ZERO |
| 0167 | REP | 18 | LAST 1393 | 07,2732 | 51=474 1 | INDEX | CDUIND | |
| 0168 | REP | 6 | LAST 1393 | 07,2733 | 57=471 1 | XCH | COMMAND | |
| 0169 | REP | 4 | LAST 1393 | 07,2734 | 0 2662 1 | TC | NEXTODU | |
| 0170 | REP | 6 | LAST 1037 | 07,2735 | 3 7707 0 | SENDPULS | CAP | 13,14,15 |
| 0171 | REP | 1 | | 07,2736 | 0 0006 1 | EXTEND | | |
| 0172 | REP | 12 | LAST 963 | 07,2737 | 05 014 1 | WOR | CHAN14 | |
| 0173 | REP | 1 | | 07,2740 | 3 3546 0 | CAP | 600MS | |
| 0174 | REP | 2 | LAST 1392 | 07,2741 | 1 2641 1 | TCP | COARS2 -1 | |
| 0175 | REP | 47 | LAST 1391 | 07,2742 | 3 4705 1 | CA+SCB | CAP | RIT6 |
| 0176 | REP | 1 | | 07,2743 | 0 0006 1 | EXTEND | | |
| 0177 | REP | 41 | LAST 1391 | 07,2744 | 05 012 1 | WOR | CHAN12 | |
| 0178 | REP | 65 | LAST 1283 | 07,2745 | 0 5213 1 | TC | TASKOVER | |

END OF COARSE ALIGNMENT.

2 DEGREES.

COARSE ALIGN ERROR.

2 DEGREES SCALED AT HALF-REVOLUTIONS

THEN TO VARDELAY
ENABLE ALL THREE ISS CDU ERROR COUNTERS



L IMU MODE SWITCHING ROUTINES

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| | | | | | | | | | | |
|------|-----|-----|------|------|---------|----------|----------|--------|-------------|-----------------------------------|
| 0179 | REP | 41 | LAST | 1363 | 07,2746 | 3 4707 0 | SETCOARS | CAP | BIT4 | BYPASS IF ALREADY IN COARSE ALIGN |
| 0180 | | | | | 07,2747 | 0 0006 1 | | EXTEND | | |
| 0181 | REP | 42 | LAST | 1393 | 07,2750 | 02 012 0 | | RAND | CHAN12 | |
| 0182 | REP | 375 | LAST | 1392 | 07,2751 | 10 000 0 | | CCS | A | |
| 0183 | REP | 329 | LAST | 1368 | 07,2752 | 0 0002 0 | | TC | 0 | |
| 0184 | REP | 48 | LAST | 1393 | 07,2753 | 4 4705 0 | | CS | BIT6 | CLEAR ISS ERROR COUNTERS |
| 0185 | | | | | 07,2754 | 0 0006 1 | | EXTEND | | |
| 0186 | REP | 43 | LAST | 1394 | 07,2755 | 03 012 1 | | WAND | CHAN12 | |
| 0187 | REP | 38 | LAST | 1385 | 07,2756 | 4 4701 1 | | CS | BIT10 | KNOCK DOWN GYRO ACTIVITY |
| 0188 | | | | | 07,2757 | 0 0006 1 | | EXTEND | | |
| 0189 | REP | 13 | LAST | 1393 | 07,2760 | 03 014 1 | | WAND | CHAN14 | |
| 0190 | REP | 256 | LAST | 1393 | 07,2761 | 4 4714 0 | | CS | ZERO | |
| 0191 | REP | 2 | LAST | 148 | 07,2762 | 54 047 0 | | TS | GYROCMD | |
| 0192 | REP | 42 | LAST | 1394 | 07,2763 | 3 4707 0 | | CAP | BIT4 | PUT ISS IN COARSE ALIGN |
| 0193 | | | | | 07,2764 | 0 0006 1 | | EXTEND | | |
| 0194 | REP | 44 | LAST | 1394 | 07,2765 | 05 012 1 | | WOR | CHAN12 | |
| 0195 | REP | 42 | LAST | 1389 | 07,2766 | 4 1036 1 | | CS | DSPTAB +11D | TURN ON NO ATT LAMP |
| 0196 | REP | 1 | | | 07,2767 | 7 3011 0 | | MASK | OCT40010 | |
| 0197 | REP | 43 | LAST | 1394 | 07,2770 | 27=036 1 | | ADS | DSPTAB +11D | |
| 0198 | REP | 33 | LAST | 1390 | 07,2771 | 4 1321 1 | | CS | IMCDS33 | DISABLE DAP AUTO AND HOLD MODES |
| 0199 | REP | 49 | LAST | 1394 | 07,2772 | 7 4705 0 | | MASK | BIT6 | |
| 0200 | REP | 34 | LAST | 1394 | 07,2773 | 27=321 1 | | ADS | IMCDS33 | |
| 0201 | REP | 48 | LAST | 1390 | 07,2774 | 4 1320 0 | | CS | IMCDS30 | DISABLE IMUPAIL |
| 0202 | REP | 43 | LAST | 1394 | 07,2775 | 7 4707 1 | | MASK | BIT4 | |
| 0203 | REP | 49 | LAST | 1394 | 07,2776 | 27=320 0 | | ADS | IMCDS30 | |
| 0204 | REP | 42 | LAST | 1390 | 07,2777 | 4 4706 0 | RNDREFDR | CS | BIT5 | KNOCK DOWN TRACK FLAG |
| 0205 | REP | 24 | LAST | 989 | 07,3000 | 7 0075 1 | | MASK | FLAGWRD1 | |
| 0206 | REP | 25 | LAST | 1394 | 07,3001 | 54 075 1 | | TS | FLAGWRD1 | |
| 0207 | REP | 51 | LAST | 1377 | 07,3002 | 4 4674 1 | | CS | BIT15 | KNOCK DOWN DRIFT FLAG |
| 0208 | REP | 19 | LAST | 1195 | 07,3003 | 7 0076 1 | | MASK | FLAGWRD2 | |
| 0209 | REP | 29 | LAST | 1394 | 07,3004 | 54 076 1 | | TS | FLAGWRD2 | |
| 0210 | REP | 48 | LAST | 1391 | 07,3005 | 4 4676 0 | | CS | BIT13 | KNOCK DOWN REPSMAT FLAG |
| 0211 | REP | 2 | LAST | 417 | 07,3006 | 7 0077 0 | | MASK | FLAGWRD3 | |
| 0212 | REP | 3 | LAST | 1394 | 07,3007 | 54 077 0 | | TS | FLAGWRD3 | |
| 0213 | REP | 321 | LAST | 1394 | 07,3010 | 0 0002 0 | | TC | 0 | |
| 0214 | | | | | 07,3011 | 40010 1 | OCT40010 | OCT | 40010 | |



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P0215 IMU FINE ALIGN MODE SWITCH.

| | | | | | | | | |
|------|-----|----|-----------|---------|----------|----------|--------|----------|
| 0216 | | | | 07,3012 | 0 0004 0 | IMUPINE | INHINT | |
| 0217 | REP | 4 | LAST 1391 | 07,3013 | 0 3455 0 | | TC | CAGETSTN |
| 0218 | REP | 1 | | 07,3014 | 4 3543 1 | | CS | BITS4-5 |
| 0219 | | | | 07,3015 | 0 0008 1 | | EXTEND | |
| 0220 | REP | 45 | LAST 1394 | 07,3016 | 03 012 1 | | WAND | CHAN12 |
| 0221 | REP | 50 | LAST 1394 | 07,3017 | 4 4705 0 | | CS | BITS |
| 0222 | REP | 35 | LAST 1394 | 07,3020 | 7 1321 1 | | MASK | IMODES33 |
| 0223 | REP | 38 | LAST 1395 | 07,3021 | 55-321 1 | | TS | IMODES33 |
| 0224 | REP | 4 | LAST 1389 | 07,3022 | 0 3070 0 | | TC | NOATTOPF |
| 0225 | REP | 40 | LAST 1394 | 07,3023 | 3 4701 0 | | CAP | BIT10 |
| 0226 | REP | 55 | LAST 1391 | 07,3024 | 0 5140 1 | | TC | WAITLIST |
| 0227 | REP | 19 | LAST 1393 | E3,1474 | | | EBANK= | CDUIND |
| 0228 | REP | 1 | | 07,3025 | 03038 1 | | 2CADR | IPAILCK |
| 0228 | REP | 1 | | 07,3026 | 16103 1 | | | |
| 0229 | REP | 5 | LAST 779 | 07,3027 | 3 4735 1 | | CAP | 2SECS |
| 0230 | REP | 58 | LAST 1395 | 07,3030 | 0 5140 1 | | TC | WAITLIST |
| 0231 | REP | 20 | LAST 1395 | E3,1474 | | | EBANK= | CDUIND |
| 0232 | REP | 1 | | 07,3031 | 03034 0 | | 2CADR | IMUPINED |
| 0232 | REP | 1 | | 07,3032 | 16103 1 | | | |
| 0233 | REP | 3 | LAST 1391 | 07,3033 | 1 2557 0 | | TCF | MODEEXIT |
| 0234 | REP | 5 | LAST 1392 | 07,3034 | 0 3443 1 | IMUPINED | TC | CAGETEST |
| 0235 | REP | 3 | LAST 1393 | 07,3035 | 1 3433 1 | | TCF | ENDIMU |

SEE IF IMU BEING CAGED.

RESET ZERO AND COARSE

INSURE DAP AUTO AND HOLD MODES ENABLED

IMU FAIL WAS INHIBITED DURING THE PRESUMABLY PRECEDING COARSE ALIGN. LEAVE

IT ON FOR THE FIRST 5 SECS OF FINE ALIGN

SEE THAT NO ONE HAS CAGED THE IMU.

L IMU MODE SWITCHING ROUTINES

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| | | | | | | | | |
|------|-----|-----|-----------|---------|----------|----------|--------|-------------|
| 0236 | REP | 1 | | 07,3036 | 0 3450 0 | IPAILQK | TC | CAGETSTO |
| 0237 | REP | 66 | LAST 1393 | 07,3037 | 1 5213 0 | | TCP | TASKOVER |
| 0238 | REP | 44 | LAST 1394 | 07,3040 | 3 4707 0 | | CAP | BIT4 |
| 0239 | REP | | | 07,3041 | 0 0006 1 | | EXTEND | |
| 0240 | REP | 46 | LAST 1395 | 07,3042 | 02 012 0 | | RAND | CHAN12 |
| 0241 | REP | 376 | LAST 1394 | 07,3043 | 10 000 0 | | CCS | A |
| 0242 | REP | 67 | LAST 1396 | 07,3044 | 1 5213 0 | | TCP | TASKOVER |
| 0243 | REP | 50 | LAST 1394 | 07,3045 | 4 1320 0 | | CS | IMODES30 |
| 0244 | REP | 47 | LAST 1394 | 07,3046 | 7 4676 0 | | MASK | BIT13 |
| 0246 | REP | 45 | LAST 1396 | 07,3050 | 4 4707 1 | | CS | BIT4 |
| 0247 | REP | 52 | LAST 1396 | 07,3051 | 7 1320 0 | PPAILQK2 | MASK | IMODES30 |
| 0248 | REP | 53 | LAST 1396 | 07,3052 | 55=320 0 | | TS | IMODES30 |
| 0249 | REP | 40 | LAST 1390 | 07,3053 | 0 4633 0 | | TC | IBKCALL |
| 0250 | REP | 6 | LAST 1390 | 07,3054 | 14665 1 | | CADR | SETISSW |
| 0251 | REP | 68 | LAST 1396 | 07,3055 | 1 5213 0 | | TCP | TASKOVER |
| 0252 | REP | 2 | LAST 1394 | 07,3056 | 0 3450 0 | PPAILQK | TC | CAGETSTO |
| 0253 | REP | 69 | LAST 1396 | 07,3057 | 1 5213 0 | | TCP | TASKOVER |
| 0254 | REP | 54 | LAST 1396 | 07,3060 | 4 1320 0 | | CS | IMODES30 |
| 0255 | REP | 41 | LAST 1395 | 07,3061 | 7 4701 1 | | MASK | BIT10 |
| 0256 | REP | 55 | LAST 1396 | 07,3062 | 27=320 0 | | ADS | IMODES30 |
| 0257 | REP | 37 | LAST 1395 | 07,3063 | 4 1321 1 | | CS | IMODES33 |
| 0258 | REP | 48 | LAST 1396 | 07,3064 | 7 4676 0 | | MASK | BIT13 |
| 0259 | REP | 38 | LAST 1396 | 07,3065 | 27=321 1 | | ADS | IMODES33 |
| 0260 | REP | 43 | LAST 1394 | 07,3066 | 4 4708 0 | | CS | BITS |
| 0261 | REP | 1 | | 07,3067 | 1 3051 1 | | TCP | PPAILQK2 |
| 0262 | REP | 2 | LAST 1394 | 07,3070 | 4 3011 0 | NOATTOPF | CS | OCT40010 |
| 0263 | REP | 44 | LAST 1394 | 07,3071 | 7 1036 1 | | MASK | DSPTAR +11D |
| 0264 | REP | 52 | LAST 1394 | 07,3072 | 6 4674 0 | | AD | BIT15 |
| 0265 | REP | 45 | LAST 1396 | 07,3073 | 55=036 1 | | TS | DSPTAR +11D |
| 0266 | REP | 322 | LAST 1394 | 07,3074 | 0 0002 0 | | TC | 0 |

ENABLE IMU FAIL UNLESS IMU BEING CAGED.
IT IS.

DONT RESET IMU FAIL INHIBIT IF SOMEONE
HAS GONE INTO COARSE ALIGN.

RESET IMU FAIL.

THE ISS WARNING LIGHT MAY COME ON NOW
THAT THE INHIBIT HAS BEEN REMOVED.

ENABLE PIP FAIL PROC ALARM.

RESET IMU AND PIPA FAIL BITS.

SUBROUTINE TO TURN OFF NO ATT LAMP.

L IMU MODE SWITCHING ROUTINES

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P0267 ROUTINES TO INITIATE AND TERMINATE PROGRAM USE OF THE PIPAS. NO INUSTALL REQUIRED IN EITHER CASE.

| | | | | | | | | | | |
|-------|-----|-----|------|------|---------|----------|---------|--------|----------|---|
| 0272 | REP | 257 | LAST | 1394 | 07,3075 | 4 4714 0 | PIPUSE | CS | ZERO | |
| 0273 | REP | 12 | LAST | 788 | 07,3076 | 54 037 1 | | TS | PIPAX | |
| 0274 | REP | 3 | LAST | 430 | 07,3077 | 54 040 1 | | TS | PIPAY | |
| 0275 | REP | 6 | LAST | 788 | 07,3100 | 54 041 0 | | TS | PIPAZ | |
| 02752 | REP | 3 | LAST | 1396 | 07,3081 | 8 3450 0 | PIPUSE1 | TC | CAGSTSTO | DO NOT ENABLE PIPA FAIL IF IMU IS CAGED |
| 02754 | REP | 6 | LAST | 1390 | 07,3082 | 1 4570 0 | | TCP | SWRSTURN | |
| 02758 | | | | | 07,3111 | 0 0004 0 | | INHINT | | |
| 0276 | REP | 78 | LAST | 1363 | 07,3112 | 4 4712 0 | | CS | BIT1 | IF PIPA FAILS FROM NOW ON (UNTIL PIPPRE2), LIGHT ISS WARNING. |
| 0277 | REP | 58 | LAST | 1396 | 07,3113 | 4 1320 0 | | MASK | IMODES30 | |
| 0278 | REP | 57 | LAST | 1397 | 07,3114 | 7 4712 0 | | TS | IMODES30 | |
| 0279 | REP | 41 | LAST | 1396 | 07,3107 | 0 4633 0 | PIPPRE2 | TC | IRKCALL | ISS WARNING MIGHT COME ON NOW. |
| 0280 | REP | 7 | LAST | 1396 | 07,3110 | 14665 1 | | CADR | SETISSW | (OR GO OFF ON PIPPRE2). |
| 0281 | REP | 4 | LAST | 1395 | 07,3111 | 1 2557 0 | | TCP | MODEEXIT | |
| 0282 | | | | | 07,3112 | 0 0004 0 | PIPPRE2 | INHINT | | PROGRAM DONE WITH PIPAS. DONT LIGHT ISS WARNING. |
| 0283 | REP | 58 | LAST | 1397 | 07,3113 | 4 1320 0 | | CS | IMODES30 | |
| 0284 | REP | 79 | LAST | 1397 | 07,3114 | 7 4712 0 | | MASK | BIT1 | |
| 0285 | REP | 59 | LAST | 1397 | 07,3115 | 27-320 0 | | ADS | IMODES30 | |
| 0286 | REP | 42 | LAST | 1396 | 07,3116 | 7 4701 1 | | MASK | BIT10 | IF PIP FAIL ON, DO PROG ALSRM AND RESET ISS WARNING. |
| 0287 | REP | 377 | LAST | 1396 | 07,3117 | 10 000 0 | | CCS | A | |
| 0288 | REP | 5 | LAST | 1397 | 07,3120 | 1 2557 0 | | TCP | MODEEXIT | |
| 0289 | REP | 48 | LAST | 1393 | 07,3121 | 0 5537 0 | | TC | ALARM | |
| 0290 | | | | | 07,3122 | 00212 0 | | OCT | 212 | |
| 0291 | | | | | 07,3123 | 0 0004 0 | | INHINT | | |
| 0292 | REP | 1 | | | 07,3124 | 1 3107 0 | | TCP | PIPPRE2 | |

L IMU MODE SWITCHING ROUTINES

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P0293 THE FOLLOWING ROUTINE TORQUES THE IRIGS ACCORDING TO DOUBLE PRECISION INPUTS IN THE SIX REGISTERS
 R0295 BEGINNING AT THE BCADR ARRIVING IN A. THE MINIMUM SIZE OF ANY PULSE TRAIN IS 16 PULSES (.25 CDU COUNTS). THE
 R0297 UNSENT PORTION OF THE COMMAND IS LEFT INTACT IN THE INPUT COMMAND REGISTERS.

| LINE | REG | LAST | ADDR | DATA | OP | REG | DATA | COMMENT |
|------|----------|-----------|---------|----------|---------|-------------|---------|---|
| 0299 | | | E3,1400 | | | EBANK= 1400 | | VARIABLE, ACTUALLY. |
| 0300 | RESP 673 | LAST 1387 | 07,3125 | 54 161 0 | IMPULSE | TS | MPAC +5 | SAVE ARRIVING BCADR. |
| 0301 | RESP 5 | LAST 1395 | 07,3128 | 0 3455 0 | TC | CAGETSTJ | | DONT PROCEED IF IMU BEING CAGED. |
| 0302 | RESP 3 | LAST 437 | 07,3127 | 11=304 0 | CCS | LOYRO | | SEE IF GYROS BUSY. |
| 0303 | RESP 1 | | 07,3130 | 0 3171 0 | TC | GYROBUSY | | SLEEP. |
| 0304 | RESP 674 | LAST 1398 | 07,3131 | 54 156 1 | TS | MPAC +2 | | |
| 0305 | RESP 51 | LAST 1395 | 07,3132 | 3 4705 1 | CAP | BITS | | ENABLE THE POWER SUPPLY. |
| 0306 | | | 07,3133 | 0 0006 1 | EXTEND | | | |
| 0307 | RESP 14 | LAST 1394 | 07,3134 | 05 014 1 | WOR | CHAN14 | | |
| 0308 | RESP 20 | LAST 1383 | 07,3135 | 3 4710 0 | CAP | FOUR | | |
| 0310 | RESP 57 | LAST 1395 | 07,3138 | 0 5140 1 | TC | WAITLIST | | (IF A JOB WAS PUT TO SLEEP, THE POWER |
| 0311 | RESP 21 | LAST 1395 | E3,1474 | | EBANK= | CDUIND | | SUPPLY IS LEFT ON BY THE WAKING JOB). |
| 0312 | RESP 1 | | 07,3137 | 03207 1 | BCADR | STRTOYRO | | |
| 0312 | RESP 1 | | 07,3140 | 16103 1 | | | | |
| 0313 | RESP 675 | LAST 1398 | 07,3141 | 3 0161 1 | CA | MPAC +5 | | SET UP EBANK; SAVING CALLER'S EBANK FOR |
| 0314 | RESP 58 | LAST 1387 | 07,3142 | 56 003 1 | XCH | EBANK | | RESTORATION ON RETURN. |
| 0315 | RESP 676 | LAST 1398 | 07,3143 | 56 161 1 | XCH | MPAC +5 | | |
| 0316 | RESP 4 | LAST 1398 | 07,3144 | 55=304 0 | TS | LOYRO | | RESERVES GYROS. |
| 0317 | RESP 14 | LAST 1384 | 07,3145 | 7 4373 0 | MASK | LOW8 | | |
| 0318 | RESP 21 | LAST 1393 | 07,3146 | 54 061 1 | TS | ITEMP1 | | |
| 0319 | RESP 73 | LAST 1392 | 07,3147 | 3 4711 1 | CAP | TWO | | FORCE SIGN AGREEMENT ON INPUTS. |
| 0320 | RESP 677 | LAST 1398 | 07,3150 | 54 157 0 | GYROGRS | TS | MPAC +3 | |
| 0321 | | | 07,3151 | 8 0000 1 | DOUBLE | | | |
| 0322 | RESP 22 | LAST 1398 | 07,3152 | 8 0061 0 | AD | ITEMP1 | | |
| 0323 | RESP 678 | LAST 1398 | 07,3153 | 54 160 1 | TS | MPAC +4 | | |
| 0324 | | | 07,3154 | 0 0006 1 | EXTEND | | | |
| 0325 | RESP 378 | LAST 1397 | 07,3155 | 5 0000 1 | INDEX | A | | |
| 0326 | | | 07,3156 | 3 1401 0 | DCA | 1400 | | |
| 0327 | RESP 679 | LAST 1398 | 07,3157 | 52 155 1 | DXCH | MPAC | | |
| 0328 | RESP 11 | LAST 1299 | 07,3160 | 0 7226 0 | TC | TPAGRES | | |
| 0329 | RESP 680 | LAST 1398 | 07,3161 | 52 155 1 | DXCH | MPAC | | |
| 0330 | RESP 681 | LAST 1398 | 07,3162 | 50 160 0 | INDEX | MPAC +4 | | |
| 0331 | | | 07,3163 | 53=401 1 | DXCH | 1400 | | |
| 0332 | RESP 682 | LAST 1398 | 07,3164 | 10 157 0 | CCS | MPAC +3 | | |
| 0333 | RESP 1 | | 07,3165 | 1 3150 1 | TCF | GYROGRS | | |
| 0334 | RESP 683 | LAST 1398 | 07,3166 | 3 0161 1 | CA | MPAC +5 | | RESTORE CALLER'S EBANK. |
| 0335 | RESP 59 | LAST 1398 | 07,3167 | 54 003 0 | TS | EBANK | | |
| 0336 | RESP 6 | LAST 1397 | 07,3170 | 1 2557 0 | TCF | MODEEXIT | | |



L IMU MODE SWITCHING ROUTINES

P0337 ROUTINES TO ALLOW TORQUING BY ONLY ONE JOB AT A TIME.

| | | | | | | | | | |
|------|-----|-----|-----------|---------|--------|----------|----------|----------|---------|
| 0338 | | | 07,3171 | 0 0008 | 1 | GYROBUSY | EXTEND | | |
| 0339 | REP | 20 | LAST 1160 | 07,3172 | 3 0134 | 1 | DCA | BUF2 | |
| 0340 | REP | 684 | LAST 1398 | 07,3173 | 52 155 | 1 | DXCH | MPAC | |
| 0341 | REP | 1 | | 07,3174 | 3 3208 | 0 | REGSLEEP | CAP | LOWAKE |
| 0342 | REP | 5 | LAST 1294 | 07,3175 | 1 5070 | 1 | TCP | JOBSLEEP | |
| 0343 | REP | 5 | LAST 1398 | 07,3176 | 11=304 | 0 | OWAKE | CCS | LOYRO |
| 0344 | REP | 1 | | 07,3177 | 1 3174 | 1 | TCP | REGSLEEP | |
| 0345 | REP | 685 | LAST 1399 | 07,3200 | 54 156 | 1 | | TS | MPAC +2 |
| 0346 | | | | 07,3201 | 0 0008 | 1 | | EXTEND | |
| 0347 | REP | 686 | LAST 1399 | 07,3202 | 3 0155 | 0 | | DCA | MPAC |
| 0348 | REP | 21 | LAST 1399 | 07,3203 | 52 134 | 0 | | DXCH | BUF2 |
| 0349 | REP | 160 | LAST 1364 | 07,3204 | 3 4712 | 1 | | CAP | ONE |
| 0350 | REP | 1 | | 07,3205 | 1 3136 | 1 | | TCP | OWAKE2 |
| 0351 | REP | 1 | | 07,3206 | 17176 | 1 | LOWAKE | CADR | OWAKE |

SAVE RETURN 2PCADR.

WHEN AWAKENED, SEE IF GYROS STILL BUSY.
IF SO, SLEEP SOME MORE.

RESTORE SWRETURN INFO.



L INU MODE SWITCHING ROUTINES

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P0352 GYRO-TORQUING WAITLIST TASKS.

| | | | | | | | | | | |
|------|-----|-----|-----------|---------|--------|---|----------|--------|------------|--------------------------------------|
| 0353 | REP | 1 | | 07,3207 | 4 3430 | 1 | STRTOYRO | CS | GDESELECT | DE-SELECT LAST GYRO. |
| 0354 | | | | 07,3210 | 0 0006 | 1 | | EXTEND | | |
| 0355 | REP | 15 | LAST 1398 | 07,3211 | 03 014 | 1 | | WAND | CHAN14 | |
| 0356 | REP | 6 | LAST 1395 | 07,3212 | 0 3443 | 1 | | TC | CAGETEST | |
| 0357 | REP | 6 | LAST 1399 | 07,3213 | 3 1304 | 1 | STRTOYR2 | CA | LOYRO | JUMP ON PHASE COUNTER IN BITS 13-14. |
| 0358 | | | | 07,3214 | 0 0006 | 1 | | EXTEND | | |
| 0359 | REP | 46 | LAST 1396 | 07,3215 | 7 4707 | 1 | | MP | BIT4 | |
| 0360 | REP | 379 | LAST 1398 | 07,3216 | 50 000 | 1 | | INDEX | A | |
| 0361 | | | | 07,3217 | 1 3220 | 0 | | TCP | +1 | |
| 0362 | REP | 1 | | 07,3220 | 0 3235 | 0 | | TC | GSELECT | =0. DO Y GYRO. |
| 0363 | | | | 07,3221 | 00202 | 1 | | OCT | 00202 | |
| 0364 | REP | 2 | LAST 1400 | 07,3222 | 0 3235 | 0 | | TC | GSELECT | =1. DO Z GYRO. |
| 0365 | | | | 07,3223 | 00302 | 0 | | OCT | 00302 | |
| 0366 | REP | 3 | LAST 1400 | 07,3224 | 0 3233 | 0 | | TC | GSELECT -2 | =2. DO X GYRO. |
| 0367 | | | | 07,3225 | 00100 | 0 | | OCT | 00100 | |
| 0368 | REP | 258 | LAST 1397 | 07,3226 | 3 4714 | 1 | | CAP | ZERO | =3. DONE |
| 0369 | REP | 7 | LAST 1400 | 07,3227 | 55=304 | 0 | | TS | LOYRO | |
| 0370 | REP | 2 | LAST 1399 | 07,3230 | 3 3206 | 0 | | CAP | LOWAKE | WAKE A POSSIBLE SLEEPING JOB. |
| 0371 | REP | 6 | LAST 1294 | 07,3231 | 0 5074 | 1 | | TC | JOWAKE | |
| 0372 | REP | 2 | LAST 1395 | 07,3232 | 1 3034 | 1 | NORESET | TCP | IMPINED | DO NOT RESET POWRR SUPPLY |

L IMU MODE SWITCHING ROUTINES

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| | | | | | | | | |
|------|-----|-----|-----------|---------|----------|----|---------|----------|
| 0373 | REP | 21 | LAST 1398 | 07,3233 | 4 4718 1 | -2 | CS | FOUR |
| 0374 | REP | 8 | LAST 1400 | 07,3234 | 27-304 0 | | ADS | LOYRO |
| 0375 | REP | 323 | LAST 1398 | 07,3235 | 50 002 0 | | GSELECT | INDEX 0 |
| 0376 | | | | 07,3236 | 3 0000 1 | | CAP | 0 |
| 0377 | REP | 4 | LAST 1379 | 07,3237 | 54 084 1 | | TS | ITEMP4 |
| 0378 | REP | 20 | LAST 1371 | 07,3240 | 7 4718 1 | | MASK | SEVEN |
| 0379 | REP | 49 | LAST 1398 | 07,3241 | 6 4676 1 | | AD | BIT13 |
| 0380 | REP | 9 | LAST 1401 | 07,3242 | 27-304 0 | | ADS | LOYRO |
| 0381 | REP | 60 | LAST 1398 | 07,3243 | 54 003 0 | | TS | EBANK |
| 0382 | REP | 15 | LAST 1398 | 07,3244 | 7 4373 0 | | MASK | LOW8 |
| 0383 | REP | 23 | LAST 1398 | 07,3245 | 54 081 1 | | TS | ITEMP1 |
| 0384 | REP | 21 | LAST 1401 | 07,3246 | 4 4718 1 | | CS | SEVEN |
| 0385 | REP | 5 | LAST 1401 | 07,3247 | 7 0064 1 | | MASK | ITEMP4 |
| 0386 | REP | 6 | LAST 1401 | 07,3250 | 54 084 1 | | TS | ITEMP4 |
| 0387 | | | | 07,3251 | 0 0006 1 | | EXTEND | |
| 0388 | REP | 24 | LAST 1401 | 07,3252 | 5 0081 0 | | INDEX | ITEMP1 |
| 0389 | | | | 07,3253 | 3 1401 0 | | DCA | 1400 |
| 0390 | REP | 28 | LAST 1379 | 07,3254 | 52 071 0 | | DACH | RUPTRG1 |
| 0391 | REP | 29 | LAST 1401 | 07,3255 | 10 070 1 | | CCS | RUPTRG1 |
| 0392 | REP | 1 | | 07,3256 | 1 3271 1 | | TCP | MAJ+ |
| 0393 | | | | 07,3257 | 1 3281 0 | | TCP | +2 |
| 0394 | REP | 1 | | 07,3260 | 1 3411 1 | | TCP | MAJ- |
| 0395 | REP | 7 | LAST 1379 | 07,3261 | 10 071 0 | | CCS | RUPTRG2 |
| 0396 | REP | 1 | | 07,3262 | 1 3286 1 | | TCP | MIN+ |
| 0397 | REP | 1 | | 07,3263 | 1 3213 0 | | TCP | STRIGYR2 |
| 0398 | REP | 1 | | 07,3264 | 1 3406 1 | | TCP | MIN- |
| 0399 | REP | 2 | LAST 1401 | 07,3265 | 1 3213 0 | | TCP | STRIGYR2 |

SPECIAL ENTRY TO REGRESS LOYRO FOR X.

SELECT GYRO.
PACKED WORD CONTAINS GYRO SELECT BITS
AND INCREMENT TO LOYRO.

MOVE DP COMMAND TO RUPTRG3 FOR TESTING.



L IMU MODE SWITCHING ROUTINES

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| | | | | | | | | | |
|------|-----|-----|-----------|---------|--------|---|----------|--------|----------|
| 0400 | REP | 1 | | 07,3266 | 6 3322 | 1 | MIN. | AD | -GYROMIN |
| 0401 | | | | 07,3267 | 0 0006 | 1 | | EXTEND | |
| 0402 | REP | 3 | LAST 1401 | 07,3270 | 6 3213 | 1 | | BZMP | STRTOYR2 |
| 0403 | | | | 07,3271 | 0 0006 | 1 | MAJ. | EXTEND | |
| 0404 | REP | 1 | | 07,3272 | 3 3432 | 1 | | DCA | GYROFRAC |
| 0405 | REP | 30 | LAST 1401 | 07,3273 | 20 071 | 0 | | DAS | RUPTREG1 |
| 0406 | REP | 7 | LAST 1401 | 07,3274 | 3 0064 | 0 | | CA | ITEMP4 |
| 0407 | | | | 07,3275 | 0 0006 | 1 | | EXTEND | |
| 0408 | REP | 16 | LAST 1400 | 07,3276 | 05 014 | 1 | | WOR | CHAN14 |
| 0409 | REP | 10 | LAST 1387 | 07,3277 | 3 6043 | 0 | | CAP | LOW7 |
| 0410 | REP | 6 | LAST 1401 | 07,3300 | 7 0071 | 0 | | MASK | RUPTREG2 |
| 0411 | REP | 9 | LAST 1402 | 07,3301 | 56 071 | 1 | | XCH | RUPTREG2 |
| 0412 | | | | 07,3302 | 0 0006 | 1 | QMERGE | EXTEND | |
| 0413 | REP | 30 | LAST 1378 | 07,3303 | 7 4703 | 0 | | MP | BIT8 |
| 0414 | REP | 17 | LAST 1379 | 07,3304 | 54 062 | 1 | | TS | ITEMP2 |
| 0415 | REP | 31 | LAST 1402 | 07,3305 | 3 0070 | 0 | | CA | RUPTREG1 |
| 0416 | | | | 07,3306 | 0 0006 | 1 | | EXTEND | |
| 0417 | REP | 35 | LAST 1389 | 07,3307 | 7 4702 | 1 | | MP | BIT9 |
| 0418 | REP | 32 | LAST 1402 | 07,3310 | 54 070 | 1 | | TS | RUPTREG1 |
| 0419 | REP | 225 | LAST 1391 | 07,3311 | 3 0001 | 0 | | CA | L |
| 0420 | | | | 07,3312 | 0 0006 | 1 | | EXTEND | |
| 0421 | REP | 76 | LAST 1363 | 07,3313 | 7 4675 | 0 | | MP | BIT14 |
| 0422 | REP | 18 | LAST 1402 | 07,3314 | 26 062 | 1 | | ADS | ITEMP2 |
| 0423 | | | | 07,3315 | 0 0006 | 1 | | EXTEND | |
| 0424 | REP | 33 | LAST 1402 | 07,3316 | 3 0071 | 1 | | DCA | RUPTREG1 |
| 0425 | REP | 1 | | 07,3317 | 6 7716 | 0 | | AD | MINUS1 |
| 0426 | REP | 380 | LAST 1400 | 07,3320 | 10 000 | 0 | | CCS | A |
| 0427 | REP | 1 | | 07,3321 | 1 3345 | 1 | | TCP | LANGYRO |
| 0428 | | | | 07,3322 | 77601 | 0 | -GYROMIN | OCT | -176 |
| 0429 | | | | 07,3323 | 1 3327 | 0 | | TCP | +4 |
| 0430 | REP | 77 | LAST 1402 | 07,3324 | 3 4675 | 1 | | CAP | BIT14 |
| 0431 | REP | 19 | LAST 1402 | 07,3325 | 26 062 | 1 | | ADS | ITEMP2 |
| 0432 | REP | 259 | LAST 1400 | 07,3326 | 3 4714 | 1 | | CAP | ZERO |
| 0433 | REP | 25 | LAST 1401 | 07,3327 | 50 061 | 0 | +4 | INDEX | ITEMP1 |
| 0434 | | | | 07,3330 | 53=401 | 1 | | DxCH | 1400 |

SMALL POSITIVE COMMAND. SEE IF AT LEAST 16 GYRO PULSES.

DEFINITE POSITIVE OUTPUT.

SELECT POSITIVE TORQUING FOR THIS GYRO.

LEAVE NUMBER OF POSSIBLE 8192 AUGMENTS TO INITIAL COMMAND IN MAJOR PART OF LONG TERM STORAGE AND TRUNCATED FRACTION IN MINOR PART. THE MAJOR PART WILL BE COUNTED DOWN TO ZERO IN THE COURSE OF PUTTING OUT THE ENTIRE COMMAND.

INITIAL COMMAND.

SEE IF MORE THAN ONE PULSE TRAIN NEEDED (MORE THAN 16383 PULSES).

MAY BE ADJUSTED TO SPECIFY MINIMUM CMD

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| | | | | | | | | |
|-------|-----|-----|-----------|---------|----------|----------|--------|------------|
| 0435 | REP | 20 | LAST 1402 | 07,3331 | 3 0082 0 | | CA | ITEMP2 |
| 0436 | REP | 3 | LAST 1394 | 07,3332 | 54 047 0 | LASTSR0 | TS | GYROCMD |
| 0437 | | | | 07,3333 | 0 0006 1 | | EXTEND | |
| 0438 | REP | 43 | LAST 1397 | 07,3334 | 7 4701 1 | | MP | BIT10 |
| 0439 | REP | 47 | LAST 1387 | 07,3335 | 8 6214 0 | | AD | THRES |
| 0440 | REP | 58 | LAST 1398 | 07,3336 | 0 5140 1 | | TC | WAITLIST |
| 0441 | REP | 22 | LAST 1398 | E3,1474 | | | BRANK= | CDUIND |
| 0442 | REP | 2 | LAST 1398 | 07,3337 | 03207 1 | | ZCADR | STRTOYRO |
| 0442 | | | | 07,3340 | 16103 1 | | | |
| 0448 | REP | 44 | LAST 1403 | 07,3341 | 3 4701 0 | GYROEXIT | CAP | BIT10 |
| 0449 | | | | 07,3342 | 0 0006 1 | | EXTEND | |
| 0450 | REP | 17 | LAST 1402 | 07,3343 | 05 014 1 | | WOR | CHAN14 |
| 0451 | REP | 70 | LAST 1398 | 07,3344 | 1 5213 0 | | TCF | TASKOVER |
| 0452 | REP | 28 | LAST 1402 | 07,3345 | 50 061 0 | LONGDYRO | INDEX | ITEMP1 |
| 0453 | | | | 07,3348 | 53=401 1 | | DYCH | 1400 |
| 0454 | REP | 78 | LAST 1402 | 07,3347 | 3 4675 1 | | CAP | BIT14 |
| 0455 | REP | 21 | LAST 1403 | 07,3350 | 8 0082 0 | | AD | ITEMP2 |
| 0456 | REP | 4 | LAST 1403 | 07,3351 | 54 047 0 | | TS | GYROCMD |
| 0457 | | | | 07,3352 | 0 0006 1 | AUG3 | EXTEND | |
| 0458 | REP | 45 | LAST 1403 | 07,3353 | 7 4701 1 | | MP | BIT10 |
| 0459 | REP | 4 | LAST 1384 | 07,3354 | 6 7714 1 | | AD | NEG3 |
| 0460 | REP | 59 | LAST 1403 | 07,3355 | 0 5140 1 | | TC | WAITLIST |
| 0461 | REP | 23 | LAST 1403 | E3,1474 | | | BRANK= | CDUIND |
| 0462 | REP | 1 | | 07,3356 | 03361 0 | | ZCADR | 8192AUG |
| 0462 | REP | 1 | | 07,3357 | 16103 1 | | | |
| 0463 | REP | 1 | | 07,3360 | 1 3341 0 | | TCF | GYROEXIT |
| 0464 | REP | 7 | LAST 1400 | 07,3361 | 0 3443 1 | 8192AUG | TC | CACETEST |
| 04641 | REP | 47 | LAST 1400 | 07,3362 | 3 4707 0 | | CAP | BIT4 |
| 04642 | | | | 07,3363 | 0 0006 1 | | EXTEND | |
| 04643 | REP | 47 | LAST 1398 | 07,3364 | 02 012 0 | | RAND | CHAN12 |
| 04644 | REP | 361 | LAST 1402 | 07,3365 | 10 000 0 | | CCS | A |
| 04645 | REP | 3 | LAST 1393 | 07,3366 | 1 3441 1 | | TCF | IMURAD |
| 0465 | REP | 10 | LAST 1401 | 07,3367 | 3 1304 1 | | CA | LOYRO |
| 0466 | REP | 61 | LAST 1401 | 07,3370 | 54 003 0 | | TS | BRANK |
| 0467 | REP | 16 | LAST 1401 | 07,3371 | 7 4373 0 | | MASK | LOW8 |
| 0468 | REP | 27 | LAST 1403 | 07,3372 | 54 061 1 | | TS | ITEMP1 |
| 0469 | REP | 28 | LAST 1403 | 07,3373 | 50 061 0 | | INDEX | ITEMP1 |
| 0470 | | | | 07,3374 | 11=400 0 | | CCS | 1400 |
| 0471 | REP | 1 | | 07,3375 | 1 3401 0 | | TCF | AUG2 |
| 0472 | REP | 78 | LAST 1403 | 07,3376 | 3 4675 1 | | CAP | BIT14 |
| 0473 | REP | 5 | LAST 1403 | 07,3377 | 26 047 0 | | ADS | GYROCMD |
| 0474 | REP | 1 | | 07,3400 | 1 3333 0 | | TCF | LASTSR0 +1 |

ENTIRE COMMAND.

WAITLIST DT TRUNCATION AND PHASE UNCERTAINTIES.

INITIAL COMMAND OUT PLUS N AUGMENTS OF 8192. INITIAL COMMAND IS AT LEAST 8192.

GET WAITLIST DT TO TIME WHEN TRAIN IS ALMOST OUT.

ADD 8192 PULSES TO GYROCMD

SEE IF THIS IS THE LAST AUG.

MORE TO COMP.



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| | | | | | | | | |
|------|-----|----|-----------|---------|----------|------|-------|---------|
| 0475 | REF | 29 | LAST 1403 | 07,3401 | 50 061 0 | AUG2 | INDEX | ITEMP1 |
| 0476 | | | | 07,3402 | 55-400 0 | | TS | 1400 |
| 0477 | REF | 80 | LAST 1403 | 07,3403 | 3 4675 1 | | CAP | BIT14 |
| 0478 | REF | 6 | LAST 1403 | 07,3404 | 26 047 0 | | ADS | GYROCMD |
| 0479 | REF | 1 | | 07,3405 | 1 3352 1 | | TCP | AUG3 |

COMPUTS DT.

L INU MODE SWITCHING ROUTINES

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| | | | | | | | | | |
|------|-----|----|-----------|---------|----------|-----------|--------|------------|---|
| 0480 | REP | 2 | LAST 1402 | 07,3406 | 6 3322 1 | MIN- | AD | -GYROMIN | POSSIBLE NEGATIVE OUTPUT. |
| 0481 | | | | 07,3407 | 0 0006 1 | | EXTEND | | |
| 0482 | REP | 4 | LAST 1402 | 07,3410 | 6 3213 1 | | BZP | STRTOYR2 | |
| 0483 | | | | 07,3411 | 0 0006 1 | MAJ- | EXTEND | | DEFINITE NEGATIVE OUTPUT. |
| 0484 | REP | 2 | LAST 1402 | 07,3412 | 4 3432 0 | | DCS | GYROFRAC | |
| 0485 | REP | 34 | LAST 1402 | 07,3413 | 20 071 0 | | DAS | RUPTREG1 | |
| 0486 | REP | 8 | LAST 1402 | 07,3414 | 3 0084 0 | | CA | ITMP4 | SELECT NEGATIVE TORQUING FOR THIS GYRO. |
| 0487 | REP | 38 | LAST 1402 | 07,3415 | 6 4702 0 | | AD | BIT9 | |
| 0488 | | | | 07,3416 | 0 0006 1 | | EXTEND | | |
| 0489 | REP | 18 | LAST 1403 | 07,3417 | 05 014 1 | | WOR | CHAN14 | |
| 0490 | REP | 35 | LAST 1405 | 07,3420 | 4 0070 1 | | CS | RUPTREG1 | SET UP RUPTREGS TO FALL INTO GMERCE. |
| 0491 | REP | 36 | LAST 1405 | 07,3421 | 54 070 1 | | TS | RUPTREG1 | ALL NUMBERS PUT INTO GYROCMD ARE |
| 0492 | REP | 19 | LAST 1402 | 07,3422 | 4 0071 0 | | CS | RUPTREG2 | POSITIVE - BIT9 OF CHAN 14 DETERMINES |
| 0493 | REP | 11 | LAST 1402 | 07,3423 | 7 6043 1 | | MASK | LOW | THE SIGN OF THE COMMAND. |
| 0494 | | | | 07,3424 | 4 0000 0 | | COM | | |
| 0495 | REP | 11 | LAST 1405 | 07,3425 | 56 071 1 | | XCH | RUPTREG2 | |
| 0496 | | | | 07,3426 | 4 0000 0 | | COM | | |
| 0497 | REP | 1 | | 07,3427 | 1 3302 1 | | TCP | GMERCE | |
| 0498 | | | | 07,3430 | 01700 1 | GDESELECT | OCT | 1700 | TURN OFF SELECT AND ACTIVITY BITS. |
| 0499 | | | | 07,3431 | 00000 1 | GYROFRAC | ZDEC | .215 B -21 | |
| 0499 | | | | 07,3432 | 00034 0 | | | | |



L IMU MODE SWITCHING ROUTINES

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P0500 IMU MODE SWITCHING ROUTINES COME HERE WHEN ACTION COMPLETE.

| | | | | | | | | | | |
|------|-----|-----|-----------|----------|----------|----------|----------|----------|--|--|
| 0501 | | | 07,3433 | 0 0006 1 | ENDIMU | EXTEND | | | | |
| 0502 | REP | 33 | LAST 1190 | 07,3434 | 00 011 1 | READ | DSALMOUT | | | MODE IS BAD IF CAGE HAS OCCURED OR IF |
| 0503 | REP | 80 | LAST 1397 | 07,3435 | 7 4712 0 | MARK | BIT1 | | | ISS WARNING IS ON. |
| 0504 | REP | 382 | LAST 1403 | 07,3436 | 10 000 0 | CCS | A | | | |
| 0505 | REP | 4 | LAST 1403 | 07,3437 | 1 3441 1 | TCP | IMUBAD | | | |
| | | | | | | | | | | |
| 0506 | REP | 3 | LAST 578 | 07,3440 | 1 3467 0 | IMJGOOD | TCP | GOODEND | | WITH C(A) = 0. |
| 0507 | REP | 260 | LAST 1402 | 07,3441 | 3 4714 1 | IMUBAD | CAP | ZERO | | |
| 0508 | REP | 2 | LAST 578 | 07,3442 | 1 3464 0 | TCP | RADEND | | | |
| | | | | | | | | | | |
| 0509 | REP | 52 | LAST 1398 | 07,3443 | 3 4705 1 | CAGETEST | CAP | BIT6 | | SUBROUTINE TO TERMINATE IMU MODE |
| 0510 | REP | 80 | LAST 1397 | 07,3444 | 7 1320 0 | | MARK | IMODES30 | | SWITCH IF IMU HAS BEEN CAGED. |
| 0511 | REP | 383 | LAST 1406 | 07,3445 | 10 000 0 | | CCS | A | | |
| 0512 | REP | 5 | LAST 1406 | 07,3446 | 1 3441 1 | | TCP | IMUBAD | | DIRECTLY. |
| 0513 | REP | 324 | LAST 1401 | 07,3447 | 0 0002 0 | | TC | 0 | | WITH C(A) = +0. |
| | | | | | | | | | | |
| 0514 | REP | 61 | LAST 1406 | 07,3450 | 4 1320 0 | CAGETSTO | CS | IMODES30 | | SKIP IF IMU NOT BEING CAGED. |
| 0515 | REP | 53 | LAST 1406 | 07,3451 | 7 4705 0 | | MARK | BIT6 | | |
| 0516 | REP | 384 | LAST 1406 | 07,3452 | 10 000 0 | | CCS | A | | |
| 0517 | REP | 325 | LAST 1406 | 07,3453 | 24 002 0 | | INCR | 0 | | |
| 0518 | REP | 326 | LAST 1406 | 07,3454 | 0 0002 0 | | TC | 0 | | |
| | | | | | | | | | | |
| 0519 | REP | 62 | LAST 1406 | 07,3455 | 4 1320 0 | CAGETSTJ | CS | IMODES30 | | IF DURING MODE SWITCH INITIALIZATION |
| 0520 | REP | 54 | LAST 1406 | 07,3456 | 7 4705 0 | | MARK | BIT6 | | IT IS FOUND THAT THE IMU IS BEING CAGED, |
| 0521 | REP | 385 | LAST 1406 | 07,3457 | 10 000 0 | | CCS | A | | SET IMUCADR TO -0 TO INDICATE OPERATION |
| 0522 | REP | 327 | LAST 1406 | 07,3460 | 0 0002 0 | | TC | 0 | | COMPLETE BUT FAILED. RETURN IMMEDIATELY |
| | | | | | | | | | | |
| 0523 | REP | 261 | LAST 1406 | 07,3461 | 4 4714 0 | | CS | ZERO | | TO SWRETURN. |
| 0524 | REP | 3 | LAST 1195 | 07,3462 | 55-322 1 | | TS | IMUCADR | | |
| 0525 | REP | 7 | LAST 1398 | 07,3463 | 1 2557 0 | | TCP | MODEEXIT | | |

L IMU MODE SWITCHING ROUTINES

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0528 GENERALIZED MODE SWITCHING TERMINATION. ENTER AT GOODEND FOR SUCCESSFUL COMPLETION OF AN I/O OPERATION
 0528 OR AT BADEND FOR A N UNSUCCESSFUL ONE. C(A) OR ARRIVAL =0 FOR IMU, 1 FOR OPTICS.

| | | | | | | | | | | | | |
|------|-----|-----|------|------|---------|----|------|---|---------|-------|------------|---|
| 0530 | REP | 12 | LAST | 1405 | 07,3464 | 54 | 071 | 0 | BADEND | TS | RUPTRG2 | DEVICE INDEX. |
| 0531 | REP | 262 | LAST | 1406 | 07,3465 | 4 | 4714 | 0 | | CS | ZERO | FOR FAILURE. |
| 0532 | REP | 4 | LAST | 1406 | 07,3466 | 1 | 3471 | 1 | | TCP | GOODEND +2 | |
| 0533 | REP | 13 | LAST | 1407 | 07,3467 | 54 | 071 | 0 | GOODEND | TS | RUPTRG2 | |
| 0534 | REP | 101 | LAST | 1399 | 07,3470 | 4 | 4712 | 0 | | CS | ONE | FOR SUCCESS. |
| 0535 | REP | 6 | LAST | 1379 | 07,3471 | 54 | 072 | 0 | | TS | RUPTRG3 | |
| 0536 | REP | 14 | LAST | 1407 | 07,3472 | 50 | 071 | 1 | | INDEX | RUPTRG2 | SEE IF USING PROGRAM ASLEEP. |
| 0537 | REP | 5 | LAST | 237 | 07,3473 | 11 | 322 | 1 | | CCS | MODECADR | |
| 0538 | REP | | | | 07,3474 | 1 | 3478 | 0 | | TCP | +2 | YES - WAKE IT UP. |
| 0539 | REP | 1 | | | 07,3475 | 1 | 3506 | 0 | | TCP | ENDMODE | IF 0, PROGRAM NOT IN YET. |
| 0540 | REP | 263 | LAST | 1407 | 07,3476 | 3 | 4714 | 1 | | CAF | ZERO | WAKE SLEEPING PROGRAM. |
| 0541 | REP | 15 | LAST | 1407 | 07,3477 | 50 | 071 | 1 | | INDEX | RUPTRG2 | |
| 0542 | REP | 6 | LAST | 1407 | 07,3500 | 57 | 322 | 0 | | XCH | MODECADR | |
| 0543 | REP | 7 | LAST | 1400 | 07,3501 | 0 | 5074 | 1 | | TC | JOBWAKE | |
| 0544 | REP | 7 | LAST | 1407 | 07,3502 | 4 | 0072 | 0 | | CS | RUPTRG3 | ADVANCE LOC IF SUCCESSFUL. |
| 0545 | REP | 23 | LAST | 1294 | 07,3503 | 50 | 064 | 0 | | INDEX | LOCCTR | |
| 0546 | REP | 41 | LAST | 1190 | 07,3504 | 26 | 164 | 0 | | ADS | LOC | |
| 0547 | REP | 71 | LAST | 1403 | 07,3505 | 1 | 5213 | 0 | | TCP | TASKOVER | |
| 0548 | REP | 8 | LAST | 1407 | 07,3506 | 3 | 0072 | 1 | ENDMODE | CA | RUPTRG3 | -0 INDICATES OPERATION COMPLETE BUT |
| 0549 | REP | 16 | LAST | 1407 | 07,3507 | 50 | 071 | 1 | | INDEX | RUPTRG2 | UNSUCCESSFUL. -1 INDICATES COMPLETE AND |
| 0550 | REP | 7 | LAST | 1407 | 07,3510 | 55 | 322 | 1 | | TS | MODECADR | SUCCESSFUL. |
| 0551 | REP | 72 | LAST | 1407 | 07,3511 | 1 | 5213 | 0 | | TCP | TASKOVER | |



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R0552 GENERAL STALLING ROUTINE. USING PROGRAMS COME HERE TO WAIT FOR I/O COMPLETION.

R0554 PROGRAM DESCRIPTION DATE- 21 FEB 1967
 R0555 LOG SECTION IMU MODE SWITCHING
 R0556 MOD BY- R.NELANSON TO ADD DOCUMENTATION ASSEMBLY SUNDISK REV. 82

R0557 FUNCTIONAL DESCRIPTION-
 R0558 TO DELAY FURTHER EXECUTION OF THE CALLING ROUTINE UNTIL ITS SELECTED
 R0559 I/O FUNCTION IS COMPLETE, THE FOLLOWING CHECKS ON THE CALLING ROUTINE'S
 R0560 MODECADR ARE MADE AND ACTED UPON.
 R0561 1) +0 INDICATES INCOMPLETE I/O OPERATION, CALLING ROUTINE IS PUT TO
 R0562 SLEEP.
 R0563 2) -1 INDICATES COMPLETED I/O OPERATION. STALL BYPASSES JOBSLEEP
 R0564 CALL AND RETURNS TO CALLING ROUTINE AT L+2
 R0565 3) -0 INDICATES COMPLETED I/O WITH FAILURE. STALL CLEARS MODECADR
 R0566 AND RETURNS TO CALLING ROUTINE AT L+2.
 R0567 4) VALUE GREATER THAN 0 INDICATES TWO ROUTINES CALLING FOR USE OF
 R0568 SAME DEVICE. STALL EXITS TO ABORT WHICH EXECUTES A PROGRAM
 R0569 RESTART WHICH IN TURN CLEARS ALL MODECADR REGISTERS.

R0570 CALLING SEQUENCE-
 R0571 L TC BANKCALL
 R0572 L+1 CADR (ONE OF 5 STALL ADDRESSES I.E. IMUSTALL, OPTSTALL, RADSTALL,
 R0573 AOTSTALL, OR ATTSTALL)

R0574 NORMAL-EXIT MODE-
 R0575 TCP JOBSLEEP OR TCP MODEEXIT

R0576 ALARM OR ABORT EXIT MODE-
 R0577 TC ABORT

R0578 OUTPUT-
 R0579 MODECADR=CADR IF JOBSLEEP
 R0580 MODECADR=+0 IF I/O COMPLETE
 R0581 BUF2=L+3 IF I/O COMPLETE AND GOOD.
 R0582 BUF2=L+2 IF I/O COMPLETE BUT FAILED.

R0583 ERASABLE INITIALIZATION-
 R0584 BUF2 CONTAINS RETURN ADDRESS PLUS 1, (L+2)
 R0585 BUF2+1 CONTAINS FRANK VALUE OF CALLING ROUTINE.
 R0586 MODECADR OF CALLING ROUTINE CONTAINS +0, -1, -0 OR CADR RETURN ADDRESS.

R0587 DEBRIS-
 R0588 RUPTRNO2 AND CALLING ROUTINE MODECADR.

| | | | | | | | |
|------|---------|-----------|---------|----------|--------------|-------|------|
| 0589 | REP 162 | LAST 1407 | 07,3512 | 3 4712 1 | AOTSTALL CAP | ONE | AOT. |
| 0590 | REP 1 | | 07,3513 | 0 3517 1 | TC | STALL | |
| 0591 | REP 74 | LAST 1398 | 07,3514 | 3 4711 1 | RADSTALL CAP | TWO | |
| 0592 | REP 2 | LAST 1408 | 07,3515 | 1 3517 0 | TCP | STALL | |

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| | | | | | | | | | |
|------|-----|-----|-----------|---------|----------|----------|----------|----------|----------|
| 0593 | REP | 1 | | 07,3512 | | | OPTSTALL | EQUALS | AOTSTALL |
| 0594 | REP | 264 | LAST 1407 | 07,3516 | 3 4714 1 | | IMUSTALL | CAP | ZERO |
| 0595 | | | | 07,3517 | 0 0004 0 | | STALL | | INHINT |
| 0596 | REP | 17 | LAST 1407 | 07,3520 | 54 071 0 | | TS | RUPTRSG2 | |
| 0597 | REP | 386 | LAST 1406 | 07,3521 | 50 000 1 | | INDEX | A | |
| 0598 | REP | 8 | LAST 1407 | 07,3522 | 11=322 1 | | CCS | MODECADR | |
| 0599 | REP | 1 | | 07,3523 | 1 3541 0 | | TCF | MODABORT | |
| 0600 | REP | 1 | | 07,3524 | 1 3535 0 | | TCF | MODESLP | |
| 0601 | REP | 1 | | 07,3525 | 1 3531 1 | | TCF | MODEGOOD | |
| 0602 | REP | 18 | LAST 1409 | 07,3526 | 50 071 1 | MO2 | INDEX | RUPTRSG2 | |
| 0603 | REP | 9 | LAST 1409 | 07,3527 | 55=322 1 | | TS | MODECADR | |
| 0604 | REP | 8 | LAST 1406 | 07,3530 | 1 2557 0 | | TCF | MODEEXIT | |
| 0605 | REP | 387 | LAST 1409 | 07,3531 | 10 000 0 | MODEGOOD | CCS | A | |
| 0606 | REP | 2 | LAST 1409 | 07,3532 | 1 3541 0 | | TCF | MODABORT | |
| 0607 | REP | 22 | LAST 1399 | 07,3533 | 24 133 0 | | INCR | BUF2 | |
| 0608 | REP | 1 | | 07,3534 | 1 3528 1 | | TCF | MO2 | |
| 0609 | REP | 5 | LAST 730 | 07,3535 | 0 4804 1 | MODESLP | TC | MAKECADR | |
| 0610 | REP | 19 | LAST 1409 | 07,3536 | 50 071 1 | | INDEX | RUPTRSG2 | |
| 0611 | REP | 10 | LAST 1409 | 07,3537 | 55=322 1 | | TS | MODECADR | |
| 0612 | REP | 6 | LAST 1399 | 07,3540 | 1 5070 1 | | TCF | JOBSLEEP | |
| 0613 | REP | 4 | LAST 1154 | 07,3541 | 0 5622 1 | MODABORT | TC | POODOO | |
| 0614 | | | | 07,3542 | 01210 0 | | OCT | 1210 | |

IMU.

SAVE DEVICE INDEX.
SEE IF OPERATION COMPLETE.

ALLOWABLE STATES ARE +0, -1, AND -0.
OPERATION INCOMPLETE.
COMPLETE AND GOOD IF = -1.

COMPLETE AND FAILED IF -0. RESET TO +0.
RETURN TO CALLER.

MAKE SURE INITIAL STATE -1.

IF SO, INCREMENT RETURN ADDRESS AND
RETURN IMMEDIATELY, SETTING CADR = +0.

CALL FROM SWITCHABLE FIXED ONLY.

TWO PROGRAMS USING SAME DEVICE.



L IMU MODE SWITCHING ROUTINES

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P0615 CONSTANTS FOR MODE SWITCHING ROUTINES

| | | | | | | | | | | |
|-------|-----|----|------|------|---------|--------|---------|----------|------------|--------------------------------|
| 0616 | REP | 4 | LAST | 1011 | 5656 | | BITS3d4 | = | OCT14 | |
| 0617 | REP | 5 | LAST | 1364 | 4726 | | BITS4d6 | = | OCT50 | |
| 0618 | | | | | 07,3543 | 00030 | 1 | BITS4-5 | OCT | 00030 |
| 0619 | REP | 31 | LAST | 1402 | 4703 | | | IMUSEPLO | EQUALS | BITS |
| 0620 | | | | | 07,3544 | 77500 | 1 | -COMAX | DEC | -191 |
| 0621 | | | | | 07,3545 | 77477 | 0 | -COMAX- | DEC | -192 |
| 0622 | | | | | 07,3546 | 00074 | 1 | 600MS | DEC | 60 |
| 0623 | REP | 3 | LAST | 417 | 07,3012 | | | IMUPIN20 | = | IMUPINB |
| 0624 | REP | 4 | LAST | 411 | 07,3547 | 3 1325 | 1 | OCMANUR | CA | ATTCADR |
| 0625 | | | | | 07,3550 | 0 0006 | 1 | | EXTEND | |
| 0626 | | | | | 07,3551 | 1 3554 | 1 | BZP | +3 | |
| 0627 | REP | 5 | LAST | 1409 | 07,3552 | 0 5622 | 1 | TC | POCDOO | NO |
| 0628 | | | | | 07,3553 | 01210 | 0 | OCT | 1210 | 2 TRYING TO USE SAME DEVICE |
| 0629 | | | | | 07,3554 | 0 0006 | 1 | +3 | EXTEND | |
| 0630 | REP | 23 | LAST | 1409 | 07,3555 | 3 0134 | 1 | DCA | RUF2 | |
| 0632 | REP | 5 | LAST | 1410 | 07,3556 | 53=326 | 0 | DXCH | ATTCADR | SAVE FINAL RETURN FOR KALCMAN3 |
| 0633 | REP | 34 | LAST | 1379 | 07,3557 | 3 0006 | 1 | CA | BRANK | |
| 0634 | REP | 22 | LAST | 1401 | 07,3560 | 7 4716 | 1 | MASK | SEVEN | |
| 0635 | REP | 6 | LAST | 1410 | 07,3561 | 27=326 | 0 | ADS | ATTCADR +1 | |
| 0642 | REP | 27 | LAST | 1188 | 07,3562 | 3 0167 | 1 | CA | PRIORITY | |
| 0643 | REP | 2 | LAST | 198 | 07,3563 | 7 7674 | 1 | MASK | PRIO37 | |
| 0644 | REP | 2 | LAST | 411 | 07,3564 | 55=327 | 1 | TS | ATTPRIO | SAVE USERS PRIO |
| 06452 | REP | 1 | | | 07,3565 | 3 3571 | 1 | CAP | KALERCEN | SET BRANK FOR KALCMAN3 |
| 06453 | REP | 62 | LAST | 1403 | 07,3566 | 54 003 | 0 | TS | BRANK | |
| 06454 | REP | 62 | LAST | 1365 | 07,3567 | 0 4574 | 0 | TC | POSTLMP | |
| 06455 | REP | 1 | | | 07,3570 | 44000 | 1 | CADR | KALCMAN3 | |
| 06456 | REP | 16 | LAST | 410 | 07,3571 | 03261 | 1 | KALERCEN | ECADR | RCDU |

L IMU MODE SWITCHING ROUTINES

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R0646 PROGRAM DESCRIPTION
 R0647 IMU STATUS CHECK ROUTINE R02 (SUBROUTINE UTILITY)
 R0648 MOD NO - 1
 R0649 MOD BY - N.BRODEUR
 R0650 FUNCTIONAL DESCRIPTION

R0651
 R0652 TO CHECK WHETHER IMU IS ON AND IF ON WHETHER IT IS ALIGNED TO AN
 R0653 ORIENTATION KNOWN BY THE CNC. TO REQUEST SELECTION OF THE APPROPRIATE
 R0654 PROGRAM IF THE IMU IS OFF OR NOT ALIGNED TO AN ORIENTATION KNOWN BY THE
 R0655 CNC. CALLED THROUGH BANKCALL.
 R0656 CALLING SEQUENCE-

R0657 L TC BANKCALL
 R0658 L+1 CADR R02BOTH
 R0659
 R0660 SUBROUTINES CALLED

R0661
 R0662 VARALARM
 R0663 FLAGUP
 R0664 NORMAL EXIT MODES

R0665
 R0666 AT L+2 OF CALLING SEQUENCE
 R0667 ALARM OR ABORT EXIT MODES
 R0668 GOTOPOCH, WITH ALARM
 R0673 ERASABLE INITIALIZATION REQUIRED

R0674
 R0675 NONE
 R0676 DERRIS

R0677
 R0678 CENTRAL'S-A, Q, L.

| | | | | | | | | | |
|-------|-----|-----|-----------|---------|----------|---------|--------|--------------|------------------------|
| R0679 | | | | 34,3775 | | | | BANK 34 | |
| R0680 | REF | 1 | | 07,2000 | | | | SETLOC R02 | |
| R0681 | | | | 07,3572 | | | | BANK | |
| R0682 | REF | 1 | | | | | | COUNT 04/R02 | COUNT* |
| R0683 | | | | 07,3572 | 00063 1 | DEC51 | DEC | 51 | |
| R0684 | REF | 50 | LAST 1401 | 07,3573 | 3 4676 1 | R02BOTH | CAP | BIT13 | |
| R0685 | REF | 51 | LAST 1168 | 07,3574 | 7 0077 0 | | MASK | STATE +3 | REFSMPLD |
| R0686 | REF | 388 | LAST 1409 | 07,3575 | 10 000 0 | | CCS | A | |
| R0687 | REF | 2 | LAST 722 | 07,3576 | 0 3607 0 | | TC | R02ZERO | ZERO IMUS |
| R0688 | REF | 63 | LAST 1406 | 07,3577 | 3 1320 1 | | CA | IMODES30 | |
| R0689 | REF | 37 | LAST 1405 | 07,3600 | 7 4702 1 | | MASK | BIT9 | IS ISS INITIALIZED |
| R0690 | | | | 07,3601 | 0 0006 1 | | EXTEND | | |
| R0691 | | | | 07,3602 | 1 3604 1 | | R2P | +2 | |
| R0692 | REF | 48 | LAST 1403 | 07,3603 | 4 4707 1 | | CS | BIT4 | SEND IMU ALARM CDR 210 |
| R0693 | REF | 1 | | 07,3604 | 6 3612 1 | | AD | OCT220 | SEND REFSM ALARM |
| R0694 | REF | 3 | LAST 853 | 07,3605 | 0 5651 0 | | TC | VARALARM | |
| R0695 | REF | 70 | LAST 853 | 07,3606 | 0 4106 1 | | TC | GOTOPOCH | |



L IMU MODE SWITCHING ROUTINES

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| | | | | | | | | | |
|-------|-----|----|------|------|---------|----------|---------|-------|----------|
| 0700 | REP | 52 | LAST | 1328 | 07,3607 | 0 5435 0 | R022BRO | TC | UPFLAG |
| 0701 | REP | 4 | LAST | 420 | 07,3610 | 00007 0 | | ADRES | IMUSE |
| 0702 | REP | 9 | LAST | 1397 | 07,3611 | 1 4570 0 | | TCP | SWRSTURN |
| 07025 | | | | | 07,3612 | 00220 1 | OCT220 | OCT | 220 |

L IMJ MODE SWITCHING ROUTINES

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R0703 PROGRAM DESCRIPTION P06 10FEB67

R0704 TRANSFER THE ISS/CMC FROM THE OPERATE TO THE STANDBY CONDITION.

R0705 THE NORMAL CONDITION OF READINESS OF THE GNC'S WHEN NOT IN USE IS STANDBY. IN THIS CONDITION THE IMJ
R0707 HEATER POWER IS ON. THE IMJ OPERATE POWER IS OFF. THE COMPUTER POWER IS ON. THE OPTICS POWER IS OFF. THE
R0709 CMC STANDBY ON THE MAIN AND LEB DISKYS IS ON.

R0710 CALLING SEQUENCE:

R0711 ASTRONAUT REQUEST THROUGH DSKY V37E 06E.

R0712 SUBROUTINES CALLED:

R0713 GOMPRP1

R0716 BANKCALL

R0719 PLACDOWN

L IMU MODE SWITCHING ROUTINES

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R0810 PRESTAND PREPARES FOR STANDBY BY SNAPSHOTTING THE SCALER AND TIME1 TIME2
 R0811 THE LOW 5 BITS OF THE SCALER ARE INSPECTED TO INSURE COMPATABILITY
 R0812 BETWEEN THE SCALER READING AND THE TIME1 TIME2 READING.

| | | | | | | | | | | | |
|-------|-----|-----|------|---------|---------|--------|-------|--------|----------|--------------|-------------------------------------|
| 08125 | REP | 1 | | 26,2000 | | | | SETLOC | P05P06 | | |
| 08126 | | | | 26,3655 | | | | BANK | | | |
| 0813 | REP | 3 | LAST | 202 | 1150 | | | EBANK= | TIME2SAV | | |
| 0814 | REP | 1 | | | | | | COUNT* | SS/P06 | | |
| 08145 | REP | 53 | LAST | 1412 | 26,3655 | 0 | 5435 | 0 | P06 | TC | UPFLAG |
| 08146 | REP | 3 | LAST | 1284 | 26,3656 | 0 | 0054 | 0 | | ADRES | NODOFLAG |
| 0815 | | | | | 26,3657 | 0 | 0004 | 0 | PRESTAND | INHINT | |
| 0816 | | | | | 26,3660 | 0 | 0006 | 1 | | EXTEND | |
| 0817 | REP | 31 | LAST | 1386 | 26,3661 | 3 | 0025 | 0 | DCA | TIME2 | SNAPSHOT TIME1TIME2 |
| 0818 | REP | 4 | LAST | 1414 | 26,3662 | 53=151 | 1 | | DCH | TIME2SAV | |
| 0819 | REP | 1 | | | 26,3663 | 0 | 3714 | 0 | TC | SCALPREP | |
| 0820 | REP | 1 | | | 26,3664 | 0 | 3657 | 0 | TC | PRESTAND | T1, T2, SCALER NOT COMPATIBLE |
| 0821 | REP | 687 | LAST | 1399 | 26,3665 | 52 | 155 | 1 | DCH | MPAC | T1, T2 AND SCALER OK |
| 0822 | REP | 1 | | | 26,3666 | 53=153 | 0 | | DCH | SCALSAVE | STORE SCALER |
| 0823 | | | | | 26,3667 | 0 | 0004 | 0 | | INHINT | |
| 0824 | REP | 246 | LAST | 1037 | 26,3670 | 0 | 4555 | 0 | TC | BANKCALL | |
| 0825 | REP | 3 | LAST | 150 | 26,3671 | 1 | 16777 | 1 | CADR | RNDREFDR | REFSM, DRIFT, TRACK FLAGS DOWN |
| 0826 | REP | 55 | LAST | 1284 | 26,3672 | 0 | 5447 | 0 | TC | DOWNFLAG | |
| 0827 | REP | 5 | LAST | 1412 | 26,3673 | 0 | 0007 | 0 | ADRES | IMUSE | IMUSE DOWN |
| 08271 | REP | 56 | LAST | 1414 | 26,3674 | 0 | 5447 | 0 | TC | DOWNFLAG | |
| 08272 | REP | 5 | LAST | 610 | 26,3675 | 0 | 0010 | 0 | ADRES | RNDVZPLG | RNDVZPLG DOWN |
| 0828 | REP | 37 | LAST | 1390 | 26,3676 | 3 | 4700 | 1 | CAP | BIT11 | |
| 0829 | | | | | 26,3677 | 0 | 0006 | 1 | | EXTEND | |
| 0830 | REP | 14 | LAST | 1068 | 26,3700 | 05 | 013 | 0 | WOR | CHAN13 | SET STANDBY ENABLE BIT |
| 0831 | REP | 101 | LAST | 1377 | 26,3701 | 0 | 5301 | 0 | TC | PHASCHG | SET RESTART TO POSTAND WHEN STANDBY |
| 0832 | | | | | 26,3702 | 07024 | 0 | | OCT | 07024 | RECOVERS |
| 0833 | | | | | 26,3703 | 20000 | 0 | | OCT | 20000 | |
| 08335 | REP | 2 | LAST | 1414 | 1152 | | | | EBANK= | SCALSAVE | |
| 0834 | REP | 1 | | | 26,3704 | 03734 | 1 | | 2CADR | POSTAND | |
| 0834 | REP | 1 | | | 26,3705 | 54102 | 0 | | | | |
| 0835 | REP | 1 | | | 26,3706 | 3 | 4731 | 0 | CAP | OCT62 | |
| 0836 | REP | 247 | LAST | 1414 | 26,3707 | 0 | 4555 | 0 | TC | BANKCALL | |
| 0837 | REP | 7 | LAST | 736 | 26,3710 | 20751 | 0 | | CADR | GOPERP1 | |
| 0838 | | | | | 26,3711 | 1 | 3706 | 1 | TCF | -3 | |
| 0839 | | | | | 26,3712 | 1 | 3706 | 1 | TCF | -4 | |
| 0840 | | | | | 26,3713 | 1 | 3706 | 1 | TCF | -5 | |
| 08405 | REP | 9 | LAST | 1037 | 4731 | | | | OCT62 | EQUALS .5SEC | DEC 50 = OCT 62 |

R0841 THE LOW 5 BITS OF THE SCALER READS 10000 FOR THE FIRST INTERVAL AFTER A



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00042 T1 INCREMENT. IF SCALPREP DETECTS THIS INTERVAL THE T1, T2 AND SCALER
 00043 DATA ARE NOT COMPATIBLE AND RETURN IS TO L+1 FOR ANOTHER READING OF THE
 00044 DATA. OTHERWISE, THE RETURN IS TO L+2 TO PROCEED. ROUTINE ALSO PREPARES
 00045 THE SCALER READING FOR COMPUTATION OF THE INCREMENT TO UPDATE T1 T2. (THE
 00046 10 MS BIT (BIT 6) OF THE SCALER IS INCREMENTED 5 MS OUT OF PHASE FROM
 00047 T1.) ADDITION OF 5 MS (BIT 5) TO THE SCALER READING HAS THE EFFECT OF
 00048 ADJUSTING BIT 6 IN THE SCALER TO BE IN PHASE WITH BIT 1 OF T1. THE LOW 5
 00049 BITS OF THE SCALER READING ARE THEN SET TO ZERO, TO TRUNCATE THE SCALER
 00050 DATA TO 10 MS. RESULTS ARE STORED IN MPAC, +1.

| | | | | | | | | |
|-------|---------|-----------|---------|----------|----------|----------|----|---|
| 00051 | | | 26,3714 | 0 0006 1 | SCALPREP | EXTEND | | |
| 00052 | REP 688 | LAST 1414 | 26,3715 | 22 156 0 | CKCH | MPAC | +2 | |
| 00053 | REP 3 | LAST 424 | 26,3716 | 0 4527 0 | TC | FINSTIME | +1 | |
| 00054 | | | 26,3717 | 0 0003 1 | RELINT | | | |
| 00055 | REP 689 | LAST 1415 | 26,3720 | 52 155 1 | DXCH | MPAC | | |
| 00056 | REP 44 | LAST 1396 | 26,3721 | 3 4706 1 | CA | BITS | | ADD 5 MS TO THE SCALER READING. |
| 00057 | REP 226 | LAST 1402 | 26,3722 | 54 001 1 | TS | L | | |
| 00058 | REP 265 | LAST 1409 | 26,3723 | 3 4714 1 | CA | ZERO | | |
| 00059 | REP 690 | LAST 1415 | 26,3724 | 20 155 1 | DAS | MPAC | | |
| 00060 | REP 9 | LAST 356 | 26,3725 | 4 4382 0 | CS | LOWS | | SET LOW 5 BITS OF (SCALER+5MS) TO ZERO |
| 00061 | REP 691 | LAST 1415 | 26,3726 | 7 0155 1 | MASK | MPAC | +1 | AND STORE RESULTS IN MPAC,+1. |
| 00062 | REP 692 | LAST 1415 | 26,3727 | 56 155 0 | XCH | MPAC | +1 | |
| 00063 | REP 10 | LAST 1415 | 26,3730 | 7 4382 0 | MASK | LOWS | | TEST LOW 5 BITS OF SCALER FOR THE FIRST |
| A0064 | | | | | | | | INTERVAL AFTER THE T1 INCREMENT |
| A0065 | | | | | | | | (NOW = 00000, SINCE BIT 5 ADDED). |
| 00066 | REP 389 | LAST 1411 | 26,3731 | 10 000 0 | CCS | A | | IS IT 1ST INTERVAL AFTER T1 INCREMENT |
| 00067 | REP 693 | LAST 1415 | 26,3732 | 24 156 0 | INCR | MPAC | +2 | NO |
| 00068 | REP 694 | LAST 1415 | 26,3733 | 0 0156 0 | TC | MPAC | +2 | YES |

00069 POSTAND RECOVERS TIME AFTER STANDRY. THE SCALER IS SNAPSHOTTED AND THE
 00070 TIME1 TIME2 COUNTER IS SET TO ZERO. THE LOW 5 BITS OF THE SCALER ARE
 00071 INSPECTED TO INSURE COMPATABILITY BETWEEN THE SCALER READING AND THE
 00072 CLEARING OF THE TIME COUNTER. IT THEN COMPUTES THE DIFFERENCE IN SCALER
 00073 VALUES (IN DP) AND ADDS THIS TO THE PREVIOUSLY SNAPSHOTTED VALUES OF
 00074 TIME1 TIME2 AND PLACES THIS NEW TIME INTO THE TIME1 TIME2 COUNTER.

| | | | | | | | | |
|-------|---------|-----------|---------|----------|---------|----------|-------|--|
| 00075 | REP 1 | | | | COUNT# | SS/P05 | | |
| 00076 | REP 38 | LAST 1414 | 26,3734 | 4 4700 0 | POSTAND | CS | BIT11 | RECOVER TIME AFTER STANDRY. |
| 00077 | | | 26,3735 | 0 0006 1 | EXTEND | | | |
| 00078 | REP 15 | LAST 1414 | 26,3736 | 03 013 0 | WAND | CHAN13 | | CLEAR STANDRY ENABLE BIT |
| 00079 | | | 26,3737 | 0 0004 0 | INHINT | | | |
| 00080 | REP 286 | LAST 1415 | 26,3740 | 3 4714 1 | CA | ZERO | | |
| 00081 | REP 227 | LAST 1415 | 26,3741 | 54 001 1 | TS | L | | |
| 00082 | REP 32 | LAST 1414 | 26,3742 | 52 025 1 | DXCH | TIME2 | | CLEAR TIME1 TIME2 |
| 00083 | REP 2 | LAST 1414 | 26,3743 | 0 3714 0 | TC | SCALPREP | | STORE SCALER IN MPAC, MPAC,+1 |
| 00084 | REP 2 | LAST 1414 | 26,3744 | 0 3737 1 | TC | POSTAND | +3 | T1, T2, SCALER NOT COMPATIBLE |
| 00085 | | | 26,3745 | 0 0006 1 | EXTEND | | | T1, T2 AND SCALER OK |
| 00086 | REP 3 | LAST 1414 | 26,3746 | 4 1153 0 | DCS | SCALSAVR | | |
| 00087 | REP 695 | LAST 1415 | 26,3747 | 20 155 1 | DAS | MPAC | | FORM DP DIFFERENCE OF POSTSTANDRY SCALER |



L DUJ MODE SWITCHING ROUTINES

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0000 REP 46 LAST 1403 26,3750 3 4701 0
 0000 REP 9 LAST 374 26,3751 0 7256 1
 0000 REP 267 LAST 1415 26,3752 3 4714 1
 0001 REP 696 LAST 1415 26,3753 54 156 1
 0002 REP 12 LAST 1398 26,3754 0 7226 0
 0003 REP 697 LAST 1416 26,3755 10 154 0
 0004 REP 1 LAST 1416 26,3756 0 3763 0
 0005 REP 2 LAST 1416 26,3757 0 3763 0
 0006 REP 1 LAST 1416 26,3760 0 3761 1
 0007 REP 47 LAST 1416 26,3761 3 4701 0
 0008 REP 698 LAST 1416 26,3762 26 154 0
 0009 REP 1 LAST 1416 26,3763 0 0006 1
 0000 REP 5 LAST 1414 26,3764 3 1151 0
 0001 REP 699 LAST 1416 26,3765 20 155 1
 0002 REP 13 LAST 1416 26,3766 0 7226 0
 0003 REP 700 LAST 1416 26,3767 52 155 1
 0004 REP 33 LAST 1415 26,3770 20 025 1
 00045 REP 57 LAST 1414 26,3771 0 5447 0
 00046 REP 4 LAST 1414 26,3772 00054 0
 0005 REP 71 LAST 1411 26,3773 0 4106 1

CAP BIT10
 TC SHORTMP
 CAP ZSR0
 TS MPAC *2
 TC TPAGREE
 CCS MPAC
 TC POSTCOM
 TC POSTCOM
 TC +1
 CAP BIT10
 ADS MPAC
 POSTCOM EXTEND
 DCA TIME2SAV
 DAS MPAC
 TC TPAGREE
 DXCH MPAC
 DAS TIME2
 TC DOWNFLAG
 ADRES NODOFLAG
 TC GOTOPOCH

MINUS PRESTANDBY SCALER AND SHIFT RIGHT
 5 TO ALIGN BITS WITH TIME1,TIME2.
 NEEDED FOR TP AGREE
 MAKE DP DIFF AGREE
 IF DP DIFF NET +, NO SCALER OVERFLOW
 BETWEEN PRS AND POST STANDBY.
 IF DP DIFF NET -, SCALER OVERFLOWED. ADD
 BIT 10 TO HIGH DIFF TO CORRECT.
 C(MPAC,+1) IS MAGNITUDE OF DELTA SCALER.
 PRESTANDBY TIME1,TIME2
 FORCE SIGN AGREEMENT
 UPDATED VALUE FOR T1,T2.
 LOAD UPDATED VALUE INTO T1,T2, WITH
 CLEAR NODOFLAG



L KEYRUPT, UPRUPT

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| | | | | | | | |
|------|-----|-----|-----------|---------|----------|----------|-------------|
| 0001 | | | 14,3744 | | | BANK | 14 |
| 0002 | REP | 1 | 07,2000 | | | SETLOC | KEYRUPT |
| 0003 | | | 07,3613 | | | BANK | |
| 0004 | REP | 1 | | | | COUNT* | 88/KEYUP |
| 0005 | REP | 25 | LAST 1202 | 07,3613 | 54 016 1 | KEYRUPT1 | TS BANKRUPT |
| 0006 | REP | 328 | LAST 1406 | 07,3614 | 56 002 0 | XCH | O |
| 0007 | REP | 20 | LAST 1202 | 07,3615 | 54 012 0 | TS | CRUPT |
| 0008 | REP | 2 | LAST 350 | 07,3616 | 0 4414 1 | TC | LOADSAMP |
| 0009 | REP | 11 | LAST 1415 | 07,3617 | 3 4362 1 | CAP | LOW5 |
| 0010 | | | | 07,3620 | 0 0006 1 | EXTEND | |
| 0011 | REP | 2 | LAST 165 | 07,3621 | 02 015 1 | RAND | HNKEYIN |
| 0012 | REP | 6 | LAST 1379 | 07,3622 | 54 073 1 | KEYCOM | RUPTR04 |
| 0013 | REP | 14 | LAST 654 | 07,3623 | 4 0101 0 | CS | FLAGWRD5 |
| 0014 | REP | 53 | LAST 1396 | 07,3624 | 7 4674 1 | MASK | BIT15 |
| 0015 | REP | 15 | LAST 1417 | 07,3625 | 26 101 0 | ADS | FLAGWRD5 |
| 0016 | REP | 6 | LAST 1174 | 07,3626 | 3 4371 0 | ACCEPTUP | CAP CHRPRIO |
| 0017 | REP | 33 | LAST 1387 | 07,3627 | 0 5027 1 | TC | NOVAC |
| 0018 | REP | 66 | LAST 370 | 0777 | | ERANK= | DSPCOUNT |
| 0019 | REP | 1 | | 07,3630 | 02000 0 | 2CADR | CHARIN |
| 0019 | REP | 1 | | 07,3631 | 60101 1 | | |
| 0020 | REP | 7 | LAST 1417 | 07,3632 | 3 0073 0 | CA | RUPTR04 |
| 0021 | REP | 24 | LAST 1407 | 07,3633 | 50 064 0 | INDEX | LOCCTR |
| 0022 | REP | 701 | LAST 1416 | 07,3634 | 54 154 0 | TS | MPAC |
| 0023 | REP | 46 | LAST 1059 | 07,3635 | 0 5222 0 | TC | RESUME |

TIME IS SNATCHED IN RUPT FOR MOLN 65.

CHECK IF KEYS SM-1M ON

(NOTE: RUPTR04 = KEYTEMP1)

LEAVE 5 BIT KEY CDR IN MPAC FOR CHARIN



L KEYRUPT, UPRUPT

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P0024 UPRUPT PROGRAM

| | | | | | | | | |
|-------|-----|-----|-----------|---------|----------|----------|--------|----------|
| 0025 | REP | 26 | LAST 1417 | 07,3638 | 54 018 1 | UPRUPT | TS | BANKRUPT |
| 0026 | REP | 329 | LAST 1417 | 07,3637 | 56 002 0 | | XCH | 0 |
| 0027 | REP | 21 | LAST 1417 | 07,3640 | 54 012 0 | | TS | CRUPT |
| 0028 | REP | 3 | LAST 1417 | 07,3641 | 0 4414 1 | | TC | LODSAMPT |
| 0029 | REP | 268 | LAST 1418 | 07,3642 | 3 4714 1 | | CAP | ZERO |
| 0030 | REP | 2 | LAST 188 | 07,3643 | 56 045 0 | | XCH | INLINK |
| 0031 | REP | 2 | LAST 128 | 07,3644 | 54 073 1 | | TS | KEYTEMP1 |
| 0032 | REP | 34 | LAST 1363 | 07,3645 | 3 4710 0 | | CAP | BIT3 |
| 0033 | | | | 07,3646 | 0 0006 1 | | EXTEND | |
| 0034 | REP | 34 | LAST 1408 | 07,3647 | 05 011 1 | | WOR | DSALMOUT |
| 0035 | REP | 12 | LAST 1417 | 07,3650 | 3 4362 1 | UPRPT1 | CAP | LOW5 |
| 0036 | REP | 3 | LAST 1418 | 07,3651 | 7 0073 1 | | MASK | KEYTEMP1 |
| 0037 | REP | 4 | LAST 1418 | 07,3652 | 56 073 0 | | XCH | KEYTEMP1 |
| 0038 | | | | 07,3653 | 0 0006 1 | | EXTEND | |
| 0039 | REP | 48 | LAST 1418 | 07,3654 | 7 4701 1 | | MP | BIT10 |
| 0040 | REP | 1 | | 07,3655 | 54 734 0 | | TS | KEYTEMP2 |
| 0041 | REP | 13 | LAST 1418 | 07,3656 | 7 4362 0 | | MASK | LOW5 |
| 0042 | REP | 1 | | 07,3657 | 6 3713 1 | | AD | HI10 |
| 0043 | REP | 1 | | 07,3660 | 0 3710 1 | | TC | UPTTEST |
| 0044 | REP | 49 | LAST 1418 | 07,3661 | 3 4701 0 | | CAP | BIT10 |
| 0045 | | | | 07,3662 | 0 0006 1 | | EXTEND | |
| 0046 | REP | 2 | LAST 1418 | 07,3663 | 7 0734 0 | | MP | KEYTEMP2 |
| 0047 | REP | 14 | LAST 1418 | 07,3664 | 7 4362 0 | | MASK | LOW5 |
| 0048 | | | | 07,3665 | 4 0000 0 | | CON | |
| 0049 | REP | 2 | LAST 1418 | 07,3666 | 0 3710 1 | | TC | UPTTEST |
| 0050 | REP | 1 | | 07,3667 | 4 3716 0 | UPCK | CS | ELRCODE |
| 0051 | REP | 5 | LAST 1418 | 07,3670 | 6 0073 0 | | AD | KEYTEMP1 |
| 0052 | | | | 07,3671 | 0 0006 1 | | EXTEND | |
| 0053 | REP | 1 | | 07,3672 | 1 3700 1 | | BZF | CLUPLOCK |
| 0054 | REP | 49 | LAST 1411 | 07,3673 | 3 4707 0 | | CAP | BIT4 |
| 0055 | REP | 19 | LAST 777 | 07,3674 | 7 0103 1 | | MASK | FLAGWRD7 |
| 0056 | REP | 390 | LAST 1415 | 07,3675 | 10 000 0 | | CCS | A |
| 0057 | REP | 49 | LAST 1417 | 07,3676 | 0 5222 0 | | TC | RESUME |
| 0058 | REP | 1 | | 07,3677 | 0 3626 0 | | TC | ACCEPTUP |
| 0059 | REP | 50 | LAST 1418 | 07,3700 | 4 4707 1 | CLUPLOCK | CS | BIT4 |
| 0060 | REP | 20 | LAST 1418 | 07,3701 | 7 0103 1 | | MASK | FLAGWRD7 |
| 0061 | REP | 21 | LAST 1418 | 07,3702 | 54 103 1 | | TS | FLAGWRD7 |
| 0062 | REP | 2 | LAST 1418 | 07,3703 | 0 3626 0 | | TC | ACCEPTUP |
| A0063 | | | | | | | | |
| 0064 | REP | 22 | LAST 1418 | 07,3704 | 4 0103 1 | TMFAIL2 | CS | FLAGWRD7 |
| 0065 | REP | 51 | LAST 1418 | 07,3705 | 7 4707 1 | | MASK | BIT4 |
| 0066 | REP | 23 | LAST 1418 | 07,3706 | 26 103 1 | | ADS | FLAGWRD7 |
| 0067 | REP | 50 | LAST 1418 | 07,3707 | 0 5222 0 | | TC | RESUME |
| 0068 | REP | 6 | LAST 1418 | 07,3710 | 6 0073 0 | UPTTEST | AD | KEYTEMP1 |

TIME IS SNATCHED IN RUPT FOR NOUN 65.

TURN ON UPACT LIGHT
(BIT 3 OF CHANNEL 11)

TEST FOR TRIPLE CHAR REDUNDANCY
LOW5 OF WORD
LOW5 INTO KEYTEMP1

SHIPT RIGHT 5

MID 5

SHIPT RIGHT 5
HIGH 5

CODE IS GOOD. IF CODE = "ERROR RESET",
CLEAR UPLOCKPL (SET BIT4 OF FLAGWRD7 = 0)
IF CODE DOES NOT = "ERROR RESET", ACCEPT
CODE ONLY IF UPLOCKPL IS CLEAR (=0).

TEST UPLOCKPL FOR 0 OR 1.

UPLOCKPL = 1
UPLOCKPL = 0

CLEAR UPLOCKPL (I.E., SET BIT4 OF
FLAGWRD7 = 0)

CODE IS BAD
LOCK OUT FURTHER UPLINK ACTIVITY
(BY SETTING UPLOCKPL = 1) UNTIL
"ERROR RESET" IS SENT VIA UPLINK.



L KSYRUPT, UPRUPT

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| | | | | | | |
|------|---------|-----------|---------|----------|------|-----------|
| 0070 | REP 301 | LAST 1410 | 07,3711 | 10 000 0 | CCS | A |
| 0071 | REP 1 | | 07,3712 | 0 3704 1 | TC | TFAIL2 |
| 0072 | | | 07,3713 | 77740 1 | H110 | OCT 77740 |
| 0073 | REP 2 | LAST 1410 | 07,3714 | 0 3704 1 | TC | TFAIL2 |
| 0074 | REP 330 | LAST 1410 | 07,3715 | 0 0002 0 | TC | 0 |

0075 07,3716 00022 1 ELRCODE OCT 22

R0076 UPLINK ACTIVITY LIGHT IS TURNED OFF BY

- R0077 1. VBRELDSP
- R0078 2. ERROR RESET
- R0079 3. UPDATE PROGRAM(P27) ENTERED BY V70,V71,V72,AND V73.

R0080
 R0081 THE RECEPTION OF A BAD CODE (I.E. CCC FAILURE) LOCKS OUT FURTHER UPLINK ACTIVITY BY SETTING BIT4 OF FLAGWRD7 = 1.
 R0082 THIS INDICATION WILL BE TRANSFERRED TO THE GROUND BY THE DOWNLINK WHICH DOWNLINKS ALL FLAGWORDS.
 R0083 WHEN UPLINK ACTIVITY IS LOCKED OUT, IT CAN BE ALLOWED WHEN THE GROUND UPLINKS AND «ERROR RESET» CODE.
 R0084 (IT IS RECOMMENDED THAT THE «ERROR LIGHT RESET» CODE IS PRECEDED BY 16 BITS THE FIRST OF WHICH IS 1 FOLLOWED
 R0085 BY 15 ZEROS. THIS WILL ELIMINATE EXTRANEOUS BITS FROM INLINK WHICH MAY HAVE BEEN LEFT OVER FROM THE ORIGINAL
 R0086 FAILURE)
 R0087 UPLINK ACTIVITY IS ALSO ALLOWED (UNLOCKED) DURING FRESH START WHEN FRESH START SETS BIT4 OF FLAGWRD7 = 0.
 R0088
 R0089
 R0090
 R0091
 R0092



L DISPLAY INTERPACE ROUTINES

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R0001 DISPLAYS CAN BE CLASSIFIED INTO THE FOLLOWING CATEGORIES-

- R0002 1. PRIORITY DISPLAYS- DISPLAYS WHICH TAKE PRIORITY OVER ALL OTHER DISPLAYS. USUALLY THESE DISPLAYS ARE SENT OUT UNDER CRITICAL ALARM CONDITIONS.
- R0004 2. EXTENDED VERB DISPLAYS- ALL EXTENDED VERBS AND MARK ROUTINES SHOULD USE EXTENDED VERB (MARK) DISPLAYS.
- R0005 3. NORMAL DISPLAYS- ALL MISSION PROGRAM DISPLAYS WHICH INTERFACE WITH THE ASTRONAUT DURING THE NORMAL SEQUENCE OF EVENTS.
- R0007 4. MISC. DISPLAYS- ALL DISPLAYS NOT HANDLED BY THE DISPLAY INTERFACEROUTINES. THESE INCLUDE SUCH DISPLAYS AS MM DISPLAYS AND SPECIAL PURPOSE DISPLAYS HANDLED BY PINBALL.
- R0010 5. ASTRONAUT INITIATED DISPLAYS- ALL DISPLAYS INITIATED EXTERNALLY.
- R0012
- R0013
- R0014

THE FOLLOWING TERMS ARE USED TO DESCRIBE THE STATUS OF DISPLAYS-

- R0015 1. ACTIVE- THE DISPLAY WHICH IS (1) BEING DISPLAYED TO THE ASTRONAUT AND WAITING FOR A RESPONSE OR (2) WAITING FIRST IN LINE FOR THE ASTRONAUT TO FINISH USING THE DSKY OR (3) BEING DISPLAYED ON THE DSKY BUT NOT WAITING FOR A RESPONSE.
- R0017
- R0019
- R0020 2. INACTIVE -A DISPLAY WHICH HAS (1) BEEN ACTIVE BUT WAS INTERRUPTEDBY A DISPLAY OF HIGHER PRIORITY, (2) BEEN PUT INTO THE WAITING LIST AT TIME IT WAS REQUESTED DUE TO THE FACT A HIGHER PRIORITY DISPLAY WAS ALREADY GOING, (3) BEEN INTERRUPTED BY THE ASTRONAUT (CALLED A PINBRANCH CONDITION, SINCE THIS TYPE OF INACTIVE DISPLAY IS USUALLY REACTIVATED ONLY BY PINBALL) OR (4) A DISPLAY WHICH HAS FINISHED BUT STILL HAS INFO SAVED FOR RESTART PURPOSES.
- R0026
- R0028
- R0029

DISPLAY PRIORITIES WORK AS FOLLOWS-

R0030 INTERRUPTS-

- R0031 1. THE ASTRONAUT CAN INTERRUPT ANY DISPLAY WITH AN EXTERNAL DISPLAY REQUEST.
- R0033 2. INTERNAL DISPLAYS CAN NOT BE SENT OUT WHEN THE ASTRONAUT IS USING THE DSKY.
- R0035 3. PRIORITY DISPLAYS INTERRUPT ALL OTHER TYPES OF INTERNAL DISPLAYS. A PRIORITY DISPLAY INTERRUPTING ANOTHER PRIORITY DISPLAY WILL CAUSE AN ABORT UNLESS BIT14 IS SET FOR THE LINUS ROUTINE.
- R0037
- R0039 4. A MARK DISPLAY INTERRUPTS ANY NORMAL DISPLAY.
- R0040 5. A MARK THAT INTERRUPTS A MARK COMPLETELY REPLACES IT.

R0041 ORDER OF WAITING DISPLAYS-

- R0042 1. ASTRONAUT EXTERNAL USE
- R0043 2. PRIORITY
- R0044 3. INTERRUPTED MARK
- R0045 4. INTERRUPTED NORMAL
- R0046 5. MARK TO BE REQUESTED (SEE DESCRIPTION OF ENDMARK)
- R0047 6. MARK WAITING
- R0048 7. NORMAL WAITING

L DISPLAY INTERFACE ROUTINES USER'S PAGE NO. 2 50 54

P0049 THE DISPLAY ROUTINES ARE INTENDED TO SERVE AS AN INTERFACE BETWEEN THE USER AND PINBALL. THE FOLLOWING STATEMENTS CAN BE MADE ABOUT NORMAL DISPLAYS AND PRIORITY DISPLAYS (A DESCRIPTION OF MARK ROUTINES WILL FOLLOW LATER)

P0054 1. ALL ROUTINES THAT END IN R HAVE AN IMMEDIATE RETURN TO THE USER. FOR ALL FLASHING DISPLAYS THIS RETURN IS TO THE USER'S CALL CADR +4. FOR THE ONLY NON FLASHING IMMEDIATE RETURN DISPLAY (GODSPR) THIS RETURN IS TO THE USER'S CALLING LOC +1.

P0055 2. ALL ROUTINES NOT ENDING IN R DO NOT DO AN IMMEDIATE RETURN TO THE USER.

P0061 3. ALL ROUTINES THAT END IN R START A SEPARATE JOB (MAKEPLAY) WITH USER'S JOB PRIORITY.

P0063 4. ALL ROUTINES NOT ENDING IN R BRANCH DIRECTLY TO MAKEPLAY WHICH MAKES THESE DISPLAYS A PART OF THE USER'S JOB.

P0065 5. ALL DISPLAY ROUTINES ARE CALLED VIA BANKCALL.

P0067 6. TO RESTART A DISPLAY THE USER WILL GENERALLY USE A PHASE OF ONE WITH DESIRED RESTART GROUP (SEE DESCRIPTION OF RESTARTS).

P0070 7. ALL FLASHING DISPLAYS HAVE 3 RETURNS TO THE USER FROM ASTRONAUT RESPONSES. A TERMINATE (V34) BRANCHES TO THE USER'S CALL CADR +1. A PROCEED (V33) BRANCHES TO THE USER'S CALL CADR +2. AN ENTER OR RECYCLE (V32) BRANCHES TO THE USER'S CALL CADR +3.

P0075 8. ALL ROUTINES MUST BE USED UNDER EXECUTIVE CONTROL.

P0076 A DESCRIPTION OF EACH ROUTINE WITH AN EXAMPLE FOLLOWS

P0077 GODSP IS USED TO DISPLAY A VERB NOUN ARRIVING IN A. NO RETURN IS MADE TO THE USER.

P0079 1. GODSP IS NOT RESTORABLE

P0080 2. A VERB PASTE WITH GODSP ALWAYS TURNS ON THE FLASH.

P0081 CAP V000Y

P0082 TO BANKCALL

P0083 CADR GODSP

P0084 V000Y OCT 000Y

P0085 GODSPR IS THE SAME AS GODSP ONLY RETURN IS TO THE USER.

P0086 CAP V000Y

P0087 TO BANKCALL

P0088 CADR GODSPR

P0089 IMMEDIATE RETURN OF GODSPR

P0090 FLASH DISPLAYS A FLASHING VERB NOUN WITH NO IMMEDIATE RETURN TO THE USER. 3 RETURNS ARE POSSIBLE FROM THE ASTRONAUT (SEE NO. 7 ABOVE).

P0093 CAP V000Y

P0094 TO BANKCALL

P0095 CADR 00FLASH

P0096 TERMINATE RETURN

P0097 PROCEED RETURN

P0098 ENTER OR RECYCLE RETURN

P0099 GODSPR1 IS ENTERED WITH DESIRED CHECKLIST VALUE IN A. GODSPR1 WILL DISPLAY THIS VALUE IN R1 BY MEANS OF A



L DISPLAY INTERFACE ROUTINES

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R0101 V01 N25.A FLASHING PLEASE PERFORM ON CHECKLIST (V50 N25) IS THEN DISPLAYED. NO IMMEDIATE RETURN IS MADE TO
R0103 USER (SEE NO. 7 ABOVE).

R0104 GOPERF1 BLANKS REGISTERS R2 AND R3

| | | | |
|-------|------|----------|-----------------------------|
| A0105 | CAP | OCTCX | CODE FOR CHECKLIST VALUE XX |
| A0106 | TC | BANKCALL | |
| A0107 | CADR | GOPERF1 | |
| A0108 | ... | ... | TERMINATE RETURN |
| A0109 | ... | ... | PROCEED RETURN |
| A0110 | ... | ... | ENTER RETURN |

R0111 GOPERF2 IS ENTERED WITH A VARIABLE NOUN AND V01 (V00 FOR N10 OR N11) IN A. GOPERF2 WILL FIRST DISPLAY THE
R0113 REQUESTED NOUN BY MEANS OF A V01NYY OR A V00NYY. PLEASE PERFORM ON NOUN (V50 NYY) THEN BECOMES A FLASHING
R0115 DISPLAY. NO IMMEDIATE RETURN IS MADE TO THE USER (SEE NO. 7 ABOVE).

R0116 GOPERF2 DOES NOT BLANK ANY REGISTERS

| | | | |
|-------|------|----------|--------------------------------|
| A0117 | CAP | V00NYY | VARIABLE NOUN YY. XX=00 OR 01. |
| A0118 | TC | BANKCALL | |
| A0119 | CADR | GOPERF2 | |
| A0120 | ... | ... | TERMINATE RETURN |
| A0121 | ... | ... | PROCEED RETURN |
| A0122 | ... | ... | ENTER RETURN |

R0123 GOPERF3 IS USED FOR A PLEASE PERFORM ON A PROGRAM NUMBER. THE DESIRED PROGRAM NO. IS ENTERED IN A. GOPERF3
R0125 DISPLAYS THE NO. BY MEANS OF A V06 N07 FOLLOWED BY A FLASHING V50 N07 FOR A PLEASE PERFORM. NO IMMEDIATE RETURN
R0127 IS MADE TO THE USER (SEE NO. 7 ABOVE).

R0128 GOPERF3 BLANKS REGISTERS R2 AND R3

| | | | |
|-------|------|----------|------------------------|
| A0129 | CAP | DECCX | REQUEST PERFORM ON PXX |
| A0130 | TC | BANKCALL | |
| A0131 | CADR | GOPERF3 | |
| A0132 | ... | ... | TERMINATE RETURN |
| A0133 | ... | ... | PROCEED RETURN |
| A0134 | ... | ... | ENTER RETURN |

R0135 GOPERF4 IS USED FOR A PLEASE PERFORM ON AN OPTION. THE DESIRED OPTION IS ENTERED IN A AND STORED IN OPTION1.
R0137 GOPERF4 DISPLAYS R1 AND R2 BY MEANS OF A V04N06 FOLLOWED BY A FLASHING V50N06 FOR A PLEASE PERFORM. NO
R0139 IMMEDIATE RETURN IS MADE TO THE USER (SEE NO. 7 ABOVE).

| | | | |
|-------|------|----------|------------------------------|
| A0140 | CAP | OCTCX | REQUEST PERFORM ON OPTION XX |
| A0141 | TC | BANKCALL | |
| A0142 | CADR | GOPERF4 | |
| A0143 | ... | ... | TERMINATE RETURN |
| A0144 | ... | ... | PROCEED RETURN |
| A0145 | ... | ... | ENTER RETURN |

R0146 GOPERF4 BLANKS REGISTER R3



L DISPLAY INTERPACE ROUTINES

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R0147 GODSPRET IS USED TO DISPLAY A VERB NOUN ARRIVING IN A WITH A RETURN TO THE USER AFTER THE DISPLAY HAS BEEN SENT
R0149 OUT.A0150 CAP VIGNYY
A0151 TC BANKCALL
A0152 CADR GODSPRET

A0153 RETURN TO USER

R0154 RECODSP IS USED TO DISPLAY A VERB NOUN ARRIVING IN A. RECODSP IS THE SAME AS GODSP ONLY RECODSP REPLACES ANY
R0156 ACTIVE NORMAL DISPLAY IF ONE WAS ACTIVE.A0157 CAP VIGNYY
A0158 TC BANKCALL
A0159 CADR RECODSP

R0160 REFLASH IS THE SAME AS GOFLASH ONLY REFLASH REPLACES ANY ACTIVE NORMAL DISPLAY IF ONE WAS ACTIVE.

A0162 CAP VIGNYY VIX NYY WILL BE A FLASHING VERB NOUN
A0163 TC BANKCALL
A0164 CADR REFLASHA0165 TERMINATE RETURN
A0166 PROCEED RETURN
A0167 ENTER RETURN

R0168 GOFLASHR IS SAME AS GOFLASH ONLY AN IMMEDIATE RETURN IS MADE TO THE USERS CALL. CADR +4.

A0170 CAP VIGNYY
A0171 TC BANKCALL
A0172 CADR GOFLASHRA0173 TERMINATE RETURN
A0174 PROCEED RETURN
A0175 ENTER OR RECYCLE RETURN

A0176 IMMEDIATE RETURN FROM GOFLASHR

R0177 GOPERF1R IS THE SAME AS GOPERF1 ONLY GOPERF1R HAS AN IMMEDIATE RETURN TOUSERS CALL. CADR +4.

R0179 GOPERF1R BLANKS REGISTERS R2 AND R3

A0180 CAP OCTOX CODE FOR CHECKLIST VALUE XX.
A0181 TC BANKCALL
A0182 CADR GOPERF1RA0183 TERMINATE RETURN
A0184 PROCEED RETURN
A0185 ENTER RETURN

A0186 IMMEDIATE RETURN FROM GOPERF1R

R0187 GOPERF2R IS THE SAME AS GOPERF2 ONLY AN IMMEDIATE RETURN IS MADE TO USERS CALL. CADR +4.



L DISPLAY INTERFACE ROUTINES

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R0189 GOPERF2R DOES NOT BLANK ANY REGISTERS

| | | | |
|-------|------|----------|---|
| A0190 | CAP | V00NYY | VARIABLE NOUN YY REQUESTED. XX=00 OR 01 |
| A0191 | TC | BANKCALL | |
| A0192 | CADR | GOPERF2R | |
| A0193 | ... | ... | TERMINATE RETURN |
| A0194 | ... | ... | PROCEED RETURN |
| A0195 | ... | ... | ENTER RETURN |
| A0196 | ... | ... | IMMEDIATE RETURN HERE FROM GOPERF2R |

R0197 GOPERF3R IS THE SAME AS GOPERF3 ONLY AN IMMEDIATE RETURN IS MADE TO USERS CALL CADR +4.

R0199 GOPERF3R BLANKS REGISTERS R2 AND R3

| | | | |
|-------|------|----------|-----------------------------------|
| A0200 | CAP | PRODX | PERFORM PROGRAM XX |
| A0201 | TC | BANKCALL | |
| A0202 | CADR | GOPERF3R | |
| A0203 | ... | ... | TERMINATE RETURN |
| A0204 | ... | ... | PROCEED RETURN |
| A0205 | ... | ... | ENTER RETURN |
| A0206 | ... | ... | GOPERF3R IMMEDIATELY RETURNS HERE |

R0207 GOPERF4R IS THE SAME AS GOPERF4 ONLY AN IMMEDIATE RETURN IS MADE TO USERS CALL CADR +4.

| | | | |
|-------|------|----------|-----------------------------|
| A0209 | CAP | OPTDX | REQUEST PERFORM ON OPTIONXX |
| A0210 | TC | BANKCALL | |
| A0211 | CADR | GOPERF4R | |
| A0212 | ... | ... | TERMINATE RETURN |
| A0213 | ... | ... | PROCEED RETURN |
| A0214 | ... | ... | ENTER RETURN |
| A0215 | ... | ... | IMMEDIATE RETURN TO USER |

R0216 GOPERF4R BLANKS REGISTER R3

R0217 REFLASR IS THE SAME AS REFLASH ONLY AN IMMEDIATE RETURN IS MADE TO THE USERS CALL CADR +4.

| | | | |
|-------|------|----------|-------------------------------------|
| A0219 | CAP | V00NYY | V0X NY WILL BE A FLASHING VERB NOUN |
| A0220 | TC | BANKCALL | |
| A0221 | CADR | REFLASR | |
| A0222 | ... | ... | TERMINATE RETURN |
| A0223 | ... | ... | PROCEED RETURN |
| A0224 | ... | ... | ENTER RETURN |
| A0225 | ... | ... | IMMEDIATE RETURN TO USER |

R0226 REODSPR IS THE SAME AS REODSP ONLY A RETURN (IMMEDIATE) IS MADE TO THE USER.



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A0228
A0229
A0230

A0231

CAP VOOVY
TC BANCALL
CADR REODSPR

... ..

IMMEDIATE RETURN TO USER



L DISPLAY INTERFACE ROUTINES

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R0232 GOMARK IS USED TO DISPLAY A MARK VERB NOUN ARRIVING IN A. NO RETURN IS MADE TO THE USER.

R0234 GOMOSP = GOMARK

| | | | |
|-------|------|----------|--------------------------------------|
| A0235 | CAP | V00NYY | V00NYY CONTAINS VERB AND NOUN |
| A0236 | TC | BANKCALL | |
| A0237 | CADR | GOMARK | OTHER EXTENDED VERBS USE CADR GOMOSP |

R0238 GOMARKR IS THE SAME AS GOMARK ONLY RETURN IS TO THE USER.

R0239 GOMOSPR = GOMARKR

| | | | |
|-------|------|----------|---------------------------------------|
| A0240 | CAP | V00NYY | |
| A0241 | TC | BANKCALL | |
| A0242 | CADR | GOMARKR | OTHER EXTENDED VERBS USE CADR GOMOSPR |

A0243 IMMEDIATE RETURN OF GOMARKR

R0244 GOMARKP DISPLAYS A FLASHING MARK VERB NOUN WITH NO IMMEDIATE RETURN TO THE USER. 3 RETURNS ARE POSSIBLE FROM THE ASTRONAUT (SEE NO. 7 ABOVE).

R0247 GOMOSPP = GOMARKP

| | | | |
|-------|------|----------|--|
| A0248 | CAP | V00NYY | V00NYY WILL BE A FLASHING MARK VERB NOUN |
| A0249 | TC | BANKCALL | |
| A0250 | CADR | GOMARKP | OTHER EXTENDED VERBS USE CADR GOMOSPP |
| A0251 | ... | ... | TERMINATE RETURN |
| A0252 | ... | ... | PROCEED RETURN |
| A0253 | ... | ... | ENTER OR RECYCLE RETURN |

R0254 GOMARKPR IS THE SAME AS GOMARKP ONLY AN IMMEDIATE RETURN IS MADE TO THE USER CALL CADR +4.

R0256 GOMOSPPR = GOMARKPR

| | | | |
|-------|------|----------|--|
| A0257 | CAP | V00NYY | FLASHING MARK VERB NOUN |
| A0258 | TC | BANKCALL | |
| A0259 | CADR | GOMARKPR | OTHER EXTENDED VERBS USE CADR GOMOSPPR |
| A0260 | ... | ... | TERMINATE RETURN |
| A0261 | ... | ... | PROCEED RETURN |
| A0262 | ... | ... | ENTER OR RECYCLE RETURN |

A0263 IMMEDIATE RETURN TO THE USER

R0264 GOMARK1 IS USED FOR A PLEASE PERFORM ON A MARK REQUEST WITH ONLY 1 ASTRONAUT RETURN TO THE USER. NO IMMEDIATE RETURN IS MADE. THE DESIRED MARK PLEASE PERFORM VERB AND DESIRED NOUN IS ENTERED IN A. GOMARK1 DISPLAYS R1, R2, R3 MEANS OF A V05NYY FOLLOWED BY A FLASHING V5XNYY FOR A PLEASE PERFORM. THE ASTRONAUT WILL RESPOND WITH A MARK OR MARK REJECT OR AN ENTER. THE ENTER IS THE ONLY ASTRONAUT RESPONSE THAT WILL COME BACK TO THE USER.

| | | | |
|-------|-----|----------|-------------------|
| A0272 | CAP | V5XNYY | X=1,2,3,4 Y= NOUN |
| A0273 | TC | BANKCALL | |



L DISPLAY INTERPACE ROUTINES

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A0274                                CADR  GOMARK1
A0275                                ...    ...    ENTER RETURN
R0276  *** IF BLANKING DESIRED ON NON R ROUTINES, NOTIFY DISPLAYER.
R0277  GOMARK1R IS THE SAME AS A GOMARK1 ONLY AN IMMEDIATE RETURN IS MADE TO THE USERS CALL CADR +2.
A0279  CAP  VSXNY  X=1,2,3,4  YY = NOLN
A0280  TC   BANKCALL
A0281  CADR  GOMARK1R
A0282  ...    ...    ASTRONAUT ENTER RETURN
A0283  ...    ...    IMMEDIATE RETURN TO USER
R0284  GOMARK2 IS THE SAME AS GOMARK1 ONLY 3 RETURNS ARE MADE TO THE USER FROM THE ASTRONAUT.
A0286  CAP  VSXNY  X=1,2,3,4  YY=NOLN
A0287  TC   BANKCALL
A0288  CADR  GOMARK2
A0289  ...    ...    TERMINATE RETURN
A0290  ...    ...    PROCEED RETURN
A0291  ...    ...    ENTER RETURN
R0292  GOMARK2R IS THE SAME AS GOMARK1R ONLY 3 ASTRONAUT RETURNS ARE MADE TO THE USER.
A0294  CAP  VSXNY  X=0,1,2,3,4  YY=NOLN
A0295  TC   BANKCALL
A0296  CADR  GOMARK2R
A0297  ...    ...    TERMINATE RETURN
A0298  ...    ...    PROCEED RETURN
A0299  ...    ...    ENTER RETURN
A0300  ...    ...    IMMEDIATE RETURN TO THE USER
R0301  GOMARK3 IS USED FOR A PLEASE PERFORM ON A MARK REQUEST WITH A 3 COMP. DEC DISPLAY. THE DESIRED MARK PLEASE
R0303  PERFORM VERR AND NOLN ARE ENTERED IN A. GOMARK3 DISPLAYS R1, R2, R3 BY MEANS OF A V06NYY FOLLOWED BY A FLASHING
R0305  VSXNY FOR A PLEASE PERFORM. GOMARK3 HAS 3 ASTRONAUT RETURNS TO THE USER WITH NO IMMEDIATE RETURN.
A0307  CAP  VSXNY  X=1, 2,3,4  YY=NOLN
A0308  TC   BANKCALL
A0309  CADR  GOMARK3
A0310  ...    ...    TERMINATE RETURN
A0311  ...    ...    PROCEED RETURN
A0312  ...    ...    ENTER RETURN
R0313  GOMARK4 IS THE SAME AS GOMARK3 ONLY R2 AND R3 ARE BLANKED AND R1 IS DISPLAYED IN OCTAL.
A0315  CAP  VSXNY  X=1,2,3,4  YY=NOLN
A0316  TC   BANKCALL
A0317  CADR  GOMARK4
A0318  ...    ...    TERMINATE RETURN
A0319  ...    ...    PROCEED RETURN

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L DISPLAY INTERFACE ROUTINES

A0320 ENTER RETURN

R0321 EDSPRET IS USED TO DISPLAY A VERB NOUN ARRIVING IN A WITH A RETURN MADE TO THE USER AFTER THE DISPLAY HAS BEEN
R0323 SENT OUT.

A0324 CAP VOONYY
A0325 TC BANKCALL
A0326 CADR EDSPRET

A0327 RETURN TO USER

R0328 KLERNEK CLEANS OUT ALL MARK DISPLAYS (ACTIVE AND INACTIVE). A RETURN IS MADE TO THE USER AFTER THE MARK DISPLAYS
R0330 HAVE BEEN CLEANED OUT.

A0331 TC BANKCALL
A0332 CADR KLERNEK

A0333 RETURN TO USER

R0334 MARKBRAN IS A SPECIAL PURPOSE ROUTINE USED FOR SAVING JOB VAC AREAS (SEE DESCRIPTION OF MARKBRAN BELOW).

A0336 TC BANKCALL
A0337 CADR MARKBRAN

A0338 BAD RETURN IF MARK DISPLAY NOT ACTIVE

A0339 (GOOD RETURN TO IMMEDIATE RETURN LOC OF
A0340 LAST FLASHING MARK R ROUTINE)

R0341 PINBRNCH REESTABLISHES THE LAST ACTIVE FLASHING DISPLAY. IF THERE IS NO ACTIVE FLASHING DISPLAY, THE DSKY IS
R0343 BLANKED AND CONTROL IS SENT TO ENDOPJOB.

A0344 TC POSTJUMP
A0345 CADR PINBRNCH

R0346 PRIDSP IS USED AS A PRIORITY DISPLAY. IT WILL DISPLAY A GOFLASH TYPE DISPLAY WITH THREE POSSIBLE RETURNS FROM
R0348 THE ASTRONAUT(SEE NO.7 ABOVE).

R0349 THE MAIN PURPOSE OF PRIDSP IS TO REPLACE THE PRESENT DISPLAY WITH A DISPLAY OF HIGHER PRIORITY AND TO
R0351 PROVIDE A MEANS FOR RESTORING THE OLD DISPLAY WHEN THE PRIORITY DISPLAY
R0352 IS RESPONDED TO BY THE ASTRONAUT.

R0353 THE FORMER DISPLAY IS RESTORED BY AN AUTOMATIC BRANCH TO WAKE UP THE DISPLAY THAT WAS INTERRUPTED BY THE
R0355 PRIO DISPLAY.

A0356 CAP VOONYY VOONYY WILL BE A FLASHING VERB NOUN
A0357 TC BANKCALL
A0358 CADR PRIDSP
A0359 TERMINATE RETURN
A0360 PROCEED RETURN



L DISPLAY INTERFACE ROUTINES

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| | | | |
|-------|--|----------|------------------------------------|
| A0361 | ... | ... | ENTER OR RECYCLE RETURN |
| R0362 | PRICDSPR IS THE SAME AS PRICDSONLY AN IMMEDIATE RETURN IS MADE TO THE USERS CALL CADR +4. | | |
| A0364 | CAP | V00NY | V00NY WILL BE A FLASHING VERB NOUN |
| A0365 | TC | BANKCALL | |
| A0366 | CADR | PRICDSPR | |
| A0367 | ... | ... | TERMINATE RETURN |
| A0368 | ... | ... | PROCEED RETURN |
| A0369 | ... | ... | ENTER OR RECYCLE RETURN |
| A0370 | ... | ... | IMMEDIATE RETURN |
| R0371 | PRICLARM DOES A V05N09 PRICDSPR. | | |
| R0372 | CLEANDSP CLEANS OUT ALL NORMAL DISPLAYS (ACTIVE AND INACTIVE). A RETURN IS MADE TO THE USER AFTER NORMAL | | |
| R0374 | DISPLAYS ARE CLEANED OUT. | | |
| A0375 | TC | BANKCALL | |
| A0376 | CADR | CLEANDSP | |
| A0377 | ... | ... | RETURN TO USER |

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P0378 GENERAL INFORMATION

R0379 -----
R0380 ALARM OR ABORT EXIT MODES--

A0381 PRIORITY TC ABORT
A0382 OCT 1502

R0383 PRIORITY IS BRANCHED TO WHEN (1) A NORMAL DISPLAY IS REQUESTED AND ANOTHER NORMAL DISPLAY IS ALREADY ACTIVE
R0385 (REFLASH AND RECODSP ARE EXCEPTIONS) OR (2) A PRIORITY DISPLAY IS REQUESTED WHEN ANOTHER PRIORITY DISPLAY IS
R0387 ALREADY ACTIVE (A PRIORITY WITH LINUS BIT14 IS AN EXCEPTION).
R0388 ERASABLE INITIALIZATION REQUIRED--

R0389 ACCOMPLISHED BY FRESH START- 1. FLAGWRD4 (USED EXCLUSIVELY BY DISPLAY INTERFACE ROUTINES)
R0391 2. NVSAVE = NORMAL VERR AND NOUN REGISTER.
R0393 3. EBANKTEM = NORMAL INACTIVE FLAGWORD(ALSO CONTAINS NORMALS EBANK).
R0395 5. R1SAVE = MARKCRAN CONTROL WORD
R0396 4. R2STREG = PRIORITY 30 AND SUPERRANK 3.
R0398 OUTPUT--

R0399 NVWORD = PRIO VERR AND NOUN
R0400 NVWORD +1(MARKOV) = MARK VERR AND NOUN
R0401 NVWORD +2(NVSAVE) = NORMAL VERR AND NOUN

R0402 DSPFLG(EBANKSAV) = PRIO FLAGWORD (INCLUDING EBANK)
R0403 DSPFLG +1(MARKERAN) = MARK FLAGWORD (INCLUDING EBANK)
R0404 DSPFLG +2(EBANKTEM) = NORMAL FLAGWORD (INCLUDING EBANK)

R0405 CADRFLSH = PRIO USERS CALL CADR +1 LOCATION
R0406 CADRFLSH +1(MARKFLSH) = MARK USERS CALL CADR +1 LOCATION
R0407 CADRFLSH +2(TEMPFLSH) = NORMAL USERS CALL CADR +1 LOCATION

R0408 PRIOTIME = TIME EACH PRIO REQUEST FIRST SENT OUT
R0409 OPTION1 = DESIRED OPTION FROM GOPERP4
R0410 FLAGWRD4 = BIT INFO FOR CONTROL OF ALL DISPLAY ROUTINES
R0411 DSPTM1 = R1 INPO FOR ASTRONAUT FROM PERFORM DISPLAYS(NORMAL)
R0412 SUBROUTINES USED-- NVSLR, FLAGUP, FLAGDOWN, ENDOPJOB, BLANKSLR, ABORT, JORWAKE, JOBSLEEP, FINDVAC, PRIOCHNG,
R0414 JANTERM, NVSUBUSY, FLASHN, ENDIDLE, CHANG1, BANKJUMP, MAKECADR, NOVAC,
R0415 DEBRIS-- (STORED INTO)

R0416 TEMPORARY TEMPORARIES- A, O, L, MPAC +2, MPAC +3, MPAC +4, MPAC +5, MPAC +6, RUPTREG2, RUPTREG3, CYL,
R0418 EBANK, RUPTREG4, LOC, BANKSET, MODE, MPAC, MPAC +1 4, PACEREG
R0420 ERASABLES(SHARED AND USED WITH OTHER PROGRAMS) CADRSTOR, DSPLIST, LOC, DSPTM1, OPTION1

R0422 ERASABLES(USED ONLY BY DISPLAY ROUTINES)- NVWORD,+1,+2, DSPFLG,+1,+2, CADRFLSH,+1,+2, PRIOTIME, FLAGWRD4,



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R0424 R1SAVE, MARK2PAC,
 R0425 DEBRIS-- (USED BUT NOT STORED INTO)- NOUNREQ, VERBREQ, LOCTR, MONSAVE1
 R0426 FLAGWORD DESCRIPTIONS--
 R0427 FLAGWRD4- SEE DESCRIPTION UNDER LOG SECTION ERASABLE ASSIGNMENTS

R0428 DSPFLG, DSPFLG+1, DSPFLG +2-
 R0429 -----

R0430 BITS 1 BLANK R1
 R0431 2 BLANK R2
 R0432 3 BLANK R3
 R0433 4 FLASHING DISPLAY REQUESTED
 R0434 5 PERFORM DISPLAY REQUESTED
 R0435 6 ----- R0DSPRET GCDSPRET
 R0436 7 PRIO DISPLAY -----
 R0437 8 ----- DEC MARK PERFORM -----
 R0438 9 ERANK
 R0439 10 ERANK
 R0440 11 ERANK
 R0441 12 ----- V99PASTE
 R0442 13 2ND PART OF PERFORM
 R0443 15 REFLASH OR REDO ----- REFLASH OR REDO
 R0444 15 ----- MARK REQUEST -----
 R0445 RESTARTING DISPLAYS--

R0446 RULES FOR THE DSKY OPERATOR--

- R0447 1. PROCEED AND TERMINATE SERVE AS RESPONSES TO REQUESTS FOR OPERATOR RESPONSE (FLASHING V/N). AS LONG
 R0448 AS THERE IS ANY REQUEST AWAITING OPERATOR RESPONSE, ANY USE OF PROCEED OR TERMINATE WILL SERVE AS
 R0449 RESPONSES TO THAT REQUEST. CARE SHOULD BE EXERCISED IN ATTEMPTING TO KILL AN OPERATOR INITIATED MONITOR
 R0450 WITH PROCEED AND TERMINATE FOR THIS REASON.
 R0451
 R0452 2. THE ASTRONAUT MUST RESPOND TO A PRIORITY DISPLAY NO SOONER THAN 5 SECS FROM THE TIME THE MISSION
 R0453 PROGRAM SENT OUT THE REQUEST FOR OPERATOR RESPONSE (THE ASTRONAUT WOULD SEE THIS DISPLAY FOR LESS TIME
 R0454 DUE TO TIME IT TAKES TO GET DISPLAY SENT OUT.) IF THE ASTRONAUT RESPONDS TOO SOON, THE PRIORITY DISPLAY
 R0455 IS SENT OUT AGAIN---AND AGAIN UNTIL AN ACCUMULATED 5 SECS FROM TIME THE FIRST PRIORITY DISPLAY WAS SENT
 R0456 OUT. THE SAME 5 SEC. DELAY WILL OCCUR AT 163.84 SECS OR IN ANY MULTIPLE OF THAT TIME DUE TO PROGRAM
 R0457 CONSIDERATION.
 R0458
 R0459 3. KEY RELEASE BUTTON-
 R0460 A) IF THE KEY RELEASE LIGHT IS ON, IT SIMPLY RELEASES THE KEYBOARD AND DISPLAY FOR INTERNAL USE.
 R0461 B) IF THE KEY RELEASE LIGHT IS OFF, AND IF SOME REQUEST FOR OPERATOR RESPONSE (FLASHING V/N) IS STILL
 R0462 AWAITING RESPONSE THEN IT RE-ESTABLISHES THE DISPLAYS THAT ORIGINALLY REQUESTED RESPONSE.
 R0463 IF AN OPERATOR WANTS THEREFORE TO RE-ESTABLISH BUT CONDITION (A) IS ENCOUNTERED, A SECOND DEPRESSION OF
 R0464 KEY RELEASE BUTTON MAY BE NECESSARY.
 R0465
 R0466 4. IT IS IMPORTANT TO ANSWER ALL REQUESTS FOR OPERATOR RESPONSE.
 R0467
 R0468 5. IT IS ALWAYS GOOD PRACTICE TO TERMINATE AN EXTENDED VERB BEFORE ASKING FOR ANOTHER ONE OR THE SAME ONE
 R0469 OVER AGAIN.
 R0470 SPECIAL CONSIDERATIONS--



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- R0480 1. MPAC +2 SAVED ONLY IN MARK DISPLAYS
R0481 2. GODSP(R), REODSP(R), GOMARK(R) ALWAYS TURN ON THE FLASH IF ENTERED WITH A PASTE VERB REQUEST.
R0483 3. ALL NORMAL DISPLAYS ARE RESTARTABLE EXCEPT GODSP(R), REODSP(R)
R0484 4. ALL EXTENDED VERBS WITH DISPLAYS SHOULD START WITH A TC TESTACT AND FINISH WITH A TC ENDXT.
R0486 5. GODSP(R) AND REODSP(R) MUST BE IN THE SAME EBANK AND SUPERBANK AS THE LAST NORMAL DISPLAY RESTARTED
R0488 BY A .1 RESTART PHASE CHANGE.
R0489 6. IN ORDER TO SET UP A NON DISPLAY .1 RESTART POINT, THE USER MUST MAKE CERTAIN THAT RESTRG3 CONTAINS THE
R0491 CORRECT PRIORITY AND SUPERBANK AND THAT ERANKTEM CONTAINS THE CO
R04911 7. IF CLEANSP IS RESTARTED VIA A .1 PHASE CHANGE, CAP ZERO SHOULD BE EXECUTED BEFORE THE TC BANKCALL.



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P0492 CALLING SEQUENCE FOR BLANKING
 A0493
 A0494
 A0495

CAP BITX X=1,2,3 BLANK R1,R2,R3 RESPECTIVELY
 TC BLANKET
 RETURN TO USER HERE

R0496 IN ORDER TO USE BLANKET CORRECTLY THE USER MUST USE A DISPLAY ROUTINE THAT ENDS IN R FIRST FOLLOWED BY THE CALL
 R0498 TO BLANKET AT THE IMMEDIATE RETURN LOC.

| | | | | | | | |
|-------|---|-----------|---------|----------|----------|-----------------|--|
| 0499 | | | 5415 | | | BLOCK 02 | |
| 0500 | REP 1 | | 4000 | | | SETLOC PPTAG4 | |
| 0501 | | | 5415 | | | BANK | |
| 0502 | REP 1 | | | | | COUNT 02/DSPLA | |
| 0503 | REP 702 | LAST 1417 | 5415 | 54 162 0 | BLANKET | TS MPAC +6 | |
| 0504 | REP 1 | | 5416 | 4 0160 1 | | CS PLAYTEM4 | |
| 0505 | REP 703 | LAST 1433 | 5417 | 7 0162 0 | | MASK MPAC +6 | |
| 0506 | REP 704 | LAST 1433 | 5420 | 50 161 1 | | INDEX MPAC +5 | |
| 0507 | REP 2 | LAST 1433 | 5421 | 26 160 1 | | ADS PLAYTEM4 | |
| 0508 | REP 331 | LAST 1419 | 5422 | 0 0002 0 | | TC 0 | |
| 0511 | REP 63 | LAST 1410 | 5423 | 0 4574 0 | ENDMARK | TC POSTJUMP | |
| 0512 | REP 1 | | 5424 | 20457 0 | | CADR MARKEND | |
| 05121 | REP 209 | LAST 1418 | 5425 | 3 4714 1 | CLEARMRK | CAP ERRO | |
| 05122 | REP 20 | LAST 888 | 5426 | 55=044 1 | | TS EXTRACT | |
| 05123 | | | 5427 | 0 0004 0 | | INHINT | |
| 05124 | REP 81 | LAST 1406 | 5430 | 4 4712 0 | | CS BIT1 | |
| 05125 | REP 5 | LAST 385 | 5431 | 7 0100 1 | | MASK FLAGWRD4 | |
| 05126 | REP 6 | LAST 1433 | 5432 | 54 100 1 | | TS FLAGWRD4 | |
| 05127 | | | 5433 | 0 0003 1 | | RELINT | |
| 05128 | REP 332 | LAST 1433 | 5434 | 0 0002 0 | | TC 0 | |
| R0513 | **ALL EXTENDED VERB ROUTINES THAT HAVE AT LEAST ONE FLASHING DISPLAY MUST TCP ENDMARK OR TCP ENDEXT WHEN | | | | | | |
| R0515 | FINISHED. | | | | | | |
| 0516 | | | 10,2457 | | | BANK 10 | |
| 0517 | REP 1 | | 10,2000 | | | SETLOC DISPLAYS | |
| 0518 | | | 10,2457 | | | BANK | |
| 0519 | REP 1 | | | | | COUNT 10/DSPLA | |
| R0520 | NTERONLY IS USED TO DIFFERENTIATE THE MARK ROUTINE WITH ONLY ONE RETURN TO THE USER FROM THE MARKING ROUTINE WITH | | | | | | |
| R0522 | 3 RETURNS TO THE USER. THIS ROUTINE IS ONLY USED BY GOMARK1 AND GOMARK1R. | | | | | | |
| 05291 | REP 6 | LAST 744 | 10,2457 | 0 5425 1 | MARKEND | TC CLEARMRK | |
| 05297 | REP 1 | | 10,2460 | 1 3547 0 | | TCP MARKOVER | |

L DISPLAY INTERPACE ROUTINES

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| | | | | | | | | | | | |
|-------|-----|-----|-----------|---------|----|------|---|----------|------|----------|--|
| 0530 | REP | 1 | | 10,2461 | 54 | 155 | 1 | GOMARK | TS | PLAYTEM1 | ENTRANCE FOR MARK GODSP |
| 0531 | REP | 54 | LAST 1417 | 10,2462 | 3 | 4674 | 0 | GOMARKS | CAP | BIT15 | BIT15 SET FOR ALL MARK REQUESTS |
| 0532 | REP | 1 | | 10,2463 | 1 | 2626 | 0 | | TCP | GOFLASH2 | |
| 0533 | REP | 270 | LAST 1433 | 10,2464 | 3 | 4714 | 1 | KLEENEX | CAP | ZERO | CLEAN OUT EXTENDED VERBS |
| 0534 | REP | 2 | LAST 1434 | 10,2465 | 54 | 155 | 1 | GOMARKP | TS | PLAYTEM1 | ENTRANCE FOR MARK GOFLASH |
| 0535 | REP | 1 | | 10,2466 | 3 | 3157 | 1 | | CAP | MARKPMSK | MARK, FLASH |
| 0536 | REP | 2 | LAST 1434 | 10,2467 | 1 | 2626 | 0 | | TCP | GOFLASH2 | |
| 0539 | REP | 3 | LAST 1434 | 10,2470 | 54 | 155 | 1 | GOMARK2 | TS | PLAYTEM1 | MARK GOPERFS-3 AST. RETURNS |
| 0540 | REP | 1 | | 10,2471 | 3 | 3646 | 0 | MARKFORM | CAP | MPERFMSK | MARK, PERFORM, FLASH |
| 0541 | REP | 3 | LAST 1434 | 10,2472 | 1 | 2626 | 0 | | TCP | GOFLASH2 | |
| 0542 | REP | 4 | LAST 1434 | 10,2473 | 54 | 155 | 1 | GOMARK3 | TS | PLAYTEM1 | USED FOR 3COMP DECIMAL PERFORM |
| 0543 | REP | 1 | | 10,2474 | 3 | 3633 | 1 | | CAP | MARK3MSK | |
| 0544 | REP | 4 | LAST 1434 | 10,2475 | 1 | 2626 | 0 | | TCP | GOFLASH2 | |
| 0545 | REP | 5 | LAST 1434 | 10,2476 | 54 | 155 | 1 | GOMARK4 | TS | PLAYTEM1 | |
| 0546 | REP | 1 | | 10,2477 | 3 | 3634 | 0 | | CAP | MARK4MSK | MARK, PERFORM, FLASH, BLANK |
| 0547 | REP | 5 | LAST 1434 | 10,2500 | 1 | 2626 | 0 | | TCP | GOFLASH2 | |
| 0548 | REP | 6 | LAST 1434 | 10,2501 | 54 | 155 | 1 | GOMARKR | TS | PLAYTEM1 | ENTRANCE FOR MARK GODSPR |
| 0549 | REP | 55 | LAST 1434 | 10,2502 | 3 | 4674 | 0 | | CAP | BIT15 | |
| 0550 | REP | 1 | | 10,2503 | 1 | 2604 | 0 | | TCP | GODSPR2 | |
| 0551 | REP | 7 | LAST 1434 | 10,2504 | 54 | 155 | 1 | GOMARKPR | TS | PLAYTEM1 | ENTRANCE FOR MARK GOFLASHR |
| 0552 | REP | 2 | LAST 1434 | 10,2505 | 3 | 3157 | 1 | | CAP | MARKPMSK | |
| 0553 | REP | -1 | | 10,2506 | 1 | 2765 | 0 | | TCP | GODSPRS | |
| 0559 | REP | 8 | LAST 1434 | 10,2507 | 54 | 155 | 1 | GOMARK2R | TS | PLAYTEM1 | MARK GOPERFS-3 AST. RETS. IMMEDIATE RET. |
| 0560 | REP | 2 | LAST 1434 | 10,2510 | 3 | 3646 | 0 | | CAP | MPERFMSK | MARK, PERFORM, FLASH |
| 0561 | REP | 2 | LAST 1434 | 10,2511 | 1 | 2765 | 0 | | TCP | GODSPRS | |
| 05611 | REP | 9 | LAST 1434 | 10,2512 | 54 | 155 | 1 | GOMARK3R | TS | PLAYTEM1 | |
| 05612 | REP | 2 | LAST 1434 | 10,2513 | 3 | 3633 | 1 | | CAP | MARK3MSK | |
| 05613 | REP | 3 | LAST 1434 | 10,2514 | 1 | 2765 | 0 | | TCP | GODSPRS | |
| 0562 | REP | 163 | LAST 1408 | 10,2515 | 3 | 4712 | 1 | MAKEMARK | CAP | ONE | |
| 0563 | REP | 1 | | 10,2516 | 0 | 3063 | 1 | | TC | COPIES | |
| 0564 | REP | 7 | LAST 1433 | 10,2517 | 3 | 0100 | 0 | | CA | FLAGWRD4 | IS NORM OR PRIO BUSY OR WAITING |
| 0565 | REP | 1 | | 10,2520 | 7 | 3647 | 0 | | MASK | OCT34300 | |
| 0566 | REP | 392 | LAST 1419 | 10,2521 | 10 | 000 | 0 | | CCS | A | |
| 0567 | REP | 1 | | 10,2522 | 1 | 2560 | 1 | | TCP | CHKPRIO | |
| 0568 | REP | 8 | LAST 1434 | 10,2523 | 3 | 0100 | 0 | | CA | FLAGWRD4 | IS MARK SLEEPING DUE TO ASTRO BUSY |



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| | | | | | | | | | |
|-------|---|-----|-----------|---------|----------|----------|----------|--------------------------------|--------------------------|
| 0549 | REP | 36 | LAST 1411 | 10,2524 | 7 4702 1 | MASK | BITS | | |
| 0570 | | | | 10,2525 | 0 0000 1 | EXTEND | | | |
| 0571 | REP | 1 | | 10,2526 | 1 2530 1 | BZF | MARKPLAY | NO | |
| 0572 | REP | 110 | LAST 1284 | 10,2527 | 1 5112 1 | TCP | ENDOPJOB | | |
| 0584 | | | | 10,2530 | 0 0004 0 | MARKPLAY | INHINT | | |
| 0585 | REP | 29 | LAST 1363 | 10,2531 | 4 4715 1 | CS | FIVE | RESET MARK OVER NORM, SET MARK | |
| 0586 | REP | 9 | LAST 1434 | 10,2532 | 7 0100 1 | MASK | FLAGWRD4 | | |
| 05865 | REP | 164 | LAST 1434 | 10,2533 | 6 4712 1 | AD | ONE | | |
| 0597 | REP | 10 | LAST 1435 | 10,2534 | 54 100 1 | TS | FLAGWRD4 | | |
| 0598 | | | | 10,2535 | 0 0003 1 | RELINT | | | |
| 0599 | REP | 1 | | 10,2536 | 4 1070 0 | ODDQMARK | CS | MARKFLAG | PERFORM |
| 0600 | REP | 45 | LAST 1415 | 10,2537 | 7 4708 0 | MASK | BITS | | |
| 0601 | REP | 393 | LAST 1434 | 10,2540 | 10 000 0 | CCS | A | | |
| 0602 | REP | 1 | | 10,2541 | 1 2544 1 | TCP | MARKCOP | | |
| 0603 | REP | 1 | | 10,2542 | 4 0370 1 | CS | MAROV | | |
| 0604 | REP | 2 | LAST 1435 | 10,2543 | 54 370 1 | TS | MAROV | | |
| 0605 | REP | 185 | LAST 1435 | 10,2544 | 3 4712 1 | MARKCOP | CAP | ONE | MARK INDEX |
| 0606 | REP | 1 | | 10,2545 | 1 2744 0 | TCP | PRIOPLAY | | |
| 0607 | REP | 1 | | 10,2546 | 3 0165 0 | COPYTODD | CA | MPAC2SAV | |
| 0608 | REP | 705 | LAST 1433 | 10,2547 | 54 158 1 | TS | MPAC +2 | | |
| 0609 | REP | 1 | | 10,2550 | 50 164 1 | COPYPACS | INDEX | COPINDEX | |
| 0610 | REP | 1 | | 10,2551 | 3 3657 0 | CAP | PRIOCT | | |
| 0611 | REP | 1 | | 10,2552 | 54 162 0 | TS | GENMASK | | |
| 0612 | REP | 2 | LAST 1435 | 10,2553 | 50 164 1 | INDEX | COPINDEX | | |
| 0613 | REP | 1 | | 10,2554 | 3 1067 1 | CAP | BRANKSAV | | |
| 0614 | REP | 1 | | 10,2555 | 54 160 1 | TS | TEMPOR2 | ACTIVE BRANK AND FLAG | |
| 0615 | REP | 63 | LAST 1410 | 10,2556 | 54 003 0 | TS | BRANK | | |
| 0616 | REP | 333 | LAST 1433 | 10,2557 | 0 0002 0 | TC | 0 | | |
| 0617 | PINCHK CHECKS TO SEE IF THE CURRENT MARK REQUEST IS MADE BY THE ASTRONAUT WHILE INTERRUPTING A GOPLAY DISPLAY | | | | | | | | |
| 0619 | (A NORMAL OR A PRIO). IF THE ASTRONAUT TRIES TO MARK DURING A PRIO, THE CHECK FAIL LIGHT GOES ON AND THE MARK | | | | | | | | |
| 0621 | REQUEST IS ENDED. IF HE TRIES TO MARK DURING A NORM, THE MARK IS ALLOWED. IN THIS CASE THE NORM IS PUT TO SLEEP | | | | | | | | |
| 0623 | UNTIL ALL MARKING IS FINISHED. | | | | | | | | |
| 0624 | IF THE MARK REQUEST COMES FROM THE PROGRAM DURING A TIME THE ASTRONAUT IS NOT INTERRUPTING A NORMAL OR A | | | | | | | | |
| 0626 | PRIO, THE MARK REQUEST IS PUT TO SLEEP UNTIL THE PRESENT ACTIVE DISPLAY IS RESPONDED TO BY THE ASTRONAUT. | | | | | | | | |
| 0628 | REP | 11 | LAST 1435 | 10,2560 | 3 0100 0 | CHKPRIO | CA | FLAGWRD4 | MARK ATTEMPT DURING PRIO |
| 0629 | REP | 1 | | 10,2561 | 7 3402 0 | MASK | OCT24100 | | |
| 0630 | REP | 394 | LAST 1435 | 10,2562 | 10 000 0 | CCS | A | | |
| 0631 | REP | 1 | | 10,2563 | 1 3602 1 | TCP | MARSLERP | | |



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| | | | | | | | | |
|------|-----|-----|-----------|---------|----------|----------|----------|----------|
| 0632 | REP | 12 | LAST 1435 | 10,2564 | 4 0100 1 | CS | FLAGWD4 | |
| 0633 | REP | 35 | LAST 1418 | 10,2565 | 7 4710 1 | MASK | BIT3 | |
| 0634 | | | | 10,2566 | 0 0004 0 | INHINT | | |
| 0635 | REP | 13 | LAST 1436 | 10,2567 | 26 100 1 | ADS | FLAGWD4 | |
| 0636 | REP | 1 | | 10,2570 | 1 2662 0 | TCP | SETNORM | |
| 0637 | REP | 3 | LAST 1435 | 10,2571 | 3 0370 0 | MARKPERP | CA | MARKOV |
| 0638 | REP | 1 | | 10,2572 | 7 4160 0 | MASK | VEREMASK | |
| 0639 | REP | 1 | | 10,2573 | 1 3246 0 | TCP | INV50DSP | |
| 0640 | REP | 10 | LAST 1434 | 10,2574 | 54 155 1 | GODSP | TS | PLAYTEM1 |
| 0641 | REP | 271 | LAST 1434 | 10,2575 | 3 4714 1 | GODSP2 | CAP | ZERO |
| 0642 | REP | 8 | LAST 1434 | 10,2576 | 1 2626 0 | TCP | GOFLASH2 | |
| 0643 | REP | 11 | LAST 1436 | 10,2577 | 54 155 1 | GODSPRET | TS | PLAYTEM1 |
| 0644 | REP | 55 | LAST 1406 | 10,2600 | 3 4705 1 | | CAP | BIT6 |
| 0645 | REP | 7 | LAST 1436 | 10,2601 | 1 2626 0 | | TCP | GOFLASH2 |
| 0646 | REP | 12 | LAST 1436 | 10,2602 | 54 155 1 | GODSPR | TS | PLAYTEM1 |
| 0647 | REP | 272 | LAST 1436 | 10,2603 | 3 4714 1 | GODSPR1 | CAP | ZERO |
| 0648 | REP | 3 | LAST 1433 | 10,2604 | 54 160 1 | GODSPR2 | TS | PLAYTEM4 |
| 0649 | REP | 273 | LAST 1436 | 10,2605 | 3 4714 1 | | CAP | ZERO |
| 0650 | REP | 1 | | 10,2606 | 1 2767 1 | | TCP | GODSPR1 |

SET MARK OVER NORM

ENTRANCE FOR A GODSP WITH A PASTE

SET BIT6 TO GO BACK TO USER AFTER INV50

* DONT MOVE

R0651 CLEAN DSP IS USED FOR CLEARING OUT A NORMAL DISPLAY THAT IS PRESENTLY ACTIVE OR A NORMAL DISPLAY THAT IS
R0653 SET UP TO BE STARTED OR RESTARTED.

R0654 NORMALLY THE USER WILL NOT NEED TO USE THIS ROUTINE SINCE A NEW NORMAL DISPLAY AUTOMATICALLY CLEARS OUT AN
R0656 OLD DISPLAY.

R0657 CALLING SEQUENCE FOR CLEAN DSP-

| | | | | | | | | |
|-------|-----|-----|-----------|---------|----------|----------|----------|----------|
| A0658 | | | | | | TC | BANKCALL | |
| A0659 | | | | | | CADR | CLEANDSP | |
| 0660 | REP | 274 | LAST 1436 | 10,2607 | 3 4714 1 | CLEANDSP | CAP | ZERO |
| 0661 | REP | 13 | LAST 1436 | 10,2610 | 54 155 1 | REFLASH | TS | PLAYTEM1 |
| 0662 | REP | 1 | | 10,2611 | 3 3632 0 | | CAP | REDOMASK |
| 0663 | REP | 8 | LAST 1436 | 10,2612 | 1 2626 0 | | TCP | GOFLASH2 |
| 0664 | REP | 14 | LAST 1436 | 10,2613 | 54 155 1 | REFLASHR | TS | PLAYTEM1 |
| 0665 | REP | 2 | LAST 1436 | 10,2614 | 3 3632 0 | | CAP | REDOMASK |
| 0666 | REP | 4 | LAST 1434 | 10,2615 | 1 2765 0 | | TCP | GODSPR1 |

FLASH AND PERMIT

FLASH AND PERMIT



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| | | | | | | | | |
|------|-----|-----|-----------|---------|----------|----------|--------|----------|
| 0667 | REP | 15 | LAST 1436 | 10,2616 | 54 155 1 | RECODSP | TS | PLAYTEM1 |
| 0668 | REP | 81 | LAST 1404 | 10,2617 | 3 4675 1 | | CAP | BIT14 |
| 0669 | REP | 9 | LAST 1436 | 10,2620 | 1 2626 0 | | TCP | GOFLASH2 |
| 0670 | REP | 16 | LAST 1437 | 10,2621 | 54 155 1 | RECODSPR | TS | PLAYTEM1 |
| 0671 | REP | 82 | LAST 1437 | 10,2622 | 3 4675 1 | | CAP | BIT14 |
| 0672 | REP | 2 | LAST 1434 | 10,2623 | 1 2604 0 | | TCP | GODSPR2 |
| 0673 | REP | 17 | LAST 1437 | 10,2624 | 54 155 1 | GOFLASH | TS | PLAYTEM1 |
| 0674 | REP | 52 | LAST 1418 | 10,2625 | 3 4707 0 | | CAP | BIT4 |
| 0675 | REP | 4 | LAST 1436 | 10,2626 | 54 160 1 | GOFLASH2 | TS | PLAYTEM4 |
| 0676 | REP | 1 | | 10,2627 | 0 3050 1 | | TC | SAVELOCS |
| 0677 | | | | 10,2630 | 0 0003 1 | | | RELINT |
| 0678 | REP | 1 | | 10,2631 | 1 2674 1 | | TCP | MAKEPLAY |
| 0679 | REP | 18 | LAST 1437 | 10,2632 | 54 155 1 | PRICDSPR | TS | PLAYTEM1 |
| 0680 | REP | 1 | | 10,2633 | 3 3651 0 | | CAP | BITS7+4 |
| 0681 | REP | 5 | LAST 1436 | 10,2634 | 1 2765 0 | | TCP | GODSPRS |
| 0682 | REP | 19 | LAST 1437 | 10,2635 | 54 155 1 | PRICDSP | TS | PLAYTEM1 |
| 0683 | REP | 2 | LAST 1437 | 10,2636 | 3 3651 0 | SETPRIO | CAP | BITS7+4 |
| 0684 | REP | 10 | LAST 1437 | 10,2637 | 1 2626 0 | | TCP | GOFLASH2 |
| 0685 | REP | 275 | LAST 1436 | 10,2640 | 3 4714 1 | MAKEPRIO | CAP | ZERO |
| 0686 | REP | 3 | LAST 1435 | 10,2641 | 54 164 0 | | TS | COPINDEX |
| 0687 | REP | 1 | | 10,2642 | 0 3522 1 | | TC | LINUSCHR |
| 0688 | REP | 1 | | 10,2643 | 1 2650 1 | | TCP | HIPRIO |
| 0689 | REP | 14 | LAST 1436 | 10,2644 | 3 0100 0 | | CA | FLAGWRD4 |
| 0690 | REP | 1 | | 10,2645 | 7 3670 1 | | MASK | OCT20100 |
| 0691 | REP | 395 | LAST 1435 | 10,2646 | 10 000 0 | | OCS | A |
| 0692 | REP | 1 | | 10,2647 | 1 2723 1 | | TCP | PRIORORT |
| 0693 | REP | 15 | LAST 1437 | 10,2650 | 3 0100 0 | HIPRIO | CA | FLAGWRD4 |
| 0694 | REP | 1 | | 10,2651 | 7 5612 0 | | MASK | OCT40400 |
| 0695 | | | | 10,2652 | 0 0006 1 | | EXTEND | |
| 0696 | REP | 1 | | 10,2653 | 1 2656 1 | | RZP | ASKIPNR4 |
| 0697 | REP | 276 | LAST 1437 | 10,2654 | 3 4714 1 | SETPRIO | CAP | ZERO |
| 0698 | REP | 1 | | 10,2655 | 1 3122 1 | | TCP | JOPXCHS |
| 0699 | REP | 16 | LAST 1437 | 10,2656 | 3 0100 0 | ASKIPNR4 | CA | FLAGWRD4 |

LEAVE ONLY FLASH BIT SET

BRANCH DIRECT WITH NO SEPARATE JOB CALL

LINUS RETURN

IS PRIO IN ENDIDLE OR BUSY

YES, ABORT

MARK ACTIVE

NO

NORMAL ACTIVE

L DISPLAY INTERFACE ROUTINES

| | | | | | | | | | |
|-------|-----|-----|-----------|---------|--------|---|----------|-----------|---|
| 0700 | REP | 1 | | 10,2657 | 7 3666 | 0 | MASK | OCT10200 | BITS 13+8 |
| 0701 | | | | 10,2660 | 0 0006 | 1 | EXTEND | | |
| 0702 | REP | 1 | | 10,2661 | 1 2664 | 0 | BZP | QKTOCOPY | NO |
| 0703 | REP | 166 | LAST 1435 | 10,2662 | 3 4712 | 1 | SETNORM | CAP | ONE |
| 0704 | REP | 2 | LAST 1437 | 10,2663 | 1 3122 | 1 | TCP | JOBXCHS | |
| 0705 | REP | 1 | | 10,2664 | 0 3062 | 0 | QKTOCOPY | TC | COPYNORM |
| 0706 | REP | 1 | | 10,2665 | 0 3333 | 1 | TC | WITCHONE | |
| 0707 | REP | 8 | LAST 1407 | 10,2666 | 0 5074 | 1 | TC | JOBWAKE | |
| 0708 | REP | 1 | | 10,2667 | 0 3350 | 1 | TC | XCHTOEND | |
| 0709 | REP | 22 | LAST 1384 | 10,2670 | 3 0025 | 0 | REDOPRIO | CA | TIME1 |
| 0710 | REP | 1 | | 10,2671 | 55-147 | 0 | TS | PRIOTIME | SAVE TIME PRIODSP SENT OUT |
| 0711 | REP | 277 | LAST 1437 | 10,2672 | 3 4714 | 1 | KEEPPRIO | CAP | ZERO |
| 0712 | REP | 2 | LAST 1435 | 10,2673 | 1 2744 | 0 | TCP | PRIOPLAY | START UP PRIO DISPLAY |
| 0713 | REP | 28 | LAST 1410 | 10,2674 | 3 0167 | 1 | MAKEPLAY | CA | PRIORITY |
| 0713 | REP | 3 | LAST 1410 | 10,2675 | 7 7674 | 1 | MASK | PRIO37 | SAVE USERS PRIORITY |
| 07132 | REP | 1 | | 10,2676 | 54 163 | 1 | TS | USERPRIO | |
| 07133 | REP | 1 | | 10,2677 | 3 7670 | 1 | CAP | PRIO33 | RAISE PRIORITY FOR FAST JOBS AFTER WAKE |
| 07134 | REP | 10 | LAST 815 | 10,2700 | 0 5103 | 0 | TC | PRIOCHNG | |
| 07135 | REP | 5 | LAST 1437 | 10,2701 | 3 0160 | 0 | CA | PLAYTRM4 | IS IT MARK OR PRIO OR NORM |
| 0714 | REP | 1 | | 10,2702 | 7 3650 | 0 | MASK | BITS15+7 | |
| 0715 | REP | 396 | LAST 1437 | 10,2703 | 10 000 | 0 | CCS | A | |
| 0716 | REP | 1 | | 10,2704 | 1 2640 | 0 | TCP | MAKEPRIO | ITS PRIO |
| 0717 | REP | 1 | | 10,2705 | 1 2707 | 1 | TCP | IFLEGAL | |
| 0718 | REP | 1 | | 10,2706 | 1 2515 | 0 | TCP | MAKEMARK | ITS MARK |
| 0719 | REP | 75 | LAST 1408 | 10,2707 | 3 4711 | 1 | IFLEGAL | CAP | TWO |
| 0720 | REP | 4 | LAST 1437 | 10,2710 | 54 164 | 0 | TS | COPINDEX | |
| 0721 | REP | 2 | LAST 1437 | 10,2711 | 0 3522 | 1 | TC | LINUSCHR | |
| 0722 | REP | 1 | | 10,2712 | 1 2725 | 1 | TCP | QKTOPLAY | LINUS RETURN |
| 0723 | REP | 3 | LAST 196 | 10,2713 | 4 1071 | 1 | CS | BRANKTEM | |
| 0724 | REP | 53 | LAST 1437 | 10,2714 | 7 4707 | 1 | MASK | BIT4 | |
| 0725 | REP | 397 | LAST 1438 | 10,2715 | 10 000 | 0 | CCS | A | |
| 0726 | REP | 2 | LAST 1438 | 10,2716 | 1 2725 | 1 | TCP | QKTOPLAY | NO |
| 0727 | REP | 17 | LAST 1437 | 10,2717 | 3 0100 | 0 | CA | FLAGWRD4 | WAS NORM ASLEEP |
| 0728 | REP | 1 | | 10,2720 | 7 3641 | 0 | MASK | NFLUSMASK | ARE ANY NORMS ASLEEP |
| 0729 | | | | 10,2721 | 0 0006 | 1 | EXTEND | | |
| 0730 | REP | 3 | LAST 1438 | 10,2722 | 1 2725 | 1 | BZP | QKTOPLAY | NO |



L DISPLAY INTERPACE ROUTINES

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| | | | | | | | | | |
|-------|---|-----|-----------|---------|----------|----------|--------|----------|--|
| 0731 | REP | 6 | LAST 1410 | 10,2723 | 0 5622 1 | PRIORBT | TC | POODOO | |
| 0732 | | | | 10,2724 | 01502 1 | | OCT | 1502 | |
| 0733 | REP | 1 | | 10,2725 | 0 3064 0 | OKTOPLAY | TC | COPIES2 | |
| 07331 | REP | 2 | LAST 1438 | 10,2726 | 3 0163 0 | | CA | USERPRIO | |
| 07332 | | | | 10,2727 | 0 0006 1 | | EXTEND | | |
| 07333 | REP | 24 | LAST 1378 | 10,2730 | 04 007 1 | | ROR | SUPERPK | |
| 07334 | REP | 3 | LAST 193 | 10,2731 | 54 366 0 | | TS | RESTREQ | |
| 0737 | REP | 16 | LAST 1438 | 10,2732 | 3 0100 0 | | CA | FLAGWRD4 | |
| 0738 | REP | 1 | | 10,2733 | 7 3642 0 | | MASK | PMASK | |
| 0739 | REP | 398 | LAST 1438 | 10,2734 | 10 000 0 | | CCS | A | |
| 0740 | REP | 1 | | 10,2735 | 1 3102 0 | | TCP | GOSLEEPS | |
| 0741 | | | | 10,2736 | 1 2740 1 | | TCP | +2 | |
| 0742 | REP | 2 | LAST 1439 | 10,2737 | 1 3102 0 | | TCP | GOSLEEPS | |
| 0743 | COULD PUT NORM BUSY CHECK HERE TO SAVE TIME | | | | | | | | |
| 0744 | REP | 2 | LAST 1438 | 10,2740 | 0 3333 1 | | TC | WITCHONE | |
| 0745 | REP | 9 | LAST 1438 | 10,2741 | 0 5074 1 | | TC | JOBWAKE | |
| 0746 | REP | 2 | LAST 1438 | 10,2742 | 0 3350 1 | | TC | XCHTORD | |
| 0747 | REP | 76 | LAST 1438 | 10,2743 | 3 4711 1 | PLAYJUM1 | CAP | TWO | |
| 0748 | REP | 5 | LAST 1438 | 10,2744 | 54 164 0 | PRIOPLAY | TS | COPINDEX | |
| 0749 | REP | 1 | | 10,2745 | 1 3216 0 | | TCP | GOPLAY | |
| 0750 | REP | 20 | LAST 1437 | 10,2746 | 54 155 1 | EXDSPRET | TS | PLAYTEM1 | |
| 0751 | REP | 2 | LAST 154 | 10,2747 | 3 7703 1 | | CAP | BIT15+6 | |
| 0752 | REP | 11 | LAST 1437 | 10,2750 | 1 2626 0 | | TCP | GOFLASH2 | |
| 0753 | REP | 2 | LAST 715 | 10,2751 | 55-045 0 | GOPERP1 | TS | NORMTEM1 | |
| 0754 | REP | 1 | | 10,2752 | 3 3624 1 | | CAP | V01N25 | |
| 0755 | REP | 21 | LAST 1439 | 10,2753 | 54 155 1 | GOPERP5 | TS | PLAYTEM1 | |
| 0756 | REP | 1 | | 10,2754 | 3 3623 0 | | CAP | PERPMASK | |
| 0757 | REP | 12 | LAST 1439 | 10,2755 | 1 2626 0 | | TCP | GOFLASH2 | |
| 0758 | REP | 22 | LAST 1439 | 10,2756 | 54 155 1 | GOPERP2 | TS | PLAYTEM1 | |
| 0759 | REP | 1 | | 10,2757 | 3 3627 1 | | CAP | PERF2MSK | |
| 0760 | REP | 13 | LAST 1439 | 10,2760 | 1 2626 0 | | TCP | GOFLASH2 | |
| 0764 | REP | 1 | | 10,2761 | 0 3043 0 | GOPERP4 | TC | PURRS4 | |
| 0765 | REP | 14 | LAST 1439 | 10,2762 | 1 2626 0 | | TCP | GOFLASH2 | |

PRIO OR MARK GOING

YES

MARK GOING

IS IT NVSR BUSY, ENDILE OR NOONE

STORE DESIRED CHECKLIST VALUE
USED TO DISPLAY CHECKLIST VALUE IN R1

LEAVE ONLY FLASH, PERFORM, BLANKING

DESIRED VERR-NOUN TO DISPLAY R1,R2,R3



L DISPLAY INTERFACE ROUTINES

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| | | | | | | | | |
|-------|-----|-----|-----------|---------|----------|----------|----------|-----------|
| 0766 | REP | 23 | LAST 1439 | 10,2763 | 54 155 1 | GOFLASHR | TS | PLAYTEM1 |
| 0767 | REP | 64 | LAST 1438 | 10,2764 | 3 4707 0 | | CAP | BIT4 |
| 0768 | REP | 6 | LAST 1438 | 10,2765 | 54 160 1 | GODSPRS | TS | PLAYTEM4 |
| 0769 | REP | 48 | LAST 1403 | 10,2766 | 3 6214 0 | | CAP | THREE |
| 0770 | | | | 10,2767 | 0 0004 0 | GODSPRS1 | INHINT | |
| 0771 | REP | 9 | LAST 1407 | 10,2770 | 54 072 0 | | TS | RUPTRREG3 |
| 0772 | REP | 29 | LAST 1438 | 10,2771 | 3 0187 1 | | CA | PRIORITY |
| 0773 | REP | 4 | LAST 1438 | 10,2772 | 7 7674 1 | | MASK | PRIO37 |
| 0774 | REP | 11 | LAST 1187 | 10,2773 | 54 053 0 | | TS | NEWPRIO |
| 07741 | REP | 7 | LAST 1440 | 10,2774 | 3 0160 0 | | CA | PLAYTEM4 |
| 07742 | REP | 55 | LAST 1440 | 10,2775 | 7 4707 1 | | MASK | BIT4 |
| 07743 | REP | 388 | LAST 1439 | 10,2776 | 10 000 0 | | CCS | A |
| 07744 | REP | 1 | | 10,2777 | 1 3005 0 | | TCP | VACDSP |
| 07745 | REP | 12 | LAST 1440 | 10,3000 | 3 0063 1 | | CA | NEWPRIO |
| 07746 | REP | 34 | LAST 1417 | 10,3001 | 0 5027 1 | | TC | NOVAC |
| 07747 | REP | 7 | LAST 664 | E7,1777 | | BRANK= | WHOCARES | |
| 07748 | REP | 2 | LAST 1437 | 10,3002 | 02874 0 | | ZCADR | MAKEPLAY |
| 07748 | | | | 10,3003 | 20107 0 | | | |
| 07749 | REP | 1 | | 10,3004 | 1 3013 1 | | TCP | BOTHJOBS |
| 0775 | REP | 35 | LAST 1410 | 10,3005 | 3 0006 1 | VACDSP | CA | BRANK |
| 0776 | | | | 10,3006 | 0 0006 1 | | EXTEND | |
| 0777 | REP | 25 | LAST 1439 | 10,3007 | 04 007 1 | | ROR | SUPERRANK |
| 0778 | REP | 228 | LAST 1415 | 10,3010 | 54 001 1 | | TS | L |
| 0779 | REP | 1 | | 10,3011 | 3 3865 1 | | CAP | MAKEOEN |
| 0780 | REP | 3 | LAST 411 | 10,3012 | 0 5053 1 | | TC | SPVAC |
| 0781 | REP | 2 | LAST 1437 | 10,3013 | 0 3050 1 | BOTHJOBS | TC | SAVELOCS |
| 0782 | | | | 10,3014 | 0 0006 1 | | EXTEND | |
| 0783 | REP | 706 | LAST 1435 | 10,3015 | 3 0156 0 | | DCA | MPAC +1 |
| 0784 | REP | 25 | LAST 1417 | 10,3016 | 50 064 0 | | INDEX | LOCCTR |
| 0785 | REP | 707 | LAST 1440 | 10,3017 | 52 156 1 | | DXCH | MPAC +1 |
| 0786 | | | | 10,3020 | 0 0006 1 | | EXTEND | |
| 0787 | REP | 708 | LAST 1440 | 10,3021 | 3 0160 0 | | DCA | MPAC +3 |
| 0788 | REP | 26 | LAST 1440 | 10,3022 | 50 064 0 | | INDEX | LOCCTR |
| 0789 | REP | 709 | LAST 1440 | 10,3023 | 52 160 1 | | DXCH | MPAC +3 |
| 0790 | REP | 27 | LAST 1440 | 10,3024 | 3 0064 0 | | CA | LOCCTR |
| 0791 | REP | 710 | LAST 1440 | 10,3025 | 54 161 0 | | TS | MPAC +5 |
| 0792 | REP | 1 | | 10,3026 | 0 3055 1 | | TC | SAVELOC |
| 0793 | | | | 10,3027 | 0 0003 1 | | RRLINT | |

LEAVE ONLY FLASH BIT SET

IMMEDIATE RETURN IS CALL CADR +4

MAKE DISPLAY ONE HIGHER THAN USER

IS THIS A FLASHING R DISPLAY

YES, MAKE DISPLAY JOB A VAC
NO, MAKE DISPLAY JOB A NOVAC

COPY TEMPS INTO PERMANENT REGISTERS

SAVE NWORD AND USERS MPAC +2

SAVE USERS CADR, FLAGS AND BRANK

L DISPLAY INTERFACE ROUTINES

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| | | | | | | | |
|------|-----|-----|-----------|---------|----------|----------|-------------|
| 0794 | REP | 9 | LAST 1372 | 10,3030 | 1 4577 1 | TCP | BANKJMP |
| 0795 | REP | 3 | LAST 1439 | 10,3031 | 55-045 0 | GOPERP1R | TS NORMTEM1 |
| 0796 | REP | 2 | LAST 1439 | 10,3032 | 3 3624 1 | CAP | V01N25 |
| 0797 | REP | 24 | LAST 1440 | 10,3033 | 54 155 1 | GOPERPRS | TS PLAYTEM1 |
| 0798 | REP | 2 | LAST 1439 | 10,3034 | 3 3623 0 | CAP | PERPMASK |
| 0799 | REP | 8 | LAST 1437 | 10,3035 | 1 2765 0 | TCP | GODSPRS |
| 0800 | REP | 25 | LAST 1441 | 10,3036 | 54 155 1 | GOPERP2R | TS PLAYTEM1 |
| 0801 | REP | 2 | LAST 1439 | 10,3037 | 3 3627 1 | CAP | PERP2MSK |
| 0802 | REP | 7 | LAST 1441 | 10,3040 | 1 2765 0 | TCP | GODSPRS |
| 0806 | REP | 2 | LAST 1439 | 10,3041 | 0 3043 0 | GOPERP4R | TC FURRS4 |
| 0807 | REP | 8 | LAST 1441 | 10,3042 | 1 2765 0 | TCP | GODSPRS |
| 0808 | REP | 7 | LAST 848 | 10,3043 | 55-131 1 | FURRS4 | TS OPTION1 |
| 0809 | REP | 1 | | 10,3044 | 3 3630 1 | CAP | V04N08 |
| 0810 | REP | 28 | LAST 1441 | 10,3045 | 54 155 1 | TS | PLAYTEM1 |
| 0811 | REP | 1 | | 10,3046 | 3 3631 0 | CAP | PERP4MSK |
| 0812 | REP | 334 | LAST 1435 | 10,3047 | 0 0002 0 | TC | 0 |
| 0813 | | | | 10,3050 | 0 0004 0 | SAVELOCS | INHINT |
| 0815 | REP | 1 | | 10,3051 | 4 3640 1 | CS | OCT3400 |
| 0816 | REP | 8 | LAST 1440 | 10,3052 | 7 0160 1 | MASK | PLAYTEM4 |
| 0817 | REP | 84 | LAST 1435 | 10,3053 | 6 0003 1 | AD | BRANK |
| 0818 | REP | 9 | LAST 1441 | 10,3054 | 54 160 1 | TS | PLAYTEM4 |
| 0819 | REP | 335 | LAST 1441 | 10,3055 | 22 002 0 | SAVELOCR | LXCH 0 |
| 0820 | REP | 8 | LAST 1409 | 10,3056 | 0 4604 1 | TC | MAKBCADR |
| 0821 | REP | 1 | | 10,3057 | 54 157 0 | TS | PLAYTEM3 |
| 0822 | REP | 10 | LAST 1440 | 10,3060 | 6 0072 1 | AD | RUPTRG3 |
| 0823 | REP | 229 | LAST 1440 | 10,3061 | 0 0001 0 | TC | L |
| 0824 | REP | 278 | LAST 1438 | 10,3062 | 3 4714 1 | COPYNORM | CAP ZERO |
| 0825 | REP | 8 | LAST 1439 | 10,3063 | 54 164 0 | COPIES | TS COPINDEX |
| 0826 | | | | 10,3064 | 0 0004 0 | COPIES2 | INHINT |
| 0827 | REP | 10 | LAST 1441 | 10,3065 | 3 0160 0 | CA | PLAYTEM4 |
| 0828 | REP | 7 | LAST 1441 | 10,3066 | 50 164 1 | INDEX | COPINDEX |
| 0829 | REP | 2 | LAST 1435 | 10,3067 | 55-067 0 | TS | BRANKSAV |

CALL CADR +4
 DESIRED CHECKLIST VALUE
 DISPLAYS CHECKLIST VALUE IN R1
 LEAVE ONLY FLASH, PERFORM, BLANKING
 DESIRED VERB-NOUN TO DISPLAY R1,R2,R3
 DESIRED OPTION CODE
 FLASH,PERFORM AND BLANK R3
 BRANK BITS
 NOT USED FOR NON R ROUTINES
 FLAGWORD
 EQUIV TO DSPFLG



L DISPLAY INTERFACE ROUTINES

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| | | | | | | | | |
|------|-----|-----|-----------|---------|----------|-----------|----------|----------|
| 0829 | REP | 1 | | 10,3070 | 7 3658 0 | MASK | CADRMASK | |
| 0831 | | | | 10,3071 | 0 0008 1 | EXTEND | | |
| 0832 | REP | 1 | | 10,3072 | 1 3076 1 | BZF | SKIPADD | |
| 0833 | REP | 2 | LAST 1441 | 10,3073 | 3 0157 1 | CA | PLAYTEM3 | |
| 0834 | REP | 8 | LAST 1441 | 10,3074 | 50 164 1 | INDEX | COPINDEX | |
| 0835 | REP | 3 | LAST 173 | 10,3075 | 54 372 0 | TS | CADRPLSH | |
| 0836 | REP | 27 | LAST 1441 | 10,3076 | 3 0155 0 | SKIPADD | CA | PLAYTEM1 |
| 0837 | REP | 9 | LAST 1442 | 10,3077 | 50 164 1 | INDEX | COPINDEX | |
| 0838 | REP | 1 | | 10,3100 | 54 367 1 | TS | NWORD | |
| 0842 | REP | 1 | | 10,3101 | 1 3357 1 | TOP | RELINTO | |
| 0843 | REP | 10 | LAST 1442 | 10,3102 | 50 164 1 | DOOSLEEPS | INDEX | COPINDEX |
| 0844 | REP | 2 | LAST 1435 | 10,3103 | 3 3657 0 | CA | PRIOCT | |
| 0845 | REP | 1 | | 10,3104 | 7 3106 1 | MASK | WAITMASK | |
| 0846 | REP | 1 | | 10,3105 | 0 7717 1 | TC | UPENT2 | |
| 0847 | | | | 10,3106 | 03004 0 | WAITMASK | OCT | 3004 |
| 0848 | REP | 167 | LAST 1438 | 10,3107 | 4 4712 0 | CS | CNE | |
| 0849 | REP | 11 | LAST 1442 | 10,3110 | 6 0164 1 | AD | COPINDEX | |
| 0850 | REP | 1 | | 10,3111 | 54 154 0 | TS | FACEREG | |
| 0851 | REP | 2 | LAST 1442 | 10,3112 | 50 154 1 | XCHSLEEP | INDEX | FACEREG |
| 0852 | REP | 1 | | 10,3113 | 3 3636 1 | CAP | WAKECADR | |
| 0853 | | | | 10,3114 | 0 0004 0 | INHINT | | |
| 0854 | REP | 10 | LAST 1439 | 10,3115 | 0 5074 1 | TC | JOBWAKE | |
| 0855 | REP | 3 | LAST 1439 | 10,3116 | 0 3350 1 | TC | XCHTOEND | |
| 0856 | REP | 3 | LAST 1442 | 10,3117 | 50 154 1 | INDEX | FACEREG | |
| 0859 | REP | 2 | LAST 1442 | 10,3120 | 3 3636 1 | CAP | WAKECADR | |
| 0860 | REP | 7 | LAST 1409 | 10,3121 | 1 5070 1 | TOP | JOBSLEEP | |
| 0861 | REP | 4 | LAST 1442 | 10,3122 | 54 154 0 | JOBXCHS | TS | FACEREG |
| 0862 | REP | 3 | LAST 1439 | 10,3123 | 0 3333 1 | TC | WITCHONE | |
| 0863 | REP | 11 | LAST 1442 | 10,3124 | 0 5074 1 | TC | JOBWAKE | |
| 0864 | REP | 5 | LAST 1442 | 10,3125 | 3 0154 1 | CA | FACEREG | |
| 0865 | REP | 28 | LAST 1440 | 10,3126 | 50 064 0 | INDEX | LOCCTR | |
| 0866 | REP | 6 | LAST 1442 | 10,3127 | 54 154 0 | TS | FACEREG | |
| 0867 | REP | 1 | | 10,3130 | 3 3143 1 | CAP | XCHOADD | |
| 0868 | REP | 1 | | 10,3131 | 0 3351 0 | TC | XCHNYLOC | |
| 0869 | REP | 7 | LAST 1442 | 10,3132 | 50 154 1 | INDEX | FACEREG | |
| 0870 | REP | 1 | | 10,3133 | 3 3660 1 | CA | MARKOCT | |
| 0871 | REP | 1 | | 10,3134 | 7 3662 1 | MASK | IDLESLEP | |
| 0872 | REP | 1 | | 10,3135 | 0 7735 1 | TC | DOWNENT2 | |
| 0873 | | | | 10,3136 | 74004 0 | IDLEMASK | OCT | 74004 |

FLASH AND GDSPRET

VERB NOUN

FIND CADR IN JOB AREA

CAUSES AWAKENED JOB TO GO TO ENDJOB

REPLACE SAME CADR BUT NEW JOB AREA

CONTROLS TYPE OF DISPLAY PUT TO SLEEP

* DONT MOVE



L DISPLAY INTERPACE ROUTINES

USER'S PAGE NO. 24 E0 54

| | | | | | | | | |
|------|-----|-----|-----------|---------|----------|----------|-----------------|---|
| 0874 | REP | 8 | LAST 1442 | 10,3137 | 50 154 1 | INDEX | PACERSG | BIT SHOWS PRIORITY INTERRUPTED NORMAL OR MARK |
| 0875 | REP | 46 | LAST 1435 | 10,3140 | 3 4706 1 | CA | BITS | BITS FOR MARK, BIT4 FOR NORMAL |
| 0876 | REP | 22 | LAST 1401 | 10,3141 | 6 4710 0 | AD | FOUR | |
| 0877 | REP | 2 | LAST 1442 | 10,3142 | 0 7717 1 | TC | UPENT2 | FLAG ROUTINE DOES RELINT |
| 0878 | REP | 1 | | 10,3143 | 03112 0 | XCHQADD | GENADR XCHSLEEP | * DONT MOVE |
| 0879 | REP | 19 | LAST 1439 | 10,3144 | 3 0100 0 | CA | FLAGWRD4 | |
| 0880 | REP | 36 | LAST 1436 | 10,3145 | 7 4710 1 | MASK | BIT3 | IF BIT3 THEN MARK OVER NORMAL |
| 0881 | REP | 400 | LAST 1440 | 10,3146 | 10 000 0 | CCS | A | |
| 0882 | REP | 2 | LAST 1435 | 10,3147 | 0 2530 0 | GENMARK | TC MARKPLAY | USED AS GENADR FOR JORWAKE |
| 0883 | REP | 2 | LAST 1438 | 10,3150 | 1 2864 0 | TCF | QKTCOPY | |
| 0884 | REP | 279 | LAST 1441 | 10,3151 | 3 4714 1 | MARKWAKE | CAP ZERO | |
| 0885 | REP | 2 | LAST 1435 | 10,3152 | 54 160 1 | WAKEPLAY | TS TEMPOR2 | |
| 0886 | REP | 3 | LAST 1443 | 10,3153 | 50 160 0 | INDEX | TEMPOR2 | |
| 0887 | REP | 1 | | 10,3154 | 3 3652 0 | CA | BITS5+11 | |
| 0888 | REP | 23 | LAST 1443 | 10,3155 | 6 4710 0 | AD | FOUR | |
| 0889 | REP | 2 | LAST 1442 | 10,3156 | 0 7735 1 | TC | DOWNENT2 | |
| 0890 | REP | | | 10,3157 | 40010 1 | MARKPMK | OCT 40010 | **DONT MOVE |
| 0891 | REP | 4 | LAST 1443 | 10,3160 | 50 160 0 | INDEX | TEMPOR2 | |
| 0892 | REP | 3 | LAST 1442 | 10,3161 | 3 3636 1 | CAP | WAKECADR | |
| 0893 | REP | | | 10,3162 | 0 0004 0 | INHINT | | |
| 0894 | REP | 12 | LAST 1442 | 10,3163 | 0 5074 1 | TC | JORWAKE | |
| 0895 | REP | 1 | | 10,3164 | 1 3463 1 | TCF | ENDRET | |

R0896 ALL .1 RESTARTS BRANCH DIRECTLY TO INITDSP. NORMAL DISPLAYS ARE THE ONLY DISPLAYS ALLOWED TO USE .1 RESTARTS
R0898 INITDSP FIRST RESTORES THE BRANK AND THE SUPERBRANK TO THE MOST RECENT NORMAL BRANK AND SUPERBRANK.
R0900 IF THE MOST RECENT NORMAL DISPLAY REQUEST WAS NOT FINISHED, CONTROL IS SENT BACK TO THE LAST NORMAL USER.
R0902 OTHERWISE THE NORMAL DISPLAY SET UP IN THE NORMAL DISPLAY REOS IS STARTED UP IMMEDIATELY.

| | | | | | | | | |
|-------|-----|-----|-----------|---------|----------|----------|-------------|---------------------------------------|
| 0904 | REP | 4 | LAST 1438 | 10,3165 | 3 1071 0 | INITDSP | CA EBANKTEM | RESTORE MOST RECENT NORMAL BRANK |
| 0905 | REP | 65 | LAST 1441 | 10,3166 | 54 003 0 | TS | EBANK | |
| 0906 | REP | 4 | LAST 1439 | 10,3167 | 3 0366 1 | CA | RESTRPO | SUPERBRANK AND JOB PRIORITY |
| 0907 | REP | 1 | | 10,3170 | 0 4666 0 | TC | SUPERSW | RESTORE SUPERBRANK |
| 0908 | REP | 5 | LAST 1440 | 10,3171 | 7 7674 1 | MASK | PRI037 | |
| 0909 | REP | 11 | LAST 1438 | 10,3172 | 0 5103 0 | TC | PRI0CHNG | |
| 0910 | REP | 49 | LAST 1440 | 10,3173 | 4 6214 1 | CS | THREE | |
| 0911 | REP | 4 | LAST 812 | 10,3174 | 6 0374 1 | AD | TEMPPLSH | |
| 0912 | REP | 10 | LAST 1441 | 10,3175 | 1 4577 1 | TCF | BRANKJUMP | |
| 0913 | REP | | | 10,3176 | 0 0003 1 | PINBRNCH | RELINT | FOR GOPIN USERS |
| 0913S | REP | 1 | | 10,3177 | 3 1072 0 | CA | MARK2PAC | NEEDED TO SAVE MPAC +2 FOR MARK USERS |
| 0914 | REP | T11 | LAST 1440 | 10,3200 | 54 156 1 | TS | MPAC +2 | ONLY |
| 0915 | REP | 20 | LAST 1443 | 10,3201 | 3 0100 0 | CA | FLAGWRD4 | PINBRANCH CONDITION |



| | | | | | | | | | |
|------|-----|-----|-----------|---------|----------|----------|--|-------|-----------|
| 0916 | REP | 1 | | 10,3202 | 7 7707 1 | | | | |
| 0917 | REP | 401 | LAST 1443 | 10,3203 | 10 000 0 | | | | |
| 0918 | REP | 1 | | 10,3204 | 1 3207 0 | | | | |
| 0919 | REP | 1 | | 10,3205 | 1 3017 0 | | | | |
| 0920 | REP | 3 | LAST 1443 | 10,3206 | 1 2530 1 | | | | |
| 0921 | REP | 54 | LAST 1414 | 10,3207 | 0 5435 0 | NORBRNCH | | | |
| 0922 | REP | 1 | | 10,3210 | 00105 0 | UPPLAD | | ADRES | PINBRLO |
| 0923 | REP | 63 | LAST 1437 | 10,3211 | 3 4075 1 | CAP | | | BIT14 |
| 0924 | REP | 21 | LAST 1443 | 10,3212 | 7 0100 1 | MARK | | | FLAGRDA |
| 0925 | REP | 402 | LAST 1444 | 10,3213 | 10 000 0 | CCS | | | A |
| 0926 | REP | 1 | | 10,3214 | 1 2072 1 | TCP | | | KEBPRI0 |
| 0927 | REP | 1 | | 10,3216 | 1 2743 1 | TCP | | | PLAYJMI |
| 0928 | REP | 1 | | 10,3216 | 0 2550 0 | NVDSF | | | COPYPAC |
| 0929 | REP | 5 | LAST 1443 | 10,3217 | 3 0100 0 | CA | | | TRAPOR2 |
| 0930 | REP | 23 | LAST 1410 | 10,3220 | 7 4716 1 | CA | | | SEVEN |
| 0931 | REP | 230 | LAST 1441 | 10,3221 | 54 001 1 | TS | | | L |
| 0932 | REP | 51 | LAST 1411 | 10,3222 | 4 4076 0 | CS | | | BIT13 |
| 0933 | REP | 12 | LAST 1442 | 10,3223 | 50 104 1 | INDEX | | | COPYINDEX |
| 0934 | REP | 1 | | 10,3224 | 7 1007 0 | MARK | | | DSPFLA |
| 0935 | REP | 13 | LAST 1444 | 10,3225 | 50 104 1 | INDEX | | | COPYINDEX |
| 0936 | REP | 2 | LAST 1444 | 10,3226 | 55=007 0 | TS | | | DSPFLA |
| 0937 | REP | 32 | LAST 1410 | 10,3227 | 7 4703 0 | MARK | | | BIT8 |
| 0938 | REP | 5 | LAST 1445 | 10,3230 | 54 141 1 | TS | | | TEM1 |
| 0939 | REP | 712 | LAST 1443 | 10,3231 | 3 0156 0 | CA | | | MPAC25V |
| 0940 | REP | 2 | LAST 1435 | 10,3232 | 54 105 1 | TS | | | MPAC25AV |
| 0941 | REP | 2 | LAST 1443 | 10,3233 | 55=072 1 | TS | | | MARK2PAC |
| 0942 | REP | 14 | LAST 1444 | 10,3234 | 50 104 1 | INDEX | | | COPYINDEX |
| 0943 | REP | 2 | LAST 1442 | 10,3235 | 10 307 1 | CCS | | | NVDRD |
| 0944 | REP | 1 | | 10,3236 | 1 3245 0 | TCP | | | NVDSPI |
| 0945 | REP | 1 | | 10,3237 | 1 3361 1 | TCP | | | CLEANBD |
| 0946 | REP | 4 | LAST 1436 | 10,3240 | 4 0370 1 | CS | | | MAROV |
| 0947 | REP | 5 | LAST 1444 | 10,3241 | 54 370 1 | TS | | | MAROV |
| 0948 | REP | 12 | LAST 1405 | 10,3242 | 7 6043 1 | MARK | | | LOWT |
| 0949 | REP | 1 | | 10,3243 | 6 3043 0 | AD | | | V05NO0M1 |
| 0950 | REP | 6 | LAST 1444 | 10,3244 | 6 0141 0 | AD | | | TEM1 |
| 0951 | REP | 168 | LAST 1442 | 10,3245 | 6 4712 1 | AD | | | QNB |
| 0952 | REP | 1 | | 10,3246 | 0 4171 1 | TCP | | | NVNONOPT |
| 0953 | REP | 1 | | 10,3247 | 1 3373 1 | TCP | | | REST |
| 0954 | REP | 6 | LAST 380 | 10,3250 | 0 4447 1 | TCP | | | FLASHOP |
| 0955 | REP | 1 | | 10,3251 | 0 2546 1 | TCP | | | COPYT000 |

* FOR DISK ONLY *

IN CASE MARKPLAY AWAKENED AFTER SLEEPING

IF BUSY IN CASE OF EXTENDED VFRM NON FLASH

MPACS DESTROYED BY NVSRM

BIT8 SET IF DEC MARK PERFORM DISPLAY

SET UP BLANK BITS FOR NVNONOPT IN CASE USER REQUESTS BLANKING MONITOR

SET PINBRANCH BIT

** NOTHING IN IDLE

PRI0 INTERRUPTED

L DISPLAY INTERFACE ROUTINES

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| | | | | | | | | |
|-------|-----|-----|-----------|---------|----------|----------|----------|--|
| 0953 | REP | 58 | LAST 1416 | 10,3252 | 0 5447 0 | TC | DOWNFLAG | UNSET SLEEPING BITS |
| 0954 | REP | 1 | | 10,3253 | 00102 1 | ADRES | MROVFLG | |
| 09541 | REP | 59 | LAST 1445 | 10,3254 | 0 5447 0 | TC | DOWNFLAG | |
| 09542 | REP | 1 | | 10,3255 | 00103 0 | ADRES | MROVFLG | |
| 09543 | REP | 60 | LAST 1445 | 10,3256 | 0 5447 0 | TC | DOWNFLAG | |
| 09544 | REP | 1 | | 10,3257 | 00104 1 | ADRES | MROVFLG | |
| 0955 | REP | 6 | LAST 1444 | 10,3260 | 3 0160 0 | BLANKCHK | CA | TEMPOR2 |
| 0956 | REP | 2 | LAST 351 | 10,3261 | 0 4271 1 | TC | BLANKSUB | BLANK BITS 1,2,3 IF SET |
| 0957 | REP | 1 | | 10,3262 | 1 3216 0 | TCP | NVDSF | |
| 0958 | REP | 47 | LAST 1443 | 10,3263 | 3 4706 1 | PERFCHK | CAP | BITS |
| 0959 | REP | 7 | LAST 1445 | 10,3264 | 7 0160 1 | MASK | TEMPOR2 | BIT 5 FOR PERFORM |
| 0960 | REP | 403 | LAST 1444 | 10,3265 | 10 000 0 | CCS | A | IS THIS A GOPERF DISPLAY |
| 0961 | REP | 1 | | 10,3266 | 1 3311 0 | TCP | 1STOR2ND | YES |
| 0962 | REP | 56 | LAST 1440 | 10,3267 | 3 4707 0 | GOANIDLE | CAP | BIT4 |
| 0963 | REP | 8 | LAST 1445 | 10,3270 | 7 0160 1 | MASK | TEMPOR2 | |
| 0964 | REP | 404 | LAST 1445 | 10,3271 | 10 000 0 | CCS | A | |
| 0965 | REP | 1 | | 10,3272 | 1 3406 1 | TCP | FLASHSUB | IT IS |
| 0966 | REP | 9 | LAST 1445 | 10,3273 | 4 0160 1 | CS | TEMPOR2 | IS THIS A GOSPRET |
| 0967 | REP | 56 | LAST 1436 | 10,3274 | 7 4705 0 | MASK | BIT6 | |
| 0968 | REP | 405 | LAST 1445 | 10,3275 | 10 000 0 | CCS | A | |
| 0969 | REP | 1 | | 10,3276 | 1 3303 0 | TCP | ISITN00 | |
| 09691 | REP | 15 | LAST 1444 | 10,3277 | 50 164 1 | INDEX | COPINDEX | |
| 09692 | REP | 4 | LAST 1442 | 10,3300 | 3 0372 1 | CA | CADRPLSH | |
| 09693 | REP | 713 | LAST 1444 | 10,3301 | 54 157 0 | TS | MPAC +3 | |
| 09694 | REP | 1 | | 10,3302 | 1 3501 1 | TCP | ENDIT | |
| 0972 | REP | 16 | LAST 1445 | 10,3303 | 50 164 1 | ISITN00 | INDEX | COPINDEX |
| 0973 | REP | 3 | LAST 1444 | 10,3304 | 3 0367 0 | CA | MWORD | IS THIS A PASTE |
| 0974 | REP | 13 | LAST 1444 | 10,3305 | 7 6043 1 | MASK | LOW7 | CHECK MADE FOR PINBRNCH AND PRIO ON MARK |
| 0975 | REP | | | 10,3306 | 0 0006 1 | EXTEND | | YES, ASSUME PASTE ALWAYS ON FLASH |
| 0976 | REP | 2 | LAST 1445 | 10,3307 | 1 3406 1 | BZF | FLASHSUB | NOT FLASH, NOT GOPERF, THEREFORE EXIT |
| 0977 | REP | 111 | LAST 1435 | 10,3310 | 1 5112 1 | TCP | ENDOFJOB | |
| 0978 | REP | 10 | LAST 1445 | 10,3311 | 3 0160 0 | 1STOR2ND | CA | TEMPOR2 |
| 0979 | REP | 52 | LAST 1444 | 10,3312 | 7 4676 0 | MASK | BIT13 | |
| 0980 | REP | 406 | LAST 1445 | 10,3313 | 10 000 0 | CCS | A | |
| 0981 | REP | 1 | | 10,3314 | 1 3267 0 | TCP | GOANIDLE | SECOND |
| 0982 | REP | 53 | LAST 1445 | 10,3315 | 3 4676 1 | CA | BIT13 | |
| 0983 | REP | 17 | LAST 1445 | 10,3316 | 50 164 1 | INDEX | COPINDEX | |
| 0984 | REP | 3 | LAST 1444 | 10,3317 | 27-067 0 | ADS | DSPPLG | |
| 09845 | | | | 10,3320 | 22 007 0 | ZL | | |
| 0985 | | | | 10,3321 | 0 0006 1 | EXTEND | | IS IT MARK |
| 0986 | REP | 1 | | 10,3322 | 6 2571 0 | BZMP | MARKPRFP | YES |

L DISPLAY INTERFACE ROUTINES

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| | | | | | | | | |
|--------|-----|-----|-----------|---------|--------|---|----------|------------|
| 0987 | REP | 35 | LAST 1381 | 10,3323 | 7 4677 | 1 | MASK | BIT12 |
| 09871 | | | | 10,3324 | 0 0006 | 1 | EXTEND | |
| 09872 | REP | 1 | | 10,3325 | 1 3331 | 1 | BZF | V50PASTE |
| 09874 | REP | 20 | LAST 678 | 10,3326 | 4 1145 | 1 | CS | NVWORD1 |
| 098741 | REP | 1 | | 10,3327 | 6 3667 | 0 | AD | V97N00 |
| 09875 | REP | 2 | LAST 1438 | 10,3330 | 1 3246 | 0 | TCP | NV50DSP |
| 0988 | REP | 1 | | 10,3331 | 3 3626 | 0 | V50PASTE | V50N00 |
| 0989 | REP | 3 | LAST 1446 | 10,3332 | 1 3246 | 0 | TCP | NV50DSP |
| 0990 | REP | 48 | LAST 1445 | 10,3333 | 4 4706 | 0 | WITCHONE | CS |
| 0991 | | | | 10,3334 | 0 0006 | 1 | EXTEND | BITS |
| 0992 | REP | 35 | LAST 1418 | 10,3335 | 03 011 | 1 | WAND | DSALMOUT |
| 0993 | REP | 22 | LAST 1444 | 10,3336 | 3 0100 | 0 | CA | FLAGWRD4 |
| 0994 | REP | 1 | | 10,3337 | 7 3644 | 0 | MASK | NV8USMK |
| 0995 | REP | 407 | LAST 1445 | 10,3340 | 10 000 | 0 | CCS | A |
| 0996 | REP | 169 | LAST 1444 | 10,3341 | 3 4712 | 1 | CAP | ONE |
| 0997 | REP | 231 | LAST 1444 | 10,3342 | 54 001 | 1 | TS | L |
| 0998 | REP | 268 | LAST 1443 | 10,3343 | 3 4714 | 1 | CAP | ZERO |
| 0999 | REP | 232 | LAST 1446 | 10,3344 | 50 001 | 0 | INDEX | L |
| 1000 | REP | 11 | LAST 370 | 10,3345 | 57=042 | 0 | XCH | CADRSTOR |
| 1001 | | | | 10,3346 | 0 0004 | 0 | INHINT | |
| 1002 | REP | 336 | LAST 1441 | 10,3347 | 0 0002 | 0 | TC | 0 |
| 1003 | REP | 6 | LAST 360 | 10,3350 | 3 4233 | 1 | XCHTOEND | CAP |
| 1004 | REP | 29 | LAST 1442 | 10,3351 | 56 064 | 0 | XCHNYLOC | XCH |
| 1005 | | | | 10,3352 | 0 0008 | 1 | EXTEND | LOCCTR |
| 1006 | REP | 2 | LAST 1442 | 10,3353 | 6 3357 | 0 | BZF | RELINTO |
| 1007 | REP | 30 | LAST 1446 | 10,3354 | 56 064 | 0 | XCH | LOCCTR |
| 1008 | REP | 31 | LAST 1446 | 10,3355 | 50 064 | 0 | INDEX | LOCCTR |
| 1009 | REP | 42 | LAST 1407 | 10,3356 | 54 164 | 0 | TS | LOC |
| 1010 | | | | 10,3357 | 0 0003 | 1 | RELINTO | RELINT |
| 1011 | REP | 337 | LAST 1446 | 10,3360 | 0 0002 | 0 | TC | 0 |
| 1012 | REP | 5 | LAST 777 | 10,3361 | 3 7667 | 1 | CLEANEND | CAP |
| 1014 | REP | 33 | LAST 1387 | 10,3362 | 0 5042 | 1 | TC | PRI032 |
| 1015 | REP | 2 | LAST 180 | 0371 | | | EBANK= | NVSAVE |
| 1016 | REP | 1 | | 10,3363 | 04245 | 0 | ZCADR | JAMTERM |
| 1016 | REP | 1 | | 10,3364 | 04100 | 1 | | |
| 1017 | REP | 3 | LAST 1445 | 10,3365 | 1 3407 | 0 | TCP | FLASHUR +1 |
| 1018 | REP | 23 | LAST 1446 | 10,3366 | 3 0100 | 0 | ISITPRIO | CA |
| 1019 | REP | 1 | | 10,3367 | 7 3414 | 1 | MASK | ITISMASK |
| 1020 | | | | 10,3370 | 0 0006 | 1 | EXTEND | |
| 1021 | REP | 2 | LAST 1437 | 10,3371 | 1 2723 | 1 | BZF | PRIORORT |
| 1022 | REP | 112 | LAST 1445 | 10,3372 | 1 5112 | 1 | TCP | ENDOFJOB |

NVWORD1= -0 IS V97. NVWORD1= -400 IS V99

DISPLAY SECOND PART OF GOPERP

TURN OFF KEY RELEASE LIGHT

IS IT NVSUB ASLEEP

TC ENDOFJOB REPLACES GENADR IN LOC FOR
WAS THIS ADDRESS SLEEPING

NO
YES

BACK TO USER

ONE LOWER THAN DISPLAYS SLEEPING

IS PINRRPLG, MARKIDPLG SET

L DISPLAY INTERPACE ROUTINES

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| | | | | | | | | | |
|------|-----|-----|-----------|---------|----------|----------|--------|----------|-------------------------------------|
| 1023 | REP | 12 | LAST 1446 | 10,3373 | 11=042 1 | REST | CCS | CADRSTOR | IS SOMEONE IN ENDIDLE |
| 1024 | REP | 113 | LAST 1446 | 10,3374 | 1 5112 1 | | TCP | ENDOPJOB | YES |
| 1025 | REP | 1 | | 10,3375 | 1 3377 0 | | TCP | RESTSLEP | |
| 1026 | REP | 114 | LAST 1447 | 10,3376 | 1 5112 1 | | TCP | ENDOPJOB | |
| 1027 | REP | 2 | LAST 1435 | 10,3377 | 3 0162 1 | RESTSLEP | CA | GENMASK | SET NVSLEEP BITS |
| 1028 | REP | 1 | | 10,3400 | 7 3645 1 | | MASK | ASTROMSK | |
| 1029 | REP | 3 | LAST 1443 | 10,3401 | 0 7717 1 | | TC | UPENT2 | |
| 1030 | REP | 0 | | 10,3402 | 24100 0 | OCT24100 | OCT | 24100 | *** DONT MOVE |
| 1031 | REP | 18 | LAST 1445 | 10,3403 | 50 164 1 | | INDEX | COPINDEX | |
| 1032 | REP | 1 | | 10,3404 | 3 3635 1 | | CAP | NVCADR | |
| 1033 | REP | 2 | LAST 376 | 10,3405 | 0 4456 1 | | TC | NVSLBUSY | BUSY OR ABORT IF ILLEGAL |
| 1034 | REP | 4 | LAST 359 | 10,3406 | 0 4443 0 | FLASHSR | TC | FLASHN | |
| 1035 | REP | 19 | LAST 1447 | 10,3407 | 3 0164 1 | | CA | COPINDEX | COPINDEX DESTROYED BY ENDIDLE |
| 1036 | REP | 1 | | 10,3410 | 54 157 0 | | TS | COPMPAC | |
| 1037 | REP | 3 | LAST 1447 | 10,3411 | 3 0162 1 | | CA | GENMASK | |
| 1038 | REP | 1 | | 10,3412 | 7 3136 1 | | MASK | IDLEMASK | |
| 1039 | REP | 4 | LAST 1447 | 10,3413 | 0 7717 1 | | TC | UPENT2 | |
| 1040 | REP | 0 | | 10,3414 | 40040 1 | ITISMASK | OCT | 40040 | *** ENDIDLE ALLOW *** DONT MOVE |
| 1041 | REP | 2 | LAST 188 | 10,3415 | 3 1073 1 | | CA | R1SAVE | IS THIS A REPEAT AND RETURN DISPLAY |
| 1042 | REP | 20 | LAST 1447 | 10,3416 | 50 164 1 | | INDEX | COPINDEX | |
| 1043 | REP | 37 | LAST 1443 | 10,3417 | 7 4710 1 | | MASK | BIT3 | |
| 1044 | REP | 408 | LAST 1446 | 10,3420 | 10 000 0 | | CCS | A | |
| 1045 | REP | 1 | | 10,3421 | 1 3506 0 | | TCP | UNSETRI | YES |
| 1046 | REP | 13 | LAST 1447 | 10,3422 | 11=042 1 | | CCS | CADRSTOR | SEE IF SOMEONE ALREADY IN ENDIDLE |
| 1047 | REP | 1 | | 10,3423 | 1 3366 0 | | TCP | ISITPRIO | |
| 1048 | REP | 1 | | 10,3424 | 1 3426 0 | | TCP | +2 | |
| 1049 | REP | 2 | LAST 1447 | 10,3425 | 1 3366 0 | | TCP | ISITPRIO | |
| 1050 | REP | 1 | | 10,3426 | 0 4223 0 | | TC | ENDIDLE | |
| 1051 | REP | 1 | | 10,3427 | 1 3520 1 | IDLESET1 | TCP | TERMATB | |
| 1052 | REP | 1 | | 10,3430 | 1 3537 1 | | TCP | PROCEED | ENDIDLE RETURNS HERE ON PROCEED |
| 1053 | REP | 1 | | 10,3431 | 4 3654 1 | | CS | LOWLOAD | |
| 1054 | REP | 714 | LAST 1445 | 10,3432 | 6 0154 1 | | AD | MPAC | VERRREQ |
| 1055 | REP | 1 | | 10,3433 | 0 0006 1 | | EXTEND | | |
| 1056 | REP | 409 | LAST 1447 | 10,3434 | 26 000 0 | | DIM | A | |
| 1057 | REP | 1 | | 10,3435 | 0 0006 1 | | EXTEND | | |
| 1058 | REP | 1 | | 10,3436 | 1 3607 1 | | RZF | LOADITIS | V21 OR V22 OR V23 ON DSKY |
| 1059 | REP | 77 | LAST 1439 | 10,3437 | 3 4711 1 | OKTORNT | CAP | TWO | |
| 1060 | REP | 1 | | 10,3440 | 54 161 0 | ENDOUT | TS | OUTHERE | |



L DISPLAY INTERFACE ROUTINES

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| | | | | | | | |
|------|-----|-----|-----------|---------|----------|----------|-----------|
| 1061 | REP | 24 | LAST 1446 | 10,3441 | 3 0100 0 | CA | PLAOWRDA |
| 1062 | REP | 15 | LAST 1379 | 10,3442 | 7 4105 0 | MASK | OCT60000 |
| 1063 | REP | 410 | LAST 1447 | 10,3443 | 10 000 0 | CCS | A |
| 1064 | REP | 1 | | 10,3444 | 1 3447 1 | TCP | TIMECHK |
| 1065 | REP | 1 | | 10,3445 | 1 3555 0 | TCP | NORMRET |
| 1066 | REP | 1 | | 10,3446 | 1 3541 0 | TCP | MARKRET |
| 1067 | REP | 23 | LAST 1438 | 10,3447 | 4 0025 1 | TIMECHK | CS |
| 1068 | REP | 2 | LAST 1438 | 10,3450 | 6 1147 1 | AD | PRIO TIME |
| 1069 | REP | 411 | LAST 1448 | 10,3451 | 10 000 0 | CCS | A |
| 1070 | | | | 10,3452 | 4 0000 0 | COM | |
| 1071 | REP | 5 | LAST 1384 | 10,3453 | 6 7700 1 | AD | OCT37776 |
| 1072 | REP | 170 | LAST 1446 | 10,3454 | 6 4712 1 | AD | ONE |
| 1073 | REP | 1 | | 10,3455 | 6 3877 1 | AD | -2SEC |
| 1074 | | | | 10,3456 | 0 0006 1 | EXTEND | |
| 1075 | REP | 2 | LAST 1444 | 10,3457 | 6 2672 0 | BZAP | KEEPPRIO |
| 1076 | REP | 2 | LAST 1446 | 10,3460 | 1 3555 0 | TCP | NORMRET |
| 1084 | REP | 171 | LAST 1448 | 10,3461 | 3 4712 1 | NORMAKE | CAP |
| 1085 | REP | 1 | | 10,3462 | 1 3152 0 | TCP | WAKEPLAY |
| 1086 | REP | 2 | LAST 1447 | 10,3463 | 10 161 0 | ENDRET | CCS |
| 1087 | REP | 172 | LAST 1448 | 10,3464 | 6 4712 1 | AD | ONE |
| 1088 | | | | 10,3465 | 1 3467 0 | TCP | +2 |
| 1089 | REP | 115 | LAST 1447 | 10,3466 | 1 5112 1 | TCP | ENDOFJOB |
| 1090 | REP | 2 | LAST 1447 | 10,3467 | 50 157 1 | INDEX | COPMPAC |
| 1091 | REP | 5 | LAST 1445 | 10,3470 | 6 0372 1 | AD | CADRPLSH |
| 1092 | REP | 715 | LAST 1447 | 10,3471 | 54 157 0 | TS | MPAC +3 |
| 1093 | REP | 4 | LAST 1447 | 10,3472 | 3 0162 1 | CA | GENMASK |
| 1094 | REP | 1 | | 10,3473 | 7 3475 0 | MASK | PINIDMSK |
| 1095 | REP | 3 | LAST 1443 | 10,3474 | 0 7735 1 | TC | DOWNENT2 |
| 1096 | | | | 10,3475 | 74044 1 | PINIDMSK | OCT 74044 |
| 1097 | REP | 50 | LAST 1443 | 10,3476 | 4 6214 1 | CS | THREE |
| 1098 | REP | 2 | LAST 231 | 10,3477 | 0 4170 0 | TC | NVSLR |
| 1099 | | | | 10,3500 | 1 3501 1 | TCP | +1 |
| 1100 | REP | 3 | LAST 1439 | 10,3501 | 3 0163 0 | ENDIT | CA |
| 1101 | REP | 6 | LAST 1443 | 10,3502 | 7 7674 1 | MASK | USERPRIO |
| 1102 | REP | 12 | LAST 1443 | 10,3503 | 0 5103 0 | TC | PRIO37 |
| 1103 | REP | 716 | LAST 1448 | 10,3504 | 3 0157 1 | CA | PRIOCHNO |
| 1104 | REP | 11 | LAST 1443 | 10,3505 | 1 4577 1 | TCP | MPAC +3 |
| 1105 | REP | 21 | LAST 1447 | 10,3506 | 50 164 1 | UNSETR1 | INDEX |
| 1106 | REP | 38 | LAST 1447 | 10,3507 | 4 4710 1 | CS | COPINDEX |
| 1107 | REP | 3 | LAST 1447 | 10,3510 | 7 1073 0 | MASK | RIT3 |
| 1108 | REP | 4 | LAST 1448 | 10,3511 | 55=073 0 | TS | R1SAVE |

CHECK NATURE OF ENDIDLE RETURN

PRIO ENDIDLE RETURN
NORMAL ENDIDLE RETURN
MARK ENDIDLE RETURN

NORMAL ENDIDLE EXIT

REMOVE ENDIDLE AND PINBRANCH BITS

*** DONT MOVE

BLANK EVERYTHING EXCEPT MM

RETURN TO USERS PRIORITY

RESET REPEAT AND RETURN REQUEST



L DISPLAY INTERSPACE ROUTINES

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| | | | | | | | | |
|-------|---|-----------|---------|--------|---|----------|----------|--|
| 1109 | REP 281 | LAST 1446 | 10,3512 | 3 4714 | 1 | CAP | ZERO | *** 205 ONLY MARKBRAN USERS IN SUPERBANK 0 |
| 1110 | REP 2 | LAST 1443 | 10,3513 | 0 4666 | 0 | TC | SUPERBW | |
| 1111 | REP 51 | LAST 1448 | 10,3514 | 3 8214 | 0 | -1 CAP | THREE | RETURN TO USERS IMMEDIATE RETURN LOC |
| 1112 | REP 22 | LAST 1448 | 10,3515 | 50 164 | 1 | IMMEDRET | INDEX | |
| 1113 | REP 6 | LAST 1448 | 10,3516 | 6 0372 | 1 | AD | CADRFLSH | |
| 1114 | REP 12 | LAST 1448 | 10,3517 | 1 4577 | 1 | TCF | BANKJUMP | |
| 1115 | REP 282 | LAST 1449 | 10,3520 | 3 4714 | 1 | TERMATE | CAP | ASTRONAUT TERMINATE (V34) RETURNS TO |
| 1116 | REP 1 | | 10,3521 | 1 3440 | 0 | TCF | ENDOUT | |
| 1117 | REP 11 | LAST 1441 | 10,3522 | 4 0160 | 1 | LINUSCHR | CS | IS THIS A LINUS |
| 1118 | REP 84 | LAST 1444 | 10,3523 | 7 4675 | 0 | | MASK | BIT14 |
| 1119 | REP 412 | LAST 1448 | 10,3524 | 10 000 | 0 | | CCS | A |
| 1120 | REP 4 | LAST 1372 | 10,3525 | 1 6706 | 1 | | TCF | 0+1 |
| 1121 | REP 3 | LAST 1442 | 10,3526 | 4 0157 | 0 | | CS | PLAYTEM3 |
| 1122 | REP 23 | LAST 1449 | 10,3527 | 50 164 | 1 | | INDEX | COPINDEX |
| 1123 | REP 7 | LAST 1449 | 10,3530 | 6 0372 | 1 | | AD | CADRFLSH |
| 1124 | | | 10,3531 | 0 0006 | 1 | | EXTEND | |
| 1125 | | | 10,3532 | 1 3534 | 1 | | RZP | +2 |
| 1126 | REP 338 | LAST 1446 | 10,3533 | 0 0002 | 0 | | TC | 0 |
| 1127 | REP 12 | LAST 381 | 10,3534 | 11-012 | 1 | | CCS | DSPLCK |
| 1128 | REP 116 | LAST 1448 | 10,3535 | 0 5112 | 0 | | TC | ENDOPJCR |
| 1129 | REP 339 | LAST 1449 | 10,3536 | 0 0002 | 0 | | TC | 0 |
| R1130 | MORE LOGIC COULD BE INCORPORATED HERE TO MAKE SURE A RECYCLE IS A RECYCLAND CONVERSLY THAT A LOAD IS A LOAD. | | | | | | | |
| 1132 | REP 173 | LAST 1448 | 10,3537 | 3 4712 | 1 | PROCEED | CAP | ONE |
| 1133 | REP 2 | LAST 1449 | 10,3540 | 1 3440 | 0 | | TCF | ENDOUT |
| R1138 | LASTPLAY CHECKS TO SEE IF (1) THE LAST NORMAL DISPLAY WAS EITHER INTERRUPTED BY A PRIO OR A MARK (MARK COULD ONLY HAPPEN DURING PINBRANCH) OR IF (2) THE LAST NORMAL DISPLAY WAS REQUESTED WHILE A HIGHER PRIORITY DISPLAY WAS GOING RESULTING IN THE NORMAL BEING PUT TO SLEEP. | | | | | | | |
| R1143 | IF EITHER OF THE ABOVE 2 CONDITIONS EXISTS, THE NORMAL DISPLAY IS AWAKENED TO GO TO PLAYJUM1 WHICH STARTS UP THE MOST RECENT VALID NORMAL DISPLAY. IF THESE 2 CONDITIONS DO NOT EXIST, CONTROL GOES TO PLAYJUM1 WHICH IS STARTED IMMEDIATELY WITH THE ASSUMPTION THAT THE MOST RECENT NORMAL DISPLAY IS ALREADY IN-ENDIDLE DURING A PINBRANCH) OR THAT A RESTART HAS OCCURRED AND THE DISPLAY CAN BE STARTED AS A .1 RESTART. | | | | | | | |
| 1163 | REP 42 | LAST 1391 | 10,3541 | 4 6211 | 1 | MARKRET | CS | SIX |
| 1164 | REP 25 | LAST 1448 | 10,3542 | 7 0100 | 1 | | MARK | FLAGWRD4 |
| 1165 | | | 10,3543 | 0 0004 | 0 | | INHINT | |
| 1166 | REP 26 | LAST 1449 | 10,3544 | 54 100 | 1 | | TS | FLAGWRD4 |
| 1167 | | | 10,3545 | 0 0003 | 1 | | RELINT | |
| 1168 | REP 2 | LAST 1443 | 10,3546 | 1 3463 | 1 | | TCF | ENDRET |
| 1169 | REP 2 | LAST 1402 | 10,3547 | 3 7716 | 0 | MARKOVER | CAP | MINUS1 |
| 1170 | REP 3 | LAST 1448 | 10,3550 | 54 161 | 0 | | TS | OUTHERE |

*** MAY MOVE DISPLAY FLAGWORD OUT OF

INHINT REALM

RUPTRG2 IS - MEANS ENDOPJCR TO ENDRET



L DISPLAY INTERFACE ROUTINES

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| | | | | | | | | |
|-------|-----|-----|-----------|---------|----------|----------|-----------|---|
| 1171 | REP | 27 | LAST 1449 | 10,3551 | 3 0100 0 | CA | FLAGWRD4 | IS ENDIDFLG SET |
| 1172 | REP | 15 | LAST 1372 | 10,3552 | 7 4371 1 | MASK | PRIO30 | IS NORMAL OR PRIO IN ENDIDLE |
| 1173 | REP | 413 | LAST 1449 | 10,3553 | 10 000 0 | CCS | A | |
| 1174 | REP | 1 | | 10,3554 | 1 3207 0 | TCP | NORMENCH | |
| 1175 | REP | 28 | LAST 1450 | 10,3555 | 3 0100 0 | NORMRET | CA | FLAGWRD4 |
| 1176 | REP | 2 | LAST 1443 | 10,3556 | 7 3652 1 | MASK | BIT55+11 | IS MARK SLEEPING |
| 1177 | REP | 414 | LAST 1450 | 10,3557 | 10 000 0 | CCS | A | OR WAITING |
| 1178 | REP | 1 | | 10,3560 | 1 3151 0 | TCP | MARKWAKE | |
| 1179 | REP | 29 | LAST 1450 | 10,3561 | 3 0100 0 | CA | FLAGWRD4 | NO |
| 1180 | REP | 1 | | 10,3562 | 7 3653 0 | MASK | BIT54+10 | IS NORMAL INTERRUPTED OR WAITING |
| 1181 | REP | 415 | LAST 1450 | 10,3563 | 10 000 0 | CCS | A | |
| 1182 | REP | 1 | | 10,3564 | 1 3461 0 | TCP | NORMWAKE | YES |
| 1183 | REP | 5 | LAST 1443 | 10,3565 | 3 1071 0 | CA | BRANKTEM | NO, WAS IT A FLASH REQUEST |
| 1184 | REP | 6 | LAST 1410 | 10,3566 | 7 4726 1 | MASK | OCT50 | OR A GODSPRET |
| 1185 | REP | 416 | LAST 1450 | 10,3567 | 10 000 0 | CCS | A | |
| 1186 | REP | 3 | LAST 1449 | 10,3570 | 1 3463 1 | TCP | ENDRET | YES |
| 1187 | REP | 3 | LAST 1446 | 10,3571 | 3 0371 1 | CA | NVSAVE | |
| 1188 | | | | 10,3572 | 0 0006 1 | EXTEND | | |
| 1189 | REP | 4 | LAST 1450 | 10,3573 | 1 3463 1 | BZF | ENDRET | |
| 1190 | REP | 4 | LAST 648 | 10,3574 | 3 4762 0 | CAP | PRIO15 | |
| 1191 | | | | 10,3575 | 0 0004 0 | INHINT | | |
| 1192 | REP | 35 | LAST 1440 | 10,3576 | 0 5027 1 | TC | NOVAC | |
| 1193 | REP | 4 | LAST 1445 | | 0367 | BRANK= | NVWORD | |
| 1194 | REP | 2 | LAST 1444 | 10,3577 | 02743 0 | ZCADR | PLAYJUM1 | |
| 1194 | | | | 10,3600 | 20100 1 | | | |
| 1195 | REP | 5 | LAST 1450 | 10,3601 | 1 3463 1 | TCP | ENDRET | |
| 1196 | REP | 30 | LAST 1450 | 10,3602 | 3 0100 0 | MARSLEEP | CA | FLAGWRD4 |
| 1197 | REP | 3 | LAST 1450 | 10,3603 | 7 3652 1 | MASK | BIT55+11 | IS MARK ALREADY IN |
| 1198 | REP | 417 | LAST 1450 | 10,3604 | 10 000 0 | CCS | A | |
| 1199 | REP | 117 | LAST 1449 | 10,3605 | 1 5112 1 | TCP | ENDOPJOR | YES |
| 11991 | REP | 3 | LAST 1439 | 10,3606 | 1 3102 0 | TCP | GOOSLEEPS | |
| 1200 | REP | 3 | LAST 1448 | 10,3607 | 50 157 1 | LOADITIS | INDEX | COMPAC |
| 1201 | REP | 5 | LAST 1450 | 10,3610 | 3 0367 0 | CA | NVWORD | |
| 1202 | REP | 14 | LAST 1445 | 10,3611 | 7 6043 1 | MASK | LOW7 | |
| 1203 | | | | 10,3612 | 4 0000 0 | COM | | |
| 1204 | REP | 717 | LAST 1448 | 10,3613 | 6 0155 0 | AD | MPAC +1 | NOLNREG |
| 1205 | | | | 10,3614 | 0 0006 1 | EXTEND | | |
| 1206 | REP | 1 | | 10,3615 | 1 3437 0 | BZF | OKTOENT | NO, THEN LOAD IS VALID |
| 1207 | REP | 6 | LAST 447 | 10,3616 | 1 3176 0 | TCP | PINBRNCH | YES, ACCEPT LOAD BUT ASK FOR LAST AGAIN |
| 1208 | REP | 52 | LAST 1449 | 10,3617 | 4 6214 1 | BRASER | CS | THREE |
| 1209 | REP | 3 | LAST 1448 | 10,3620 | 0 4170 0 | TC | NVSUB | BLANK EVERYTHING&CRPT MM |
| 1210 | REP | 118 | LAST 1450 | 10,3621 | 1 5112 1 | TCP | ENDOPJOR | |

L DISPLAY INTERFACE ROUTINES

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| | | | | | | | | |
|-------|------|-----|------|------|---------|----------|-----------|-----------------|
| 1211 | RESP | 119 | LAST | 1450 | 10,3622 | 1 5112 1 | TCP | ENDOPJOB |
| 1212 | | | | | 10,3623 | 00036 1 | PERPMASK | OCT 0038 |
| 1213 | | | | | 10,3624 | 00231 1 | V01N25 | VN 00125 |
| 1214 | | | | | 10,3625 | 01401 0 | V06N07 | VN 00607 |
| 1215 | | | | | 10,3626 | 14400 0 | V50N00 | VN 5000 |
| 1216 | | | | | 10,3627 | 00030 1 | PERP2MSK | OCT 00030 |
| 1217 | | | | | 10,3630 | 01008 0 | V04N08 | VN 00406 |
| 1218 | | | | | 10,3631 | 00014 1 | PERP4MSK | OCT 14 |
| 1219 | RESP | 7 | LAST | 1450 | 10,3176 | | GOAGIN | EQUALS PINBRNCH |
| 1220 | | | | | 10,3631 | 20010 1 | REDQMSK | OCT 20010 |
| 1221 | | | | | 10,3633 | 40230 1 | MARK3MSK | OCT 40230 |
| 1222 | | | | | 10,3634 | 40036 0 | MARK4MSK | OCT 40036 |
| 1223 | RESP | 1 | | | 10,3635 | 20670 1 | NVCADR | CADR REDOPRIO |
| 1224 | RESP | 4 | LAST | 1444 | 10,3636 | 20530 0 | WAKBCADR | CADR MARKPLAY |
| 1225 | RESP | 3 | LAST | 1450 | 10,3637 | 20743 0 | | CADR PLAYJUM1 |
| 1226 | | | | | 10,3640 | 03400 0 | OCT3400 | OCT 3400 |
| 1227 | | | | | 10,3641 | 11210 1 | NBUSMASK | OCT 11210 |
| 1228 | | | | | 10,3642 | 66521 1 | PM-MASK | OCT 66521 |
| 1229 | RESP | 4 | LAST | 358 | 4160 | | VERB-MASK | = MID7 |
| 1230 | | | | | 10,3643 | 01177 1 | V05N00M1 | OCT 1177 |
| 1231 | RESP | 1 | | | 10,2461 | | GOXDSP | EQUALS GOMARK |
| 1232 | RESP | 1 | | | 10,2501 | | GOXDSPR | EQUALS GOMARKR |
| 1233 | RESP | 9 | LAST | 891 | 10,2465 | | GOXDSPF | EQUALS GOMARKP |
| 1234 | RESP | 5 | LAST | 891 | 10,2504 | | GOXDSPFR | EQUALS GOMARKPR |
| 1235 | RESP | 4 | LAST | 563 | 5423 | | ENDEXT | EQUALS ENDMARK |
| 1236 | RESP | 14 | LAST | 1186 | 0165 | | MPAC2SAV | EQUALS BANKSRT |
| 1238 | | | | | 10,3644 | 00100 0 | NBUSMASK | OCT 700 |
| 12385 | | | | | 10,3645 | 00704 1 | ASTROMSK | OCT 704 |
| 1239 | | | | | 10,3646 | 40030 0 | MPERPMASK | OCT 40030 |
| 1240 | | | | | 10,3641 | 34300 0 | OCT34300 | OCT 34300 |
| 1241 | | | | | 10,3650 | 40100 1 | BITS15+7 | OCT 40100 |
| 1242 | | | | | 10,3651 | 00110 1 | BITS7+4 | OCT 110 |
| 1243 | RESP | 3 | LAST | 1441 | 1061 | | DSPFLG | EQUALS ERANKSAV |
| 1244 | RESP | 1 | | | 1010 | | MARKFLAG | EQUALS MARKERAN |
| 1245 | RESP | 6 | LAST | 1450 | 1071 | | SAVEFLAG | EQUALS ERANKTEM |
| 1246 | | | | | 10,3652 | 02020 1 | BITS6+11 | OCT 2020 |
| 1247 | | | | | 10,3653 | 01010 1 | BITS4+10 | OCT 1010 |
| 1249 | | | | | 10,3654 | 00026 0 | LOWLOAD | DEC 22 |
| 1250 | | | | | 10,3655 | 11130 0 | BUSYMASK | OCT 77730 |
| 1252 | | | | | 10,3656 | 00080 1 | CADR-MASK | OCT 50 |
| 1253 | RESP | 7 | LAST | 1393 | 7707 | | PINMASK | EQUALS 13,14,15 |
| 1254 | RESP | 2 | LAST | 1445 | 10,3216 | | GOPLAY | EQUALS NVDSP |
| A1255 | | | | | | | PRIOSAVE | EQUALS R1SAVE |
| 1256 | RESP | 718 | LAST | 1450 | 0157 | | COPMPAC | EQUALS MPAC +3 |
| 1257 | RESP | 719 | LAST | 1451 | 0160 | | TEMPOR2 | EQUALS MPAC +4 |
| 1258 | RESP | 720 | LAST | 1451 | 0161 | | OUTHERE | EQUALS MPAC +5 |
| 1259 | RESP | 43 | LAST | 1446 | 0164 | | COP INDEX | EQUALS LOC |
| 1260 | RESP | 26 | LAST | 1152 | 0163 | | USERPRIO | EQUALS MODR |

FLASH, PERFORM, BLANK R2 AND R3

GOPERF3 VN DISPLAY BEFORE V50

FLASH, PERFORM

FLASH, BLANK R3

BITS 4 AND 14
MARK, DECIMAL NOUN, PERFORM, FLASH
MARK, PERFORM, FLASH, BLANK 2 AND 3

ERANK MASK

(OCT 37600)
V05 MINUS ONE

BIT 15,5,4 FOR MARK, PERFORM, FLASH

* DONT MOVE
* DONT MOVE



L DISPLAY INTERFACE ROUTINES

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| | | | | | | | |
|-------|---------|-----------|---------|---------|----------|-----------------|------|
| 1261 | REP 721 | LAST 1451 | 0162 | | GENMASK | EQUALS MPAC +6 | |
| 1262 | | | 10,3657 | 20144 1 | PRIOCT | OCT 20144 | PRI0 |
| 1263 | | | 10,3660 | 42424 0 | MARKOCT | OCT 42424 | MARK |
| 1264 | | | 10,3661 | 11254 1 | | OCT 11254 | NORM |
| | | | | | | | |
| 1265 | | | 10,3662 | 74704 1 | IDLESLEP | OCT 74704 | |
| 1266 | | | 10,3663 | 87777 1 | OCT87777 | OCT 87777 | |
| 1267 | REP 18 | LAST 891 | 5415 | | LINUS | EQUALS BLANKET | |
| 1268 | REP 722 | LAST 1452 | 0154 | | FACER80 | EQUALS MPAC | |
| 1269 | REP 723 | LAST 1452 | 0155 | | PLAYTEM1 | EQUALS MPAC +1 | |
| 1270 | REP 724 | LAST 1452 | 0157 | | PLAYTEM3 | EQUALS MPAC +3 | |
| 1271 | REP 725 | LAST 1452 | 0160 | | PLAYTEM4 | EQUALS MPAC +4 | |
| 1273 | | | 10,3664 | 40420 0 | OCT40420 | OCT 40420 | |
| 1274 | REP 3 | LAST 1440 | 10,3665 | 02674 0 | MAKEGEN | GENADR MAKEPLAY | |
| 1275 | | | 10,3666 | 10200 1 | OCT10200 | OCT 10200 | |
| 1276 | | | 10,3667 | 30200 0 | V97N00 | VN 09700 | |
| 12761 | | | 10,3670 | 20100 1 | OCT20100 | OCT 20100 | |

PASTE FOR V97 OR V99

L SERVICE ROUTINES

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| Address | Operation | Comments | Address | Operation | Comments | Block | Instruction | Operation |
|---------|-----------|-----------|---------|-----------|----------|--------------|-------------|--|
| 0037 | | | 7717 | | | BLOCK 3 | | |
| 0038 | REP 1 | | 8000 | | | SETLOC | FPDAG6 | |
| 0039 | | | 7717 | | | BANK | | |
| 0040 | REP 1 | | | | | COUNT | 03/FLAG | |
| 0043 | REP 233 | LAST 1446 | 7717 | 54 001 1 | UPENT2 | TS | L | WHICH FLAGWORD IS IT |
| 0044 | REP 4 | LAST 1382 | 7720 | 7 4716 1 | | MASK | OCT7 | |
| 0045 | REP 234 | LAST 1453 | 7721 | 56 001 0 | | XCH | L | SAVE IN L FOR INDEXING |
| 0046 | REP 3 | LAST 1364 | 7722 | 7 5630 0 | | MASK | OCT77770 | OBTAIN THE BIT INFORMATION |
| 0047 | | | 7723 | 0 0004 0 | | INHINT | | PREVENT INTERRUPTS |
| 0048 | REP 30 | LAST 1404 | 7724 | 54 061 1 | | TS | ITEMP1 | STORE THE BIT INFORMATION TEMPORARIALY |
| 0049 | REP 235 | LAST 1453 | 7725 | 50 001 0 | | NDX | L | |
| 0050 | REP 12 | LAST 993 | 7726 | 4 0074 0 | | CS | FLAGWRD0 | |
| 0051 | REP 31 | LAST 1453 | 7727 | 7 0061 1 | | MASK | ITEMP1 | |
| 0052 | REP 236 | LAST 1453 | 7730 | 50 001 0 | | NDX | L | |
| 0053 | REP 13 | LAST 1453 | 7731 | 26 074 0 | | ADS | FLAGWRD0 | |
| 0054 | | | 7732 | 0 0003 1 | | RELINT | | RELEASE INTERRUPT INHIBIT |
| 0055 | REP 340 | LAST 1449 | 7733 | 24 002 0 | | INCR | 0 | OBTAIN THE CORRECT RETURN ADDRESS |
| 0056 | REP 341 | LAST 1453 | 7734 | 0 0002 0 | | TC | 0 | RETURN |
| 0059 | REP 237 | LAST 1453 | 7735 | 54 001 1 | DOWNENT2 | TS | L | WHICH FLAGWORD IS IT |
| 0060 | REP 5 | LAST 1453 | 7736 | 7 4716 1 | | MASK | OCT7 | |
| 0061 | REP 238 | LAST 1453 | 7737 | 56 001 0 | | XCH | L | SAVE IN L FOR INDEXING |
| 0062 | REP 4 | LAST 1453 | 7740 | 7 5630 0 | | MASK | OCT77770 | OBTAIN THE BIT INFORMATION |
| 0063 | | | 7741 | 4 0000 0 | | COM | | START TO PROCESS THE INFORMATION |
| 0064 | | | 7742 | 0 0004 0 | | INHINT | | PREVENT INTERRUPTS |
| 0065 | REP 239 | LAST 1453 | 7743 | 50 001 0 | | NDX | L | |
| 0066 | REP 14 | LAST 1453 | 7744 | 7 0074 0 | | MASK | FLAGWRD0 | |
| 0067 | REP 240 | LAST 1453 | 7745 | 50 001 0 | | NDX | L | |
| 0068 | REP 15 | LAST 1453 | 7746 | 54 074 0 | | TS | FLAGWRD0 | |
| 0069 | | | 7747 | 0 0003 1 | | RELINT | | RELEASE INTERRUPT INHIBIT |
| 0070 | REP 342 | LAST 1453 | 7750 | 24 002 0 | | INCR | 0 | OBTAIN THE CORRECT RETURN ADDRESS |
| 0071 | REP 343 | LAST 1453 | 7751 | 0 0002 0 | | TC | 0 | RETURN |
| 0072 | REP 24 | LAST 1444 | 4716 | | OCT7 | EQUALS SEVEN | | |
| 0073 | | | 10,3671 | | | BANK | 10 | |



L SERVICES ROUTINES

P0074 UPFLAG AND DOWNFLAG ARE ENTIRELY GENERAL FLAG SETTING AND CLEARING SUBROUTINES. USING THEM, WHETHER OR
R0075 NOT IN INTERRUPT, ONE MAY SET OR CLEAR ANY SINGLE, NAMED BIT IN ANY ERASABLE REGISTER, SUBJECT OF COURSE TO
R0076 ERASE SETTING. A NAMED BIT, AS THE WORD IS USED HERE, IS ANY BIT WITH A NAME FORMALLY ASSIGNED BY THE YUL
R0081 ASSEMBLER.

R0082 AT PRESENT THE ONLY NAMED BITS ARE THOSE IN THE FLAGWORDS. ASSEMBLER CHANGES WILL MAKE IT POSSIBLE TO
R0084 NAME ANY BIT IN ERASABLE MEMORY.

R0085 CALLING SEQUENCES ARE AS FOLLOWS:-

| | | | | | | |
|-------|--|-------|--------------|--|-------|--------------|
| R0086 | | TC | UPFLAG | | TC | DOWNFLAG |
| R0087 | | ADRES | NAME OF FLAG | | ADRES | NAME OF FLAG |

R0088 RETURN IS TO THE LOCATION FOLLOWING THE ADDRESS ABOUT .58 MS AFTER THE ATC.

R0090 UPON RETURN A CONTAINS THE CURRENT FLAGWORD SETTING.

| | | | | | | |
|-------|-----|-----|-----------|---------------|----------|---------------|
| R0091 | | | 5435 | | BLOCK | 02 |
| R0092 | REP | 5 | LAST 1381 | 4000 | SETLOC | PPFLAG1 |
| R0093 | | | 5435 | | BANK | |
| R0094 | REP | 1 | | | COUNT* | SS/FLAG |
| | | | | | | |
| R0095 | REP | 344 | LAST 1453 | 5435 3 0002 0 | UPFLAG | CA 0 |
| R0096 | REP | 1 | | 5436 0 5453 0 | | TC DERIT |
| R0097 | | | | 5437 4 0000 0 | | COM |
| R0098 | | | | 5440 0 0006 1 | | EXTEND |
| R0099 | REP | 16 | LAST 1101 | 5441 04 001 1 | | ROR LCHAN |
| R100 | REP | 32 | LAST 1453 | 5442 50 061 0 | COMFLAG | INDEX ITEMPL |
| R101 | REP | 16 | LAST 1453 | 5443 54 074 0 | | TS FLAGWRD0 |
| R102 | REP | 5 | LAST 1379 | 5444 22 063 1 | | LXCH ITEMPL3 |
| R103 | | | | 5445 0 0003 1 | | RELINT |
| R104 | REP | 241 | LAST 1453 | 5446 0 0001 0 | | TC L |
| R105 | REP | 345 | LAST 1454 | 5447 3 0002 0 | DOWNFLAG | CA 0 |
| R106 | REP | 2 | LAST 1454 | 5450 0 5453 0 | | TC DERIT |
| R107 | REP | 242 | LAST 1454 | 5451 7 0001 1 | | MASK L |
| R108 | REP | 1 | | 5452 1 5442 1 | | TCF COMFLAG |
| R109 | REP | 174 | LAST 1449 | 5453 6 4712 1 | DERIT | AD ONE |
| R110 | | | | 5454 0 0004 0 | | INHINT |
| R111 | REP | 6 | LAST 1454 | 5455 54 063 0 | | TS ITEMPL3 |
| R112 | REP | 4 | LAST 1187 | 5456 3 4721 1 | | CA LOW4 |
| R113 | REP | 33 | LAST 1454 | 5457 54 061 1 | | TS ITEMPL1 |
| R114 | REP | 7 | LAST 1454 | 5460 50 063 1 | | INDEX ITEMPL3 |
| R115 | | | | 5461 2-7777 0 | | CA 0 -1 |
| R116 | REP | 243 | LAST 1454 | 5462 54 001 1 | | TS L |
| R117 | REP | 283 | LAST 1449 | 5463 3 4714 1 | | CA ZERO |



L SERVICE ROUTINES

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| | | | | | | | | |
|------|-----|-----|------|------|------|------|------|---|
| 0118 | | | | 5464 | 0 | 0008 | 1 | |
| 0119 | REP | 34 | LAST | 1454 | 5465 | 10 | 061 | 1 |
| 0120 | REP | 35 | LAST | 1455 | 5466 | 52 | 062 | 1 |
| 0121 | REP | 36 | LAST | 1455 | 5467 | 50 | 061 | 0 |
| 0122 | REP | 17 | LAST | 1454 | 5470 | 3 | 0074 | 1 |
| 0123 | REP | 244 | LAST | 1454 | 5471 | 54 | 001 | 1 |
| 0124 | REP | 22 | LAST | 1403 | 5472 | 50 | 062 | 0 |
| 0125 | REP | 56 | LAST | 1434 | 5473 | 4 | 4674 | 1 |
| 0126 | REP | 346 | LAST | 1454 | 5474 | 0 | 0002 | 0 |

| | |
|--------|---------|
| EXTEND | |
| DV | ITEMP1 |
| DXCH | ITEMP1 |
| INDEX | ITEMP1 |
| CA | FLAGWD0 |
| TS | L |
| INDEX | ITEMP2 |
| CS | BIT15 |
| TC | 0 |

A = FLAGWD, L = (15 - BIT)

CURRENT STATE

-(15 - BIT)

L SERVICES ROUTINES

P0127 DELAYJOB- A GENERAL ROUTINE TO DELAY A JOB A SPECIFIC AMOUNT OF TIME BEFORE PICKING UP AGAIN.

R0129 ENTRANCE REQUIREMENTS...

| | | | | | | |
|-------|-------|--|---------|--------|----------|----------------------------|
| A0130 | | | | CAP | DT | DELAY JOB FOR DT CENTISECS |
| A0131 | | | | TC | BANKCALL | |
| A0132 | | | | CADR | DELAYJOB | |
| 0133 | | | 00,3651 | BANK | 06 | |
| 0134 | REP 1 | | 00,2000 | SETLOC | DELAYJOB | |
| 0135 | | | 00,3732 | BANK | | |

R0136 THIS MUST REMAIN IN BANK 0 *****
 0137 REP 1 COUNT 00/DELAY

| | | | | | | | |
|------|---------|-----------|---------|----------|----------|----------|-----------------------------------|
| 0138 | | | 00,3732 | 0 0004 0 | DELAYJOB | INHINT | |
| 0139 | REP 347 | LAST 1455 | 00,3733 | 54 002 1 | TS | 0 | STORE DELAY DT IN 0 FOR DLY -1 IN |
| 0140 | REP 1 | | 00,3734 | 3 6214 0 | CAP | DELAYNLM | WAITLIST |
| 0141 | REP 37 | LAST 1405 | 00,3735 | 54 070 1 | DELLOOP | TS | RUPTREG1 |
| 0142 | REP 418 | LAST 1450 | 00,3736 | 50 000 1 | INDEX | A | |
| 0143 | REP 5 | LAST 188 | 00,3737 | 3 1141 1 | CA | DELAYLOC | IS THIS DELAYLOC AVAILABLE |
| 0144 | | | 00,3740 | 0 0006 1 | EXTEND | | |
| 0145 | REP 1 | | 00,3741 | 1 3746 0 | RZP | OK2DELAY | YES |
| 0146 | REP 38 | LAST 1456 | 00,3742 | 10 070 1 | CCS | RUPTREG1 | NO, TRY NEXT DELAYLOC |
| 0147 | REP 1 | | 00,3743 | 1 3735 1 | DELLOOP | | |
| 0148 | REP 7 | LAST 1199 | 00,3744 | 0 5604 0 | TC | BALOUT | NO AVAILABLE LOCs AVAILABLE. |
| 0149 | | | 00,3745 | 01104 0 | OCT | 1104 | |
| 0150 | REP 1 | | 00,3746 | 3 3766 0 | OK2DELAY | CA | TCSLEEP |
| 0151 | REP 5 | LAST 1193 | 00,3747 | 54 061 1 | TS | WAITEXIT | SET WAITLIST IMMEDIATE RETURN |
| 0152 | REP 30 | LAST 1180 | 00,3750 | 3 0004 0 | CA | FRANK | |
| 0153 | REP 39 | LAST 1456 | 00,3751 | 6 0070 0 | AD | RUPTREG1 | STORE FRANK FOR TASK CALL |
| 0154 | REP 245 | LAST 1455 | 00,3752 | 54 001 1 | TS | L | |
| 0155 | REP 1 | | 00,3753 | 3 3767 1 | CAP | WAKCAD | STORE CADR FOR TASK CALL |
| 0156 | REP 2 | LAST 1193 | 00,3754 | 1 5146 0 | TCP | DLY2 -1 | DLY IS IN WAITLIST ROUTINE |
| 0157 | REP 7 | LAST 1441 | 00,3755 | 0 4604 1 | TCGETCAD | TC | MAKECADR |
| 0158 | REP 40 | LAST 1456 | 00,3756 | 50 070 0 | INDEX | RUPTREG1 | |
| 0159 | REP 6 | LAST 1456 | 00,3757 | 55=141 0 | TS | DELAYLOC | SAVE DELAY CADRS |
| 0160 | REP 8 | LAST 1442 | 00,3760 | 0 5070 0 | TC | JORSLEEP | |
| 0161 | REP 284 | LAST 1454 | 00,3761 | 3 4714 1 | WAKER | CAP | ZERO |
| 0162 | REP 36 | LAST 1440 | 00,3762 | 50 006 1 | INDEX | FRANK | |
| 0163 | REP 7 | LAST 1456 | 00,3763 | 57=141 1 | XCH | DELAYLOC | MAKE DELAYLOC AVAILABLE |



L SERVICE ROUTINES

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| | | | | | | | | |
|------|-----|----|-----------|---------|--------|---|----------|--------------------|
| 0164 | REP | 13 | LAST 1443 | 00,3764 | 0 5074 | 1 | TC | JOBWAKE |
| 0165 | REP | 73 | LAST 1407 | 00,3765 | 0 5213 | 1 | TC | TASKOVER |
| 0166 | REP | 1 | | 00,3766 | 03753 | 0 | TC SLEEP | GENADR TCOSTCAD -2 |
| 0167 | REP | 1 | | 00,3767 | 03761 | 1 | WAKECAD | GENADR WAKER |



L SERVICE ROUTINES

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P0169 GENTRAN, A BLOCK TRANSFER ROUTINE.

R0170 WRITTEN BY D. BYLES
R0171 MOD 1 BY KERNAN

UTILITYM REV 17 11/18/67

R0172 MOD 2 BY SCHLEBERG (REMOVE RELINT) SKIPPER REV 4 2/28/68

R0173 THIS ROUTINE IS USEFULL FOR TRANSFERING N CONSECUTIVE ERASABLE OR FIXED QUANTITIES TO SOME OTHER N
R0175 CONSECUTIVE ERASABLE LOCATIONS. IF BOTH BLOCKS OF DATA ARE IN SWITCHABLE EBANKS, THEY MUST BE IN THE SAME ONE.

R0177 GENTRAN IS CALLABLE IN A JOB AS WELL AS A RUPT. THE CALLING SEQUENCE IS:

| | | | | |
|-------|------|-------|---------|--------------------------------------|
| A0179 | I | CA | N-1 | J OF QUANTITIES MINUS ONE. |
| A0180 | I +1 | TC | GENTRAN | IN FIXED-FIXED. |
| A0181 | I +2 | ADRES | L | STARTING ADRES OF DATA TO BE MOVED. |
| A0182 | I +3 | ADRES | M | STARTING ADRES OF DUPLICATION BLOCK. |
| A0183 | I +4 | | | RETURNS HERE. |

R0184 GENTRAN TAKES 25 MCT'S (300 MICROSECONDS) PER ITEM + 5 MCT'S (60 MICS) FOR ENTERING AND EXITING.

R0186 A, L AND ITEMP1 ARE NOT PRESERVED.

| | | | | | | |
|------|---------|-----------|------|----------|----------------|------------|
| 0187 | | | 5475 | | BLOCK 02 | |
| 0188 | REP 2 | LAST 1433 | 4000 | | SETLOC PPTAG4 | |
| 0189 | | | 5475 | | BANK | |
| 0190 | REP 37 | LAST 1455 | 0061 | | EBANK= ITEMP1 | |
| 0191 | REP 1 | | | | COUNT* SS/TRAN | |
| 0192 | | | 5475 | 0.0004 0 | GENTRAN | INHINT |
| 0193 | REP 38 | LAST 1458 | 5476 | 54 061 1 | TS | ITEMP1 |
| 0194 | REP 348 | LAST 1458 | 5477 | 50 002 0 | INDEX | 0 |
| 0195 | | | 5500 | 6 0000 1 | AD | 0 |
| 0196 | REP 419 | LAST 1456 | 5501 | 50 000 1 | INDEX | A |
| 0197 | | | 5502 | 3 0000 1 | CA | 0 |
| 0198 | REP 246 | LAST 1456 | 5503 | 54 001 1 | TS | L |
| 0199 | REP 39 | LAST 1458 | 5504 | 3 0061 0 | CA | ITEMP1 |
| 0200 | REP 349 | LAST 1458 | 5505 | 50 002 0 | INDEX | 0 |
| 0201 | | | 5506 | 6 0001 0 | AD | 1 |
| 0202 | REP 420 | LAST 1458 | 5507 | 50 000 1 | INDEX | A |
| 0203 | | | 5510 | 22 000 1 | LXCH | 0 |
| 0204 | REP 40 | LAST 1458 | 5511 | 10 061 1 | CCS | ITEMP1 |
| 0205 | REP 13 | LAST 785 | 5512 | 1 5476 0 | TCF | GENTRAN +1 |
| 0207 | REP 4 | LAST 1372 | 5513 | 1 6710 0 | TCF | 0+2 |

SAVE N-1.
C(Q) = ADRES L.
ADRES (L + N - 1).
C(ABOVE).
SAVE DATA.
ADRES (M + N - 1).
STUFF IT.
LOOP UNTIL N-1 = 0.
RETURN TO CALLER.



L SERVICE ROUTINES

P0208 B5OFF ZERO BIT 5 OF EXTVEACT, WHICH IS SET BY TESTXACT.

R0209 MAY BE USED AS NEEDED BY ANY EXTENDED VERB WHICH HAS DONE TESTXACT

| 0211 | REP | 1 | | | | COUNT# | SS/EXTVB |
|------|-----|-----|-----------|------|----------|--------|---------------|
| 0212 | REP | 49 | LAST 1446 | 5514 | 4 4706 0 | B5OFF | CS BITS |
| 0213 | REP | 21 | LAST 1433 | 5515 | 7 1044 1 | | MASK EXTVEACT |
| 0214 | REP | 22 | LAST 1459 | 5516 | 55-044 1 | | TS EXTVEACT |
| 0215 | REP | 120 | LAST 1451 | 5517 | 0 5112 0 | | TC ENDOPJOB |



L SERVICES ROUTINES

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P0216 SUBROUTINES TO TURN OFF AND TURN ON TRACKER FAIL LIGHT.

| | | | | | | | | |
|-------|------|-----|------|----------|----------|-------------|---|--|
| 0217 | | | 5520 | 0 0004 0 | TRPAILOP | INHINT | | |
| 0218 | RESP | 1 | 5521 | 4 7704 1 | CS | OCT40200 | TURN OFF TRACKER LIGHT | |
| 0219 | RESP | 46 | 5522 | 7 1036 1 | MASK | DSPTAB +11D | | |
| 0220 | RESP | 57 | 5523 | 8 4874 0 | AD | BIT15 | | |
| 0221 | RESP | 47 | 5524 | 55-036 1 | TS | DSPTAB +11D | | |
| 02215 | RESP | 37 | 5525 | 4 1331 0 | CS | OPTMODES | TO INSURE THAT OCDU FAIL WILL GO ON AGAIN IF IT WAS ON IN ADDITION TO TRACKER FAIL. | |
| 02216 | RESP | 55 | 5526 | 7 4704 1 | MASK | BIT7 | | |
| 02217 | RESP | 38 | 5527 | 27-331 0 | ADS | OPTMODES | | |
| 0222 | | | 5530 | 0 0003 1 | REQ | RELINT | | |
| 0223 | RESP | 350 | 5531 | 0 0002 0 | TC | 0 | | |
| 0224 | | | 5532 | 0 0004 0 | TRPAILON | INHINT | | |
| 0225 | RESP | 48 | 5533 | 4 1036 1 | CS | DSPTAB +11D | TURN ON | |
| 0226 | RESP | 2 | 5534 | 7 7704 1 | MASK | OCT40200 | | |
| 0227 | RESP | 49 | 5535 | 27-036 1 | ADS | DSPTAB +11D | | |
| 0228 | RESP | 1 | 5536 | 1 5530 0 | TCP | REQ | | |



L ALARM AND ABORT

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R0001 THE FOLLOWING SUBROUTINE MAY BE CALLED TO DISPLAY A NON-ABORTIVE ALARM CONDITION. IT MAY BE CALLED
R0003 EITHER IN INTERRUPT OR UNDER EXECUTIVE CONTROL.

R0004 CALLING SEQUENCE IS AS FOLLOWS:

R0005 TC ALARM
R0006 OCT AAANN ALARM NO. NN IN GENERAL AREA AAA.
R0007 (RETURNS HERE)

| Line | Code | Label | Address | Operation | Comments |
|------|---|----------|---------|---------------|-------------------------|
| 0000 | REP | 1 | 5537 | SETLOC | PPTRAG7 |
| 0001 | | | 4000 | | BANK |
| 0002 | | | 5537 | | |
| 0003 | REP | 8 LAST | 382 | | BANK= FAILREG |
| 0004 | REP | 1 | | | COUNT 02/ALARM |
| 0005 | ALARM TURNS ON THE PROGRAM ALARM LIGHT, BUT DOES NOT DISPLAY. | | | | |
| 0006 | | | 5537 | 0 0004 0 | ALARM INHINT |
| 0007 | REP | 351 LAST | 1460 | 5540 3 0002 0 | CA 0 |
| 0008 | REP | 4 LAST | 1384 | 5541 55=383 1 | ALARM2 TS ALMCA DR |
| 0009 | REP | 352 LAST | 1461 | 5542 50 002 0 | INDEX 0 |
| 0010 | | | | 5543 3 0000 1 | CA 0 |
| 0011 | REP | 247 LAST | 1458 | 5544 54 001 1 | BORTENT TS L |
| 0012 | REP | 37 LAST | 1456 | 5545 3 0006 1 | PRICENT CA BRANK |
| 0013 | | | | 5546 0 0006 1 | +1 EXTEND |
| 0014 | REP | 26 LAST | 1440 | 5547 04 007 1 | ROR SUPERBANK |
| 0015 | REP | 5 LAST | 1461 | 5550 55=384 0 | TS ALMCA DR +1 |
| 0016 | REP | 353 LAST | 1461 | 5551 3 0002 0 | LARMENT CA 0 |
| 0017 | REP | 41 LAST | 1458 | 5552 54 081 1 | TS ITEMP1 |
| 0018 | REP | 9 LAST | 1461 | 5553 10 375 1 | CHKFAIL1 CCS FAILREG |
| 0019 | REP | 1 | | 5554 1 5557 1 | TCP CHKFAIL2 |
| 0020 | REP | 10 LAST | 1461 | 5555 22 375 0 | LXCH FAILREG |
| 0021 | REP | 1 | | 5556 1 5571 0 | TCP PROCLARM |
| 0022 | REP | 11 LAST | 1461 | 5557 10 376 1 | CHKFAIL2 CCS FAILREG +1 |
| 0023 | REP | 1 | | 5560 1 5563 0 | TCP FAIL3 |
| 0024 | REP | 12 LAST | 1461 | 5561 22 376 0 | LXCH FAILREG +1 |
| 0025 | REP | 1 | | 5562 1 5574 0 | TCP MULTEXIT |
| 0026 | REP | 13 LAST | 1461 | 5563 3 0377 1 | FAIL3 CA FAILREG +2 |
| 0027 | REP | 37 LAST | 1201 | 5564 7 4672 1 | MASK POSMAX |
| 0028 | REP | 421 LAST | 1458 | 5565 10 000 0 | CCS A |
| 0029 | REP | 1 | | 5566 1 5600 0 | TCP MULTPA II. |
| 0030 | REP | 14 LAST | 1461 | 5567 22 377 1 | LXCH FAILREG +2 |

ADD SUPER BITS.

STORE RETURN FOR ALARM

IS ANYTHING IN FAILREG
YES TRY NEXT REG

TURN ALARM LIGHT ON FOR FIRST ALARM



L ALARM AND ABORT

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| | | | | | |
|-------|--|------------------|--------------|-------------|-----------------------------------|
| 0037 | REP 2 LAST 1461 | 5570 1 5574 0 | TCP | MULTEXIT | |
| 0038 | REP 50 LAST 1460 | 5571 4 1036 1 | PROCLARM CS | DSPTAB +11D | |
| 0039 | REP 2 LAST 1437 | 5572 7 5612 0 | MASK | OCTA0400 | |
| 0040 | REP 51 LAST 1462 | 5573 27=036 1 | ADS | DSPTAB +11D | |
| 0041 | REP 42 LAST 1461 | 5574 56 061 0 | MULTEXIT XCH | ITEMP1 | OBTAIN RETURN ADDRESS IN A |
| 0042 | | 5575 0 0003 1 | RELINT | | |
| 0043 | REP 422 LAST 1461 | 5576 50 000 1 | INDEX A | | |
| 0044 | | 5577 0 0001 0 | TC | 1 | |
| 0045 | REP 248 LAST 1461 | 5600 3 0001 0 | MULTPAIL CA | L | |
| 0046 | REP 58 LAST 1460 | 5601 6 4674 0 | AD | BIT15 | |
| 0047 | REP 15 LAST 1461 | 5602 54 377 0 | TS | FAILREG +2 | |
| 0048 | REP 3 LAST 1462 | 5603 1 5574 0 | TCP | MULTEXIT | |
| R0049 | PRIOLARM DISPLAYS V05N09 VIA PRICDSPR WITH 3 RETURNS TO THE USER FROM THE ASTRONAUT AT CALL LOC +1,+2,+3 AND | | | | |
| R0051 | AN IMMEDIATE RETURN TO THE USER AT CALL LOC +4. EXAMPLE FOLLOWS, | | | | |
| A0052 | | | CAP | OCTCX | ALARM CODE |
| A0053 | | | TC | BANKCALL | |
| A0054 | | | CADR | PRIOLARM | |
| A0055 | | | ... | ... | |
| A0056 | | | ... | ... | |
| A0057 | | | ... | ... | |
| A0058 | | | TC | PHASCHNG | ASTRONAUT RETURN |
| A0059 | | | OCT | X.1 | IMMEDIATE RETURN TO USER. RESTART |
| | | | | | PHASE CHANGE FOR PRIO DISPLAY |
| 0060 | | 10,3671 | BANK | 10 | |
| 0061 | REP 2 LAST 1433 | 10,2000 | SETLOC | DISPLAYS | |
| 0062 | | 10,3671 | BANK | | |
| 0063 | REP 2 LAST 1433 TO 1453' | 650 650* | COUNT | 10/DSPLA | |
| 0064 | | 10,3671 0 0004 0 | PRIOLARM | INHINT | *** KEEP IN DISPLAY ROUTINES BANK |
| 0065 | REP 248 LAST 1462 | 10,3672 54 001 1 | TS | L | SAVE ALARM CODE |
| 0066 | REP 24 LAST 1410 | 10,3673 3 0133 0 | CA | BUF2 | 2 CADR OF PRIOLARM USER |
| 0067 | REP 6 LAST 1461 | 10,3674 55=363 1 | TS | ALMCADR | |
| 0068 | REP 25 LAST 1462 | 10,3675 3 0134 1 | CA | BUF2 +1 | |
| 0069 | REP 1 | 10,3676 0 5546 0 | TC | PRICENT +1 | * LEAVE L ALONE |
| 0071 | | 10,3677 77467 1 | -2SEC | DESC | *** DONT MOVE |
| 0072 | REP 5 LAST 759 | 10,3700 3 4743 0 | CAP | V05N09 | |
| 0073 | REP 1 | 10,3701 1 2632 0 | TCP | PRICDSPR | |
| 0074 | | 5604 | BLOCK | 02 | |
| 0075 | REP 2 LAST 1461 | 4000 | SETLOC | FFTAGT | |
| 0076 | | 5604 | BANK | | |



L ALARM AND ABORT

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| | | | | | | | |
|--------|-----|-----|--------------------|------|----------|----------|-----------------|
| 0077 | REP | 2 | LAST 1461 TO 1462' | 37 | 37* | COUNT | 02/ALARM |
| 0078 | | | | 5604 | 0 0004 0 | BAILOUT | INHINT |
| 0079 | REP | 354 | LAST 1461 | 5605 | 3 0002 0 | CA | 0 |
| 0080 | REP | 7 | LAST 1462 | 5606 | 55=363 1 | TS | ALMCADR |
| 0081 | REP | 355 | LAST 1463 | 5607 | 50 002 0 | INDEX | 0 |
| 0082 | | | | 5610 | 3 0000 1 | CAP | 0 |
| 0083 | REP | 1 | | 5611 | 0 5544 1 | TC | BORTENT |
| 0084 | | | | 5612 | 40400 1 | OCT40400 | OCT 40400 |
| 00845 | | | | 5613 | 0 0004 0 | INHINT | |
| 0085 | REP | 78 | LAST 1447 | 5614 | 3 4711 1 | WHIMPER | CA TWO |
| 00851 | REP | 17 | LAST 1372 | 5615 | 6 0005 1 | AD | Z |
| 00852 | REP | 1 | | 5616 | 54 017 0 | TS | BRUPT |
| 00853 | | | | 5617 | 5 0017 1 | RESUME | |
| 00854 | REP | 64 | LAST 1433 | 5620 | 0 4574 0 | TC | POSTLUMP |
| 00855 | REP | 3 | LAST 254 | 5621 | 12641 1 | CADR | ENEMA |
| 008552 | | | | 5622 | 0 0004 0 | POODOO | INHINT |
| 008553 | REP | 356 | LAST 1463 | 5623 | 3 0002 0 | CA | 0 |
| 008554 | REP | 8 | LAST 1463 | 5624 | 55=363 1 | ABORT2 | TS ALMCADR |
| 008555 | REP | 357 | LAST 1463 | 5625 | 50 002 0 | INDEX | 0 |
| 008556 | | | | 5626 | 3 0000 1 | CAP | 0 |
| 008557 | REP | 2 | LAST 1463 | 5627 | 0 5544 1 | TC | BORTENT |
| 008558 | | | | 5630 | 77770 1 | OCT77770 | OCT 77770 |
| 00856 | REP | 1 | | 5631 | 3 4705 1 | CA | V37PLRIT |
| 008561 | REP | 24 | LAST 1418 | 5632 | 7 0103 1 | MASK | FLAGWRT |
| 008562 | REP | 423 | LAST 1462 | 5633 | 10 000 0 | CCS | A |
| 008563 | REP | 1 | | 5634 | 0 5613 0 | TC | WHIMPER -1 |
| 00857 | REP | 248 | LAST 1414 | 5635 | 0 4555 0 | TC | BANKCALL |
| 00858 | REP | 2 | LAST 180 | 5636 | 12474 0 | CADR | MR.KLEAN |
| 00859 | REP | 2 | LAST 1463 | 5637 | 0 5614 1 | TC | WHIMPER |
| 0086 | | | | 5640 | 0 0004 0 | COHOLE | INHINT |
| 0087 | REP | 358 | LAST 1463 | 5641 | 3 0002 0 | CA | 0 |
| 0088 | REP | 1 | | 5642 | 0 5624 1 | TC | ABORT2 |
| 0089 | | | | 5643 | 01103 1 | OCT1103 | OCT 1103 |
| 0091 | | | | 5644 | 0 0004 0 | CURTAINS | INHINT |
| 0092 | REP | 359 | LAST 1463 | 5645 | 3 0002 0 | CA | 0 |
| 0094 | REP | 2 | LAST 1384 | 5646 | 0 5541 1 | TC | ALARM2 |
| 0095 | | | | 5647 | 00217 0 | OCT217 | OCT 00217 |
| 0096 | REP | 9 | LAST 1463 | 5650 | 0 1363 0 | TC | ALMCADR |
| 0099 | REP | 121 | LAST 1459 | 5112 | | DOALARM | EQUALS ENDOPJCR |
| A0101 | | | | | | CAP | (ALARM) |
| A0102 | | | | | | TC | VARALARM |

RESUME SENDS CONTROL HERE

DONT MOVE
IS AVERAGE G ON

YES. DONT DO POODOO. DO BAILOUT.

RETURN TO USER



L ALARM AND ABORT

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0103 VARALARM TURNS ON PROGRAM ALARM LIGHT BUT DOES NOT DISPLAY
0104 5651 0 0004 0 VARALARM INHINT

0105 REP 250 LAST 1462 5652 54 001 1 TS L SAVE USERS ALARM CODE

0106 REP 360 LAST 1463 5653 3 0002 0 CA 0 SAVE USERS 0

0107 REP 10 LAST 1463 5654 55=363 1 TS ALMADR

0108 REP 2 LAST 1462 5655 0 5545 0 TC PRIORNT

0109 5656 00014 1 OCT14 OCT 14 DONT MOVE

0110 REP 11 LAST 1464 5657 0 1363 0 TC ALMADR RETURN TO USER

0111 REP 8 LAST 1456 5604 ABORT EQUALS BAILOUT *** TEMPORARY UNTIL ABORT CALLS OUT

L UPDATE PROGRAM USER'S PAGE NO. 1 80 84

R0001 PROGRAM NAME' P27
R0002 WRITER BY' KILROY/ DE WOLF

R0003 MOD NO' 6
R0004 MOD BY' KILROY
R0005 DATE' 01DEC67

R0006 LOG SECTION' UPDATE PROGRAM.

R0007 FUNCT. DESCR' P27 (THE UPDATE PROGRAM) PROCESSES COMMANDS AND DATA
R0008 INSERTIONS REQUESTED BY THE GROUND VIA UPLINK.
R0009 THE P27 PROGRAM WILL ACCEPT UPDATES
R0010 ONLY DURING P00 FOR THE LM, AND ONLY DURING P00,
R0011 P02, AND FRESH START FOR THE CSM

R0012 CALLING SEQ' PROGRAM IS INITIATED BY UPLINK ENTRY OF VERBS 70, 71, 72 AND 73.

R0014 SUBROUTINES' TESTACT, NEWMODEX, NEWMODEX +3, GOODSPF, BANKCALL, FINDVAC, INTPRST, INTSTALL, TPAGREE,
R0016 INTWAKBJ, ENDEXT, POSTJUMP, FALTON, NEWPHASE, PHASCHNG

R0017 NORMAL EXIT' TC ENDEXT

R0018 ALARM/ABORT' TC FALTON FOLLOWED BY TC ENDEXT

R0019 RESTARTS' P27 IS RESTART PROTECTED IN TWO WAYS...
R0020 1. PRIOR TO VERIFLAG INVERSION(WHICH IS CAUSED BY THE GROUND/ASTRONAUTS VERIFICATION OF UPDATE
R0022 DATA BY SENDING A V33E WHEN V21N02 IS FLASHING)---
R0023 NO PROTECTION EXCEPT PRE-P27 MODE IS RESTORED, COAST + ALIGN DOWNLIST IS SELECTED AND UPLINK
R0025 ACTIVITY LIGHT IS TURNED OFF.(JUST AS IF A V34E WAS SENT DURING P27 DATA LOADS).
R0027 V70,V71,V72 OR V73 WILL HAVE TO BE COMPLETELY RESENT BY USER.
R0029 2. AFTER VERIFLAG INVERSION(WHEN UPDATE OF THE SPECIFIED BRASABLES IS BEING PERFORMED)---
R0031 PROTECTED AGAINST RESTARTS.

R0032 DEBRIS' UPBLUP (20D) TEMP STORAGE FOR ADDRESSES AND CONTENTS.
R0033 UPVERB (1) VERB NUMBER MINUS 70D (E.G. FOR V72, UPVERB = 72D - 70D = 2)
R0035 UPOLDMD (1) FOR MAJOR MODE INTERRUPTED BY P27.
R0036 COMPNMB (1) TOTAL NUMBER OF COMPONENTS TO BE TRANSMITTED.
R0038 UPCOUNT (1) ACTUAL NUMBER OF COMPONENTS RECEIVED.
R0039 UPTEMP (1) SCRATCH, BUT USUALLY CONTAINS COMPONENT NUMBER TO BE CHANGED DURING VERIFY CYCLE

R0041 INPUT'

R0042 ENTRY' DESCRIPTION

R0043 VTD000000000000 (LIFTOFF TIME INCREMENT) DOUBLE PRECISION OCTAL TIME INCREMENT, X000X X000X,
R0045 IS ADDED TO TEPHEN, SUBTRACTED FROM AGC CLOCK(TIME2,TIME1), SUBTRACTED FROM CSM STATE
R0047 VECTOR TIME(TETCSM) AND SUBTRACTED FROM LM STATE VECTOR TIME(TETLEM).
R0049 THE DP OCTAL TIME INCREMENT IS SCALED AT 2(28).



L UPDATE PROGRAM

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R0050 V71B11BAAAAE (CONTIGUOUS BLOCK UPDATE) 11-2 OCTAL COMPONENTS,X0000,
R0051 X0000E ARE LOADED INTO ERASABLE STARTING AT BCADR, AAAA.
R0052 X0000E IT IS .OE. 3 .AND. .LE. 20D.,
R0053 AND (AAAA + 11 - 3) DOES NOT PRODUCE AN ADDRESS IN THE
R0054 0 NEXT BANK
R0055 SCALING IS SAME AS INTERNAL REGISTERS.

R0056 V72B11E (SCATTER UPDATE) (11-1)/2 OCTAL COMPONENTS,X0000, ARE
R0057 AAAAB0000E LOADED INTO ERASABLE LOCATIONS, AAAA.
R0058 AAAAB0000E 11 IS .OE. 3 .AND. .LE. 19D, AND MUST BE ODD.
R0060 SCALING IS SAME AS INTERNAL REGISTERS.

R0061 V73B0000E0000E (OCTAL CLOCK INCREMENT) DOUBLE PRECISION OCTAL TIME
R0062 INCREMENT X000 X0000, IS ADDED TO THE AGC CLOCK, IN
R0063 CENTISECONDS SCALED AT (2)28.
R0064 THIS LOAD IS THE OCTAL EQUIVALENT OF V55.
R0065 OUTPUT' IN ADDITION TO THE ABOVE REGISTER LOADS, ALL UPDATES
R0066 COMPLEMENT BITS OF FLAGWORD.
R0067 ADDITIONAL NOTES' VERB 71, JUST DEFINED ABOVE WILL BE USED TO PERFORM BUT NOT LIMITED TO THE FOLLOWING UPDATES--

- R0069 1. CSM/LM STATE VECTOR UPDATE
- R0072 2. REFSMAT UPDATE
- R0073 THE FOLLOWING COMMENTS DELINEATE EACH SPECIAL UPDATE----

R0074 1. CSM/LM STATE VECTOR UPDATE(ALL DATA ENTRIES IN OCTAL)

| R0075 | ENTRIES' | DATA DEFINITION' | SCALE FACTORS' |
|-------|---------------------------------------|---|----------------|
| R0077 | V71E | CONTIGUOUS BLOCK UPDATE VERB | |
| R0078 | 21E | NUMBER OF COMPONENTS FOR STATE VECTOR UPDATE | |
| R0080 | AAAAE | BCADR OF α UPS/FLAG α | |
| R0082 | X0000E | STATE VECTOR IDENTIFIER' 00001 FOR CSM, 77776 FOR LEM - EARTH SPHERE OF INFLUENCE SCALING | |
| R0083 | | 00002 FOR CSM, 77775 FOR LEM - LUNAR SPHERE OF INFLUENCE SCALING | |
| R0084 | X0000E0000E | X POSITION | |
| R0086 | X0000E0000E | Y POSITION | |
| R0088 | X0000E0000E | Z POSITION | |
| R0090 | X0000E0000E | X VELOCITY | |
| R0092 | X0000E0000E | Y VELOCITY | |
| R0094 | X0000E0000E | Z VELOCITY | |
| R0096 | X0000E0000E | TIME FROM AGC CLOCK ZERO | |
| R0098 | V33E | VERB 33 TO SIGNAL THAT THE STATE VECTOR IS READY TO BE STORED. | |
| R0144 | 2. REFSMAT(ALL DATA ENTRIES IN OCTAL) | | |
| R0145 | ENTRIES' | DATA DEFINITIONS' | SCALE FACTORS' |



L UPDATE PROGRAM

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| | | | | | | | | |
|-------|-----|-----|-----------|---------|----------|---------|----------------|--|
| 0193 | REF | 2 | LAST 1467 | 43,3741 | 30 331 0 | CAB | UPVERBSV | SET UPVERB TO INDICATE TO P27 |
| 0194 | REF | 2 | LAST 70 | 43,3742 | 54 302 1 | TS | UPVERB | WHICH EXTENDED VERB CALLED IT. |
| 0195 | REF | 175 | LAST 1454 | 43,3743 | 3 4712 1 | CAP | ONE | |
| 0196 | REF | 2 | LAST 70 | 43,3744 | 54 303 0 | TS | UPCOUNT | INITIALIZE UPCOUNT TO 1 |
| 0197 | REF | 65 | LAST 1463 | 43,3745 | 0 4574 0 | TC | POSTJUMP | LEAVE EXTENDED VERB BANK AND |
| 0198 | REF | 1 | | 43,3746 | 57384 1 | CADR | UPPART2 | GO TO UPDATE PROGRAM(P27) BANK. |
| 0199 | REF | 16 | LAST 1417 | 43,3747 | 4 0101 0 | QCMORE | CS | FLAGWRD5 |
| 0200 | REF | 33 | LAST 1444 | 43,3750 | 7 4703 0 | MASK | BITS | CHECK IF COMPUTER IS LOC |
| 0201 | REF | 424 | LAST 1463 | 43,3751 | 10 000 0 | CCS | A | IS COMPUTER LOC OR AGC |
| 0202 | REF | 1 | | 43,3752 | 1 3760 1 | UPERLEN | TCP | UPERROR |
| 0203 | REF | 79 | LAST 1463 | 43,3753 | 4 4711 0 | CS | TWO | ERROR- IT'S THE LEN + MODE IS NOT POO. |
| 0204 | REF | 20 | LAST 1467 | 43,3754 | 7 1011 1 | MASK | MODREG | |
| 0205 | REF | 425 | LAST 1468 | 43,3755 | 10 000 0 | CCS | A | |
| 0206 | REF | 2 | LAST 1468 | 43,3756 | 1 3760 1 | UPERCNC | TCP | UPERROR |
| A0207 | | | | | | | | ERROR- IT'S THE CMC AND MODE IS NOT |
| 0208 | REF | 361 | LAST 1464 | 43,3757 | 0 0002 0 | TC | Q | P00 OR P02. |
| | | | | | | | | ALLOW UPDATE TO PROCEED |
| 0209 | REF | 66 | LAST 1468 | 43,3760 | 0 4574 0 | UPERROR | TC | TURN ON OPERATOR ERROR LIGHT |
| 0210 | REF | 1 | | 43,3761 | 57745 0 | CADR | UPERROUT +2 | GO TO COMMON UPDATE PROGRAM EXIT |
| 0211 | REF | 285 | LAST 1456 | 4714 | | UP70 | EQUALS ZERO | |
| 0212 | REF | 176 | LAST 1468 | 4712 | | UP71 | EQUALS ONE | |
| 0213 | REF | 80 | LAST 1468 | 4711 | | UP72 | EQUALS TWO | |
| 0214 | REF | 53 | LAST 1450 | 6214 | | UP73 | EQUALS THREE | |
| 0215 | | | | 04,3650 | | | BANK 04 | |
| 0216 | REF | 2 | LAST 1300 | 27,2000 | | | SETLOC UPDATE2 | |
| 0217 | | | | 27,3364 | | | BANK | |
| 0218 | REF | 1 | | | | | COUNT# 55/P27 | |
| 0219 | | | | 27,3364 | | UPPART2 | EQUALS | UPDATE PROGRAM - PART 2 |
| 0220 | REF | 102 | LAST 1414 | 27,3364 | 0 5301 0 | TC | PHASCHNG | SET RESTART GROUP 6 TO RESTORE OLD MODE |
| 0221 | | | | 27,3365 | 07026 1 | OCT | 07026 | AND DOWNLIST AND EXIT IF RESTART OCCURS. |
| 0222 | | | | 27,3366 | 30000 1 | OCT | 30000 | PRIORITY SAME AS CHRPRIO |
| 0223 | REF | 7 | LAST 173 | 0304 | | EBANK= | UPBUFF | |
| 0224 | REF | 1 | | 27,3367 | 03675 0 | 2CADR | UPCOUT +1 | |
| 0224 | REF | 1 | | 27,3370 | 56100 0 | | | |
| 0225 | REF | 177 | LAST 1468 | 27,3371 | 3 4712 1 | CAP | ONE | |
| 0226 | REF | 7 | LAST 1067 | 27,3372 | 54 332 1 | TS | DNLSICD | DOWNLIST |
| 0227 | REF | 13 | LAST 754 | 27,3373 | 0 5243 1 | TC | NEWMODEX | SET MAJOR MODE = 27 |
| 0228 | | | | 27,3374 | 00033 1 | DEC | 27 | |

L UPDATE PROGRAM

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| ADDR | OP | COND | LAST | PC | PC | PC | INDEX | OP | COMMENT |
|-------|-----|------|-----------|---------|----------|--------|--------|-----------|-------------------------|
| 0229 | REP | 3 | LAST 1468 | 27,3375 | 50 302 0 | | INDEX | UPVERB | |
| 0230 | | | | 27,3376 | 1 3377 0 | | TCP | +1 | |
| 0231 | | | | 27,3377 | 1 3402 0 | | TCP | +3 | |
| 0232 | REP | 1 | | 27,3400 | 1 3405 1 | | TCP | QWELL1 | |
| 0233 | REP | 2 | LAST 1469 | 27,3401 | 1 3405 1 | | TCP | QWELL1 | |
| 0234 | REP | 61 | LAST 1468 | 27,3402 | 3 4711 1 | | CA | TWO | |
| 0235 | REP | 4 | LAST 173 | 27,3403 | 54 300 0 | | TS | COMPNUMB | |
| 0236 | REP | 1 | | 27,3404 | 1 3430 1 | | TCP | QWELL2 | |
| 0237 | REP | 1 | | 27,3405 | 3 3500 1 | QWELL1 | CAP | ADUPRUFF | |
| 0238 | REP | 726 | LAST 1452 | 27,3406 | 54 156 1 | | TS | MPAC +2 | |
| 0239 | REP | 1 | | 27,3407 | 3 3501 0 | +2 | CAP | UPLOADNV | |
| 0240 | REP | 249 | LAST 1463 | 27,3410 | 0 4555 0 | | TC | BANKCALL | |
| 0241 | REP | 13 | LAST 623 | 27,3411 | 20465 1 | | CADR | GOKDSPP | |
| 0242 | REP | 1 | | 27,3412 | 1 3675 1 | | TCP | UPOUT4 | |
| 0243 | REP | 3 | LAST 1469 | 27,3413 | 1 3407 0 | | TCP | QWELL1 +2 | |
| 0244 | REP | 1 | | 27,3414 | 0 3471 0 | | TC | CK4V32 | |
| 0245 | REP | 46 | LAST 1363 | 27,3415 | 4 4711 0 | | CS | BIT2 | |
| 0246 | REP | 8 | LAST 1468 | 27,3416 | 6 0304 0 | | AD | UPRUFF | |
| 0247 | | | | 27,3417 | 0 0006 1 | | EXTEND | | |
| 0248 | REP | 4 | LAST 1469 | 27,3420 | 6 3407 1 | | BZMP | QWELL1 +2 | |
| 0249 | REP | 9 | LAST 1469 | 27,3421 | 4 0304 1 | | CS | UPRUFF | |
| 0250 | REP | 1 | | 27,3422 | 6 4376 1 | | AD | UP21 | |
| 0251 | | | | 27,3423 | 0 0006 1 | | EXTEND | | |
| 0252 | REP | 5 | LAST 1469 | 27,3424 | 6 3407 1 | | BZMP | QWELL1 +2 | |
| 0253 | REP | 10 | LAST 1469 | 27,3425 | 30 304 0 | | CAB | UPRUFF | |
| 0254 | REP | 5 | LAST 1469 | 27,3426 | 54 300 0 | | TS | COMPNUMB | |
| 0257 | | | | | | | | | UPRUFF LOADING SEQUENCE |
| 02571 | REP | 3 | LAST 1468 | 27,3427 | 24 303 1 | | INCR | UPCOUNT | |
| 0258 | REP | 1 | | 27,3430 | 3 3845 0 | QWELL2 | CAP | ADUPBPM1 | |
| 0259 | REP | 4 | LAST 1469 | 27,3431 | 6 0303 1 | | AD | UPCOUNT | |
| 0260 | REP | 727 | LAST 1469 | 27,3432 | 54 156 1 | +2 | TS | MPAC +2 | |
| 0261 | REP | 2 | LAST 1469 | 27,3433 | 3 3501 0 | +3 | CAP | UPLOADNV | |
| 0262 | REP | 250 | LAST 1469 | 27,3434 | 0 4555 0 | | TC | BANKCALL | |
| 0263 | REP | 14 | LAST 1469 | 27,3435 | 20465 1 | | CADR | GOKDSPP | |
| 0264 | REP | 2 | LAST 1469 | 27,3436 | 1 3675 1 | | TCP | UPOUT4 | |
| 0265 | REP | 2 | LAST 1469 | 27,3437 | 1 3433 1 | | TCP | QWELL2 +3 | |
| 0266 | REP | 2 | LAST 1469 | 27,3440 | 0 3471 0 | | TC | CK4V32 | |
| 0267 | REP | 5 | LAST 1469 | 27,3441 | 4 0303 0 | | CS | UPCOUNT | |
| 0268 | REP | 6 | LAST 1469 | 27,3442 | 6 0300 1 | | AD | COMPNUMB | |
| 0269 | | | | 27,3443 | 0 0006 1 | | EXTEND | | |
| 0270 | REP | 1 | | 27,3444 | 6 3446 1 | | BZMP | UPVERIFY | |
| 0272 | REP | 3 | LAST 1469 | 27,3445 | 1 3427 1 | | TCP | QWELL2 -1 | |
| 0273 | | | | | | | | | VERIFY SEQUENCE |

BRANCH DEPENDING ON WHETHER THE UPDATE VERB REQUIRES A FIXED OR VARIABLE NUMBER V70 FIXED. (OF COMPONENTS V71 VARIABLE - GO GET NO. OF COMPONENTS V72 VARIABLE - GO GET NO. OF COMPONENTS V73 (AND V70) FIXED SET NUMBER OF COMPONENTS TO 2. GO GET THE TWO UPDATE COMPONENTS

* REQUEST USER TO SEND NUMBER *
* OF COMPONENTS PARAMETER(II). *
(CK4V32 RETURNS HERE IF V32 ENCOUNTERED) DISPLAY A FLASHING V21N01 TO REQUEST II. V34 TERMINATE UPDATE(P27) RETURN DATA OR V32 RETURN

IS II(NUMBER OF COMPONENTS PARAMETER) .GE. 3 AND .LE. 20D.

SAVE II IN COMPNUMB

INCREMENT COUNT OF COMPONENTS RECEIVED. CALCULATE LOCATION(BCADR) IN UPRUFF WHERE NEXT COMPONENT SHOULD BE STORED. PLACE BCADR INTO R3. (CK4V32 RETURNS HERE IF V32 ENCOUNTERED) DISPLAY A FLASHING V21N01 TO REQUEST DATA. V34 TERMINATE UPDATE(P27) RETURN. V33 PROCEED RETURN DATA OR V32 RETURN HAVE WE FINISHED RECEIVING ALL THE DATA WE EXPECTED.

YES- GO TO VERIFICATION SEQUENCE
NO- REQUEST ADDITIONAL DATA.



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| | | | | | | | | |
|-------|-----|-----|--|---------|----------|-----------|---------|-----------|
| 0274 | REP | 1 | | 27,3446 | 3 3477 0 | UPVERIFY | CAP | ADUPTMP |
| 0275 | REP | 728 | LAST 1469 | 27,3447 | 54 156 1 | | TS | MPAC +2 |
| 0276 | REP | 1 | | 27,3450 | 3 3502 0 | | CAP | UPVRFYV |
| 0277 | REP | 251 | LAST 1469 | 27,3451 | 0 4555 0 | | TC | BANKCALL |
| 0278 | REP | 15 | LAST 1469 | 27,3452 | 20465 1 | | CADR | QOQDSP |
| 0279 | REP | 3 | LAST 1469 | 27,3453 | 1 3675 1 | | TCF | UPOUT4 |
| 0280 | REP | 1 | | 27,3454 | 1 3503 0 | | TCF | UPSTORE |
| 0281 | REP | 3 | LAST 1469 | 27,3455 | 0 3471 0 | | TC | CK4V32 |
| 0282 | REP | 2 | LAST 70 | 27,3456 | 3 0330 1 | | CA | UPTMP |
| 0283 | | | | 27,3457 | 0 0006 1 | | EXTEND | |
| 0284 | REP | 2 | LAST 1469 | 27,3460 | 6 3446 1 | | BZMF | UPVERIFY |
| 0285 | REP | 3 | LAST 1470 | 27,3461 | 4 0330 0 | | CS | UPTMP |
| 0286 | REP | 7 | LAST 1469 | 27,3462 | 6 0300 1 | | AD | COMPNUM |
| 0289 | REP | 82 | LAST 1433 | 27,3463 | 6 4712 1 | | AD | BIT1 |
| 0290 | | | | 27,3464 | 0 0006 1 | | EXTEND | |
| 0291 | REP | 3 | LAST 1470 | 27,3465 | 6 3446 1 | | BZMF | UPVERIFY |
| 0292 | REP | 2 | LAST 1469 | 27,3466 | 3 3645 0 | | CAP | ADUPTMP1 |
| 0293 | REP | 4 | LAST 1470 | 27,3467 | 6 0330 1 | | AD | UPTMP |
| 0294 | REP | 4 | LAST 1469 | 27,3470 | 1 3432 0 | | TCF | QWELL2 +2 |
| 0295 | REP | 2 | LAST 1468 | 27,3675 | | UPOUT4 | EQUALS | UPOUT +1 |
| R0296 | | | CHECK FOR VERB 32 SEQUENCE | | | | | |
| 0297 | REP | 729 | LAST 1470 | 27,3471 | 4 0154 0 | CK4V32 | CS | MPAC |
| 0298 | REP | 57 | LAST 1445 | 27,3472 | 7 4705 0 | | MASK | BIT6 |
| 0299 | REP | 428 | LAST 1468 | 27,3473 | 10 000 0 | | CCS | A |
| 0300 | REP | 362 | LAST 1468 | 27,3474 | 0 0002 0 | | TC | 0 |
| 0301 | REP | 363 | LAST 1470 | 27,3475 | 50 002 0 | | INDEX | 0 |
| 0302 | | | | 27,3476 | 7=7771 0 | | TC | 0 -6 |
| 0305 | REP | 5 | LAST 1470 | 27,3477 | 00330 1 | ADUPTMP | ADRES | UPTMP |
| 0306 | REP | 11 | LAST 1469 | 27,3500 | 00304 0 | ADUPBUFF | ADRES | UPRUFF |
| 0307 | | | | 27,3501 | 05201 1 | UPLOADNV | VN | 2101 |
| 0308 | | | | 27,3502 | 05202 1 | UPVRFYV | VN | 2102 |
| 0309 | REP | 3 | LAST 1174 | 4376 | | UP21 | = | MD1 |
| 03121 | REP | 30 | LAST 1435 | 4715 | | UPOUTPHAS | EQUALS | PIVE |
| R0313 | | | PRE-STORE AND PAN TO APPROPRIATE BRANCH SEQUENCE | | | | | |
| 0314 | | | | 27,3503 | | UPSTORE | EQUALS | |
| 0315 | | | | 27,3503 | 0 0004 0 | | INHINT | |
| 0316 | REP | 25 | LAST 1463 | 27,3504 | 30 103 0 | CAB | FLAGWD7 | |
| 0317 | REP | 251 | LAST 1464 | 27,3505 | 56 001 0 | XCH | L | |
| 0318 | REP | 39 | LAST 1448 | 27,3506 | 3 4710 0 | CAP | BIT3 | |
| 0319 | | | | 27,3507 | 0 0006 1 | EXTEND | | |
| 0320 | REP | 17 | LAST 1454 | 27,3510 | 06 001 0 | ROR | LCHAN | |

PLACE ECADR WHERE COMPONENT NO. INDEX IS TO BE STORED INTO R3. (CK4V32 RETURNS HERE IF V32 ENCOUNTERED) DISPLAY A FLASHING V21N02 TO REQUEST DATA CORRECTION OR VERIFICATION. V34 TERMINATE UPDATE(P27) RETURN V33 DATA SENT IS GOOD. GO STORE IT. COMPONENT NO. INDEX OR V32 RETURN DOES THE COMPONENT NO. INDEX JUST SENT SPECIFY A LEGAL COMPONENT NUMBER? NO, IT IS NOT POSITIVE NONZERO

NO
YES- BASED ON THE COMPONENT NO. INDEX CALCULATE THE ECADR OF LOCATION IN UPBUFF WHICH USER WANTS TO CHANGE.

COMES HERE ON V34 TO TERMINATE UPDATE

ON DATA RETURN FROM «GOXDSP»
ON DATA RETURN FROM «GOXDSP» THE CONTENTS OF MPAC = VERB. SO TEST FOR V32. IT'S NOT A V32, IT'S DATA. PROCEED.

V32 ENCOUNTERED - GO BACK AND GET DATA

ADDRESS OF TEMP STORAGE FOR CORRECTIONS
ADDRESS OF UPDATE DATA STORAGE BUFFER
VERB 21 NOUN 01
VERB 21 NOUN 02
DEC 21 = MAX NO OF COMPONENTS +1

GROUND HAS VERIFIED UPDATE. STORE DATA.

INVERT VERIFLAG(BIT3 OF FLAGWD7) TO INDICATE TO THE GROUND(VIA DOWNLINK) THAT THE V33(WHICH THE GROUND SENT TO VERIFY THE UPDATE) HAS BEEN SUCCESSFULLY RECEIVED BY THE UPDATE PROGRAM

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| | | | | | | | | |
|-------|-----|-----|--|---------|-----------|----------|------------|--|
| 0321 | REP | 26 | LAST 1470 | 27,3511 | 54 103 1 | TS | FLAGWD7 | |
| 0322 | REP | 103 | LAST 1468 | 27,3512 | 0 5301 0 | TC | PHASCHNG | SET RESTART GROUP 6 TO REDO THE UPDATE |
| 0323 | | | | 27,3513 | 0 04026 1 | OCT | 04026 | DATA STORE IF A RESTART OCCURS. |
| 0324 | | | | 27,3514 | 0 0004 0 | INHINT | | (BECAUSE PHASCHNG DID A RELINT) |
| 0325 | REP | 82 | LAST 1468 | 27,3515 | 4 4711 0 | CS | TWO | GO TO UPFNDVAC IF INSTALL IS REQUIRED, |
| 0326 | REP | 4 | LAST 1468 | 27,3516 | 6 0302 0 | AD | UPVERB | THAT IS, IF IT'S A V70 - V72. |
| 0327 | | | | 27,3517 | 0 0006 1 | EXTEND | | GO TO UPEND73 IF IT'S A V73. |
| 0328 | REP | 1 | | 27,3520 | 6 3527 1 | BZP | UPFNDVAC | |
| R0330 | | | VERB 73 BRANCH | | | | | |
| 0331 | | | | 27,3521 | 0 0006 1 | UPEND73 | EXTEND | V73-PERFORM DP OCTAL AGC CLOCK INCREMENT |
| 0332 | REP | 12 | LAST 1470 | 27,3522 | 3 0305 1 | DCA | UPBUFF | |
| 0333 | REP | 13 | LAST 1471 | 27,3523 | 52 315 1 | DCH | UPBUFF +8D | |
| 0334 | REP | 1 | | 27,3524 | 0 3552 0 | TC | TIMEDIDL | |
| 0335 | REP | 7 | LAST 358 | 27,3525 | 0 4400 1 | TC | PALTON | ERROR- TURN ON *OPERATOR ERROR* LIGHT |
| 0336 | REP | 3 | LAST 1470 | 27,3526 | 0 3675 0 | TC | UPOUT +1 | GO TO COMMON UPDATE PROGRAM EXIT |
| 0337 | REP | 7 | LAST 1417 | 27,3527 | 3 4371 0 | UPFNDVAC | CAP | CHRPRIO |
| 0338 | REP | 34 | LAST 1446 | 27,3530 | 0 5042 1 | TC | PINDVAC | (USE EXTENDED VERB PRIORITY) |
| 0339 | REP | 14 | LAST 1467 | E3,1708 | | EBANK= | TEPHEN | GET VAC AREA FOR *CALL INSTALL* |
| 0340 | REP | 1 | | 27,3531 | 0 03534 0 | 2CADR | UPJOB | (NOTE) THIS WILL ALSO SET BRANK FOR |
| 0340 | REP | 1 | | 27,3532 | 56103 0 | | | *TEPHEN* UPDATE BY V70) |
| 0341 | REP | 122 | LAST 1463 | 27,3533 | 0 5112 0 | TC | ENDOFJOB | |
| 0342 | REP | 245 | LAST 1338 | 27,3534 | 0 6006 1 | UPJOB | TC | INTERPT |
| 0343 | | | | 27,3535 | 77624 1 | CALL | | THIS COULD BE A STATE VECTOR UPDATE--SO |
| 0344 | REP | 32 | LAST 1298 | 27,3536 | 27371 1 | | INTSTALL | WAIT/PUT JOB TO SLEEP) IF ORBIT INT(OI) |
| A0345 | | | | | | | | IS IN PROGRESS--OR--GRAB OI AND RETURN |
| 0346 | | | | 27,3537 | 77776 1 | UPWAKE | EXIT | TO UPWAKE IF OI IS NOT IN PROGRESS. |
| 0347 | REP | 104 | LAST 1471 | 27,3540 | 0 5301 0 | TC | PHASCHNG | RESTART PROTECT(GROUP 6) |
| 0348 | | | | 27,3541 | 0 04026 1 | OCT | 04026 | |
| 0350 | REP | 55 | LAST 1444 | 27,3542 | 0 5435 0 | TC | UPPLAG | SET INTEGRATION RESTART BIT |
| 0351 | REP | 5 | LAST 1317 | 27,3543 | 0 0236 0 | ADRES | REINTPLG | |
| 0352 | | | | 27,3544 | 0 0004 0 | INHINT | | |
| 0355 | | | | 27,3545 | | UPPART3 | EQUALS | |
| 0356 | REP | 5 | LAST 1471 | 27,3545 | 50 302 0 | INDEX | UPVERB | BRANCH TO THE APPROPRIATE UPDATE VERB |
| 0357 | | | | 27,3546 | 1 3547 0 | TCP | +1 | ROUTINE TO ACTUALLY PERFORM THE UPDATE |
| 0358 | REP | 1 | | 27,3547 | 1 3706 1 | TCP | UPEND70 | V70 |
| 0359 | REP | 1 | | 27,3550 | 1 3615 1 | TCP | UPEND71 | V71 |
| 0360 | REP | 1 | | 27,3551 | 1 3647 0 | TCP | UPEND72 | V72 |
| R0361 | | | ROUTINE TO INCREMENT CLOCK(TIME2, TIME1) WITH CONTENTS OF DP WORD AT UPBUFF. | | | | | |



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| | | | | | | | | | |
|-------|-----|-----|----------------|---------|--------|----------|----------|-------------|---|
| 0363 | | | 27,3552 | 0 0006 | 1 | TIMEDIDL | EXTEND | | |
| 0364 | REP | 6 | LAST 1470 | 27,3553 | 22 330 | 1 | QXCH | UPTMP | SAVE 0 FOR RETURN |
| 0365 | REP | 286 | LAST 1468 | 27,3554 | 3 4714 | 1 | CAP | ZERO | ZERO AND SAVE TIME2, TIME1 |
| 0366 | | | | 27,3555 | 22 007 | 0 | ZL | | |
| 0367 | REP | 34 | LAST 1418 | 27,3556 | 52 025 | 1 | DXCH | TIME2 | |
| 0368 | REP | 14 | LAST 1471 | 27,3557 | 52 327 | 0 | DXCH | UPRUFF +18D | STORE IN CASE OF OVERFLOW |
| 0369 | REP | 1 | | 27,3560 | 3 4715 | 0 | CAP | UPDTHAS | DO |
| 0370 | REP | 252 | LAST 1470 | 27,3561 | 54 001 | 1 | TS | L | A |
| 0371 | | | | 27,3562 | 4 0000 | 0 | COM | | QUICK |
| 03711 | REP | 3 | LAST 652 | 27,3563 | 52 765 | 1 | DXCH | -PHAS6 | PHASCHNG |
| 0372 | | | | 27,3564 | 0 0004 | 0 | TIMEDIDR | INHINT | |
| 0373 | REP | 287 | LAST 1472 | 27,3565 | 3 4714 | 1 | CAP | ZERO | |
| 0374 | | | | 27,3566 | 22 007 | 0 | ZL | | PICK UP INCREMENTER(AND ZERO |
| 0375 | REP | 730 | LAST 1470 | 27,3567 | 54 156 | 1 | TS | MPAC +2 | IT IN CASE OF RESTARTS) AND |
| 0376 | REP | 15 | LAST 1472 | 27,3570 | 52 315 | 1 | DXCH | UPRUFF +AD | STORE IT |
| 0377 | REP | 731 | LAST 1472 | 27,3571 | 52 155 | 1 | DXCH | MPAC | INTO MPAC FOR TRACE. |
| 0378 | | | | 27,3572 | 0 0006 | 1 | EXTEND | | |
| 0379 | REP | 16 | LAST 1472 | 27,3573 | 3 0327 | 1 | DCA | UPRUFF +18D | |
| 0380 | REP | 732 | LAST 1472 | 27,3574 | 20 155 | 1 | DAS | MPAC | FORM SUM IN MPAC |
| 0381 | | | | 27,3575 | 0 0006 | 1 | EXTEND | | |
| 0382 | REP | 1 | | 27,17e | 1 3805 | 0 | BZF | DELDTOK | TEST FOR OVERFLOW |
| 0383 | REP | 288 | LAST 1472 | 27,177 | 3 4714 | 1 | CAP | ZERO | |
| 0384 | REP | 17 | LAST 1472 | 27,3600 | 52 327 | 0 | DXCH | UPRUFF +18D | OVERFLOW, RESTORE OLD VALUE OF CLOCK |
| 0385 | REP | 35 | LAST 1472 | 27,3601 | 20 025 | 1 | DAS | TIME2 | AND TURN ON OPERATOR ERROR |
| 0386 | REP | 105 | LAST 1471 | 27,3602 | 0 5301 | 0 | TC | PHASCHNG | RESTART PROTECT(GROUP 6) |
| 0387 | | | | 27,3603 | 04026 | 1 | OCT | 04026 | |
| 0388 | REP | 7 | LAST 1472 | 27,3604 | 0 0330 | 1 | TC | UPTMP | GO TO ERROR EXIT |
| 0389 | REP | 14 | LAST 1416 | 27,3605 | 0 7226 | 0 | DELDTOK | TC | TPACRE |
| 0390 | REP | 733 | LAST 1472 | 27,3606 | 52 155 | 1 | DXCH | MPAC | FORCE SIGN AGREEMENT |
| 0391 | REP | 36 | LAST 1472 | 27,3607 | 20 025 | 1 | DAS | TIME2 | INCREMENT TIME2, TIME1 |
| 0392 | REP | 106 | LAST 1472 | 27,3610 | 0 5301 | 0 | TC | PHASCHNG | RESTART PROTECT(GROUP 6) |
| 0393 | | | | 27,3611 | 04026 | 1 | OCT | 04026 | |
| 0394 | | | | 27,3612 | 0 0004 | 0 | INHINT | | |
| 0395 | REP | 8 | LAST 1472 | 27,3613 | 50 330 | 1 | INDEX | UPTMP | (CODED THIS WAY FOR RESTART PROTECT(GROUP 6)) |
| 0396 | | | | 27,3614 | 0 0001 | 0 | TC | 1 | NORMAL RETURN |
| 0397 | | | VERB 71 BRANCH | | | | | | |
| 0402 | REP | 18 | LAST 1472 | 27,3615 | 30 305 | 1 | UPENDT1 | CAP | UPRUFF +1 |
| 0403 | REP | 66 | LAST 1443 | 27,3616 | 54 003 | 0 | TS | ERANK | SET ERANK |
| 0404 | REP | 17 | LAST 1403 | 27,3617 | 7 4373 | 0 | MASK | LOW8 | AND |
| 0405 | REP | 9 | LAST 1472 | 27,3620 | 54 330 | 0 | TS | UPTMP | CALCULATE |
| | | | | | | | | | S-REG VALUE OF RECEIVING AREA |

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| | | | | | | | | | | | |
|-------|-----|-----|------|------|---------|-------|--------|---|----------|-----------|--|
| 0406 | REP | 5 | LAST | 1403 | 27,3621 | 6 | 7714 | 1 | AD | NEG3 | IN THE PROCESS OF |
| 0407 | REP | 6 | LAST | 1470 | 27,3622 | 6 | 0300 | 1 | AD | COMPNUMB | PERFORMING |
| 0408 | | | | | 27,3623 | 0 | 0006 | 1 | EXTEND | | THIS UPDATE |
| 0409 | REP | 1 | | | 27,3624 | 1 | 3632 | 1 | BZF | STORLPT1 | WILL WE |
| 0410 | REP | 39 | LAST | 1435 | 27,3625 | 7 | 4702 | 1 | MASK | BIT0 | OVERFLOW |
| 0411 | REP | 427 | LAST | 1470 | 27,3626 | 10 | 000 | 0 | CCS | A | INTO THE NEXT EBANK.... |
| 0412 | REP | 2 | LAST | 1468 | 27,3627 | 1 | 3743 | 0 | TCP | UPERROUT | YES |
| 0413 | REP | 6 | LAST | 1473 | 27,3630 | 3 | 7714 | 1 | CA | NEG3 | NO. CALCULATE NUMBER OF |
| 0414 | REP | 9 | LAST | 1473 | 27,3631 | 6 | 0300 | 1 | AD | COMPNUMB | WORDS TO BE STORED MINUS ONE |
| 0415 | REP | 734 | LAST | 1472 | 27,3632 | 54 | 154 | 0 | STORLPT1 | TS | MPAC |
| 0416 | REP | 428 | LAST | 1473 | 27,3633 | 50 | 000 | 1 | INDEX | A | SAVE NO. OF WORDS REMAINING MINUS ONE |
| 0417 | REP | 19 | LAST | 1472 | 27,3634 | 3 | 0306 | 1 | CA | UPRUFF +2 | TAKE NEXT UPDATE WORD FROM |
| 0418 | REP | 253 | LAST | 1472 | 27,3635 | 54 | 001 | 1 | TS | L | UPRUFF AND |
| 0419 | REP | 735 | LAST | 1473 | 27,3636 | 3 | 0154 | 1 | CA | MPAC | SAVE IT IN L |
| 0420 | REP | 10 | LAST | 1472 | 27,3637 | 6 | 0330 | 1 | AD | UPTEMP | CALCULATE NEXT |
| 0421 | REP | 429 | LAST | 1473 | 27,3640 | 50 | 000 | 1 | INDEX | A | RECEIVING ADDRESS |
| 0422 | | | | | B3,1400 | | | | EBANK= | 1400 | |
| 0423 | | | | | 27,3641 | 23 | 400 | 1 | LXCH | 1400 | UPDATE THE REGISTER BY CONTENTS OF L |
| 0424 | REP | 15 | LAST | 1471 | B3,1706 | | | | EBANK= | TEPHEN | |
| 0425 | REP | 736 | LAST | 1473 | 27,3642 | 10 | 154 | 0 | CCS | MPAC | ARE THERE ANY WORDS LEFT TO BE STORED |
| 0426 | REP | 2 | LAST | 1473 | 27,3643 | 1 | 3632 | 1 | TCP | STORLPT1 | YES |
| 0427 | REP | 4 | LAST | 1471 | 27,3644 | 1 | 3674 | 0 | TCP | UPOUT | NO. THEN EXIT UPDATE PROGRAM |
| 0428 | REP | 20 | LAST | 1473 | 27,3645 | 00303 | 1 | | ADUPBFM1 | ADRES | SAME AS ADUPRUFF BUT LESS 1 (DON'T MOVE) |
| 0429 | REP | 5 | LAST | 1473 | 27,3646 | 1 | 3674 | 0 | TCP | UPOUT | NO. EXIT UPDATE (HERE WHEN COMPNUMB = 3) |
| R0430 | | | | | VERB | T2 | BRANCH | | | | |
| 0431 | REP | 63 | LAST | 1470 | 27,3647 | 3 | 4712 | 1 | UPEND72 | CAP | BIT1 |
| 0432 | REP | 10 | LAST | 1473 | 27,3650 | 7 | 0300 | 0 | MASK | COMPNUMB | HAVE AN ODD NO. OF COMPONENTS |
| 0433 | REP | 430 | LAST | 1473 | 27,3651 | 10 | 000 | 0 | CCS | A | BEEN SENT FOR A V72 UPDATE... |
| 0434 | | | | | 27,3652 | 1 | 3654 | 1 | TCP | +2 | YES |
| 0435 | REP | 3 | LAST | 1473 | 27,3653 | 1 | 3743 | 0 | TCP | UPERROUT | ERROR- SHOULD BE ODD NO. OF COMPONENTS |
| 0451 | REP | 47 | LAST | 1469 | 27,3654 | 4 | 4711 | 0 | CS | BIT2 | |
| 0452 | REP | 11 | LAST | 1473 | 27,3655 | 6 | 0300 | 1 | AD | COMPNUMB | |
| 0453 | REP | 737 | LAST | 1473 | 27,3656 | 54 | 154 | 0 | LDLOOP72 | TS | MPAC |
| 0454 | REP | 431 | LAST | 1473 | 27,3657 | 50 | 000 | 1 | INDEX | A | NOW PERFORM THE UPDATE |
| 0455 | REP | 21 | LAST | 1473 | 27,3660 | 30 | 305 | 1 | CAB | UPRUFF +1 | PICK UP NEXT UPDATE WORD |
| 0456 | REP | 432 | LAST | 1473 | 27,3661 | 22 | 000 | 1 | LXCH | A | |
| 0457 | REP | 738 | LAST | 1473 | 27,3662 | 10 | 154 | 0 | CCS | MPAC | SET POINTER TO ECADR (MUST BE CCS) |
| 0458 | REP | 739 | LAST | 1473 | 27,3663 | 54 | 154 | 0 | TS | MPAC | |
| 0459 | REP | 433 | LAST | 1473 | 27,3664 | 50 | 000 | 1 | INDEX | A | |
| 0460 | REP | 22 | LAST | 1473 | 27,3665 | 30 | 305 | 1 | CAB | UPRUFF +1 | PICK UP NEXT ECADR OF REG TO BE UPDATED |
| 0461 | REP | 67 | LAST | 1472 | 27,3666 | 54 | 003 | 0 | TS | EBANK | SET EBANK |
| 0462 | REP | 16 | LAST | 1472 | 27,3667 | 7 | 4373 | 0 | MASK | LOW8 | ISOLATE RELATIVE ADDRESS |
| 0463 | REP | 434 | LAST | 1473 | 27,3670 | 50 | 000 | 1 | INDEX | A | |
| 0464 | | | | | B3,1400 | | | | EBANK= | 1400 | |
| 0465 | | | | | 27,3671 | 23 | 400 | 1 | LXCH | 1400 | UPDATE THE REGISTER BY CONTENTS OF L |
| 0466 | REP | 16 | LAST | 1473 | B3,1706 | | | | EBANK= | TEPHEN | |



L UPDATE PROGRAM

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0467 REP 140 LAST 1473 27,3872 10 154 0
 0468 REP 1 27,3873 1 3856 0
 0469 NORMAL FINISH OF P27

CCS MPAC
 TCP LDLOOP72

ARE WE THROUGH THE V72 UPDATE...
 NO

0470 27,3874
 0471 REP 1 27,3874 0 2882 1
 0472 REP 3 LAST 1467 27,3875 30 301 0
 0473 REP 14 LAST 1468 27,3876 0 5248 1
 0474 REP 289 LAST 1472 27,3877 3 4714 1
 0475 REP 8 LAST 1468 27,3700 54 332 1
 0476 REP 3 LAST 583 27,3701 0 3750 0

UPOUT EQUALS
 TC INTWAKEU
 +1 CAB UPOLDMOD
 TC NEWMODEX +3
 CAP ZERO
 TS DNLSTCOD
 TC UPACTOFF

RELEASE GRAB OF ORBITAL INTEGRATION
 RESTORE PRIOR P27 MODE

TURN OFF «UPLINK ACTIVITY» LIGHT

0477 27,3702 0 0006 1
 0478 REP 17 LAST 1392 27,3703 3 4714 1
 0479 REP 4 LAST 1472 27,3704 52 765 1

EXTEND
 DCA NEG0
 DXCH -PHASE8

KILL GROUP 6.

0480 REP 38 LAST 891 27,3705 0 5423 1
 0481 VERB TO BRANCH

TC ENDEXT

EXTENDED VERB EXIT

0482 27,3706 0 0006 1
 0483 REP 23 LAST 1473 27,3707 4 0305 0
 0484 REP 24 LAST 1474 27,3710 52 315 1
 0485 REP 2 LAST 1471 27,3711 0 3552 0

UPENDY0 EXTEND
 DCS UPBRUFF
 DXCH UPBRUFF +8D
 TC TIMEDIDL

V70 DOES THE FOLLOWING WITH DP DELTA
 TIME IN UPBRUFF

DECREMENT AGC CLOCK

0486 REP 4 LAST 1473 27,3712 0 3743 1

TC UPERROUT

ERROR WHILE DECREMENTING CLOCK -- EXIT

0487 REP 17 LAST 1473 27,3713 0 0006 1
 0488 27,3714 4 0305 0
 0489 REP 25 LAST 1474 27,3715 52 317 0
 0490 REP 26 LAST 1474 27,3716 0 0006 1
 0491 27,3717 4 0305 0
 0492 REP 27 LAST 1474 27,3720 52 321 0
 0493 REP 28 LAST 1474 27,3720 52 321 0

EBANK= TERPHEN
 EXTEND
 DCS UPBRUFF
 DXCH UPBRUFF +10D
 EXTEND
 DCS UPBRUFF
 DXCH UPBRUFF +12D

COPY DECREMENTERS FOR
 RESTART PROTECTION

0494 REP 107 LAST 1472 27,3721 0 5301 0
 0495 27,3722 04026 1

TC PHASCHNG
 OCT 04026

RESTART PROTECT(GROUP 6)

0496 REP 290 LAST 1474 27,3723 3 4714 1
 0497 27,3724 22 007 0
 0498 REP 29 LAST 1474 27,3725 52 317 0
 0499 REP 3 LAST 204 27,3726 21=571 1

CAP ZERO
 ZL
 DXCH UPBRUFF +10D
 DAS TETCSM

DECREMENT CSM STATE VECTOR TIME

0500 REP 291 LAST 1474 27,3727 3 4714 1
 0501 27,3730 22 007 0
 0502 REP 30 LAST 1474 27,3731 52 321 0
 0503 REP 3 LAST 84 27,3732 21=643 0

CAP ZERO
 ZL
 DXCH UPBRUFF +12D
 DAS TETLEM

DECREMENT LEM STATE VECTOR TIME

L UPDATE PROGRAM

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| | | | | | | | | | |
|-------|-----|-----|----------------|---------|----------|----------|-----------|------------------------------------|--|
| 0504 | REP | 292 | LAST 1474 | 27,3733 | 3 4714 1 | CAP | ZERO | | |
| 0505 | | | | 27,3734 | 22 007 0 | ZL | | | |
| 0506 | REP | 31 | LAST 1474 | 27,3735 | 52 305 0 | DYCH | UPBUFF | | |
| 0507 | REP | 18 | LAST 1474 | 27,3736 | 21=710 1 | DAS | TEPHEN +1 | INCREMENT TP TEPHEN | |
| 0508 | REP | 19 | LAST 1475 | 27,3737 | 27=706 0 | ADS | TEPHEN | | |
| 0509 | REP | 108 | LAST 1474 | 27,3740 | 0 5301 0 | TC | PHASCHNG | RESTART PROTECT(GROUP 6) | |
| 0510 | | | | 27,3741 | 04026 1 | OCT | 04026 | | |
| 0511 | REP | 32 | LAST 1475 | 0304 | | BRANK= | UPBUFF | | |
| 0512 | REP | 6 | LAST 1473 | 27,3742 | 0 3674 1 | TC | UPOUT | GO TO STANDARD UPDATE PROGRAM EXIT | |
| R0513 | | | ERROR SEQUENCE | | | | | | |
| 0514 | REP | 6 | LAST 1471 | 27,3743 | 0 4400 1 | UPERROUT | TC | FALTON | TURN ON *OPERATOR ERROR* LIGHT |
| 0515 | REP | 7 | LAST 1475 | 27,3744 | 1 3674 0 | TC | UPOUT | | GO TO COMMON UPDATE PROGRAM EXIT |
| 0516 | REP | 9 | LAST 1475 | 27,3745 | 0 4400 1 | +2 | TC | FALTON | TURN ON *OPERATOR ERROR* LIGHT |
| 0517 | REP | 4 | LAST 1474 | 27,3746 | 0 3750 0 | TC | UPACTOFF | | TURN OFF *UPLINK ACTIVITY* LIGHT |
| 0518 | REP | 39 | LAST 1474 | 27,3747 | 0 5423 1 | TC | ENDEXT | | EXTENDED VERS EXIT |
| A0519 | | | | | | | | | (THE PURPOSE OF UPERROUT +2 EXIT IS |
| A0520 | | | | | | | | | TO PROVIDE AN ERROR EXIT WHICH DOES NOT |
| A0521 | | | | | | | | | RESET ANY RESTART GROUPS) |
| A0522 | | | | | | | | | |
| R0523 | | | | | | | | | |
| | | | | | | | | | 'UPACTOFF' IS A ROUTINE TO TURN OFF UPLINK ACTIVITY LIGHT ON ALL EXITS FROM UPDATE PROGRAM(P27). |
| 0525 | REP | 40 | LAST 1470 | 27,3750 | 4 4710 1 | UPACTOFF | CS | BIT3 | |
| 0527 | | | | 27,3751 | 0 0006 1 | EXTEND | | | TURN OFF UPLINK ACTIVITY LIGHT |
| 0528 | REP | 36 | LAST 1446 | 27,3752 | 03 011 1 | WAND | DSALMOUT | | (BIT 3 OF CHANNEL 11) |
| 0530 | REP | 364 | LAST 1470 | 27,3753 | 0 0002 0 | TC | 0 | | |



L RTB OF CODES

USER=5 PAGE NO. 1 Pg 54

0001 22,3505 BANK 22
 0002 REP 1 22,2000 SETLOC RTBCODES
 0003 22,3505 BANK
 0004 REP 13 LAST 1327 E5,1713 BRANK= XNB
 0005 REP 1 COUNT= 88/RTB

R0006 LOAD TIME2, TIME1 INTO MPAC'

0007 22,3505 0 0006 1 LOADTIME EXTEND
 0008 REP 37 LAST 1472 22,3506 3 0025 0 DCA TIME2
 0009 REP 2 LAST 1094 22,3507 1 6024 0 TCP SLOAD2

R0010 CONVERT THE SINGLE PRECISION 2-S COMPLEMENT NUMBER ARRIVING IN MPAC (SCALED IN HALF-REVOLUTIONS) TO A
 R0012 DP 1-S COMPLEMENT NUMBER SCALED IN REVOLUTIONS.

0016 REP 741 LAST 1474 22,3510 10 154 0 CDULOGIC CCS MPAC
 0017 REP 293 LAST 1475 22,3511 3 4714 1 CAP ZERO
 0018 22,3512 1 3515 1 TCP +3
 0019 22,3513 13 514 0 NCOF
 0020 REP 25 LAST 1177 22,3514 4 4675 0 CS HALF
 0021 REP 742 LAST 1476 22,3515 54 155 1 TS MPAC +1
 0022 REP 294 LAST 1476 22,3516 3 4714 1 CAP ZERO
 0023 REP 743 LAST 1476 22,3517 56 154 1 XCH MPAC
 0024 22,3520 0 0006 1 EXTEND
 0025 REP 26 LAST 1476 22,3521 7 4675 0 MP HALF
 0026 REP 744 LAST 1476 22,3522 20 155 1 DAS MPAC
 0027 REP 68 LAST 1355 22,3523 1 6030 0 TCP DANZIG

MODE IS ALREADY AT DOUBLE-PRECISION

R0040 READ THE PIPS INTO MPAC WITHOUT CHANGING THEM'

0041 22,3524 0 0004 0 READPIPS INHINT
 0042 REP 13 LAST 1397 22,3525 3 0037 0 CA PIPAX
 0043 REP 745 LAST 1476 22,3526 54 154 0 TS MPAC
 0044 REP 4 LAST 1397 22,3527 3 0040 0 CA PIPAY
 0045 REP 746 LAST 1476 22,3530 54 157 0 TS MPAC +3
 0046 REP 7 LAST 1397 22,3531 3 0041 1 CA PIPAZ
 0047 22,3532 0 0003 1 RELINT
 0048 REP 747 LAST 1476 22,3533 54 161 0 TS MPAC +5
 0049 REP 295 LAST 1476 22,3534 3 4714 1 CAP ZERO
 0050 REP 748 LAST 1476 22,3535 54 155 1 TS MPAC +1
 0051 REP 749 LAST 1476 22,3536 54 160 1 TS MPAC +4
 0052 REP 750 LAST 1476 22,3537 54 162 0 TS MPAC +6

0053 REP 3 LAST 1152 22,3540 1 6470 0 VBCMODE TCP VBCMODE
 R0054 FORCE TP SIGN AGREEMENT IN MPAC'

0055 REP 15 LAST 1472 22,3541 0 7226 0 SQNAGREE TC TPAGREE

L RTB OP CODES

USBR=5 PAGE NO. 2 ES 54

0056 REF 69 LAST 1476 22,3542 1 6030 0 TCP DANZIG

R0057 CONVERT THE DP 1=5 COMPLEMENT ANGLE SCALED IN REVOLUTIONS TO A SINGLE PRECISION 2=5 COMPLEMENT ANGLE
R0058 SCALED IN HALF-REVOLUTIONS.

0060 REF 1 22,3543 0 3573 0 15TO2S TC 1TO2SUB
0061 REF 296 LAST 1476 22,3544 3 4714 1 CAP ZERO
0062 REF 751 LAST 1476 22,3545 54 155 1 TS MPAC +1
0063 REF 5 LAST 1122 22,3546 1 6027 0 TCP NEWMODE

R0064 DO 2=5 TO 1=5 CONVERSION OF ANGLE

0065 REF 6 LAST 1477 22,3547 6 0070 0 V15TO2S TC 1TO2SUB
0066 REF 752 LAST 1477 22,3550 52 162 0 DXCH MPAC +5
0067 REF 753 LAST 1477 22,3551 52 155 1 DXCH MPAC
0068 REF 3 LAST 1477 22,3552 0 3573 0 TC 1TO2SUB
0069 REF 754 LAST 1477 22,3553 54 156 1 TS MPAC +2

ANSWER ARRIVES IN A AND MPAC.

0070 REF 755 LAST 1477 22,3554 52 160 1 DXCH MPAC +3
0071 REF 756 LAST 1477 22,3555 52 155 1 DXCH MPAC
0072 REF 4 LAST 1477 22,3556 0 3573 0 TC 1TO2SUB
0073 REF 757 LAST 1477 22,3557 54 155 1 TS MPAC +1

0074 REF 758 LAST 1477 22,3560 3 0161 1 CA MPAC +5
0075 REF 759 LAST 1477 22,3561 54 154 0 TS MPAC

0076 REF 178 LAST 1468 22,3562 3 4712 1 TPMODE CAP ONE
0077 REF 6 LAST 1477 22,3563 1 6027 0 TCP NEWMODE

MODE IS TP.

R0078 V15TO2S FOR 2 COMPONENT VECTOR. USED BY RR.

0079 REF 0 LAST 1477 22,3564 0 0070 0 V15TO2S TC 1TO2SUB
0080 REF 760 LAST 1477 22,3565 52 160 1 DXCH MPAC +3
0081 REF 761 LAST 1477 22,3566 52 155 1 DXCH MPAC
0082 REF 6 LAST 1477 22,3567 0 3573 0 TC 1TO2SUB
0083 REF 254 LAST 1473 22,3570 54 001 1 TS L
0084 REF 762 LAST 1477 22,3571 3 0157 1 CA MPAC +3
0085 REF 3 LAST 1476 22,3572 1 6024 0 TCP SLOAD2

R0086 SUBROUTINE TO DO DOUBLING AND 1=5 TO 2=5 CONVERSION

0087 REF 763 LAST 1477 22,3573 52 155 1 1TO2SUB DXCH MPAC
0088 22,3574 20 001 1 DOUBL
0089 REF 435 LAST 1473 22,3575 10 000 0 CCS A
0090 REF 179 LAST 1477 22,3576 6 4712 1 AD ONE
0091 22,3577 1 3601 1 TCP +2
0092 22,3600 4 0000 0 CCM

FINAL MPAC +1 UNSPECIFIED.

0093 REF 764 LAST 1477 22,3601 54 154 0 TS MPAC

THIS WAS REVERSE OF MSU.

AND SKIP ON OVRFLOW.



L KTB OP CODES

USER-S PAGE NO. 3 E5 84

| | | | | | | |
|------|---------|-----------|---------|----------|-----|--------|
| 0094 | REP 385 | LAST 1475 | 22,3802 | 0 0002 0 | TC | 0 |
| 0095 | REP 436 | LAST 1477 | 22,3803 | 50 000 1 | CAP | LIMITS |
| 0096 | REP 8 | LAST 1177 | 22,3804 | 3 4873 1 | ADS | MPAC |
| 0097 | REP 785 | LAST 1477 | 22,3805 | 28 154 0 | TC | 0 |
| 0098 | REP 386 | LAST 1478 | 22,3806 | 0 0002 0 | | |

OVERFLOW UNCORRECT AND IN MSU.



L RTB OP CODES

| | | | | | | | | | |
|-------|---------|-----------|--|----------|-----------|-------|-----------|---|--|
| P0099 | | | SUBROUTINE TO INCREMENT CDUS | | | | | | |
| 0102 | REP 1 | | 22,3607 | 3 3622 1 | INCRDUS | CAP | LOC THETA | | |
| 0103 | REP 127 | LAST 1338 | 22,3610 | 54 130 1 | | TS | BUF | PLACE ADRES(THETA) IN BUF. | |
| 0104 | REP 766 | LAST 1478 | 22,3611 | 30 154 1 | | CAB | MPAC | INCREMENT IN 1S COMPL. | |
| 0105 | REP 1 | | 22,3612 | 0 3623 0 | | TC | CDUINC | | |
| 0106 | REP 128 | LAST 1479 | 22,3613 | 24 130 0 | | INCR | BUF | | |
| 0107 | REP 767 | LAST 1479 | 22,3614 | 30 157 1 | | CAB | MPAC +3 | | |
| 0108 | REP 2 | LAST 1479 | 22,3615 | 0 3623 0 | | TC | CDUINC | | |
| 0109 | REP 129 | LAST 1479 | 22,3616 | 24 130 0 | | INCR | BUF | | |
| 0110 | REP 768 | LAST 1479 | 22,3617 | 30 161 1 | | CAB | MPAC +5 | | |
| 0111 | REP 3 | LAST 1479 | 22,3620 | 0 3623 0 | | TC | CDUINC | | |
| 0112 | REP 1 | | 22,3621 | 1 3540 1 | | TCP | VECMODE | | |
| 0113 | REP 23 | LAST 1392 | 22,3622 | 01155 1 | LOC THETA | ADRES | THETAD | | |
| R0114 | | | THE FOLLOWING ROUTINE INCREMENTS IN 2S COMPLEMENT THE REGISTER WHOSE ADDRESS IS IN BUF BY THE 1S COMPL. | | | | | | |
| R0116 | | | QUANTITY FOUND IN TEM2. THIS MAY BE USED TO INCREMENT DESIRED IMU AND OPTICS CDU ANGLES OR ANY OTHER 2S COMPL. | | | | | | |
| R0118 | | | (+0 UNEQUAL TO -0) QUANTITY. MAY BE CALLED BY BANKCALL/SKCALL. | | | | | | |
| 0119 | REP 6 | LAST 1334 | 22,3623 | 54 142 1 | CDUINC | TS | TEM2 | 1S COMPL. QUANT. ARRIVES IN ACC. STORE IT | |
| 0120 | REP 130 | LAST 1479 | 22,3624 | 50 130 0 | | INDEX | BUF | | |
| 0121 | | | 22,3625 | 10 000 0 | | CCS | 0 | CHANGE 2S COMPL. ANGLE(IN BUF) INTO 1S | |
| 0122 | REP 180 | LAST 1477 | 22,3626 | 6 4712 1 | | AD | ONE | | |
| 0123 | | | 22,3627 | 1 3633 0 | | TCP | +4 | | |
| 0124 | REP 181 | LAST 1479 | 22,3630 | 6 4712 1 | | AD | ONE | | |
| 0125 | REP 182 | LAST 1479 | 22,3631 | 6 4712 1 | | AD | ONE | OVERFLOW HERE IF 2S COMPL. IS 180 DEG. | |
| 0126 | | | 22,3632 | 4 0000 0 | | COM | | | |
| 0127 | REP 7 | LAST 1479 | 22,3633 | 6 0142 0 | | AD | TEM2 | SULT MOVES FROM 2ND TO 3D QUAD.(OR BACK) | |
| 0129 | REP 437 | LAST 1478 | 22,3634 | 10 000 0 | | CCS | A | BACK TO 2S COMPL. | |
| 0130 | REP 183 | LAST 1479 | 22,3635 | 6 4712 1 | | AD | ONE | | |
| 0131 | | | 22,3636 | 1 3640 1 | | TCP | +2 | | |
| 0132 | | | 22,3637 | 4 0000 0 | | COM | | | |
| 0133 | REP 8 | LAST 1479 | 22,3640 | 54 142 1 | | TS | TEM2 | STORE 14BIT QUANTITY WITH PRESENT SIGN | |
| 0134 | | | 22,3641 | 1 3645 1 | | TCP | +4 | | |
| 0135 | REP 438 | LAST 1479 | 22,3642 | 50 000 1 | | INDEX | A | SIGN. | |
| 0137 | REP 9 | LAST 1478 | 22,3643 | 3 4673 1 | | CAP | LIMITS | FIX IT, BY ADDING IN 37777 OR 40000 | |
| 0138 | REP 9 | LAST 1479 | 22,3644 | 6 0142 0 | | AD | TEM2 | | |
| 0139 | REP 131 | LAST 1479 | 22,3645 | 50 130 0 | | INDEX | BUF | | |
| 0140 | | | 22,3646 | 54 000 0 | | TS | 0 | STORE NEW ANGLE IN 2S COMPLEMENT. | |
| 0141 | REP 367 | LAST 1478 | 22,3647 | 0 0002 0 | | TC | 0 | | |



L RTS OP CODES

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P0142 RTS TO TORQUE GYROS, EXCEPT FOR THE CALL TO INUSTALL. ECADR OF COMMANDS ARRIVES IN X1.

| RTS | REP | OP | LAST | ADDR | DATA | INDEX | FIXLOC | ADDRESS OF GYRO COMMANDS SHOULD BE IN X1 |
|------|-----|-----|-----------|---------|----------|----------|----------|--|
| 0144 | REP | 41 | LAST 1294 | 22,3850 | 50 120 1 | PULSEIMU | INDEX | |
| 0145 | REP | 90 | LAST 1344 | 22,3851 | 3 0046 0 | CA | X1 | |
| 0146 | REP | 252 | LAST 1470 | 22,3852 | 0 4555 0 | TC | BANKCALL | |
| 0147 | REP | 6 | LAST 714 | 22,3853 | 17125 1 | CADR | IMPULSE | |
| 0148 | REP | 70 | LAST 1477 | 22,3854 | 1 6030 0 | TCP | DANZIG | |

L REP OF CODES

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R0149 EACH ROUTINE TAKES A 3X3 MATRIX STORED IN DOUBLE PRECISION IN A FIXED AREA OF ERASABLE MEMORY AND REPLACES IT
R0151 WITH THE TRANSPOSE MATRIX. TRANSP1 USES LOCATIONS XNB+0,+1 THROUGH XNB+16D, 17D AND TRANSP2 USES LOCATIONS
R0153 XNB1+0,+1 THROUGH XNB1+16D, 17D. EACH MATRIX IS STORED BY ROWS.

| | | | | | | | | | | | |
|------|-----|----|------|------|---------|--------|------|--------|---------|--------|-----------|
| 0154 | REP | 14 | LAST | 1476 | 22,3655 | 02713 | 0 | XNBEB | ECADR | XNB | |
| 0155 | REP | 5 | LAST | 262 | 22,3656 | 02554 | 1 | XNB1EB | ECADR | XNB1 | |
| 0156 | REP | 15 | LAST | 1481 | E5,1713 | | | | EBANK= | XNB | |
| 0164 | REP | 1 | | | 22,3657 | 3 | 3655 | 1 | TRANSP1 | CAP | XNBEB |
| 0165 | REP | 66 | LAST | 1473 | 22,3660 | 54 | 003 | 0 | | TS | EBANK |
| 0166 | REP | 16 | LAST | 1481 | 22,3661 | 53=716 | 1 | | | DxCH | XNB +2 |
| 0167 | REP | 17 | LAST | 1481 | 22,3662 | 53=722 | 0 | | | DxCH | XNB +8 |
| 0168 | REP | 16 | LAST | 1481 | 22,3663 | 53=716 | 1 | | | DxCH | XNB +2 |
| 0169 | REP | 19 | LAST | 1481 | 22,3664 | 53=720 | 1 | | | DxCH | XNB +4 |
| 0170 | REP | 20 | LAST | 1481 | 22,3665 | 53=730 | 0 | | | DxCH | XNB +12D |
| 0171 | REP | 21 | LAST | 1481 | 22,3666 | 53=720 | 1 | | | DxCH | XNB +4 |
| 0172 | REP | 22 | LAST | 1481 | 22,3667 | 53=726 | 1 | | | DxCH | XNB +10D |
| 0173 | REP | 23 | LAST | 1481 | 22,3670 | 53=732 | 1 | | | DxCH | XNB +14D |
| 0174 | REP | 24 | LAST | 1481 | 22,3671 | 53=726 | 1 | | | DxCH | XNB +10D |
| 0175 | REP | 71 | LAST | 1480 | 22,3672 | 1 | 6030 | 0 | | TCP | DANZIG |
| 0176 | REP | 6 | LAST | 1481 | E5,1554 | | | | | EBANK= | XNB1 |
| 0177 | REP | 1 | | | 22,3673 | 3 | 3656 | 1 | TRANSP2 | CAP | XNB1EB |
| 0178 | REP | 69 | LAST | 1481 | 22,3674 | 54 | 003 | 0 | | TS | EBANK |
| 0180 | REP | 7 | LAST | 1481 | 22,3675 | 53=557 | 0 | | | DxCH | XNB1 +2 |
| 0181 | REP | 8 | LAST | 1481 | 22,3676 | 53=563 | 1 | | | DxCH | XNB1 +6 |
| 0182 | REP | 9 | LAST | 1481 | 22,3677 | 53=557 | 0 | | | DxCH | XNB1 +2 |
| 0183 | REP | 10 | LAST | 1481 | 22,3700 | 53=561 | 0 | | | DxCH | XNB1 +4 |
| 0184 | REP | 11 | LAST | 1481 | 22,3701 | 53=571 | 1 | | | DxCH | XNB1 +12D |
| 0185 | REP | 12 | LAST | 1481 | 22,3702 | 53=561 | 0 | | | DxCH | XNB1 +4 |
| 0186 | REP | 13 | LAST | 1481 | 22,3703 | 53=567 | 0 | | | DxCH | XNB1 +10D |
| 0187 | REP | 14 | LAST | 1481 | 22,3704 | 53=573 | 0 | | | DxCH | XNB1 +14D |
| 0188 | REP | 15 | LAST | 1481 | 22,3705 | 53=567 | 0 | | | DxCH | XNB1 +10D |
| 0191 | REP | 72 | LAST | 1481 | 22,3706 | 1 | 6030 | 0 | | TCP | DANZIG |



L RTB OF CODES

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R0192 THE SUBROUTINE SIGNMPAC SETS C(MPAC, MPAC +1) TO SIGN(MPAC).
 R0193 FOR THIS, ONLY THE CONTENTS OF MPAC ARE EXAMINED. ALSO +0 YIELDS POSMAX AND -0 YIELDS NEGMAX.

R0195 ENTRY MAY BE BY EITHER OF THE FOLLOWING:

R0196 1. LIMIT THE SIZE OF MPAC ON INTERPRETIVE OVERFLOW
 R0197 ENTRY: BOVB
 R0198 SIGNMPAC

R0199 2. GENERATE IN MPAC THE SIGNUM FUNCTION OF MPAC
 R0200 ENTRY: RTB
 R0201 SIGNMPAC

R0202 IN EITHER CASE, RETURN IS TO THE NEXT INTERPRETIVE INSTRUCTION IN THE CALLING SEQUENCE.

| | | | | | | | | |
|------|---------|-----------|---------|----------|----------|-----------|-------------------------------------|--|
| 0204 | | | 22,3707 | 0 0006 1 | SIGNMPAC | EXTEND | | |
| 0205 | REP 2 | LAST 353 | 22,3710 | 3 4672 0 | DCA | DPOS MAX | | |
| 0206 | REP 769 | LAST 1479 | 22,3711 | 52 155 1 | DXCH | MPAC | | |
| 0207 | REP 439 | LAST 1479 | 22,3712 | 10 000 0 | CCS | A | | |
| 0208 | REP 297 | LAST 1477 | 22,3713 | 3 4714 1 | DPNMODE | CAP ZERO | SETS MPAC +2 TO ZERO IN THE PROCESS | |
| 0209 | REP 4 | LAST 1477 | 22,3714 | 1 6026 1 | TCP | SLOAD2 +2 | | |
| 0210 | | | 22,3715 | 1 3718 0 | TCP | +1 | | |
| 0211 | | | 22,3716 | 0 0006 1 | EXTEND | | | |
| 0212 | REP 3 | LAST 1482 | 22,3717 | 4 4672 1 | DCS | DPOS MAX | | |
| 0213 | REP 5 | LAST 1482 | 22,3720 | 1 6024 0 | TCP | SLOAD2 | | |

R0214 RTB OF CODE NORMUNIT IS LIKE INTERPRETIVE INSTRUCTION UNIT, EXCEPT THAT IT CAN BE DEPENDED ON NOT TO BLOW
 R0216 UP WHEN THE VECTOR BEING UNITIZED IS VERY SMALL -- IT WILL BLOW UP WHEN ALL COMPONENTS ARE ZERO. IF NORMUNIT
 R0216 IS USED AND THE UPPER ORDER HALVES OF ALL COMPONENTS ARE ZERO, THE MAGNITUDE RETURNED IN 36D WILL BE TOO LARGE
 R0220 BY A FACTOR OF 2(13) AND THE SQUARED MAGNITUDE RETURNED AT 34D WILL BE TOO BIG BY A FACTOR OF 2(26).

| | | | | | | | | |
|-------|---------|-----------|---------|----------|-----------|-------------|--------------------------------------|--|
| 0222 | REP 184 | LAST 1479 | 22,3721 | 3 4712 1 | NORMUNIT1 | CAP ONE | | |
| 02221 | REP 1 | | 22,3722 | 1 3724 1 | TCP | NORMUNIT +1 | | |
| 02222 | REP 298 | LAST 1482 | 22,3723 | 3 4714 1 | NORMUNIT | CAP ZERO | | |
| 02223 | REP 42 | LAST 1480 | 22,3724 | 6 0120 1 | AD | FIXLOC | | |
| 02224 | REP 770 | LAST 1482 | 22,3725 | 54 156 1 | TS | MPAC +2 | | |
| 02225 | REP 253 | LAST 1480 | 22,3726 | 0 4555 0 | TC | BANKCALL | GET SIGN AGREEMENT IN ALL COMPONENTS | |
| 0223 | REP 3 | LAST 1145 | 22,3727 | 01010 1 | CADR | VEGAGREE | | |
| 0224 | REP 771 | LAST 1482 | 22,3730 | 10 154 0 | CCS | MPAC | | |
| 0225 | REP 1 | | 22,3731 | 1 3765 1 | TCP | NOSHIPT | | |
| 0226 | | | 22,3732 | 1 3734 0 | TCP | +2 | | |
| 0227 | REP 2 | LAST 1482 | 22,3733 | 1 3765 1 | TCP | NOSHIPT | | |
| 0228 | REP 772 | LAST 1482 | 22,3734 | 10 157 0 | CCS | MPAC +3 | | |
| 0229 | REP 3 | LAST 1482 | 22,3735 | 1 3765 1 | TCP | NOSHIPT | | |
| 0230 | | | 22,3736 | 1 3740 0 | TCP | +2 | | |
| 0231 | REP 4 | LAST 1482 | 22,3737 | 1 3765 1 | TCP | NOSHIPT | | |
| 0232 | REP 773 | LAST 1482 | 22,3740 | 10 161 0 | CCS | MPAC +5 | | |
| 0233 | REP 5 | LAST 1482 | 22,3741 | 1 3765 1 | TCP | NOSHIPT | | |
| 0234 | | | 22,3742 | 1 3744 1 | TCP | +2 | | |
| 0235 | REP 6 | LAST 1482 | 22,3743 | 1 3765 1 | TCP | NOSHIPT | | |

L RTB OP CODES

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| | | | | | | | |
|-------|--------------|-----------|---------|----------|----------|-------------|--|
| 0236 | REF 774 | LAST 1482 | 22,3744 | 3 0155 0 | CA | MPAC +1 | SHIFT ALL COMPONENTS LEFT 13 |
| 0237 | | | 22,3745 | 0 0006 1 | EXTEND | | |
| 0238 | REF 85 | LAST 1449 | 22,3746 | 7 4675 0 | MP | BIT14 | |
| 0239 | REF 775 | LAST 1483 | 22,3747 | 20 155 1 | DAS | MPAC | DAS GAINS A LITTLE ACCURACY |
| 0240 | REF 776 | LAST 1483 | 22,3750 | 3 0160 0 | CA | MPAC +4 | |
| 0241 | | | 22,3751 | 0 0006 1 | EXTEND | | |
| 02411 | REF 86 | LAST 1483 | 22,3752 | 7 4675 0 | MP | BIT14 | |
| 02412 | REF 777 | LAST 1483 | 22,3753 | 20 160 1 | DAS | MPAC +3 | |
| 02413 | REF 778 | LAST 1483 | 22,3754 | 3 0162 1 | CA | MPAC +6 | |
| 02414 | | | 22,3755 | 0 0006 1 | EXTEND | | |
| 02415 | REF 87 | LAST 1483 | 22,3756 | 7 4675 0 | MP | BIT14 | |
| 02416 | REF 779 | LAST 1483 | 22,3757 | 20 162 0 | DAS | MPAC +5 | |
| 02417 | REF 5 | LAST 1145 | 22,3760 | 3 4720 0 | CAP | THIRTEEN | |
| 02418 | REF 780 | LAST 1483 | 22,3761 | 50 156 0 | INDEX | MPAC +2 | |
| 02419 | | | 22,3762 | 54 045 1 | TS | 37D | |
| 0242 | REF 67 | LAST 1468 | 22,3763 | 0 4574 0 | OFFTUNIT | TC | |
| 0243 | REF 2 | LAST 1088 | 22,3764 | 01024 0 | CADR | UNIT +1 | SKIP THE ATC VECAGREE DONE AT UNIT |
| 02431 | REF 299 | LAST 1482 | 22,3765 | 3 4714 1 | NOSHIPT | CAP | ZERO |
| 02432 | REF 1 | | 22,3766 | 1 3761 0 | TCP | OFFTUNIT -2 | |
| R0300 | RTB VECSONAG | | | | | | FORCES SIGN AGREEMENT OF VECTOR IN MPAC. |
| 0301 | REF 254 | LAST 1482 | 22,3767 | 0 4555 0 | VECSONAG | TC | BANKCALL |
| 0302 | REF 4 | LAST 1482 | 22,3770 | 01010 1 | CADR | VECAGREE | |
| 0303 | REF 73 | LAST 1481 | 22,3771 | 0 6030 1 | TC | DANZIG | |

*** END OF SATRAP .007 ***



SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, J OF REFS, PAGE OF FIRST REP, PAGE OF LAST REP.

| SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES |
|----------|---------|--------|-------------|----------|---------|--------|-------------|----------|---------|--------|--------------|
| .050 | 26,3237 | 834 | 1 804 | -OCT10 | 6171 | 1083 | 1 1083 | =14MS | 17,3340 | 1024 | 7 1010 1024 |
| .05GBIT | 4710 | = 57 | | -ON | 40,2334 | 315 | 2 314 353 | ===== | | | |
| .05GSW | 0148 | = 57 | 4 804 823 | -PHASE1 | 0752 | 73 | 6 181 1380 | A | 0000 | = 37 | 439 80 1482 |
| .166... | 23,3430 | 1331 | 1 1327 | -PHASE2 | 0754 | 73 | 3 181 197 | A-PCPK | 13,3138 | 1290 | 4 1287 1300 |
| .30 | 11,3674 | 1321 | 1 1292 | -PHASE3 | 0756 | 73 | 3 181 526 | ABCLD | 41,2612 | 337 | 1 321 |
| .5SEC | 4731 | 1171 | 9 127 1414 | -PHASE4 | 0760 | 73 | 3 181 652 | ABLOAD | 41,2677 | 338 | 1 321 |
| .6SECTS | 24,2774 | 655 | | -PHASE5 | 0762 | 73 | 4 181 779 | ABORT | 5804 | = 1484 | |
| ===== | | | | -PHASE6 | 0764 | 73 | 4 181 1474 | ABORT2 | 5624 | 1463 | 1 1463 |
| +DESCON | 40,2204 | 313 | 1 313 | -ROLL1 | 4377 | = 980 | 1 958 | ABS | 00,3226 | 1151 | 2 1150 |
| +DOWN | 00,2610 | 1138 | 1 1137 | -ROLL2 | 16,3740 | 980 | 1 958 | ABVAL | 00,3201 | 1150 | |
| +LIMIT | 42,3252 | 334 | 1 334 | -SLOPE | 16,3730 | 980 | 3 953 955 | ABVALABS | 00,3178 | 1150 | 1 1088 |
| +MCA | 87,1625 | = 120 | 9 120 629 | -T-3 | 15,3765 | 1062 | 1 1057 | ACADN63 | 24,2402 | 846 | 1 847 |
| +ON | 40,2314 | 314 | 3 314 353 | -TORQUE | 16,3673 | 958 | 1 957 | ACADN65 | 24,2406 | 846 | 2 842 844 |
| +ROLL1 | 4715 | = 960 | 1 958 | -TPER | 84,1745 | = 89 | 7 89 514 | ACRD2Y | 17,3435 | 1027 | 1 1027 |
| +ROLL2 | 4732 | = 960 | 1 958 | -UP | 00,2620 | 1138 | 1 1137 | ACRD2Z | 17,3500 | 1028 | 1 1027 |
| +TORQUE | 16,3652 | 957 | 1 957 | -VM/360K | 15,3772 | 1062 | 2 1054 1062 | ACCEPTUP | 07,3626 | 1417 | 2 1418 |
| +2ACTDEG | 20,2145 | 687 | 2 686 | -VMT/180 | 15,3772 | = 1062 | 1 1054 | ACCEPTWD | 41,2027 | 318 | 2 318 |
| ===== | | | | -VREL | 87,1525 | = 116 | 3 116 838 | ACCOMP | 11,2430 | 1305 | 1 1313 |
| *NBS** | 23,3601 | 1337 | 1 497 | -VT/180 | 86,1613 | = 110 | 13 110 1055 | ACDWD | 85,1522 | = 97 | 2 433 |
| *SND* | 23,3577 | 1337 | 5 281 887 | -VT/180E | 86,1570 | = 111 | 1 1053 | ACORRD | 86,1630 | = 107 | 5 107 1028 |
| ===== | | | | -1/KR2 | 26,3211 | 834 | 1 820 | ACOS=0 | 00,3638 | 1159 | 4 1159 1161 |
| -AYO | 83,1713 | = 84 | 2 818 1220 | -1/12 | 13,3757 | 1322 | 1 1311 | ACOSABRT | 00,3722 | 1161 | |
| -BIT10 | 06,2763 | 155 | 1 151 | -1/2+2 | 00,2444 | 1134 | 1 1155 | ACOSOVF | 00,3720 | 1161 | 1 1159 |
| -BIT14 | 7705 | 1173 | 2 888 904 | -1/8 | 7710 | 1173 | 1 1069 | ACOSHR | 00,3713 | 1161 | 1 1159 |
| -CCSPR | 01,3153 | 1188 | 1 1189 | -1CHK | 43,3271 | 1365 | 5 1366 1371 | ACOSST | 00,3624 | 1159 | 1 1159 |
| -CDUT+1 | 20,3710 | 1040 | 1 1039 | -15DEGS | 06,2506 | 144 | 1 143 | ACOSST2 | 00,3641 | 1159 | 2 1159 |
| -COMAX | 07,3544 | 1410 | 2 1392 1393 | -2SEC | 10,3677 | 1462 | 1 1448 | ACOSZERR | 00,3726 | 1161 | 1 1159 |
| -COMAX- | 07,3545 | 1410 | 2 1392 1393 | -4ACTDEG | 20,2144 | 687 | 1 686 | ACOS3 | 00,3651 | 1160 | 1 1161 |
| -COSB | 86,1673 | = 93 | 1 93 | -50SC | 04,3515 | 1259 | 1 1247 | ACRDZ | 17,3055 | 1015 | 2 1015 |
| -DELAG | 86,1676 | = 109 | 5 109 1042 | -6.05DEG | 26,3011 | 764 | 1 763 | ACRJETS | 17,3174 | 1019 | 2 1014 1027 |
| -DELAGD | 86,1677 | = 109 | 4 109 1042 | -70DEGS | 06,2505 | 144 | 1 143 | ACROLI | 17,3005 | 1014 | |
| -DELAGG | 86,1675 | = 109 | 3 109 1042 | ===== | | | | ACTCENT | 86,1632 | = 91 | 3 91 467 |
| -ELR | 05,3166 | 189 | 2 185 186 | /RUP+ | 00,2721 | 1142 | 2 1141 | ACTIVE | 22,3376 | 490 | 2 464 490 |
| -ENDRAS | 7712 | 1173 | 1 1080 | /RUP- | 00,2715 | 1141 | 2 1141 | ACTLIM | 20,3161 | 937 | 2 926 931 |
| -ENDVAC | 6220 | 1084 | 2 1080 1098 | /MPAC+ | 00,2767 | 1143 | 2 1143 | ACTSAT | 20,3413 | 941 | 2 937 |
| -ERTHRAT | 34,2277 | 531 | 1 528 | /MPAC- | 00,2763 | 1143 | 2 1143 | ACYCHECK | 17,3113 | 1016 | |
| -FOURDT | 17,2002 | 677 | 1 676 | /NORM | 00,2732 | 1142 | 1 1142 | ACYJETS | 17,3210 | 1020 | 2 1016 1027 |
| -GYROMIN | 07,3322 | 1402 | 2 1402 1405 | /NORM2 | 00,2725 | 1142 | 1 1142 | AC2Y | 17,3453 | 1027 | 2 1027 |
| -HSCALED | 26,3313 | 835 | 1 805 | ===== | | | | ADR | 86,1655 | = 108 | 7 108 1002 |
| -KSCALE | 26,3315 | 835 | 1 805 | = .24 | 21,2610 | 986 | 1 985 | ADRVEL | 86,1523 | = 108 | 4 1001 1004 |
| -KVSACLE | 37,3671 | 842 | 1 836 | =+.1SEC | 17,3335 | 1024 | 5 1021 1028 | ADDINDRP | 33,3261 | 437 | 1 437 |
| -MAXADR | 4364 | = 1364 | 1 1369 | =+14MS | 21,3034 | 990 | 1 987 | ADDRESS | 6052 | 1079 | |
| -MAXDELV | 37,3135 | 784 | 1 782 | =-.1SEC | 17,3333 | 1024 | 3 1021 1024 | ADDRWD | 0116 | 67 | 79 1077 1338 |
| -MUT(B) | 37,3355 | 790 | 1 790 | =-2 | 7715 | = 1020 | 4 1015 1028 | ADNDXKT | 25,3024 | 817 | 1 815 |
| -MUT(M) | 37,3357 | 790 | | =-4 | 6061 | = 1020 | 2 1015 1016 | ADRCOMP | 33,3346 | 439 | |

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

UN UNDEFINED - DEFINED BY RELIABLE J DEFINED BY JCKRR OR PRASE ANYWHERE MD MULTIPLY DEFINED
 BD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEP, J OF REFS, PAGE OF FIRST REP, PAGE OF LAST REP.

| SYMBOL | DEP | H | REFERENCES | SYMBOL | DEP | H | REFERENCES | SYMBOL | DEP | H | REFERENCES |
|----------|---------|-------|-------------|----------|---------|--------|-------------|----------|---------|-------|-------------|
| ADIAK | E3,1463 | 83 | 1 294 | ALARM2 | 5541 | 1461 | 2 1364 1463 | ALWAYSQ | 33,3203 | 436 | 2 431 437 |
| ADIAZ | E3,1464 | 83 | 1 294 | ALARMS | 35,3534 | 551 | 2 546 547 | ALJOKZ | 33,3131 | 435 | 1 427 |
| ADIAZ | E3,1465 | 83 | 1 295 | ALCKOK | 33,2671 | 432 | | ALK1S | E6,1454 | = 97 | 4 427 435 |
| ADOT | E6,1533 | = 106 | 9 106 1001 | ALDK | E5,1542 | = 97 | 3 432 433 | AM | E6,1764 | = 112 | 4 112 405 |
| ADOTLOOP | 21,2275 | 977 | 1 977 | ALFA/PIP | E6,1673 | = 109 | 2 109 841 | AMBOUPT | 22,3444 | 1008 | 2 977 986 |
| ADOT1 | E6,1535 | = 106 | 1 106 | ALFA/180 | E6,1665 | = 109 | 9 109 1044 | AND | E6,1663 | = 109 | 6 109 1042 |
| ADOT2 | E6,1537 | = 106 | 1 106 | ALPACOM | E6,1603 | = 110 | 4 110 1045 | AND/PIP | E6,1671 | = 109 | 2 109 778 |
| ADPCIN2 | 5313 | 1378 | 1 1378 | ALFAPAD | E6,1411 | = 99 | 2 747 772 | ANOB1 | E6,1640 | = 107 | 5 107 1008 |
| ADRS+1 | 43,3623 | 1370 | | ALFK | E4,1422 | = 90 | 1 432 | ANOB4 | E6,1641 | = 107 | 5 108 1008 |
| ADRSCHK | 43,3572 | 1369 | 2 1369 | ALFLT | 33,2633 | 431 | 1 430 | ANOB5 | E6,1642 | = 108 | 5 108 1008 |
| ADRS1 | 43,3242 | 1364 | 1 257 | ALFLT1 | 33,2637 | 431 | 1 212 | ANOB7 | E6,1643 | = 108 | 5 108 1009 |
| ADRSK | E3,1466 | 83 | 1 294 | ALFLT3 | 33,2706 | 432 | 1 432 | ANOB8 | E6,1644 | = 108 | 5 108 1008 |
| ADRSY | E3,1467 | 83 | 1 294 | ALILP | 33,2731 | 432 | 1 432 | ANOVED | 11,3532 | 1318 | 1 1317 |
| ADRSZ | E3,1470 | 83 | 1 294 | ALINTIME | 43,2328 | 240 | 1 230 | ANGLTIME | 22,3001 | 405 | 1 405 |
| ADSLM | 43,3561 | 1369 | 2 1369 | ALK | E5,1456 | = 97 | 9 97 | ANOVCOR | 15,2542 | 1036 | 5 1044 1059 |
| ADTIME | 35,2464 | 484 | 1 464 | ALKCG | 33,2674 | 432 | | ANOK | E5,1510 | = 97 | 2 433 434 |
| ADUPBPM1 | 27,3645 | 1473 | 2 1469 1470 | ALKCG2 | 33,2677 | 432 | 1 432 | ANGY | E5,1506 | = 97 | 1 434 |
| ADUPBPP | 27,3500 | 1470 | 1 1469 | ALKLP | 33,2740 | 432 | 1 433 | ANGZ | E5,1502 | = 97 | 1 434 |
| ADUPTMP | 27,3477 | 1470 | 1 1470 | ALLDC/OC | 41,3004 | 339 | 2 337 338 | ANNNNNN | 33,3376 | 439 | 1 428 |
| ADVAN | 01,3231 | 1190 | 2 1185 1385 | ALLOP | 33,2575 | 430 | 1 429 | AO | E6,1661 | = 109 | 40 109 1058 |
| ADVCM | 36,2242 | 545 | 1 544 | ALLOOP1 | 33,2603 | 430 | 1 211 | AO/PIP | E6,1667 | = 109 | 3 109 837 |
| ADVCRS | 14,2206 | 702 | 1 556 | ALLOOP3 | 33,2577 | 430 | | AOPTIME | E4,1755 | = 89 | 13 89 733 |
| ADVCRBIT | 4701 | = 60 | | ALLSET | 35,2727 | 471 | 1 471 | AOTSTALL | 07,3512 | 1408 | 1 1409 |
| ADVTRACK | 28,2000 | 732 | 1 730 | ALLSTALL | 13,3373 | 1293 | 2 1295 | AOPERI | 22,2000 | = 28 | 1 488 |
| ADVTRK | 0175 | = 60 | 3 699 730 | ALL3DEC | 42,3506 | 348 | 1 346 | APSEBIT | 4706 | = 60 | |
| AD14MSF | 17,3241 | 1021 | 1 1021 | ALM/END | 43,2120 | 232 | 18 231 261 | APSESW | 0202 | = 60 | 2 1272 1273 |
| AD14MSR | 17,3361 | 1024 | 1 1024 | ALMCADR | 1363 | = 80 | 11 80 1464 | APSIDES | 12,3671 | 1273 | 1 488 |
| AD14MSY | 17,3305 | 1023 | 1 1023 | ALMCYCLE | 4161 | 358 | 16 319 359 | AP0 | E6,1427 | 99 | 2 99 964 |
| AEARTH | 31,3031 | 621 | 1 618 | ALOAD | 41,2726 | 338 | 1 321 | AP0(EP) | 17,222C | 964 | |
| AERR | E6,1517 | = 106 | 6 106 1004 | ALOADED | 13,3127 | 1290 | 2 1289 1290 | AP1 | E6,1430 | 99 | 3 99 965 |
| AERRVEL | E6,1522 | = 106 | 8 106 1003 | ALP | E7,1703 | = 117 | 7 117 619 | AP1(EP) | 17,2273 | 965 | |
| APAILP | 17,2701 | 1011 | 1 1011 | ALPHA | 0010 | = 1275 | 4 1247 1249 | AP2 | E6,1432 | 99 | 3 99 965 |
| APAIN | 30,3663 | 666 | 3 632 666 | ALPHAM | E4,1707 | = 87 | 13 88 1310 | AP2(EP) | 17,2333 | 965 | |
| APAINM | 04,2076 | 194 | 1 195 | ALPHAV | E4,1551 | = 87 | 47 87 1320 | AP3 | E6,1434 | 99 | 3 99 966 |
| AHEADS | 6402 | 1091 | 1 1091 | ALRM15 | 4720 | = 697 | 1 696 | AP3(EP) | 17,2370 | 966 | |
| APNOROT | 21,3234 | 996 | 1 988 | ALSIGNAG | 7513 | 1118 | 4 1141 1144 | ARATE | 22,2771 | 405 | 3 405 |
| APROOV | E7,1657 | = 116 | 4 117 819 | ALSK | 33,3700 | 446 | 1 433 | ARCCOS | 00,3611 | 1159 | 1 1088 |
| AIG | E6,1662 | = 109 | 3 109 1034 | ALT | 1107 | = 76 | 8 76 1209 | ARCSIN | 00,3607 | 1159 | 1 1088 |
| AIG/PIP | E6,1670 | = 109 | 1 109 | ALTCALC | 22,2123 | 393 | 1 393 | ARCTAN | 13,2463 | 1210 | 2 1207 |
| ATINGOTN | 33,2214 | 419 | 1 419 | ALTI | E7,1734 | = 118 | 3 118 536 | ARCTANOX | 13,2511 | 1210 | 2 1210 |
| AINDA | E3,1444 | = 97 | 49 97 98 | ALTIM | E5,1540 | = 97 | 4 429 430 | ARCTRIG | 23,3211 | 1325 | 10 282 1328 |
| AK | E6,1476 | 100 | 17 111 993 | ALTIMS | E5,1541 | = 97 | 2 430 432 | ARG+ | 7234 | 1111 | 1 1111 |
| AK1 | E6,1477 | 100 | 8 538 1045 | ALTM | 0060 | = 38 | | ARHI | 00,3416 | 1155 | 2 1156 |
| AK2 | E6,1500 | 100 | 9 536 1048 | ALTTAR | 31,3704 | 897 | 2 557 622 | AROLO | 00,3467 | 1156 | 1 1156 |
| ALARM | 5537 | 1461 | 40 138 1397 | ALTVAR | 1356 | 81 | 1 574 | AROPRO | 7254 | 1111 | 1 1111 |

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

UN UNDEFINED = DEFINED BY EQUALS J DEFINED BY JOKER OR BRASH ANYWHERE MD MULTIPLY DEFINED
 BD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE



SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, J OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

| SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES |
|----------|---------|-------|-------------|----------|---------|--------|-------------|----------|---------|---------|--------------|
| ARGZRO2 | 7251 | 1111 | 1 1111 | ATTDISP2 | 34,2366 | 535 | 1 535 | AZMTCO1 | 33,3736 | 447 | 2 209 242 |
| ARG90 | 5024 | 1177 | 1 1177 | ATTHOLD | 21,3308 | 998 | 3 998 999 | AZO | E3,1711 | 84 | 1 1219 |
| AROUT1SP | 40,2610 | 331 | 1 329 | ATTKALAN | E6,1617 | = 107 | 10 107 1011 | A0 | 0327 | = 70 | 8 809 822 |
| ARTHINSF | 40,2764 | 344 | 1 343 | ATTTRIO | 1327 | = 79 | 2 411 1410 | A0CALC | 25,2400 | 809 | 1 809 |
| ARTIN1SP | 40,2777 | 344 | 1 343 | ATTRATES | 15,2705 | = 1044 | 1 1043 | A1 | E7,1663 | = 117 | 4 117 819 |
| ARTOUTSP | 40,2603 | 331 | 1 329 | ATTSEC | E6,1560 | = 107 | 3 107 977 | ===== | | | |
| ARLPT | 0010 | = 37 | 11 127 1202 | AUGERQUL | 32,2075 | 635 | 2 634 | 856 | BACK | 25,3345 | 824 1 824 |
| ASCALE | 13,3727 | 1321 | 1 1307 | AUG2 | 07,3401 | 1404 | 1 1403 | BACKWARD | 12,2272 | 1251 | 1 1248 |
| ASBT | 34,3254 | 583 | 3 583 586 | AUG3 | 07,3352 | 1403 | 1 1404 | BACK2 | 25,3370 | 825 | 1 825 |
| ASINEX | 60,3706 | 1160 | 1 1159 | AUTOCK | 34,3241 | 583 | 1 584 | BADKWDX | 12,2305 | 1251 | 2 1251 |
| ASKOP | E7,1730 | = 117 | 2 813 814 | AUTOCONT | 21,3252 | 998 | | BADEND | 07,3464 | 1407 | 2 578 1408 |
| ASKIPNEM | 10,2656 | 1437 | 1 1437 | AVBCTR | 0024 | = 1221 | 7 1216 1218 | BADR2 | 12,3661 | 1273 | 2 1272 |
| ASMLWP | 17,3404 | 1026 | 2 1021 1022 | AVECBIT | 4712 | = 47 | | BADVCTOR | 24,3657 | 872 | 1 872 |
| ASMLWR | 17,3424 | 1027 | 2 1024 | AVECEXIT | 1222 | = 77 | 10 77 758 | BADX | 12,2265 | 1251 | 3 1248 |
| ASMLWY | 17,3550 | 1029 | 2 1023 | AVECFLAG | 0035 | = 47 | 2 506 758 | RAILCUT | 5604 | 1463 | 8 217 1464 |
| ASPDAN | E7,1733 | = 117 | 1 814 | AVECOUT | 37,2761 | 780 | 1 779 | RANDTARL | 31,3526 | 894 | 1 890 |
| ASPS | E7,1730 | = 117 | 6 117 | AVENDBIT | 4712 | = 63 | | BANKCALL | 4555 | 1073 | 254 190 1483 |
| ASPS(TM) | E6,1525 | = 114 | 1 814 | AVENIDSW | 0225 | = 63 | 3 284 1297 | BANKJUMP | 4577 | 1073 | 12 320 1449 |
| ASRUP | E7,1732 | = 117 | 1 813 | AVERAGED | 37,3046 | 782 | 1 782 | BANKMASK | 4364 | = 1174 | 3 1085 1098 |
| ASP1 | E7,1731 | = 117 | 1 813 | AVETOMID | 13,3472 | 1298 | 1 783 | BANKRUPT | 0016 | = 37 | 26 129 1418 |
| ASP3 | E7,1734 | = 117 | 2 814 | AVFLAG | 0050 | = 49 | 10 485 668 | BANKSET | 0185 | 70 | 14 1075 1451 |
| ASTNBIT | 4677 | = 58 | | AVFLAGA | 35,3726 | 639 | 5 455 549 | RARELY1 | 27,3362 | = 833 | 4 810 819 |
| ASTNFLAG | 0154 | = 58 | | AVFLAGP | 35,3741 | 639 | 5 455 549 | RASEOTF | E4,1624 | = 87 | 2 499 500 |
| ASTN99P | 24,3333 | 662 | | AVFLBIT | 4706 | = 49 | | RASEOTV | E4,1640 | = 87 | 2 499 500 |
| ASTROMSK | 10,3645 | 1451 | 1 1447 | AVGEND | 37,3070 | 783 | 1 780 | RASETEMP | 1061 | = 199 | 2 198 |
| ASTROTIN | 04,2762 | 494 | 1 495 | AVGEXIT | 1222 | = 77 | 3 529 783 | RASETHP | E4,1654 | = 87 | 2 499 |
| ATAN=90 | 13,2516 | 1210 | 1 1210 | AVOUTCAD | 37,2765 | 780 | 1 780 | RASETHV | E4,1662 | = 87 | 2 499 |
| ATDOTCAD | 15,2703 | 1043 | 1 1043 | AX*SRWT | 23,3603 | 1337 | 1 1338 | RASETIME | E4,1671 | = 87 | 3 499 500 |
| ATERJOB | 34,2326 | 532 | 2 531 536 | AXC | 01,2376 | 1162 | 1 1087 | RR | 0006 | = 1379 | 5 1378 1386 |
| ATERSET | 34,2420 | 536 | 1 532 | AXISCODE | E7,1477 | = 120 | 2 121 202 | RRANK | 0006 | = 37 | 37 127 1481 |
| ATERDASK | 34,2314 | 531 | 2 210 527 | AXISGEN | 23,3334 | 1329 | 3 444 724 | RCDJ | E6,1661 | = 112 | 16 109 1410 |
| ATIGINC | E4,1421 | 86 | 2 460 521 | AXISGEN1 | 23,3342 | 1329 | 1 1329 | RDDV | 7552 | 1119 | 2 1086 1119 |
| ATOPCSM | 13,2636 | 1284 | 4 32 1318 | AXISGEN2 | 23,3371 | 1329 | 1 1330 | RDPAIL | 20,2255 | 889 | 2 889 |
| ATOPLEM | 13,2711 | 1286 | 4 32 1318 | AXISGEN3 | 23,3414 | 1330 | 1 1330 | RDPZ2Z | 17,3531 | 1028 | 2 1028 |
| ATOPOTH | 13,2711 | = 32 | 1 504 | AXO | E3,1715 | = 84 | 2 618 1220 | RDOT | 26,3643 | 1221 | 1 1216 |
| ATOPHIS | 13,2636 | = 32 | | AXT | 01,2371 | 1162 | 1 1087 | RDRACZ | 17,3137 | 1016 | 2 1016 |
| ATTACHED | 43,3032 | 258 | 1 230 | AY0 | E6,1427 | = 99 | 1 967 | RDRJETS | 17,3175 | 1019 | 2 1016 1028 |
| ATTACHIT | 43,3037 | 258 | 1 258 | AY0(EY) | 17,2412 | 967 | | RDRLL | 17,3073 | 1016 | 2 1014 |
| ATTADR | 1325 | 79 | 6 79 1410 | AY1 | E6,1430 | = 99 | 2 968 | RDSU | 7031 | 1104 | 1 1086 |
| ATTCHBIT | 4711 | = 59 | | AY1(EY) | 17,2465 | 968 | | RDT | E7,1704 | = 122 | 7 122 680 |
| ATTCHFLG | 0166 | = 59 | | AY2 | E6,1432 | = 99 | 2 968 | RDZCHECK | 17,3031 | 1014 | |
| ATTCK1 | 43,2447 | 244 | 1 243 | AY2(EY) | 17,2525 | 968 | | RDZJETS | 17,3207 | 1020 | 2 1015 1028 |
| ATTDISP | 34,2337 | 532 | 1 532 | AY3 | E6,1434 | = 99 | 2 969 | RECONSTD | 25,3220 | 821 | 1 811 |
| ATTDISPR | 37,2124 | 534 | | AY3(EY) | 17,2562 | 969 | | REE17 | 04,3472 | 1259 | |
| ATTDISP1 | 37,2103 | 533 | 1 533 | AZIMUTH | E5,1400 | 96 | 6 417 534 | REE19 | 04,3504 | = 1259 | 1 1267 |

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

UN UNDEFINED = DEFINED BY EQUALS J DEFINED BY JOKER OR FRASE ANYWHERE MD MULTIPLY DEFINED
 BD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT MX MISCELLANEOUS TROUBLE



SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, J OF REFS, PAGE OF FIRST REP, PAGE OF LAST REP.

| SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES |
|----------|---------|------|------------------|----------|---------|------|-------------|-----------|---------|------|-----------------|
| BBS22 | 04,3510 | = | 1259 1 1249 | BIT5d6 | 06,2757 | 155 | 2 138 150 | BOOP | 33,3017 | 433 | 1 434 |
| BELOW1 | 10,2400 | 1380 | 1 1381 | BIT1 | 4712 | 1170 | 63 45 1473 | BOOSTEMP | E6,1716 | = | 113 4 535 536 |
| BELOW2 | 10,2415 | 1380 | 2 1380 | BIT10 | 4701 | 1170 | 49 44 1418 | BORTENT | 5544 | 1481 | 2 1463 |
| BELOW3 | 10,2431 | 1380 | 1 1380 | BIT11 | 4700 | 1170 | 38 44 1415 | BOTHJOBS | 10,3013 | 1440 | 1 1440 |
| BELOW4 | 10,2434 | 1380 | 2 1380 | BIT12 | 4677 | 1170 | 35 44 1446 | BOTHPAD | 23,2473 | 508 | 1 508 |
| BEST1 | 0302 | a | 70 16 70 738 | BIT13 | 4676 | 1170 | 53 44 1445 | BOTHSON | 40,2300 | 314 | 1 314 |
| BESTJ | 0303 | = | 70 3 70 709 | BIT13-14 | 4371 | = | 1174 | BOTHSHIP | 23,2426 | SOT | 1 508 |
| BESTTRIM | 24,2760 | 654 | | BIT14 | 4675 | 1170 | 87 44 1463 | BOV(B) | 01,2504 | 1165 | 1 1087 |
| BETA/PIP | E6,1674 | = | 109 3 109 841 | BIT14+7 | 27,2124 | 385 | | BPL | 01,2530 | 1166 | 1 1166 |
| BETA/180 | E6,1666 | = | 109 7 109 1047 | BIT14COM | 10,2427 | 1380 | 1 1380 | BPL/BMN | 01,2521 | 1166 | 1 1087 |
| BETACOM | E6,1604 | = | 110 2 110 1047 | BIT15 | 4674 | 1170 | 58 44 1462 | BP1 | E6,1436 | 99 | 4 99 965 |
| BETADOT | E6,1704 | = | 109 5 109 1049 | BIT15+6 | 7703 | 1173 | 2 154 1439 | BP1(NP0) | 17,2251 | 964 | |
| BETAN | E4,1607 | = | 87 6 87 1320 | BIT15/14 | 41,3227 | 349 | 2 349 351 | BP2 | E6,1440 | 99 | 4 100 965 |
| BETAIV | E4,1557 | = | 87 11 87 1307 | BIT2 | 4711 | 1170 | 47 47 1473 | BP2(NP0) | 17,2311 | 965 | |
| BETA1 | E7,1753 | = | 125 4 125 871 | BIT3 | 4710 | 1170 | 40 45 1475 | BP3 | E6,1442 | 99 | 4 100 966 |
| BETA12 | E7,1764 | = | 125 6 118 863 | BIT4 | 4707 | 1170 | 56 45 1445 | BRANCH | 6872 | 1100 | 8 1111 1166 |
| BPAI1Y | 17,2735 | 1012 | 1 1012 | BIT5 | 4706 | 1170 | 49 45 1459 | BRATE | E6,1710 | = | 112 5 405 409 |
| BHIZ | 01,2477 | 1165 | | BIT6 | 4705 | 1170 | 57 45 1470 | BRANCHCON | 40,2501 | 317 | 1 317 |
| BIAS | E6,1564 | = | 107 5 107 999 | BIT7 | 4704 | 1170 | 55 45 1460 | BRANCHCTR | 12,2252 | 1250 | 1 1251 |
| BIASCALE | 22,3025 | 406 | 1 405 | BIT7-8 | 04,2374 | 199 | 1 196 | BRUPT | 0017 | = | 37 1 1463 |
| BIASCOM | 40,2532 | 330 | 2 330 | BIT8 | 4703 | 1170 | 33 45 1468 | BSURO | 26,3651 | 1221 | 1 1216 |
| BIASEDZ | 15,3023 | 1046 | 3 1048 1049 | BIT9 | 4702 | 1170 | 39 44 1473 | BUP | 0130 | 68 | 131 68 1479 |
| BIASH1 | 00,2586 | 1136 | 1 1155 | BLANKCHK | 10,3280 | 1445 | | BUP+ | 00,2422 | 1133 | 3 1132 1135 |
| BIASLO | 00,2270 | 1129 | 1 1156 | BLANKCON | 40,2515 | 317 | 2 317 329 | BUP- | 00,2416 | 1132 | 3 1132 1135 |
| BIASTEMP | E6,1674 | = | 112 4 405 409 | BLANKDSP | 41,3506 | 365 | 2 365 | BUPBRNK | 34,3224 | 575 | 1 575 |
| BIAS1 | E6,1565 | = | 107 5 107 999 | BLANKET | 5415 | 1433 | 18 475 1452 | BUP.LIM | 15,3773 | = | 1062 4 1053 |
| BIAS2 | E6,1566 | = | 107 5 107 999 | BLANKRET | 0114 | = | 67 | BUPNEG | 00,2531 | 1135 | 1 1132 |
| BIOTIME | 12,3441 | 1270 | 1 1269 | BLANKSUB | 4271 | = | 368 | BUPNORM | 00,2500 | 1135 | 1 1135 |
| BINCON | 4377 | 373 | 3 353 1174 | BLAST | E6,1457 | = | 100 | BUPPOS | 00,2516 | 1135 | 2 1132 1135 |
| BINROUND | 40,2774 | 344 | 3 343 344 | BLAST1 | E6,1461 | = | 100 | BUPZERO | 00,2363 | 1132 | 1 1135 |
| BIS | 36,2207 | 544 | 1 546 | BLAST2 | E6,1463 | = | 100 | BUP2 | 0133 | 68 | 25 69 1462 |
| BITSOFF | 41,2670 | 338 | 1 338 | BLNKBRNK | 4316 | 368 | 1 368 | BUNKER | E6,1667 | = | 103 9 103 947 |
| BITSOFF1 | 41,2675 | 338 | 1 338 | BLNKSUB1 | 40,3406 | 389 | 2 368 | BUSYMASK | 10,3655 | 1451 | |
| BITS15+7 | 10,3650 | 1451 | 1 1438 | BLOAD | 41,2737 | 339 | 1 321 | BUTTONS | 05,2564 | 182 | 1 182 |
| BITS2-10 | 4746 | 1171 | | BMACX | 0042 | = | 37 | BVECTOR | E7,1501 | = | 119 22 119 1223 |
| BITS3d4 | 5656 | = | 1410 2 1389 1390 | BMACY | 0043 | = | 37 | BVECTORS | 23,3047 | 566 | 2 571 596 |
| BITS4+10 | 10,3653 | 1451 | 1 1450 | BMAOZ | 0044 | = | 37 | BVECTR | 0032 | = | 1221 5 1217 |
| BITS4d5 | 4722 | 1171 | 3 139 161 | BKCHK | 43,3714 | 1371 | | BVSU | 7005 | 1103 | 1 1086 |
| BITS4d6 | 4726 | = | 1410 5 179 1389 | BKOPTN | 43,3313 | 1385 | | BYPASS | 27,2520 | 578 | 1 578 |
| BITS4-5 | 07,3543 | 1410 | 1 1395 | BODYATT | 37,2000 | = | 31 | RY1 | E6,1436 | = | 99 3 967 968 |
| BITS4,5 | 21,2173 | 975 | | BODYRATE | 15,2556 | 1041 | 1 1035 | RY1(NY0) | 17,2443 | = | 967 |
| BITS5+11 | 10,3652 | 1451 | 3 1443 1450 | BODY1 | E6,1706 | = | 113 | RY2 | E6,1440 | = | 100 3 968 |
| BITS5-6 | 4730 | = | 526 | BODY2 | E6,1705 | = | 113 | RY2(NY0) | 17,2503 | = | 968 |
| BITS6,8 | 40,3571 | 382 | | BODY3 | E6,1704 | = | 113 | RY3 | E6,1442 | = | 100 3 969 |
| BITS7+4 | 10,3651 | 1451 | 2 1437 | BQKKEP2 | 05,3300 | 914 | 1 914 | RZE/GOTO | 01,2514 | 1166 | 1 1087 |

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

UN UNDEFINED = DEFINED BY EQUALS J DEFINED BY JOKER OR BRASH ANYWHERE ND MULTIPLY DEFINED
 RD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE



SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, J OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

| SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES |
|----------|---------|--------|-------------|--------------|---------|-------|------------|---------------|---------|--------|-------------|
| B2RO | E6,1742 | = 104 | 11 184 | 960 CALCORAV | 37,3256 | 789 | 4 528 | 790 CD*TRNG | 23,3436 | 1333 | |
| B2STORE | 20,2471 | 926 | | CALCOTA | 23,3140 | 1323 | 3 444 | 714 CD*TRNGS | 23,3450 | 1334 | 3 1333 1337 |
| B1 | E6,1545 | = 101 | 3 101 | 928 CALCLN | 34,3473 | 586 | | CDLFP/2 | 0016 | = 1341 | 3 634 769 |
| B1TMP | E6,1717 | = 104 | 5 104 | 937 CALCMAN2 | 0053 | = 49 | 2 405 | 407 CDVBS | 06,2012 | 130 | |
| B12-1 | 4372 | = 373 | | CALCMAN3 | 0052 | = 49 | 1 405 | CDSEC | 36,2004 | 541 | 1 546 |
| B12T14 | 7671 | = 1174 | 1 1089 | CALCN63 | 24,2436 | 647 | 1 646 | CDUNBSM | 23,3567 | 1336 | |
| B2 | E6,1546 | = 101 | 1 102 | CALCN65 | 24,2325 | 645 | 1 646 | CDUNSNB | 23,3554 | 1336 | |
| B2/A2 | 13,2455 | 1209 | 1 1211 | CALCPHI | 22,2702 | 403 | 1 403 | CDUANG | E5,1553 | = 97 | |
| B2TMP | E6,1720 | = 104 | 4 104 | 937 CALCRVO | 37,3323 | 790 | 1 783 | CDUHKWD | 1341 | = 80 | 2 227 228 |
| B2X3C | 13,2453 | 1209 | 1 1209 | CALCMNSC | 16,2567 | 718 | 2 707 | 728 CDUFLAG | E5,1471 | = 96 | |
| B3 | E6,1547 | = 102 | 3 102 | 928 CALCSXA | 23,2034 | 281 | 1 731 | CDUINC | 22,3823 | 1479 | 3 1479 |
| B3TMP | E6,1721 | = 104 | 4 104 | 937 CALCTPF | 27,3060 | 1350 | 4 514 | 764 CDUIND | E3,1474 | = 83 | 23 138 1403 |
| B3TOR4 | 01,2623 | 1169 | 2 1168 1169 | CALCTLS | 31,3230 | 889 | 1 889 | CDULIMIT | E5,1453 | = 96 | |
| B4 | E6,1550 | = 102 | 1 102 | CALCTPR | 27,3055 | 1350 | 1 514 | CDULOGIC | 22,3510 | 1476 | 10 280 1334 |
| B4TMP | E6,1722 | = 104 | 4 104 | 937 CALCTP | 30,3716 | 669 | 1 668 | CDULOOP | 34,3270 | 583 | 1 583 |
| B5 | E6,1551 | = 102 | 3 102 | 928 CALCSBIT | 4711 | = 49 | | CDUNDX | E5,1546 | = 97 | |
| B5OFF | 5514 | 1459 | 8 496 | 888 CALCSBIT | 4710 | = 49 | | CDUREADP | E5,1451 | = 96 | |
| B5TMP | E6,1723 | = 104 | 4 104 | 937 CALFA | E6,1506 | = 110 | 8 110 | 1060 CDUREADI | E5,1452 | = 96 | |
| B5TOR6 | 01,2512 | 1165 | | CALL | 6607 | 1098 | 1 1166 | CDUS | 0036 | = 37 | 8 37 500 |
| B6 | E6,1552 | = 102 | 1 102 | CALL/ITA | 01,2534 | 1166 | 1 1087 | CDUSMD | 0054 | = 38 | 2 38 |
| B6TMP | E6,1724 | = 104 | 4 104 | 938 CALLCODE | 4723 | 1171 | 1 1090 | CDUSPOT | 0766 | 73 | 14 73 1336 |
| B7TMP | E6,1725 | = 104 | 3 104 | 938 CALLCON | 26,2658 | 762 | 1 764 | CDUSPOTX | 0772 | = 73 | 1 661 |
| | | | | CALLRECT | 11,3234 | 1313 | 4 1312 | CDUSPOTY | 0766 | = 73 | 1 661 |
| | | | | CALLRPT | 13,2425 | 1208 | 1 1208 | CDUSPOTZ | 0770 | = 73 | 1 661 |
| CK30LIM | 26,2643 | 759 | 2 758 759 | CALLRTRP | 13,2335 | 1206 | 1 1206 | CDUT | 0035 | = 37 | 8 37 699 |
| CMWNN1 | 23,3561 | 1336 | 2 1336 1337 | CALLRS | 43,3004 | 257 | 1 231 | CDUTCMD | 0053 | = 38 | 3 38 164 |
| CMWNN2 | 23,3563 | 1336 | 1 1337 | CALLRS2 | 30,2120 | 556 | 1 556 | CDUTIMEP | E5,1446 | = 96 | |
| CMWNN3 | 23,3574 | 1337 | 2 1337 | CALL40.8 | 24,3045 | 656 | 2 655 | 657 CDUTIMEI | E5,1444 | = 96 | |
| C/DO | E7,1705 | = 117 | 3 117 | 821 CALOOP | 14,2770 | 716 | 1 717 | CDUTODCN | 22,2405 | 398 | 3 387 392 |
| CA,SCB | 07,2742 | 1393 | 2 144 183 | CALOOP1 | 14,3027 | 717 | 2 716 | CDUTRIG | 23,3432 | 1333 | 9 497 887 |
| CADDY | E6,1665 | = 103 | 7 103 | 947 CALSAM1 | 15,2437 | 738 | 1 737 | CDUTRIGS | 23,3442 | 1333 | 3 1333 1336 |
| CADRFLSH | 0372 | 72 | 7 168 1449 | CALS3A | 14,2756 | 716 | 1 696 | CDUX | 0032 | = 37 | 31 168 1392 |
| CADRMARK | 0373 | 72 | | CAN | E6,1716 | = 112 | 5 112 | 394 CDUXCMD | 0050 | = 37 | 4 148 1392 |
| CADRMARK | 10,3656 | 1451 | 1 1442 | CANCOARS | 06,3140 | 159 | 2 158 | CDUXD | E6,1646 | = 108 | 10 108 979 |
| CADRSTOR | 1042 | 74 | 13 168 1447 | CANDEL | 23,2645 | 511 | 1 508 | CDUY | 0033 | = 37 | 17 219 1388 |
| CADRDR | 01,2001 | = 206 | 1 1385 | CANTDO | 32,2067 | 635 | 2 634 | CDUYCMD | 0051 | = 37 | 2 148 982 |
| CAGESUB | 06,2717 | 154 | 1 138 | CANTROO | 04,2070 | 194 | 1 193 | CDUVD | E6,1650 | = 108 | 5 108 585 |
| CAGESUB1 | 06,2725 | 154 | 1 140 | CANV37 | 04,2123 | 195 | 2 195 | 784 CDUZ | 0034 | = 37 | 23 143 1388 |
| CAGESUB2 | 06,2730 | 154 | 1 140 | CANZOPT | 06,3070 | 157 | 2 157 | CDUZCMD | 0052 | = 38 | 2 148 982 |
| CAGETST | 07,3443 | 1406 | 7 1390 1403 | CAPSI | E6,1645 | = 108 | 4 108 | 1008 CDUZD | E6,1652 | = 108 | 5 108 585 |
| CAGETSTJ | 07,3455 | 1406 | 5 1389 1398 | CARD | E6,1671 | = 103 | 6 103 | 947 CEARTH | 0016 | = 705 | 3 704 710 |
| CAGETSTO | 07,3450 | 1406 | 3 1396 1397 | CATLOG | 14,3743 | 1361 | 10 622 | 738 CENTANG | E7,1753 | = 124 | 6 167 549 |
| CALCDIR | E5,1470 | = 96 | | CCALL | 6575 | 1098 | 1 1086 | CFAILP | 17,2703 | 1011 | 1 1011 |
| CALCOT6 | 17,3605 | 1030 | 2 1031 | CCSHOLE | 5640 | 1463 | 18 313 | 1189 CFFA | E7,1756 | = 125 | 4 125 874 |
| CALCOA | 23,3244 | 1327 | 3 417 772 | CCSL | 7632 | 1121 | 1 1174 | CD_CORR | 16,3064 | 907 | |
| CALCOA1 | 23,3304 | 1327 | 1 1328 | | | | | | | | |

HEALTH KEY: NORMALLY DEFINED UNLESS PLACED AS FOLLOWS:

UN UNDERLINED = DEFINED BY EQUALS J DEFINED BY JOKER OR BRASH ANYWHERE MD MULTIPLY DEFINED
 BD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, J OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

| SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES |
|----------|---------|------|-------------|----------|---------|------|-------------|-----------|---------|------|-----------------|
| COOTO | 6652 | 1099 | 1 1086 | CHKSD | 14,2726 | 715 | 1 715 | CM/DSBIT | 4711 | = | 57 |
| CHAN | E5,1453 | = | 96 | CHKSDA | 14,2752 | 716 | 1 716 | CM/DSBY | 0147 | = | 57 1 783 |
| CHANDSP | 41,2503 | 328 | 1 327 | CHKSDATA | 14,2702 | 716 | 2 714 724 | CM/DUMPR | 15,3730 | 1060 | |
| CHAND1 | 5057 | 1178 | 4 421 1370 | CHKSTRK | 16,3250 | 919 | 1 919 | CM/END | 15,3755 | 1061 | 1 1060 |
| CHAND2 | 5063 | 1178 | 1 1078 | CHKSUPR | 43,3644 | 1370 | 1 1370 | CM/PDA1 | 15,3716 | 1060 | 1 1045 |
| CHANJOB | 01,2727 | 1183 | 4 1178 1189 | CHKTEMP | 37,3242 | 788 | 1 788 | CM/PDAIR | 15,3724 | 1060 | 2 1045 1059 |
| CHANLOAD | 41,3154 | 342 | 1 342 | CHOCK | 26,3247 | 834 | 1 811 | CM/PLAS | 0102 | = | 798 23 754 1059 |
| CHANTEMP | E6,1633 | = | 107 | CHRPRIO | 4371 | 373 | 7 132 1471 | CM/GYMDT | E6,1725 | = | 110 6 110 1039 |
| CHAN12 | 0012 | = | 39 | CHI | 26,3253 | 635 | 3 811 819 | CM/GYMIC | 15,2532 | 1035 | 2 1034 1035 |
| CHAN13 | 0013 | = | 39 | CH31TEMP | E6,1632 | = | 107 | CM/POSE | 37,3373 | 836 | 1 750 |
| CHAN14 | 0014 | = | 39 | CKLPTBTS | 43,2457 | 244 | 2 243 | CM/POSE2 | 37,3422 | 836 | 1 836 |
| CHAN30 | 0030 | = | 39 | CKMDMORE | 43,3747 | 1468 | 1 1467 | CM/POSE3 | 37,3656 | 841 | |
| CHAN31 | 0031 | = | 39 | CKMID2 | 13,3653 | 1299 | 1 1317 | CM/RCS | 15,3236 | 1051 | 1 1045 |
| CHAN32 | 0032 | = | 39 | CKMDCAD | 43,2271 | 237 | 4 233 237 | CM/SAVE | E6,1623 | = | 111 3 111 1061 |
| CHAN33 | 0033 | = | 39 | CKOVWRD1 | 24,3254 | 661 | 1 660 | CM/SWIC1 | 20,3707 | 1040 | 1 1039 |
| CHANS | 0005 | = | 974 | CKOPTVB | 43,2367 | 241 | 1 230 | CM/SWIC2 | 4377 | = | 1040 1 1039 |
| CHAN6 | 0006 | = | 974 | CK1K2 | 32,2206 | 637 | 1 636 | CM/TRIO | 37,3432 | 837 | |
| CHAR | 0117 | = | 67 | CK4V32 | 27,3471 | 1470 | 3 1469 1470 | CM/ARBIT | 4677 | = | 55 |
| CHARALRM | 40,3335 | 358 | 10 310 358 | CLEANDSP | 10,2807 | 1436 | 6 445 749 | CMCSTADL | 05,2113 | = | 169 2 166 176 |
| CHARIN | 40,2000 | 310 | 1 1417 | CLEANEND | 10,3361 | 1446 | 1 1444 | CMCSTA01 | 05,2047 | = | 169 1 169 |
| CHARIN2 | 40,2013 | 310 | 2 310 | CLEANOUT | 43,2675 | 254 | 1 260 | CMCSTA02 | 05,2056 | = | 169 2 169 |
| CHAZPOCC | 43,2400 | 241 | 1 231 | CLEAR | 40,2370 | 316 | 1 311 | CMCSTA03 | 05,2063 | = | 169 2 169 |
| CHECKB | 5363 | 1381 | 1 1378 | CLEARMRK | 5425 | 1433 | 6 199 1433 | CMCSTA04 | 05,2065 | = | 169 1 169 |
| CHECKCTR | 12,2651 | 1257 | 2 1250 1269 | CLEARWWS | 30,2343 | 590 | 1 591 | CMCSTA05 | 05,2067 | = | 169 1 169 |
| CHECKG | 33,2321 | 421 | 2 418 419 | CLEARWS4 | 30,3451 | 602 | 1 602 | CMCSTA06 | 05,2076 | = | 169 1 169 |
| CHECKO1 | 33,2324 | 421 | 1 421 | CLEAR1 | 40,2423 | 316 | 1 316 | CMCSTA07 | 05,2101 | = | 169 1 169 |
| CHECKOAK | 22,2111 | 393 | 1 393 | CLOAD | 41,2754 | 339 | 1 321 | CM/DAPARM | 0135 | = | 55 |
| CHECKOM | 5253 | 1372 | 12 217 727 | CLOCKJOB | 24,3244 | 661 | 1 659 | CM/DARMD | E6,1700 | = | 109 11 109 1059 |
| CHECKONJ | 43,3330 | 1365 | 3 1365 1370 | CLOCKON | 24,3201 | 659 | 1 659 | CM/DBETUP | 10,2122 | 164 | 5 163 164 |
| CHECKTAB | 04,2075 | 194 | 1 194 | CLOG2/32 | 23,2213 | 287 | 1 286 | CM/DSOUT | 16,3227 | 918 | 1 920 |
| CHECKT23 | 17,3601 | 1030 | 1 1031 | CLKTASK | 24,3172 | 659 | 5 212 659 | CM/TMP | E6,1744 | = | 104 32 104 937 |
| CHKAVBO | 37,2736 | 779 | 2 212 778 | CLPASHI | 40,2406 | 316 | 1 316 | CM/ENTROL | 05,2214 | = | 173 2 166 176 |
| CHKAXIS | 27,2225 | 388 | 1 388 | CLPASS | 1015 | 74 | 13 188 366 | CM/ENTRO1 | 05,2047 | = | 173 1 173 |
| CHKCOMED | 33,3401 | 439 | 3 429 437 | CLRM00N | 13,2666 | 1285 | 2 1286 1314 | CM/ENTRO2 | 05,2056 | = | 174 2 173 |
| CHKORS | 07,2675 | 1392 | 1 1393 | CLROVFLW | 13,2465 | 1210 | 1 1210 | CM/ENTRO3 | 05,2063 | = | 174 1 173 |
| CHKCTR | 37,3002 | 781 | | CLRW678 | 30,3076 | 597 | 1 597 | CM/ENTRO4 | 05,2065 | = | 174 1 173 |
| CHKPAIL1 | 5553 | 1461 | | CLRS | 40,2426 | 316 | 1 316 | CM/ENTRO5 | 05,2264 | 174 | 1 173 |
| CHKPAIL2 | 5557 | 1461 | 1 1461 | CLSEC | 36,2006 | 541 | 1 547 | CM/ENTRO7 | 05,2101 | = | 174 |
| CHKLINUS | 27,2056 | 384 | 2 383 384 | CLUPDATE | 35,3063 | 474 | 1 473 | CM/NTOVFL | 12,2316 | 1251 | 1 1251 |
| CHKLIST | 05,3366 | 1067 | | CLUPLOCK | 07,3700 | 1418 | 1 1418 | CMOON | 0022 | = | 705 2 704 705 |
| CHKNOVAC | 01,3631 | 1384 | 1 1387 | CM/ATUP | 37,3560 | 840 | | CMOONBIT | 4677 | = | 59 |
| CHKPOOH | 43,2715 | 255 | 7 241 257 | CM/BTAS | 15,3214 | 1049 | 2 1046 | CMOONFLG | 0173 | = | 59 23 32 1285 |
| CHKPRIO | 10,2560 | 1435 | 1 1434 | CM/DAPIC | 20,3645 | 1039 | 1 746 | CM/PG22M | 05,2273 | = | 175 1 176 |
| CHKTAB | 14,2705 | 715 | | CM/DAPON | 20,3565 | 1037 | 1 747 | CM/PG2201 | 05,2047 | = | 175 1 175 |
| CHKSB | 14,2707 | 715 | 1 715 | CM/DAP2C | 20,3650 | 1039 | | CM/PG2202 | 05,2056 | = | 175 2 175 |

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

UN UNDEFINED = DEFINED BY EQUALS J DEFINED BY JOKER OR BRASH ANYWHERE MD MULTIPLY DEFINED
 BD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEP, J OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

| SYMBOL | DEP | H | REFERENCES | SYMBOL | DEP | H | REFERENCES | SYMBOL | DEP | H | REFERENCES |
|-----------|---------|--------|-------------|----------|---------|--------|-------------|----------|---------|--------|--------------|
| CMPO2203 | 05,2063 | = 175 | 2 175 | CODE | 0124 | = 87 | 15 311 365 | CONC+S1 | 43,3237 | 1364 | 1 1368 |
| CMPO2204 | 05,2065 | = 176 | 1 175 | COEPPOLY | 34,2510 | 537 | 1 533 | CONC+S2 | 43,3240 | 1364 | 1 1368 |
| CMPO2205 | 05,2337 | 176 | 1 175 | COP | E6,1742 | = 112 | 48 112 405 | CONCAL | 36,2230 | 544 | 1 544 |
| CMPO2206 | 05,2076 | = 176 | 1 175 | COPMAXCO | 22,2170 | 394 | | CONICS | 12,2000 | = 26 | 3 1246 1263 |
| CMPO2207 | 05,2101 | = 176 | 1 175 | COPSKOW | E6,1710 | = 112 | 8 111 396 | CONICS1 | 04,2000 | = 25 | 3 1259 1275 |
| CMPOS | 34,3123 | 574 | 2 570 574 | COGA | E7,1774 | = 124 | 18 124 1272 | CONICX1 | E7,1734 | = 125 | 5 125 869 |
| CMPOEDL | 05,2001 | = 167 | 1 176 | COGAPBIT | 4707 | = 61 | | CONSTD | 25,3224 | 821 | 1 808 |
| CMPOE01 | 05,2047 | 167 | 5 167 | COGAPLAG | 0203 | = 60 | 4 893 1261 | CONSTD1 | 25,3243 | 821 | 1 822 |
| CMPOE02 | 05,2056 | 168 | 6 167 | COGAMAX | 0018 | = 1276 | 4 1267 1270 | CONTL2 | 01,3657 | 1385 | 2 1387 |
| CMPOE03 | 05,2063 | 168 | 6 167 | COGAMIN | 0010 | = 1276 | 3 1268 1270 | CONTRK | 27,2363 | 576 | 1 576 |
| CMPOE04 | 05,2065 | 168 | 5 167 | COGAVFL | 12,2767 | 1260 | 2 1260 1272 | CONTRVB | 10,2020 | 162 | 1 162 |
| CMPOE05 | 05,2067 | 168 | 3 167 | COGLCLIM | 04,3525 | 1259 | 1 1271 | CONTINU | 43,3614 | 1370 | 5 1369 1370 |
| CMPOE06 | 05,2076 | 168 | 4 167 | COGULIM | 04,3523 | 1259 | 2 1268 | CONTINU2 | 25,3126 | 819 | 1 819 |
| CMPOE07 | 05,2101 | 168 | 5 167 | COLINEAR | 04,3623 | 1262 | 1 1262 | CONTINU3 | 33,3530 | 443 | 1 442 |
| CMPX1 | E5,1455 | = 97 | 2 432 | COLREG | 1102 | = 76 | 7 76 1318 | CONMANU | 22,3206 | 409 | 1 408 |
| CMRSDDL | 05,2147 | = 171 | 1 176 | COMADRS | 43,3531 | 1368 | 2 1370 | CONTRNE | 20,2324 | 691 | 2 691 |
| CMRSD01 | 05,2047 | = 171 | 1 171 | COMPLAG | 5442 | 1454 | 1 1454 | CONTWO | 20,2325 | 691 | 2 691 |
| CMRSD02 | 05,2056 | = 171 | 2 171 | COMBOM1 | 23,2000 | = 28 | 1 280 | CONT1 | 25,3057 | 818 | 1 818 |
| CMRSD03 | 05,2063 | = 171 | 2 171 | COMBOM2 | 10,2000 | = 28 | 1 284 | CONT3 | 25,3067 | 818 | 1 818 |
| CMRSD04 | 05,2065 | = 172 | 1 171 | COMMAND | E3,1471 | = 83 | 6 1388 1393 | CONMNR | 41,3064 | 341 | 1 340 |
| CMRSD05 | 05,2067 | = 172 | 1 171 | COMMANDO | 1305 | 78 | 6 163 165 | CONVRNCE | 27,2474 | 577 | 2 577 |
| CMRSD06 | 05,2076 | = 172 | 1 171 | COMMPX | 43,3523 | 1368 | 2 1370 | CON1 | 5332 | 1378 | 1 1378 |
| CMRSD07 | 05,2101 | = 172 | 1 171 | COMMNUT | 12,2752 | 1260 | 1 1273 | CON2 | 10,2443 | 1380 | 1 1378 |
| CMTIME | 15,3737 | 1060 | 1 1060 | COMMONLM | 12,3430 | 1269 | 1 1270 | CON2ADR | 5347 | 1378 | 1 1378 |
| CMTIME | 0304 | = 70 | 3 70 1061 | COMNEO | 07,2721 | 1393 | 1 1392 | COPIES | 10,3063 | 1441 | 1 1434 |
| CMTR1 | 37,3562 | 840 | | COMP | 7637 | 1121 | 4 1088 1151 | COPIES2 | 10,3064 | 1441 | 1 1439 |
| CMTR2 | 37,3633 | 841 | | COMPAT | 15,3320 | 1052 | 2 1051 1052 | COPINDEX | 0184 | = 1451 | 23 1435 1449 |
| CMTR | 22,2375 | 398 | | COMDISP | 35,3207 | 496 | 1 496 | CORPAC | 0157 | = 1451 | 3 1447 1450 |
| CONCHK | 27,2361 | 576 | | COMPOS | 33,3237 | 437 | 1 437 | COPYNORM | 10,3062 | 1441 | 1 1438 |
| CONTR30 | 35,3655 | 828 | 3 827 828 | COMPICK | 41,2510 | 328 | 1 328 | COPYPACS | 10,2550 | 1435 | 1 1444 |
| CONTR | E6,1447 | 100 | 25 641 908 | COMPMAT | 13,2061 | 502 | | COPYTOGO | 10,2546 | 1435 | 1 1444 |
| CONTRK | 43,3484 | 1367 | | COMPMTX | 27,2160 | 387 | 1 389 | COPY40.9 | 16,2345 | 680 | |
| CONTRCON | 4726 | = 1364 | 1 1367 | COMPMSN | 27,2237 | 388 | 1 388 | CORANGOV | 37,3663 | 841 | 4 840 841 |
| CONTRCOPY | 16,3122 | 908 | 2 906 920 | COMPNUM | 0300 | 70 | 11 70 1473 | CORCOPY | 16,3110 | 908 | 1 920 |
| CONTRLOOP | 43,3485 | 1367 | 1 1368 | COMPOS | 07,2654 | 1392 | 1 1392 | COREINC | 01,3054 | 1186 | 2 1182 1186 |
| CONTRIMP | E6,1707 | = 103 | 4 103 908 | COMPTBIT | 4703 | = 54 | | CORPOND | 01,2681 | 1182 | |
| COALION | 33,2302 | 421 | 3 416 421 | COMPTST | 41,2423 | 328 | 6 326 339 | CORPLAN | 15,2446 | 738 | 2 737 738 |
| COARFINE | 14,3004 | 716 | | COMPTGO | 35,3564 | 626 | 2 473 626 | CORSCHK2 | 07,2707 | 1393 | 2 1392 1393 |
| COARS | 07,2612 | 1391 | 1 1391 | COMPTST1 | 41,2425 | 328 | 1 327 | CORSETUP | 16,3053 | 907 | 2 906 920 |
| COARSERR | 07,2712 | 1393 | 2 1392 | COMPUTER | 0122 | = 54 | 4 485 1297 | COSCDJ | 0744 | = 72 | 5 72 1335 |
| COARSLOK | 06,3055 | 157 | 1 156 | COMPUER | 33,2000 | 415 | 2 209 241 | COSCDUX | 0750 | = 72 | 6 535 930 |
| COARSTOL | 07,2720 | 1393 | 1 1393 | COMP12 | 22,2203 | 395 | 1 394 | COSCDUY | 0744 | = 72 | 5 718 1340 |
| COARS1 | 07,2617 | 1391 | 1 1391 | COMTERM | 11,2755 | 1309 | 1 1312 | COSCDUZ | 0746 | = 72 | 7 535 1340 |
| COARS2 | 07,2642 | 1392 | 2 1392 1393 | COMZERO | 07,2731 | 1393 | 2 1392 1393 | COSP | 0030 | = 1277 | 4 1272 1273 |
| COB | 0040 | = 1221 | 4 1216 1217 | CONG2 | 13,2280 | 731 | 3 730 733 | COSQ/2 | E7,1667 | = 117 | 5 117 813 |

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

UN UNDEFINED = DEFINED BY EQUALS J DEFINED BY JCKER OR FRASE ANYWHERE MD MULTIPLY DEFINED
 BD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, J OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

| SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES |
|----------|---------|--------|-------------|----------|---------|--------|-------------|----------|---------|--------|-------------|
| COSI | 26,3633 | 1221 | 2 1217 | CSTEER | E7,1702 | = 122 | 6 122 677 | C6TMP | E6,1724 | = 105 | 1 932 |
| COSINE | 00,3516 | 1157 | 2 1088 1334 | CSTH | E5,1733 | = 94 | 13 94 1273 | C7TMP | E6,1725 | = 105 | |
| COSM | E6,1511 | = 110 | 4 110 1041 | CSTH-RHO | E5,1737 | = 94 | 4 94 1268 | ===== | | | |
| COSO | E6,1513 | = 110 | 3 110 1042 | CSUPT | 34,3732 | = 885 | 1 849 | D | E7,1637 | = 116 | 22 116 828 |
| COSOCOSM | E6,1515 | = 110 | 2 1041 | CSUN | 0020 | = 705 | 1 705 | DACLIMIT | 21,2526 | = 984 | 3 983 |
| COSPHI/2 | 0022 | = 1322 | 6 1309 1311 | CHETA | 1156 | = 76 | 2 412 993 | DACLOOP | 21,2463 | = 983 | 1 983 |
| COSPHIB | 11,3144 | 1311 | 1 1309 | CYLIST | 0334 | = 1069 | 6 1067 | DACNCLS | 21,2375 | = 980 | 1 978 |
| COSTALIN | 0000 | = 203 | 6 203 | CULTRIT | 4704 | = 50 | | DAD | 6744 | 1101 | 1 1088 |
| COSTH | 0020 | = 71 | 16 262 1327 | CULTED | 14,2476 | = 709 | 4 709 | DANZIG | 6030 | 1078 | 73 280 1483 |
| COSTRIM | 15,3220 | 1049 | 1 1043 | CULTFLAG | 0085 | = 50 | 8 283 731 | DAPBIT1 | 0132 | = 55 | 2 690 1037 |
| COS15 | 26,3317 | 835 | 1 708 | CULTRIX | E5,1735 | = 93 | 1 709 | DAPBIT2 | 0133 | = 55 | 2 690 1037 |
| COS33 | 14,2503 | 710 | 1 708 | CURTAINS | 8644 | = 1463 | 6 714 726 | DAPCK | 34,3250 | = 583 | 1 583 |
| COUNT | 0143 | = 68 | 12 311 357 | CYBCTR | 0010 | = 1221 | 1 1217 | DAPDATR1 | E6,1466 | = 100 | 72 168 1037 |
| COUNTPL | E5,1552 | = 97 | | CXOFF | E5,1745 | = 95 | 4 95 598 | DAPDATR2 | E6,1467 | = 100 | 6 274 889 |
| COVNV | 42,3635 | 887 | 1 887 | CYCLEBIT | 4701 | = 48 | | DAPDISP | 43,2536 | = 247 | 1 230 |
| COZY4 | E7,1627 | = 120 | 5 121 482 | CYCLESW | 0043 | = 48 | | DAPDISP1 | 42,2000 | = 247 | 1 247 |
| CPHI | 1155 | = 76 | 9 246 993 | CYCLSHFT | 43,3473 | = 1368 | | DAPFIG | 42,3521 | = 690 | 1 245 |
| CPHIBIT | 4674 | = 44 | | CYL | 0022 | = 37 | 24 312 1368 | DAPINIT | 20,3111 | = 936 | 2 902 941 |
| CPHIFLAG | 0000 | = 44 | 2 772 1328 | CYR | 0020 | = 37 | 46 198 1384 | DAPINITS | 17,2207 | = 902 | 1 902 |
| CPHIX | 1333 | = 79 | 10 238 994 | CZERO | E6,1742 | = 104 | | DARMASS | 05,2000 | = 26 | 1 913 |
| CPSI | 1157 | = 78 | 1 412 | CZSTORE | 20,2760 | = 932 | | DAPROLL | 16,2000 | = 27 | 3 904 952 |
| CREWMANU | 43,2527 | 246 | 1 230 | C001 | 26,3265 | = 835 | 1 808 | DAPS1 | 20,2000 | = 28 | 1 1037 |
| CRITCON | 40,2216 | 313 | 1 312 | C1 | E6,1571 | = 102 | 3 102 934 | DAPS2 | 20,2000 | = 28 | 2 922 945 |
| CRSTOR | 34,3530 | 587 | 1 587 | C1/16 | 27,3356 | = 833 | 1 813 | DAPS3 | 21,2000 | = 28 | 3 691 996 |
| CRSTOR1 | 34,3533 | 587 | 1 587 | C1/2 | 7666 | = 1172 | 1 1177 | DAPS4 | 17,2000 | = 27 | 2 963 1010 |
| CRS61.1 | 34,3225 | 582 | 1 584 | C1TMP | E6,1717 | = 105 | 2 932 934 | DAPS5 | 17,2000 | = 27 | 1 1032 |
| CRS61.2 | 34,3323 | 584 | | C12 | 26,3205 | = 834 | 1 813 | DAPS6 | 20,2000 | = 28 | 3 677 690 |
| CRS61.2A | 34,3404 | 585 | | C18 | 26,3163 | = 833 | 1 818 | DAPS7 | 17,2000 | = 27 | 3 677 899 |
| CSCDES | 06,3125 | 158 | 1 158 | C2 | E6,1572 | = 102 | 1 102 | DAPS8 | 22,2000 | = 28 | 1 1008 |
| CSCOMAN | 06,3133 | 158 | 1 158 | C2TMP | E6,1720 | = 105 | 1 932 | DAPTS | 20,3417 | = 941 | |
| CSCTOZOP | 06,3130 | 158 | | C20 | 26,3215 | = 834 | 1 820 | DAPTRIT | 4674 | = 55 | |
| CSI/CDH | 35,2000 | = 30 | 1 455 | C21 | 26,3217 | = 834 | 1 818 | DAPTRIT | 4675 | = 55 | |
| CSMCONIC | 13,3045 | 1288 | 9 542 887 | C3 | E6,1573 | = 102 | 3 102 934 | DATAPL | E5,1502 | = 97 | 10 418 422 |
| CSMASS | E6,1474 | = 100 | 17 194 914 | C3/2 | 7706 | = 1173 | 1 1177 | DATATEST | E7,1603 | = 119 | 1 128 |
| CSMPOS | 1206 | = 78 | 11 78 600 | C3TMP | E6,1721 | = 105 | 1 934 | DB | 16,3727 | = 980 | 4 952 955 |
| CSMPREC | 13,3022 | 1288 | 7 32 889 | C33JMP | 06,2745 | = 155 | 1 142 | DBARTRIM | 24,2765 | = 655 | 1 655 |
| CSMSTORE | 22,3402 | 490 | 2 490 542 | C33TEST | 06,2367 | = 141 | 6 138 140 | DCDU | E6,1603 | = 107 | 8 107 1340 |
| CSMUFF | 34,3034 | 573 | 1 570 | C4 | E6,1574 | = 102 | 1 102 | DCDUINCR | 21,2351 | = 978 | |
| CSMVEC | 43,2703 | 254 | 1 231 | CARTE | 35,3755 | = 885 | 1 845 | DCMTCODU | 22,2855 | = 403 | 2 388 407 |
| CSS | 0016 | = 710 | 1 709 | C4TMP | E6,1722 | = 105 | 1 932 | DCOGA | 0014 | = 1276 | 4 1269 1270 |
| CSSUN | 15,2201 | 706 | 1 705 | C4SLIM | 15,3216 | = 1049 | 2 1047 | DCOMP | 7654 | 1121 | 2 1121 |
| CSS33 | 14,2511 | 710 | 2 709 | C5 | E6,1575 | = 102 | 3 102 934 | DCOMPTST | 41,2436 | = 327 | 2 328 |
| CSS5 | 15,2177 | 705 | 2 704 705 | C5/2 | 4742 | = 1171 | 1 1177 | DCONSTD | 25,3213 | = 821 | 2 814 815 |
| CSS66 | 14,2505 | 710 | 1 708 | C5TMP | E6,1723 | = 105 | 1 934 | DCTSTCYC | 41,2451 | = 327 | 2 341 342 |
| CSS6640 | 14,2507 | 710 | 1 708 | C6 | E6,1576 | = 102 | 1 102 | DDV | 7546 | 1119 | 1 1086 |

HEALTH KEY: NORMALLY DEFINED UNLESS PLACED AS FOLLOWS:

UN UNDEFINED = DEFINED BY EQUALS J DEFINED BY JOKER OR ERASE ANYWHERE MD MULTIPLY DEFINED
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SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, J OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

| SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES |
|----------|---------|-------|-------------|----------|---------|--------|-------------|----------|---------|--------|-------------|
| DDV/BDV | 00,2353 | 1132 | 1 1119 | DELAYNM | 0214 | = 32 | 1 1456 | DELTEMPZ | E6,1521 | = 106 | 2 976 977 |
| DDV/CALL | 00,3004 | 1143 | 1 1143 | DELAY200 | 21,2524 | 983 | 1 983 | DELTIME | 12,2426 | 1254 | 3 1249 1269 |
| DE-OR-50 | 30,2101 | 556 | 1 556 | DELBARP | 20,2526 | 927 | 1 968 | DELTTIME | E6,1612 | = 91 | 2 519 |
| DEBIT | 5453 | 1454 | 2 1454 | DELBARY | 20,3015 | 932 | 1 969 | DELV | 1162 | 77 | 10 77 802 |
| DEC-12 | 04,3465 | 1176 | | DELBRTMP | E6,1715 | = 103 | 11 104 935 | DELVCTL | E7,1664 | = 122 | 3 647 648 |
| DEC-8 | 04,3464 | 1176 | | DELCDOX | E6,1575 | = 107 | 6 107 979 | DELVEE | E5,1622 | = 92 | 5 92 547 |
| DECBRNCH | 1000 | 73 | 18 311 359 | DELCDOY | E6,1577 | = 107 | 4 107 586 | DELVEST3 | E7,1645 | = 121 | 18 121 668 |
| DECDSP | 41,2520 | 328 | 1 320 | DELCDOZ | E6,1601 | = 107 | 4 107 586 | DELVEO | E5,1632 | = 92 | 3 92 547 |
| DECDSP3 | 41,2572 | 329 | 2 329 | DELCMP | 22,2530 | 400 | 3 387 405 | DELVIMU | E7,1674 | = 122 | 7 122 648 |
| DECRND | 40,2166 | 312 | 2 312 | DELDEP | E6,1761 | = 94 | 5 94 1257 | DELVLVC | E7,1404 | = 115 | 10 276 856 |
| DECON | 40,2223 | 313 | 1 312 | DELEL | E7,1451 | = 120 | 5 120 464 | DELVOV | E7,1537 | = 120 | 4 277 503 |
| DECOUNT | 0117 | = 67 | 27 322 345 | DELELO | 0032 | = 455 | 3 461 464 | DELVREP | E7,1432 | = 115 | 8 847 804 |
| DECRST | 0115 | = 67 | 2 341 342 | DELHTE | E7,1753 | = 124 | 2 276 542 | DELVSAR | E7,1653 | = 121 | 3 121 666 |
| DECR461 | 37,2575 | 585 | 3 584 585 | DELINDEP | 0014 | = 1277 | 2 1256 1257 | DELVSIN | E7,1645 | = 121 | 11 121 651 |
| DECROND | 40,3164 | 354 | 1 353 | DELLOOP | 00,3735 | 1456 | 1 1456 | DELVSLV | E7,1404 | = 115 | 4 115 631 |
| DECTEM | 0122 | = 67 | 3 328 | DELLTA | E7,1422 | = 115 | 11 115 668 | DELVSUM | E6,1750 | = 105 | 6 105 681 |
| DECTEST | 41,2442 | 327 | 2 326 327 | DELM | E6,1560 | = 97 | 5 432 433 | DELVSUMP | E6,1756 | = 105 | 2 655 656 |
| DECTOBIN | 40,2133 | 312 | 1 312 | DEMLP | 33,2710 | 432 | 1 432 | DELVTTP | E6,1636 | = 91 | 5 91 520 |
| DECTWO | 35,3143 | 477 | 3 467 548 | DELOGA | E6,1677 | = 103 | 5 103 955 | DELVTPI | E6,1634 | = 91 | 5 91 520 |
| DEC182 | 30,3653 | 605 | 1 600 | DELOGAC | 16,3356 | 953 | | DELVX | 1162 | = 77 | 13 292 788 |
| DEC15 | 4721 | = 833 | | DELOGART | E6,1675 | = 103 | 7 103 955 | DELVY | 1164 | = 77 | 10 294 788 |
| DEC17 | 4375 | = 424 | 2 416 436 | DELOK | 12,2637 | 1257 | 1 1256 | DELVZ | 1166 | = 77 | 9 294 788 |
| DEC227 | 15,2452 | 738 | 1 737 | DELOOP | 21,2352 | 978 | 1 979 | DELX | E6,1642 | = 94 | 6 94 1251 |
| DEC23 | 43,2356 | 240 | 1 240 | DELOPCMD | 10,2166 | 165 | 2 164 | DELYBAR | E6,1623 | = 102 | 7 102 935 |
| DEC409 | 20,2275 | 690 | 1 688 | DELPRAR | E6,1621 | = 102 | 7 102 929 | DEP | 0036 | = 1277 | 1 1256 |
| DEC45 | 4727 | 1171 | 3 941 1164 | DELRDONE | 32,2063 | 635 | | DEPREV | E6,1763 | = 94 | 2 94 1256 |
| DEC46 | 20,2276 | 690 | 1 688 | DELRSP1 | 32,2017 | 634 | 1 511 | DESOPMOD | 1315 | 79 | 2 156 159 |
| DEC51 | 07,3572 | 1411 | | DELRSP1 | 32,2000 | = 30 | 1 634 | DESOPTS | 1161 | 77 | 5 96 700 |
| DEC57 | 4374 | = 424 | 1 418 | DELSTOR | 34,2453 | 536 | 1 535 | DESOPTT | 1160 | 77 | 7 96 700 |
| DEC585 | 33,3110 | 435 | 1 419 | DELT | E6,1644 | = 94 | 3 94 1249 | DEXDEX | 0142 | = 69 | 7 1333 1339 |
| DECCOM | 40,2566 | 331 | 1 330 | DELTACSM | E3,1572 | 84 | 3 574 621 | DEXI | 0143 | = 69 | 1 1338 |
| DECCON1 | 40,2757 | 344 | 1 343 | DELTAL | E4,1727 | = 88 | 4 88 890 | DEX1 | 0143 | = 69 | 5 69 1338 |
| DECCON2 | 40,2761 | 344 | 1 344 | DELTALEM | E3,1644 | 84 | 1 574 | DEX2 | 0144 | = 69 | |
| DEGINSP | 40,2714 | 343 | 1 343 | DELTAQ | E7,1523 | = 119 | 5 119 1224 | DFAILY | 17,2737 | 1012 | 1 1012 |
| DEGINSP2 | 40,2725 | 343 | 1 345 | DELTAQ | E5,1610 | = 91 | 5 91 519 | DPRNT | 40,3287 | 357 | |
| DEGOUTSP | 40,2516 | 330 | 2 329 330 | DELTAQ | E7,1725 | = 125 | 2 125 126 | DPT | E6,1547 | = 106 | 7 106 1028 |
| DEGRE81 | 14,3052 | 717 | 1 716 | DELTAQ | 27,3605 | 1472 | 1 1472 | DPTMAX | 17,3334 | 1024 | 4 1021 1024 |
| DEGRE810 | 34,3547 | 587 | 1 583 | DELTAQ | 21,2141 | 974 | 1 992 | DPTMOON | 36,2022 | 542 | 1 546 |
| DEGTAB | 40,2576 | 331 | 2 330 331 | DELTAQ | 21,2142 | 974 | 3 974 993 | DPT1 | E6,1550 | = 106 | 4 106 1022 |
| DEG359 | 14,3053 | 717 | 1 716 | DELTAQ | 17,2661 | 1011 | 1 1010 | DPT2 | E6,1551 | = 106 | 4 106 1023 |
| DEL | E7,1425 | = 119 | 12 387 407 | DELTAQ | 1256 | = 78 | 19 78 1229 | DHOOK | E7,1655 | = 116 | 5 116 819 |
| DELATT20 | 17,2662 | 1011 | 1 1010 | DELTAQ | E7,1743 | = 124 | 8 124 547 | DHOOKYQ7 | 25,2776 | 816 | 2 811 816 |
| DELAYX | 5172 | 1194 | 1 1193 | DELTAQ | E7,1447 | = 120 | 5 120 464 | DIFCHK | 10,2220 | 228 | 3 228 |
| DELAYJOB | 00,3732 | 1456 | 13 194 1037 | DELTEMPX | E6,1515 | = 106 | 5 106 977 | DIFREQ+0 | 11,3371 | 1316 | 1 1312 |
| DELAYLOC | 1141 | 76 | 7 187 1456 | DELTEMPY | E6,1517 | = 106 | 3 106 976 | DIFREQ+1 | 11,3375 | 1316 | 1 1312 |

HEALTH KEY: NORMALLY DEFINED UNLESS PLACED AS FOLLOWS:

UN UNDEFINED = DEFINED BY EQUALS J DEFINED BY JOKER OR ERASE ANYWHERE MD MULTIPLY DEFINED
 BD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, J OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

| SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES |
|----------|---------|-------|--------------|-----------|---------|--------|--------------|----------|---------|--------|-------------|
| DIFBO-2 | 11,3408 | 1318 | 1 1312 | DNDUMPI | 05,3543 | 1071 | 2 254 1071 | DOSTRULL | 24,2635 | 652 | 1 208 |
| DIFBOCNT | E3,1500 | 83 | 25 83 1318 | DNDUMP1 | 05,3571 | 1071 | 1 1071 | DOSUBLST | 05,3521 | 1089 | 1 1088 |
| DIFBOCOM | 11,3551 | 1318 | 2 1318 | DNDUMP2 | 05,3573 | 1071 | 1 1071 | DOSWITCH | 11,3300 | 1313 | 2 1312 1313 |
| DIFBOTAB | 11,3152 | 1312 | 1 1311 | DNECADR | 0336 | = 1089 | 15 1088 1089 | DOT | 7300 | 1113 | 1 1088 |
| DIFBOO | 11,3245 | 1313 | 1 1317 | DNECLMP | 43,2706 | 254 | 2 230 254 | DOTERM | 40,3500 | 371 | 1 370 |
| DIFP | E7,1607 | = 116 | 7 116 | DNLADM1 | 04,2476 | = 202 | 1 197 | DOTICK | 23,2542 | 509 | 1 509 |
| DIFPOLD | E7,1611 | = 116 | 5 116 | DNLADP00 | 4714 | = 203 | 1 196 | DOTINC | 0136 | 88 | 7 88 1114 |
| DINQBIT | 4712 | = 51 | | DNLSTADR | 0332 | = 71 | | DOTIXBR | 01,2451 | 1163 | |
| DINQFLAG | 0073 | = 51 | 20 204 1318 | DNLSTOOD | 0332 | 71 | 8 71 1474 | DOTPER | 23,2740 | 514 | 1 514 |
| DIRADRES | 6055 | 1079 | 2 1093 | DNPBASE1 | 05,3351 | 1086 | 2 188 1071 | DOTRET | 0137 | 88 | 8 88 1153 |
| DISCET | 31,3222 | 889 | 1 889 | DNPBASE2 | 05,3357 | 1086 | 1 1088 | DOTSUB | 7125 | 1108 | 3 1114 |
| DISLID | 31,3358 | 891 | 1 891 | DNO | 0337 | 71 | 1 1069 | DOTVCON | 24,2607 | 652 | 1 208 |
| DISPOK | 0000 | = 80 | 2 473 474 | DNRNGERR | E7,1715 | = 117 | 4 117 825 | DOTVCRCS | 24,2722 | 654 | 1 209 |
| DISPLACE | 41,3061 | 340 | 2 340 | DNTABLE | 05,2342 | 176 | 1 1067 | DOELK | 40,2476 | 317 | 2 316 317 |
| DISPLAYS | 35,3073 | 475 | 2 455 456 | DNTBLUFF | 0340 | 71 | 28 128 1071 | DOVLOAD | 6432 | 1093 | 1 1090 |
| DISPMA | 35,3544 | 628 | 1 629 | DNTMEXIT | 05,3535 | 1089 | 6 1067 1072 | DOVLOAD* | 6435 | 1093 | 1 1090 |
| DISPMSX | 35,3163 | 496 | 1 496 | DNTMPAST | 06,2853 | 152 | 1 155 | DOVNT1 | 30,2132 | 556 | 1 556 |
| DISPTARG | 27,2613 | 770 | 2 782 | DNTMOOTO | 0335 | 71 | 7 188 1071 | DOW.. | 11,3610 | 1320 | 2 1313 1318 |
| DISP45 | 35,3547 | 628 | 1 628 | DNTM1 | 0034 | = 39 | 1 1069 | DOW..1 | 11,3636 | 1320 | 2 1320 |
| DISTEM | 0122 | = 87 | 3 328 | DNTM2 | 0035 | = 39 | 1 1069 | DOWNCNTL | 25,3252 | 821 | 1 818 |
| DISTLS | 31,3272 | 890 | 1 890 | DOALARM | 5112 | = 1463 | | DOWNENT2 | 7735 | 1453 | 3 1442 1448 |
| DISTTL | 31,3376 | 891 | 2 891 | DOBRATE | 15,2521 | 1035 | 1 1035 | DOWNFLAG | 5447 | 1454 | 60 195 1445 |
| DIVIDE | 31,2756 | 621 | 7 618 619 | DOBRATE* | 15,2508 | 1035 | | DOWNTELM | 05,2000 | = 28 | 2 166 1086 |
| DLAYJOB | 00,2000 | = 25 | 1 1456 | DOCM1 | 36,3753 | 1230 | 1 1229 | DP(-22) | 27,3352 | 1356 | 1 1351 |
| DLBND | E7,1641 | = 116 | 4 116 817 | DOCSM | 36,3758 | 1230 | 1 1229 | DP-.002 | 36,2024 | 542 | 1 543 |
| DLBND0 | 26,3155 | 833 | 1 817 | DOELVZ | 37,3206 | 787 | 1 788 | DP-.01 | 35,3144 | 477 | 3 473 |
| DLOAD | 6021 | 1077 | 1 1088 | DODLOAD | 6427 | 1093 | 1 1090 | DPADD | 21,2040 | 970 | 1 979 |
| DLOAD* | 7702 | 1173 | 1 1081 | DODLOAD* | 6113 | 1081 | 2 1090 1093 | DPADD+ | 21,2060 | 970 | 1 970 |
| DLOADCOD | 7701 | 1173 | 1 1093 | DODNADR | 05,3380 | 1086 | | DPADD- | 21,2062 | 971 | 1 970 |
| DLY2 | 5147 | 1193 | 2 1193 1456 | DODNCHAN | 05,3428 | 1087 | | DPADD2+ | 21,2065 | 971 | 1 970 |
| DMSFBIT | 4702 | = 54 | | DODNCTR | 05,3445 | 1088 | 1 1067 | DPAGREE | 7224 | 1111 | 1 657 |
| DMSFLO | 0121 | = 54 | 12 572 1230 | DODQNTM | 05,3342 | 1088 | 2 127 128 | DPB-14 | 27,2326 | 389 | 2 387 389 |
| DMSDE | 7301 | 1113 | 1 1152 | DOPSTART | 05,2372 | 179 | 5 182 186 | DPB-9 | 17,2010 | 677 | 1 678 |
| DMP | 7052 | 1108 | 15 312 347 | DOPGAMDOT | 37,3575 | 840 | 1 840 | DPBIT14 | 01,3476 | 1204 | 1 1204 |
| DMPINCP2 | 30,3053 | 597 | | DOJET | 21,3732 | 1008 | 3 1004 1006 | DPHALF | 26,3327 | = 1175 | 12 394 534 |
| DMPINTE0 | 30,2375 | 591 | | DONEADR | 37,3255 | 788 | 1 787 | DPINCOM | 40,3034 | 345 | 1 345 |
| DMPNSUB | 7285 | 1112 | | DONCLN46 | 42,2004 | 247 | 1 247 | DPINORM | 40,3042 | 345 | 1 345 |
| DMPNTMP | 0135 | = 68 | 2 1112 | DONCLN47 | 42,2022 | 247 | 1 248 | DPINSP | 40,3017 | 345 | 4 343 345 |
| DMPR | 7543 | 1119 | 1 1086 | DONCLN48 | 42,2046 | 248 | 3 248 | DPINSP2 | 40,3044 | 345 | 1 343 |
| DMPSUB | 7056 | 1108 | 22 1108 1338 | DOPROC | 40,3502 | 371 | 2 370 381 | DPINSP4 | 40,3051 | 345 | 1 343 |
| DMPSUB2 | 7075 | 1108 | 1 1111 | DORSTART | 05,2552 | 182 | 1 182 | DPIPAY | E5,1532 | = 97 | 3 431 436 |
| DMP1 | 7541 | 1119 | 1 1086 | DOSPSOFF | 24,2714 | 653 | 1 210 | DPIPZ | E5,1536 | = 97 | 1 431 |
| DNADRDR | 05,3365 | 1067 | 1 1089 | DOSSHFT | 00,2322 | 1130 | 1 1130 | DPNDE | 22,3713 | 1482 | 3 494 881 |
| DNDUMP | 05,3556 | 1071 | 1 1071 | DOSTORE | 6331 | 1089 | 1 1078 | DPNDX | E6,1507 | = 106 | 25 106 1001 |
| | | | | | | | | DPOSIX | 4671 | 1170 | 3 353 1482 |

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

UN UNDEFINED = DEFINED BY EQUALS J DEFINED BY JOKER OR BRACE ANYWHERE MD MULTIPLY DEFINED
 BD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE



SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, J OF REFS, PAGE OF FIRST REP, PAGE OF LAST REP.

| SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES |
|-----------|---------|--------|-------------|----------|---------|--------|-------------|----------|---------|--------|--------------|
| DPQUT | 40,2627 | 332 | 3 331 | DSPCNT | 0776 | 73 | 7 131 188 | DSP2DEC | 40,3176 | 354 | 1 336 |
| DPPOS*MAX | 26,3337 | 1175 | 12 421 892 | DSPCOM1 | 41,2370 | 326 | 3 328 328 | DSQ | 00,3174 | 1150 | 1 1088 |
| DPTEST | 41,2261 | 322 | 4 322 342 | DSPCOM2 | 41,2404 | 326 | 2 326 | DSQSUB | 00,3300 | 1153 | 5 1150 1158 |
| DPTEST1 | 41,2300 | 323 | 4 323 | DSPCOM3 | 41,2412 | 326 | 1 326 | DSRBL | 0141 | = 68 | 4 356 357 |
| DPZRO | 04,3455 | = 1321 | 3 708 1313 | DSPCOUNT | 0777 | 73 | 66 132 1417 | DSRUPTEN | 0073 | = 66 | 5 131 |
| DP1/2 | 04,3453 | = 1209 | 5 1209 1221 | DSPDCND | 41,2563 | 329 | 4 329 335 | DSRUPTSW | 1302 | 78 | 11 126 187 |
| DP1/20 | 37,3363 | 790 | 1 789 | DSPDCGET | 41,2524 | 328 | 1 328 | DSTORE | 25,2162 | 802 | 1 805 |
| DP1/4 | 11,3700 | 1321 | 3 1273 1321 | DSPDCPUT | 41,2534 | 328 | 1 329 | DSU | 6754 | 1103 | 1 1086 |
| DP1/4TH | 26,3321 | 1175 | 4 31 1224 | DSPDCWD1 | 40,3136 | 353 | 4 354 | DSLH | 20,3233 | 938 | 2 927 932 |
| DP1/6 | 26,2104 | 733 | 1 732 | DSPDC2NR | 40,3171 | 354 | 3 334 355 | DSLMSC | 20,3407 | 940 | |
| DP1MIN | 23,3136 | 608 | 1 608 | DSPDCNR | 40,3165 | 354 | | DSLMTMP | E6,1713 | = 103 | 37 103 940 |
| DP1OUTSP | 40,2614 | 331 | 1 329 | DSPDCVN | 40,3211 | 355 | 4 332 370 | DT/TAU | 22,3141 | = 408 | 1 407 |
| DP2(-3) | 27,3354 | 1356 | 1 1353 | DSPDCWD | 40,3131 | 353 | 4 329 333 | DT/2 | E4,1713 | = 88 | 11 88 1318 |
| DP2(-4) | 27,3356 | 1356 | 4 763 1347 | DSPDELAY | 35,3154 | 496 | 1 496 | DT/2COMP | 13,3275 | 1292 | 1 1293 |
| DP2/3 | 11,3716 | 1321 | 3 1302 1321 | DSPDFDEC | 40,2675 | 336 | 1 320 | DT/2MAX | 13,3367 | 1293 | 2 1292 1293 |
| DP2OUTSP | 40,2621 | 331 | 2 329 | DSPFLG | 1067 | = 1451 | 3 1444 1445 | DT/2MIN | 13,3365 | 1293 | 1 1293 |
| DP3OUTSP | 40,2623 | 331 | 1 329 | DSPFMEN | 41,3343 | 352 | 1 321 | DTEAROT | E7,1605 | = 116 | 8 116 803 |
| DP9/10 | 04,3513 | 1259 | 4 1250 1257 | DSPIN | 40,3225 | 356 | 5 311 357 | DTHEPAM | E6,1611 | = 107 | 11 107 1340 |
| DQUARTER | 11,3700 | = 1321 | 2 1307 | DSPIN1 | 40,3252 | 357 | 2 356 357 | DT21PR | E7,1647 | = 125 | 5 125 864 |
| DRCN | E7,1665 | = 125 | 6 125 865 | DSPLAY | 06,2047 | 131 | 1 131 | DUMMYAD | 04,2132 | 195 | 1 200 |
| DRPTBIT | 4674 | = 47 | | DSPLIST | 1043 | 74 | 6 188 377 | DUMMYJOB | 01,3223 | 1190 | 2 181 1189 |
| DRPTSUR2 | 06,3461 | 297 | 1 301 | DSPLOCK | 1012 | 74 | 12 188 1449 | DUMPCNIC | 27,3016 | 1345 | |
| DRNO | E6,1552 | = 106 | 6 106 977 | DSPLV | 41,3403 | 355 | | DUMPCNT | 0333 | 71 | 1 1071 |
| DRNOLOOP | 21,2202 | 975 | 1 976 | DSPLY58 | 04,3310 | 520 | 1 520 | DUMPPISH | 26,3043 | 766 | |
| DRNO1 | E6,1554 | = 106 | 1 107 | DSPLY61 | 04,3313 | 520 | 1 520 | DUMPLC | 0336 | = 71 | 5 1071 |
| DRNO2 | E6,1556 | = 107 | 1 107 | DSPMM | 04,2537 | 369 | 1 380 | DUMPP61 | 26,2261 | 744 | |
| DRIFTFLG | 0036 | = 47 | 3 717 783 | DSPMAJB | 40,3435 | 370 | 2 369 1372 | DUMPPRA | 27,3054 | 1347 | |
| DRIFT1 | E6,1514 | = 97 | 1 418 | DSPMAJCR | 40,3435 | = 1372 | 1 1372 | DUMPPFP1 | 27,3137 | 1351 | |
| DRIFT2 | E6,1512 | = 97 | 1 420 | DSPMTEN | 0140 | = 66 | 2 370 | DUMPPFP2 | 27,3234 | 1352 | |
| DRIFTSUB | 06,3441 | 297 | 3 294 295 | DSPMSK | 4716 | = 356 | 1 355 | DUMPTRIG | 27,2611 | 770 | |
| DRIFTT | E6,1452 | = 97 | 2 416 419 | DSPNCTIN | 40,3315 | 357 | 1 355 | DUMPCAM | 26,3072 | 768 | |
| DSALMOUT | 0011 | = 39 | 36 145 1475 | DSPNCTWD | 41,3353 | 355 | 3 320 352 | DURATION | 16,3322 | 952 | |
| DSEKIT | 0114 | = 67 | 3 356 357 | DSPOFF | 05,3074 | 187 | 1 187 | DV | E7,1705 | = 125 | 9 125 882 |
| DSEYBIT | 4674 | = 53 | | DSPQUT | 06,2063 | 131 | 2 130 | DV/SC | 7605 | 1120 | 2 1120 |
| DSEYFLAG | 0113 | = 53 | | DSPQUTSR | 06,2024 | 131 | 2 131 133 | DVCALC | 32,3701 | 881 | 3 876 879 |
| DSLX | 40,3301 | 357 | 2 357 | DSPRND | 40,3120 | 353 | 1 353 | DVCNTR | E7,1431 | = 115 | 18 32 782 |
| DSMAG | 0142 | = 66 | 2 357 | DSPSCAN | 06,2032 | 131 | 2 131 | DVECTR | 0010 | = 1221 | 1 1217 |
| DSMSK | 40,3303 | 357 | 2 357 | DSPSFNCR | 41,2557 | 329 | 1 329 | DVL | E7,1661 | = 117 | 8 117 819 |
| DSPA | 41,2364 | 326 | 1 320 | DSPSIGN | 40,3103 | 353 | 4 353 354 | DVLOS | E6,1610 | = 91 | 10 91 469 |
| DSPAB | 41,2357 | 326 | 1 320 | DSPSTAR | 1023 | 74 | 51 130 1462 | DVNORM | 00,2505 | 1135 | 3 1134 |
| DSPABC | 41,2352 | 326 | 1 320 | DSPTEK | 1051 | = 74 | 5 74 495 | DVNORMCT | 0137 | = 68 | 6 1132 1143 |
| DSPABORT | 4243 | 367 | 3 367 | DSPTEM1 | 1045 | 74 | 40 74 890 | DVOK | 16,3515 | 955 | 1 955 |
| DSPALARM | 40,3323 | 358 | 5 320 343 | DSPTEM2 | 1050 | 74 | 12 74 424 | DVOVP | 00,2405 | 1132 | 11 1134 1145 |
| DSPB | 41,2372 | 326 | 1 320 | DSPWRRT | 0144 | = 66 | 3 353 | DVSIGN | 0136 | = 68 | 10 1132 1149 |
| DSPC | 41,2377 | 326 | 1 320 | DSP2BIT | 41,3406 | 356 | 1 359 | DVTHRESH | 1353 | 81 | 1 676 |

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

| | | | | | | |
|------------------|----|-------------------------------------|----|------------------------------------|----|------------------|
| UN UNDEFINED | = | DEFINED BY EQUALS | J | DEFINED BY JOKER OR ERASE ANYWHERE | ND | MULTIPLY DEFINED |
| RD BADLY DEFINED | CD | DEFINITION ASSOCIATED WITH CONFLICT | XX | MISCELLANEOUS TROUBLE | | |

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, J OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

| SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES | | |
|----------|---------|---|------------|-----------------|-----------|---------|------------|-------------|-------------|----------|------------|------|------|
| DVTRUSH | 4717 | = | 784 | E/CALL | 04,2578 | | 414 | EOFLBIT | 4703 | = | 56 | | |
| DVTOTAL | E7,1425 | = | 115 | 782 E/JOBWAK | 04,2612 | | 415 | EORESS | E4,1717 | = | 88 | | |
| DVTOTUP | 37,3036 | | 782 | 1 782 E/PROG | 04,2000 | = | 25 | 2 413 415 | 0141 | = | 56 | | |
| DVXSC | 7377 | | 1116 | 2 1115 E/SWITCH | 04,2574 | | 413 | EIGHT | 4707 | = | 1174 | | |
| DVATTMP | E7,1457 | = | 122 | 2 647 648 | EARROT1 | 23,2215 | 289 | 1 800 | EISOI | 42,3612 | | 887 | |
| DWRPTBB | 4060 | | 128 | 1 127 | EARROT2 | 23,2225 | 289 | 3 289 803 | EJSCAN | 01,3141 | | 1188 | |
| DXCHT12 | 17,3824 | | 1031 | 1 1030 | EARSFH | 11,3260 | 1313 | 1 1312 | EJ1 | 01,3206 | | 1189 | |
| DXCHT23 | 17,3830 | | 1031 | 1 1030 | EARTCNTR | 14,2234 | 704 | | EJ2 | 01,3216 | | 1189 | |
| DXCOMP | 12,2130 | | 1249 | 3 1251 | EARTHCON | 23,2630 | 510 | 1 510 | EKPRIME | E6,1413 | | 99 | |
| DXITFIX | 05,3341 | | 915 | 1 913 | EARTHIL | 26,3622 | 1220 | 2 1213 1215 | EKTLX/I | E6,1418 | | 99 | |
| DXTEST | 05,3234 | | 913 | | EARTHJU | 16,2376 | 681 | 1 680 | ELAPTIME | 31,3414 | | 892 | |
| DYNDISP | 24,3237 | | 860 | 1 859 | EARTHMX | 26,3570 | 1219 | 2 1213 1215 | ELCALC | 35,2232 | | 461 | |
| DZCALL | 15,3678 | | 1059 | 2 1053 1054 | EARTHMOX | 0051 | = | 1221 | 4 1216 1219 | ELEPS | 35,3141 | | 477 |
| DZCALL1 | 15,3714 | | 1059 | 1 1052 | EARTHPAD | 23,2463 | 508 | 1 508 | ELEV | E7,1743 | = | 124 | |
| DZCOM | 15,3050 | | 1046 | 1 1046 | EARTHPR | 33,2370 | 423 | 2 423 528 | ELEVEN | 4717 | | 1170 | |
| DZVOCOM | 15,3051 | | 1046 | 1 1046 | EARTHPR* | 33,2417 | 423 | 5 418 438 | ELEX | 35,2507 | | 464 | |
| DZ1 | 15,3403 | | 1054 | 1 1053 | ERANK | 0003 | = | 37 | 69 182 1481 | ELOOPFIN | 43,3435 | | 1367 |
| DZ2 | 15,3410 | | 1054 | 1 1054 | ERANKSAV | 1087 | | 75 | 3 1435 1451 | ELRCODE | 07,3718 | | 1419 |
| D0 | E7,1707 | = | 117 | 4 117 821 | ERANKTEM | 1071 | | 75 | 6 180 1451 | ELRCODE1 | 40,2057 | | 311 |
| D0B0 | 25,2310 | | 897 | 1 897 | ERANK3 | 4744 | = | 1174 | 3 184 841 | ELRSKIP | 05,2585 | | 183 |
| D1 | 20,3432 | | 941 | 3 938 | ERANK4 | 4700 | = | 1174 | 1 639 | EMATRIX | E5,1570 | = | 91 |
| D1/1024 | 04,3507 | | 1259 | 1 1288 | ERANK5 | 4751 | | 1172 | 3 236 561 | ENDOT | 0110 | = | 67 |
| D1/128 | 04,3475 | | 1259 | 3 1252 1263 | ERANK6 | 4752 | = | 1174 | 11 184 798 | ENSALT | E4,1417 | | 86 |
| D1/16 | 04,3503 | | 1259 | 2 1265 1272 | ERANK7 | 4753 | | 1172 | 6 252 798 | ENS | 0055 | = | 38 |
| D1/256 | 04,3511 | | 1259 | 3 1252 1259 | ERACC | 4752 | = | 798 | 4 840 1039 | ENARL1 | 16,3205 | | 918 |
| D1/32 | 04,3505 | | 1259 | 6 549 1272 | ERDVCONTR | 34,2000 | | 32 | 1 527 | ENARL2 | 16,3216 | | 918 |
| D1/4 | 04,3501 | | 1259 | 5 32 1272 | ERDVCONTR | 24,2000 | | 32 | | ENARL6 | 17,3757 | | 1033 |
| D1/64 | 04,3477 | | 1259 | 5 1247 1273 | ERENTRY | 4753 | = | 798 | 4 758 829 | ENATMA | 43,2502 | | 244 |
| D1/8 | 04,3473 | | 1259 | 1 1273 | ERMARKOO | 07,2000 | | 32 | | END-DELV | E7,1425 | | 115 |
| D2 | 20,3434 | | 942 | 3 938 939 | ERMRKUP | 07,2001 | | 32 | | END-E3 | E3,1767 | = | 85 |
| D2J2 | 20,3255 | | 938 | | ERF40TMP | 24,2001 | | 32 | | END-E4 | E4,1777 | = | 90 |
| D21 | E6,1670 | = | 112 | | EROPLACE | 34,2001 | | 32 | 1 527 | END-E5 | E5,1777 | = | 98 |
| D3 | 20,3436 | | 942 | 3 939 | ERRN1 | 37,2000 | | 33 | | END-E6 | E6,1776 | = | 114 |
| D3J3 | 20,3277 | | 939 | | ERUP2 | 0364 | | 71 | 10 413 414 | END-E7 | E7,1777 | = | 126 |
| D4 | 20,3440 | | 942 | 3 939 | ECC | E5,1753 | = | 94 | 2 94 1273 | END-IN/M | E7,1631 | = | 121 |
| D4J4 | 20,3321 | | 939 | | ECLIPOL | 15,2167 | | 705 | 1 705 | END-KALC | E7,1447 | = | 119 |
| D5 | 20,3442 | | 942 | 3 940 | ECONFRAC | E6,1422 | | 99 | 1 907 | END-P30S | E7,1664 | = | 122 |
| D5J5 | 20,3343 | | 939 | | ECSSEER | E7,1424 | = | 115 | 5 171 844 | END-SVCR | E7,1451 | = | 115 |
| D6 | 20,3444 | | 942 | 3 940 | EDOP | 0023 | = | 37 | 13 351 1368 | END-UE | 1377 | = | 81 |
| D6J6 | 20,3365 | | 940 | | EDOT | E6,1515 | = | 106 | 16 106 1005 | END-W | E5,1642 | = | 91 |
| D6ORBIT | 4711 | = | 51 | | EDOTVEL | E6,1520 | = | 106 | 7 106 1003 | ENDALL | 40,2164 | | 312 |
| D6ORFLG | 0072 | = | 51 | 6 576 1318 | EDRIVEY | E6,1503 | | 100 | 4 113 983 | ENDALM | 4167 | | 358 |
| ===== | | | | | EDRIVEZ | E6,1504 | | 101 | 2 113 982 | ENDRLFP | 4317 | = | 368 |
| E(-AT) | 20,3422 | | 941 | 4 927 933 | EE | 13,2457 | | 1209 | 1 1209 | ENDRUP1 | 40,3435 | = | 369 |
| E/RKCALL | 04,2557 | | 413 | | | | | | | ENDRUP | 0324 | = | 70 |

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

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 BD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEP, J OF REFS, PAGE OF FIRST REP, PAGE OF LAST REP.

| SYMBOL | DEP | H | REFERENCES | SYMBOL | DEP | H | REFERENCES | SYMBOL | DEP | H | REFERENCES |
|----------|---------|--------|--------------|-----------|---------|--------|-------------|-----------|---------|-------|-------------|
| ENDQNG | 33,2355 | 422 | | ENDPRCHG | 01,3006 | 1184 | 2 1183 1189 | END45 | 35,3560 | 626 | 1 626 |
| ENDDAMP | 21,3405 | 999 | 1 999 | ENDP505 | 15,2143 | 696 | 2 712 724 | ENDMA | 05,2641 | 184 | 3 185 1463 |
| ENDDOH | 22,2530 | = 400 | | ENDP76 | 13,2155 | 504 | 2 502 | ENGINEOFF | 24,2706 | 653 | 3 207 657 |
| ENDDOT | 7154 | 1106 | 1 1153 | ENDRDL0 | 40,2674 | 332 | 1 336 | ENGONBIT | 4704 | = 54 | |
| ENDDPSC | 40,2713 | 336 | 1 343 | ENDRELD5 | 40,3406 | = 362 | 1 366 | ENGONFL0 | 0123 | = 54 | |
| ENDDPUSH | 6517 | 1095 | 1 1095 | ENDREP11 | 34,2267 | 530 | 1 530 | ENGROOST | 24,3270 | 661 | 1 661 |
| ENDDCVN | 40,3225 | = 355 | 1 356 | ENDRET | 10,3463 | 1448 | 5 1443 1450 | ENG2BIT | 4700 | = 46 | |
| ENDEN | 36,2443 | 547 | 2 546 547 | ENDROLL | 22,3234 | 411 | | ENG2FLAG | 0023 | = 46 | 3 640 671 |
| ENDEXIT | 25,3570 | 627 | 2 748 817 | ENDRODAT | 41,2315 | 323 | | ENTANSWR | 07,2367 | 226 | 1 226 |
| ENDEXT | 5423 | = 1451 | 39 231 1475 | ENDROWT | 41,3505 | 360 | 1 364 | ENTCADR | 26,2427 | 749 | 1 749 |
| ENDEXTV8 | 5423 | = 232 | 7 235 237 | ENDRSTRT | 05,2472 | 181 | 2 185 | ENTER | 41,2002 | 318 | 2 311 358 |
| ENDFIG | 42,3561 | 690 | 1 690 | ENDRTOUT | 41,2612 | = 329 | 1 337 | ENTERJMP | 40,2060 | 311 | 1 311 |
| ENDFINO | 5115 | 1180 | 4 1182 1186 | ENDRTUTIN | 41,3220 | = 343 | 1 349 | ENTEXIT | 0136 | = 318 | 10 319 359 |
| ENDTSAL | 33,3262 | 137 | | ENDRS7 | 37,2424 | 561 | 2 560 | ENTMASK | 25,2113 | 600 | 1 798 |
| ENDHMS | 42,3521 | = 348 | | ENDSAM | 14,2303 | 705 | 1 704 | ENTMID1 | 13,3616 | 1298 | 1 1298 |
| ENDIDLE | 4223 | 367 | 1 1447 | ENDSCALE | 40,2747 | 344 | 5 343 345 | ENTMID2 | 13,3612 | 1298 | 1 1298 |
| ENDIGN | 24,2645 | 652 | | ENDSELECT | 17,3764 | = 1033 | | ENTPASH1 | 41,2012 | 318 | |
| ENDIMU | 07,3433 | 1406 | 3 1390 1395 | ENDSPBIT | 4676 | = 55 | | ENTPASH0 | 41,2035 | 319 | 3 316 366 |
| ENDINST | 4233 | 367 | 6 314 1446 | ENDSPF | 41,3352 | 352 | 1 355 | ENTRET | 0136 | = 66 | 6 314 365 |
| ENDINT | 13,2607 | 1284 | 1 204 | ENDSPMIN | 42,3364 | 336 | 1 346 | ENTRYDSP | 0134 | = 55 | 4 747 754 |
| ENDIT | 10,3501 | 1448 | 1 1445 | ENDSPM | 04,2547 | 370 | 1 376 | ENTRYSW | 25,2114 | 800 | 1 798 |
| ENDJETS | 17,3614 | 1030 | | ENDSPOCT | 40,3320 | 358 | | ENTRYUPD | 0001 | = 203 | 1 203 |
| ENDJOB1 | 01,3124 | 1188 | 1 1180 | ENDSTATE | 11,3502 | 1317 | 1 1316 | ENTRYVN | 1263 | = 78 | 7 78 826 |
| ENDLANB | 16,2302 | 680 | | ENDSUMS | 43,3000 | 257 | 1 1370 | ENTSET | 41,3560 | 365 | 2 365 |
| ENDMANU | 22,3237 | 411 | 1 404 | ENDS40.6 | 20,2142 | 687 | | ENTTIM2 | 04,3075 | 495 | 1 495 |
| ENDMANU7 | 27,2051 | 384 | | ENDS40.9 | 16,2357 | 680 | 1 681 | EP | 26,1742 | = 104 | 6 963 966 |
| ENDMANU1 | 27,2052 | 384 | 2 383 385 | ENDTKX) | 27,3343 | 1355 | 1 1355 | EPC1RTE | 34,3751 | 885 | 1 859 |
| ENDMARK | 5423 | 1433 | 4 227 1451 | ENDTASK | 5173 | 1195 | 4 186 1201 | EPC1ORTE | 34,3773 | 885 | 1 879 |
| ENDMARKS | 07,2412 | 227 | 1 227 | ENDTEST1 | 33,2267 | 420 | 2 424 435 | EPC2RTE | 34,3753 | 885 | 1 846 |
| ENDMASSP | 05,3277 | 914 | | ENDTFF | 27,3231 | 1352 | 3 1352 1354 | EPC3RTE | 34,3755 | 885 | 1 847 |
| ENDMAXDV | 00,2624 | 1138 | 2 1138 1140 | ENDTIN | 06,2270 | 138 | 1 138 | EPC4RTE | 34,3757 | 885 | 1 861 |
| ENDMODE | 07,3506 | 1407 | 1 1407 | ENDTINON2 | 06,2310 | 139 | 1 138 | EPC5RTE | 34,3761 | 885 | |
| ENDMONDO | 41,3336 | 351 | 1 351 | ENDTPUSH | 6521 | 1095 | 2 1095 1152 | EPC6RTE | 34,3763 | 885 | 1 863 |
| ENDMRC | 17,2051 | 900 | | ENDTSLC | 00,2212 | 1127 | 1 1127 | EPC7RTE | 34,3765 | 885 | 1 864 |
| ENDNTST | 40,2150 | 312 | 2 312 | ENDTVCIN | 17,2204 | 902 | | EPC8RTE | 34,3767 | 885 | 1 865 |
| ENDNUM | 40,2160 | 312 | 1 312 | ENDVLOAD | 6460 | 1094 | 2 1096 | EPC9RTE | 34,3771 | 885 | 2 878 880 |
| ENDNVBSY | 04,2556 | 376 | | ENDVPUSH | 6507 | 1095 | | EPHEN | 26,2000 | = 29 | 1 740 |
| ENDNVSB1 | 41,3602 | 366 | 1 379 | ENDVXV | 6747 | 1101 | 4 1101 1118 | EPRESM1 | 04,2475 | = 202 | 1 202 |
| ENDOFJOB | 5112 | 1180 | 122 195 1471 | ENDV97B | 24,3511 | 665 | | EPSFQUR | 35,3146 | 477 | 2 467 545 |
| ENDOUT | 10,3440 | 1447 | 2 1449 | ENDV97P | 24,3431 | 664 | | EPSILONL | 67,1776 | = 124 | 2 1267 1269 |
| ENDPASTE | 4157 | 351 | | ENDV97T | 24,3402 | 663 | | EPSILONL | 1347 | 80 | 2 1249 |
| ENDPINF | 4526 | = 377 | | ENDV99P | 24,3347 | 662 | | EP4(10)H | 30,3661 | 668 | 1 668 |
| ENDPINS1 | 40,3574 | = 382 | 1 623 | ENDV99PI | 24,3341 | 662 | | EP4(10)L | 16,2402 | 681 | 1 679 |
| ENDPINS2 | 41,3715 | = 380 | | ENDZOPT | 06,3172 | 159 | 1 159 | EP4(45)H | 30,3657 | 668 | 1 668 |
| ENDPLAC | 14,2147 | 701 | 2 576 | END2DEC | 40,3210 | 354 | | EP4(45)L | 16,2400 | 681 | 1 679 |

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

| | | | |
|------------------|--|--------------------------------------|---------------------|
| UN UNDEFINED | = DEFINED BY EQUALS | J DEFINED BY JOKER OR BRASH ANYWHERE | MD MULTIPLY DEFINED |
| MD BADLY DEFINED | CD DEFINITION ASSOCIATED WITH CONFLICT | XX MISCELLANEOUS TROUBLE | |

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEP, J OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

| SYMBOL | DEP | H | REFERENCES | SYMBOL | DEP | H | REFERENCES | SYMBOL | DEP | H | REFERENCES |
|----------|---------|--------|-------------|----------|---------|--------|-------------|----------|---------|--------|-------------|
| ERAD | 13,2461 | 1209 | 1 1212 | ESTICADR | 33,2121 | 417 | 2 417 | FALTOP | 4404 | 373 | |
| ERADFBIT | 4676 | = 46 | | ESTIMS | 33,2453 | 427 | 3 417 439 | FALTON | 4400 | 313 | 9 191 1415 |
| ERADFLAG | 0021 | = 46 | 15 451 1212 | ESTROKER | E8,1412 | 99 | 6 202 945 | FAZA | 36,3510 | 1226 | 1 1228 |
| ERADM | E4,1640 | = 87 | 10 87 1212 | ETDECAY | E6,1415 | 99 | 1 676 | FAZAB | 36,3665 | 1229 | 1 1230 |
| ERASCHK | 43,3335 | 1366 | 1 1365 | ETERROR | 31,3523 | 893 | 2 893 | FAZAB1 | 36,3713 | 1229 | 1 1228 |
| ERASCON1 | 43,3230 | 1364 | 1 1366 | ETPIFLAG | 0046 | = 48 | 7 48 464 | FAZAB2 | 36,3717 | 1229 | 1 1229 |
| ERASCON2 | 43,3231 | 1364 | 1 1366 | ETRYDAP | 15,2000 | = 27 | 3 1034 1041 | FAZAB3 | 36,3726 | 1229 | 1 1229 |
| ERASCON3 | 43,3232 | 1364 | 1 1366 | ETSWITCH | E6,1421 | 99 | 1 901 | FAZAB4 | 36,3736 | 1229 | 1 1230 |
| ERASCON4 | 43,3233 | 1364 | 1 1366 | ETVCDT/2 | E6,1420 | 99 | 2 900 906 | FAZAB5 | 36,3745 | 1230 | 2 1230 1297 |
| ERASCON5 | 43,3241 | 1364 | 1 1367 | EXDAP | 15,3054 | 1047 | 1 1045 | FAZA1 | 36,3514 | 1227 | |
| ERASCON6 | 4744 | = 1364 | 3 1366 1367 | EXDAPIN | 15,3005 | 1045 | 1 1048 | FAZB | 36,3607 | 1228 | 1 1227 |
| ERASSR | 10,3617 | 1450 | 1 1444 | EXDAPOPP | 43,2721 | 255 | 1 241 | FAZB1 | 36,3612 | 1228 | |
| ERASID | 4747 | = 32 | 1 1071 | EXDAP1 | 15,3121 | 1048 | 3 1048 1049 | FAZB2 | 36,3640 | 1228 | 1 1228 |
| ERASLOOP | 43,3365 | 1366 | 4 1366 1367 | EXDAP2 | 15,3146 | 1048 | 1 1047 | FAZB3 | 36,3645 | 1228 | 1 1228 |
| ERASTAL1 | 13,3452 | 1295 | 1 1295 | EXDAP3 | 15,3113 | 1048 | 2 1048 | FAZC | 36,3653 | 1228 | 2 1228 |
| ERASTAL2 | 13,3455 | 1295 | 1 1295 | EXDAP4 | 15,3104 | 1048 | 2 1047 | FRANK | 0004 | = 37 | 30 367 1456 |
| ERASWAK1 | 13,3460 | 1295 | | EXDSPRET | 10,2746 | 1439 | 3 235 237 | FRANKMSK | 4364 | = 1085 | 2 1186 |
| ERASWAK2 | 13,3462 | 1295 | | EXECPANK | 5120 | 1180 | 8 1178 1180 | FBIASSUR | 06,3617 | 301 | 3 299 |
| ERASZRO | 0007 | = 166 | 1 166 | EXECCOPY | 16,2741 | 905 | 2 905 | FBR3 | 11,2410 | 1304 | 1 1318 |
| ERCNT | 0117 | = 61 | 7 379 | EXECPHS | 16,3170 | 918 | | FCADDY | 20,3475 | 946 | 1 945 |
| ERCOM | 40,3555 | 382 | 1 381 | EXECTEM1 | 0061 | = 66 | 4 1178 1186 | FCADRM1 | 04,2403 | = 200 | 1 198 |
| ERCOMP | E8,1647 | = 98 | 4 439 | EXECTEM2 | 0062 | = 66 | 4 1181 1186 | FCARD | 20,3477 | 946 | 3 94s 941 |
| ERCOMPPL | 33,3423 | 440 | 1 439 | EXIT | 6712 | 1100 | 1 1078 | FCARD1 | 20,3500 | 946 | |
| ERCOMP1 | E8,1647 | = 98 | 12 419 444 | EXITM | 0114 | = 67 | 7 340 341 | FCARD2 | 20,3501 | 946 | |
| ERCON | 40,3570 | 382 | 1 381 | EXRSTR | 16,3271 | 919 | 1 918 | FCARD3 | 20,3502 | 946 | |
| ERCOUNT | 1365 | = 80 | 3 80 1364 | EXTENTST | 16,3630 | 957 | | FCARD4 | 20,3503 | 946 | |
| ERECTIME | E8,1646 | = 98 | 1 427 | EXTVACT | 1044 | 74 | 22 180 1459 | FCARD5 | 20,3504 | 946 | |
| ERECTIM1 | E8,1646 | = 98 | 3 437 439 | EXTVRS | 42,2000 | = 31 | 2 247 689 | FCARD6 | 20,3505 | 946 | |
| EREPFRAC | E6,1423 | 99 | 2 676 901 | EXTVRS | 43,2000 | = 31 | 4 230 1467 | FCSTART | 30,2000 | = 29 | |
| ERESTORE | 1360 | = 80 | 11 80 1367 | EY | E6,1742 | = 104 | 7 987 989 | FDAIDSP1 | 21,2401 | 980 | |
| ERMINUS | 40,3547 | 381 | | E134567B | 43,3346 | 1366 | 1 1367 | FDAIDSP2 | 21,3144 | 993 | 1 980 |
| ERPLUS | 40,3552 | 382 | 1 381 | E2 | E7,1645 | = 121 | 4 542 543 | FDAITOTL | 21,3161 | 993 | 1 993 |
| ERBSTMP | E6,1742 | = 104 | 20 104 936 | E3RTE | 35,3771 | 886 | 1 846 | FDOT | 26,3641 | 1221 | 1 1216 |
| ERBLIN | 4676 | = 941 | 2 936 | E6SETTER | 24,3307 | 661 | 3 653 664 | FENG | 24,2334 | 645 | 1 640 |
| ERROR | 40,3504 | 381 | 1 310 | E7SETTER | 24,3304 | 661 | 3 641 657 | FETCH2WD | 05,3507 | 1069 | 2 1066 1087 |
| ERRORLIM | 20,3126 | 936 | 2 925 930 | ===== | | | | FPTAG1 | 4000 | = 2 | 5 21s 1454 |
| ERRORS | 43,3255 | 1364 | 1 1364 | F | E7,1726 | = 122 | 5 122 683 | FPTAG10 | 4000 | = 25 | 2 190 193 |
| ERRORSK | E8,1567 | = 101 | 13 107 1001 | FACEREG | 0154 | = 1452 | 8 1442 1443 | FPTAG12 | 4000 | = 25 | 1 129 |
| ERRORY | E6,1570 | = 107 | 8 107 999 | FACTOR | E7,1613 | = 116 | 5 116 820 | FPTAG2 | 4000 | = 25 | 3 622 1385 |
| ERRORZ | E6,1571 | = 107 | 8 107 999 | FACT1 | E7,1615 | = 116 | 5 116 819 | FPTAG3 | 4000 | = 2s | 1 1388 |
| ERTHR | 33,2401 | 423 | 1 423 | FACT2 | E7,1617 | = 116 | 4 116 818 | FPTAG4 | 4000 | = 25 | 2 1433 1458 |
| ERTHRVSE | 32,2000 | 423 | 2 427 435 | FAILDSP | 24,3261 | 661 | | FPTAG5 | 6000 | = 25 | |
| ERVECTOR | E8,1404 | 96 | 4 419 423 | FAILRBO | 0375 | 72 | 15 179 1462 | FPTAG6 | 6000 | = 25 | 1 1453 |
| ESCAPE | 0136 | = 68 | 4 1159 1160 | FAIL3 | 5563 | 1461 | 1 1461 | FPTAG7 | 4000 | = 25 | 2 1461 1462 |
| ESCAPE2 | 0137 | = 68 | 2 1159 1160 | FAKEPRET | 5121 | 1180 | 2 1178 1188 | FPTAG8 | 4000 | = 25 | 1 351 |

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

UN UNDEFINED = DEFINED BY EQUALS J DEFINED BY JOKER OR PHRASE ANYWHERE MD MULTIPLY DEFINED
 ED BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEP, J OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

| SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES |
|----------|---------|---|------------|----------|---------|-------|------------------|----------|---------|---|------------------|
| PFTAG | 4000 | = | 25 | FLAGRD9 | 0105 | = | 81 14 198 993 | GAMCOMP | 11,2582 | | 1308 3 1305 1306 |
| PLOTIME | 35,2274 | = | 462 | FLASHMGA | 35,3714 | = | 629 1 629 | GAMDFSW | 0138 | = | 55 |
| PLOTEXIT | 30,2321 | = | 590 | FLASHOFF | 4447 | = | 374 6 238 1444 | GANDOT | E6,1723 | = | 110 7 110 1043 |
| PILDELV | E5,1474 | = | 97 | FLASHON | 4443 | = | 374 4 319 1447 | GANDVX | 32,3877 | = | 880 3 878 880 |
| PILDELV1 | E5,1474 | = | 98 | FLASHSUB | 10,3408 | = | 1447 3 1445 1446 | GANDV10 | 32,3500 | = | 878 3 874 875 |
| PINALBIT | 4705 | = | 48 | FLOWRD10 | 0108 | = | 63 | GANDV15 | 32,3525 | = | 878 1 878 |
| PINALDV | 00,2825 | = | 1139 | FLOWRD11 | 0107 | = | 64 | GANDV20 | 32,3531 | = | 878 2 878 |
| PINALPLG | 0047 | = | 49 | FLUSHJET | 6000 | = | 1036 3 1034 1031 | GANDV25 | 32,3534 | = | 878 1 880 |
| PINCOPY | 16,3256 | = | 919 | FORCV25 | 42,3516 | = | 348 2 348 | GANDV30 | 32,3544 | = | 878 1 878 |
| PINDGMB | 27,2246 | = | 388 | FORHUNT | 28,3014 | = | 817 2 e08 817 | GANDV32 | 32,3564 | = | 879 1 879 |
| PINDTIME | 01,3573 | = | 1363 | PORTYONE | 13,3436 | = | 1294 1 1287 | GANDV35 | 32,3513 | = | 879 1 879 |
| PINDVAC | 5042 | = | 1178 | POUR | 4710 | = | 1174 23 292 1443 | GANDV40 | 32,3577 | = | 879 1 879 |
| PINDVAC2 | 01,2826 | = | 1181 | POURSEC | 11,2006 | = | 677 1 677 | GANDV45 | 32,3604 | = | 879 1 879 |
| PINBK2 | 43,2257 | = | 237 | POURTEEN | 4333 | = | 1148 1 1145 | GANDV47 | 32,3632 | = | 880 1 879 |
| PINBNLY | 14,3031 | = | 717 | POURTH | 26,3321 | = | 835 2 e02 834 | GANDV50 | 32,3638 | = | 880 2 879 |
| PINBTMP | 4526 | = | 424 | PPX2 | 17,3413 | = | 1026 2 1028 | GANDV55 | 32,3655 | = | 880 1 880 |
| FIRELOOK | 16,3820 | = | 957 | PRANDRES | 05,2000 | = | 26 1 179 | GANDV60 | 32,3663 | = | 880 1 880 |
| FIREPLUG | 16,3824 | = | 957 | PROS2 | 24,2336 | = | 645 2 644 | GANDV65 | 32,3610 | = | 880 2 880 |
| FIRSTBIT | 4704 | = | 46 | PRESBK | 21,2161 | = | 975 1 996 | GAMMA | E7,1455 | = | 119 5 119 1228 |
| FIRSTPLO | 0046 | = | 48 | PRESCONT | 21,3256 | = | 998 1 996 | GAMMAE1 | E7,1770 | = | 118 7 117 856 |
| FIRSTIME | 12,2813 | = | 1256 | PRESFBIT | 4110 | = | 45 7 112 724 | GAMMAL | E7,1710 | = | 111 4 811 814 |
| FIRSTIME | 16,2322 | = | 680 | PRESFLAG | -0014 | = | 45 1 989 | GAMMAL1 | 0028 | = | 117 6 810 813 |
| FIRST3 | 7707 | = | 554 | PRESFLNC | 21,3035 | = | 990 1 989 | GAMMASB | E4,1722 | = | 88 2 275 888 |
| FISHCALC | 26,3027 | = | 166 | PRESRET | 0144 | = | 68 3 991 | GAMRP | 0010 | = | 1211 3 1207 1211 |
| FIVE | 4715 | = | 1170 | PRESSTA | 21,3041 | = | 991 3 991 | GBIASK | E3,1480 | = | 82 19 83 722 |
| FIXCLPAS | 40,2303 | = | 314 | PRESHDAP | 21,2530 | = | 985 1 974 | CCOMP | E3,1471 | = | 63 6 294 295 |
| FIXCW | 05,3243 | = | 913 | PRESV | 20,3478 | = | 946 1 945 | CCOMPSUB | 06,3412 | = | 296 9 292 42 |
| FIXDELAY | 5156 | = | 1193 | PSUBO | 28,3847 | = | 1221 1 1218 | CCOMPSW | E3,1477 | = | 83 4 415 |
| FIXLOC | 0120 | = | 67 | PULLDSP | 41,3842 | = | 379 1 379 | CCOMPVER | 33,3425 | = | 442 1 298 |
| FIXRANGE | 40,2555 | = | 330 | PULLDSP1 | 41,3843 | = | 379 2 554 583 | CCOMP1 | 06,3525 | = | 298 1 444 |
| FIXROOT | 00,3452 | = | 1155 | PURST3 | 7707 | = | 588 13 87 1320 | CCOMP4 | 33,3574 | = | 444 4 442 446 |
| FLAGPILL | 0110 | = | 66 | PV | E4,1601 | = | 87 1 1384 | CCOMP5 | 33,3610 | = | 444 1 1400 |
| FLAGOFF | 23,2400 | = | 507 | PVACCADR | 01,3765 | = | 1387 8 118 828 | CESELECT | 07,3430 | = | 1405 7 7 790 |
| FLAGOFF | 35,2775 | = | 472 | PX | E7,1652 | = | 116 2 1370 | CDT/2 | 1208 | = | 77 4 77 790 |
| FLAGON | 35,2751 | = | 472 | PXADRS | 43,3555 | = | 1369 1 1370 | CDTSETUP | 20,2076 | = | 686 7 7 790 |
| FLAGTABL | 04,2356 | = | 199 | PXPX | 43,3541 | = | 1369 2 1029 | CDT1/2 | 1247 | = | 77 2 77 790 |
| FLAGRD0 | 0074 | = | 44 | PYX2 | 17,3557 | = | 1029 3 871 879 | GEADDR | 8105 | = | 1080 2 1136 1140 |
| FLAGRD1 | 0075 | = | 45 | P2RTE | 0012 | = | 45 10,3147 1443 | GENDDV | 00,2570 | = | 1137 4 1435 1448 |
| FLAGRD2 | 0076 | = | 47 | P2RTERIT | 4708 | = | 45 0162 = 1452 | GENPL | E5,1444 | = | 96 27 96 97 |
| FLAGRD3 | 0077 | = | 49 | ===== | ===== | ===== | ===== | GENRPT | E6,1770 | = | 113 5 113 565 |
| FLAGRD4 | 0100 | = | 51 | GAINCHNG | 16,2731 | = | 905 1 905 | GENSCL | 00,2346 | = | 1131 2 1131 |
| FLAGRD5 | 0101 | = | 53 | GAINDOWN | 16,3013 | = | 906 1 906 | GENSCR | 00,2277 | = | 1130 4 1129 1151 |
| FLAGRD6 | 0102 | = | 55 | GAIN1 | 21,3063 | = | 992 1 975 | | | | |
| FLAGRD7 | 0103 | = | 57 | GAIN2 | 21,3101 | = | 992 1 977 | | | | |
| FLAGRD8 | 0104 | = | 59 | GAMA | E6,1722 | = | 110 3 110 840 | | | | |

HEALTH KEY* NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS*

UN UNDEFINED = DEFINED BY EQUALS J DEFINED BY JOKER OR PHASE ANYWHERE MD MULTIPLY DEFINED
 BD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEP, # OF REFS, PAGE OF FIRST REP, PAGE OF LAST REP.

| SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES |
|-----------|---------|-------|-------------|-----------|---------|--------|-------------|----------|---------|--------|--------------|
| GENSHIPT2 | 00,2224 | 1128 | 1 1128 | GETUNITY | 25,2137 | 802 | 1 802 | GOFLASH2 | 10,2828 | 1437 | 14 1434 1439 |
| GENSHIPT | 00,2214 | 1128 | 1 1119 | GETVEL | 25,2133 | 802 | 1 802 | GOOMARK | 10,2538 | 1435 | |
| GENTRAN | 5475 | 1458 | 13 222 1458 | GETX | 12,2772 | 1283 | 3 1280 1273 | GOOPROD | 04,2202 | 198 | 1 197 |
| GEOCOMPS | E5,1643 | = 98 | | GETM5 | 35,3033 | 473 | 3 473 | GOINT | 35,2702 | 471 | 2 464 |
| GEOCOMP1 | E5,1643 | = 98 | 5 416 435 | GINDTST | 20,2100 | 688 | 1 687 | GOLOADLV | 43,2275 | 238 | 6 230 231 |
| GEOCONS1 | 33,3712 | 446 | 1 437 | GIMLOCK1 | 23,3324 | 1328 | 1 1327 | GOLOC | 0705 | = 1387 | 30 1382 1387 |
| GEOCONS2 | 33,3714 | 447 | 1 437 | GIMTRIM | 20,2127 | 687 | 3 688 687 | GOMANUR | 07,3547 | 1410 | 1 384 |
| GEOCONS3 | 33,3716 | 447 | 2 437 | GL-NOATT | 40,3572 | 382 | 1 381 | GOMARK | 10,2461 | 1434 | 1 1451 |
| GEOCONS4 | 33,3720 | 447 | 1 437 | GLAMPST | 08,2502 | 144 | 1 144 | GOMARKP | 10,2465 | 1434 | 9 240 1451 |
| GEOCONS5 | 26,3327 | = 440 | 1 437 | GLIMITR | 25,3470 | 826 | 1 826 | GOMARKPR | 10,2504 | 1434 | 5 560 1451 |
| GEOINUTT | 33,2030 | 416 | 1 436 | GLINVERT | 08,2473 | 144 | 1 144 | GOMARKR | 10,2501 | 1434 | 1 1451 |
| GEBM | 04,3573 | 1262 | 2 1261 1267 | GLOCKOK | 08,2434 | 143 | 2 143 | GOMARK2 | 10,2470 | 1434 | 3 563 735 |
| GEBMSON | E5,1674 | = 94 | 7 94 1268 | GLOCKMON | 08,2427 | 143 | 1 141 | GOMARK2R | 10,2507 | 1434 | |
| GEBORBJ | 33,3704 | 446 | 2 433 434 | GLOCKOK | 5222 | = 155 | 4 144 | GOMARK3 | 10,2473 | 1434 | |
| GEBORBK | 33,3708 | 446 | | GLOCKPAIL | 0056 | = 49 | 2 417 1328 | GOMARK3R | 10,2512 | 1434 | |
| GEBOSAVD | E5,1631 | = 97 | | GLOCKPBIT | 4675 | = 49 | | GOMARK4 | 10,2476 | 1434 | 1 226 |
| GEBOSAVB1 | E5,1631 | = 98 | 5 430 439 | GMAX | E7,1721 | = 117 | 3 117 763 | GOMARS | 10,2462 | 1434 | |
| GEBSTR4 | 5112 | = 441 | 1 212 | GMAX/2 | 26,3157 | 833 | 2 828 | GOMAXL/D | 25,3464 | 826 | 4 820 826 |
| GET_LVC | 04,2678 | 485 | 1 485 | GMDRBIT | 4701 | = 56 | | GOMOD | 04,2200 | 198 | 1 197 |
| GET-MGA | 04,2680 | 485 | 3 473 629 | GMDRVSW | 0137 | = 56 | 1 56 | GOMOVE | 27,2336 | 391 | 1 391 |
| GETAKS | 21,3171 | 993 | 1 994 | GMDIFBIT | 4700 | = 56 | | GONEBIT | 4701 | = 56 | |
| GETANGLE | 25,2217 | 803 | | GMERGE | 07,3302 | 1402 | 1 1405 | GONERY | 0160 | = 58 | 4 803 825 |
| GETARG | 32,2036 | 634 | 1 635 | GMODE | E4,1613 | = 87 | 1 87 | GONROLAD | 25,3462 | 826 | 3 825 826 |
| GETCADR | 01,3515 | 1205 | 1 1204 | GN/CCODE | 4736 | 1171 | | GONPAST | 0137 | = 56 | 4 807 827 |
| GETCOMP | 41,2512 | 328 | 5 328 328 | GOAGIN | 10,3176 | = 1451 | | GONKTBNK | 43,3660 | 1370 | 3 1370 |
| GETHOOK | 25,2525 | 811 | 1 811 | GOALMOCY | 41,2347 | 324 | 1 342 | GOODEND | 07,3467 | 1407 | 4 227 1407 |
| GETLEWD | 25,2671 | 814 | 1 814 | GOANIDLE | 10,3267 | 1445 | 1 1445 | GOPERPRS | 10,3033 | 1441 | |
| GETECC | 12,3703 | 1273 | 1 1273 | GOBAC | 13,3450 | 1294 | 2 1294 | GOPERPS | 10,2753 | 1439 | |
| GETERAD | 13,2437 | 1209 | 4 618 1212 | GOBAQUE | 11,2706 | 1308 | 2 1311 1317 | GOPERP1 | 10,2751 | 1439 | 7 612 1414 |
| GETETA | 26,3073 | 805 | 1 803 | GORB | 4054 | 128 | 1 127 | GOPERP1R | 10,3031 | 1441 | 1 746 |
| GETINREL | 40,2225 | 313 | 4 311 316 | GOBL/2 | 1214 | = 77 | 3 77 785 | GOPERP2 | 10,2756 | 1439 | |
| GETLIX | 15,3280 | 1052 | 1 1051 | GOBL1/2 | 1255 | = 77 | 3 78 789 | GOPERP2R | 10,3036 | 1441 | 1 383 |
| GETMAXDT | 13,3322 | 1293 | 1 1292 | GODSP | 10,2574 | 1438 | | GOPERP4 | 10,2761 | 1439 | 1 450 |
| GETNBWMM | 5354 | 1378 | 1 1378 | GODSPALM | 41,2350 | 324 | 20 318 365 | GOPERP4R | 10,3041 | 1441 | 1 695 |
| GETOFF | 15,3476 | 1055 | 1 1055 | GODSPR | 10,2602 | 1436 | 3 384 759 | GOPIN | 43,2121 | 232 | 28 233 690 |
| GETOFF2 | 15,3522 | 1056 | 1 1055 | GODSPRET | 10,2577 | 1436 | 3 442 722 | GOPLAY | 10,3216 | = 1451 | 1 1439 |
| GETON1 | 15,3437 | 1054 | 1 1054 | GODSPRS | 10,2765 | 1440 | 8 1434 1441 | GOPPOFIX | 04,2000 | 190 | 1 190 |
| GETON2 | 15,3462 | 1055 | 1 1055 | GODSPRS1 | 10,2767 | 1440 | 1 1438 | GOPSLAD | 25,3515 | 826 | 1 828 |
| GETOPMD | 10,2047 | 163 | 1 164 | GODSPR1 | 10,2603 | 1436 | | GOPROG | 05,2520 | 182 | 2 127 128 |
| GETPART2 | 01,3533 | 1382 | 1 1387 | GODSPR2 | 10,2604 | 1436 | 2 1434 1437 | GOPROG2 | 05,2641 | = 185 | 1 196 |
| GETPRIO | 5350 | 1378 | 2 1378 1381 | GODSP2 | 10,2575 | 1438 | | GOPROG3 | 05,2657 | 184 | 3 183 184 |
| GETRPSV | 11,2534 | 1308 | 1 1306 | GOSTIMS | 33,2118 | 417 | 1 417 | GOO | 41,3020 | 340 | 1 340 |
| GETRVN | 35,3413 | 500 | 1 499 | GOSTVR | 43,2000 | 230 | 1 320 | GORFDO20 | 27,2111 | 385 | 1 384 |
| GETTP | 30,3322 | 600 | 6 591 598 | GOFLASH | 10,2624 | 1437 | 42 190 853 | GOSHOSLM | 43,2751 | = 257 | 1 231 |
| GETUM | 23,3110 | 568 | 2 571 591 | GOFLASHR | 10,2763 | 1440 | 19 475 851 | GOSL8EPS | 10,3102 | 1442 | 3 1439 1450 |

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

UN UNDEFINED = DEFINED BY EQUALS J DEFINED BY JCKER OR ERASE ANYWHERE ND MULTIPLY DEFINED
 RD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEP, J OF REFS, PAGE OF FIRST REP, PAGE OF LAST REP.

| SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES |
|----------|---------|------|------------------|-----------|---------|------|------------------|-----------|---------|------|----------------|
| GOTO | 6615 | 1098 | 13 1099 1166 | GYROCTR | 0047 | = | 37 | HILNITY | 26,3325 | = | 32 2 281 888 |
| GOTOADDR | E7,1645 | = | 116 14 116 829 | GYROEXIT | 07,3341 | 1403 | 1 1403 | HILNITZ | 26,3323 | = | 32 4 281 892 |
| GOTOBRS | 6631 | 1098 | 1 1098 | GYROPAC | 07,3431 | 1405 | 2 1402 1405 | HI10 | 07,3713 | 1419 | 1 1418 |
| GOTOCE | 6644 | 1099 | 1 1098 | GYTOBETO | E5,1472 | = | 96 | HIS | 4364 | 373 | 9 131 1370 |
| GOTOPOOH | 4106 | 190 | 71 185 1416 | GONBYBIT | 4703 | = | 58 | HIGZERS | 26,3331 | = | 31 31 514 1356 |
| GOTOR21 | 43,2573 | 151 | 1 230 | G21 | E6,1672 | = | 112 | HMSIN | 42,3365 | 346 | 1 343 |
| GOTOR23 | 43,2576 | 251 | 1 230 | H | E4,1611 | = | 87 6 87 1318 | HMSOUT | 42,3143 | 333 | 1 329 |
| GOTOUPSY | 25,3025 | 818 | 1 814 | HACK | 20,3506 | 946 | 4 924 930 | HOLDATT | 34,3466 | 586 | |
| GOTOV56 | 4550 | e22 | 2 365 575 | HACKWLT | 20,3515 | 946 | 1 946 | HOLDFLAG | 1332 | 79 | 17 393 1001 |
| GOVUPOT | 40,3222 | 355 | 1 324 | HALF | 4675 | = | 1174 26 417 1476 | HOLDPLNC | 21,3356 | 999 | 1 996 |
| GQD8P | 10,2461 | = | 1451 | HALFDP | 04,3453 | = | 1176 1 1307 | HOLDW | E5,1664 | = | 95 7 95 1228 |
| GQD8PF | 10,2465 | = | 1451 15 234 1470 | HALFNPLT | 23,2267 | 290 | | HORIZ | 31,2527 | 618 | 1 614 |
| GQD8PFR | 10,2504 | = | 1451 | HALFPR | 4674 | = | 1051 1 1052 | HORIZ.1 | 31,2565 | 618 | 1 621 |
| GQD8PR | 10,2501 | = | 1451 | HALPREV | 04,2651 | 465 | 2 465 | HORIZ.2 | 31,2735 | 620 | 1 620 |
| GRABANG | 21,3362 | 999 | 1 996 | HALPSAFE | 36,2401 | 547 | 1 546 | HORIZ.3 | 31,2740 | 620 | 1 620 |
| GRAD | E7,1651 | = | 118 3 116 825 | HALPY | 1075 | 75 | 1 75 | HORIZ.4 | 31,2744 | 620 | 2 620 |
| GRQPKIL | 04,2172 | 196 | | HALVE | 26,3327 | = | 835 7 811 835 | HORIZ.5 | 31,2746 | 620 | 1 620 |
| GRP2PC | 27,2741 | 1301 | 26 553 1317 | HANG20 | 06,2071 | 131 | 1 130 | HORIZ.6 | 31,2752 | 620 | 1 618 |
| GRP2SVO | E7,1536 | = | 119 4 119 1301 | HAPO | E4,1763 | = | 90 5 90 632 | HORIZALT | 1354 | 61 | 2 618 |
| GRRKBIT | 4708 | = | 54 | HAPOK | E4,1751 | = | 89 4 89 513 | HORIZON | E5,1752 | = | 95 5 95 611 |
| GRRKPLG | 0125 | = | 54 1 254 | HAVDRNG | 25,3445 | 825 | 1 825 | HP | E5,1624 | = | 92 6 92 548 |
| GSLEBCT | 07,3235 | 1401 | 3 1400 | HAVEBASE | 35,3335 | 499 | 1 500 | HPE | 36,2000 | 541 | 1 550 |
| GSHFT | 7570 | 1119 | 1 1086 | HAVEQUES | 11,2002 | 479 | 1 679 | HPER | E4,1765 | = | 90 3 274 632 |
| GTSOPSS | 33,3132 | 435 | 1 415 | HAVENORM | 04,3625 | 1262 | 1 1262 | HPERMIN | E4,1720 | = | 89 12 89 550 |
| GTSOPSS1 | 33,2001 | 415 | 1 201 | HCRUPTBB | 4062 | 128 | 1 128 | HPERX | E4,1753 | = | 89 4 89 514 |
| GTSFIN | 42,2126 | 266 | 1 342 | HDISP | E6,1712 | = | 113 1 113 | HPL | 36,2002 | 541 | 1 550 |
| GTSFINLQ | 41,3152 | 342 | 1 342 | HDOT | E7,1736 | = | 118 2 275 538 | HPO | E5,1630 | = | 92 4 92 547 |
| GTSFOUL | 42,2120 | 266 | 1 329 | HDOTDISP | E6,1714 | = | 113 1 113 | HRCON | 42,3451 | 347 | 2 346 |
| GTSFOUTL | 41,2561 | 329 | 1 329 | HEADSUP | E6,1726 | = | 110 6 110 799 | HRCON1 | 42,3212 | 333 | 1 333 |
| GTSOPNDZ | E5,1655 | = | 98 | HIDHALP | 26,3327 | = | 31 12 289 1325 | HUNTEST | 25,2365 | 809 | 4 809 821 |
| GTSOPTCS | 33,3622 | 444 | 1 446 | HIDP1/4 | 26,3321 | = | 31 4 770 1356 | HUNTEST1 | 25,2434 | 810 | 1 809 |
| GTSOPTSS | 33,3623 | 444 | | HIGENERGY | 12,3424 | 1269 | 1 1269 | HUNTEST3 | 25,2553 | 811 | 1 816 |
| GTSWTLST | E5,1645 | = | 98 | HIGHGAIN | 22,3161 | 409 | 1 409 | I | E6,1700 | = | 103 14 103 957 |
| GTSWTLT1 | E5,1645 | = | 98 3 427 430 | HIGH4 | 7711 | 1173 | 4 129 1098 | I AVG | E6,1471 | 100 | 2 691 |
| QUEST | 33,2016 | 418 | | HIGH9 | 7713 | 1173 | 5 476 1081 | I AVG/TLX | E6,1472 | 100 | 1 910 |
| QUESTBIT | 4711 | = | 47 | HIMINCON | 42,3311 | 335 | 1 335 | IRKCALL | 4633 | 1075 | 41 133 1397 |
| QUESTSW | 0034 | = | 47 4 479 1268 | HIND | 0143 | = | 56 3 814 817 | ICORPAIL | 06,2665 | = | 154 1 155 |
| QUESTS1 | 33,2254 | 419 | | HINDBIT | 4705 | = | 57 | ICORK2 | 43,2182 | 235 | |
| QWAKE | 07,3176 | 1399 | 1 1399 | HIPRIO | 10,2650 | 1437 | 1 1437 | IDADDTAR | 42,2563 | 274 | 2 265 |
| QWAKE2 | 07,3136 | 1398 | 1 1399 | HISCALAR | 0003 | = | 39 2 424 1101 | IDADDTEN | 0142 | = | 68 |
| QYNDIBIT | 4712 | = | 57 | HISECON | 42,3310 | 335 | 1 334 | IDAD1TEN | 0150 | 69 | 4 265 341 |
| QYNDIPSW | 0150 | = | 57 | HITERMIN | 0123 | = | 67 3 346 347 | IDAD2TEN | 0151 | 69 | 2 265 |
| QYNOGRE | 07,3150 | 1398 | 1 1398 | HITEMOUT | 1007 | = | 73 4 333 336 | IDAD3TEN | 0152 | 69 | |
| QYNOBUSY | 07,3171 | 1399 | 1 1398 | HILNITX | 26,3327 | = | 32 4 281 888 | IDLRBIT | 4705 | = | 47 |

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

UN UNDEFINED = DEFINED BY EQUALS J DEFINED BY JOKER OR ERASE ANYWHERE MD MULTIPLY DEFINED
 RD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, J OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

| SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES |
|----------|---------|-------|-------------|----------|---------|--------|-------------|----------|---------|------|--------------|
| IDLECADR | 43,2730 | 255 | 1 255 | IMUFINEB | 07,3034 | 1395 | 2 1395 1400 | INDEX | 0115 | 1081 | 1 1079 |
| IDLEFAIL | 0030 | = 47 | 3 663 678 | IMUFINEK | 43,2240 | 237 | 1 230 | INDEX1 | 23,3671 | 1339 | 1 1338 |
| IDLEFBIT | 4704 | a 58 | | IMUFINEV | 43,2270 | 231 | 1 237 | INDEXLOC | 0130 | = 68 | 12 1081 1184 |
| IDLEFLAG | 0161 | = 58 | | IMUFIN20 | 07,3012 | = 1410 | 2 717 722 | INDEXNUM | E4,1733 | = 88 | 3 88 891 |
| IDLEMASK | 10,3136 | 1442 | 1 1447 | IMUOOD | 07,3440 | 1406 | | INDEX2 | 6133 | 1081 | 1 1081 |
| IDLERST1 | 10,3427 | 1447 | | IMUMON | 06,2174 | 135 | 2 133 | INDJMP | 6243 | 1086 | 6 1080 1083 |
| IDLESLEP | 10,3662 | 1452 | 1 1442 | IMUOP | 06,2604 | 150 | 1 155 | INDWORK | 6153 | 1081 | 1 1081 |
| IDOPLMK | E5,1753 | = 95 | 5 95 622 | IMUOP2 | 06,2625 | 150 | 1 150 | INFINAPO | 12,3732 | 1214 | 2 1214 |
| IERASTST | 6074 | 1080 | 1 1080 | IMUPULSE | 07,3125 | 1396 | 6 237 1480 | INFINBIT | 4704 | = 60 | |
| IFAILINH | 05,3155 | 188 | 1 183 | IMUSE | 0007 | = 44 | 5 197 1414 | INFINFLG | 0200 | = 60 | 5 893 1269 |
| IFAILJMP | 06,2737 | 185 | 1 138 | IMUSEBIT | 47'03 | = 45 | | INFINITY | 12,3210 | 1266 | 5 1283 1268 |
| IFAILOK | 07,3036 | 1396 | 1 1395 | IMUSEFLG | 47'03 | = 1410 | 3 139 150 | INFLIGHT | 23,2000 | = 28 | 1 1323 |
| IFLAGC | 13,3053 | 1288 | 1 1289 | IMUSTALL | 07,3516 | 1409 | 12 233 722 | INHOLD | 21,3447 | 1001 | 1 1001 |
| IFLAGP | 13,3030 | 1288 | 1 1288 | IMUSTLLO | 33,2316 | 421 | 5 416 434 | INITA | 27,2552 | 578 | 1 578 |
| IFLAGAL | 10,2707 | 1438 | 1 1438 | IMUSUPER | 30,2000 | = 29 | 1 241 | INITB | 27,2556 | 578 | 1 578 |
| IGC | E5,1761 | = 93 | 4 93 1328 | IMUTEST | 33,2004 | 416 | | INITDSP | 10,3165 | 1443 | 1 1382 |
| IGNFLAG | 0153 | = 58 | | IMUVAR | 34,3221 | 575 | 2 571 574 | INITIALW | 27,2544 | 578 | 2 570 814 |
| IGNFLBIT | 4676 | = 58 | | IMUVARR | 36,3651 | 605 | 1 596 | INITLOC2 | 17,2211 | 902 | 1 900 |
| IGNITION | 24,2552 | 851 | 2 210 662 | IMUZERO | 07,2516 | 1389 | 2 233 416 | INITR1 | 25,2354 | 808 | 1 807 |
| IGSAMX | 27,2213 | 388 | 1 388 | IMUZEROA | 07,2526 | 1389 | 1 1389 | INITROLL | 25,2260 | 807 | 1 799 |
| IMEDIATE | 01,3612 | 1384 | 4 1383 1388 | IMUZEROK | 43,2127 | 233 | 1 233 | INITSUB | 04,2315 | 198 | 2 190 195 |
| IMEDRET | 10,3515 | 1449 | | IMUZERO2 | 07,2561 | 1390 | 1 1389 | INITV | 12,3510 | 1271 | 2 1269 1270 |
| IMODES30 | 1320 | 79 | 63 135 1411 | IMUZERO3 | 07,2570 | 1390 | | INITVEL | 11,2000 | 419 | 3 487 668 |
| IMODES33 | 1321 | 79 | 38 132 1396 | IM30INIF | 05,3167 | 189 | 1 180 | INITVELX | 11,2251 | 483 | 1 483 |
| IMPLURN | 24,2655 | 853 | 1 851 | IM30INIR | 05,3170 | 189 | 1 183 | INITVEL1 | 11,2022 | 479 | 1 419 |
| IMPULBIT | 4702 | = 48 | | IM33INIT | 47'83 | = 189 | 2 180 183 | INITVEL2 | 11,2056 | 480 | 1 482 |
| IMPULCHK | 24,2565 | 651 | | INBLND | 27,3140 | 1351 | 1 1350 | INITVEL3 | 11,2101 | 480 | 2 480 |
| IMPULSW | 0044 | = 48 | 5 199 683 | INCORBIT | 4700 | = 53 | | INITVEL4 | 11,2133 | 481 | 1 481 |
| IMU/OPT | E5,1450 | = 96 | | INCORFLG | 0117 | = 53 | 9 570 597 | INITVEL5 | 11,2157 | 481 | 1 481 |
| IMUJCK | 21,2576 | 986 | 1 986 | INCORPEX | E4,1642 | = 87 | 4 1206 1209 | INITVEL6 | 11,2221 | 482 | 1 482 |
| IMUJTTCK | 43,2412 | 243 | 1 230 | INCORP1 | 36,3250 | 1222 | 3 572 617 | INITVEL7 | 11,2224 | 482 | 1 481 |
| IMUBACK | 33,2033 | 416 | | INCORP2 | 36,3462 | 1226 | 3 573 617 | INITZOPT | 06,3216 | 180 | 3 158 159 |
| IMUCAD | 07,3441 | 1408 | 5 139 1408 | INCOR1 | 36,3304 | 1223 | 1 1223 | INLINK | 0045 | 37 | 2 168 1418 |
| IMUCADR | 1322 | = 79 | 3 188 1408 | INCOR1A | 36,3313 | 1223 | 1 1223 | INLUNCK | 11,3201 | 1312 | 1 1313 |
| IMUCADR | 06,2555 | 148 | 1 155 | INCOR1B | 36,3342 | 1223 | 1 1223 | INREL | 0137 | = 68 | 23 312 317 |
| IMUCAL | 33,2000 | = 30 | 6 416 446 | INCOR1C | 36,3350 | 1223 | 2 1223 | INRELTAB | 40,2231 | 313 | 2 313 316 |
| IMUCAL1 | 04,2000 | = 25 | 1 444 | INCOR2 | 36,3411 | 1224 | 2 1224 1231 | INRLBIT | 4708 | = 57 | |
| IMUCAL2 | 06,2000 | = a s | | INCOR2AB | 36,3441 | 1225 | 1 1225 | INRLSW | 0144 | = 57 | 2 807 808 |
| IMUCAL3 | 32,2000 | = 30 | 1 423 | INCOR3 | 36,3445 | 1225 | 1 1225 | INROLOUT | 25,2343 | 808 | 3 807 808 |
| IMUCOARK | 43,2153 | 234 | 1 234 | INCR | 01,2433 | 1183 | 1 1087 | INT/W | 13,3550 | 1297 | 2 1296 |
| IMUCOARS | 07,2602 | 1391 | 5 235 722 | INCRCDU | 22,3607 | 1419 | | INTBANK | 13,3021 | 1281 | 1 1287 |
| IMUCOARV | 43,2174 | 235 | 2 235 236 | INCRCDU | 22,3060 | 401 | 2 408 409 | INTBITAB | 13,3467 | 1295 | 2 1294 |
| IMUCOMP | 06,2000 | = a s | 1 292 | INCRSVG | 20,2013 | 678 | 1 676 | INTBIT15 | 0115 | 67 | 7 67 1081 |
| IMUPAIL | 06,2665 | = 154 | 1 155 | INDEP | E7,1774 | = 124 | 4 1256 1257 | INTB15+ | 0114 | 67 | 3 67 |
| IMUPINE | 07,3012 | 1395 | 3 237 1410 | INDERASE | 6155 | 1081 | 1 1081 | INTORV | 13,3113 | 1290 | 13 204 1299 |

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

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 RD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, J OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

| SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES |
|----------|---------|--------|--------------|----------|---------|--------|-------------|----------|---------|-------|-------------|
| INTBRV3 | 13,3086 | 1289 | 8 471 869 | INVC107 | 32,2447 | 859 | | ITR15 | 6072 | 1080 | |
| INTBRV1 | 13,3115 | 1290 | 2 1288 | INVC109 | 32,2452 | 859 | 1 859 | ITR7 | 6230 | 1084 | |
| INTBRV2 | 13,3120 | 1290 | 1 1318 | INVC115 | 32,2477 | 059 | 1 859 | ITSAJOB | 01,3627 | 1384 | 1 1383 |
| INTERCEP | 16,3732 | 960 | 1 953 | INVC120 | 32,2503 | 859 | 1 859 | ITSAJOB2 | 01,3740 | 1387 | 1 1385 |
| INTERP | 38,2360 | 546 | 2 546 547 | INVC125 | 32,2507 | 859 | 1 859 | ITSAJBL | 01,3643 | 1384 | 1 1382 |
| INTERIT | 13,3204 | 1291 | 3 1292 1293 | INVRSEON | 12,3132 | 1265 | 1 1265 | ITSAVAR | 01,3543 | 1382 | 1 1382 |
| INTFLAG | 0227 | = 83 | | IOCARATE | E6,1701 | = 103 | 3 103 | ITSAWAIT | 01,3562 | 1383 | 1 1383 |
| INTPLBIT | 4675 | = 83 | 2 183 1294 | IRSTURN | E4,1614 | = 87 | 8 87 1291 | ITSEVEN | 01,3744 | 1387 | 1 1384 |
| INTORATE | 11,3236 | 1313 | 2 1313 | IRSTURN1 | 1127 | 76 | 6 76 1300 | ITSINDIR | 5367 | 1383 | 1 1383 |
| INTIME | E7,1502 | = 121 | 8 121 545 | IRIGCOMP | 06,3331 | 294 | | ITSLGCL1 | 5376 | 1385 | 2 1385 1386 |
| INTINIT | 13,2000 | = 27 | 3 203 1296 | IRIOX | 06,3333 | 294 | | ITSLGCL2 | 01,3701 | 1386 | 1 1386 |
| INTINT | 35,2706 | 471 | 2 467 469 | IRIOY | 06,3347 | 294 | | ITSLIKES | 01,3614 | 1384 | 1 1382 |
| INTLOOP | 35,2032 | 455 | 1 456 | IRIOZ | 06,3363 | 294 | | ITSLNOCL | 01,3726 | 1386 | 1 1382 |
| INTMASK | 05,3162 | 189 | 1 184 | IRIG1 | 06,3407 | 296 | 2 292 296 | ITSNVAC | 01,3637 | 1384 | 1 1384 |
| INTACTS | 41,2116 | 320 | 2 319 | ISCADR.0 | 4234 | 367 | 2 367 376 | ITSMBIT | 4675 | = 58 | |
| INTOHTS | 13,2122 | 503 | | ISITN00 | 10,3303 | 1445 | 1 1445 | ITSWICH | 0152 | = 58 | 7 455 546 |
| INTPRST | 6006 | 1077 | 245 195 1471 | ISITN01 | 04,2061 | 194 | 1 193 | ITSWLST | 01,3733 | 1386 | 1 1385 |
| INTPRST1 | 26,2000 | = 29 | 1 1175 | ISITPRIO | 10,3366 | 1446 | 2 1447 | ITURNON | 06,2526 | 146 | 1 155 |
| INTPRST2 | 04,2000 | = 25 | 1 1176 | ISLIST.0 | 4240 | 367 | 2 367 376 | ITURNON2 | 06,2551 | 147 | 2 146 150 |
| INTRPVP | 04,3413 | 522 | 2 519 | ISSERVON | 04,2112 | 195 | 1 194 | IXX | E6,1470 | 100 | 4 691 914 |
| INTRSM | 6017 | 1077 | 1 1185 | ISSUP | 06,2323 | 139 | | ===== | | | |
| INTSTALL | 13,3371 | 1293 | 32 195 1471 | ISSWOPF | 06,2700 | 153 | | J/M | E6,1623 | = 107 | 3 107 1006 |
| INTTEMP | E6,1506 | 101 | 2 101 106 | ISSWON | 06,2710 | 153 | 1 153 | J/M1 | E6,1624 | = 107 | 2 107 691 |
| INTVAL | 33,3120 | 435 | 2 427 431 | ISSZERO | 06,2354 | 140 | 1 148 | J/M2 | E6,1625 | = 107 | 2 107 691 |
| INTVALLE | 05,3314 | 915 | 1 913 | ISWCALL | 4637 | 1075 | 1 919 | JAMIT | 07,2402 | 227 | 1 227 |
| INTVAR | E4,1777 | = 90 | 2 90 572 | ISWRSTRN | 4646 | 1075 | | JAMPROC | 4257 | 368 | |
| INTVEC | E5,1476 | = 97 | | IT | E5,1610 | = 92 | 3 92 544 | JAMTRM | 4245 | 367 | 1 1446 |
| INTVEC1 | E5,1476 | = 98 | 3 437 | ITCTR | E7,1504 | = 121 | 4 479 482 | JCAKIS | 31,3055 | 622 | 1 612 |
| INTVEL | 11,2000 | = 26 | 1 479 | ITEMP1 | 0061 | 66 | 42 66 1462 | JCOUNT | 0002 | = 894 | 1 890 |
| INTWAKE | 13,3406 | 1294 | 4 259 1291 | ITEMP2 | 0062 | 66 | 22 66 1455 | JETACTN | 15,3661 | 1058 | 2 1058 1059 |
| INTWAKEC | 27,2713 | 1301 | 1 1301 | ITEMP3 | 0063 | 66 | 7 66 1454 | JETADDR | 21,3747 | 1007 | 1 1007 |
| INTWAKEM | 27,2710 | 1301 | 1 1300 | ITEMP4 | 0064 | 66 | 8 66 1405 | JETAG | E6,1711 | = 109 | 10 109 1059 |
| INTWAKEU | 27,2662 | 1300 | 1 1474 | ITEMP5 | 0065 | 66 | 2 66 1379 | JETCALL | 15,3667 | 1059 | 1 1058 |
| INTWAKEV | 27,2725 | 1301 | 1 1301 | ITEMP6 | 0066 | 66 | 3 154 1379 | JETCALL1 | 15,3627 | 1058 | 1 1058 |
| INTWAKEW | 13,3404 | 1294 | 2 635 1301 | ITERATOR | 12,2543 | 1256 | 1 1269 | JETCALL2 | 15,3652 | 1058 | 3 1058 |
| INTWAKE1 | 13,3426 | 1294 | 3 504 1294 | ITERCTR | 0026 | = 1277 | 4 1247 1267 | JETCALL3 | 15,3636 | 1058 | 1 1059 |
| INTWAKLM | 27,2723 | 1301 | 1 1301 | ITSMASK | 10,3414 | 1447 | 1 1446 | JETEM | E6,1720 | = 110 | 28 110 1049 |
| INTWAKUP | 27,2727 | 1301 | 1 1300 | ITSMOON | 37,3312 | 789 | 1 789 | JETEM2 | E6,1624 | = 111 | 3 1046 |
| INTWAKUO | 0330 | = 1300 | 3 1300 1301 | ITRO | 6337 | 1089 | | JETROLL | 16,3635 | 957 | 2 957 |
| INTWAKIO | 0330 | = 70 | 1 1300 | ITR1 | 6326 | 1009 | | JETS | 21,3425 | 1001 | 4 990 999 |
| INTY | E5,1500 | = 97 | 6 432 433 | ITR10 | 6111 | 1080 | | JETSLECT | 17,2577 | 1010 | 1 1007 |
| INTYBIT | 4707 | = 50 | | ITR11 | 6151 | 1081 | | JJ | E7,1771 | = 117 | 6 824 825 |
| INTYPLG | 0070 | = 50 | 17 471 1299 | ITR12 | 6103 | 1080 | | JLOOP | 21,3431 | 1001 | 1 1006 |
| INTZ | E5,1504 | = 97 | | ITR13 | 6162 | 1082 | 1 1081 | JLOOPNT | E4,1724 | = 88 | 6 88 890 |
| INVC100 | 32,2427 | 858 | 1 845 | ITR14 | 6206 | 1083 | | JLOOPP | 31,3315 | 890 | 1 891 |

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 BD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, J OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

| SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES |
|----------|---------|-------|-------------|-----------|---------|------|------------|----------|---------|--------|-------------|
| JN | 21,3641 | 1004 | 5 1003 1004 | KALOMON3 | 22,2000 | 392 | 1 1410 | KLOOFCNT | E4,1725 | = 88 | 4 88 891 |
| JNDX | E6,1617 | = 110 | 9 110 1057 | KALOMON1 | 22,2000 | = 28 | 4 392 407 | KMATRIX | 21,2334 | = 977 | 2 974 975 |
| JNDX1 | E6,1620 | = 110 | 6 111 1058 | KALOMON2 | 22,2000 | = 28 | 1 398 | KMJ | E6,1620 | = 107 | 3 107 977 |
| JOBSLEEP | 5070 | 1160 | 6 387 1458 | KALOMON3 | 22,2000 | = 28 | 1 398 | KMJ1 | E6,1621 | = 107 | 2 107 891 |
| JOBSLP1 | 01,3017 | 1165 | 1 1180 | KALOMON4 | 22,2000 | = 28 | 1 398 | KMJ2 | E6,1622 | = 107 | 2 107 891 |
| JOBSLP2 | 01,3030 | 1165 | 1 1187 | KALOMON5 | 22,2000 | = 28 | 1 398 | KMPAC | E6,1510 | = 106 | 38 106 1030 |
| JOBSLP3 | 01,3044 | 1166 | 1 1180 | KALOMON6 | 22,2000 | = 28 | 1 398 | KMPTEMP | E6,1512 | = 106 | 3 106 970 |
| JOBSLP4 | 01,3050 | 1166 | 1 1188 | KALOMON7 | 22,2000 | = 28 | 1 398 | KNOWNBIT | 4703 | = 56 | |
| JOBSLP5 | 01,3056 | 1166 | 2 1188 | KALOMON8 | 22,2000 | = 28 | 1 398 | KNOWNBLO | 0141 | = 56 | 6 56 591 |
| JOBSLP6 | 01,3060 | 1166 | 1 1188 | KALOMON9 | 22,2000 | = 28 | 1 398 | KPDN | 4727 | = 941 | 3 925 941 |
| JOBSLP7 | 01,3066 | 1166 | 2 1437 1438 | KALOMON10 | 22,2000 | = 28 | 1 398 | KPDN3 | E6,1651 | = 104 | 3 104 964 |
| JOBSLP8 | 01,3072 | 1166 | 2 1437 1438 | KALOMON11 | 22,2000 | = 28 | 1 398 | KPIP | 37,3351 | 790 | |
| JOBSLP9 | 01,3078 | 1166 | 6 1003 1004 | KALOMON12 | 22,2000 | = 28 | 1 398 | KPIP1 | 37,3353 | 790 | 2 782 790 |
| JP | 21,3650 | 1004 | 6 1003 1004 | KALOMON13 | 22,2000 | = 28 | 1 398 | KPRIMEBT | E6,1644 | = 103 | 6 103 907 |
| JSWCHBIT | 4675 | = 44 | 5 1313 1318 | KALOMON14 | 22,2000 | = 28 | 1 398 | KRESUME1 | 21,2403 | 980 | 1 975 |
| JSWITCH | 0001 | = 44 | 1 779 | KALOMON15 | 22,2000 | = 28 | 1 398 | KRESUME2 | 21,3141 | 993 | |
| JTAGTIME | 37,3136 | 784 | 1 779 | KALOMON16 | 22,2000 | = 28 | 1 398 | KR1 | 26,3007 | 764 | 1 763 |
| JTIME | 21,3713 | 1006 | 4 1003 1004 | KALOMON17 | 22,2000 | = 28 | 1 398 | KR2 | 26,3013 | 764 | 1 763 |
| JUNCT1 | 04,3203 | 518 | 1 518 | KALOMON18 | 22,2000 | = 28 | 1 398 | KR3 | 26,3015 | 764 | 1 763 |
| JUNCT2 | 04,3236 | 519 | 1 519 | KALOMON19 | 22,2000 | = 28 | 1 398 | KR4 | 26,3023 | 765 | 1 763 |
| JUNCT3 | 36,2347 | 546 | 1 547 | KALOMON20 | 22,2000 | = 28 | 1 398 | KSPNDX | E6,1664 | = 112 | 7 112 408 |
| JUNCT4 | 36,2353 | 546 | 3 547 | KALOMON21 | 22,2000 | = 28 | 1 398 | KT | E4,1763 | = 89 | 10 89 522 |
| JUNCT5 | 36,2244 | 545 | 1 545 | KALOMON22 | 22,2000 | = 28 | 1 398 | KTETA | 26,3233 | 834 | 1 805 |
| JZBRO | E6,1744 | = 104 | 5 925 | KALOMON23 | 22,2000 | = 28 | 1 398 | KTETA1 | 26,3001 | 764 | 1 770 |
| JZSTORE | 20,2432 | 925 | 5 925 | KALOMON24 | 22,2000 | = 28 | 1 398 | KTLX/I | E6,1646 | = 103 | 5 103 910 |
| J1 | E6,1553 | = 102 | 3 102 928 | KALOMON25 | 22,2000 | = 28 | 1 398 | KTRCS | 4675 | = 1062 | 1 1054 |
| J1TMP | E6,1726 | = 104 | 7 104 938 | KALOMON26 | 22,2000 | = 28 | 1 398 | KT1 | 26,3235 | 834 | 1 805 |
| J18 | 21,3614 | 1003 | 2 1002 1004 | KALOMON27 | 22,2000 | = 28 | 1 398 | KVSCALE | 26,3227 | 834 | 1 802 |
| J2 | E6,1555 | = 102 | 3 102 928 | KALOMON28 | 22,2000 | = 28 | 1 398 | KV1 | E6,1666 | = 112 | 3 112 |
| J2BROSO | 13,3751 | 1322 | 1 1310 | KALOMON29 | 22,2000 | = 28 | 1 398 | KV2 | E6,1674 | = 112 | |
| J2TMP | E6,1730 | = 104 | 7 104 939 | KALOMON30 | 22,2000 | = 28 | 1 398 | KV3 | E6,1702 | = 112 | |
| J20 | 21,3620 | 1003 | 1 1002 | KALOMON31 | 22,2000 | = 28 | 1 398 | KWB | 26,3243 | 834 | 1 836 |
| J21 | 21,3631 | 1003 | 1 1002 | KALOMON32 | 22,2000 | = 28 | 1 398 | KYDN | 4727 | = 941 | 2 931 |
| J22 | 21,3657 | 1004 | 5 1002 1003 | KALOMON33 | 22,2000 | = 28 | 1 398 | KYGEN3 | E6,1651 | = 104 | 2 967 |
| J23 | 21,3670 | 1004 | 7 1002 1003 | KALOMON34 | 22,2000 | = 28 | 1 398 | K1D | 26,3223 | 834 | 1 821 |
| J24 | 21,3702 | 1004 | 2 1003 | KALOMON35 | 22,2000 | = 28 | 1 398 | K1K2LOOP | 32,2135 | 636 | 1 636 |
| J3 | E6,1557 | = 102 | 3 102 928 | KALOMON36 | 22,2000 | = 28 | 1 398 | K1RTB | 35,3757 | 885 | 1 845 |
| J3TMP | E6,1732 | = 104 | 7 104 939 | KALOMON37 | 22,2000 | = 28 | 1 398 | K1VAL | 17,2012 | 683 | 1 682 |
| J4 | E6,1561 | = 102 | 4 102 928 | KALOMON38 | 22,2000 | = 28 | 1 398 | K2CALC | 32,2133 | 636 | 1 636 |
| J4BRO/J3 | 13,3741 | 1322 | 2 1310 | KALOMON39 | 22,2000 | = 28 | 1 398 | K2D | 26,3225 | 834 | 2 821 822 |
| J4TMP | E6,1734 | = 104 | 7 104 939 | KALOMON40 | 22,2000 | = 28 | 1 398 | K2ROLL | E7,1643 | = 116 | 7 116 827 |
| J5 | E6,1563 | = 102 | 4 102 928 | KALOMON41 | 22,2000 | = 28 | 1 398 | K2RTB | 35,3761 | 885 | 1 845 |
| J5TMP | E6,1736 | = 104 | 8 104 940 | KALOMON42 | 22,2000 | = 28 | 1 398 | K2VAL | 17,2014 | 683 | 1 683 |
| J6 | 21,3502 | 1001 | 1 1001 | KALOMON43 | 22,2000 | = 28 | 1 398 | K3RTB | 35,3763 | 885 | 1 845 |
| J6TMP | E6,1740 | = 104 | 6 104 940 | KALOMON44 | 22,2000 | = 28 | 1 398 | K3S1 | 22,2371 | 398 | |
| J7 | 21,3528 | 1002 | 1 1002 | KALOMON45 | 22,2000 | = 28 | 1 398 | | | | |
| J8 | 21,3535 | 1002 | 1 1002 | KALOMON46 | 22,2000 | = 28 | 1 398 | | | | |

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|----------|---------|-------|-------------|----------|---------|--------|-------------|----------|---------|--------|-------------|
| K3VAL | 17,2016 | 684 | 1 683 | LATJAB | 31,3540 | 895 | 3 558 890 | LIGHTON | 27,2461 | 577 | 1 577 |
| K4 | 22,2372 | 398 | | LAUNCHAZ | E5,1633 | = 97 | 8 169 534 | LIGHTSET | 05,2744 | 185 | 2 182 184 |
| K4RTS | 35,3765 | 886 | 1 845 | LBUP2 | 00,2470 | 1134 | 2 1158 1160 | LIM(-22) | 27,3350 | 1358 | 1 1351 |
| K4SQ | 22,2373 | 398 | | LCHAN | 0001 | = 39 | 17 132 1470 | LIMITCOM | 42,3247 | 334 | 1 334 |
| ===== | | | | | | | | | | | |
| L | 0001 | = 37 | 254 39 1477 | LCK/360 | E6,1614 | = 110 | 18 110 1055 | LIMITL/D | 25,3520 | 827 | 8 807 826 |
| L/D | E7,1633 | = 116 | 13 116 829 | LDANZIG | 00,3712 | 1160 | 1 1159 | LIMITS | 4673 | = 1170 | 9 842 1479 |
| L/DCALC | E7,1726 | = 117 | 1 804 | LDATALST | 0334 | 71 | 1 1069 | LIMVEL | 38,2020 | 542 | 1 547 |
| L/DCMINR | E7,1627 | = 116 | 4 116 829 | LDLOOP2 | 27,3656 | 1473 | 1 1474 | LINUS | 5415 | = 1452 | 2 384 661 |
| L/D1 | E7,1635 | = 116 | 5 116 829 | LDNDUMP | 05,3554 | 1071 | 1 1071 | LINUSCHR | 10,3522 | 1449 | 2 1437 1438 |
| LAD | E7,1623 | = 116 | 17 116 827 | LDNDUMPI | 43,2711 | 254 | 1 254 | LITLUSUB | 33,3722 | 447 | 2 443 444 |
| LADPAD | E6,1407 | 99 | 1 798 | LDNDUMPI | 05,3555 | 1071 | 1 1071 | LLASRD | 30,3336 | 601 | 2 599 698 |
| LALOTORY | 13,2373 | 1206 | 7 528 800 | LDNPHAS1 | 05,3156 | 188 | 1 188 | LLASRDA | 30,3345 | 601 | 3 558 698 |
| LAMBERT | 12,3215 | 1267 | 1 481 | LDNPHAS2 | 05,3474 | 1068 | 1 1068 | LMCRAE | 16,3731 | 960 | 2 954 955 |
| LAMBLOOP | 12,3332 | 1288 | 3 1289 1271 | LDPOSIX | 04,3466 | = 1275 | 1 1274 | LMLMCOM | 13,2234 | 730 | 1 730 |
| LAMENTER | 12,2706 | 1258 | 1 1271 | LEPT | 00,2342 | 1131 | 1 1128 | LMLLOOP | 31,3345 | 890 | 1 890 |
| LAMPTEST | 06,2750 | 155 | 2 144 145 | LEPT- | 00,2336 | 1131 | 1 1128 | LMK52 | 13,2224 | 730 | 1 730 |
| LANDALT | E4,1761 | = 89 | 4 89 601 | LEPTNCOM | 40,3061 | 345 | 1 345 | LMOONBIT | 4700 | = 60 | |
| LANDBANK | 43,3174 | 261 | 1 261 | LEPTS | 4345 | 372 | 5 326 1370 | LMOONFLO | 0174 | = 60 | 5 32 1286 |
| LANDLAT | 1103 | = 76 | 1 277 | LECALTST | 40,2430 | 316 | 2 316 | LMPOS | 34,3132 | 574 | 2 570 573 |
| LANDLONG | E4,1757 | = 89 | 4 89 601 | LEMCONIC | 13,3057 | 1288 | 4 542 730 | LMTCOM | 43,3105 | 259 | 1 259 |
| LANDMARK | E5,1751 | = 95 | 24 95 891 | LEMMASS | E6,1473 | 100 | 6 100 914 | LMTCOMSV | 43,3100 | 259 | 1 230 |
| LARGE | 00,3065 | 1145 | 1 1145 | LEMNO | 05,3215 | 913 | | LNDKSEL | 31,3215 | 889 | 1 257 |
| LARGE2 | 00,3112 | 1147 | 2 1145 1146 | LEMNM | 0056 | = 38 | | LNG(SPL) | E7,1402 | = 115 | 5 115 857 |
| LARGE3 | 00,3074 | 1147 | 1 1145 | LEMPOS | 1214 | = 78 | 5 78 605 | LNGCALL2 | 01,3461 | 1204 | 1 1204 |
| LARMENT | 5551 | 1461 | | LEMPREC | 13,3036 | 1288 | 3 32 523 | LNLAKEND | 31,3101 | 622 | 1 622 |
| LASINEX | 00,3630 | 1159 | 1 1159 | LEMSTORE | 22,3372 | 490 | 2 490 542 | LOADCDD | 22,3301 | 412 | 1 393 |
| LASTBIAS | 06,3636 | 301 | 1 776 | LEMTST | 05,3211 | 913 | | LOADDAP | 24,2000 | = 28 | |
| LASTOTS | 33,3267 | 438 | | LEMVBC | 43,2700 | 254 | 1 231 | LOADITIS | 10,3607 | 1450 | 1 1447 |
| LASTMSP | E6,1522 | = 101 | 1 101 | LEMYES | 05,3220 | 913 | 1 913 | LOADLV | 41,2771 | 339 | 10 318 347 |
| LASTSEQ | 07,3332 | 1403 | 1 1403 | LEMS2 | 13,2214 | 730 | 1 730 | LOADLV1 | 41,2001 | 318 | 1 238 |
| LASTTIME | 01,3500 | 1204 | | LENGHOT | E5,1412 | 96 | 14 416 439 | LOADSTAT | 1014 | 74 | 4 339 370 |
| L'STXOND | 0035 | = 79 | | LEO | E7,1653 | = 116 | 7 116 826 | LOADSTDT | 33,2564 | 429 | 2 430 431 |
| LASTYOND | 0035 | = 79 | | LESCK | 05,3157 | 189 | 1 188 | LOADTIME | 22,3505 | 1476 | 30 423 1299 |
| LAT | 1103 | = 76 | 17 76 1208 | LEWD | E7,1724 | = 116 | 11 809 820 | LOADYZ | 22,3303 | 412 | 1 411 |
| LAT(SPL) | E7,1400 | 115 | 11 115 857 | LEWDOVFL | 25,2733 | 815 | 1 815 | LOC | 0164 | 70 | 43 370 1451 |
| LAT-LONG | 13,2322 | 1206 | 9 451 894 | LEWDPTR | 25,2737 | 815 | 1 815 | LOCCTR | 0064 | = 66 | 31 370 1446 |
| LATANG | E7,1675 | = 117 | 7 117 827 | LEWD1 | 26,3147 | 833 | 1 817 | LOCSAM | 14,2216 | = 704 | 2 696 737 |
| LATAZCK | 04,2617 | 445 | 1 416 | LPTPLCON | 43,2712 | 254 | 1 230 | LOCSKIRT | 22,2736 | = 405 | 7 393 396 |
| LATBIAS | 26,3241 | 834 | 1 827 | LOCLCADR | 01,3764 | 1387 | 1 1386 | LOCTHETA | 22,3622 | 1479 | 1 1479 |
| LATITUDE | E5,1402 | 96 | 6 416 528 | LOCL2CDR | 5241 | 1204 | 1 1204 | LOD | E7,1625 | = 116 | 3 116 826 |
| LATLONG | 13,2000 | = 27 | 1 1206 | LOCCMP | 06,3516 | 298 | 2 292 298 | LODMIXN | 42,2100 | 265 | 1 265 |
| LATSLOPE | 26,3144 | = 835 | 1 798 | LOWAKE | 07,3206 | 1399 | 2 1399 1400 | LODNLV | 42,2116 | 265 | 1 265 |
| LATSW | 0145 | = 57 | 1 820 | LOYRO | 1304 | 78 | 10 188 1403 | LODNLLOC | 41,2113 | 320 | 8 319 339 |
| LATSWBIT | 4707 | = 57 | | LOYROBIN | 43,2266 | 237 | 1 237 | LODNTAR | 42,2062 | 265 | 1 320 |
| | | | | LIFTTEMP | 1265 | = 78 | 5 78 530 | LODPAD | E6,1410 | 99 | 1 798 |

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|----------|---------|------|--------------|----------|---------|--------|-------------|----------|---------|-------|-------------|
| LODPHALF | 04,3453 | = 31 | 2 676 1273 | LOW2 | 6214 | = 1174 | 1 1128 | M/SCON1 | 42,3312 | 335 | 1 334 |
| LODPHAX | 04,3486 | 1176 | 2 495 1275 | LOW3 | 4716 | = 1174 | 3 198 1125 | M/SCON2 | 42,3313 | 335 | 1 334 |
| LODPHAX1 | 04,3478 | 1176 | | LOW4 | 4721 | 1171 | 4 833 1454 | M/SCON3 | 42,3315 | 335 | 4 334 |
| LODP1/4 | 04,3501 | = 32 | 1 1210 | LOW5 | 4382 | 373 | 14 227 1418 | M/SLIMIT | 42,3241 | 334 | 2 334 |
| LODSAMPT | 4414 | 374 | 3 350 1418 | LOW7 | 6043 | 1078 | 14 194 1450 | M/SNORM | 42,3255 | 334 | 7 534 335 |
| LOENERGY | 12,3444 | 1270 | 1 1269 | LOW7+2K | 4750 | 1172 | 1 1084 | M/SOUT | 42,3216 | 334 | 1 329 |
| LOG | 23,2155 | 286 | 1 813 | LOW8 | 4373 | 373 | 18 372 1473 | MACVBC2 | E5,1721 | = 94 | 6 94 1271 |
| LOLIM | 12,3505 | 1271 | 2 1268 | LOW9 | 4741 | 1171 | 7 223 1188 | MAOVTP1 | E5,1634 | = 92 | 2 92 545 |
| LONGT | 35,2667 | 471 | 3 467 631 | LOBZERS | 04,3455 | = 31 | 5 666 1259 | MAINRTNE | 04,3242 | 519 | 1 522 |
| LONG | 1105 | = 76 | 12 76 1208 | LRBOCHK | 04,3070 | 495 | 1 494 | MAINRTN1 | 04,3266 | 520 | 1 520 |
| LONGRASE | 1125 | 76 | 2 1380 1386 | LRCHDVO | 36,2424 | 547 | 1 547 | MAJ+ | 07,3271 | 1402 | 1 1401 |
| LONGCADR | 1133 | 76 | 2 1204 1205 | LRUPT | 0011 | = 37 | | MAJ- | 07,3411 | 1405 | 1 1401 |
| LONGCALL | 5231 | 1203 | 4 417 1387 | LSDISP | 18,2533 | 698 | 1 698 | MAKECADR | 4604 | 1074 | 7 383 1456 |
| LONGCLCL | 01,3721 | 1386 | 2 1386 | LSLONG | E4,1752 | = 88 | 2 889 | MAKEOEN | 10,3665 | 1452 | 1 1440 |
| LONGCYCL | 01,3465 | 1204 | 1 1205 | LSPOS | 26,2110 | 740 | 3 704 1312 | MAKEMARK | 10,2515 | 1434 | 1 1438 |
| LONGKIT | E3,1434 | 82 | 3 1204 1205 | LSTRKCH | 43,3721 | 1371 | 1 1370 | MAKEPLAY | 10,2674 | 1438 | 3 1437 1452 |
| LONGOYNO | 07,3345 | 1403 | 1 1402 | LSTIME | 26,2126 | 741 | 3 740 741 | MAKEPRIO | 10,2640 | 1437 | 1 1438 |
| LONGRTN | 01,3505 | 1204 | 1 1205 | LSTPTR | 0144 | = 68 | | MAKESERV | 37,2746 | 779 | 1 780 |
| LONGSAVE | E4,1734 | = 88 | 3 88 892 | LST1 | E3,1400 | 82 | 48 128 1382 | MAMAX1 | E7,1851 | = 125 | 3 125 872 |
| LONGTAB | 31,3622 | 896 | 3 558 890 | LST2 | E3,1410 | 82 | 30 186 1201 | MAMAX2 | E7,1853 | = 125 | 3 125 872 |
| LONGTIME | 1137 | 76 | 11 1203 1386 | LST2CON | 41,2145 | 320 | 1 320 | MANROT | 21,3022 | 990 | 3 988 996 |
| LOONE | 34,3600 | 588 | 1 588 | LST2PAN | 43,2002 | 230 | 2 230 378 | MANTARLE | 21,3024 | 990 | 2 989 990 |
| LOOPSST | 32,2130 | 636 | 4 635 636 | LTHVACA | 05,3161 | 189 | 4 187 | MANTOCSC | 06,3112 | 158 | 3 157 158 |
| LOOPSIN | 22,2414 | 398 | 1 398 | LUNABIT | 4677 | = 50 | | MANTOMAN | 06,3107 | 158 | 1 158 |
| LOOP1 | 23,3624 | 1338 | 1 1338 | LUNAFIAG | 0060 | = 50 | 27 450 1212 | MANUCALL | 22,3216 | 409 | 1 409 |
| LOOP2 | 23,3623 | 1338 | 1 1338 | LUNHAZI | E5,1833 | = 98 | 5 98 436 | MANUDBS | 06,3077 | 158 | 1 156 |
| LOOSE | 33,2772 | 433 | 1 433 | LUNENT | 26,2774 | 764 | 1 762 | MANUEXIS | 34,3452 | 586 | 2 583 584 |
| LOPC | 30,2000 | = 29 | | LUNMKLD | 31,3084 | 622 | 1 614 | MANUEKIT | 34,3453 | 586 | |
| LOSCALAR | 0004 | = 39 | 3 424 | LUNPOS | 26,2115 | 740 | 2 887 1313 | MANUOFF | 22,3133 | 408 | 1 408 |
| LOSVBC | E5,1413 | 96 | 5 96 444 | LUNSPH | 11,3263 | 1313 | 1 1312 | MANUSTAL | 22,3110 | 408 | |
| LOS1 | E5,1454 | = 96 | | LUNVEL | 26,2120 | 741 | 1 1314 | MANUSTAT | 22,3142 | 408 | 1 407 |
| LOS2 | E5,1462 | = 96 | | LV | 0044 | = 38 | 2 1145 1147 | MANUSTOP | 22,3232 | 411 | 1 408 |
| LOTENIN | 0124 | = 67 | | LVRUP | 6242 | 1085 | 1 1109 | MANUVER | 27,2000 | = 29 | 2 383 390 |
| LOTSMOUT | 1010 | = 73 | 1 336 | LVSQUARE | 0042 | = 38 | 2 1145 1150 | MANUVER1 | 27,2000 | = 29 | 1 389 |
| LOTRUST | 20,2021 | 678 | 1 678 | LWILIST | 5152 | 1193 | 1 1197 | MANYFEET | 38,2016 | 542 | 1 544 |
| LOUNITY | 04,3453 | = 32 | | LWDSTORE | 25,2700 | 815 | 1 815 | MARKCONT | 07,2152 | 222 | 1 228 |
| LOUNITY | 04,3451 | = 32 | | LXA | 01,2401 | 1162 | 1 1087 | MARKCOP | 10,2544 | 1435 | 1 1435 |
| LOUNITZ | 04,3447 | = 32 | | LXC | 01,2405 | 1162 | 1 1087 | MARKCTR | 1126 | = 78 | 1 504 |
| LOWIDCOD | 05,2000 | 166 | 1 1072 | L14/OUT | 40,2615 | 331 | 1 331 | MARKDATA | 1242 | = 78 | 7 78 613 |
| LOWLOAD | 10,3654 | 1451 | 1 1447 | L350 | 25,3532 | 827 | | MARKDIP | 10,2203 | 228 | 1 228 |
| LOWENERY | 14,2000 | 622 | 1 611 | L353 | 25,3545 | 827 | 1 827 | MARKDISP | 37,2405 | 561 | 1 222 |
| LOWSUPER | 30,2000 | = 29 | 4 32 694 | L355 | 25,3560 | 827 | 4 827 829 | MARKDOWN | E7,1674 | = 123 | 9 32 725 |
| LOWVERB | 41,2034 | 319 | 1 319 | L357 | 25,3624 | 829 | 1 827 | MARKERAN | 1070 | 75 | 1 1451 |
| LOW10 | 4747 | 1171 | 20 32 1369 | ===== | ===== | ===== | ===== | MARKEND | 10,2457 | 1433 | 1 1433 |
| LOW11 | 4372 | 373 | 7 130 1089 | M.6RTE | 34,3706 | 884 | 1 864 | MARKET | 07,2167 | 222 | 1 222 |

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|----------|---------|------|------------------|-----------|---------|------|----------------|----------|---------|------|------------------|
| MARKST3 | 07,2216 | 222 | 2 222 | MAXIN | 42,2054 | 246 | 1 247 | MIDAVFLO | 0224 | = | 63 3 1299 1317 |
| MARKFLAG | 1070 | = | 1451 1 1435 | MAXLIM | 16,3735 | 960 | 2 953 955 | MIDGIM | 04,2000 | = | 25 1 485 |
| MARKPMK | 10,3157 | 1443 | 2 1434 | MAXON | 23,2763 | 514 | 3 514 | MIDFLAG | 0002 | = | 44 5 1292 1320 |
| MARKFORM | 10,2471 | 1434 | | MAXOUT | 42,2020 | 247 | 1 248 | MIDFLBIT | 4876 | = | 44 |
| MARKINDX | 0301 | = | 70 8 70 726 | MAXPHI | 32,2167 | 636 | 2 636 | MIDGIM | 04,2653 | 485 | 3 633 668 |
| MARKIT | 07,2427 | 227 | 1 220 | MAXPHIC | 32,2172 | 636 | 1 636 | MIDGIM1 | 04,2673 | 485 | 1 485 |
| MARKITI | 07,2156 | 222 | | MAXPLS | 10,2201 | 165 | 2 164 | MIDTOAV1 | 13,3577 | 1298 | 1 642 |
| MARKOV | 0370 | 72 | 5 1435 1444 | MAXPLS1 | 10,2202 | 165 | 2 164 | MIDTOAV2 | 13,3573 | 1298 | 2 647 756 |
| MARKOCT | 10,3660 | 1452 | 1 1442 | MAXRA | 27,3051 | 1347 | 2 1347 | MID1PBIT | 4710 | = | 62 |
| MARKOK | 07,2015 | 217 | 1 217 | MAXRNG | 25,3764 | 833 | 1 825 | MID1FLAG | 0223 | = | 62 4 1298 1300 |
| MARKOVR | 10,3547 | 1449 | 1 1433 | MAXRST | 00,2565 | 1136 | 4 1135 1149 | MID2 | 13,3672 | 1299 | 1 1299 |
| MARKPERP | 10,2571 | 1436 | 1 1445 | MAXTPP | 27,3241 | 1353 | 1 1352 | MID6 | 4363 | 373 | 1 340 |
| MARKPLAY | 10,2530 | 1435 | 4 1435 1451 | MAXTPP1 | 27,3240 | 1353 | 1 1350 | MID7 | 4160 | 351 | 4 351 1451 |
| MARKRBT | 10,3541 | 1449 | 1 1448 | MAXTPRE | 16,3574 | 956 | 1 956 | MIN | 0010 | = | 1277 4 1256 1257 |
| MARKRUPT | 07,2103 | 219 | 2 127 128 | MAXTST | 16,3600 | 956 | | MIN+ | 07,3266 | 1402 | 1 1401 |
| MARKSTAT | 1330 | 79 | 42 188 736 | MAXVTEST | 15,3415 | 1054 | 1 1054 | MIN- | 07,3406 | 1405 | 1 1401 |
| MARKTIME | 1224 | = | 78 10 78 614 | MAXVTM1 | 15,3434 | 1054 | 1 1054 | MINANG | 22,2366 | 398 | 1 393 |
| MARKWAKE | 10,3151 | 1443 | 1 1450 | MAXVTM2 | 15,3452 | 1055 | | MINB12 | 7710 | = | 1069 1 1067 |
| MARK2 | 07,2224 | 223 | 1 222 | MAX250 | 35,3135 | 477 | 1 461 | MINB1314 | 05,3414 | 1067 | 1 1067 |
| MARK2DN | 07,1502 | = | 115 2 169 725 | MCDUYNCTL | 34,3556 | 587 | 2 537 585 | MINCHECK | 12,2576 | 1256 | 1 1256 |
| MARK2PAC | 1072 | 75 | 2 1443 1444 | MCDUYNCT | 34,3556 | 587 | | MINCOGA | 12,3322 | 1268 | 1 1271 |
| MARK3MSK | 10,3633 | 1451 | 2 1434 | MCDUYNCT | 34,3556 | 587 | | MINCON | 42,3453 | 347 | 1 346 |
| MARK4MSK | 10,3634 | 1451 | 1 1434 | MCDUYNCT | 34,3556 | 587 | | MINCON1 | 42,3210 | 333 | 1 336 |
| MARSOP | 35,3720 | 629 | 1 629 | MCDUYNCT | 34,3556 | 587 | | MINCON2 | 42,3206 | 333 | 2 333 |
| MARSLEP | 10,3602 | 1450 | 1 1435 | MCDUYNCT | 34,3556 | 587 | | MINDR | 24,2210 | 643 | 1 643 |
| MASKREG | 05,1544 | = | 97 | MDOTPA IL | 37,3140 | 784 | | MINDEX | 0774 | 73 | 4 195 198 |
| MASS | 06,1475 | = | 100 | MDOTCS | 34,3730 | 685 | 1 649 | MINRECT | 11,3360 | 1315 | 2 503 1297 |
| MASSBACK | 24,2750 | 654 | | MDT | 06,1636 | 102 | 1 103 | MINLIM | 16,3733 | 960 | 1 953 |
| MASSPROP | 05,3207 | 913 | 5 194 913 | MD1 | 4376 | 373 | 3 370 1470 | MINLIMAP | 16,3510 | 955 | |
| MASSIMP | 06,1662 | = | 103 11 103 905 | MEASINC | 36,2000 | = | 30 1 1222 | MINPERE | 23,2461 | 508 | 3 507 765 |
| MATINC | 0140 | 68 | 8 68 1114 | MEASINC1 | 36,2000 | = | 30 1 1226 | MINPERM | 23,2457 | 508 | 1 510 |
| MATMOVE | 14,3040 | 717 | 3 717 728 | MERRORX | 06,1541 | = | 106 5 106 990 | MINTAU | 21,3302 | 997 | 3 996 |
| MATKJOB | 34,2127 | 528 | 2 207 424 | MERRORY | 06,1543 | = | 106 1 106 | MINTIME2 | 05,3361 | 1066 | 1 1067 |
| MAT1B1 | 34,3554 | 587 | | MERRORZ | 06,1545 | = | 106 1 106 | MINTST | 16,3573 | 956 | |
| MAX | 0016 | = | 1277 4 1256 1257 | MERUPDAT | 21,3001 | 990 | 1 989 | MINUS1 | 7716 | = | 1174 2 1402 1449 |
| MAXANG | 22,2367 | 398 | 1 393 | METHOD1 | 22,2234 | 395 | 1 395 | MINUS2 | 7715 | = | 1387 3 186 1382 |
| MAXCHECK | 12,2632 | 1257 | 1 1257 | METHOD2 | 22,2210 | 395 | | MIS | 06,1720 | = | 112 17 112 407 |
| MAXCHK | 23,2754 | 514 | 6 513 632 | METHOD3 | 22,2260 | 395 | 2 395 | MISCJUMP | 6303 | 1087 | 1 1084 |
| MAXCOGA | 12,3304 | 1268 | 2 1267 1268 | MPI | 07,1425 | = | 119 12 392 394 | MIXAD | 41,2260 | 322 | 1 322 |
| MAXDB | 24,2211 | 643 | 1 643 | MPISYM | 06,1666 | = | 112 12 394 396 | MIXRR | 0140 | = | 68 12 265 345 |
| MAXDBRIT | 4877 | = | 61 | MPS | 07,1425 | = | 119 5 119 392 | MIXCON | 4726 | = | 265 1 265 |
| MAXDRFLO | 0212 | = | 61 2 247 248 | MGC | 06,1763 | = | 93 4 93 1327 | MIXON1 | 41,2234 | 322 | 1 322 |
| MAXDT | 13,3316 | 1293 | 2 1292 | MGLVPLAG | 0130 | = | 55 2 485 | MIXON2 | 41,2246 | 322 | 1 322 |
| MAXDV | 00,2642 | 1140 | 1 1136 | MO2 | 07,3526 | 1409 | 1 1409 | MIXONLN | 41,2221 | 322 | 1 319 |
| MAXDVSW | 0140 | = | 68 6 1132 1147 | MIDAVBIT | 4711 | = | 63 | MIXTEMP | 0125 | = | 68 3 316 322 |

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

UN UNDEFINED = DEFINED BY EQUALS J DEFINED BY JOKER OR PHASE ANYWHERE MD MULTIPLY DEFINED
 RD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE



SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, J OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

| SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES | |
|----------|---------|------|------------|---------------|---------------|---------|--------------|----------------|---------------|---------|---------------|---------------|
| MCABORT | 07,2013 | 217 | I 216 | MONITOR | 41,3220 | 349 | 7 320 | 321 MRCRIMP | E6,1445 | = | 100 4 641 635 | |
| MCACPT | 10,2216 | 228 | I 228 | MONIT1 | 41,3222 | 349 | | MRLPTBIT | 4706 | = | 52 | |
| MCODUS | 0360 | 11 | 2 219 | 223 MONIT2 | 41,3335 | 349 | 2 349 | MRLPTPLG | 0106 | = | 52 | |
| MCODUT | 0362 | 11 | 2 219 | 223 MONRES | 41,3337 | 351 | 1 351 | MRSOCAN1 | 32,2000 | = | 30 | |
| MCODUX | 0363 | 71 | 3 219 | 228 MONRES | 41,3265 | 350 | 2 350 | MSINT.5 | 34,3741 | = | 885 1 650 | |
| MCODUZ | 0357 | 71 | 3 219 | 228 MONSAVE | 1020 | 14 | 7 186 | 351 MSTORE1 | 01,2414 | 1162 | 2 1163 1166 | |
| MCODUZ | 0361 | 11 | 3 219 | 228 MONSAVE1 | 1021 | 74 | 12 186 | 377 MXP) | 0032 | = | 1322 | |
| MCNCDR | 14,3320 | 725 | 1 725 | MONSAVE2 | 1022 | 74 | 4 349 | 384 MXTIME | 01,3510 | 1205 | 2 1204 | |
| MCNDX | 0354 | 71 | 3 228 | MONSBIT | 4677 | = | 44 | MUEARTH | 13,3735 | 1322 | 9 480 1322 | |
| MCOVBIT | 4110 | = | 53 | MONCASE | 16,2342 | 680 | 1 680 | MULTEXIT | 5574 | 1462 | 3 1461 1462 | |
| MCOVPLG | 0110 | = | s 3 | MONCNTR | 14,2256 | T04 | 1 704 | MULTPAIL | 5600 | 1462 | 1 1461 | |
| MCRBJBOT | 01,2300 | 224 | 1 220 | MONFLAG | 0003 | = | 44 | MUM | 13,3733 | = | 1322 | |
| MCRLEAS | 07,2063 | 218 | 6 420 | 123 MOONCON | 23,2617 | 510 | 1 510 | MUTABLE | 04,3630 | 1275 | 7 486 1257 | |
| MCRLESS | 01,2070 | 218 | 1 554 | MOONPK | 26,3416 | 1216 | 2 1213 | 1215 MVAITBIT | 4700 | = | 52 | |
| MCRUPTB | 4057 | 128 | 1 127 | MOONPTH | 0174 | = | 32 | 3 259 | MVAITPLG | 0100 | = | 51 |
| MCTZT1 | 0355 | 71 | e 219 | 223 MOONTHIS | 23,2467 | 508 | 1 508 | MOM3 | 22,2304 | 391 | 4 387 407 | |
| MKVACND | 01,2031 | 217 | 5 217 | MOONTHIS | 0173 | = | 32 | 9 259 | 1296 MKV | 7303 | 1113 | 1 1066 |
| MKVBSX | 07,2415 | 227 | 1 22e | MORBRLL | 16,3560 | 956 | 1 956 | MYSLBS | 21,2000 | = | 28 1 970 | |
| MKVBS0 | 07,2421 | 227 | 1 223 | 40,2213 | 313 | 2 312 | 3 312 | M14ARTB | 34,3700 | 884 | I 878 | |
| MKVBS1 | 07,2346 | 22e | 4 217 | 227 MOVATHIS | 13,2651 | = | 32 | 1 1297 | MISRTB | 34,3702 | 884 | 1 861 |
| MM | E7,1650 | = | 116 | 825 MOVEACSM | 13,2651 | 1285 | 4 32 | 1285 MORTER28 | 34,3712 | 884 | 1 847 | |
| MMADREP | 41,2033 | 318 | 1 316 | 13,2724 | 1286 | 3 1229 | 1286 | MORTER28 | 34,3720 | 884 | 1 847 | |
| MMATRIX | 0024 | = | 1221 | 6 1213 | 1309 MOVEPCSM | 13,2700 | 1285 | 3 1230 | 1285 MORTER28 | 34,3716 | 884 | I 845 |
| MNDPLAY | 41,3420 | 359 | 2 316 | 321 MOVEPLEM | 13,2745 | 1286 | 3 1229 | 1286 | ===== | | | |
| MNUMBER | 0775 | 13 | 9 193 | 197 MPAC | 0154 | 70 | 780 184 1483 | N | E6,1666 | = | 103 5 103 947 | |
| MNTENP | 1060 | = | 199 | 3 198 | MPAC. | 00,2437 | 1134 | 2 1133 | NAKEYIN | 0016 | = | 39 5 165 220 |
| MKEYIN | 0015 | = | 39 | 2 185 | 1417 MPAC. | 0162 | = | 331 7 332 374 | NEONLY | 06,3542 | 299 | 1 1195 |
| MODABORT | 07,3541 | 1409 | 2 1409 | MPAC. | 00,2433 | 1133 | 2 1133 | NRDX | E3,1460 | 82 | 7 82 1195 | |
| MODONE | 12,2112 | 1248 | 3 1248 | MPACSR | 00,2033 | 1122 | 2 1130 | 1151 NEDY | E3,1461 | 82 | 2 294 299 | |
| MODE | 0163 | T0 | 26 292 | 1451 MPACSRND | 00,2050 | 1123 | 1 1122 | NEDZ | E3,1462 | 83 | 2 295 299 | |
| MODECADR | 1322 | 19 | 10 79 | 1409 MPACTST | 42,3467 | 347 | I 346 | NED2 | 06,3560 | 299 | 1 301 | |
| MODEEXIT | 0712557 | 1390 | 6 1389 | 1409 MPACVREP | 7501 | 1118 | 4 1114 | 1337 NED3 | 06,3567 | 299 | 1 299 | |
| MODEGOOD | 07,3531 | 1409 | 1 1409 | MPAC2SAV | 0165 | = | 1451 | 2 1435 1444 | NEPOSPL | 33,2037 | 416 | 1 442 |
| MODESLP | 07,3535 | 1409 | 1 1409 | MPEBPMK | 10,3646 | 1451 | 2 1434 | NEFRANCH | 11,3135 | 1311 | 3 1309 1320 | |
| MODESW | 67,2000 | = | 2 e | 1 1389 | MPEBTD | 26,2108 | 733 | 1 732 | NEFRANCH1 | 11,3125 | 1311 | 1 1310 |
| MONCDEL | 12,2605 | 1256 | 2 1256 | MPTENP | 0135 | 68 | 63 68 1161 | NERCYCLP | E6,1747 | = | 105 4 105 656 | |
| MODPDEL | 12,2643 | 1217 | 2 1257 | MR_CLEAN | 05,2474 | 181 | 2 180 | 1463 NERCYCLS | E6,1746 | = | 105 9 105 661 | |
| MODRES | 1011 | 74 | 20 160 | 1468 MRKLEA | 17,2033 | 899 | 2 899 | 919 NISM | 23,3541 | 1336 | 2 568 725 | |
| MODROUTS | 04,2010 | = | 359 | 1 359 | MRCRUP1 | E7,1725 | = | 124 37 32 736 | NRUSMASK | 10,3641 | 1451 | 1 1438 |
| MONADR | 40,3341 | 358 | 1 356 | 1 356 | MRCRUP2 | E7,1734 | = | 124 16 124 783 | NR1NR2 | 23,2301 | 290 | 1 280 |
| MONBACK | 41,3340 | 351 | 1 351 | MRKIDBIT | 4674 | = | 51 | | NR2NR1 | 23,2257 | 289 | 4 281 282 |
| MONBUSY | 41,3341 | 352 | 1 351 | MRKIDPLG | 0074 | = | 51 | | NCDU | E6,1666 | = | 112 3 407 408 |
| MONDEL | 41,3310 | 350 | 1 350 | MRCNFBIT | 4702 | = | 52 | | NCDPTST | 41,2435 | 327 | |
| MONDO | 41,3311 | 350 | 1 350 | MRCNPLG | 0102 | = | 52 | 1 1445 | NDRMFBIT | 4701 | = | 58 |
| | | | | MRCREJCT | 07,2307 | 224 | 1 224 | | NDRCHCE | 12,2223 | 1250 | 2 1250 |

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

UN UNDEFINED = DEFINED BY EQUALS J DEFINED BY JOKER OR BRACE ANYWHERE MD MULTIPLY DEFINED
 ED BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEP, J OF REFS, PAGE OF FIRST REP, PAGE OF LAST REP.

| SYMBOL | DEP | H | REFERENCES | SYMBOL | DEP | H | REFERENCES | SYMBOL | DEP | H | REFERENCES |
|-----------|---------|--------|-------------|----------|---------|--------|-------------|----------|---------|-------|-------------|
| NEXCTR | ES,1421 | 96 | 6 416 419 | NEWAZMTH | ES,1635 | = 97 | 3 438 447 | NJETSFL0 | 0017 | = 45 | 3 844 849 |
| ND1 | 4375 | 373 | 6 314 440 | NEWAZ1 | ES,1635 | = 98 | 2 438 | NJ22 | 21,3553 | 1002 | 2 1002 |
| NEARLY1 | 23,2211 | 286 | 1 286 | NEW(S) | 20,2561 | 928 | | NJ23 | 21,3604 | 1003 | 2 1003 |
| NEARONE | 27,3362 | 1356 | 5 799 1353 | NEW(S) | 20,3037 | 934 | | NKVAL | E4,1728 | = 88 | 3 88 891 |
| NEAR1/4 | 26,3161 | 833 | 2 803 | NEWDEL | 12,2641 | 1257 | 2 1256 1257 | NNADTAB | 42,2133 | 264 | 1 265 |
| NEEDLEBIT | 4702 | = 44 | | NEWDELHI | 22,3027 | 407 | 1 410 | NNADTEM | 0146 | 89 | 8 265 342 |
| NEEDLEIN | 17,2153 | 901 | | NEWDELK | 12,2243 | 1250 | 3 1250 1251 | NNTYPTAB | 42,2277 | 289 | 1 285 |
| NEEDLER | 21,2404 | 982 | 9 531 1060 | NEWIRBIT | 4676 | = 59 | | NNTYPTM | 0147 | 69 | 5 265 341 |
| NEEDLER1 | 21,2415 | 982 | 1 982 | NEWIFLG | 0172 | = 59 | 3 1289 1293 | NN1 | E7,1645 | = 125 | 2 275 548 |
| NEEDLER2 | 21,2448 | 982 | 2 243 982 | NEWJ(S) | 20,2572 | 928 | | NN1A | E7,1727 | = 125 | 13 125 875 |
| NEEDLES | 21,2462 | 983 | 1 244 | NEWJOB | 0067 | 66 | 22 187 1371 | NN2 | E7,1731 | = 125 | 8 125 878 |
| NEEDLES3 | 21,2455 | 983 | 1 982 | NEWLIST | 05,3372 | 1067 | | NO.CORES | 01,2657 | 1181 | 2 1181 1186 |
| NEEDLEUP | 16,2706 | 904 | | NEWLOC | 0085 | = 86 | 9 1178 1188 | NO.MMS | 0035 | = 202 | 1 202 |
| NEEDLE11 | 21,2427 | 982 | 1 243 | NEWMODE | 6027 | 1076 | 6 1094 1477 | NO.TSVAR | 21,2607 | 986 | 1 985 |
| NEEDLFL0 | 0006 | = 44 | 3 238 | NEWMODEA | 5246 | 1372 | 1 198 | NO.WDS | 6213 | 1083 | 5 1083 1152 |
| NEC | 6710 | 1100 | 4 1100 | NEWMODEX | 5243 | 1372 | 14 415 1474 | NO.05G | 25,2255 | 804 | 1 804 |
| NEC.2 | 40,2783 | 344 | 1 344 | NEWOPS | 6037 | 1078 | 1 1077 | NO.12-10 | 16,3706 | 958 | 1 958 |
| NECAMA | 25,2743 | 816 | 1 811 | NEWPAR | 14,2452 | 709 | 1 709 | NO.13-15 | 16,3656 | 958 | |
| NECBPW | 05,3340 | 915 | 1 913 | NEWPHASE | 4114 | 215 | 9 430 779 | NO.16-14 | 16,3877 | 958 | |
| NECCOS | 13,2505 | 1210 | 1 1210 | NEWPRIO | 0083 | = 86 | 12 198 1440 | NO.9-11 | 16,3865 | 958 | 1 957 |
| NECMAX | 4674 | = 1174 | 12 409 1198 | NEWRVN | 26,2243 | 744 | 1 744 | NOACY | 17,3147 | 1017 | 3 1016 |
| NECONE | 7716 | 1173 | 29 156 1384 | NEWROLL | 16,3563 | 956 | 2 956 | NOADJUST | 42,3652 | 888 | 2 887 888 |
| NECPCMD | 10,2161 | 164 | 1 164 | NEWSTATE | 12,2660 | 1258 | 1 1260 | NOATTOFF | 07,3070 | 1396 | 4 139 1395 |
| NECOPT | 40,2540 | 330 | 1 330 | NEWTC | 12,2141 | 1249 | 1 1249 | NOAZCHGE | 33,3371 | 439 | 1 438 |
| NECOLUT | 13,2513 | 1210 | 1 1210 | NEWY(S) | 20,3050 | 934 | | NORDZ | 17,3065 | 1015 | 3 1014 1015 |
| NECP | 12,3421 | 1269 | 3 1268 1269 | NEWZCOMP | 37,3876 | 1230 | 1 1224 | NORITS | E5,1452 | = 98 | |
| NECSON | 40,2275 | 314 | 1 311 | NEWZKSS | 33,3556 | 444 | | NOCHANGE | 21,2710 | 988 | 1 988 |
| NECTESTS | 25,3175 | 820 | 1 821 | NEXTBRND | 31,3404 | 891 | 2 891 | NOCHO | 35,2771 | 472 | 1 472 |
| NECTPP | 27,3235 | 1353 | 2 1352 | NEXTBRKS | 33,3537 | 443 | | NOCHORLD | 33,3374 | 439 | 1 438 |
| NECTOFL | 12,2331 | 1251 | 1 1251 | NEXTCDL | 07,2662 | 1392 | 4 1392 1393 | NOCOARSE | 05,2625 | 183 | 1 183 |
| NECVEL | 21,3473 | 1001 | 3 1001 | NEXTCOL | 11,3465 | 1317 | 2 1318 | NOCARPUP | 42,3544 | 690 | 1 690 |
| NEC0 | 4713 | 1170 | 17 131 1474 | NEXTCORE | 01,2717 | 1182 | 2 1181 | NODDOT | 26,3837 | 1221 | 1 1216 |
| NEC1 | 7718 | = 1174 | 5 293 1174 | NEXTES | 35,2441 | 464 | 1 463 | NODIO | 26,3645 | 1221 | 1 1216 |
| NEC1/2 | 4673 | 1170 | 9 163 1201 | NEXTIME | E6,1671 | = 112 | 3 409 | NODISKY | 25,3600 | 828 | 1 827 |
| NEC100 | 5127 | 1190 | | NEXTINCL | 05,3377 | 1067 | 1 1067 | NODORIT | 4712 | = 49 | |
| NEC12 | 00,3730 | 1161 | 3 1129 1151 | NEXTINSL | 05,3522 | 1069 | 1 1067 | NODOFLAG | 0054 | = 49 | 4 204 1416 |
| NEC180 | 40,2751 | 344 | 1 343 | NEXTLINE | 23,2610 | 510 | 1 510 | NODSPLT | 08,2132 | 133 | 2 131 |
| NEC2 | 7715 | 1173 | 7 229 1387 | NEXTOPT | 10,2150 | 164 | 4 164 165 | NODSPY | 06,2154 | 133 | 1 133 |
| NEC3 | 7714 | 1173 | 6 569 1473 | NEXT1 | 25,3172 | 820 | 1 820 | NOCERANK | 43,3360 | 1368 | 1 1367 |
| NEC4 | 8061 | 1079 | 3 1020 1384 | NEWUS | 36,2476 | 548 | 2 548 | NOFLASH | 24,3301 | 661 | 1 661 |
| NEC5 | 41,2115 | 320 | | NINE | 4334 | = 1174 | 8 439 1016 | NOGANDOT | 37,3610 | 840 | 1 840 |
| NEC7 | 5630 | = 199 | | NINER4 | 26,2213 | 742 | 1 741 | NOGANDUT | 15,2671 | 1043 | 1 1042 |
| NETZERO | 6070 | 1080 | | NINETEEN | 4374 | = 902 | 2 901 905 | NOIMLOC | 22,2738 | 405 | 1 405 |
| NEWANGL | 22,3032 | 407 | 1 405 | NJET | 17,3400 | 1025 | 3 1021 1024 | NOIMRLN | 06,2455 | 144 | 2 143 |
| NEWANGLE | 26,3543 | 1218 | 4 1216 1219 | NJETSBIT | 4674 | = 45 | | NODD | 22,2727 | 404 | 2 393 407 |

HEALTH KEY: NORMALLY DEFINED UNLESS PLACED AS FOLLOWS:

UN UNDEFINED = DEFINED BY EQUALS J DRPINED BY JOKER OR FRASE ANYWHERE MD MULTIPLY DRPINED
 BD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANROUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEP, J OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

| SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES |
|-----------|---------|------|-------------------|-----------|---------|------|------------------|-----------|----------|---|------------------|
| NOCOM2 | 22,2725 | 404 | | NOSWBIT | 4704 | = | 58 | NRMNVTBIT | 4703 | = | 52 |
| NOCLUSS | 12,3471 | 1270 | 1 1288 | NOSWITCH | 0142 | = | 58 | NRMNVPLO | 0103 | = | 62 1 1445 |
| NOCHTAUTO | 21,2881 | 961 | 1 987 | NOTADDUL | 16,2502 | | 883 | NRTSRM | 0020 | = | 1341 I 768 1350 |
| NOIBKSW | 6032 | 1078 | 1 1119 | NOTBIT12 | 40,3573 | | 382 | NRUPTBIT | 4707 | = | 53 |
| NOINT | 13,2630 | 1284 | 1 1283 | NOTIME | 13,3702 | 1300 | 2 1298 1299 | NRUPTPLG | 0107 | = | 13 |
| NOKILL | 43,2784 | 257 | 1 257 | NOTPLAN | 15,2423 | 737 | 1 737 | NSBC | 15,3211 | | 1049 1 1048 |
| NOLDCALC | 25,2253 | 604 | 2 804 | NOTSET | 35,3710 | 629 | 1 629 | NSUM | 20,3173 | | 931 2 926 932 |
| NOLEM | 17,2651 | 1011 | 1 1011 | NOTYBT | 20,3606 | 1037 | 1 1037 | NSUMSC | 20,3227 | | 938 |
| NOLEVAL | 05,3304 | 915 | 1 913 | NOLN | 40,2271 | | 314 1 311 | NSUMTMP | E6,1711 | = | 103 14 103 938 |
| NOLNLIST | 05,2113 | = | 188 | NOLNADD | 0146 | = | 66 29 322 | NTARCBIT | 4710 | = | 57 |
| NOMPIO | E7,1447 | = | 115 3 115 680 | NOLNCADR | 1017 | | 14 0 319 | NTARCPLO | 0146 | = | 61 3 472 |
| NOMTPI | E4,1763 | = | 90 6 455 471 | NOLNREG | 1002 | | 73 15 188 | NTRYPRIO | 4675 | = | 198 |
| NOMPTIRE | 16,3808 | 951 | 1 958 | NOLNTEM | 0122 | = | 87 3 322 | NUCHANO2 | 01,3032 | | 1185 1 1190 |
| NONAVKEY | 05,2764 | 186 | 2 185 | NOLNTEST | 41,2457 | | 327 2 331 | NULIRECT | 01,3242 | | 1190 1 1190 |
| NONVIE | 35,2570 | 461 | 1 467 | NOLUPDATE | 16,2740 | | 905 | NUPAZ+10 | 4128 | | 215 |
| NOPOLY | 34,2504 | 531 | 1 533 | NOJUT | 1016 | | 14 9 131 | NUJET | E6,1612 | = | 110 1 110 1058 |
| NOPOLYM | 37,2181 | 535 | 1 537 | NOJUTCON | 4717 | = | 1114 1 188 | NUM | 40,2076 | | 311 9 310 311 |
| NOBRSM | 5228 | 1202 | 1 128 | NOLVBAU | 04,2245 | | 191 1 195 | NUMORPS | 4715 | = | 189 2 184 |
| NOBRSM | 5224 | 1202 | 4 188 959 | NOVAC | 5027 | | 1178 35 132 1450 | NUMCSM | E3,1600 | | 84 1 621 |
| NORATE | 21,2771 | 990 | 1 989 | NOVACADR | 01,3767 | | 1381 1 1364 | NUMLEM | E3,1852 | | 84 |
| NORSET | 07,3232 | 1400 | | NOVAC2 | 01,2850 | | 1181 1 1178 | NVBNKTRM | 1040 | | 74 1 364 |
| NORFBIT | 4700 | = | 44 | NOVAC3 | 01,2853 | | 1181 1 1162 | NVBSMSK | 10,3644 | | 1451 1 1446 |
| NORPHOR | 0004 | = | 44 4 812 820 | NOVRWRT | 35,2644 | | 469 1 410 | NVCADR | 10,3635 | | 1451 1 1447 |
| NORPINAL | 13,3255 | 1292 | | NOV3TMM | 04,2475 | | 202 1 194 | NVCOM | 40,2280 | | 314 1 314 |
| NORMADR | 42,3314 | 335 | 1 334 | NOXLNCMD | 17,2883 | | 1011 1 1010 | NVDSP | 10,3216 | | 1444 2 1445 1451 |
| NORMENCH | 10,3207 | 1444 | 1 1450 | NO2Y | 17,3426 | | 1027 4 1027 | NVDSP1 | 10,31245 | | 1444 1 1444 |
| NORMEX | 1340 | = | 80 18 481 543 | NO2Z | 17,3432 | | 1027 3 1028 | NVMOOPT | 4111 | | 364 1 1444 |
| NORMGAM | E4,1615 | = | 81 7 87 1231 | NP | E6,1744 | = | 104 4 964 | NVOTEM | 1031 | | 74 2 364 |
| NORMLIZE | 37,3141 | 785 | 3 211 777 | NPDCODE | 17,2224 | | 984 | NVSAVE | 0371 | | 72 3 180 1450 |
| NORMLOP | 33,2646 | 431 | 1 431 | NPJETS | E6,1523 | = | 108 I 104 1022 | NVSRBRNK | 4215 | | 364 2 364 |
| NORMSET | 10,3555 | 1450 | 2 1448 | NPO | E6,1561 | = | 104 13 964 968 | NVSRCOM | 4200 | | 364 1 316 |
| NORMSW | 0156 | = | 58 8 480 1262 | NPONCODE | 17,2213 | | 964 1 925 | NVSRDNL | 40,3342 | | 358 2 358 360 |
| NORMTEM1 | 1045 | = | 14 3 715 1441 | NP1 | E6,1563 | = | 104 1 964 | NVSWAIT | 4461 | | 378 |
| NORMTEST | 00,3511 | 1158 | | NP1NCODE | 17,2246 | | 964 1 926 | NVSWT1 | 4411 | | 316 1 316 |
| NORMTA | 06,2007 | 129 | 2 129 | NP1TMP | E6,1736 | = | 104 9 964 965 | NVSR | 4110 | | 364 3 231 1450 |
| NORMUNIT | 22,3723 | 1482 | 1 1482 | NP2 | E6,1541 | = | 104 1 964 | NVSRBR | 41,2000 | | 318 1 364 |
| NORMLNK1 | 22,3721 | 1482 | | NP2NCODE | 17,2306 | | 965 | NVSRCOM | 4204 | | 364 |
| NORMWAKE | 10,3481 | 1448 | 1 1450 | NP2TMP | E6,1711 | = | 104 9 965 966 | NVSRBEND | 4216 | | 364 4 358 306 |
| NORMZI | 0044 | = | 1231 12 1230 1231 | NP3 | E6,1543 | = | 104 1 985 | NVSRBSY1 | 04,2550 | | 376 1 376 |
| NOROLL | 16,3632 | 957 | 6 953 956 | NP3NCODE | 17,2346 | | 966 | NVSRBSY | 4456 | | 316 2 316 1447 |
| NOROLL1 | 16,3717 | 959 | 1 960 | NP3TMP | E6,1713 | = | 104 8 966 | NVSRB1 | 41,3534 | | 365 2 316 304 |
| NOROLLT6 | 16,3725 | 960 | 1 957 | NRJETS | E6,1522 | = | 106 13 106 1028 | NVSRB2 | 41,3581 | | 365 1 365 |
| NOSAM | 15,2376 | 737 | | NRMAG | 0040 | = | 1341 I 168 1351 | NVTEMP | 0123 | = | 87 9 304 376 |
| NOSAVPIP | 37,2721 | 119 | 1 778 | NRMIDBIT | 4676 | = | 51 | NVWORD | 0361 | | 72 5 1442 1450 |
| NOSHIFT | 22,3765 | 1483 | 6 1482 | NRMIDPLG | 0076 | = | 51 | NVWORD1 | 1145 | | 78 20 626 1446 |

HEALTH KEY: NORMALLY DEFINED UNLESS PLACED AS FOLLOWS:

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SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEP, J OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

| SYMBOL | DEP | H | REFERENCES | SYMBOL | DEP | H | REFERENCES | SYMBOL | DEP | H | REFERENCES |
|-----------|-----------|------|-------------|----------|---------|------|-------------|----------|---------|------|-------------|
| NV50DSP | 10,3246 | 1444 | 3 1438 1446 | OCTAL30 | 43,2471 | 244 | 1 243 | OCT27/24 | 24,2354 | 646 | 1 653 |
| NWA17BIT | 4701 = | 52 | | OCTBACK | 41,3401 | 355 | 1 358 | OCT272 | 06,2756 | 155 | 1 148 |
| NWA17PLD | 0101 = | 52 | | OCTHIRTY | 4722 = | 161 | 2 158 | OCT30000 | 4371 = | 185 | |
| NOXPOSVEL | 40,3675 | 624 | 1 624 | OCTL700 | 30,2171 | 557 | | OCT30002 | 6440 = | 1174 | |
| NOXTRK | 43,3631 | 1370 | 2 257 1371 | OCTL7000 | 30,2172 | 557 | 2 555 558 | OCT31 | 4113 | 193 | 3 348 783 |
| NOXPL33 | 06,2425 | 142 | 7 151 152 | OCTL77 | 30,2170 | 557 | 1 558 | OCT34BAR | 42,3513 | 348 | 2 348 |
| NOXIBT | 06,2413 | 142 | 3 142 | OCT00010 | 4707 = | 198 | | OCT3400 | 10,3640 | 1451 | 1 1441 |
| NOXIFAIL | 06,2227 | 136 | 11 145 150 | OCT00060 | 21,3020 | 990 | | OCT34300 | 10,3647 | 1451 | 1 1434 |
| NOXIFB17 | 06,2215 | 136 | 3 136 | OCT00077 | 31,3052 | 622 | 1 611 | OCT35 | 24,2356 | 846 | |
| NOXTRST | 05,2713 | 185 | 2 184 185 | OCT00300 | 21,3021 | 990 | | OCT37 | 4362 = | 227 | 4 185 779 |
| NOXTRSUPR | 43,3656 | 1370 | 1 1370 | OCT01120 | 04,2375 | 200 | 1 196 | OCT37737 | 06,2164 | 134 | 1 144 |
| NOXTRNN | 33,3136 | 436 | | OCT01400 | 21,3017 | 990 | 1 1004 | OCT37766 | 7676 | 1173 | 1 974 |
| NYD | E6,1744 = | 104 | 4 967 | OCT01760 | 21,3018 | 990 | 1 988 | OCT37774 | 7677 | 1173 | 2 907 945 |
| NYDNODE | 17,2416 | 967 | | OCT02200 | 20,2143 | 687 | 1 686 | OCT37776 | 7700 | 1173 | 5 133 1448 |
| NYJETS | E6,1524 = | 108 | 6 1013 1023 | OCT02202 | 24,2777 | 655 | 1 655 | OCT40 | 4705 = | 161 | 2 158 159 |
| NY9 | E6,1605 = | 104 | 13 967 969 | OCT10000 | 4676 = | 185 | | OCT40001 | 6056 | 1079 | 2 1174 1198 |
| NY9NODE | 17,2405 | 967 | 1 931 | OCT10001 | 7632 = | 1174 | | OCT40010 | 07,3011 | 1394 | 2 1394 1398 |
| NY1 | E6,1607 = | 104 | 1 967 | OCT10200 | 10,3686 | 1452 | 1 1438 | OCT40200 | 7704 | 1173 | 2 1460 |
| NY1NODE | 17,2440 | 967 | 1 932 | OCT11 | 4334 = | 1170 | 1 576 | OCT40201 | 01,3402 | 1199 | 1 1196 |
| NY1TMP | E6,1736 = | 104 | 9 967 968 | OCT1103 | 5643 | 1463 | | OCT404 | 14,2174 | 701 | 1 701 |
| NY2 | E6,1565 = | 104 | 1 967 | OCT12 | 4377 = | 645 | | OCT40400 | 5612 | 1463 | 2 1437 1462 |
| NY2NODE | 17,2500 | 968 | | OCT120 | 4732 = | 1174 | 2 197 960 | OCT40420 | 10,3664 | 1452 | |
| NY2TMP | E6,1711 = | 104 | 9 968 969 | OCT13 | 4717 = | 161 | 1 157 | OCT41 | 4270 = | 756 | 1 748 |
| NY3 | E6,1587 = | 104 | 1 968 | OCT14 | 5656 | 1464 | 4 155 1410 | OCT50 | 4726 | 1171 | 6 243 1450 |
| NY3NODE | 17,2540 | 969 | | OCT140 | 4733 = | 1174 | | OCT51 | 43,3076 | 259 | 2 259 260 |
| NY3TMP | E6,1713 = | 104 | 8 969 | OCT1400 | 4744 | 1171 | 10 372 1382 | OCT53 | 24,2355 | 646 | |
| NZERO | 17,2205 | 992 | 1 899 | OCT14000 | 4761 = | 1379 | 2 1378 1379 | OCT54 | 06,2754 | 155 | 1 139 |
| N1 | 20,3423 | 941 | 1 937 | OCT15 | 4720 | 1170 | 4 153 1148 | OCT55000 | 41,3714 | 380 | 1 380 |
| N2 | 20,3424 | 941 | 1 937 | OCT15000 | 4762 = | 155 | 1 153 | OCT60000 | 4105 = | 1174 | 15 184 1448 |
| N22ORN17 | 0220 = | 62 | 2 238 239 | OCT16 | 4333 = | 1148 | 2 738 1148 | OCT605 | 34,3734 | 885 | 3 847 878 |
| N2217BIT | 4705 = | 62 | | OCT16000 | 21,3023 | 990 | 4 988 999 | OCT612 | 34,3735 | 885 | 1 859 |
| N3 | 20,3425 | 941 | 1 937 | OCT17 | 27,2472 | 577 | 1 576 | OCT613 | 34,3738 | 885 | 1 865 |
| N4 | 20,3426 | 941 | 1 937 | OCT1720 | 06,2760 | 155 | 1 151 | OCT62 | 4731 = | 1414 | 1 1414 |
| N45PROC | 35,3053 | 474 | 1 473 | OCT176 | 00,2126 | 1125 | 2 1131 | OCT66 | 14,2677 | 713 | 1 711 |
| N49DISP | E7,1501 = | 119 | 12 275 617 | OCT177 | 8043 = | 1387 | 1 1384 | OCT67777 | 10,3663 | 1452 | |
| N5 | 20,3427 | 941 | 1 938 | OCT17770 | 4765 | 1172 | 2 1377 1379 | OCT7 | 4716 = | 1453 | 5 1377 1453 |
| N6 | 20,3430 | 941 | 1 938 | OCT20100 | 10,3670 | 1452 | 1 1437 | OCT140 | 06,2761 | 155 | 1 148 |
| N7 | 20,3431 | 941 | 1 938 | OCT203 | 37,2332 | 554 | | OCT14777 | 05,3164 | 189 | 1 186 |
| ===== | | | | OCT217 | 5647 | 1463 | | OCT15 | 06,2755 | 155 | 1 154 |
| OBLATE | 11,2725 | 1309 | 2 1305 1308 | OCT220 | 07,3612 | 1412 | 1 1411 | OCT17000 | 06,2762 | 155 | 1 148 |
| OBTA INLL | 30,2213 | 558 | 1 557 | OCT23 | 4374 = | 1174 | 1 1083 | OCT17603 | 05,3163 | 189 | 1 186 |
| OCCDS | 14,2316 | 705 | 2 704 705 | OCT24 | 4112 | 193 | 5 161 664 | OCT17777 | 05,2742 | 185 | |
| OCCULT | 14,2457 | 709 | 2 708 | OCT24100 | 10,3402 | 1447 | 1 1435 | OCT17770 | 5630 | 1463 | 4 199 1453 |
| OCCUPTST | 06,3224 | 161 | 2 158 159 | OCT25 | 4376 = | 1174 | | OC14400 | 33,2441 | 424 | 1 416 |
| OCTAL3 | 6214 | 1083 | 1 1174 | OCT27 | 11,3720 | 1321 | 1 1306 | OC24100 | 43,2123 | 232 | 1 231 |

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|-----------|---------|------|------------------|----------|---------|---|-------------------|----------|---------|-----|------------------|
| OC40010 | 06,2753 | 155 | 1 154 | OMEGA XB | E6,1533 | = | 101 | OPTMON | 06,2765 | 156 | 2 133 |
| OC40200 | 27,2473 | 577 | | OMEGA XC | E6,1525 | = | 101 | OPTNREG | E6,1473 | = | 96 |
| OPFTUNIT | 22,3763 | 1483 | 1 1483 | OMEGA YB | E6,1535 | = | 101 3 924 925 | OPTNSW | 0046 | = | 48 3 518 519 |
| OGA | E6,1674 | = | 103 6 103 954 | OMEGA YC | E6,1527 | = | 101 2 899 924 | OPTN1 | 04,3154 | = | 518 1 518 |
| OGAD | E6,1450 | 100 | 2 651 904 | OMEGA ZB | E6,1537 | = | 101 3 930 | OPTN2 | 04,3232 | = | 519 1 519 |
| OGAERR | E6,1674 | = | 103 1 904 | OMEGA ZC | E6,1531 | = | 101 1 930 | OPTSTALL | 07,3512 | = | 1409 2 446 726 |
| OGANOW | E6,1672 | = | 103 10 103 952 | ONCEMON | 13,3013 | = | 1287 1 1287 | OPTTRST | 06,2130 | = | 133 2 133 |
| OGAPAST | E6,1673 | = | 103 3 103 952 | ONCEMORE | 33,3040 | = | 434 | OPTVARK | 20,3141 | = | 938 2 925 931 |
| OGARATE | E6,1533 | = | 104 8 952 955 | ONE | 4712 | = | 1174 184 131 1482 | OPTVARKP | 20,2440 | = | 925 |
| OGC | E6,1757 | = | 93 19 93 1328 | ONE/C | 31,3027 | = | 621 2 616 | OPTVARKY | 20,2727 | = | 931 |
| OGCPL | 33,2444 | = | 424 1 434 | ONEBIT | 04,3521 | = | 1259 1 1270 | OPTX | 0038 | = | 37 |
| OGP | E6,1702 | = | 112 | ONER4 | 26,2215 | = | 742 1 742 | OPTXCMD | 0054 | = | 38 |
| OHMELL1 | 27,3405 | = | 1469 5 1469 | ONEDPP | 33,3116 | = | 435 2 421 438 | OPTY | 0035 | = | 37 2 79 |
| OHMELL2 | 27,3430 | = | 1469 4 1469 1470 | ONERTWO | 5315 | = | 1376 1 1379 | OPTYCMD | 0053 | = | 38 |
| OIMAX | 35,2415 | = | 463 1 463 | ONESC | 22,3204 | = | 409 4 408 409 | OPTZERO | 06,3151 | = | 159 1 158 |
| OIMPHI | 22,2723 | = | 403 1 403 | ONESC | 21,2143 | = | 974 | OPT2 | 10,2044 | = | 163 1 163 |
| OIMTHA | 22,2703 | = | 403 1 403 | ONETHOU | 17,2206 | = | 902 1 900 | ORBITAL | 11,2000 | = | 26 1 1302 |
| OIMCOPY | 10,2664 | = | 1438 2 1438 1443 | ONNITOR | 37,2767 | = | 781 1 781 | ORBITAL1 | 11,2000 | = | 26 1 1321 |
| OIMCENT | 10,3437 | = | 1447 1 1450 | ONROLL | 16,3451 | = | 954 1 954 | ORBITAL2 | 13,2000 | = | 27 1 1321 |
| OIMCRAB | 13,3445 | = | 1294 1 1294 | OP/INERT | 43,2136 | = | 233 2 233 234 | ORWPBIT | 4705 | = | 50 |
| OIMPLAY | 10,2725 | = | 1439 3 1438 | OPDEGIN2 | 40,3007 | = | 344 | ORWFLAG | 0066 | = | 50 14 203 1318 |
| OKU12 | 22,2250 | = | 395 1 395 | OPDEGOUT | 40,2524 | = | 330 1 329 | ORDERBIT | 4705 | = | 60 |
| OKU21 | 22,2224 | = | 395 1 395 | OPFALOP | 06,3252 | = | 161 1 161 | ORDERSW | 0201 | = | 60 3 1256 1257 |
| OKU31 | 22,2274 | = | 396 1 396 | OPFALON | 06,3235 | = | 161 | ORIG | E4,1673 | = | 87 |
| OK2DELAY | 00,3746 | = | 1456 1 1456 | OPINDIFF | 43,2147 | = | 233 1 233 | ORIGCHK | 11,3304 | = | 1313 1 1313 |
| OLDAZMH | E5,1637 | = | 97 3 436 439 | OPJUMP | 6046 | = | 1078 1 1078 | ORIGEX | E4,1670 | = | 87 4 87 1314 |
| OLDAZ1 | E5,1637 | = | 96 | OPJUMP2 | 6216 | = | 1084 1 1078 | OTHERS | 13,3501 | = | 1296 1 1297 |
| OLDBODY1 | E6,1503 | = | 113 | OPJUMP3 | 6232 | = | 1085 1 1084 | OTHERV | 04,3423 | = | 523 1 523 |
| OLDBODY2 | E6,1504 | = | 113 | OPONLY | 06,2342 | = | 139 1 138 | OTHINT | 35,3373 | = | 500 1 500 |
| OLDBODY3 | E6,1505 | = | 113 | OPTCADR | 1323 | = | 79 3 188 701 | OTHPREC | 13,3036 | = | 32 5 450 507 |
| OLDBT1 | 1074 | = | 75 1 783 | OPTCOARK | 43,2175 | = | 236 1 234 | OTHSHIP | 23,2423 | = | 507 |
| OLDELP | E6,1706 | = | 109 3 109 1042 | OPTCOARV | 43,2174 | = | 236 1 236 | OUT | 13,2154 | = | 504 1 504 |
| OLDELO | E6,1707 | = | 109 3 109 1041 | OPTC1 | 43,2217 | = | 236 3 236 | OUTHERE | 0181 | = | 1451 3 1447 1449 |
| OLDELR | E6,1710 | = | 109 3 109 1042 | OPTDATA | 33,3434 | = | 442 1 442 | OUTLINK | 0057 | = | 38 |
| OLDPRIO | 5327 | = | 1376 1 1381 | OPTDRGIN | 40,3002 | = | 344 1 343 | OUTPUT | 20,2114 | = | 687 3 686 |
| OLDUJA | E7,1533 | = | 116 3 116 836 | OPTDRIVE | 10,2000 | = | 162 1 133 | OUTTAG | E6,1611 | = | 110 4 110 1059 |
| OMEGA MS | 33,2447 | = | 424 2 423 424 | OPTDRV | 10,2000 | = | 26 1 162 | OUTO | 0010 | = | 39 5 130 134 |
| OMEGA | E7,1457 | = | 119 9 119 1226 | OPTIND | 1303 | = | 76 25 156 699 | OVERADAY | 23,2245 | = | 289 1 289 |
| OMEGA B | E6,1533 | = | 101 4 101 104 | OPTINITP | 05,3172 | = | 189 1 180 | OVERFFIX | 33,2276 | = | 421 2 419 423 |
| OMEGA C | E6,1525 | = | 101 7 101 678 | OPTINITR | 05,3173 | = | 189 1 183 | OVERFLOW | 6766 | = | 1103 3 1102 1126 |
| OMEGA CLC | 16,2254 | = | 677 | OPTIONVN | 23,2406 | = | 507 1 506 | OVERFLWY | 6763 | = | 1103 4 1101 1126 |
| OMEGA S | E4,1546 | = | 87 1 741 | OPTIONX | 1051 | = | 74 4 266 507 | OVERPLWZ | 6760 | = | 1103 4 1101 1126 |
| OMEGA M1 | E5,1642 | = | 95 3 95 1227 | OPTION1 | 1131 | = | 76 7 266 1441 | OVERNOUT | 25,3571 | = | 827 |
| OMEGA M2 | E5,1650 | = | 95 3 95 1227 | OPTION2 | 1132 | = | 76 12 276 849 | OVP+ | 00,2414 | = | 1132 2 1132 |
| OMEGA M3 | E5,1656 | = | 95 3 95 1228 | OPTMODES | 1331 | = | 79 38 140 1460 | OVPIND | 0121 | = | 67 13 844 1184 |

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|----------|---------|-------|-------------|-----------|---------|-------|--------------|----------|---------|--------|-------------|
| OVFLCLR | 12,3213 | 1266 | 1 1266 | PDSPFLAG | 0077 | = 51 | 3 384 565 | PHSNAME1 | E3,1436 | 82 | 5 1379 1384 |
| OVRLINE | 15,3450 | 1055 | 1 1055 | PDSUM | E6,1543 | = 101 | 4 101 928 | PHSNAME2 | E3,1440 | 82 | |
| OVRLINE1 | 15,3456 | 1055 | 2 1053 1055 | PDSUMC | 20,2525 | 927 | | PHSNAME3 | E3,1442 | 82 | |
| OVRLINE2 | 15,3460 | 1055 | 1 1055 | PDL | 6526 | 1098 | 1 1086 | PHSNAME4 | E3,1444 | 82 | |
| OZONE | 10,2018 | 162 | 2 162 | PDXCHANGE | 12,2257 | 1250 | 2 1250 | PHSNAME5 | E3,1446 | 82 | 2 841 |
| ===== | | | | | | | | | | | |
| P | E3,1741 | = 94 | 13 94 1274 | PERPCHK | 10,3263 | 1445 | | PHSPART2 | 01,3755 | 1387 | 1 1387 |
| P(T1) | E7,1755 | = 125 | 3 125 858 | PERPDLAY | E5,1656 | = 98 | 3 417 436 | PHSPRDT1 | 1054 | 74 | 5 1378 1386 |
| P/RJCODE | 15,3225 | 1050 | 4 1045 1058 | PERPERAS | 33,3034 | 434 | | PHSPRDT2 | 1056 | 74 | 3 198 610 |
| P/RPRE | 0032 | = 126 | 2 861 862 | PERPMSK | 10,3623 | 1451 | 2 1439 1441 | PHSPRDT3 | 1060 | 74 | 1 199 |
| PAC | E3,1775 | = 93 | 11 93 736 | PERP2MSK | 10,3627 | 1451 | 2 1439 1441 | PHSPRDT4 | 1062 | 74 | 1 198 |
| PAELIM | 20,2454 | 926 | | PERP4MSK | 10,3631 | 1451 | 1 1441 | PHSPRDT5 | 1064 | 74 | 1 815 |
| PACTIVE | 05,2721 | 185 | 1 185 | PERIAPO | 22,3322 | 488 | 1 546 | PHSPRDT6 | 1066 | 74 | 2 626 |
| PACTOFF | E6,1425 | .99 | 19 167 919 | PERIAPO1 | 22,3312 | 488 | 4 457 632 | PHS2CADR | 01,3762 | 1387 | 1 1382 |
| PACTIMP | E6,1703 | = 103 | 4 103 908 | PERIODCH | 12,2070 | 1248 | 1 1248 | PI/16 | 27,3346 | 1356 | 2 1352 1354 |
| PADLNO | 1263 | = 78 | 2 78 528 | PERORLIM | 20,2404 | 925 | | PI/4.0 | 23,3106 | 567 | 2 566 617 |
| PARAM | 04,3527 | 1261 | 4 861 1273 | PERRB | E6,1615 | = 102 | 3 102 926 | PICAPAR | 14,2324 | 707 | 1 696 |
| PARAM30 | 35,3665 | 628 | 3 627 629 | PFALOK | 07,3056 | 1396 | 1 139 | PICEXT | 14,2521 | 710 | 1 710 |
| PASSIVE | 22,3406 | 490 | 2 484 490 | PFALOK2 | 07,3051 | 1396 | 1 1396 | PICEND | 14,2513 | 710 | 1 708 |
| PASTOPT | 4146 | 351 | 1 351 | PFORWARD | 20,2413 | 925 | | PICEXT | 14,2517 | 710 | 1 710 |
| PASTERET | 24,3276 | 661 | 1 661 | PFRAFBIT | 4707 | = 49 | | PICKANO1 | 27,2235 | 388 | 1 388 |
| PASTEVB | 4140 | 351 | 2 351 358 | PFRAFBLO | 0051 | = 49 | 2 640 712 | PICKAXIS | 27,2256 | 389 | 2 387 |
| PAXERR | E6,1476 | = 111 | 1 1080 | PCNCSALT | 1272 | = 78 | 1 528 | PICKX | 27,2310 | 389 | 2 389 |
| PAXERR1 | E6,1713 | = 109 | 8 109 1080 | PHASCHNG | 5301 | 1377 | 108 190 1475 | PIC1 | 14,2361 | 708 | 3 708 709 |
| PBIAS | 24,3675 | 673 | 1 671 | PHAS2TAB | 10,2000 | = 26 | 2 1372 1379 | PIC2 | 14,2364 | 708 | 1 708 |
| PBIASX | E3,1452 | 82 | 1 82 | PHASE1 | 0753 | 73 | 3 185 1381 | PIC3 | 14,2373 | 708 | 6 708 709 |
| PBIASZ | E3,1454 | 82 | | PHASE2 | 0755 | 73 | | PIC4 | 14,2376 | 708 | 1 708 |
| PBIASZ | E3,1456 | 82 | | PHASE3 | 0757 | 73 | | PIINVERS | 38,2010 | 541 | 1 543 |
| PBLASTOK | 17,3247 | 1022 | 1 1021 | PHASE4 | 0761 | 73 | | PIKUP20 | 37,2273 | 553 | 1 206 |
| PBODY | E4,1550 | 87 | 18 87 1320 | PHASE5 | 0763 | 73 | 3 530 767 | PIINACT | 05,2726 | 185 | 1 185 |
| PBPASS | 17,3417 | 1026 | 1 1021 | PHASE6 | 0765 | 73 | | PINBALL1 | 40,2000 | = 31 | 1 310 |
| PCDLOTS | 20,2342 | 924 | | PHBIT | 13,3155 | 1290 | 1 1290 | PINBALL2 | 41,2000 | = 31 | 1 318 |
| PCDLYPST | E6,1655 | = 103 | 4 103 938 | PHICALC | 32,2152 | 636 | 1 636 | PINBALL3 | 42,2000 | = 31 | 2 265 333 |
| PCDUZPST | E6,1656 | = 103 | 4 103 938 | PHIDOT | E6,1705 | = 109 | 7 109 1060 | PINBALL4 | 04,2000 | = 25 | 1 369 |
| PCLOOP | 05,2680 | 184 | 1 184 | PHIV | E4,1565 | = 87 | 6 87 1316 | PINRRIT | 4705 | = 52 | |
| POND | E6,1631 | = 102 | 8 102 928 | PHI2 | E7,1760 | = 125 | 6 125 873 | PINRRPLG | 0105 | = 52 | 1 1444 |
| PCON | E7,1717 | = 125 | 3 125 881 | PHI333 | E6,1506 | = 101 | 11 101 914 | PINRRNCH | 10,3176 | 1443 | 7 194 1451 |
| PCOPY | 20,2560 | 928 | 2 920 927 | PHSRB1 | E3,1437 | 82 | | PINDEX | E6,1520 | = 106 | 3 106 1012 |
| PCOPYCYC | 20,2545 | 927 | | PHSRB2 | E3,1441 | 82 | | PINIDMSK | 10,3475 | 1448 | 1 1448 |
| PDA | 0028 | = 71 | 2 262 | PHSRB3 | E3,1443 | 82 | | PINIMSK | 7707 | = 1451 | 1 1444 |
| PDAPEND | 20,2546 | 927 | | PHSRB4 | E3,1445 | 82 | | PINSUPRT | 4215 | = 364 | 5 238 368 |
| PDDL | 6472 | 1095 | 1 1086 | PHSRB5 | E3,1447 | 82 | | PINSUPER | 40,2000 | = 31 | 1 238 |
| PDELOPP | E6,1625 | = 102 | 5 102 925 | PHSRB6 | E3,1451 | 82 | | PINTEORI | 20,2356 | 924 | |
| PDLADDER | 20,2506 | 926 | | PHSRK2 | 16,3243 | 919 | | PINTEST | 43,2002 | = 378 | |
| PDSPPRIT | 4677 | = 51 | | PHSCHNG2 | 10,2355 | 1379 | 1 1378 | PIPBIAS | E3,1452 | = 82 | 1 292 |

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| SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES |
|----------|---------|--------|--------------|----------|---------|--------|-------------|----------|---------|--------|-------------|
| PIPACR | 33,2131 | 418 | 1 417 | POINTER | 0156 | = 1387 | 7 1385 1387 | POSVEL | 21,3463 | 1001 | 3 1001 |
| PIPAGE | 1230 | = 77 | 5 77 787 | POINTEX | 1150 | = 77 | 6 77 615 | POS1/2 | 4675 | = 1174 | 9 1039 1196 |
| PIPASC | 33,3674 | 448 | 1 432 | POINTVSM | E8,1756 | = 112 | 5 112 670 | POS1/4 | 11,3700 | = 1321 | |
| PIPASCP | E3,1453 | = 82 | 1 292 | POINT1 | 28,3151 | 833 | 1 820 | POUT | 20,2455 | 926 | |
| PIPASCFX | E3,1453 | 82 | 1 82 | POINT2 | 28,3153 | 833 | | POWERED | 0003 | = 203 | 4 203 |
| PIPASCFY | E3,1455 | 82 | | POINTS | 28,3267 | 835 | 1 585 | POWFLITE | 23,2000 | = 28 | 1 1333 |
| PIPASCFZ | E3,1457 | 82 | | POLISH | 0117 | 67 | 38 87 1169 | POWFLIT1 | 23,2000 | = 28 | 1 1340 |
| PIPASR | 37,3157 | 788 | 2 777 778 | POLLEY | 5006 | 1177 | 2 1177 | POWFLIT2 | 23,2000 | = 28 | 1 286 |
| PIPATASK | 33,2153 | 418 | 2 418 | POLY | 7171 | 1109 | 10 286 1355 | POWRSERS | 7164 | 1109 | 1 533 |
| PIPAX | 0037 | = 37 | 13 288 1478 | POLYCNT | 0140 | = 68 | 4 1109 1110 | PRAXIS | E7,1722 | = 124 | 5 124 587 |
| PIPAY | 0040 | = 37 | 4 427 1478 | POLYCOB | 12,3034 | 1263 | 1 1265 | PRDTAB | 01,2000 | = 206 | 3 1385 1387 |
| PIPAZ | 0041 | = 37 | 7 427 1478 | POLYCOM | 7201 | 1109 | 1 1109 | PRE-HUNT | 25,3006 | 817 | 1 210 |
| PIPCHK | 37,3011 | 782 | 1 782 | POLYLOC | E8,1673 | = 112 | 1 537 | PREBLMP | 5250 | 1372 | |
| PIPCTR | 1227 | = 77 | 4 77 781 | POLYLOOP | 7211 | 1110 | 1 1110 | PREC/TT | 04,3382 | 522 | 2 518 |
| PIPPAIL | 08,2832 | 151 | 1 155 | POLYNUM | E8,1661 | = 112 | 3 112 533 | PRECHECK | 24,2515 | 649 | 3 208 |
| PIPPRE1 | 07,3112 | 1397 | 1 783 | POLYRET | 0141 | = 68 | 3 1109 1110 | PRECIBIT | 4703 | = 50 | |
| PIPPRE2 | 07,3107 | 1397 | 1 1397 | POLYSTOP | E8,1703 | = 113 | 2 113 533 | PRECIFLG | 0084 | = 50 | 6 204 1293 |
| PIPINDEX | E8,1422 | 96 | 4 418 421 | POLY2 | 7214 | 1110 | 1 1110 | PRECSBT | 22,3354 | 490 | 4 456 522 |
| PIPJOB | 33,2170 | 418 | 1 418 | PONG | 33,2250 | 419 | 1 419 | PRECX | 32,3053 | 866 | 3 862 865 |
| PIPCOP | 37,3025 | 782 | 2 782 | PON2 | 33,2244 | 419 | 1 419 | PREC100 | 32,2515 | 861 | 1 848 |
| PIPSDB | 37,2850 | 778 | 1 788 | PON4 | 33,2237 | 419 | | PREC120 | 32,2523 | 861 | 1 865 |
| PIPTIME | 1204 | 77 | 18 77 1297 | PODAPAD | 04,2372 | 199 | | PREC125 | 32,2531 | 861 | 1 864 |
| PIPTIME1 | 1245 | = 77 | 8 77 1299 | POODOO | 5622 | 1463 | 6 358 1439 | PREC130 | 32,2555 | 862 | 1 861 |
| PIPUS | 07,3075 | 1397 | 2 301 428 | POOPIZZ | 04,2221 | 197 | 1 196 | PREC132 | 32,2560 | 862 | 1 864 |
| PIPUS1 | 07,3101 | 1397 | | POCH | 04,2146 | 195 | | PREC140 | 32,2563 | 862 | 1 862 |
| PITCHANG | 0026 | = 888 | | POCLEAN | 05,2500 | 181 | 1 196 | PREC150 | 32,2566 | 862 | |
| PITCHDAP | 20,2327 | 924 | 1 941 | POS-2.5 | 24,3677 | 691 | | PREC155 | 32,2802 | 862 | 1 862 |
| PITCHTIM | 17,3211 | 1021 | 3 1027 1028 | POSDEL | 12,2625 | 1257 | 1 1256 | PREC160 | 32,2804 | 862 | 1 862 |
| PITCHTS | 20,3416 | 941 | 2 930 938 | POSDELX | 12,2231 | 1250 | 1 1250 | PREC162 | 32,2818 | 862 | 1 862 |
| PJETS | 17,2760 | 1013 | 3 1012 1033 | POSEC | 42,3327 | 335 | 2 335 | PREC165 | 32,2824 | 862 | 1 862 |
| PLANET | 15,2363 | 737 | 4 711 724 | POSECADR | 28,2430 | 750 | 1 746 | PREC167 | 32,2840 | 863 | 1 863 |
| PLANTIN | 28,2000 | = 29 | 1 1213 | POSEXIT | E8,1724 | = 110 | 5 110 841 | PREC168 | 32,2842 | 863 | 1 862 |
| PLANVEC | E8,1800 | = 91 | 5 91 724 | POSGN | 40,2310 | 314 | 1 311 | PREC170 | 32,2851 | 863 | |
| PLAYJUM1 | 10,2743 | 1439 | 3 1444 1451 | POSITON | E8,1423 | 96 | 5 416 424 | PREC172 | 32,2716 | 864 | 1 863 |
| PLAYJUM4 | 0155 | = 1452 | 27 1434 1442 | POSIX | 4872 | 1170 | 37 145 1461 | PREC173 | 32,2720 | 864 | 1 863 |
| PLAYJUM3 | 0157 | = 1452 | 3 1441 1449 | POSNV | E8,1530 | = 97 | 2 433 | PREC174 | 32,2730 | 864 | 1 864 |
| PLAYJUM4 | 0160 | = 1452 | 11 1433 1449 | POSN17C | 33,3163 | 436 | 2 436 439 | PREC175 | 32,2736 | 864 | 2 861 863 |
| PMANDX | E8,1857 | = 108 | 5 108 998 | POSOPCMD | 10,2144 | 164 | 1 164 | PREC205 | 32,2753 | 864 | |
| PMISC | 20,2811 | 928 | | POSTAND | 28,3734 | 1415 | 2 1414 1415 | PREC205M | 32,2772 | 864 | 1 864 |
| PMASK | 10,3842 | 1451 | 1 1439 | POSTURN | 24,2155 | 642 | 3 209 654 | PREC206 | 32,2775 | 865 | 1 864 |
| PNLADDER | 20,2474 | 926 | | POSTCOM | 28,3783 | 1418 | 2 1416 | PREC207 | 32,3005 | 865 | 1 864 |
| PNSLM | E8,1541 | = 101 | 5 101 928 | POSTJUMP | 4574 | 1073 | 67 139 1483 | PREC210 | 32,3024 | 865 | 1 865 |
| PNSLMC | 20,2505 | 928 | | POSTIPI | E8,1640 | = 91 | 4 275 548 | PREC220 | 32,3037 | 865 | 1 864 |
| POPPST | 20,2441 | 925 | 1 964 | POST41 | 24,2204 | 643 | 5 641 662 | PREC225 | 32,3051 | 866 | 1 865 |
| POINTAXS | 31,2272 | 613 | 2 612 613 | POSVECT | E4,1736 | = 88 | 5 88 893 | PREDANG | E7,1770 | = 117 | 2 117 825 |

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

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 BD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE



SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEP, J OF REFS, PAGE OF FIRST REP, PAGE OF LAST REP.

| SYMBOL | DEP | H | REFERENCES | SYMBOL | DEP | H | REFERENCES | SYMBOL | DEP | H | REFERENCES |
|----------|---------|--------|-------------|----------|---------|--------|-------------|----------|---------|-------|--------------|
| PREDICT3 | 25,3335 | 824 | 1 824 | PRI02 | 4700 | = 1174 | | PSTRQER | 20,2338 | 924 | |
| PREDOT | 7123 | 1108 | 2 1113 1116 | PRI020 | 4675 | = 1174 | 8 241 798 | PTAUNEO | 17,3217 | 1021 | 1 1021 |
| PREDSPAL | 40,3321 | 358 | 1 329 | PRI021 | 4766 | 1172 | 1 776 | PTAUPOS | 17,3221 | 1021 | 1 1021 |
| PREFINAL | 25,3325 | 824 | 4 810 824 | PRI022 | 7657 | 1172 | 1 439 | PTBAD | 05,2737 | 185 | 3 184 |
| PREL | E8,1701 | = 109 | 8 109 1081 | PRI023 | 7660 | 1172 | | PTGINC | E4,1423 | 86 | 2 460 521 |
| PRELTERM | 33,3418 | 439 | 2 439 | PRI024 | 7661 | 1172 | 1 701 | PTOACM | 13,2662 | 1285 | 2 259 1290 |
| PREM1 | 04,2440 | = 201 | 3 194 202 | PRI025 | 7662 | 1172 | 1 509 | PTOALEM | 13,2735 | 1286 | 1 1290 |
| PREMTRXC | E8,1632 | = 97 | 5 438 447 | PRI026 | 7663 | 1172 | 4 410 576 | PT1/16 | 28,3273 | 835 | 2 820 |
| PREMTRX1 | E8,1632 | = 98 | 1 438 | PRI027 | 7664 | 1172 | 4 575 683 | PULSSIMU | 22,3650 | 1480 | 1 423 |
| PREMVBYS | 4453 | 376 | 1 376 | PRI03 | 4752 | 1172 | 2 498 1174 | PULSEM | 15,2207 | 714 | |
| PREPTVC | 24,2574 | 651 | 1 653 | PRI030 | 4371 | = 1174 | 15 180 1450 | PURRS4 | 10,3043 | 1441 | 2 1439 1441 |
| PREREAD | 37,2604 | 776 | 3 212 758 | PRI031 | 7665 | 1172 | 4 301 980 | PUSH | 00,3247 | 1152 | 1 1088 |
| PREREAD1 | 37,2625 | 777 | 2 527 777 | PRI032 | 7667 | 1172 | 5 217 1448 | PUSHLOC | 0166 | 70 | 28 1083 1184 |
| PRERORS | 43,3244 | 1364 | 3 1365 | PRI033 | 7670 | 1172 | 1 1438 | PUSHUP | 6164 | 1083 | 1 1079 |
| PRESINS | 00,3525 | 1157 | 2 1157 | PRI034 | 7671 | 1172 | 8 223 1174 | PUTADD | 41,2331 | 323 | 3 323 |
| PRESTAND | 26,3657 | 1414 | 1 1414 | PRI034A | 7671 | = 974 | | PUTCQM | 41,3070 | 341 | 8 337 339 |
| PRESTORE | 6370 | 1091 | 1 1091 | PRI035 | 7672 | 1172 | 1 1195 | PUTCQM2 | 41,3150 | 342 | 4 341 344 |
| PREVGAM | 26,3045 | 766 | 2 763 764 | PRI036 | 7673 | 1172 | | PUTCSP2 | 41,3200 | 342 | 1 342 |
| PRE40.8 | 20,2040 | 685 | 2 212 684 | PRI037 | 7674 | 1173 | 6 198 1448 | PUTCSP | 41,3165 | 342 | 2 341 342 |
| PRFMSTAO | 4720 | = 724 | 1 722 | PRI04 | 4677 | = 1174 | 1 244 | PUTCPCOM | 41,3123 | 341 | 1 342 |
| PRFTRBIT | 4701 | = 54 | | PRI05 | 4754 | 1172 | 7 198 1283 | PUTCNORM | 41,3132 | 341 | 1 341 |
| PRFTRKAT | 0120 | = 54 | 4 258 587 | PRI06 | 4755 | 1172 | 4 165 1364 | PUTCSPOR | 41,3177 | 342 | 1 342 |
| PRFLNIT | 34,3541 | 587 | 1 587 | PRI07 | 4756 | 1172 | 6 249 510 | PUTCXY | 41,2710 | 338 | |
| PRI0PORT | 10,2723 | 1439 | 2 1437 1448 | PROCEED | 10,3537 | 1449 | 1 1447 | PUTCYZ | 41,2828 | 337 | |
| PRI0CHNG | 5103 | 1180 | 12 247 1448 | PROCEEDS | 08,2075 | 132 | | PWORD | 17,2687 | 1011 | 2 1011 |
| PRI0CH2 | 01,3113 | 1187 | 1 1180 | PROCESSE | 08,2075 | 132 | | PWORD1 | E8,1453 | = 100 | 4 100 1032 |
| PRI0CBIT | 4675 | = 51 | | PROCESSE | 08,2075 | 132 | | PWORD2 | E8,1454 | = 100 | 4 100 1033 |
| PRI0CFLG | 0075 | = 51 | | PROCESSE | 08,2075 | 132 | | PYJETS | 0005 | = 39 | 2 1036 1045 |
| PRI0DSP | 10,2635 | 1437 | 1 575 | PROCESSE | 08,2075 | 132 | | PYTABLE | 17,2741 | 1013 | 4 1012 1029 |
| PRI0DSPR | 10,2632 | 1437 | 1 1462 | PROCLARM | 5571 | 1462 | 1 1461 | POOHCK | 13,3328 | 1293 | 2 1292 1293 |
| PRI0CENT | 5545 | 1461 | 2 1462 1464 | PROG20 | 37,2207 | 552 | 1 200 | POSPO6 | 26,2000 | = 29 | 1 1414 |
| PRI0LARM | 10,3671 | 1462 | 1 701 | PROG21 | 37,2001 | 450 | 1 200 | PO6 | 26,3655 | 1414 | 1 200 |
| PRI0OCT | 10,3657 | 1452 | 2 1435 1442 | PROG22 | 30,2000 | 555 | 1 200 | P1FILAMP | 20,2405 | 925 | |
| PRI0PLAY | 10,2744 | 1439 | 2 1435 1438 | PROG22A | 30,2036 | 555 | 2 555 557 | P11 | 34,2002 | 526 | 1 440 |
| PRI0PITY | 0167 | 70 | 29 187 1440 | PROG22B | 30,2113 | 556 | 1 555 | P11+7 | 34,2013 | 526 | 1 530 |
| PRI0TIME | 1147 | 76 | 2 1438 1448 | PROG22C | 30,2151 | 557 | | P11POLR | 23,2000 | = 28 | 1 539 |
| PRI01 | 4701 | = 1174 | 1 531 | PROG22 | 15,2000 | 694 | 3 200 694 | P11ONE | 34,2000 | = 30 | 2 526 535 |
| PRI010 | 4676 | = 1174 | 6 246 656 | PRONVBIT | 4704 | = 52 | | P11OUT | 33,2451 | 424 | 1 531 |
| PRI011 | 4757 | 1172 | | PRONVPLG | 0104 | = 52 | 1 1445 | P11SCADR | 34,2301 | 531 | 1 529 |
| PRI012 | 4603 | 1073 | 2 179 654 | PROLND | 20,2447 | 928 | | P11TWO | 37,2000 | = 31 | 1 533 |
| PRI013 | 4760 | 1172 | 4 610 758 | PROLNT | 33,2424 | 423 | 1 528 | P11XIT | 34,2278 | 531 | 1 528 |
| PRI014 | 4761 | 1172 | 7 385 1382 | PSHRTMP | 4431 | 374 | 4 331 333 | P17 | 35,3431 | 549 | 1 200 |
| PRI015 | 4762 | 1172 | 4 155 1450 | PRT2CADR | 01,3783 | 1387 | 1 1384 | P17.1 | 35,3434 | 549 | 3 549 550 |
| PRI016 | 4763 | 1172 | 12 155 829 | PSIV | E4,1573 | = 87 | 3 87 1316 | P17.2 | 35,3500 | 550 | 1 550 |
| PRI017 | 4764 | 1172 | 1 296 | PSI333 | E8,1507 | = 101 | 6 101 914 | P17.3 | 35,3504 | 550 | |

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SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, J OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

Table with 11 columns: SYMBOL, DEF, H, REFERENCES, SYMBOL, DEF, H, REFERENCES, SYMBOL, DEF, H, REFERENCES. It lists various symbols like P178, P1781, P2FILAMP, etc., along with their definitions, health status, and reference pages.

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BD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE



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Table with columns: SYMBOL, DEP, H, REFERENCES, SYMBOL, DEP, H, REFERENCES, SYMBOL, DEP, H, REFERENCES. Contains a comprehensive list of symbols and their associated values and references.

HEALTH KEY: NORMALLY DEFINED UNLESS PLACED AS FOLLOWS:

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RD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, J OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

| SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES |
|----------|---------|-------|-------------|----------|---------|-------|-------------|-----------|---------|--------|-------------|
| REND16 | 34,3103 | 574 | 1 573 | RESA | 26,2161 | 741 | 1 740 | RLINTST | 20,2547 | 927 | 2 924 |
| REND17 | 34,3111 | 574 | 1 573 | RESCHNG | 33,3353 | 439 | 1 212 | RLS | E4,1425 | 86 | 10 175 1286 |
| REND18 | 34,3117 | 574 | 1 573 | RESSTPRP | 43,3018 | 258 | 1 231 | RLTST | 34,2473 | 537 | 1 534 |
| REND2 | 34,2535 | 569 | 1 569 | RESSTVHP | 43,3025 | 258 | 1 231 | RM | E7,1703 | = 123 | 3 123 578 |
| REND3 | 34,2555 | 569 | 3 571 575 | RESSTX2 | 12,3123 | 1265 | 1 1263 | RMAG | E3,1765 | = 85 | 1 85 |
| REND3A | 34,2554 | 569 | 1 569 | RESIGN | 35,2451 | 484 | 1 484 | RMAG1 | 0014 | = 1341 | 4 1344 1353 |
| REND4 | 34,2577 | 570 | 1 569 | RESO | E4,1532 | = 86 | 3 87 741 | RMANNEX | E6,1656 | = 108 | 6 108 998 |
| REND5 | 34,2613 | 570 | 1 573 | RESQ | 37,3365 | 790 | 1 789 | RMAX | E4,1402 | 86 | 1 572 |
| REND5A | 34,2617 | 570 | 1 570 | REST | 10,3373 | 1447 | 1 1444 | RME | 04,2535 | 203 | 1 1292 |
| REND6 | 34,2643 | 571 | 1 570 | RESTAIER | 33,3276 | 438 | 1 212 | RMW | 04,2533 | 203 | |
| REND7 | 34,2651 | 571 | 1 573 | RESTARTP | E5,1577 | = 97 | 2 429 | RN | 1170 | 77 | 18 187 1297 |
| REND8 | 34,2666 | 571 | 1 571 | RESTART | 01,2000 | = 25 | 4 206 1386 | RND/TST | 42,3456 | 347 | 3 348 347 |
| REND9 | 34,2671 | 571 | 1 571 | RESTARTS | 01,3520 | 1382 | 1 185 | RNDCON | 42,3215 | 334 | 2 335 |
| REND9A | 34,2701 | 571 | 1 571 | RETEST1 | 33,3317 | 438 | 1 211 | RNDREFDR | 07,2777 | 1394 | 3 148 1414 |
| REPCHK | 16,2761 | 906 | 1 905 | RETEST3 | 33,3330 | 438 | 1 212 | RNDVZBIT | 4704 | = 45 | |
| REPFTS | 35,2425 | 463 | 1 463 | RESTRNG | 0368 | 72 | 4 180 1443 | RNDVZPLG | 0010 | = 45 | 5 253 1414 |
| REPFRAC | E6,1652 | = 103 | 5 103 906 | RESTRSEP | 10,3377 | 1447 | 1 1447 | RNDTEST | 38,2432 | 547 | 1 544 |
| REPFP1 | 37,3175 | 787 | 1 788 | RESTRSF | 43,3206 | 261 | 1 230 | RNDSCPLG | 0120 | = 54 | 3 54 609 |
| REPFP3 | 37,3203 | 787 | 1 788 | RESUCT | E5,1547 | = 97 | 5 418 422 | RNRAD | 0046 | = 37 | 1 578 |
| REPLACE | 17,3706 | 1032 | 2 1032 | RESUME | 5222 | 1202 | 50 128 1418 | RN1 | 1231 | = 77 | 9 32 1299 |
| REPLACEP | 17,3731 | 1033 | | RETARG | 33,3645 | 446 | 1 446 | ROLL/PIP | E6,1672 | = 109 | 3 109 840 |
| REPLACER | 17,3725 | 1033 | 3 1032 1033 | RETARG1 | 33,3666 | 446 | 1 446 | ROLL/180 | E6,1664 | = 109 | 11 109 1051 |
| REPLACEY | 17,3740 | 1033 | | RETLOCN | E4,1721 | = 128 | 5 892 894 | ROLLC | E6,1715 | = 109 | 14 110 1052 |
| REPLACE1 | 17,3713 | 1032 | 2 1032 | RETNCN | 06,2268 | 138 | 1 139 | ROLLDAP | 16,3313 | 952 | 1 904 |
| REPLACE2 | 17,3720 | 1033 | 2 1032 | RETRN1 | 26,2640 | 759 | 1 758 | ROLLDUMP | 15,3666 | 1059 | 1 1059 |
| REPOSADR | 37,3874 | 842 | 1 841 | RETRN2 | 26,2630 | 759 | 2 759 | ROLLFIRS | E6,1611 | = 102 | 7 102 959 |
| REP11 | 34,2247 | 530 | 1 207 | RETRN3 | 26,2625 | 759 | 1 758 | ROLLHOLD | E6,1717 | = 110 | 4 110 1059 |
| REP11A | 34,2026 | 527 | 2 207 530 | REVINT | 6211 | 1083 | 2 1083 1174 | ROLLJETS | 0008 | = 39 | 5 1036 1059 |
| REP11A-1 | 34,2025 | 526 | 1 530 | REVERB | 35,2454 | 464 | 1 464 | ROLLLOGIC | 16,3334 | 952 | 2 952 |
| REP11A-2 | 34,2024 | 526 | 1 530 | REVS | E6,1670 | = 103 | 6 103 947 | ROLLON | 16,3442 | 954 | 1 953 |
| REP11S | 34,2272 | 530 | 1 526 | REVUP | 20,3552 | 947 | 2 947 | ROLLPREP | 16,2870 | 904 | |
| REP11SA | 34,2274 | 531 | 2 526 530 | REV37 | 04,2233 | 197 | 1 197 | ROLLSET | 16,3524 | 955 | 3 955 |
| RESO | 5530 | 1460 | 1 1460 | REXIT | E4,1770 | = 90 | 3 90 626 | ROLLTIME | 17,3321 | 1024 | 4 1015 1017 |
| RESADD | 41,2084 | 319 | 1 319 | RHO | E6,1635 | = 107 | 4 107 986 | ROLLTM | E6,1714 | = 109 | 4 109 1059 |
| RESCOM | 41,2307 | 323 | 2 323 | RHO8 | E4,1720 | = 88 | 4 88 888 | ROLLWORD | E6,1612 | = 102 | 9 102 958 |
| RESDATX | 41,2302 | 323 | 3 337 338 | RHO1 | E6,1638 | = 107 | 4 107 986 | RONE | E4,1728 | = 88 | 17 88 1350 |
| RESDATY | 41,2304 | 323 | 3 337 339 | RHO2 | E6,1637 | = 107 | 4 107 986 | ROO | 04,2127 | 195 | |
| RESDATZ | 41,2306 | 323 | 3 319 339 | RIGHT | 00,2238 | 1129 | 1 1131 | ROOD | 04,2377 | 200 | 1 195 |
| RESXLOC | 41,2207 | 321 | | RIGHT- | 00,2332 | 1131 | 1 1128 | ROOTM | 0020 | = 1275 | 3 1252 1271 |
| RESX1 | 41,3463 | 360 | 1 360 | RIGHTOTS | 33,2550 | 429 | 1 429 | ROOTPOO | 04,2030 | 193 | 1 193 |
| RESX4 | 41,3442 | 359 | 1 359 | RIGHTR | 00,2031 | 1122 | 1 1130 | ROOTRET | 1076 | 75 | 1 75 |
| RESRET | 1013 | 74 | 17 188 368 | RIGHTS | 4338 | 372 | 2 340 341 | ROPECHK | 43,3516 | 1368 | 1 1365 |
| REQUESTC | 41,3487 | 360 | 1 360 | RINDEX | E6,1517 | = 106 | 4 106 1016 | ROTA | 26,2057 | 733 | 2 732 |
| REREADAC | 37,3210 | 787 | 3 211 | RINIT | E7,1567 | = 120 | 13 120 668 | ROT180 | 27,2266 | 389 | 1 389 |
| RES | 26,2143 | 741 | 2 740 741 | RL | E7,1664 | = 119 | 2 119 615 | ROUND | 00,2116 | 1124 | 1 1088 |

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Table listing symbols and their definitions with columns: SYMBOL, DEF, H, REFERENCES. Includes entries like SOLNSW, SOLPOS, SOMERRR, SORT, SPVCUIT, STARS2, STATE, STATEBIT, etc.

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| SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES |
|-----------|---------|---|-------------------|-----------|---------|---|-----------------|----------|---------|---|----------------|
| STRAT | 14,2441 | | 709 1 709 | SWBRANCH | 6684 | | 1099 1 1169 | S22.081X | 30,3224 | | 599 1 599 |
| STRATOY | 14,2433 | | 709 1 709 | SWCALL | 4561 | | 1073 5 185 1165 | S22BOX12 | 30,2780 | | 596 1 597 |
| STRICALL | 16,3041 | | 907 | SWCHCLR | 35,2053 | | 456 1 456 | S22BOX22 | 30,3070 | | 597 1 591 |
| STRIGNOW | 16,3133 | | 908 1 908 | SWCHSST | 35,2031 | | 455 1 455 | S22BOX32 | 30,2744 | | 598 1 598 |
| STRICOPY | 16,3137 | | 908 2 908 920 | SWINIT | 05,3174 | | 189 6 180 181 | S22BOX42 | 30,3047 | | 597 1 596 |
| STRITIME | E8,1664 | = | 103 5 103 909 | SWITCHES | 01,2543 | | 1167 1 1169 | S22BOX44 | 30,3160 | | 598 1 598 |
| STRITSTI | 20,3446 | | 945 1 245 | SWRETURN | 4570 | | 1073 9 217 1412 | S22BX22A | 30,3113 | | 598 1 598 |
| STRITMP | E8,1710 | = | 103 4 103 909 | SWSAMPLE | 1314 | | 79 9 156 699 | S22BX22B | 30,3124 | | 598 1 598 |
| STRICUP | 16,3125 | | 908 2 908 920 | SWSKIP | 01,2024 | | 1169 2 1169 | S22BX44A | 30,3163 | | 598 1 598 |
| STRICOR | E8,1614 | = | 102 14 102 947 | SWSTORE | 01,2000 | | 1168 2 1168 | S22BX44B | 30,3173 | | 599 1 599 |
| STRICILL | E8,3559 | | 947 1 947 | SWTCOR | 16,2750 | | 905 2 905 920 | S22C-I | 30,2433 | | 592 1 592 |
| STRICON | 43,2505 | | 245 1 230 | SWTCORR | 16,2773 | | 906 2 905 | S22CALRC | 30,3273 | | 600 2 591 597 |
| STRICOYD | 07,3207 | | 1400 2 1398 1403 | SWTCOPY | 16,3027 | | 906 1 920 | S22D | 0038 | = | 605 3 592 593 |
| STRICOYR2 | 07,3213 | | 1400 4 1401 1405 | SWTOBIT | 4674 | = | 61 | S22D-9 | 30,2728 | | 595 1 591 |
| STRILBIT | 4678 | = | 55 | SWTOVER | 0207 | = | 61 | S22EORF | E7,1673 | = | 123 6 123 600 |
| STRILLSW | 0134 | = | 55 | SWWORD | 0130 | = | 68 | S22EXEX | 30,3230 | | 599 1 597 |
| STRKOSLM | 43,3520 | | 1388 2 257 | SWA | 01,2411 | | 1162 1 1087 | S22FLOS | 30,3326 | | 601 2 590 595 |
| STRSST | 13,2256 | | 731 1 730 | SWTALARM | 23,2142 | | 283 2 283 | S22F2410 | 30,3240 | | 599 2 592 598 |
| SUBSTA | 26,3116 | | 805 1 805 | SWTANG | 23,2053 | | 292 1 445 | S22F244 | 30,3127 | | 598 |
| SUBSTA2 | 26,3124 | | 805 1 805 | SWTANG1 | 23,2076 | | 292 1 281 | S22F244X | 30,3128 | | 598 1 595 |
| SUBXIT | E4,1770 | = | 90 24 90 639 | SWTOLOGIC | 23,2027 | | 280 1 280 | S22GTP | 30,3233 | | 599 1 599 |
| SUBLIST | 0337 | = | 1069 12 1068 1069 | SWTMARK | 07,2002 | | 216 3 448 735 | S22I=N | 30,2655 | | 595 1 595 |
| SUBTR | 00,3701 | | 1160 1 1161 | SWTMARK2 | 07,2000 | = | 26 1 218 | S22LOC | E8,1750 | = | 95 7 95 600 |
| SUBPCHEK | 12,3452 | | 1270 3 1269 1270 | SWTMARK1 | 10,2000 | = | 26 1 228 | S22LSITE | 30,2173 | | 558 1 557 |
| SUBALPA | 22,2700 | | 403 1 403 | SWTNB | 23,2000 | | 280 4 447 725 | S22NXTIN | 30,2381 | | 591 3 595 |
| SUBALPAP | 22,2720 | | 403 1 403 | SWTOPTN | E8,1413 | = | 96 | S22NXTU | 30,2470 | | 592 1 592 |
| SUDACAL | 4610 | | 1074 2 352 1369 | SWTSM | 14,3286 | | 725 2 712 723 | S22NXTWI | 30,2501 | | 592 1 592 |
| SUPDCQZ | 5122 | | 1190 5 384 1190 | SWTVAR | 34,3217 | | 575 1 571 | S22NOXA | 30,2525 | | 593 1 593 |
| SUPERBNC | 0007 | = | 39 26 182 1461 | SYNCTA | 06,2156 | | 133 1 134 | S22NOXB | 30,2552 | | 593 1 593 |
| SUPERBW | 4666 | | 1076 2 1443 1449 | SYSTEST | 43,2380 | | 241 1 231 | S22OFF-I | 30,2720 | | 595 1 591 |
| SUPER011 | 4730 | | 1171 3 528 1390 | S1 | 0050 | = | 38 56 398 1338 | S22RHO | 0040 | = | 605 6 593 600 |
| SUPER100 | 4704 | = | 1171 | S10BITS | 4747 | = | 1364 2 1366 | S22RL | E8,1634 | = | 605 2 592 |
| SUPER101 | 4732 | | 1171 1 1174 | S11.1 | 34,2436 | | 536 2 531 647 | S22RTNEX | E7,1703 | = | 123 3 123 599 |
| SUPER110 | 4733 | | 1171 1 1174 | S13BITS | 43,3236 | | 1364 1 1370 | S22SAVBT | 30,2652 | | 594 2 596 597 |
| SUPRCON | 43,3235 | | 1364 1 1370 | S17.1 | 36,2026 | | 542 1 549 | S22SCLW | 30,2641 | | 594 1 594 |
| SURELY.9 | 24,3066 | | 656 1 656 | S17.2 | 36,2104 | | 543 1 550 | S22SHIPT | 30,2316 | | 590 1 590 |
| SURPBIT | 4703 | = | 60 | S2 | 0051 | = | 38 46 423 1329 | S22TOFF | E7,1667 | = | 123 12 123 599 |
| SURPFLAG | 0177 | = | 60 5 204 1296 | S2RVTRS | 30,3005 | | 596 | S22TPRM | E7,1671 | = | 123 3 123 595 |
| SVCT3 | 5175 | | 1195 1 1195 | S2SEBUM | 30,2373 | | 591 | S22UMRL | E7,1501 | = | 605 7 592 600 |
| SVDWN1 | 10,2237 | | 284 3 259 1285 | S2INCP1 | 30,3011 | | 596 | S22UOFF | 1214 | = | 605 3 595 605 |
| SVDWN2 | 10,2283 | | 284 3 259 1286 | S2INTS1 | 30,2702 | | 595 | S22UUT | 1256 | = | 605 9 593 594 |
| SWKDAT | E7,1537 | = | 119 6 119 590 | S2RPTR | 30,2743 | | 596 | S22WBLR1 | E4,1408 | | 66 1 597 |
| SW/ | 01,2543 | = | 1169 1 1087 | S2RTRP | 30,2735 | | 595 | S22WNL | E7,1666 | = | 123 1 123 |
| SW/NDX | 0305 | = | 70 7 1039 1061 | S22.1 | 30,2255 | | 589 1 557 | S22WTX | 30,2601 | | 594 1 594 |
| SWBIT | 0131 | = | 68 5 1167 1169 | S22.111 | 30,2271 | | 590 1 590 | S22WT6X | 30,2607 | | 594 3 593 594 |

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

UN UNDEFINED = DEFINED BY EQUALS J DEFINED BY JOKER OR BRASH ANYWHERE MD MULTIPLY DEFINED
 BD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, J OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

| SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES |
|----------|---------|-------|------------|-----------|---------|--------|-------------|----------|---------|--------|---------------|
| S22W78X | 30,2627 | 594 | 3 594 | S61DT | E6,1774 | = 114 | 3 209 758 | TC | E3,1550 | = 83 | 12 83 1315 |
| S221X3 | 0030 | = 605 | 2 600 | S62.3 | 10,2302 | 772 | 1 748 | TCALARM2 | 43,3262 | | 1384 |
| S223X1 | 0022 | = 605 | 3 592 600 | S6BITS | 4373 | = 1364 | 1 1371 | TCCSM | E3,1622 | | 84 |
| S2231MKT | 30,3312 | 600 | 1 600 | ===== | | | | | | | |
| S2231X13 | 30,3303 | 600 | 2 592 593 | T | 0038 | = 1276 | 18 457 1270 | TCDANZIG | 27,3343 | = 1355 | 12 289 1350 |
| S30.1 | 31,3102 | 630 | 1 627 | TX) | 27,3325 | 1355 | 2 1352 1353 | TCDU | 37,3873 | | 842 1 840 |
| S31.1 | 31,3154 | 632 | 1 628 | T-OTHER | E3,1642 | = 84 | 1 168 | TOPINDVC | 4370 | | 373 1 360 |
| S33/34.1 | 35,2212 | 461 | 1 456 | TABLNTM | 06,2037 | 131 | 1 131 | TCOBTCAD | 00,3755 | | 1456 1 1457 |
| S34/35.1 | 35,2522 | 466 | 4 460 522 | TARPCOM | 17,2711 | 1012 | 4 1011 | TCLM | E3,1674 | | 84 |
| S34/35.2 | 35,2534 | 467 | 2 457 460 | TARPCOM | 17,3024 | 1014 | 2 1014 | TCONVAC | 4365 | | 373 1 360 |
| S34/35.3 | 35,2617 | 469 | 1 472 | TARPCOM | 17,3106 | 1016 | 2 1016 | TCPIN | 43,3074 | | 259 1 259 |
| S34/35.4 | 35,2662 | 470 | 1 472 | TARPCOM | 17,2762 | 1013 | 4 1012 | TCPINAD | 43,3077 | | 259 1 259 |
| S34/35.5 | 35,2742 | 472 | 2 457 460 | TACHEXIT | 43,3055 | 259 | 1 260 | TCO | 6711 | = 1372 | 3 161 255 |
| S3435.25 | 35,2547 | 467 | 1 519 | TACTOPP | E6,1633 | = 102 | 1 102 | TCQNK00 | 00,3454 | | 1155 1 1155 |
| S40.1 | 16,2000 | 666 | 1 640 | TAD | 7040 | 1105 | 1 1086 | TCSLEEP | 00,3766 | | 1457 1 1456 |
| S40.1B | 16,2073 | 667 | 1 666 | TAGSUB | 01,2466 | 1164 | 4 1162 1163 | TCSUBTR | 00,3731 | | 1161 1 1159 |
| S40.13 | 16,2404 | 682 | 3 207 665 | TAR/REF | 33,3471 | 442 | 2 443 445 | TCTSKOVR | 4367 | | 373 1 360 |
| S40.130 | 16,2430 | 682 | 2 682 683 | TAR/DRVE | 33,3625 | 445 | 2 443 444 | TWAIT | 4366 | | 373 1 360 |
| S40.131 | 16,2461 | 683 | 1 682 | TARGETNG | 25,2125 | 802 | 1 801 | TDCAYFX | 4725 | | 1171 |
| S40.132 | 16,2466 | 683 | 1 683 | TARGETTV | 12,3544 | 1271 | 1 1271 | TDCB1 | 0040 | = 1322 | 55 204 1318 |
| S40.133 | 16,2475 | 683 | 1 683 | TARGETIME | E5,1614 | = 91 | 2 519 522 | TDCB2 | E5,1634 | = 91 | 2 490 |
| S40.134 | 16,2477 | 683 | 1 683 | TARG1/2 | E5,1431 | = 96 | 2 445 | TDELTAV | E3,1520 | = 83 | 12 83 1317 |
| S40.135 | 17,2026 | 684 | 1 682 | TARG1BIT | 4701 | = 46 | | TDESTRED | E5,1672 | = 94 | 5 94 1270 |
| S40.14 | 20,2277 | 691 | 2 248 985 | TARG1PLO | 0024 | = 46 | 6 384 730 | TDPOS | E5,1706 | = 95 | 1 95 |
| S40.15 | 16,3145 | 910 | 3 900 907 | TARG2BIT | 4702 | = 46 | | TDVEL | E5,1714 | = 95 | 1 95 |
| S40.2,3 | 24,3512 | 670 | 1 640 | TARG2PLO | 0025 | = 46 | 5 555 730 | TEMP | 1075 | = 75 | 10 1177 |
| S40.2,3B | 24,3633 | 672 | 1 671 | TAR1 | 33,3500 | 443 | 1 443 | TEMP | E5,1451 | = 96 | |
| S40.6 | 20,2051 | 686 | 1 641 | TASKOVR | 5213 | 1202 | 73 139 1457 | TEMPADD | E5,1450 | = 96 | |
| S40.6 | 16,2130 | 675 | 1 656 | TAT | 0014 | = 1322 | 11 451 1299 | TEMPALFA | E6,1771 | = 114 | 2 114 841 |
| S40.81 | 20,2000 | 677 | 1 677 | TAU | E6,1561 | = 107 | 12 107 1024 | TEMPBR | 0064 | = 1379 | 1 1378 |
| S40.9 | 16,2257 | 679 | 1 656 | TAU. | E4,1711 | = 88 | 10 88 1308 | TEMPBRCN | 0073 | = 1379 | 6 1378 1380 |
| S41.1 | 22,3426 | 673 | 2 645 647 | TAUCHK | 17,3142 | 1016 | 1 1016 | TEMPBRDA | E6,1772 | = 114 | 3 114 841 |
| S41.2 | 20,2146 | 687 | 2 247 985 | TAUCHK | 17,3060 | 1015 | 1 1015 | TEMPDAP | E6,1445 | | 100 6 100 908 |
| S50 | 14,2216 | 704 | 1 704 | TAUNORM | 21,3731 | 1006 | 2 1006 | TEMPPLSH | 0374 | | 72 4 195 1443 |
| S52.2 | 11,2256 | 728 | 2 696 716 | TAU1 | E6,1562 | = 107 | 9 107 1022 | TEMPPO | 0061 | = 1379 | 11 215 1381 |
| S52.2.1 | 11,2277 | 728 | 1 728 | TAU2 | E6,1563 | = 107 | 9 107 1023 | TEMPO2 | 0071 | = 1379 | 3 1377 1380 |
| S52.2A | 11,2270 | 728 | 1 728 | TAZEL1 | E5,1432 | 96 | 4 442 443 | TEMPNM | 0063 | = 1379 | 3 1378 1381 |
| S52.3 | 16,2636 | 734 | 1 696 | TRASE1 | 1053 | 74 | 6 215 1383 | TEMPOK | 06,2520 | | 145 2 145 |
| S52/2 | 11,2000 | = 26 | 1 728 | TRASE2 | 1055 | 74 | 2 1294 | TEMPOR1 | 1300 | | 78 9 566 595 |
| S52/3 | 15,2000 | = 27 | | TRASE3 | 1057 | 74 | | TEMPOR2 | 0160 | = 1451 | 10 1435 1445 |
| S61.1 | 26,2543 | 757 | 2 743 746 | TRASE4 | 1061 | 74 | 1 199 | TEMPP | 0062 | = 1379 | 6 1378 1381 |
| S61.1A | 26,2603 | 758 | 3 210 758 | TRASE5 | 1063 | 74 | 1 529 | TEMPPHS | 0154 | = 1387 | 9 1382 1387 |
| S61.1B | 26,2621 | 759 | 1 758 | TRASE6 | 1065 | 74 | 2 659 778 | TEMPPR | 0070 | = 1379 | 2 1378 1381 |
| S61.1C | 26,2584 | 758 | 2 209 758 | TBITS | E6,1606 | = 110 | 2 110 1058 | TEMPP2 | 0072 | = 1379 | 5 1377 1380 |
| S61.2 | 26,2650 | 762 | 1 744 | TBUILDPX | 4724 | 1171 | | TEMPROLL | E6,1770 | = 114 | 3 114 841 |

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

UN UNDEFINED = DEFINED BY EQUALS J DEFINED BY JOKER OR FRASE ANYWHERE MD MULTIPLY DEFINED
 BD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE



SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, J OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

| SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES |
|-----------|---------|-----|------------------|-----------|---------|------|------------------|---------|---------|---|------------------|
| TEMPRO | 1146 | | TO | TESTACT | 43,2076 | 231 | 18 234 1467 | THETA | 1155 | | TO 23 76 1479 |
| TEMPSET | 16,3050 | 907 | 2 906 920 | TESTY | 35,2280 | 461 | 1 461 | THETA1 | E6,1572 | = | 107 7 107 999 |
| TEMPSW | 0085 | = | 1379 7 1377 1380 | TEST3979 | 04,3255 | 119 | 1 519 | THETA2 | E6,1573 | = | 107 3 107 998 |
| TEMPSWCH | 0157 | = | 1387 3 1382 1387 | TEST | E3,1516 | = | 83 30 83 1314 | THETA3 | E6,1574 | = | 107 4 107 999 |
| TEMPSW2 | 0086 | = | 1379 4 1377 1380 | TESTCM | E3,1570 | = | M 3 84 1474 | THETA4 | E7,1701 | = | 117 7 117 825 |
| TEMPTIME | E5,1440 | = | 96 2 423 | TESTEM | E3,1642 | = | 84 3 84 1474 | THETA5 | E5,1466 | = | 97 2 97 528 |
| TEMPVAR | 1261 | = | TO 3 1223 1224 | TESTOTHER | E3,1642 | = | 84 1 503 | THETA6 | E5,1466 | = | 98 13 98 438 |
| TEMP20 | 0155 | = | 1387 9 1382 1387 | TESTHIS | E3,1570 | = | 84 1 503 | THETA7 | E5,1466 | = | 98 5 98 438 |
| TEMP333 | E6,1510 | = | 101 3 101 914 | TESTI | 0038 | = | 83 5 79 654 | THETA8 | 34,3745 | = | 885 1 850 |
| TEMP80 | E6,1613 | = | 102 26 102 957 | TESTVENT | 1338 | = | 79 10 124 549 | THETA9 | 34,3747 | = | 885 1 850 |
| TEMP | 1224 | = | 77 5 77 788 | TF | E7,1751 | = | 124 13 89 514 | THETA10 | 25,2226 | = | 803 1 806 |
| TEMP | 1225 | = | 77 3 77 788 | TFP | E4,1743 | = | OS 7 507 1352 | THETA11 | E7,1747 | = | 124 3 124 544 |
| TEMP | 1226 | = | 77 5 77 788 | TFP/RTM | 0038 | = | 1341 4 834 764 | THETA12 | E5,1616 | = | 92 4 92 543 |
| TEMP1 | 0141 | = | 68 6 68 1444 | TFP/TRIG | 27,2573 | 769 | 1 513 | THETA13 | E5,1616 | = | 92 4 92 543 |
| TEMP1B | E7,1646 | = | 116 8 116 824 | TFP/LFA | 0032 | = | 1341 6 1345 1352 | THETA14 | 35,3137 | = | 417 1 463 |
| TEMP2 | 0142 | = | 68 9 68 1479 | TFPBANK | 23,2410 | 507 | 1 506 | THETA15 | 4720 | = | 1148 5 785 1483 |
| TEMP3 | 0143 | = | 68 9 68 1334 | TFPCALLS | 23,2703 | 513 | 1 513 | THETA16 | 26,3327 | = | 32 1 497 |
| TEMP4 | 0144 | = | 68 9 68 332 | TFPCONIC | 27,2750 | 1344 | 1 762 | THETA17 | 13,3022 | = | 32 6 450 668 |
| TEMP5 | 0145 | = | 68 2 68 69 | TFPCONJ | 27,2751 | 1344 | 1 513 | THETA18 | 23,2446 | = | 508 1 507 |
| TEMP | 4377 | = | 1174 9 187 1113 | TFPDELO | 0012 | = | 1341 2 1353 1354 | THETA19 | 13,2034 | = | 204 1 1299 |
| TEMPK14 | 22,3442 | = | 074 1 674 | TFPELL | 27,3243 | 1353 | 1 1351 | THETA20 | 6214 | = | 1114 53 32 1468 |
| TEMPDOT | E6,1647 | = | 103 3 103 905 | TFPELL1 | 27,3245 | 1353 | 1 1351 | THETA21 | 11,3672 | = | 1321 1 1307 |
| TEMP | 32,2162 | = | 636 1 636 | TFPFP | 0034 | = | 1341 7 768 1353 | THETA22 | 0055 | = | 38 2 506 509 |
| TEMPH | 34,3552 | = | 887 1 584 | TFPO1 | 0016 | = | 1341 5 1350 1353 | THETA23 | 23,2531 | = | 509 2 508 508 |
| TEMPHSEK | 21,2345 | = | 977 1 977 | TFPRP/RA | 27,3017 | 1347 | 1 513 | THETA24 | 23,2521 | = | 509 1 508 |
| TEMPHEM | E3,1706 | = | 84 19 85 1475 | TFPRDALP | 0030 | = | 1341 3 1345 1352 | THETA25 | 23,2511 | = | 508 65 115 849 |
| TEMPHEM1 | 1287 | = | 78 7 78 527 | TFPSW | 0167 | = | 59 3 1350 | THETA26 | E7,1412 | = | 115 3 208 850 |
| TEMPHEM2 | 10,3520 | = | 1449 1 1447 | TFPSWBIT | 4712 | = | 5s 15 769 1354 | THETA27 | 24,2537 | = | 651 3 208 649 |
| TEMPHEM3 | 5423 | = | 232 3 234 237 | TFPTM | 0044 | = | 1341 2 768 1344 | THETA28 | 24,2521 | = | 650 3 208 649 |
| TEMPHEM4 | 4674 | = | 57 2 57 | TFPTICK | 23,2554 | 509 | 1 1351 | THETA29 | 24,2502 | = | 649 2 209 646 |
| TEMPHEM5 | 0151 | = | 57 2 699 727 | TFPVSO | 0024 | = | 1341 8 769 1353 | THETA30 | 24,2364 | = | 646 3 209 642 |
| TEMPHEM6 | 12,3631 | = | 1272 1 1273 | TFPX | 0042 | = | 1341 6 769 1353 | THETA31 | 24,2173 | = | 643 2 643 644 |
| TEMPHEM7 | 07,2365 | = | 226 1 226 | TFPXTEST | 27,3151 | 1351 | 1 1351 | THETA32 | 24,2425 | = | 647 2 210 647 |
| TEMPHEM8 | 07,2356 | = | 228 1 226 | TFPZBROS | 26,3331 | 1356 | 2 1350 1351 | THETA33 | E7,1523 | = | 118 3 116 803 |
| TEMPHEM9 | 0133 | = | 69 3 1338 | TFP1/ALP | 0028 | = | 1341 7 1345 1354 | THETA34 | 10,3447 | = | 1448 1 1448 |
| TEMPHEM10 | 14,2176 | = | 701 2 226 701 | TFP1/4 | 26,3321 | 1356 | 4 1344 1350 | THETA35 | 22,3115 | = | 408 1 408 |
| TEMPHEM11 | E5,1761 | = | 94 2 1269 1270 | TFI | E5,1620 | = | 92 3 92 544 | THETA36 | 13,3713 | = | 1300 4 1298 1299 |
| TEMPHEM12 | 01,2612 | = | 1169 1 1169 | TFI | E5,1626 | = | 92 2 92 543 | THETA37 | 27,3552 | = | 1412 2 1471 1474 |
| TEMPHEM13 | 40,3430 | = | 369 3 369 | TFI | E7,1427 | = | 115 19 115 683 | THETA38 | 27,3564 | = | 1412 1 213 |
| TEMPHEM14 | 33,2000 | = | 30 1 415 | TFI | 16,2175 | 676 | 1 636 | THETA39 | 13,3665 | = | 1299 1 1300 |
| TEMPHEM15 | 13,3234 | = | 1292 6 1290 1319 | TFI | 32,2164 | 636 | 1 636 | THETA40 | E4,1433 | = | 86 2 86 741 |
| TEMPHEM16 | 41,2046 | = | 319 1 351 | TFI | 32,2246 | 637 | 1 636 | THETA41 | 12,2312 | = | 1251 1 1249 |
| TEMPHEM17 | 40,3077 | = | 346 4 343 353 | TFI | 0024 | = | 71 11 715 1325 | THETA42 | E5,1500 | = | 97 2 854 863 |
| TEMPHEM18 | 33,2443 | = | 424 1 416 | TFI | E4,1747 | = | 89 3 89 635 | THETA43 | 12,3552 | = | 1212 2 854 863 |
| TEMPHEM19 | 41,2041 | = | 319 1 416 | TFI | 16,2126 | 668 | 1 666 | THETA44 | 11,3155 | = | 1312 4 1293 |

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

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SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEP, J OF REFS, PAGE OF FIRST REP, PAGE OF LAST REP.

| SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES |
|-----------|---------|--------|-------------|-----------|---------|-------|-------------|----------|---------|-------|-------------|
| TIMETST | 01,3566 | 1383 | 1 1387 | TIMRESUME | 05,3542 | 1069 | | TRGNSMB | 23,3557 | 1336 | |
| TIMETST | 12,2737 | 1260 | 6 456 893 | TINIT | E7,1473 | = 120 | 4 120 680 | TRIG1 | 23,3224 | 1325 | 1 1325 |
| TIMETST | 15,3544 | 1057 | | TINITPREV | E7,1475 | = 120 | 3 120 680 | TRIG2 | 23,3235 | 1325 | 1 1325 |
| TIMETST1 | 15,3567 | 1057 | 1 1057 | TINTEST | 06,2231 | 137 | 1 135 | TRIM/CMD | 16,3262 | 919 | 1 918 |
| TIMETST2 | 15,3603 | 1057 | 1 1057 | TINJ | E3,1528 | = 83 | 12 83 1317 | TRIMONLY | 24,2085 | 641 | 1 646 |
| TIMETST3 | 15,3622 | 1058 | 1 1057 | TOBALL | 27,2013 | 383 | 3 383 384 | TRIMSCAL | 24,3871 | 673 | 2 671 |
| TIMETST4 | 15,3624 | 1058 | 1 1057 | TOBALLC | 27,2034 | 383 | 1 383 | TRIPA | 1256 | = 76 | 4 1223 1224 |
| TIMETST5 | 15,3625 | 1058 | 2 1057 1058 | TOCON2 | 5344 | 1378 | 1 1379 | TRMCKNT | 1126 | 76 | 8 76 1297 |
| TIMEX | 35,2517 | 464 | 2 462 464 | TOP-PP | 27,2000 | = 29 | 1 1344 | TRMATTCK | 43,2444 | 243 | 1 243 |
| TIMEX1 | 0025 | = 37 | 23 128 1448 | TOP-PP1 | 27,2000 | = 29 | 1 1356 | TRM3BIT | 4707 | = 47 | 1 446 |
| TIMEX2 | 0024 | = 37 | 37 167 1476 | TOFF | E6,1605 | = 110 | 7 110 1058 | TRM3PLG | 0032 | = 47 | 2 226 444 |
| TIMEX2SAV | 1150 | 76 | 5 77 1416 | TOFFOVFL | 15,3520 | 1055 | 1 1055 | TRNSPSFD | 22,2343 | 397 | 2 392 397 |
| TIMEX3 | 0026 | = 37 | 4 186 1201 | TOFFTEST | 15,3571 | 1057 | 1 1057 | TRDAXPI | 15,3314 | 1052 | |
| TIMEX4 | 0027 | = 37 | 4 131 186 | TOGETHER | 20,2184 | 688 | 1 688 | TRU360X | 12,3175 | 1266 | 1 1264 |
| TIMEX5 | 0030 | = 37 | 25 127 1043 | TOLDZMT | E5,1641 | = 98 | | TRUNA | 1160 | = 96 | |
| TIMEX6 | 0031 | = 37 | 8 957 1033 | TOLDZ1 | E5,1641 | = 98 | | TRUNBIAS | 1342 | 80 | 2 561 616 |
| TIMBIT | 4700 | = 58 | | TON1 | E6,1621 | = 111 | 12 111 1058 | TRUNBIT | 4707 | = 45 | |
| TIMFLAG | 0155 | = 58 | 4 626 644 | TON2 | E6,1607 | = 110 | 10 110 1058 | TRUNCMD | 10,2132 | 164 | 1 163 |
| TIMSCAL | 15,3527 | 1058 | 1 1055 | TON2TEST | 15,3605 | -1057 | 1 1057 | TRUNFLAG | 0013 | = 45 | 3 899 700 |
| TIMSLM | 0016 | = 1221 | 3 1218 | TORINCH | 33,3063 | 434 | | TRUNION | E6,1754 | = 95 | 2 613 616 |
| TIMSUBO | E3,1706 | = 85 | 1 1218 | TORNDX | E5,1450 | = 97 | 7 416 434 | TRUNVAR | 31,3044 | 622 | 1 617 |
| TINT | E7,1655 | = 121 | 5 518 519 | TORQUE | 33,2122 | 418 | 1 435 | TRUNX | E7,1603 | = 119 | 2 119 |
| TINTSOI | E5,1610 | = 91 | 2 518 519 | TPAGRE | 7226 | 1111 | 15 240 1476 | TRUN19 | 31,3035 | 621 | 1 617 |
| TINYHET | 26,3135 | 806 | 1 803 | TPASS4 | E7,1655 | = 121 | 12 121 850 | TRUN19A | 31,3036 | 621 | |
| TITER | E7,1664 | = 123 | 6 123 463 | TPDVL | 6557 | 1096 | 1 1096 | TRUN38 | 13,2274 | 731 | 1 731 |
| TIX | 01,2442 | 1163 | 1 1087 | TPERTICK | 23,2561 | 509 | 1 509 | TSIGHT | E5,1606 | = 91 | 13 91 737 |
| TK | E4,1731 | = 88 | 1 88 | TPLEPIN | 40,3056 | 345 | 3 331 345 | TSIGHT1 | 15,2175 | 705 | 1 698 |
| TKTLX/I | E6,1702 | = 103 | 3 103 907 | TPMODE | 22,3562 | 1477 | 12 572 1265 | TSK | 21,2056 | 970 | 4 970 971 |
| TKSS28 | 32,2244 | 637 | 1 636 | TPREV | E5,1763 | = 94 | 2 1269 1270 | TSK/CDR | 01,3517 | 1205 | 1 1204 |
| TLIPTOP | 1336 | = 79 | 5 526 530 | TPSL1 | 4420 | 374 | 6 335 345 | TSLC | 7565 | 1119 | 1 1086 |
| TLIM | 06,2507 | 145 | 1 136 | TPUSH | 00,3272 | 1152 | 1 1152 | TSLCLOOP | 00,2201 | 1127 | 1 1127 |
| TLOAD | 6437 | 1094 | 3 398 1174 | TRGL**P | 23,3453 | 1334 | 1 1334 | TSLCTEST | 00,2207 | 1127 | 1 1127 |
| TM | E6,1718 | = 112 | 4 405 409 | TRACE1 | 40,3141 | 353 | | TSLC2 | 00,2172 | 1127 | 1 1119 |
| TMANUCK | 22,3105 | 408 | | TRACE1S | 40,3152 | 353 | | TSSL | 00,2101 | 1124 | 3 1122 1131 |
| TMARK | E5,1442 | 96 | 5 423 438 | TRACKBIT | 4706 | = 47 | | TSSR | 00,2025 | 1122 | |
| TMAXFIRE | 16,3737 | 960 | 2 956 | TRACKPLG | 0031 | = 47 | 7 253 695 | TST,TRIM | 24,2362 | 646 | 1 641 |
| TMAXITL | 05,3540 | 1069 | | TRACKTRM | 43,2637 | 253 | 2 230 622 | TSTAR | 40,3537 | 381 | 1 382 |
| TMPAIL2 | 07,3704 | 1418 | 2 1419 | TRANSANG | 07,2440 | 548 | 1 547 | TSTART2 | E4,1724 | = 89 | 6 507 635 |
| TMPI | E6,1666 | = 112 | 9 392 394 | TRANSM1 | E4,1400 | = 90 | 2 90 433 | TSTCON1 | 41,3644 | 379 | 1 379 |
| TMINDEX | 0336 | 71 | 6 71 1069 | TRANSP0S | 22,2334 | 397 | 1 392 | TSTCON2 | 41,3645 | 379 | 1 379 |
| TMINFIRE | 16,3736 | 960 | 1 956 | TRANSP1 | 22,3657 | 1481 | 2 282 | TSTCON3 | 41,3646 | 380 | 1 380 |
| TNIS | E6,1666 | = 112 | 15 112 392 | TRANSP2 | 22,3673 | 1481 | 1 282 | TSTFORDP | 41,2465 | 327 | 1 326 |
| TMODE | 6446 | 1094 | | TRPAILOP | 5520 | 1460 | 2 258 577 | TSTINIT | 20,3465 | 945 | 1 945 |
| TMODULO | 1345 | 80 | 5 1247 1252 | TRPAILON | 5532 | 1460 | 1 577 | TSTINITJ | 16,3266 | 919 | 2 919 |
| TMRAD100 | 32,2272 | 854 | 2 846 856 | TRGNSBM | 23,3572 | 1337 | 2 447 1336 | TSTLTS1 | 41,3621 | 379 | 1 379 |

HEALTH KEY' NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS'

UN UNDEFINED = DEFINED BY EQUALS J DEFINED BY JOKER OR BRASE ANYWHERE MD MULTIPLY DEFINED
 RD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, J OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

| SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES |
|----------|---------|--------|-------------|----------|---------|--------|-------------|----------|---------|--------|-------------|
| UPDAT1 | 41,2344 | = 324 | 2 323 355 | UP71 | 4112 | = 1468 | 1 1467 | V-OTHER | E3,1727 | = 84 | 4 168 285 |
| UPDNLIST | 05,2214 | = 166 | | UP72 | 4111 | = 1468 | 1 1467 | V/SC | 7573 | = 1120 | 1 1086 |
| UPDTCALL | 22,3225 | = 410 | I 409 | UP73 | 6214 | = 1468 | 1 1467 | V/SCDV | 00,2750 | = 1143 | 3 1142 |
| UPDTRND | 43,2355 | = 240 | | UR | 0010 | = 888 | 1 888 | V/SC1 | 7601 | = 1120 | 1 1120 |
| UPDIRAS | 4715 | = 1410 | 1 1472 | URH | E7,1541 | = 116 | 2 768 770 | V/SC2 | 00,2854 | = 1141 | 1 1120 |
| UPEND70 | 27,3706 | = 1474 | 1 1471 | URONE | E4,1142 | = 89 | 4 744 766 | VACDSP | 10,3005 | = 1440 | 1 1440 |
| UPEND71 | 27,3615 | = 1472 | 1 1471 | URP | 0016 | = 888 | 1 888 | VACPLND | 01,2843 | = 1181 | 5 1181 |
| UPEND72 | 27,3647 | = 1473 | 1 1471 | URPV | 0016 | = 1322 | 8 1309 1322 | VACSTOR | 07,2243 | = 223 | |
| UPEND73 | 27,3521 | = 1471 | | URR | 0006 | = 894 | 2 892 | VACT3 | E7,1045 | = 120 | 8 120 545 |
| UPENT2 | 7717 | = 1453 | 4 1442 1447 | URRECT | E5,1646 | = 94 | 4 94 1252 | VACT | E4,1624 | = 87 | 1 87 |
| UPENQMC | 43,3756 | = 1468 | | UR1 | E5,1723 | = 94 | 11 94 1273 | VACY | E4,1625 | = 87 | 1 87 |
| UPERLEM | 43,3752 | = 1468 | | UR1/ | E7,1737 | = 125 | 8 125 882 | VACZ | E4,1630 | = 87 | |
| UPERROR | 43,3760 | = 1468 | 2 1468 | US | E5,1616 | = 92 | 3 616 618 | VAC1 | 0401 | = 72 | |
| UPERROUT | 27,3743 | = 1475 | 4 1468 1474 | USEADD | 41,2105 | = 319 | 1 319 | VAC1ADRC | 05,3160 | = 189 | 1 187 |
| UPFLAG | 5435 | = 1454 | 55 199 1471 | USEKAY | 36,2470 | = 548 | 2 548 | VAC1USE | 0400 | = 72 | 4 187 1181 |
| UPFNQVAC | 27,3527 | = 1471 | 1 1471 | USEMAXOT | 13,3311 | = 1292 | 1 1293 | VAC2 | 0455 | = 72 | |
| UPJOB | 27,3534 | = 1471 | 1 1471 | USEPIOS | 13,2756 | = 1286 | 1 1286 | VAC3USE | 0454 | = 72 | 3 187 1181 |
| UPLIN | 12,3301 | = 1268 | 1 1267 | USERPRIO | 0163 | = 1451 | 3 1438 1448 | VAC3 | 0531 | = 12 | |
| UPLQADW | 27,3501 | = 1470 | 2 1469 | USPRCADR | 4652 | = 1075 | 3 1334 | VAC3USE | 0530 | = 72 | 3 187 1181 |
| UPLQBIT | 4707 | = 59 | | USSTAR | E7,1650 | = 119 | 3 119 616 | VAC4 | 0605 | = 72 | |
| UPLQKPL | 0164 | = 59 | | USTAR | 1244 | = 78 | 5 78 596 | VAC4USE | 0604 | = 72 | 3 187 1181 |
| UPNSVCD | 27,2737 | = 1301 | 1 1300 | UT | E7,1712 | = 122 | 13 122 673 | VAC5 | 0661 | = 72 | 1 1381 |
| UPNEG | 7530 | = 1118 | 1 1118 | UV1/ | E7,1745 | = 125 | 4 125 859 | VAC5USE | 0660 | = 72 | 3 187 1181 |
| UPOK | 07,3667 | = 1418 | | UW | 0014 | = 894 | 1 892 | VAD | 0720 | = 1101 | 1 1088 |
| UPOLMOD | 0301 | = 70 | 3 70 1474 | UXA/2 | E7,1541 | = 116 | 9 116 838 | VALMIS | 33,2262 | = 420 | 1 434 |
| UPOUT | 27,3674 | = 1474 | 7 1468 1475 | UYA/2 | E7,1547 | = 116 | 4 116 838 | VAPRSC | E7,1567 | = 121 | 2 401 464 |
| UPOUT4 | 27,3675 | = 1470 | 3 1469 1470 | UZ | 0024 | = 1322 | 4 1309 1311 | VARALARM | 5651 | = 1464 | 3 154 1411 |
| UPPART2 | 27,3364 | = 1468 | 1 1468 | UZA/2 | E7,1555 | = 116 | 5 116 839 | VARDELAY | 5181 | = 1183 | 5 138 1391 |
| UPPART3 | 27,3545 | = 1471 | | UZZ | 0000 | = 894 | 2 892 | VARDINS | 16,2710 | = 905 | 1 805 |
| UPPOS | 7520 | = 1118 | 1 1118 | U1POS | 22,2242 | = 395 | 1 395 | VARIANCE | E7,1525 | = 119 | 13 119 1223 |
| UPRPT8B | 4056 | = 128 | 1 127 | U2 | E5,1713 | = 94 | 5 94 1272 | VARK | E6,1651 | = 103 | 5 103 936 |
| UPRPT1 | 07,3650 | = 1418 | | U2POS | 22,2216 | = 395 | 1 395 | VARST0 | E6,1511 | = 101 | 7 101 814 |
| UPRPT | 07,3636 | = 1418 | 1 127 | U3POS | 22,2266 | = 396 | 1 396 | VARST5 | E6,1516 | = 101 | 1 814 |
| UPSTORE | 27,3503 | = 1410 | 1 1470 | ===== | ===== | ===== | ===== | VARSURL | 31,3041 | = 622 | 2 616 617 |
| UPSVFLAG | E3,1501 | = 83 | 6 83 1301 | V | E7,1673 | = 117 | 18 117 624 | VARSURL3 | 31,3042 | = e22 | |
| UPIEMP | 0330 | = TO | 10 70 1473 | V(T1)/ | E7,1671 | = 125 | 6 125 882 | VATT | 0008 | = 1322 | 24 487 1299 |
| UPIEST | 07,3710 | = 1418 | 2 1418 | V(T2)/ | E7,1707 | = 125 | 10 125 869 | VATT1 | 0024 | = 1322 | 5 482 889 |
| UPIFPAST | 06,2660 | = 152 | 1 155 | V(21K) | 32,2242 | = 637 | 1 635 | VBARS | E7,1665 | = 117 | 8 117 816 |
| UPV2R | 0302 | = TO | 5 70 1471 | V(24K) | 32,2232 | = 637 | | VBCOARK | 43,2150 | = 234 | 1 230 |
| UPVERSV | 0331 | = TO | 2 1467 1468 | V(26K) | 32,2250 | = 637 | 1 636 | VBPANDIR | 41,2146 | = 320 | 1 320 |
| UPVERIFY | 27,3446 | = 1410 | 3 1469 1470 | V(28K) | 32,2226 | = 637 | | VBPROC | 40,3343 | = 360 | 5 321 368 |
| UPVRYN | 27,3502 | = 1410 | 1 1470 | V(3K) | 32,2230 | = 637 | 1 635 | VBRDLSQ | 40,3362 | = 362 | 1 310 |
| UPVAKR | 27,3537 | = 1471 | | V(32K) | 32,2236 | = 637 | 1 636 | VBRSPQ | 40,3360 | = 361 | 1 321 |
| UP21 | 4376 | = 1410 | 1 1469 | V(4K) | 32,2240 | = 637 | 1 635 | VBRPXCBC | 41,3456 | = 360 | 1 321 |
| UP70 | 4714 | = 1468 | 1 1467 | V(400) | 32,2224 | = 637 | 1 636 | VBRWAIT | 41,3502 | = 360 | 1 321 |

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

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 BD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE



SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, J OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

| SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES |
|-----------|---------|-------|-------------|----------|---------|--------|------------|---------------|---------|--------|-------------|
| VBSP1LD | 41,3001 | 339 | 2 337 338 | VEL/C | E7,1473 | = 115 | 5 115 | 738 VL | E7,1766 | = 117 | 13 276 618 |
| VBSP2LD | 41,3002 | 339 | 2 337 338 | VELSC | 33,3876 | 446 | 1 432 | VLAUN | E5,1520 | = 97 | 5 432 433 |
| VBSP3LD | 41,3003 | 339 | 1 337 | VELVECT | E4,1744 | = 88 | 4 88 | 893 VLAUNS | E5,1472 | = 97 | |
| VBSTRM | 40,3351 | 361 | 2 321 367 | VEM | 26,2173 | 741 | 1 741 | VLMIN | 26,3203 | 834 | 1 810 |
| VBSTLTS | 41,3603 | 379 | 1 321 | VEMA | 26,2200 | 741 | 1 742 | VLOAD | 6454 | 1094 | 1 1086 |
| VBUP | 0122 | 67 | 58 67 1338 | VEMSCON | 26,3025 | 765 | 1 763 | VLOAD* | 6056 | = 1174 | 1 1093 |
| VBZRO | 43,2124 | 233 | 1 230 | VERB | 40,2255 | 314 | 1 310 | VLOADCOD | 4674 | = 1174 | 1 1093 |
| VB04N06 | 34,3650 | 609 | 1 608 | VERBPAN | 41,2133 | 320 | 7 319 | 322 VLTEST | 25,3051 | 818 | |
| VB06N18 | 34,3651 | 609 | 1 608 | VERPMASK | 4160 | = 1451 | 1 1436 | VMAGI | E7,1722 | = 117 | 6 117 841 |
| VB06N22 | 15,2156 | 697 | 1 696 | VERPCLN | E4,1765 | = 89 | 7 89 | 550 VMAX | E4,1403 | 86 | 1 572 |
| VB06N98 | 33,2442 | 424 | 1 424 | VERPREG | 1001 | 73 | 20 188 | 370 VMIN | 26,3321 | = 834 | 1 805 |
| VB51 | 07,2426 | 227 | 1 226 | VERSAVE | 1041 | 74 | 3 319 | 358 VMODE | 6470 | 1094 | 3 1116 1476 |
| VB53 | 15,2360 | 737 | 1 735 | VERTDAB | 41,2151 | 320 | 1 320 | VMOON | E5,1751 | = 93 | 7 93 705 |
| VB56CADR | 4553 | 622 | 1 622 | VERB37 | 04,2000 | = 25 | 3 190 | 202 VN | 1176 | 77 | 18 167 1297 |
| VB6N5 | 14,2755 | 716 | 1 715 | VERB69 | 43,2037 | 230 | 1 230 | VNCOMP17 | 35,3517 | 550 | 4 550 551 |
| VB64 | 43,2472 | 244 | 1 230 | VERB94 | 43,3124 | 260 | 1 231 | VNCON | 43,2777 | 257 | 1 257 |
| VCONTR | E6,1653 | = 103 | 6 103 905 | VERB98 | 43,3146 | 260 | 1 231 | VNDSPCON | 40,3221 | 355 | 1 355 |
| VCONTRMP | E6,1663 | = 103 | 5 103 905 | VERIFBIT | 4710 | = 59 | | VNDSPPLY | 04,3427 | 523 | 4 517 520 |
| VCRCS | 34,3726 | 885 | 1 849 | VERIFLAG | 0165 | = 59 | | VN0641 | 04,2650 | 445 | 1 445 |
| VCSPS | 34,3724 | 884 | 1 849 | VERTDRPT | 33,2227 | 419 | | VNLDCDU | 43,2237 | 236 | 1 236 |
| VCV | E3,1542 | = 83 | 21 83 1315 | VESO | E4,1540 | = 87 | 3 87 | 741 VNLDCDU | 43,2173 | 235 | 2 234 243 |
| VCVCSM | E3,1614 | 84 | 1 621 | VPINAL | 26,3277 | 635 | 1 808 | VNLDDOT | 43,2357 | 240 | 1 240 |
| VCVLEM | E3,1666 | 84 | | VPINAL1 | 26,3301 | 635 | 1 807 | VNLDDYR | 43,2287 | 237 | 1 237 |
| VDEF | 00,3232 | 1152 | 1 1088 | VFLAG | 0062 | = 50 | 4 708 | 710 VNPLANV | 15,2453 | 738 | 1 737 |
| VDISP | E6,1710 | = 113 | 1 113 | VFLAGBIT | 4701 | = 50 | | VNPOOH | 35,3114 | 476 | 5 455 549 |
| VDI/180 | E6,1567 | = 111 | 6 1054 1059 | VO | E7,1457 | = 120 | 6 120 | 677 VNSTORE | E7,1763 | = 125 | 3 125 848 |
| VD1 | 4374 | 373 | 18 188 1174 | VGANCALC | 26,3050 | 768 | 2 634 | 763 VN0629 | 33,3771 | 447 | 1 447 |
| VEARTH | E5,1735 | = 93 | 6 93 737 | VGBODY | E7,1664 | = 122 | 6 122 | 645 VN0641 | 33,3455 | 442 | 1 442 |
| VEACOREE | 00,3010 | 1144 | 4 1141 1483 | VODISP | E7,1653 | = 121 | 7 274 | 675 VN1 | 1237 | = 77 | 4 77 1299 |
| VECANQ1 | 27,2321 | 369 | 1 368 | VOPREV | E7,1720 | = 122 | 5 645 | 681 VN1645 | 35,3005 | 473 | 5 457 851 |
| VECANQ2 | 27,2323 | 369 | 1 368 | VOTEMP | E7,1645 | = 121 | 4 656 | 681 VONE | E4,1734 | = 88 | 11 89 1344 |
| VECLEAR | 27,2131 | 387 | 1 387 | VOTIG | E7,1720 | = 122 | 12 122 | 682 VONE | E4,1771 | = 90 | 4 90 1350 |
| VECODEM | 22,3540 | 1476 | 1 1479 | VPCNT | 1125 | 76 | 10 171 | 850 VPASS3 | E7,1561 | = 120 | 10 120 543 |
| VSCDEM | E4,1436 | = 86 | 5 86 742 | VHFGOOD | 27,2523 | 578 | 1 578 | VPASS4 | E7,1637 | = 121 | 7 121 548 |
| VEOPANG | 22,2724 | 403 | 2 403 | VHFRANGE | 1256 | = 78 | 2 573 | 577 VPDVL | 6542 | 1096 | |
| VECPPOINT | 27,2126 | 367 | 4 363 587 | VHFRBIT | 4702 | = 62 | | VPPREC | E7,1611 | = 121 | 2 461 464 |
| VECPPT | 27,2000 | = 29 | 1 366 | VHFRPAD | 27,2476 | 577 | 2 128 | VPPRED | E7,1766 | = 118 | 6 117 855 |
| VECOTEMP | E6,1710 | = 111 | 3 367 389 | VHFRFLAG | 0215 | = 62 | 4 195 | 570 VPROJ | 7374 | 1116 | 1 1086 |
| VECSNAG | 22,3767 | 1483 | | VHPTIME | 1151 | = 77 | 5 171 | 577 VQUIT | 26,3213 | 834 | 2 810 824 |
| VECSHIFT | 22,3412 | 491 | | VHSDOT | 34,2303 | 531 | 1 531 | VRCALC | 27,2626 | 770 | 2 762 770 |
| VECTAB | E4,1616 | = 87 | 9 87 1320 | VINIT | E7,1575 | = 120 | 12 120 | 668 VRCON | 26,3257 | 835 | 1 808 |
| VECTIME | E4,1722 | = 88 | 4 88 893 | VINTFBIT | 4710 | = 51 | | VRECT | E3,1510 | = 83 | 10 83 1315 |
| VEHUPBIT | 4703 | = 46 | | VINTFLAG | 0071 | = 51 | 20 203 | 1317 VRECTCSM | E3,1562 | 84 | |
| VEHUPFLG | 0026 | = 46 | 14 254 1229 | VIO | E7,1724 | = 117 | 5 116 | 763 VRECTLEN | E3,1634 | 84 | |
| VEL | E7,1515 | = 116 | 4 116 802 | VIPRIME | E7,1611 | = 120 | 16 120 | 660 VRECT1 | 0030 | = 83 | |

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

UN UNDEFINED = DEFINED BY EQUALS J DEFINED BY JOKER OR ERASE ANYWHERE MD MULTIPLY DEFINED
 ED BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, J OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

| SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES | SYMBOL | DEF | H | REFERENCES |
|----------|---------|---|------------|-------------|----------|---------|---------------|-------------|---------|------|---------------|
| VREP | 1157 | = | 77 | 4 819 820 | V05N71 | 31,3051 | 622 1 813 | V06N89B | 30,3856 | 605 | 2 558 599 |
| VREPER | 25,3631 | | 830 | 6 824 825 | V05N7122 | 30,2184 | 557 1 556 | V06N90N | 04,3102 | 495 | 1 495 |
| VRIQTT2 | 00,2242 | | 1129 | 1 1129 | V06N07 | 10,3625 | 1451 | V06N92 | 14,2151 | 701 | 1 699 |
| VRODATEX | 7367 | | 1115 | 3 1125 1147 | V06N16N | 04,3101 | 495 1 494 | V06N93 | 15,2234 | 714 | 1 714 |
| VROUND | 7107 | | 1107 | 6 1115 1116 | V06N18 | 27,2125 | 385 2 383 384 | V06N93S | 33,3621 | 444 | 1 444 |
| VRFPRV | E7,1465 | = | 120 | 3 120 680 | V06N22 | 4745 | 1171 3 391 | V53 V06N94B | 15,2362 | 737 | 1 735 |
| VSHRND | 00,2073 | | 1123 | 4 1125 1161 | V06N30S | 08,3540 | 298 | V06N99A | 40,3732 | 625 | 1 623 |
| VSHR2 | 00,2080 | | 1123 | 1 1123 | V06N31** | 31,3536 | 894 1 890 | V06N99DS | 40,3600 | 623 | 1 623 |
| VSO | 00,3245 | | 1152 | 1 1088 | V06N33 | 35,3722 | 629 1 628 | V06N9933 | 40,3610 | 623 | 1 623 |
| VSO/4API | E6,1616 | = | 110 | 5 110 1054 | V06N33SR | 04,3440 | 523 1 517 | V0648 | 42,2057 | 248 | 1 248 |
| VSOIN | 15,3766 | | 1062 | 2 1053 1054 | V06N34 | 15,2155 | 697 1 695 | V0694 | 37,2535 | 563 | 1 562 |
| VSOGLB | 00,3317 | | 1153 | 3 1145 1152 | V06N34** | 31,3535 | 894 2 889 891 | V1 | 0325 | = | 70 18 70 822 |
| VSQLARE | E7,1621 | = | 116 | 6 116 827 | V06N34SR | 04,3444 | 523 1 518 | V1LEAD | 25,2425 | 809 | 1 809 |
| VSSL | 00,2145 | | 1128 | 3 1125 1131 | V06N37 | 35,3125 | 477 3 455 549 | V1STO2S | 22,3547 | 1477 | 5 388 1328 |
| VSSR | 00,2127 | | 1125 | 1 1129 | V06N40 | 24,2351 | 645 8 640 664 | V16N35 | 35,3724 | 629 | |
| VSTORE | 6412 | | 1092 | | V06N42 | 35,3723 | 629 1 628 | V16N40 | 24,2353 | 645 | 1 642 |
| VSU | 6716 | | 1101 | 1 1088 | V06N43 | 37,2101 | 451 1 451 | V16N44 | 23,2407 | 507 | 2 507 510 |
| VSLN | E5,1743 | = | 93 | 9 93 737 | V06N45 | 35,3725 | 629 | V16N45 | 35,3132 | 477 | 2 473 626 |
| VSI | E7,1671 | = | 117 | 5 117 819 | V06N45R | 30,2162 | 557 1 555 | V16N53 | 35,3311 | 498 | 1 496 |
| VTARGET | E5,1704 | = | 94 | 4 94 1271 | V06N47 | 42,2060 | 248 | V16N54 | 35,3310 | 498 | 1 496 |
| VTAROTAG | E5,1703 | = | 94 | 5 94 1271 | V06N49 | 34,3223 | 575 1 575 | V16N67 | 28,2542 | 756 | 1 754 |
| VTRP | 1226 | = | 78 | 2 78 569 | V06N49EE | 30,3855 | 605 1 597 | V16N69 | 28,2472 | 752 | 1 752 |
| VTIG | E7,1637 | = | 121 | 7 121 673 | V06N51 | 42,3704 | 888 1 888 | V16N85B | 24,2350 | 645 | 2 643 645 |
| VTRIME | E7,1617 | = | 120 | 9 120 547 | V06N55 | 35,3126 | 477 2 475 550 | V1683 | 24,2346 | 645 | 1 648 |
| VW/SC | 7576 | | 1120 | | V06N55SR | 04,3441 | 523 1 517 | V2(T1)/ | E7,1677 | = | 125 7 125 882 |
| VWC | E5,1745 | = | 94 | 20 94 1273 | V06N57SR | 04,3443 | 523 1 518 | V2T1X | 32,3478 | 876 | 2 874 876 |
| VXSC | 7353 | | 1115 | | V06N58 | 35,3127 | 477 2 457 550 | V2T100 | 32,3136 | 871 | 2 845 865 |
| VXM | 7306 | | 1113 | 1 1088 | V06N58SR | 04,3445 | 523 1 520 | V2T102 | 32,3236 | 872 | 1 872 |
| VXM/MKV | 7311 | | 1114 | 1 1113 | V06N59 | 35,3130 | 477 1 472 | V2T105 | 32,3243 | 872 | 1 872 |
| VXSC | 7350 | | 1115 | 1 1088 | V06N60 | 28,2423 | 749 1 744 | V2T110 | 32,3250 | 872 | 1 872 |
| VXV | 7427 | | 1117 | 1 1088 | V06N61 | 26,2424 | 749 2 743 747 | V2T115 | 32,3300 | 873 | 2 873 |
| VZC | E7,1634 | = | 119 | 4 119 621 | V06N62 | 34,2511 | 537 1 531 | V2T120 | 32,3311 | 873 | 1 873 |
| V01N25 | 10,3624 | | 1451 | 2 1439 1441 | V06N63 | 28,2425 | 749 1 745 | V2T125 | 32,3322 | 873 | 2 873 |
| V01N70 | 14,2700 | | 713 | 1 711 | V06N64 | 28,2426 | 749 1 749 | V2T130 | 32,3330 | 873 | 1 873 |
| V01N71 | 14,3404 | | 727 | 1 727 | V06N66 | 28,2510 | 754 1 754 | V2T135 | 32,3341 | 874 | 2 873 |
| V01N71B | 15,2361 | | 737 | 1 736 | V06N68 | 28,2437 | 751 1 751 | V2T140 | 32,3344 | 874 | 4 872 873 |
| V04N06 | 10,3630 | | 1451 | 1 1441 | V06N72 | 35,3543 | 551 1 550 | V2T145 | 32,3352 | 874 | 3 872 874 |
| V04N06SR | 04,3442 | | 523 | 1 518 | V06N81 | 35,3131 | 477 2 472 628 | V2T150 | 32,3357 | 874 | 1 874 |
| V04N46 | 42,2081 | | 248 | 1 247 | V06N81SR | 04,3446 | 523 1 520 | V2T155 | 32,3371 | 874 | 1 874 |
| V05N00M1 | 10,3643 | | 1451 | 1 1444 | V06N84 | 13,2163 | 504 2 502 | V2T160 | 32,3376 | 874 | 1 874 |
| V05N09 | 4743 | | 1171 | 5 456 1462 | V06N85R | 24,2347 | 645 2 644 659 | V2T165 | 32,3404 | 874 | 2 874 |
| V05N30E | 33,3467 | | 442 | 1 442 | V06N87NR | 37,2441 | 561 1 561 | V2T175 | 32,3424 | 875 | 1 874 |
| V05N70 | 31,3050 | | 622 | 1 611 | V06N89 | 30,2167 | 557 | V2T185 | 32,3437 | 875 | 1 874 |
| V05N70** | 31,3537 | | 894 | 1 891 | V06N89* | 16,2505 | 697 1 698 | V2T195 | 32,3461 | 875 | 1 875 |
| V05N7022 | 30,2163 | | 557 | 1 556 | V06N89A | 14,2152 | 701 | V2T200 | 32,3467 | 875 | 1 875 |

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

UN UNDEFINED = DEFINED BY EQUALS J DEFINED BY JOKER OR BRASS ANYWHERE MD MULTIPLY DEFINED
 ED BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEP, J OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

| SYMBOL | DEP | H | REFERENCES | SYMBOL | DEP | H | REFERENCES | SYMBOL | DEP | H | REFERENCES |
|----------|---------|------|------------|--------------|---------|-------|------------|--------------|-----------|-------|-------------|
| V2T205 | 32,3472 | 876 | 2 875 | V67WCRB | 40,3641 | 623 | 1 623 | V99EJOB | 24,3318 | 662 | |
| V2T300 | 32,3474 | 876 | 6 874 | 875 V67WRW | 40,3656 | 624 | 1 623 | V99FLASH | 24,3500 | 665 | |
| V37 | 04,2919 | 193 | 2 261 | 359 V67XOX | 40,3724 | 624 | 1 624 | V99P | 24,3328 | 662 | 1 661 |
| V37BAD | 04,2972 | 194 | 1 198 | V70UPDAT | 43,3722 | 1467 | 1 230 | V99P/TIG | 24,3345 | 662 | 2 662 |
| V37FLAG | 0162 = | 56 | 3 499 | 763 V71UPDAT | 43,3724 | 1467 | 1 230 | V99T | 24,3320 | 662 | 2 661 663 |
| V37FLBIT | 4705 = | 59 | 1 1463 | V72UPDAT | 43,3726 | 1467 | 1 230 | V99TJOB | 24,3324 | 662 | |
| V37KLEAN | 05,2506 | 161 | 1 196 | V73UPDAT | 43,3730 | 1467 | 4 230 1467 | ===== | | | |
| V37KNOO | 04,2257 | 197 | 1 195 | V74 | 43,2706 | = 254 | | W | E5,1400 | = 91 | 73 91 1317 |
| V37N99 | 04,2007 | 191 | 1 190 | V82CALL | 23,2332 | 508 | 1 249 | WAITADR | 0063 = | 66 | 3 1193 1197 |
| V37OCAD | 04,2378 | 200 | 1 197 | V82EMBIT | 4676 | = 61 | | WAITBANK | 0062 = | 66 | 1 1196 |
| V37X83 | 04,2261 | 198 | 1 200 | V82EMPLG | 0211 | = 61 | 7 508 | 513 WAITBB | 5155 | 1193 | 2 1193 1202 |
| V37X83C | 04,2310 | 198 | | V82PLAOS | E4,1742 | = 89 | 7 89 | 509 WAITBKIT | 0061 = | 66 | 5 1193 1456 |
| V4N08RTE | 36,3243 | 851 | 1 849 | V82G0FF | 23,2337 | 508 | 1 506 | WAITLIST | 5140 | 1193 | 59 138 1403 |
| V41K | 14,3262 | 724 | 1 722 | V82G0FF1 | 23,2411 | 507 | 1 507 | WAITMAG | 10,3108 | 1442 | 1 1442 |
| V5N09RTE | 32,2271 | 853 | 1 853 | V82G0FLP | 23,2357 | 508 | 1 507 | WAITONE | 27,2404 | 576 | 3 569 576 |
| V5N00 | 10,3626 | 1451 | 1 1446 | V82G0N | 23,2566 | 510 | 1 506 | WAITONE1 | 27,2406 | 576 | 1 576 |
| V5N25 | 07,2425 | 227 | 1 227 | V82G0N1 | 23,2604 | 510 | 2 510 | 511 WAITTEMP | 0064 = | 66 | 3 1200 |
| V5N25P | 31,3053 | 622 | 1 612 | V82G0N2 | 23,2637 | 510 | 1 510 | WAIT1/2 | 16,3333 | 952 | |
| V50PASTE | 10,3331 | 1446 | 1 1446 | V82G0N3 | 23,2657 | 511 | 1 511 | WAIT2 | 01,3246 | 1196 | 2 1193 |
| V51NB | 37,2443 | 561 | 1 563 | V82PERP | 43,2546 | 249 | 1 231 | WAKE | 13,3427 | 1294 | 2 1295 |
| V52 | 43,3153 | 261 | 1 230 | V82REDSR | 23,2576 | 510 | 1 510 | WAKECAD | 00,3767 | 1457 | 1 1456 |
| V53 | 37,2534 | 563 | 1 563 | V82STALL | 23,2370 | 507 | 1 507 | WAKECADR | 10,3636 | 1451 | 3 1442 1443 |
| V59FLAG | 0116 = | 53 | 2 560 | 561 V83 | 35,3177 | 498 | 1 498 | WAKEPLAY | 10,3152 | 1443 | 1 1448 |
| V59FLBIT | 4677 = | 53 | | V83CALL | 35,3204 | 498 | 2 32 | 498 WAKEP62 | 26,2374 | 748 | 2 209 1048 |
| V59NB | 37,2442 | 561 | 1 560 | V83PERP | 43,2553 | 249 | 2 231 | 250 WAKER | 00,3761 | 1456 | 1 1457 |
| V6N22 | 14,3261 | 724 | 1 722 | V85PERP | 43,2565 | 250 | 1 231 | WAKESTAL | 13,3464 | 1295 | 2 1294 |
| V6N33RTE | 36,3242 | 851 | 2 844 | 849 V86PERP | 43,2632 | 252 | 1 231 | WAKESTEST | 01,3065 | 1186 | 1 1186 |
| V6N34 | 37,2102 | 451 | 1 450 | V89CALL | 34,3601 | 608 | 1 256 | WAKE1 | 13,3430 | 1294 | 1 1294 |
| V6N39RTE | 36,3245 | 851 | 1 848 | V89PERP | 43,2732 | 256 | 1 231 | WANGI | E5,1446 | = 97 | 1 416 |
| V6N49 | 31,3046 | 622 | 1 617 | V89RCL | 34,3623 | 608 | 2 608 | 609 WANGO | E5,1444 | = 97 | 1 416 |
| V6N60RTE | 36,3246 | 851 | 2 844 | 848 V90PERP | 43,3140 | 260 | 1 231 | WANGT | E5,1450 | = 97 | 1 97 |
| V6N61RTE | 36,3244 | 851 | 1 848 | V94ENTER | 31,2173 | 612 | 2 207 | 612 WR0DY | E6,1525 | = 106 | 15 106 1001 |
| V6N61RTE | 36,3247 | 852 | 1 848 | V94FLAG | 0213 = | 61 | 4 260 | 613 WR0DY1 | E6,1527 | = 106 | 6 409 999 |
| V6N69 | 31,3047 | 622 | 1 612 | V94FLBIT | 4700 = | 61 | | WR0DY2 | E6,1531 | = 106 | 7 106 999 |
| V60 | 43,2303 | 238 | 1 230 | V97E | 24,3432 | 664 | 1 661 | W0CALC | 22,2740 | 405 | |
| V61 | 43,2311 | 238 | 1 230 | V97ETASK | 24,3441 | 664 | 2 210 | 664 W0GAIN | 41,3361 | 355 | 2 355 356 |
| V62 | 43,2314 | 238 | 1 230 | V97E40.6 | 24,3460 | 664 | 1 208 | W0CNT | 0137 = | 68 | 5 353 356 |
| V63 | 43,2321 | 238 | 1 230 | V97N00 | 10,3667 | 1452 | 1 1446 | W0RET | 0115 = | 67 | 9 353 356 |
| V67 | 43,3175 | 261 | 1 230 | V97P | 24,3403 | 663 | 1 661 | WEARTH | 26,3653 | 1221 | 1 1219 |
| V67CALL | 40,3574 | 623 | 1 261 | V97PTASK | 24,3411 | 663 | 2 210 | 663 WRIGHT/G | E6,1475 | 100 | 9 100 914 |
| V67DSC2 | 40,3735 | 625 | 1 623 | V97T | 24,3350 | 662 | 1 661 | WHICHALP | 15,3344 | 1053 | |
| V67K1TX | 40,3651 | 623 | 2 623 | V97TRCS | 24,3374 | 663 | 1 210 | WHIMPER | 5614 | 1463 | 2 1463 |
| V67FLAG | 0210 = | 61 | 3 623 | 624 V97TTRK | 24,3357 | 663 | 2 210 | 662 WHOCARS | E7,1777 = | 128 | 7 128 1440 |
| V67FLBIT | 4675 = | 61 | | V97VCNTR | E6,1444 | 100 | 6 210 | 905 WHOLECON | 42,3447 | 347 | 3 346 347 |
| V67WID | 40,3646 | 623 | 1 623 | V99E | 24,3312 | 662 | 1 661 | WITCHONE | 10,3333 | 1446 | 3 1438 1442 |

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

UN UNDEFINED = DEFINED BY EQUALS J DEFINED BY JOKER OR BRASH ANYWHERE MD MULTIPLY DEFINED
 BD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE



SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEP, J OF REFS, PAGE OF FIRST REP, PAGE OF LAST REP.

| SYMBOL | DEP | H | REFERENCES | SYMBOL | DEP | H | REFERENCES | SYMBOL | DEP | H | REFERENCES |
|----------|---------|---|----------------|----------|---------|---|---------------|---------|---------|---|---------------|
| gDWID | 30,3845 | | 605 6 557 622 | gDWP | 0010 | = | 605 7 601 603 | gDWTODW | 30,3354 | | 601 2 599 |
| gDNJ | 0016 | = | 605 12 601 604 | gDWSST12 | 30,3413 | | 602 1 602 | gDWOX | 1214 | = | 605 2 601 604 |
| gDNW | 0014 | = | 605 4 603 604 | gDWSSTU2 | 30,3432 | | 602 1 602 | gDW28D | 30,3643 | | 605 4 602 604 |
| gDNW-N-3 | 30,3550 | | 604 1 603 | gDWSSTWK | 30,3545 | | 604 1 603 | 90SECS | 08,2764 | | 155 2 138 |
| gDNWDEP | 30,3523 | | 603 1 603 | gDWIESTV | 30,3417 | | 602 1 602 | | | | |

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

UN UNDEFINED = DEFINED BY EQUALS J DEFINED BY JCKER OR ERASE ANYWHERE MD MULTIPLY DEFINED
 BD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

UNREPRESENTED SYMBOL LISTING, INCLUDING DEFINITION, HEALTH, & PAGE OF DEFINITION.

Table with 12 columns: SYMBOL, DEP, H, PAGE, SYMBOL, DEP, H, PAGE, SYMBOL, DEP, H, PAGE, SYMBOL, DEP, H, PAGE. Lists various symbols like KEYCALL, KILLJETS, KNONBIT, etc., with their corresponding definitions and page numbers.

HEALTH KEY: NORMALLY DEFINED UNLESS PLACED AS FOLLOWS:

UN UNDEFINED = DEFINED BY EQUALS J DEFINED BY JOKER OR ERASE ANYWHERE MD MULTIPLY DEFINED
ED BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE



UNREFERENCED SYMBOL LISTING, INCLUDING DEFINITION, HEALTH, & PAGE OF DEFINITION.

Table with 12 columns: SYMBOL, DEF, H PAGE, SYMBOL, DEF, H PAGE, SYMBOL, DEF, H PAGE, SYMBOL, DEF, H PAGE. Lists various symbols like PERORLIM, PFRATBIT, PHASE2, etc., with their definitions and page numbers.

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

UN UNDEFINED = DEFINED BY EQUALS J DEFINED BY JOKER OR BRASS ANYWHERE NO MULTIPLY DEFINED
ED BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

UNREFERENCED SYMBOL LISTING, INCLUDING DEFINITION, HEALTH, & PAGE OF DEFINITION.

Table with columns: SYMBOL, DEP, H PAGE, SYMBOL, DEP, H PAGE, SYMBOL, DEP, H PAGE, SYMBOL, DEP, H PAGE. Lists symbols like SPRT1, SHAPTA, SHAXIS, etc., and their definitions and page numbers.

HEALTH KEY: UN UNDEFINED, NO BADLY DEFINED, = DEFINED BY EQUALS, CD DEFINITION ASSOCIATED WITH CONFLICT, J DEFINED BY JOKER OR BRASH ANYWHERE, ND MULTIPLY DEFINED, XX MISCELLANEOUS TROUBLE



UNDEFINED SYMBOL LISTING, INCLUDING DEFINITION, HEALTH, & PAGE OF DEFINITION.

| SYMBOL | DEF | H PAGE | SYMBOL | DEF | H PAGE | SYMBOL | DEF | H PAGE | SYMBOL | DEF | H PAGE |
|----------|-----------|--------|----------|-----------|--------|----------|---------|--------|----------|---------|--------|
| YACLIM | 20,2743 | 931 | 1.7SPOT | 01,2022 | 206 | 380SWBIT | 4712 = | 61 | 4.73SPOT | 01,2237 | 210 |
| YCOPYCYC | 20,3034 | 933 | 1/MINLIM | 16,3734 | 960 | ***** | | | 4.75SPOT | 01,2242 | 210 |
| YDAPEND | 20,3035 | 933 | 1RTEB12 | 34,3664 | 884 | 4.11SPOT | 01,2124 | 208 | 4.77SPOT | 01,2245 | 211 |
| YDLADDER | 20,2775 | 932 | 1RTEB25 | 34,3672 | 884 | 4.13SPOT | 01,2127 | 208 | 4D/SDZ | 15,3034 | 1046 |
| YDSLUC | 20,3014 | 932 | 1RTEB4 | 34,3660 | 884 | 4.15SPOT | 01,2132 | 208 | 40CSTS | 24,2345 | 645 |
| YERORLIM | 20,2673 | 930 | 18EOXT | 85,1644 = | 98 | 4.17SPOT | 01,2135 | 209 | ***** | | |
| YFORWARD | 20,2702 | 931 | 120MS | 5656 = | 155 | 4.21SPOT | 01,2140 | 209 | 5.11SPOT | 01,2275 | 211 |
| YINTORL | 20,2645 | 930 | 17DEOML | 4375 = | 440 | 4.23SPOT | 01,2143 | 209 | 5.13SPOT | 01,2300 | 211 |
| YMISC | 20,3067 | 934 | 17TO20 | 43,3641 | 1370 | 4.25SPOT | 01,2146 | 209 | 5.15SPOT | 01,2303 | 211 |
| YNLADDER | 20,2763 | 932 | ***** | | | 4.27SPOT | 01,2151 | 209 | 5.17SPOT | 01,2306 | 211 |
| YNLMC | 20,2774 | 932 | 2.11SPOT | 01,2041 | 207 | 4.31SPOT | 01,2154 | 209 | 5.21SPOT | 01,2311 | 212 |
| YOUT | 20,2744 | 931 | 2.13SPOT | 01,2044 | 207 | 4.33SPOT | 01,2157 | 209 | 5.23SPOT | 01,2314 | 212 |
| YROUND | 20,2736 | 931 | 2.5SEC | 37,3137 | 784 | 4.35SPOT | 01,2162 | 209 | 5.25SPOT | 01,2317 | 212 |
| YSTROKER | 20,2641 | 930 | 2.5SPOT | 01,2033 | 207 | 4.37SPOT | 01,2165 | 209 | 5.27SPOT | 01,2322 | 212 |
| YWORD | 17,2723 | 1012 | 2.7SPOT | 01,2036 | 207 | 4.4SPOT | 01,2077 | 208 | 5.31SPOT | 01,2325 | 212 |
| YZSTORE | 20,2721 | 931 | 2DEORS | 33,3710 | 446 | 4.41SPOT | 01,2170 | 209 | 5.33SPOT | 01,2330 | 212 |
| Y1FILMP | 20,2674 | 930 | 2ZERS | 04,3455 = | 1210 | 4.43SPOT | 01,2173 | 209 | 5.35SPOT | 01,2333 | 212 |
| Y2FILMP | 20,2752 | 932 | 2RNDEND | 40,3076 | 348 | 4.45SPOT | 01,2176 | 209 | 5.37SPOT | 01,2336 | 212 |
| ***** | | | 2V1STO2S | 22,3564 | 1477 | 4.47SPOT | 01,2201 | 210 | 5.4SPOT | 01,2256 | 211 |
| ZERINFLT | 23,2265 | 290 | 22D3PBIT | 4676 = | 48 | 4.5SPOT | 01,2116 | 208 | 5.41SPOT | 01,2341 | 212 |
| ZEROCDS | 21,3737 | 1007 | 27TO30 | 43,3647 | 1370 | 4.51SPOT | 01,2204 | 210 | 5.5SPOT | 01,2267 | 211 |
| ZERODP | 04,3455 = | 1176 | ***** | | | 4.53SPOT | 01,2207 | 210 | 5.7SPOT | 01,2272 | 211 |
| ZEROO | 26,3331 = | 1230 | 3.11SPOT | 01,2080 | 207 | 4.55SPOT | 01,2212 | 210 | 5BLANK1 | 40,2460 | 317 |
| ZMEASBIT | 4701 = | 44 | 3.13SPOT | 01,2083 | 207 | 4.57SPOT | 01,2215 | 210 | 5B10 | 01,2523 | 1166 |
| ZOPALARM | 06,3041 | 157 | 3.15SPOT | 01,2086 | 207 | 4.6SPOT | 01,2105 | 208 | ***** | | |
| ZRUPT | 0015 = | 37 | 3.5SPOT | 01,2052 | 207 | 4.61SPOT | 01,2220 | 210 | 6.11SPOT | 01,2363 | 213 |
| ***** | | | 3.7SPOT | 01,2055 | 207 | 4.63SPOT | 01,2223 | 210 | 6.13SPOT | 01,2366 | 213 |
| 6EBANK | 43,3337 | 1366 | 3/LONOP | 11,3706 = | 32 | 4.65SPOT | 01,2226 | 210 | 6.5SPOT | 01,2355 | 213 |
| ***** | | | 3AXISBIT | 4705 = | 54 | 4.67SPOT | 01,2231 | 210 | 6.7SPOT | 01,2360 | 213 |
| 1.11SPOT | 01,2025 | 206 | 3SECS | 4737 | 1171 | 4.7SPOT | 01,2121 | 208 | 6SECTS | 24,3702 | 691 |
| 1.5SPOT | 01,2017 | 206 | 33OPTMCN | 06,2774 | 156 | 4.71SPOT | 01,2234 | 210 | 63/64+1 | 7675 | 1173 |

HEALTH KEY* NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS*

UN UNDEFINED = DEFINED BY EQUALS J DEFINED BY JOKER OR ERASE ANYWHERE MD MULTIPLY DEFINED
 RD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XC MISCELLANEOUS TROUBLE

ERASABLE 4 EQUALS CROSS-REFERENCE TABLE SHOWING DEFINITION, PAGE OF DEFINITION, AND SYMBOL

| DEF | PAGE | SYMBOL | DEF | PAGE | SYMBOL | DEF | PAGE | SYMBOL | DEF | PAGE | SYMBOL | DEF | PAGE | SYMBOL |
|---------|------|----------|---------|------|---------|---------|------|----------|---------|------|----------|---------|------|----------|
| 31,2000 | 30 | RT23 | 34,2000 | 30 | P2053 | 36,2000 | 30 | MEASINC | 40,2000 | 31 | SELSUPR | 42,2000 | 31 | EXTVBS |
| 31,2000 | 30 | R34 | 34,2000 | 30 | P2054 | 36,2000 | 30 | MEASINC1 | 40,3225 | 355 | ENDECVN | 42,2000 | 31 | PINBALL3 |
| 31,2000 | 30 | R35 | 34,2000 | 30 | RTBCON | 36,2000 | 31 | P175 | 40,3408 | 362 | ENDRELD8 | 42,2000 | 31 | SBAND |
| 32,2000 | 30 | DELRSP1 | 34,3481 | 609 | R63COMP | 36,2000 | 31 | RTS1 | 40,3435 | 369 | ENDSUB1 | 42,3521 | 348 | ENDHMSS |
| 32,2000 | 30 | IMJCAL3 | 35,2000 | 30 | C81/CDH | 37,2000 | 31 | BODYATT | 40,3435 | 1372 | DSPMMJOB | 43,2000 | 31 | EXTVERBS |
| 32,2000 | 30 | MSGSCAN1 | 35,2000 | 30 | P1751 | 37,2000 | 31 | P11TWO | 40,3574 | 382 | ENDPINS1 | 43,2000 | 31 | SELPCHC |
| 32,2000 | 30 | RTB | 35,2000 | 30 | P305 | 37,2000 | 31 | P205 | 41,2000 | 31 | PINBALL2 | 43,2002 | 378 | PINTEST |
| 33,2000 | 30 | IMJCAL | 35,2000 | 30 | P3051 | 37,2000 | 31 | RENDEZ | 41,2612 | 329 | ENDRTOUT | 43,2174 | 236 | OPTCOARV |
| 33,2000 | 30 | TESTLEAD | 35,2000 | 30 | RTBCON1 | 37,2000 | 31 | SERVICES | 41,3220 | 343 | ENDRTIN | 43,2706 | 254 | V74 |
| 33,2447 | 424 | 3990DEC | 35,2000 | 30 | R31 | 40,2000 | 31 | PINBALL1 | 41,3715 | 380 | ENDPINS2 | 43,2751 | 257 | GOSHOSUM |
| 34,2000 | 30 | P11QNS | 35,3204 | 32 | STATST | 40,2000 | 31 | PINSUPER | | | | | | |



SUMMARY OF SYMBOL TABLE LISTINGS

4948 DEFINED NORMALLY

2180 DEFINED BY EQUALS

TOTAL 7128

MEMORY TYPE & AVAILABILITY DISPLAY

| | | | |
|--------------------|--------------------------------------|--------------------|-----------------------------------|
| 0000 TO 0057 | SPECIAL OR NONEXISTENT MEMORY | 14,3747 TO 14,3777 | AVAILABLE SWITCHABLE FIXED MEMORY |
| | | 15,2000 TO 15,3776 | RESERVED SWITCHABLE FIXED MEMORY |
| | 0060 AVAILABLE ERASABLE MEMORY | 15,3777 | AVAILABLE SWITCHABLE FIXED MEMORY |
| 0061 TO 1377 | RESERVED ERASABLE MEMORY | 16,2000 TO 16,3743 | RESERVED SWITCHABLE FIXED MEMORY |
| | | 16,3744 TO 16,3777 | AVAILABLE SWITCHABLE FIXED MEMORY |
| E3,1400 TO E3,1766 | RESERVED SWITCHABLE ERASABLE MEMORY | 17,2000 TO 17,3766 | RESERVED SWITCHABLE FIXED MEMORY |
| E3,1767 TO E3,1777 | AVAILABLE SWITCHABLE ERASABLE MEMORY | 17,3767 TO 17,3777 | AVAILABLE SWITCHABLE FIXED MEMORY |
| E4,1400 TO E4,1550 | RESERVED SWITCHABLE ERASABLE MEMORY | 20,2000 TO 20,3715 | RESERVED SWITCHABLE FIXED MEMORY |
| E4,1551 TO E4,1777 | AVAILABLE SWITCHABLE ERASABLE MEMORY | 20,3716 TO 20,3777 | AVAILABLE SWITCHABLE FIXED MEMORY |
| E5,1400 TO E5,1652 | RESERVED SWITCHABLE ERASABLE MEMORY | 21,2000 TO 21,3753 | RESERVED SWITCHABLE FIXED MEMORY |
| E5,1653 TO E5,1777 | AVAILABLE SWITCHABLE ERASABLE MEMORY | 21,3754 TO 21,3777 | AVAILABLE SWITCHABLE FIXED MEMORY |
| E6,1400 TO E6,1540 | RESERVED SWITCHABLE ERASABLE MEMORY | 22,2000 TO 22,3774 | RESERVED SWITCHABLE FIXED MEMORY |
| E6,1541 TO E6,1777 | AVAILABLE SWITCHABLE ERASABLE MEMORY | 22,3775 TO 22,3777 | AVAILABLE SWITCHABLE FIXED MEMORY |
| E7,1400 TO E7,1425 | RESERVED SWITCHABLE ERASABLE MEMORY | 23,2000 TO 23,3727 | RESERVED SWITCHABLE FIXED MEMORY |
| E7,1426 TO E7,1777 | AVAILABLE SWITCHABLE ERASABLE MEMORY | 23,3730 TO 23,3777 | AVAILABLE SWITCHABLE FIXED MEMORY |
| | | 24,2000 TO 24,3705 | RESERVED SWITCHABLE FIXED MEMORY |
| 4000 TO 5662 | RESERVED FIXED MEMORY | 24,3706 TO 24,3777 | AVAILABLE SWITCHABLE FIXED MEMORY |
| 5663 TO 5777 | AVAILABLE FIXED MEMORY | 25,2000 TO 25,3770 | RESERVED SWITCHABLE FIXED MEMORY |
| 6000 TO 7754 | RESERVED FIXED MEMORY | 25,3771 TO 25,3777 | AVAILABLE SWITCHABLE FIXED MEMORY |
| 7755 TO 7777 | AVAILABLE FIXED MEMORY | 26,2000 TO 26,3776 | RESERVED SWITCHABLE FIXED MEMORY |
| | | 26,3777 | AVAILABLE SWITCHABLE FIXED MEMORY |
| 00,2000 TO 00,3772 | RESERVED SWITCHABLE FIXED MEMORY | 27,2000 TO 27,3756 | RESERVED SWITCHABLE FIXED MEMORY |
| 00,3773 TO 00,3777 | AVAILABLE SWITCHABLE FIXED MEMORY | 27,3757 TO 27,3777 | AVAILABLE SWITCHABLE FIXED MEMORY |
| 01,2000 TO 01,3772 | RESERVED SWITCHABLE FIXED MEMORY | 30,2000 TO 31,3770 | RESERVED SWITCHABLE FIXED MEMORY |
| 01,3773 TO 01,3777 | AVAILABLE SWITCHABLE FIXED MEMORY | 31,3771 TO 31,3777 | AVAILABLE SWITCHABLE FIXED MEMORY |
| | | 32,2000 TO 32,3757 | RESERVED SWITCHABLE FIXED MEMORY |
| 02,2000 TO 03,3777 | SPECIAL OR NONEXISTENT MEMORY | 32,3760 TO 32,3777 | AVAILABLE SWITCHABLE FIXED MEMORY |
| | | 33,2000 TO 33,3774 | RESERVED SWITCHABLE FIXED MEMORY |
| 04,2000 TO 04,3652 | RESERVED SWITCHABLE FIXED MEMORY | 33,3775 TO 33,3777 | AVAILABLE SWITCHABLE FIXED MEMORY |
| 04,3653 TO 04,3777 | AVAILABLE SWITCHABLE FIXED MEMORY | 34,2000 TO 35,3775 | RESERVED SWITCHABLE FIXED MEMORY |
| 05,2000 TO 05,3621 | RESERVED SWITCHABLE FIXED MEMORY | 35,3776 TO 35,3777 | AVAILABLE SWITCHABLE FIXED MEMORY |
| 05,3622 TO 05,3777 | AVAILABLE SWITCHABLE FIXED MEMORY | 36,2000 TO 36,3770 | RESERVED SWITCHABLE FIXED MEMORY |
| 06,2000 TO 06,3653 | RESERVED SWITCHABLE FIXED MEMORY | 36,3771 TO 36,3777 | AVAILABLE SWITCHABLE FIXED MEMORY |
| 06,3654 TO 06,3777 | AVAILABLE SWITCHABLE FIXED MEMORY | 37,2000 TO 37,3762 | RESERVED SWITCHABLE FIXED MEMORY |
| 07,2000 TO 07,3721 | RESERVED SWITCHABLE FIXED MEMORY | 37,3763 TO 37,3777 | AVAILABLE SWITCHABLE FIXED MEMORY |
| 07,3722 TO 07,3777 | AVAILABLE SWITCHABLE FIXED MEMORY | 40,2000 TO 40,3741 | RESERVED SWITCHABLE FIXED MEMORY |
| 10,2000 TO 10,3704 | RESERVED SWITCHABLE FIXED MEMORY | 40,3742 TO 40,3777 | AVAILABLE SWITCHABLE FIXED MEMORY |
| 10,3705 TO 10,3777 | AVAILABLE SWITCHABLE FIXED MEMORY | 41,2000 TO 41,3717 | RESERVED SWITCHABLE FIXED MEMORY |
| 11,2000 TO 11,3723 | RESERVED SWITCHABLE FIXED MEMORY | 41,3720 TO 41,3777 | AVAILABLE SWITCHABLE FIXED MEMORY |
| 11,3724 TO 11,3777 | AVAILABLE SWITCHABLE FIXED MEMORY | 42,2000 TO 42,3707 | RESERVED SWITCHABLE FIXED MEMORY |
| 12,2000 TO 12,3737 | RESERVED SWITCHABLE FIXED MEMORY | 42,3710 TO 42,3777 | AVAILABLE SWITCHABLE FIXED MEMORY |
| 12,3740 TO 12,3777 | AVAILABLE SWITCHABLE FIXED MEMORY | 43,2000 TO 43,3764 | RESERVED SWITCHABLE FIXED MEMORY |
| 13,2000 TO 13,3773 | RESERVED SWITCHABLE FIXED MEMORY | 43,3765 TO 43,3777 | AVAILABLE SWITCHABLE FIXED MEMORY |
| 13,3774 TO 13,3777 | AVAILABLE SWITCHABLE FIXED MEMORY | | |
| 14,2000 TO 14,3746 | RESERVED SWITCHABLE FIXED MEMORY | 44,2000 TO 57,3777 | SPECIAL OR NONEXISTENT MEMORY |



MEMORY TYPE & AVAILABILITY DISPLAY

60,2000 TO 67,3777 AVAILABLE SWITCHABLE FIXED MEMORY

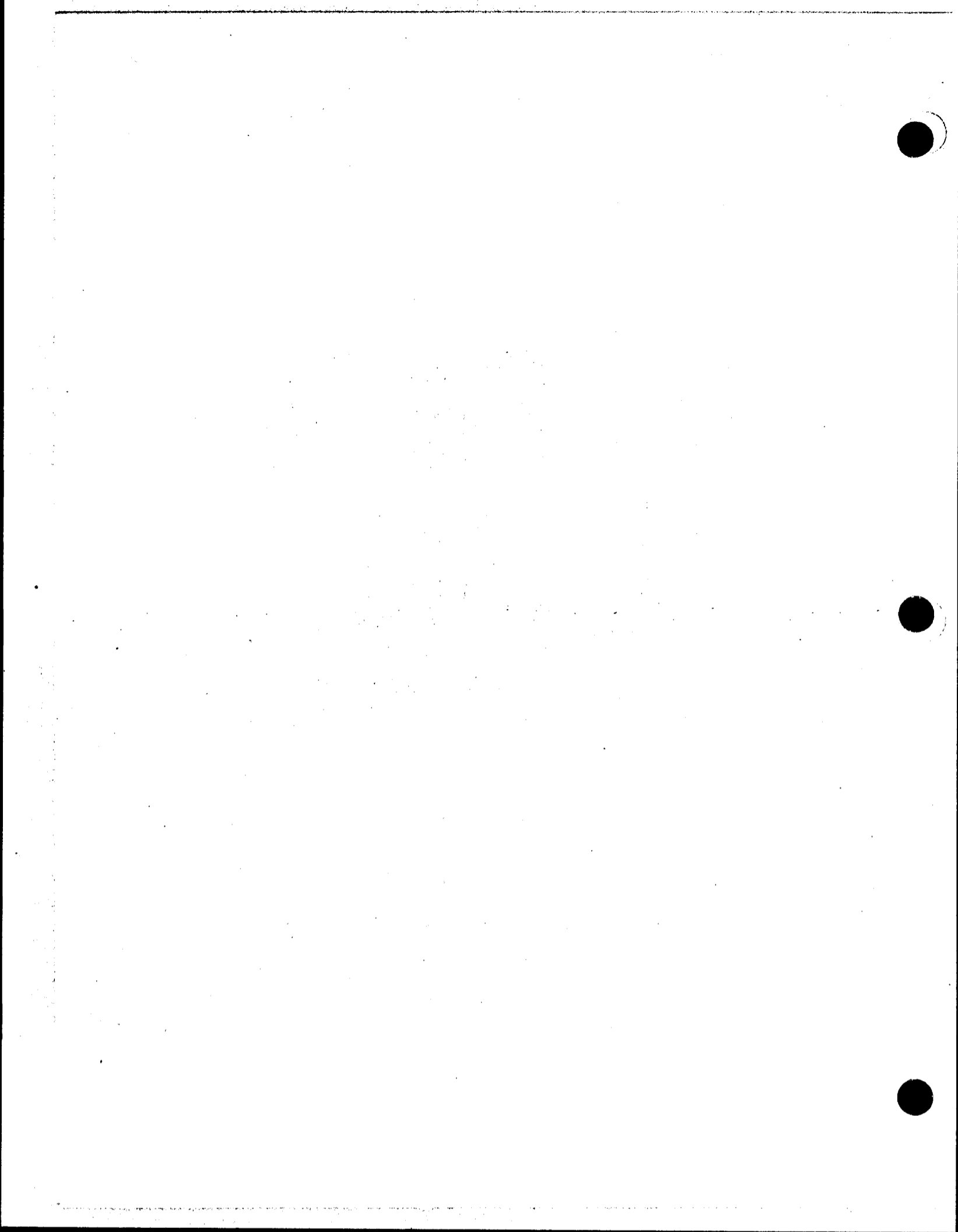
70,2000 TO 73,3777 SPECIAL OR NONEXISTENT MEMORY



| ROUTINE' COUNT DATA FOR ROUTINE'S LAST REACH'TOTAL' CUMUL | | | | | ROUTINE' COUNT DATA FOR ROUTINE'S LAST REACH'TOTAL' CUMUL | | | | | | | | |
|---|-----|---|--------------------|-----|---|-------|----------|-----|----|--------------------|-----|-----|-------|
| 34/CONST | REP | 1 | LAST 445 TO 445' | 26 | 26 | 27491 | 37/OMBAT | REP | 1 | LAST 836 TO 843' | 195 | 195 | 31344 |
| 34/CRS61 | REP | 1 | LAST 582 TO 589' | 236 | 236 | 27727 | 37/INCOR | REP | 1 | LAST 1230 TO 1247' | 50 | 50 | 31394 |
| 34/P11 | REP | 2 | LAST 535 TO 536' | 84 | 328 | 28055 | 37/P20 | REP | 1 | LAST 552 TO 555' | 84 | 84 | 31478 |
| 34/R22 | REP | 1 | LAST 569 TO 582' | 483 | 483 | 28538 | 37/R21 | REP | 1 | LAST 562 TO 564' | 57 | 57 | 31535 |
| 34/R63 | REP | 1 | LAST 608 TO 610' | 41 | 41 | 28579 | 37/R57 | REP | 1 | LAST 560 TO 562' | 53 | 53 | 31586 |
| 35/LIC68 | REP | 1 | LAST 589 TO 608' | 772 | 772 | 29351 | 37/R61 | REP | 1 | LAST 564 TO 566' | 38 | 38 | 31626 |
| 35/P17 | REP | 1 | LAST 549 TO 552' | 75 | 75 | 29426 | 37/SERV | REP | 1 | LAST 776 TO 798' | 375 | 375 | 32001 |
| 35/P30 | REP | 1 | LAST 627 TO 630' | 82 | 82 | 29508 | 40/EXTVB | REP | 1 | LAST 623 TO 626' | 99 | 99 | 32100 |
| 35/P34 | REP | 1 | LAST 626 TO 627' | 32 | 32 | 29540 | 40/PIN | REP | 10 | LAST 381 TO 383' | 56 | 892 | 32992 |
| 35/P3474 | REP | 1 | LAST 455 TO 460' | 107 | 107 | 29647 | 41/PIN | REP | 8 | LAST 379 TO 381' | 74 | 973 | 33965 |
| 35/P3575 | REP | 1 | LAST 460 TO 479' | 509 | 509 | 30156 | 42/NOLNB | REP | 1 | LAST 285 TO 280' | 561 | 561 | 34526 |
| 35/R31 | REP | 1 | LAST 496 TO 502' | 194 | 194 | 30350 | 42/PIN | REP | 2 | LAST 346 TO 349' | 92 | 238 | 34764 |
| 35/S305 | REP | 1 | LAST 630 TO 634' | 75 | 75 | 30425 | 42/R05 | REP | 1 | LAST 687 TO 689' | 80 | 80 | 34844 |
| 36/INCOR | REP | 2 | LAST 1226 TO 1230' | 198 | 334 | 30759 | 43/EXTVB | REP | 4 | LAST 246 TO 265' | 291 | 616 | 35460 |
| 36/P11 | REP | 1 | LAST 533 TO 535' | 68 | 68 | 30827 | 43/P27 | REP | 1 | LAST 1467 TO 1466' | 32 | 32 | 35492 |
| 36/TP1 | REP | 1 | LAST 541 TO 548' | 322 | 322 | 31149 | 43/SELJ | REP | 1 | LAST 1363 TO 1372' | 314 | 314 | 35806 |

PARAGRAPHS GENERATED FOR THIS ASSEMBLY

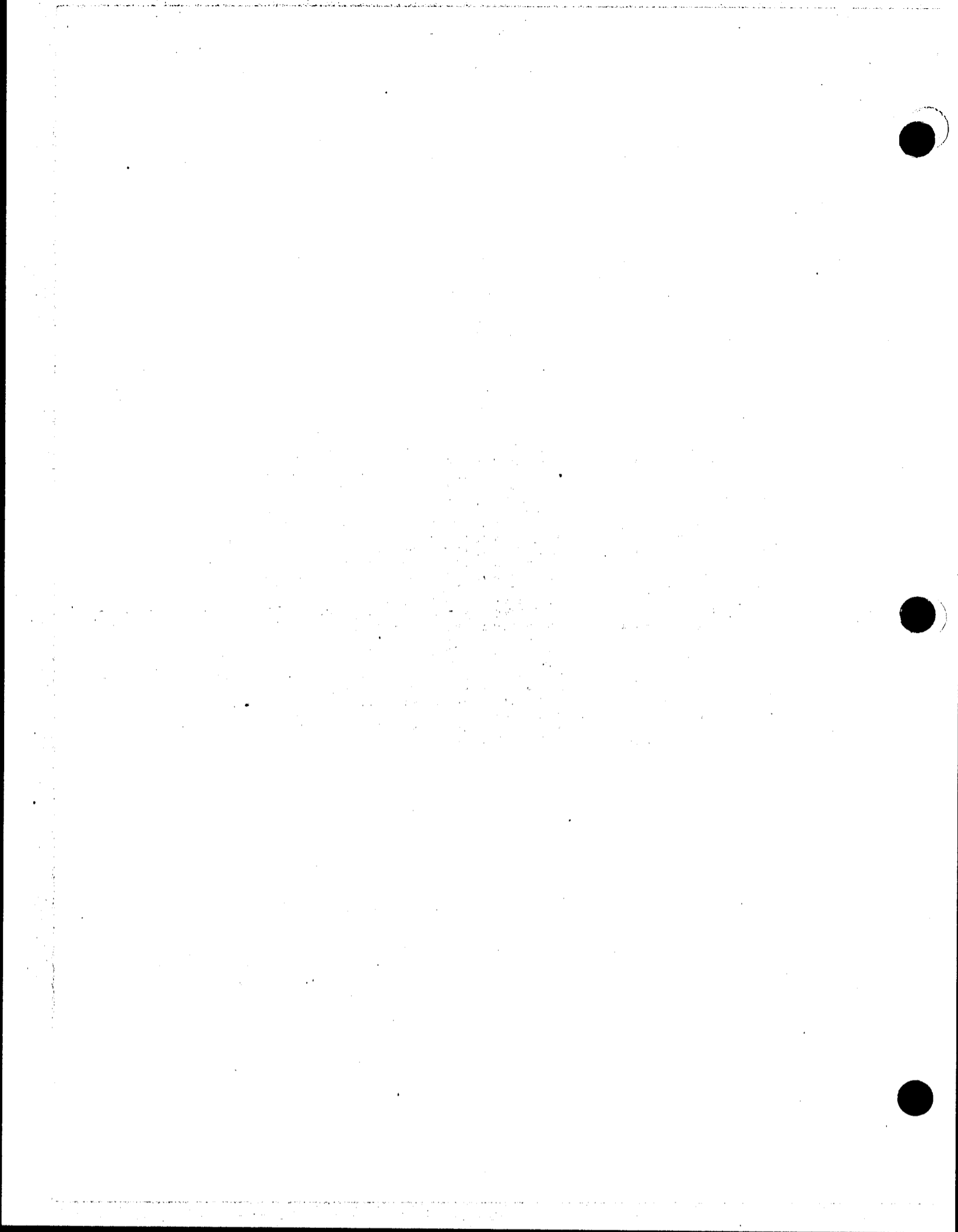
| | | | | | |
|---------|------------|-----------|-------|---------------------------------------|--------------------|
| 01,2000 | To 01,2377 | PARAGRAPH | f 024 | ROPE MODULE 1, SIDE A, SENSE LINE SET | 3 (WIRES 33-48) |
| 01,2400 | TO 01,2777 | PARAGRAPH | f 025 | ROPE MODULE 1, SIDE B, SENSE LINE SET | 3 (WIRES 33-48) |
| 01,3000 | TO 01,3377 | PARAGRAPH | f 026 | ROPE MODULE 1, SIDE A, SENSE LINE SET | 4 (WIRES 49-64) |
| 01,3400 | TO 01,3777 | PARAGRAPH | f 027 | ROPE MODULE 1, SIDE B, SENSE LINE SET | 4 (WIRES 49-64) |
| 04,2000 | To 04,2377 | PARAGRAPH | f 040 | ROPE MODULE 1, SIDE A, SENSE LINE SET | 9 (WIRES 129-144) |
| 04,2400 | To 04,2777 | PARAGRAPH | f 041 | ROPE MODULE 1, SIDE B, SENSE LINE SET | 9 (WIRES 129-144) |
| 04,3000 | TO 04,3377 | PARAGRAPH | f 042 | ROPE MODULE 1, SIDE A, SENSE LINE SET | 10 (WIRES 145-160) |
| 04,3400 | To 04,3777 | PARAGRAPH | f 043 | ROPE MODULE 1, SIDE B, SENSE LINE SET | 10 (WIRES 145-160) |
| 05,2000 | To 05,2377 | PARAGRAPH | f 044 | ROPE MODULE 1, SIDE A, SENSE LINE SET | 11 (WIRES 161-176) |
| 05,2400 | TO 05,2777 | PARAGRAPH | f 045 | ROPE MODULE 1, SIDE B, SENSE LINE SET | 11 (WIRES 161-176) |
| 05,3000 | To 05,3377 | PARAGRAPH | f 046 | ROPE MODULE 1, SIDE A, SENSE LINE SET | 12 (WIRES 177-192) |
| 05,3400 | TO 05,3777 | PARAGRAPH | f 047 | ROPE MODULE 1, SIDE B, SENSE LINE SET | 12 (WIRES 177-192) |
| 06,2000 | TO 06,2377 | PARAGRAPH | f 050 | ROPE MODULE 2, SIDE A, SENSE LINE SET | 1 (WIRES 1-16) |
| 06,2400 | TO 06,2777 | PARAGRAPH | f 051 | ROPE MODULE 2, SIDE B, SENSE LINE SET | 1 (WIRES 1-16) |
| 06,3000 | TO 06,3377 | PARAGRAPH | f 052 | ROPE MODULE 2, SIDE A, SENSE LINE SET | 2 (WIRES 17-32) |
| 06,3400 | TO 06,3777 | PARAGRAPH | f 053 | ROPE MODULE 2, SIDE B, SENSE LINE SET | 2 (WIRES 17-32) |
| 07,2000 | TO 07,2377 | PARAGRAPH | f 054 | ROPE MODULE 2, SIDE A, SENSE LINE SET | 3 (WIRES 33-48) |
| 07,2400 | To 07,2777 | PARAGRAPH | f 055 | ROPE MODULE 2, SIDE B, SENSE LINE SET | 3 (WIRES 33-48) |
| 07,3000 | To 07,3377 | PARAGRAPH | f 056 | ROPE MODULE 2, SIDE A, SENSE LINE SET | 4 (WIRES 49-64) |
| 07,3400 | TO 07,3777 | PARAGRAPH | f 057 | ROPE MODULE 2, SIDE B, SENSE LINE SET | 4 (WIRES 49-64) |
| 10,2000 | To 10,2377 | PARAGRAPH | f 060 | ROPE MODULE 2, SIDE A, SENSE LINE SET | 5 (WIRES 65-80) |
| 10,2400 | TO 10,2777 | PARAGRAPH | f 061 | ROPE MODULE 2, SIDE B, SENSE LINE SET | 5 (WIRES 65-80) |
| 10,3000 | TO 10,3377 | PARAGRAPH | f 062 | ROPE MODULE 2, SIDE A, SENSE LINE SET | 6 (WIRES 81-96) |
| 10,3400 | TO 10,3777 | PARAGRAPH | f 063 | ROPE MODULE 2, SIDE B, SENSE LINE SET | 6 (WIRES 81-96) |
| 11,2000 | TO 11,2377 | PARAGRAPH | f 064 | ROPE MODULE 2, SIDE A, SENSE LINE SET | 7 (WIRES 97-112) |
| 11,2400 | TO 11,2777 | PARAGRAPH | f 065 | ROPE MODULE 2, SIDE B, SENSE LINE SET | 7 (WIRES 97-112) |
| 11,3000 | TO 11,3377 | PARAGRAPH | f 066 | ROPE MODULE 2, SIDE A, SENSE LINE SET | 8 (WIRES 113-128) |
| 11,3400 | To 11,3777 | PARAGRAPH | f 067 | ROPE MODULE 2, SIDE B, SENSE LINE SET | 8 (WIRES 113-128) |
| 12,2000 | TO 12,2377 | PARAGRAPH | f 070 | ROPE MODULE 2, SIDE A, SENSE LINE SET | 9 (WIRES 129-144) |
| 12,2400 | TO 12,2777 | PARAGRAPH | f 071 | ROPE MODULE 2, SIDE B, SENSE LINE SET | 9 (WIRES 129-144) |
| 12,3000 | TO 12,3377 | PARAGRAPH | f 072 | ROPE MODULE 2, SIDE A, SENSE LINE SET | 10 (WIRES 145-160) |



PARAGRAPHS GENERATED FOR THIS ASSEMBLY

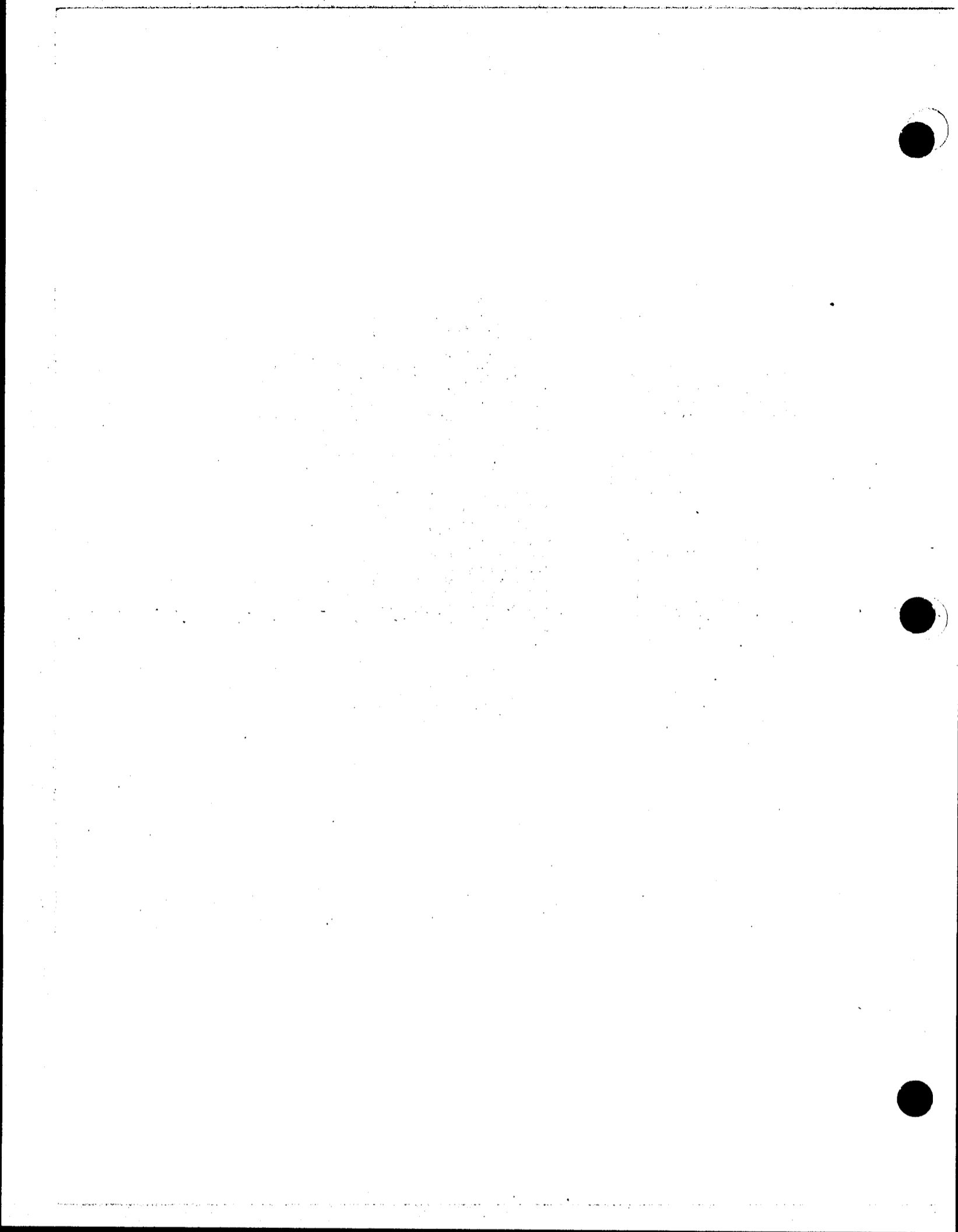
PARAGRAPHS GENERATED FOR THIS ASSEMBLY

| | | |
|--------------------|-----------------|--|
| 20,2000 TO 20,2377 | PARAGRAPH f 120 | ROPE MODULE 3, SIDE A, SENSE LINE SET 9 (WIRES 129-144) |
| 20,2400 TO 20,2777 | PARAGRAPH f 121 | ROPE MODULE 3, SIDE B, SENSE LINE SET 9 (WIRES 129-144) |
| 20,3000 TO 20,3377 | PARAGRAPH f 122 | ROPE MODULE 3, SIDE A, SENSE LINE SET 10 (WIRES 145-160) |
| 20,3400 TO 20,3777 | PARAGRAPH f 123 | ROPE MODULE 3, SIDE B, SENSE LINE SET 10 (WIRES 145-160) |
| 21,2000 TO 21,2377 | PARAGRAPH f 124 | ROPE MODULE 3, SIDE A, SENSE LINE SET 11 (WIRES 161-176) |
| 21,2400 TO 21,2777 | PARAGRAPH f 125 | ROPE MODULE 3, SIDE B, SENSE LINE SET 11 (WIRES 161-176) |
| 21,3000 TO 21,3377 | PARAGRAPH f 126 | ROPE MODULE 3, SIDE A, SENSE LINE SET 12 (WIRES 177-192) |
| 21,3400 TO 21,3777 | PARAGRAPH f 127 | ROPE MODULE 3, SIDE B, SENSE LINE SET 12 (WIRES 177-192) |
| 22,2000 TO 22,2377 | PARAGRAPH f 130 | ROPE MODULE 4, SIDE A, SENSE LINE SET 1 (WIRES 1-16) |
| 22,2400 TO 22,2777 | PARAGRAPH f 131 | ROPE MODULE 4, SIDE B, SENSE LINE SET 1 (WIRES 1-16) |
| 22,3000 TO 22,3377 | PARAGRAPH f 132 | ROPE MODULE 4, SIDE A, SENSE LINE SET 2 (WIRES 17-32) |
| 22,3400 TO 22,3777 | PARAGRAPH f 133 | ROPE MODULE 4, SIDE B, SENSE LINE SET 2 (WIRES 17-32) |
| 23,2000 TO 23,2377 | PARAGRAPH f 134 | ROPE MODULE 4, SIDE A, SENSE LINE SET 3 (WIRES 33-48) |
| 23,2400 TO 23,2777 | PARAGRAPH f 135 | ROPE MODULE 4, SIDE B, SENSE LINE SET 3 (WIRES 33-48) |
| 23,3000 TO 23,3377 | PARAGRAPH f 136 | ROPE MODULE 4, SIDE A, SENSE LINE SET 4 (WIRES 49-64) |
| 23,3400 TO 23,3777 | PARAGRAPH f 137 | ROPE MODULE 4, SIDE B, SENSE LINE SET 4 (WIRES 49-64) |
| 24,2000 TO 24,2377 | PARAGRAPH f 140 | ROPE MODULE 4, SIDE A, SENSE LINE SET 5 (WIRES 65-80) |
| 24,2400 TO 24,2777 | PARAGRAPH f 141 | ROPE MODULE 4, SIDE B, SENSE LINE SET 5 (WIRES 65-80) |
| 24,3000 TO 24,3377 | PARAGRAPH f 142 | ROPE MODULE 4, SIDE A, SENSE LINE SET 6 (WIRES 81-96) |
| 24,3400 TO 24,3777 | PARAGRAPH f 143 | ROPE MODULE 4, SIDE B, SENSE LINE SET 6 (WIRES 81-96) |
| 25,2000 TO 25,2377 | PARAGRAPH f 144 | ROPE MODULE 4, SIDE A, SENSE LINE SET 7 (WIRES 97-112) |
| 25,2400 TO 25,2777 | PARAGRAPH f 145 | ROPE MODULE 4, SIDE B, SENSE LINE SET 7 (WIRES 97-112) |
| 25,3000 TO 25,3377 | PARAGRAPH f 146 | ROPE MODULE 4, SIDE A, SENSE LINE SET 8 (WIRES 113-128) |
| 25,3400 TO 25,3777 | PARAGRAPH f 147 | ROPE MODULE 4, SIDE B, SENSE LINE SET 8 (WIRES 113-128) |



30,2400 TO 30,2777 PARAGRAPH f 161
 30,3000 TO 30,3377 PARAGRAPH f 162
 30,3400 TO 30,3777 PARAGRAPH f 163
 31,2000 TO 31,2377 PARAGRAPH f 164
 31,2400 TO 31,2777 PARAGRAPH f 165
 31,3000 TO 31,3377 PARAGRAPH f 166
 31,3400 TO 31,3777 PARAGRAPH f 167
 32,2000 TO 32,2377 PARAGRAPH f 170
 32,2400 TO 32,2777 PARAGRAPH f 171
 32,3000 TO 32,3377 PARAGRAPH f 172
 32,3400 TO 32,3777 PARAGRAPH f 173
 33,2000 TO 33,2377 PARAGRAPH f 174
 33,2400 TO 33,2777 PARAGRAPH f 175
 33,3000 TO 33,3377 PARAGRAPH f 176
 33,3400 TO 33,3777 PARAGRAPH f 177
 34,2000 TO 34,2377 PARAGRAPH f 200
 34,2400 TO 34,2777 PARAGRAPH f 201
 34,3000 TO 34,3377 PARAGRAPH f 202
 34,3400 TO 34,3777 PARAGRAPH f 203
 35,2000 TO 35,2377 PARAGRAPH f 204
 35,2400 TO 35,2777 PARAGRAPH f 205
 35,3000 TO 35,3377 PARAGRAPH f 206
 35,3400 TO 35,3777 PARAGRAPH f 207
 36,2000 TO 36,2377 PARAGRAPH f 210
 36,2400 TO 36,2777 PARAGRAPH f 211
 36,3000 TO 36,3377 PARAGRAPH f 212
 36,3400 TO 36,3777 PARAGRAPH f 213
 37,2000 TO 37,2377 PARAGRAPH f 214
 37,2400 TO 37,2777 PARAGRAPH f 215
 37,3000 TO 37,3377 PARAGRAPH f 216
 37,3400 TO 37,3777 PARAGRAPH f 217
 40,2000 TO 40,2377 PARAGRAPH f 220
 40,2400 TO 40,2777 PARAGRAPH f 221
 40,3000 TO 40,3377 PARAGRAPH f 222
 40,3400 TO 40,3777 PARAGRAPH f 223
 41,2000 TO 41,2377 PARAGRAPH f 224

ROPE MODULE 5, SIDE B, SENSE LINE SET 1 (WIRES 1-16)
 ROPE MODULE 5, SIDE A, SENSE LINE SET 2 (WIRES 17-32)
 ROPE MODULE 5, SIDE B, SENSE LINE SET 2 (WIRES 17-32)
 ROPE MODULE 5, SIDE A, SENSE LINE SET 3 (WIRES 33-48)
 ROPE MODULE 5, SIDE B, SENSE LINE SET 3 (WIRES 33-48)
 ROPE MODULE 5, SIDE A, SENSE LINE SET 4 (WIRES 49-64)
 ROPE MODULE 5, SIDE B, SENSE LINE SET 4 (WIRES 49-64)
 ROPE MODULE 5, SIDE A, SENSE LINE SET 5 (WIRES 65-80)
 ROPE MODULE 5, SIDE B, SENSE LINE SET 5 (WIRES 65-80)
 ROPE MODULE 5, SIDE A, SENSE LINE SET 6 (WIRES 81-96)
 ROPE MODULE 5, SIDE B, SENSE LINE SET 6 (WIRES 81-96)
 ROPE MODULE 5, SIDE A, SENSE LINE SET 7 (WIRES 97-112)
 ROPE MODULE 5, SIDE B, SENSE LINE SET 7 (WIRES 97-112)
 ROPE MODULE 5, SIDE A, SENSE LINE SET 8 (WIRES 113-128)
 ROPE MODULE 5, SIDE B, SENSE LINE SET 8 (WIRES 113-128)
 ROPE MODULE 5, SIDE A, SENSE LINE SET 9 (WIRES 129-144)
 ROPE MODULE 5, SIDE B, SENSE LINE SET 9 (WIRES 129-144)
 ROPE MODULE 5, SIDE A, SENSE LINE SET 10 (WIRES 145-160)
 ROPE MODULE 5, SIDE B, SENSE LINE SET 10 (WIRES 145-160)
 ROPE MODULE 5, SIDE A, SENSE LINE SET 11 (WIRES 161-176)
 ROPE MODULE 5, SIDE B, SENSE LINE SET 11 (WIRES 161-176)
 ROPE MODULE 5, SIDE A, SENSE LINE SET 12 (WIRES 177-192)
 ROPE MODULE 5, SIDE B, SENSE LINE SET 12 (WIRES 177-192)
 ROPE MODULE 6, SIDE A, SENSE LINE SET 1 (WIRES 1-16)
 ROPE MODULE 6, SIDE B, SENSE LINE SET 1 (WIRES 1-16)
 ROPE MODULE 6, SIDE A, SENSE LINE SET 2 (WIRES 17-32)
 ROPE MODULE 6, SIDE B, SENSE LINE SET 2 (WIRES 17-32)
 ROPE MODULE 6, SIDE A, SENSE LINE SET 3 (WIRES 33-48)
 ROPE MODULE 6, SIDE B, SENSE LINE SET 3 (WIRES 33-48)
 ROPE MODULE 6, SIDE A, SENSE LINE SET 4 (WIRES 49-64)
 ROPE MODULE 6, SIDE B, SENSE LINE SET 4 (WIRES 49-64)
 ROPE MODULE 6, SIDE A, SENSE LINE SET 5 (WIRES 65-80)
 ROPE MODULE 6, SIDE B, SENSE LINE SET 5 (WIRES 65-80)
 ROPE MODULE 6, SIDE A, SENSE LINE SET 6 (WIRES 81-96)
 ROPE MODULE 6, SIDE B, SENSE LINE SET 6 (WIRES 81-96)
 ROPE MODULE 6, SIDE A, SENSE LINE SET 7 (WIRES 97-112)



PARAGRAPHS GENERATED FOR THIS ASSEMBLY



| | | | | | | | | |
|------|------------|------------|------------|------------|------------|------------|------------|------------|
| 4010 | 52011 0 | 40030 0 | 64731 0 | 14085 1 | 52011 0 | 34055 0 | 56006 1 | 13416 0 |
| 4020 | 52011 0 | 34063 0 | 56006 1 | 12000 1 | 52011 0 | 34056 0 | 56006 1 | 13613 1 |
| 4030 | 52011 0 | 34057 1 | 56006 1 | 12103 0 | 52011 0 | 34056 0 | 56006 1 | 13636 0 |
| 4040 | 52011 0 | 34060 0 | 56006 1 | 13342 0 | 52011 0 | 34061 1 | 56006 1 | 12476 1 |
| 4050 | 52011 0 | 34062 1 | 56006 1 | 15225 0 | C' 12063 1 | C' 02063 0 | C' 16060 0 | C' 16067 1 |
| 4060 | C' 12060 1 | C' 56067 0 | C' 04060 0 | C' 14062 0 | C' 04060 0 | 00006 1 | 65226 1 | 00006 1 |
| 4070 | 31313 1 | 52006 0 | C' 04025 1 | C' 10003 0 | C' 14031 0 | C' 20033 0 | C' 24017 1 | C' 30036 1 |
| 4100 | C' 34034 1 | C' 40023 1 | C' 44035 1 | C' 50037 0 | C' 54000 0 | C' 60000 1 | 05301 0 | C' 00014 1 |
| 4110 | 04574 0 | C' 10000 0 | C' 00024 1 | C' 00031 0 | 00004 0 | 54001 1 | 50002 0 | 30000 1 |
| 4120 | 24002 0 | 60000 1 | 54061 1 | 10001 1 | 14133 0 | 14133 0 | 24000 1 | 54001 1 |
| 4130 | 40025 1 | 50061 0 | 55051 0 | 40001 1 | 50061 0 | 52751 0 | 00003 1 | 00002 0 |
| 4140 | 34160 1 | 71022 1 | 00006 1 | 14145 1 | 04146 0 | 31020 1 | 54023 1 | 30023 0 |
| 4150 | 04555 0 | C' 62336 0 | 34714 1 | 55013 0 | 31022 0 | 04271 1 | 04157 0 | 05112 0 |
| 4160 | C' 37600 0 | 04400 1 | 41041 1 | 55013 0 | 04555 0 | C' 62336 0 | 04574 0 | C' 62002 1 |
| 4170 | 22007 0 | 54123 0 | 34675 1 | 71021 1 | 61012 0 | 10000 0 | 00002 0 | 34712 1 |
| 4200 | 60002 0 | 55037 0 | 23022 0 | 04220 0 | 34215 0 | 56006 1 | 00006 1 | 04007 1 |
| 4210 | 55040 0 | 34215 0 | 00006 1 | 01007 1 | 02000 0 | C' 62101 0 | 53040 0 | 05122 0 |
| 4220 | 34674 0 | 55021 1 | 00002 0 | 22002 0 | 04234 0 | 04240 0 | 30001 0 | 74747 0 |
| 4230 | 60004 0 | 55042 1 | 05070 0 | 05112 0 | 11042 1 | 04243 0 | 00002 0 | 04243 0 |
| 4240 | 11043 0 | 04243 0 | 00002 0 | 05622 1 | C' 01206 1 | 34215 0 | 00006 1 | 01007 1 |
| 4250 | 34256 1 | 55013 0 | 44374 1 | 54777 1 | 04574 0 | C' 61351 1 | C' 00042 1 | 34215 0 |
| 4260 | 00006 1 | 01007 1 | 34270 0 | 55013 0 | 44374 1 | 54777 1 | 04574 0 | C' 81343 1 |
| 4270 | C' 00041 1 | 74716 1 | 54123 0 | 34675 1 | 71021 1 | 61012 0 | 10000 0 | 00002 0 |
| 4300 | 24002 0 | 10123 0 | 14304 0 | 00002 0 | 22002 0 | 34316 1 | 56006 1 | 00006 1 |
| 4310 | 04007 1 | 52131 0 | 34215 0 | 00006 1 | 01007 1 | 03406 0 | C' 60101 1 | 55017 1 |
| 4320 | 54003 0 | 74373 0 | 64744 1 | 54145 0 | 00002 0 | 31017 0 | 14320 0 | 54003 0 |
| 4330 | 74373 0 | 64744 1 | 00002 0 | C' 00016 0 | C' 00011 1 | C' 00004 0 | 54020 1 | 40020 1 |
| 4340 | 40020 1 | 40020 1 | 40020 1 | 56020 0 | 00002 0 | 54022 0 | 40022 0 | 40022 0 |
| 4350 | 40022 0 | 40022 0 | 56022 1 | 00002 0 | 60000 1 | 60000 1 | 60000 1 | 60000 1 |
| 4360 | 60000 1 | 00002 0 | C' 00037 0 | C' 01740 0 | C' 76000 0 | 05027 1 | 05140 1 | 05213 1 |
| 4370 | 05042 1 | C' 30000 1 | C' 03777 0 | C' 00377 1 | C' 00023 0 | C' 00021 1 | C' 00025 0 | C' 00012 1 |



TOTAL LISTING FOR PARAGRAPH J 011, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" A DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED A/A (INTERPRETIVE OPERATOR WORDS) OR A/C (CONSTANTS)

| | | | | | | | | |
|------|------------|------------|------------|------------|------------|------------|------------|------------|
| 4400 | 34704 0 | 00008 1 | 05011 1 | 00002 0 | 44704 1 | 00006 1 | 03011 1 | 00002 0 |
| 4410 | 34706 1 | 00006 1 | 05011 1 | 00002 0 | 00006 1 | 30025 0 | 52014 0 | 00002 0 |
| 4420 | 00006 1 | 30156 0 | 20156 1 | 00154 1 | 20154 0 | 54007 1 | 00002 0 | 54162 0 |
| 4430 | 00002 0 | 54135 1 | 10000 0 | 30135 0 | 17257 1 | 14433 0 | 44714 0 | 54154 0 |
| 4440 | 54155 1 | 54156 1 | 00002 0 | 34705 1 | 00006 1 | 05011 1 | 00002 0 | 44705 0 |
| 4450 | 00006 1 | 03011 1 | 00002 0 | 44460 0 | 00002 0 | 00004 0 | 04574 0 | C' 10550 0 |
| 4460 | C' 02003 0 | 22007 0 | 54123 0 | 34675 1 | 71021 1 | 01012 0 | 10000 0 | 14471 0 |
| 4470 | 14200 0 | 24002 0 | 14453 0 | 56002 0 | 54144 1 | 44675 0 | 00004 0 | 71021 1 |
| 4500 | 55021 1 | 11043 0 | 04504 1 | 04507 1 | 34714 1 | 07043 1 | 05074 1 | 00003 1 |
| 4510 | 44706 0 | 00006 1 | 03011 1 | 34714 1 | 55012 1 | 00144 0 | 56002 0 | 54144 1 |
| 4520 | 11043 0 | 04523 1 | 04507 1 | 34714 1 | 55012 1 | 00144 0 | 00004 0 | 00006 1 |
| 4530 | 00004 0 | 54001 1 | 00006 1 | 06004 0 | 00006 1 | 14541 1 | 00006 1 | 00004 0 |
| 4540 | 54001 1 | 44672 1 | 60001 0 | 00006 1 | 14527 1 | 00006 1 | 00003 1 | 00002 0 |
| 4550 | 00006 1 | 34554 1 | 15122 1 | C' 02637 1 | C' 06107 1 | 52134 0 | 50002 0 | 30000 1 |
| 4560 | 24002 0 | 54001 1 | 22004 0 | 74747 0 | 56002 0 | 52134 0 | 50002 0 | 02000 0 |
| 4570 | 56134 1 | 56004 0 | 56134 1 | 00133 0 | 56002 0 | 50000 1 | 30000 1 | 54004 1 |
| 4600 | 74747 0 | 56002 0 | 50002 0 | 12000 1 | 34747 1 | 70133 1 | 00134 1 | 00002 0 |
| 4610 | 54135 1 | 56004 0 | 00006 1 | 04007 1 | 56135 0 | 74747 0 | 56001 0 | 00004 0 |
| 4620 | 00006 1 | 01007 1 | 50001 0 | 32000 0 | 56135 0 | 00006 1 | 01007 1 | 00003 1 |
| 4630 | 54004 1 | 30135 0 | 00002 0 | 52073 1 | 50002 0 | 30000 1 | 24002 0 | 54001 1 |
| 4640 | 22004 0 | 74747 0 | 56002 0 | 52073 1 | 50002 0 | 02000 0 | 56073 0 | 56004 0 |
| 4650 | 56073 0 | 00072 1 | 54164 0 | 34703 1 | 54023 1 | 30006 1 | 54165 1 | 50002 0 |
| 4660 | 30000 1 | 54004 1 | 74747 0 | 56002 0 | 56164 1 | 14802 0 | 00006 1 | 01007 1 |
| 4670 | 00002 0 | C' 37777 1 | C' 37777 1 | C' 57777 1 | C' 40000 0 | C' 20000 0 | C' 10000 0 | C' 04000 0 |
| 4700 | C' 02000 0 | C' 01000 0 | C' 00400 0 | C' 00200 0 | C' 00100 0 | C' 00040 0 | C' 00020 0 | C' 00010 0 |
| 4710 | C' 00004 0 | C' 00002 0 | C' 00001 0 | C' 77777 0 | C' 00000 1 | C' 00005 1 | C' 00007 0 | C' 00013 0 |
| 4720 | C' 00015 0 | C' 00017 1 | C' 00030 1 | C' 00032 0 | C' 00045 0 | C' 00046 0 | C' 00050 1 | C' 00055 1 |
| 4730 | C' 00060 1 | C' 00062 0 | C' 00120 1 | C' 00140 1 | C' 00144 0 | C' 00310 0 | C' 00401 1 | C' 00454 1 |
| 4740 | C' 00620 0 | C' 00777 0 | C' 01124 1 | C' 01211 1 | C' 01400 1 | C' 01426 0 | C' 01776 0 | C' 01777 1 |
| 4750 | C' 02177 1 | C' 02400 1 | C' 03000 1 | C' 03400 0 | C' 05000 1 | C' 06000 1 | C' 07000 0 | C' 11000 1 |
| 4760 | C' 13000 0 | C' 14000 1 | C' 15000 0 | C' 16000 0 | C' 17000 1 | C' 17770 1 | C' 21000 1 | 64675 1 |
| 4770 | 55075 0 | 14773 1 | 41075 0 | 60000 1 | 55075 0 | 15006 0 | 57075 1 | 51075 1 |



ODAL LISTING FOR PARAGRAPH J 012, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, a" a DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED aIa (INTERPRETIVE OPERATOR WORDS) OR aCa (CONSTANTS)

| | | | | | | | | |
|------|------------|------------|------------|------------|------------|------------|---------|------------|
| 5000 | 64873 1 | 40000 0 | 61075 1 | 55075 0 | 15006 0 | 15024 0 | 00006 1 | 71075 0 |
| 5010 | 55076 0 | 00006 1 | 74742 0 | 67706 1 | 00006 1 | 71076 0 | 67666 0 | 00006 1 |
| 5020 | 71075 0 | 20001 1 | 55075 0 | 00002 0 | 50000 1 | 44673 0 | 00002 0 | 00004 0 |
| 5030 | 65121 0 | 54063 0 | 00006 1 | 50002 0 | 30001 0 | 52066 0 | 35120 1 | 56004 0 |
| 5040 | 54061 1 | 12650 1 | 00004 0 | 54063 0 | 00006 1 | 50002 0 | 30001 0 | 52066 0 |
| 5050 | 35120 1 | 56004 0 | 12626 0 | 56002 0 | 67715 0 | 56002 0 | 15047 0 | 22002 0 |
| 5060 | 35120 1 | 56006 1 | 12727 0 | 40164 0 | 54001 1 | 35120 1 | 54006 0 | 12726 1 |
| 5070 | 54164 0 | 35120 1 | 54004 1 | 13017 0 | 00004 0 | 54065 0 | 44711 0 | 26002 1 |
| 5100 | 35120 1 | 56004 0 | 13044 0 | 00004 0 | 54063 0 | 35120 1 | 56006 1 | 54165 1 |
| 5110 | 30002 0 | 13113 0 | 35120 1 | 54004 1 | 13124 1 | 30061 0 | 54004 1 | 16710 0 |
| 5120 | C' 02626 1 | C' 00110 1 | 56001 0 | 00006 1 | 01007 1 | 54006 0 | 00001 0 | C' 77677 1 |
| 5130 | 00004 0 | 54001 1 | 34672 0 | 26002 1 | 30006 1 | 00006 1 | 04007 1 | 56001 0 |
| 5140 | 00004 0 | 56002 0 | 54061 1 | 00006 1 | 50061 0 | 30001 0 | 54063 0 | 35155 0 |
| 5150 | 56006 1 | 13246 0 | 52062 1 | 64711 1 | 52006 0 | C' 02063 0 | 50002 0 | 30000 1 |
| 5160 | 24002 0 | 56002 0 | 54063 0 | 30006 1 | 00006 1 | 04007 1 | 54001 1 | 35172 0 |
| 5170 | 54061 1 | 15147 1 | 15211 1 | C' 72602 0 | C' 73714 1 | 10076 1 | 15213 0 | 15213 0 |
| 5200 | 15201 0 | 11322 1 | 15213 0 | 15206 1 | 15213 0 | 15213 0 | 37672 0 | 05027 1 |
| 5210 | C' 03542 1 | C' 14063 1 | 15213 0 | 10734 0 | 35155 0 | 54006 0 | 13423 0 | 30016 0 |
| 5220 | 00006 1 | 01007 1 | 00006 1 | 22012 1 | 30016 0 | 56006 1 | 52011 0 | 00003 1 |
| 5230 | 50017 1 | 53140 1 | 00006 1 | 50002 0 | 30001 0 | 53134 1 | 00006 1 | 35242 0 |
| 5240 | 52006 0 | C' 03461 1 | C' 02063 0 | 50002 0 | 30000 1 | 24002 0 | 55011 1 | 35252 1 |
| 5250 | 22006 1 | 14577 1 | C' 20344 0 | 50002 0 | 40000 0 | 61011 0 | 00006 1 | 16710 0 |
| 5260 | 16706 1 | 00004 0 | 50002 0 | 30000 1 | 24002 0 | 54072 0 | 74716 1 | 60000 1 |
| 5270 | 54071 0 | 30072 1 | 74765 0 | 00006 1 | 74677 1 | 56072 1 | 74674 1 | 54066 0 |
| 5300 | 15304 1 | 00004 0 | 34712 1 | 54066 0 | 50002 0 | 30000 1 | 24002 0 | 54065 0 |
| 5310 | 00006 1 | 35314 1 | 52006 0 | C' 02355 0 | C' 20103 1 | 22073 0 | 22006 1 | 22073 0 |
| 5320 | 74761 1 | 10000 0 | 15363 0 | 30062 0 | 74704 1 | 10000 0 | 15350 0 | 50061 0 |
| 5330 | 31052 1 | 54070 1 | 30062 0 | 74703 0 | 10000 0 | 15354 1 | 30002 0 | 54063 0 |
| 5340 | 30006 1 | 00006 1 | 04007 1 | 54064 1 | 35347 1 | 22073 0 | 52006 0 | C' 02443 0 |
| 5350 | 50002 0 | 30000 1 | 24002 0 | 15331 1 | 00006 1 | 50002 0 | 30001 0 | 52064 1 |
| 5360 | 34711 1 | 26002 1 | 15344 0 | 74677 1 | 10000 0 | 15350 0 | 15327 0 | 22706 0 |
| 5370 | 22006 1 | 50000 1 | 30001 0 | 22006 1 | 22706 0 | 13573 1 | 22706 0 | 22006 1 |



DATA LISTING FOR PARAGRAPH J 014, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, 'A' DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED A/B (INTERPRETIVE OPERATOR WORDS) OR A/C (CONSTANTS)

| | | | | | | | | |
|------|------------|------------|------------|------------|------------|------------|---------|---------|
| 6000 | 30007 0 | 00006 1 | 01006 0 | 00006 1 | 01005 0 | 00002 0 | 00003 1 | 00006 1 |
| 6010 | 22164 1 | 30006 1 | 54165 1 | 74674 1 | 54115 0 | 54023 1 | 16037 1 | 22006 1 |
| 6020 | 16011 0 | 00006 1 | 50116 1 | 30001 0 | 52155 1 | 34714 1 | 54156 1 | 54163 1 |
| 6030 | 30165 0 | 54006 0 | 10023 1 | 16046 1 | 10067 1 | 15063 0 | 24164 1 | 50164 1 |
| 6040 | 30000 1 | 10000 0 | 16331 1 | C' 00177 0 | 54023 1 | 76043 1 | 54020 1 | 10020 1 |
| 6050 | 16216 0 | 16712 1 | 74712 0 | 10000 0 | 16116 0 | 50164 1 | 40001 1 | 10000 0 |
| 6060 | 16164 0 | C' 77773 1 | 24164 1 | 54116 0 | 66220 1 | 10000 0 | 67712 1 | 16074 0 |
| 6070 | 30120 1 | 26116 0 | 50020 0 | 76242 1 | 00006 1 | 66105 0 | 74747 0 | 64747 1 |
| 6100 | 56116 1 | 60115 1 | 54004 1 | 50020 0 | 76242 1 | 74373 0 | 64744 1 | 56116 1 |
| 6110 | 54003 0 | 50020 0 | 76242 1 | 37702 0 | 54020 1 | 30120 1 | 54130 1 | 24164 1 |
| 6120 | 50164 1 | 40000 0 | 10000 0 | 24130 0 | 16125 0 | 54116 0 | 77711 0 | 00006 1 |
| 6130 | 16132 1 | 30115 1 | 26116 0 | 50130 0 | 40046 1 | 26116 0 | 77713 1 | 00006 1 |
| 6140 | 16153 1 | 77711 0 | 00006 1 | 16155 1 | 30116 1 | 54004 1 | 74747 0 | 64700 1 |
| 6150 | 54116 0 | 50020 0 | 36242 0 | 30120 1 | 16161 0 | 34744 1 | 56116 1 | 54003 0 |
| 6160 | 74373 0 | 26116 0 | 50020 0 | 36242 0 | 34374 0 | 70020 1 | 66171 0 | 10000 0 |
| 6170 | 16202 0 | C' 77767 1 | 66061 0 | 10000 0 | 50000 1 | 46213 0 | 16204 0 | 50163 0 |
| 6200 | 46211 1 | 16204 0 | 50163 0 | 46213 0 | 26166 1 | 54116 0 | 50020 0 | 76242 1 |
| 6210 | C' 00002 0 | C' 00006 1 | C' 00006 1 | C' 00002 0 | C' 00003 1 | C' 00006 1 | 10020 1 | 16232 0 |
| 6220 | C' 77722 0 | 24164 1 | 50164 1 | 30000 1 | 54117 1 | 34750 1 | 54004 1 | 70020 1 |
| 6230 | 50000 1 | 16303 0 | 54004 1 | 10020 1 | 50000 1 | 12000 1 | 10163 1 | 12017 1 |
| 6240 | 12017 1 | 12121 0 | C' 00122 0 | 16454 0 | 17040 0 | 17624 1 | 17350 1 | 16652 1 |
| 6250 | 16437 0 | 16021 0 | 17573 0 | 16450 1 | 16567 1 | 16472 1 | 17303 1 | 16526 1 |
| 6260 | 16575 1 | 17306 1 | 17565 1 | 17543 0 | 17546 0 | 17552 0 | 17570 0 | 16720 0 |
| 6270 | 16716 0 | 17005 1 | 17300 1 | 17427 0 | 17374 1 | 16754 0 | 17031 0 | 16744 1 |
| 6300 | 16300 0 | 17541 1 | 17562 0 | 12371 1 | 12376 0 | 12401 1 | 12405 0 | 12411 0 |
| 6310 | 12417 0 | 12433 0 | 12442 0 | 12425 1 | 12436 0 | 12514 1 | 12521 1 | 12474 0 |
| 6320 | 12534 0 | 12543 0 | 12504 0 | 30165 0 | 54004 1 | 24164 1 | 50164 1 | 40000 0 |
| 6330 | 67716 0 | 54116 0 | 74372 1 | 56116 1 | 77671 1 | 00006 1 | 74706 0 | 50000 1 |
| 6340 | 16341 0 | 06371 1 | 16030 0 | 06363 1 | 16030 0 | 06366 1 | 16030 0 | 06371 1 |
| 6350 | 16427 1 | 06371 1 | 16113 0 | 06371 1 | 16432 0 | 06371 1 | 16435 1 | 06371 1 |
| 6360 | 34723 0 | 54020 1 | 16221 1 | 50120 1 | 40046 1 | 16370 1 | 50120 1 | 40047 0 |
| 6370 | 26116 0 | 40116 0 | 64727 1 | 10000 0 | 30120 1 | 16402 0 | 34744 1 | 56116 1 |

OCAL LISTING FOR PARAGRAPH J 015, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED A/A (INTERPRETIVE OPERATOR WORDS) OR A/C (CONSTANTS)

| | | | | | | | | |
|------|---------|---------|---------|---------|---------|---------|---------|---------|
| 6400 | 54003 0 | 74373 0 | 26116 0 | 00006 1 | 30155 0 | 50116 1 | 52001 1 | 10163 1 |
| 6410 | 16423 0 | 00002 0 | 00006 1 | 30160 0 | 50116 1 | 52003 0 | 00006 1 | 30162 1 |
| 6420 | 50116 1 | 52005 0 | 00002 0 | 30156 0 | 50116 1 | 54002 1 | 00002 0 | 37701 0 |
| 6430 | 54020 1 | 16055 0 | 34674 0 | 54020 1 | 16055 0 | 36056 1 | 16114 1 | 50116 1 |
| 6440 | 30002 0 | 54156 1 | 00006 1 | 50116 1 | 30001 0 | 52155 1 | 34712 1 | 16027 0 |
| 6450 | 22007 0 | 50116 1 | 30000 1 | 16024 0 | 00006 1 | 50116 1 | 30001 0 | 52155 1 |
| 6460 | 00006 1 | 50116 1 | 30003 1 | 52160 1 | 00006 1 | 50116 1 | 30005 1 | 52162 0 |
| 6470 | 44712 0 | 16027 0 | 00006 1 | 50116 1 | 30001 0 | 52155 1 | 50166 0 | 52001 1 |
| 6500 | 50163 0 | 36213 1 | 26166 1 | 10163 1 | 16521 0 | 16517 0 | 54163 1 | 54156 1 |
| 6510 | 52160 1 | 50166 0 | 51775 0 | 52162 0 | 50166 0 | 51777 1 | 16030 0 | 54156 1 |
| 6520 | 16030 0 | 54163 1 | 56156 0 | 50166 0 | 53777 0 | 16030 0 | 00006 1 | 50116 1 |
| 6530 | 30001 0 | 52155 1 | 50166 0 | 52001 1 | 50163 0 | 36213 1 | 26166 1 | 10163 1 |
| 6540 | 16557 1 | 16480 1 | 00006 1 | 50116 1 | 30003 1 | 52160 1 | 50166 0 | 51775 0 |
| 6550 | 00006 1 | 50116 1 | 30005 1 | 52162 0 | 50166 0 | 51777 1 | 16030 0 | 00006 1 |
| 6560 | 50116 1 | 30003 1 | 52160 1 | 30156 0 | 50166 0 | 53777 0 | 16464 0 | 24164 1 |
| 6570 | 50164 1 | 30000 1 | 50116 1 | 54000 0 | 16030 0 | 24164 1 | 50164 1 | 30000 1 |
| 6600 | 50116 1 | 60000 1 | 54004 1 | 74747 0 | 50000 1 | 32000 0 | 54117 1 | 30165 0 |
| 6610 | 74364 0 | 64364 1 | 60164 1 | 50120 1 | 54052 1 | 30117 0 | 77711 0 | 00006 1 |
| 6620 | 16631 1 | 30165 0 | 54006 0 | 30117 0 | 54004 1 | 74747 0 | 64700 1 | 54164 0 |
| 6630 | 16011 0 | 30117 0 | 66220 1 | 10000 0 | 30117 0 | 16644 0 | 30120 1 | 60117 0 |
| 6640 | 50000 1 | 30000 1 | 54117 1 | 16616 1 | 54003 0 | 74373 0 | 50000 1 | 31400 1 |
| 6650 | 54117 1 | 16616 1 | 50164 1 | 30001 0 | 50116 1 | 60000 1 | 54004 1 | 74747 0 |
| 6660 | 50000 1 | 32000 0 | 54117 1 | 16616 1 | 30165 0 | 54004 1 | 50164 1 | 30001 0 |
| 6670 | 54117 1 | 16616 1 | 10154 0 | 00002 0 | 16676 1 | 16710 0 | 10155 1 | 00002 0 |
| 6700 | 16702 0 | 16710 0 | 10156 1 | 00002 0 | 16706 1 | 16710 0 | 50002 0 | 00001 0 |
| 6710 | 50002 0 | 00002 0 | 30165 0 | 54006 0 | 50164 1 | 00001 0 | 34674 0 | 16721 1 |
| 6720 | 34371 0 | 26116 0 | 00006 1 | 50116 1 | 00003 1 | 20160 1 | 00006 1 | 16731 0 |
| 6730 | 06763 0 | 00006 1 | 50116 1 | 00005 1 | 20162 0 | 00006 1 | 16740 0 | 06760 0 |
| 6740 | 00006 1 | 50116 1 | 00001 0 | 16747 1 | 00006 1 | 50116 1 | 30001 0 | 20155 1 |
| 6750 | 00006 1 | 16030 0 | 06766 0 | 16030 0 | 00006 1 | 50116 1 | 40001 1 | 16747 1 |
| 6760 | 54001 1 | 34715 0 | 16765 1 | 54001 1 | 36214 0 | 56001 0 | 50000 1 | 44673 0 |
| 6770 | 54130 1 | 00006 1 | 24000 1 | 50001 0 | 26155 1 | 54007 1 | 34714 1 | 60130 0 |

OCAL LISTING FOR PARAGRAPH J 016, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A'S DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED A1A (INTERPRETIVE OPERATOR WORDS) OR ACs (CONSTANTS)

| | | | | | | | | |
|------|---------|---------|---------|---------|---------|---------|---------|---------|
| 7000 | 50001 0 | 25154 0 | 54007 1 | 00002 0 | 17121 0 | 00006 1 | 50116 1 | 30003 1 |
| 7010 | 52160 1 | 00006 1 | 40001 1 | 20160 1 | 00006 1 | 17017 1 | 06763 0 | 00006 1 |
| 7020 | 50116 1 | 30005 1 | 52162 0 | 00006 1 | 40001 1 | 20162 0 | 00006 1 | 17031 0 |
| 7030 | 06760 0 | 00006 1 | 50116 1 | 30001 0 | 52155 1 | 00006 1 | 40001 1 | 16747 1 |
| 7040 | 00006 1 | 50116 1 | 30002 0 | 20156 1 | 50116 1 | 60000 1 | 60154 1 | 54154 0 |
| 7050 | 16030 0 | 16752 0 | 50002 0 | 30000 1 | 24002 0 | 54116 0 | 50116 1 | 30001 0 |
| 7060 | 54156 1 | 34714 1 | 56155 0 | 54135 1 | 00006 1 | 70156 1 | 56156 0 | 00006 1 |
| 7070 | 70154 0 | 20156 1 | 50116 1 | 30000 1 | 56135 0 | 60006 1 | 70135 1 | 20156 1 |
| 7100 | 56154 1 | 00006 1 | 70135 1 | 20155 1 | 00002 0 | 34714 1 | 54163 1 | 56156 0 |
| 7110 | 60000 1 | 54001 1 | 00002 0 | 60155 0 | 54155 1 | 00002 0 | 60154 1 | 54154 0 |
| 7120 | 00002 0 | 54121 1 | 00002 0 | 34711 1 | 54136 1 | 00006 1 | 22137 1 | 07056 0 |
| 7130 | 52160 1 | 52155 1 | 52131 0 | 30156 0 | 54132 0 | 30136 0 | 26116 0 | 07056 0 |
| 7140 | 52156 1 | 20132 0 | 60154 1 | 60130 0 | 54130 1 | 17147 0 | 54121 1 | 52162 0 |
| 7150 | 52155 1 | 30136 0 | 26116 0 | 07056 0 | 52132 0 | 20156 1 | 60154 1 | 60130 0 |
| 7160 | 54154 0 | 00137 1 | 06766 0 | 00137 1 | 00006 1 | 22141 0 | 54117 1 | 22140 1 |
| 7170 | 17201 1 | 50002 0 | 30000 1 | 54140 0 | 60000 1 | 60002 0 | 54117 1 | 64715 0 |
| 7200 | 54141 1 | 36242 0 | 54116 0 | 00006 1 | 50117 0 | 30004 0 | 52155 1 | 52123 0 |
| 7210 | 17214 0 | 54140 0 | 44711 0 | 26117 1 | 07056 0 | 00006 1 | 50117 0 | 30002 0 |
| 7220 | 20155 1 | 10140 0 | 17211 0 | 00141 0 | 34714 1 | 54156 1 | 22002 0 | 06872 1 |
| 7230 | 17234 1 | 17254 1 | 44672 1 | 17235 0 | 34672 0 | 54002 1 | 00006 1 | 24000 1 |
| 7240 | 60156 0 | 54156 1 | 34714 1 | 60002 0 | 60155 0 | 54155 1 | 34714 1 | 60002 0 |
| 7250 | 60154 1 | 54154 0 | 54155 1 | 00001 0 | 54156 1 | 17251 1 | 54135 1 | 00006 1 |
| 7260 | 70156 1 | 54156 1 | 34714 1 | 56155 0 | 17075 0 | 54135 1 | 00006 1 | 70155 1 |
| 7270 | 52155 1 | 00006 1 | 70135 1 | 30001 0 | 26154 0 | 00006 1 | 30155 0 | 00002 0 |
| 7300 | 07123 0 | 34714 1 | 16027 0 | 34711 1 | 54140 0 | 17311 1 | 44377 1 | 54140 0 |
| 7310 | 36211 0 | 54136 1 | 07501 1 | 07125 0 | 00006 1 | 30123 1 | 52155 1 | 52134 0 |
| 7320 | 00006 1 | 30125 1 | 52160 1 | 00006 1 | 30127 0 | 52162 0 | 30140 1 | 26116 0 |
| 7330 | 07125 0 | 52123 0 | 52155 1 | 52125 0 | 52160 1 | 52127 1 | 52162 0 | 30140 1 |
| 7340 | 26116 0 | 07125 0 | 52134 0 | 52155 1 | 52162 0 | 52125 0 | 52160 1 | 16030 0 |
| 7350 | 10163 1 | 17377 1 | 17377 1 | 07056 0 | 07107 0 | 52160 1 | 52155 1 | 52160 1 |
| 7360 | 07056 0 | 07107 0 | 52162 0 | 52155 1 | 52162 0 | 07056 0 | 07107 0 | 52155 1 |
| 7370 | 52162 0 | 52160 1 | 52155 1 | 16030 0 | 07123 0 | 44710 1 | 26116 0 | 00006 1 |

COPY LISTING FOR PARAGRAPH j 020, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #1# (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|----------|------------|---------|---------|---------|------------|---------|------------|---------|
| 00,2000 | 13207 0 | 13527 0 | 13518 1 | 13607 1 | 13611 0 | 13174 1 | 12118 1 | 17637 0 |
| 00,2010 | 13232 0 | 13023 1 | 13176 0 | 13245 0 | 16323 1 | 13274 1 | 13247 1 | 36211 0 |
| 00,2020 | 70020 1 | 54021 0 | 10020 1 | 12101 1 | C' 00024 1 | 50021 1 | 34678 1 | 54135 1 |
| 00,2030' | 10020 1 | 02050 0 | 16027 0 | 30135 0 | 000W 1 | 70158 1 | 54156 1 | 30135 0 |
| 00,2040 | 00006 1 | 70154 0 | 52155 1 | 30135 0 | 00008 1 | 70001 1 | 20156 1 | 16030 0 |
| 00,2050 | 30156 0 | 00006 1 | 70135 1 | 56155 0 | 00008 1 | 70135 1 | 56155 0 | 00001 0 |
| 00,2060 | 60000 1 | 54158 1 | 12064 0 | 20155 1 | 34714 1 | 54158 1 | 56154 1 | 00008 1 |
| 00,2070 | 70135 1 | 20155 1 | 00002 0 | 30135 0 | 00006 1 | 70158 1 | 54155 1 | 54001 0 |
| 00,2100 | 12080 1 | 30021 1 | 54135 1 | 00006 1 | 30158 0 | 20158 1 | 00154 1 | 00154 1 |
| 00,2110 | 54154 0 | 12113 1 | 54121 1 | 10135 1 | 12102 1 | 10020 1 | 07105 1 | 16030 0 |
| 00,2120 | 18030 0 | 34716 0 | 70020 1 | 54135 1 | 10020 1 | 12145 1 | C' 00176 1 | 50135 0 |
| 00,2130 | 34675 1 | 54135 1 | 02073 1 | 52155 1 | 52160 1 | 52155 1 | 02073 1 | 52155 1 |
| 00,2140 | 52162 0 | 52155 1 | 02073 1 | 17367 0 | 54135 1 | 000W 1 | 30155 0 | 20155 1 |
| 00,2150 | 00006 1 | 12153 0 | 08768 0 | 00006 1 | 30180 0 | 20180 1 | 00006 1 | 12181 1 |
| 00,2160 | 08763 0 | 00008 1 | 30162 1 | 20162 0 | 00006 1 | 12167 1 | 08760 0 | 10135 1 |
| 00,2170 | 12144 0 | 16030 0 | 54135 1 | 06672 1 | 12176 1 | 12212 0 | 07226 0 | 30154 1 |
| 00,2200 | 12207 1 | 24135 0 | 00006 1 | 30158 0 | 20158 1 | 60154 1 | 26154 0 | 60000 1 |
| 00,2210 | 54000 0 | 12201 1 | 40135 1 | 16572 0 | 70118 0 | 10000 0 | 12224 0 | 34701 0 |
| 00,2220 | 70118 0 | 10000 0 | 07105 1 | 16030 0 | 54135 1 | 34703 1 | 00006 1 | 70118 0 |
| 00,2230 | 76214 1 | 50000 1 | 12233 0 | 12332 0 | 12342 1 | 12338 1 | 10163 1 | 12277 0 |
| 00,2240 | 12317 0 | 30135 0 | 63730 0 | 00008 1 | 62131 1 | 67716 0 | 54135 1 | 34714 1 |
| 00,2250 | 54001 1 | 56154 1 | 56155 0 | 02272 1 | 20155 1 | 56157 1 | 56160 0 | 02372 1 |
| 00,2260 | 20180 1 | 56161 1 | 56162 1 | 02372 1 | 20162 0 | 10135 1 | 54135 1 | 12242 0 |
| 00,2310 | C' 04804 1 | 16030 0 | 60000 1 | 54158 1 | 34114 1 | 56001 0 | 00002 0 | 30135 0 |
| 00,2300 | 63730 0 | 00008 1 | 62322 0 | 67716 0 | 54135 1 | 34714 1 | 56154 1 | 56155 0 |
| 00,2310 | 54158 1 | 10135 1 | 54135 1 | 02300 0 | C' 22650 1 | 34701 0 | 70118 0 | 10000 0 |
| 00,2320 | 07105 1 | 16030 0 | 50135 0 | 34675 1 | 54135 1 | 34701 0 | 70118 0 | 10000 0 |
| 00,2330 | 12031 0 | 12033 1 | 40135 1 | 62128 0 | 54135 1 | 12238 0 | 42128 1 | 60135 0 |
| 00,2340 | 40000 0 | 54135 1 | 10163 1 | 12348 0 | 12348 0 | 12145 1 | 40116 0 | 00006 1 |
| 00,2350 | 74705 0 | 54020 1 | 12103 0 | 44712 0 | 54138 1 | 54137 0 | 54140 0 | 10130 1 |
| 00,2300 | 12516 0 | 12363 1 | 12531 0 | 54158 1 | 07226 0 | 10154 0 | 12414 0 | 12371 1 |
| 00,2370 | 12413 1 | 56131 1 | 56130 0 | 56155 0 | 56154 1 | 10130 1 | 12422 0 | 12401 1 |

ODD LISTING FOR PARAGRAPH J 021, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, 'A' DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #1# (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|------------|---------|---------|---------|------------|---------|------------|---------|
| 00,2400 | 12416 1 | 40154 0 | 00006 1 | 02405 1 | 24136 0 | 34672 0 | 54154 0 | 02630 0 |
| 00,2410 | 34712 1 | 54121 1 | 06030 1 | 24136 0 | 40131 0 | 12402 1 | 00006 1 | 40131 0 |
| 00,2420 | 52131 0 | 24136 0 | 10154 0 | 12437 1 | 12426 1 | 12433 0 | 10155 1 | 12437 1 |
| 00,2430 | 16030 0 | 12433 0 | 16030 0 | 00006 1 | 40155 1 | 52155 1 | 24136 0 | 40154 0 |
| 00,2440 | 67718 0 | 60130 0 | 10000 0 | 12505 1 | C' 60001 0 | 12448 1 | 34675 1 | 60000 1 |
| 00,2450 | 60155 0 | 54155 1 | 34714 1 | 64672 0 | 26154 0 | 34675 1 | 60000 1 | 60131 1 |
| 00,2460 | 54131 0 | 34714 1 | 64672 0 | 26130 1 | 40154 0 | 60130 0 | 10000 0 | 12505 1 |
| 00,2470 | C' 00133 0 | 12405 0 | 54140 0 | 40155 1 | 60131 1 | 00006 1 | 62405 1 | 12505 1 |
| 00,2500 | 00006 1 | 24137 1 | 00006 1 | 30131 1 | 20131 0 | 30130 0 | 60000 1 | 54000 0 |
| 00,2510 | 12500 1 | 52155 1 | 50137 1 | 02565 0 | 54156 1 | 16030 0 | 10000 0 | 12422 0 |
| 00,2520 | 40131 0 | 00006 1 | 62422 1 | 34675 1 | 60000 1 | 26131 0 | 34714 1 | 54130 1 |
| 00,2530 | 12363 1 | 10000 0 | 12416 1 | 30131 1 | 00006 1 | 62416 0 | 44675 0 | 12524 1 |
| 00,2540 | 22021 1 | 00006 1 | 74675 0 | 56001 0 | 60021 1 | 56001 0 | 12571 1 | 20001 1 |
| 00,2550 | 20001 1 | 20001 1 | 20001 1 | 20001 1 | 20001 1 | 20001 1 | 20001 1 | 20001 1 |
| 00,2560 | 20001 1 | 20001 1 | 20001 1 | 20001 1 | 52155 1 | 10140 0 | C' 06552 0 | 12642 1 |
| 00,2570 | 52155 1 | 00006 1 | 10130 1 | 52155 1 | 40154 0 | 00006 1 | 70131 0 | 60155 0 |
| 00,2600 | 54000 0 | 12606 1 | 00006 1 | 60130 0 | 24154 1 | 12610 0 | 00006 1 | 62620 1 |
| 00,2610 | 00006 1 | 60130 0 | 00006 1 | 12616 0 | 00006 1 | 62624 0 | 24154 1 | 12625 0 |
| 00,2620 | 00006 1 | 12630 1 | 00006 1 | 26154 0 | 60130 0 | 22007 0 | 00006 1 | 10130 1 |
| 00,2630 | 54155 1 | 10136 1 | 00002 0 | 00002 0 | 00002 0 | 00006 1 | 40155 1 | 52155 1 |
| 00,2640 | 34714 1 | 00002 0 | 40154 0 | 60130 0 | 00006 1 | 12647 1 | 12570 0 | 34672 0 |
| 00,2650 | 54154 0 | 40131 0 | 60155 0 | 12624 1 | 44712 0 | 54137 0 | 54127 1 | 03010 0 |
| 00,2660 | 52131 0 | 07513 1 | 52131 0 | 10130 1 | 12721 0 | 12667 0 | 12715 1 | 56131 1 |
| 00,2670 | 56130 0 | 56155 0 | 56154 1 | 00006 1 | 12676 0 | 12405 0 | 56160 0 | 56157 1 |
| 00,2700 | 00006 1 | 12703 0 | 12405 0 | 56162 1 | 56161 1 | 00006 1 | 12710 1 | 12405 0 |
| 00,2710 | 10130 1 | 12721 0 | 12405 0 | 12715 1 | 12405 0 | 00006 1 | 40131 0 | 52131 0 |
| 00,2720 | 24127 0 | 00006 1 | 30131 1 | 52134 0 | 12732 1 | 00006 1 | 24137 1 | 00006 1 |
| 00,2730 | 30131 1 | 20131 0 | 30130 0 | 60000 1 | 54000 0 | 12725 1 | 02750 1 | 52160 1 |
| 00,2740 | 52155 1 | 52160 1 | 02750 1 | 52162 0 | 52155 1 | 52162 0 | 02750 1 | 17367 0 |
| 00,2750 | 30127 0 | 54136 1 | 10154 0 | 12767 1 | 12756 0 | 12763 0 | 10155 1 | 12767 1 |
| 00,2760 | 00002 0 | 12763 0 | 00002 0 | 00006 1 | 40155 1 | 52155 1 | 24136 0 | 44712 0 |
| 00,2770 | 54140 0 | 40154 0 | 60133 0 | 10000 0 | 13004 1 | 12777 0 | 12405 0 | 54140 0 |



OCTAL LISTING FOR PARAGRAPH J 022, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #1# (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|---------|---------|---------|---------|---------|---------|---------|------------|
| 00,3000 | 40155 1 | 60134 1 | 00006 1 | 62405 1 | 52155 1 | 50137 1 | 12565 1 | C' 32506 0 |
| 00,3010 | 56002 0 | 52155 1 | 07513 1 | 52155 1 | 52160 1 | 07513 1 | 52160 1 | 52162 0 |
| 00,3020 | 07513 1 | 52162 0 | 00000 1 | 03010 0 | 07501 1 | 34714 1 | 56121 0 | 54141 1 |
| 00,3030 | 03317 1 | 30141 0 | 56121 0 | 00006 1 | 13036 0 | 12405 0 | 00006 1 | 30155 0 |
| 00,3040 | 50120 1 | 52043 1 | 03343 0 | 10154 0 | 13051 1 | 54001 1 | 50120 1 | 52045 1 |
| 00,3050 | 12405 0 | 44333 1 | 60135 0 | 10000 0 | 40000 0 | 13133 1 | 13065 0 | 44720 1 |
| 00,3060 | 54135 1 | 30154 1 | 54001 1 | 34714 1 | 13112 1 | 10135 1 | 13074 0 | 42024 1 |
| 00,3070 | 54135 1 | 00006 1 | 30155 0 | 13112 1 | 40000 0 | 54135 1 | 40000 0 | 50000 1 |
| 00,3100 | 34675 1 | 54130 1 | 00006 1 | 70155 1 | 56130 0 | 00006 1 | 70154 0 | 56001 0 |
| 00,3110 | 60130 0 | 56001 0 | 50120 1 | 52045 1 | 44712 0 | 54140 0 | 52123 0 | 52155 1 |
| 00,3120 | 52131 0 | 03151 1 | 52125 0 | 52155 1 | 52160 1 | 03151 1 | 52127 1 | 52155 1 |
| 00,3130 | 52162 0 | 03151 1 | 17367 0 | 54135 1 | 34714 1 | 56123 1 | 56122 0 | 56125 1 |
| 00,3140 | 56124 0 | 56127 0 | 56126 1 | 40135 1 | 50000 1 | 34675 1 | 00006 1 | 70154 0 |
| 00,3150 | 13062 1 | 10154 0 | 13170 0 | 13155 1 | 13162 0 | 10155 1 | 13170 0 | 00002 0 |
| 00,3160 | 13162 0 | 00002 0 | 44714 0 | 54136 1 | 00006 1 | 40155 1 | 50135 0 | 12564 0 |
| 00,3170 | 54136 1 | 52155 1 | 50135 0 | 12564 0 | 03300 1 | 16030 0 | 10163 1 | 13226 0 |
| 00,3200 | 13226 0 | 03317 1 | 22163 0 | 00006 1 | 30155 0 | 50120 1 | 52043 1 | 03343 0 |
| 00,3210 | 10135 1 | 13213 0 | 16030 0 | 63730 0 | 00006 1 | 63221 0 | 22007 0 | 22116 1 |
| 00,3220 | 12303 1 | 50135 0 | 34674 0 | 54135 1 | 34714 1 | 12036 1 | 06672 1 | 16030 0 |
| 00,3230 | 16030 0 | 17637 0 | 44710 1 | 26166 1 | 00006 1 | 50000 1 | 30003 1 | 52160 1 |
| 00,3240 | 00006 1 | 50166 0 | 30001 0 | 52162 0 | 16470 0 | 03317 1 | 17301 0 | 00006 1 |
| 00,3250 | 30155 0 | 50166 0 | 52001 1 | 50163 0 | 36213 1 | 26166 1 | 10163 1 | 13272 1 |
| 00,3260 | 16030 0 | 00006 1 | 30160 0 | 50166 0 | 51775 0 | 00006 1 | 30162 1 | 50166 0 |
| 00,3270 | 51777 1 | 16030 0 | 30156 0 | 16523 1 | 50120 1 | 30052 0 | 54117 1 | 16621 0 |
| 00,3300 | 30155 0 | 00006 1 | 70000 0 | 54156 1 | 34714 1 | 56155 0 | 00006 1 | 70154 0 |
| 00,3310 | 20001 1 | 20156 1 | 56154 1 | 00006 1 | 70000 0 | 20155 1 | 00002 0 | 00006 1 |
| 00,3320 | 22137 1 | 03300 1 | 52160 1 | 52155 1 | 52131 0 | 30156 0 | 54132 0 | 03300 1 |
| 00,3330 | 52156 1 | 20132 0 | 60154 1 | 60130 0 | 54130 1 | 13337 1 | 54121 1 | 52162 0 |
| 00,3340 | 52155 1 | 03300 1 | 17154 1 | 34714 1 | 54135 1 | 10154 0 | 13404 0 | 13351 1 |
| 00,3350 | 13373 1 | 56156 0 | 56155 0 | 54154 0 | 34716 0 | 54135 1 | 10154 0 | 13404 0 |
| 00,3360 | 13362 1 | 13376 1 | 56155 0 | 54154 0 | 34716 0 | 26135 1 | 10154 0 | 13404 0 |
| 00,3370 | 00002 0 | 13376 1 | 13452 0 | 10000 0 | 13402 0 | 10155 1 | 34714 1 | 13452 0 |

OCAL LISTING FOR PARAGRAPH J 023, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" A DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED a/a (INTERPRETIVE OPERATOR WORDS) OR a/a (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|--------------|------------|------------|------------|------------|------------|
| 00,3400 | 13402 0 | 13452 0 | 05622 1 | C' 01302 1 | 62444 1 | 00006 1 | 63455 0 | 52155 1 |
| 00,3410 | 22021 1 | 00006 1 | 74675 0 | 52155 1 | 56021 1 | 26155 1 | 32314 0 | 00006 1 |
| 00,3420 | 70154 0 | 62566 0 | 54130 1 | 30154 1 | 22007 0 | 00006 1 | 10130 1 | 00006 1 |
| 00,3430 | 74675 0 | 26130 1 | 00006 1 | 74675 0 | 52155 1 | 00006 1 | 10130 1 | 54131 0 |
| 00,3440 | 34714 1 | 56001 0 | 00006 1 | 10130 1 | 54001 1 | 30131 1 | 20155 1 | 00006 1 |
| 00,3450 | 13454 0 | 34672 0 | 54154 0 | 54155 1 | 00002 0 | 64676 1 | 00006 1 | 63501 0 |
| 00,3460 | 52155 1 | 22021 1 | 00006 1 | 74675 0 | 52155 1 | 56021 1 | 26155 1 | 33007 0 |
| 00,3470 | 00006 1 | 70154 0 | 62270 0 | 13422 1 | 00006 1 | 30156 0 | 20156 1 | 60154 1 |
| 00,3500 | 26154 0 | 24135 0 | 00006 1 | 30156 0 | 20156 1 | 60154 1 | 26154 0 | 60000 1 |
| 00,3510 | 54022 0 | 10022 0 | 10022 0 | 13474 1 | 13416 0 | 13467 0 | 06672 1 | 13522 0 |
| 00,3520 | 13525 1 | 13525 1 | 00006 1 | 40155 1 | 52155 1 | 34676 1 | 26154 0 | 52155 1 |
| 00,3530 | 20001 1 | 54000 0 | 13535 0 | 00006 1 | 40001 1 | 52155 1 | 30154 1 | 60000 1 |
| 00,3540 | 54001 1 | 13552 1 | 50000 1 | 34674 0 | 60000 1 | 00006 1 | 60154 1 | 54154 0 |
| 00,3550 | 40155 1 | 54155 1 | 00006 1 | 30155 0 | 52134 0 | 03300 1 | 07171 1 | C' 00003 1 |
| 00,3560 | C' 14441 0 | C' 37325 1 | C' 53250 0 | C' 60764 1 | C' 12146 1 | C' 21276 1 | C' 75466 1 | C' 71471 0 |
| 00,3570 | C' 00236 0 | C' 32757 0 | 32470 0 | 07055 0 | 00006 1 | 30156 0 | 20156 1 | 60154 1 |
| 00,3600 | 26154 0 | 00006 1 | 30156 0 | 20156 1 | 60154 1 | 26154 0 | 16030 0 | 33630 1 |
| 00,3610 | 13612 0 | 33712 0 | 54136 1 | 06672 1 | 13624 0 | 13726 0 | 00006 1 | 40155 1 |
| 00,3620 | 52155 1 | 33731 1 | 56136 0 | 54137 0 | 44675 0 | 60154 1 | 10000 0 | 13720 0 |
| 00,3630 | 13706 1 | 13641 0 | 10155 1 | 34714 1 | 13636 0 | 13641 0 | 54155 1 | 54154 0 |
| 00,3640 | 00136 0 | 00006 1 | 40155 1 | 64675 1 | 52155 1 | 52134 0 | 03343 0 | 10135 1 |
| 00,3650 | 13713 0 | 52155 1 | 52134 0 | 52155 1 | 07171 1 | C' 00006 1 | C' 13240 0 | C' 23630 0 |
| 00,3660 | C' 74721 0 | C' 47775 1 | C' 02440 0 | C' 20237 0 | C' 75067 1 | C' 70742 1 | C' 03436 0 | C' 26756 1 |
| 00,3670 | C' 74637 0 | C' 57640 1 | C' 03046 0 | C' 07143 0 | C' 76654 1 | C' 42244 0 | 32470 0 | 07055 0 |
| 00,3700 | 00136 0 | 00006 1 | 40155 1 | 64675 1 | 52155 1 | 00137 1 | 00006 1 | 40155 1 |
| 00,3710 | 64676 1 | 52155 1 | 16030 0 | 50000 1 | 34675 1 | 54135 1 | 02073 1 | 13651 1 |
| 00,3720 | 00006 1 | 13636 0 | 05537 0 | C' 01301 1 | 34714 1 | 13636 0 | 34676 1 | 13637 1 |
| 00,3730 | C' 77763 0 | 13701 0 | 00004 0 | 54002 1 | 36214 0 | 54070 1 | 50000 1 | 31141 1 |
| 00,3740 | 00006 1 | 13746 0 | 10070 1 | 13735 1 | 05604 0 | C' 01104 0 | 33766 0 | 54061 1 |
| 00,3750 | 30004 0 | 60070 0 | 54001 1 | 33767 1 | 15146 0 | 04604 1 | 50070 0 | 55141 0 |
| 00,3760 | 05070 0 | 34714 1 | 50006 1 | 57141 1 | 05074 1 | 05213 1 | C' 03753 0 | C' 03761 1 |
| 00,3770 | C' 03770 1 | C' 03771 0 | OKSM 63734 1 | | | | | |

OCAL LISTING FOR PARAGRAPH J 024, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD; #A DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #A (INTERPRETIVE OPERATOR WORDS) OR #C (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 01,2000 | 00063 1 | 00010 0 | 00063 1 | 00024 1 | 00063 1 | 00043 0 | 00063 1 | 00107 1 |
| 01,2010 | 00242 0 | 00260 0 | 00338 1 | 00348 0 | C' 00170 1 | C' 74550 1 | C' 45711 1 | C' 10000 0 |
| 01,2020 | C' 02362 1 | C' 34066 0 | C' 19000 0 | C' 02074 0 | C' 56066 1 | C' 10000 0 | C' 02273 0 | C' 76066 0 |
| 01,2030 | C' 02605 0 | C' 75216 0 | C' 26063 0 | C' 05000 1 | C' 02570 1 | C' 26063 0 | C' 10000 0 | C' 02512 0 |
| 01,2040 | C' 70067 1 | C' 14000 1 | C' 02173 0 | C' 82065 0 | C' 10000 0 | C' 02377 0 | C' 56067 0 | C' 20000 0 |
| 01,2050 | C' 02404 0 | C' 34067 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 22000 1 | C' 02127 1 | C' 70063 0 |
| 01,2060 | C' 22000 1 | C' 02247 1 | C' 70063 0 | C' 22000 1 | C' 02026 1 | C' 70063 0 | C' 76347 0 | C' 75071 0 |
| 01,2070 | C' 27710 1 | C' 77777 0 | C' 75262 0 | C' 27710 1 | C' 30000 1 | C' 02461 0 | C' 50067 0 | C' 77777 0 |
| 01,2100 | C' 75262 0 | C' 27710 1 | C' 05664 0 | C' 75517 0 | C' 27711 0 | C' 77777 0 | C' 75262 0 | C' 27710 1 |
| 01,2110 | C' 04700 1 | C' 75256 1 | C' 27710 1 | C' 00050 1 | C' 75170 0 | C' 27711 0 | C' 00240 1 | C' 75142 1 |
| 01,2120 | C' 27711 0 | C' 00764 1 | C' 75240 0 | C' 27711 0 | C' 00372 1 | C' 74317 1 | C' 27711 0 | C' 00310 0 |
| 01,2130 | C' 74352 0 | C' 27710 1 | C' 16000 0 | C' 02000 0 | C' 86065 1 | C' 16000 0 | C' 03736 0 | C' 66065 1 |
| 01,2140 | C' 01672 0 | C' 75413 0 | C' 50067 0 | C' 12000 1 | C' 02113 0 | C' 50067 0 | C' 24000 1 | C' 02000 0 |
| 01,2150 | C' 32060 0 | C' 00372 1 | C' 75055 0 | C' 27711 0 | C' 13000 0 | C' 02524 0 | C' 30065 1 | C' 04064 1 |
| 01,2160 | C' 75403 1 | C' 23711 1 | C' 12000 1 | C' 02155 1 | C' 50066 1 | C' 00764 1 | C' 75275 0 | C' 27710 1 |
| 01,2170 | C' 17000 1 | C' 02511 0 | C' 54066 0 | C' 76003 0 | C' 75213 0 | C' 23711 1 | C' 13000 0 | C' 02602 1 |
| 01,2200 | C' 54066 0 | C' 17000 1 | C' 03008 1 | C' 52066 0 | C' 77777 0 | C' 75463 1 | C' 07711 1 | C' 77777 0 |
| 01,2210 | C' 74336 1 | C' 27710 1 | C' 13000 0 | C' 02456 1 | C' 54067 1 | C' 76105 1 | C' 75352 1 | C' 27710 1 |
| 01,2220 | C' 77777 0 | C' 75225 0 | C' 27711 0 | C' 77777 0 | C' 75063 0 | C' 27711 0 | C' 00012 1 | C' 75256 1 |
| 01,2230 | C' 27710 1 | C' 77777 0 | C' 74420 1 | C' 27711 0 | C' 00372 1 | C' 74403 0 | C' 27711 0 | C' 77777 0 |
| 01,2240 | C' 74366 1 | C' 27711 0 | C' 77777 0 | C' 74324 1 | C' 27711 0 | C' 77777 0 | C' 75240 0 | C' 27711 0 |
| 01,2250 | C' 32000 0 | C' 03141 0 | C' 76067 1 | C' 00310 0 | C' 74567 0 | C' 01711 1 | C' 20000 0 | C' 03007 0 |
| 01,2260 | C' 76067 1 | C' 00310 0 | C' 74567 0 | C' 01711 1 | C' 00310 0 | C' 74567 0 | C' 01711 1 | C' 77777 0 |
| 01,2270 | C' 75123 0 | C' 01711 1 | C' 29000 0 | C' 02456 1 | C' 86065 1 | C' 77777 0 | C' 75174 1 | C' 11712 0 |
| 01,2300 | C' 20000 0 | C' 02527 0 | C' 86065 1 | C' 20000 0 | C' 03317 1 | C' 86065 1 | C' 20000 0 | C' 05112 0 |
| 01,2310 | C' 04065 0 | C' 20000 0 | C' 02637 1 | C' 86065 1 | C' 77777 0 | C' 75151 0 | C' 11712 0 | C' 20000 0 |
| 01,2320 | C' 03330 1 | C' 86065 1 | C' 20000 0 | C' 03276 1 | C' 86065 1 | C' 77777 0 | C' 75167 0 | C' 01710 0 |
| 01,2330 | C' 20000 0 | C' 03353 1 | C' 86065 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 77777 0 | C' 75041 0 |
| 01,2340 | C' 01711 1 | C' 77777 0 | C' 75173 0 | C' 01710 0 | C' 77777 0 | C' 75737 0 | C' 37711 1 | C' 00144 0 |
| 01,2350 | C' 74605 1 | C' 27710 1 | C' 00144 0 | C' 74605 1 | C' 27710 1 | C' 30000 1 | C' 03564 0 | C' 56063 1 |
| 01,2360 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 76052 1 | C' 75323 1 | C' 45711 1 | C' 00000 1 | C' 00000 1 |
| 01,2370 | C' 00000 1 | 02466 1 | 30117 0 | 50130 0 | 54046 1 | 16030 0 | 02466 1 | 40117 1 |

OUTPUT LISTING FOR PARAGRAPH J 025, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED A/A (INTERPRETIVE OPERATOR WORDS) OR A/C (CONSTANTS)

| | | | | | | | | |
|---------|---------|---------|------------|------------|------------|---------|---------|------------|
| 01,2400 | 02373 1 | 02454 0 | 50117 0 | 30000 1 | 12373 0 | 02454 0 | 50117 0 | 40000 0 |
| 01,2410 | 12373 0 | 02454 0 | 50130 0 | 30048 0 | 50117 0 | 54000 0 | 18030 0 | 02454 0 |
| 01,2420 | 50117 0 | 30000 1 | 50130 0 | 56048 0 | 12414 0 | 02454 0 | 50117 0 | 30000 1 |
| 01,2430 | 50130 0 | 26046 1 | 16030 0 | 02466 1 | 30117 0 | 12430 0 | 02454 0 | 50117 0 |
| 01,2440 | 40000 0 | 12430 0 | 02466 1 | 50130 0 | 40050 0 | 50130 0 | 60046 0 | 00006 1 |
| 01,2450 | 66030 1 | 50130 0 | 56046 0 | 16615 1 | 40117 1 | 64727 1 | 10000 0 | 30120 1 |
| 01,2460 | 12465 0 | 34744 1 | 56117 0 | 54003 0 | 74373 0 | 26117 1 | 30120 1 | 54130 1 |
| 01,2470 | 10020 1 | 24130 0 | 00002 0 | 00002 0 | 10020 1 | 30117 0 | 04560 0 | 10154 0 |
| 01,2500 | 16030 0 | 16615 1 | 16030 0 | 16615 1 | 10121 1 | 12507 0 | 16030 0 | 54121 1 |
| 01,2510 | 10020 1 | 12475 1 | C' 00360 1 | 16615 1 | 10020 1 | 06672 1 | 16030 0 | 16615 1 |
| 01,2520 | 16030 0 | 10020 1 | 12530 1 | C' 12000 1 | 06672 1 | 16030 0 | 16030 0 | 16615 1 |
| 01,2530 | 06672 1 | 16615 1 | 16615 1 | 16030 0 | 10020 1 | 16607 1 | 05640 0 | 02454 0 |
| 01,2540 | 50120 1 | 30052 0 | 12414 0 | 34721 1 | 70117 1 | 50000 1 | 34674 0 | 54131 0 |
| 01,2550 | 34704 0 | 00006 1 | 70117 1 | 54130 1 | 00004 0 | 50000 1 | 30074 1 | 54002 1 |
| 01,2560 | 34700 1 | 00006 1 | 70117 1 | 72623 0 | 50000 1 | 12566 1 | 30131 1 | 00006 1 |
| 01,2570 | 04002 1 | 12600 1 | 30131 1 | 00006 1 | 06002 0 | 12600 1 | 40131 0 | 70002 1 |
| 01,2600 | 50130 0 | 54074 0 | 00003 1 | 34676 1 | 00006 1 | 70117 1 | 72623 0 | 50000 1 |
| 01,2610 | 12611 1 | 40002 1 | 70131 0 | 10000 0 | 12624 1 | 16664 1 | 12624 1 | 05640 0 |
| 01,2620 | 05640 0 | 30002 0 | 12612 1 | C' 00014 1 | 24164 1 | 16030 0 | 54061 1 | 10400 1 |
| 01,2630 | 12643 0 | 10454 0 | 12643 0 | 10530 0 | 12643 0 | 10604 1 | 12643 0 | 10660 0 |
| 01,2640 | 12643 0 | 05604 0 | C' 01201 0 | 64711 1 | 22007 0 | 50000 1 | 21777 0 | 26063 0 |
| 01,2650 | 34714 1 | 54064 1 | 32657 1 | 54062 1 | 50064 0 | 10167 0 | 12717 0 | C' 00006 1 |
| 01,2660 | 12717 0 | 30063 1 | 50064 0 | 54167 0 | 74741 0 | 50064 0 | 54166 1 | 10064 1 |
| 01,2670 | 12704 1 | 54121 1 | 30166 0 | 54120 0 | 10067 1 | 12704 1 | 05640 0 | 05640 0 |
| 01,2700 | 54067 1 | 52066 0 | 52165 1 | 15115 0 | 52066 0 | 50064 0 | 52165 1 | 50067 0 |
| 01,2710 | 40167 0 | 80063 1 | 00006 1 | 65115 1 | C' 30064 0 | 54067 1 | 15115 0 | 33054 0 |
| 01,2720 | 26064 1 | 10062 1 | 12653 1 | 05604 0 | 01202 0 | 22164 1 | 30165 0 | 00004 0 |
| 01,2730 | 00006 1 | 04007 1 | 56001 0 | 50067 0 | 52165 1 | 52165 1 | 30165 0 | 00006 1 |
| 01,2740 | 01007 1 | 52155 1 | 50067 0 | 52155 1 | 52155 1 | 52157 0 | 50067 0 | 52157 0 |
| 01,2750 | 52157 0 | 52161 0 | 50067 0 | 52161 0 | 52161 0 | 52163 1 | 50067 0 | 52163 1 |
| 01,2760 | 52163 1 | 34714 1 | 56121 0 | 00006 1 | 12767 1 | 40166 1 | 54166 1 | 52167 0 |
| 01,2770 | 50067 0 | 52167 0 | 52167 0 | 34741 1 | 70167 0 | 54120 0 | 10166 1 | 34714 1 |

OCAL LISTING FOR PARAGRAPH J 026, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED *ai* (INTERPRETIVE OPERATOR WORDS) OR *ac* (CONSTANTS)

| | | | | | | | | |
|---------|---------|------------|---------|------------|------------|------------|------------|------------|
| 01,3000 | 13008 0 | 40166 1 | 54166 1 | 34712 1 | 56121 0 | 54067 1 | 00003 1 | 52165 1 |
| 01,3010 | 0000E 1 | 63013 0 | 52006 0 | 40000 0 | 64712 1 | 54164 0 | 16017 0 | 00004 0 |
| 01,3020 | 40167 0 | 54167 0 | 36043 0 | 70006 0 | 00006 1 | 04007 1 | 54165 1 | 44714 0 |
| 01,3030 | 54131 0 | 13141 1 | 00034 0 | 10067 1 | 13037 1 | 00003 1 | 13233 1 | 34711 1 |
| 01,3040 | 0000E 1 | 05011 1 | 52165 1 | 12733 0 | 54061 1 | 34714 1 | 54064 1 | 32657 1 |
| 01,3050 | 54062 1 | 50064 0 | 10167 0 | 13056 0 | C' 00014 1 | 13065 0 | 33054 0 | 26064 1 |
| 01,3060 | 10062 1 | 13050 0 | 44712 0 | 54064 1 | 15115 0 | 40065 0 | 50064 0 | 60164 1 |
| 01,3070 | 0000E 1 | 13073 1 | 13056 0 | 50064 0 | 40167 0 | 54063 0 | 50064 0 | 54167 0 |
| 01,3100 | 44384 0 | 70065 0 | 64700 1 | 56065 1 | 74364 0 | 50064 0 | 60165 0 | 54066 0 |
| 01,3110 | 10064 1 | 12704 1 | 12674 1 | 54164 0 | 34714 1 | 54130 1 | 34741 1 | 70167 0 |
| 01,3120 | 60063 1 | 54167 0 | 40000 0 | 13030 0 | 00004 0 | 44714 0 | 54131 0 | 56167 1 |
| 01,3130 | 14741 0 | 54001 1 | 45121 1 | 60001 0 | 00006 1 | 63141 0 | 10001 1 | 50000 1 |
| 01,3140 | 54000 0 | 10203 1 | 03206 0 | 05640 0 | 13145 0 | 10217 1 | 03206 0 | 05640 0 |
| 01,3150 | 13151 0 | 10233 1 | 03206 0 | C' 67610 1 | 13155 1 | 10247 1 | 03206 0 | 05640 0 |
| 01,3160 | 13161 0 | 10263 1 | 03206 0 | 05640 0 | 13165 1 | 10277 1 | 03206 0 | 05640 0 |
| 01,3170 | 13171 1 | 10131 0 | 05640 0 | 05640 0 | 13176 0 | 13223 0 | 10130 1 | 13201 0 |
| 01,3200 | 13005 0 | 50000 1 | 27777 0 | 63153 0 | 54067 1 | 12725 1 | 54132 0 | 60131 1 |
| 01,3210 | 10000 0 | 40132 0 | 13216 0 | 13214 1 | 50002 0 | 00002 0 | 54131 0 | 00006 1 |
| 01,3220 | 22130 0 | 50130 0 | 00002 0 | 44714 0 | 54067 1 | 00003 1 | 44711 0 | 00006 1 |
| 01,3230 | 03011 1 | 10067 1 | 13032 1 | 34711 1 | 13242 1 | 31361 1 | 54001 1 | 33241 0 |
| 01,3240 | 15123 0 | C' 66102 1 | 00006 1 | 05011 1 | 52165 1 | 15122 1 | 54062 1 | 40026 1 |
| 01,3250 | 64703 1 | 10000 0 | 66056 1 | 40000 0 | 63402 1 | 60002 0 | 10000 0 | 61400 1 |
| 01,3260 | 13322 0 | 13262 0 | 40002 1 | 64675 1 | 64675 1 | 56026 0 | 64674 0 | 60002 0 |
| 01,3270 | 0000E 1 | 22007 0 | 57400 1 | 57401 0 | 57402 0 | 57403 1 | 57404 0 | 57405 1 |
| 01,3300 | 57405 1 | 57407 0 | 30063 1 | 50002 0 | 13305 0 | 53411 0 | 53413 1 | 53415 1 |
| 01,3310 | 53417 0 | 53421 0 | 53423 1 | 53425 1 | 53427 0 | 53431 1 | 65173 1 | 00006 1 |
| 01,3320 | 15152 0 | 13375 1 | 10000 0 | 61401 0 | 13330 0 | 64712 1 | 03403 0 | C' 00001 0 |
| 01,3330 | 10000 0 | 61402 0 | 13336 0 | 64712 1 | 03403 0 | C' 00002 0 | 10000 0 | 61403 1 |
| 01,3340 | 13344 0 | 64712 1 | 03403 0 | C' 00003 1 | 10000 0 | 61404 0 | 13352 1 | 64712 1 |
| 01,3350 | 03403 0 | C' 00004 0 | 10000 0 | 61405 1 | 13360 0 | 64712 1 | 03403 0 | C' 00005 1 |
| 01,3360 | 10000 0 | 61406 1 | 13366 0 | 64712 1 | 03403 0 | C' 00006 1 | 10000 0 | 61407 0 |
| 01,3370 | 13374 0 | 64712 1 | 03403 0 | C' 00007 0 | 10000 0 | 05604 0 | C' 01203 1 | 64712 1 |



OCTAL LISTING FOR PARAGRAPH J 027, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED A/A (INTERPRETIVE OPERATOR WORDS) OR A/C (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 01,3400 | 03403 0 | C' 00010 0 | C' 40201 0 | 54084 1 | 50002 0 | 30000 1 | 54002 1 | 34712 1 |
| 01,3410 | 60084 0 | 50002 0 | 27377 1 | 40084 1 | 50002 0 | 13272 1 | 00006 1 | 04007 1 |
| 01,3420 | 54016 1 | 00006 1 | 22012 1 | 34873 1 | 57407 0 | 57406 1 | 57405 1 | 57404 0 |
| 01,3430 | 57403 1 | 57402 0 | 57401 0 | 57400 1 | 64672 0 | 28028 1 | 54734 0 | 44714 0 |
| 01,3440 | 54734 0 | 00006 1 | 45174 1 | 53431 1 | 53427 0 | 53425 1 | 53423 1 | 53421 0 |
| 01,3450 | 53417 0 | 53415 1 | 53413 1 | 53411 0 | 56001 0 | 00006 1 | 01007 1 | 56001 0 |
| 01,3460 | 52006 0 | 23435 1 | 34711 1 | 26002 1 | 55434 1 | 00006 1 | 43477 1 | 21140 1 |
| 01,3470 | 11140 1 | 13510 1 | 13473 0 | 13474 1 | 11137 1 | 13510 1 | C' 00000 1 | C' 20000 0 |
| 01,3500 | 34675 1 | 27140 1 | 05140 1 | C' 03515 0 | C' 02063 0 | 33517 1 | 53435 0 | 52006 0 |
| 01,3510 | 34675 1 | 05140 1 | C' 03465 0 | C' 02063 0 | 13505 0 | 53134 1 | 52006 0 | C' 05213 1 |
| 01,3520 | 30161 1 | 60000 1 | 54155 1 | 33762 1 | 54157 0 | 33557 0 | 54707 0 | 30154 1 |
| 01,3530 | 74744 0 | 10000 0 | 13543 1 | 10154 0 | 10000 0 | 13643 1 | 34761 0 | 05042 1 |
| 01,3540 | C' 03185 0 | C' 20103 1 | 03557 0 | 74744 0 | 10000 0 | 13614 0 | 00006 1 | 50155 0 |
| 01,3550 | 31437 0 | 52706 1 | 30154 1 | 74716 1 | 87715 0 | 10000 0 | 13726 0 | 04570 1 |
| 01,3560 | 13562 1 | 13627 0 | 33766 0 | 54704 0 | 50155 0 | 31054 1 | 10000 0 | 24000 1 |
| 01,3570 | 13573 1 | 15367 1 | 13612 0 | 40000 0 | 54001 1 | 50155 0 | 41053 1 | 00006 1 |
| 01,3600 | 60025 0 | 10000 0 | 40000 0 | 87700 1 | 64712 1 | 60001 0 | 10000 0 | 34714 1 |
| 01,3610 | 13612 0 | 13612 0 | 64712 1 | 00704 1 | 33557 0 | 54157 0 | 33763 0 | 54707 0 |
| 01,3620 | 30154 1 | 76043 1 | 54154 0 | 00006 1 | 50155 0 | 31437 0 | 52706 1 | 50155 0 |
| 01,3630 | 31054 1 | 54704 0 | 00006 1 | 83637 0 | 33765 0 | 56704 1 | 00704 1 | 33767 1 |
| 01,3640 | 56704 1 | 40000 0 | 00704 1 | 54020 1 | 10020 1 | 13646 1 | 13744 1 | 33557 0 |
| 01,3650 | 54707 0 | 30154 1 | 54021 0 | 60021 1 | 50155 0 | 62001 1 | 54156 1 | 00006 1 |
| 01,3660 | 50156 0 | 32002 1 | 22706 0 | 10000 0 | 24000 1 | 13740 0 | 24000 1 | 54705 1 |
| 01,3670 | 33766 0 | 54704 0 | 30706 0 | 74701 1 | 10000 0 | 13733 1 | 50156 0 | 32000 0 |
| 01,3700 | 15376 1 | 53140 1 | 00006 1 | 40025 1 | 21140 1 | 00006 1 | 31136 1 | 21140 1 |
| 01,3710 | 11137 1 | 13721 1 | 13714 1 | 13607 1 | 11140 1 | 13721 1 | 13717 1 | 13607 1 |
| 01,3720 | 13612 0 | 33764 1 | 54704 0 | 00006 1 | 31140 0 | 00704 1 | 33766 0 | 54704 0 |
| 01,3730 | 50155 0 | 41054 0 | 15376 1 | 40706 1 | 54706 1 | 50156 0 | 32000 0 | 13566 0 |
| 01,3740 | 56705 0 | 50156 0 | 32000 0 | 13631 1 | 30157 1 | 54707 0 | 50155 0 | 32000 0 |
| 01,3750 | 60154 1 | 60154 1 | 60154 1 | 54156 1 | 13657 1 | 36214 0 | 26156 1 | 33557 0 |
| 01,3760 | 54707 0 | 13657 1 | C' 03755 0 | C' 03533 1 | C' 05231 1 | C' 05042 1 | C' 05140 1 | C' 05027 1 |
| 01,3770 | C' 03770 1 | C' 03771 0 | C' 74057 0 | " | " | " | " | " |

OCAL LISTING FOR PARAGRAPH J 040, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #I# (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 04,2000 | 02315 1 | 32007 1 | 04555 0 | C' 20624 0 | 12001 0 | 12001 0 | 12001 0 | C' 11343 0 |
| 04,2010 | 54775 0 | 34371 0 | 54366 0 | 31320 1 | 74705 0 | 10000 0 | 12070 0 | 34678 1 |
| 04,2020 | 00006 1 | 02011 0 | 10000 0 | 12030 1 | 40102 0 | 74105 0 | 00006 1 | 62061 1 |
| 04,2030 | 00004 0 | 34752 0 | 54003 0 | 31474 1 | 55662 0 | 04633 0 | C' 50737 1 | 04633 0 |
| 04,2040 | C' 13207 0 | 32402 0 | 04633 0 | C' 42011 1 | 04633 0 | C' 51003 0 | 34714 1 | 54775 0 |
| 04,2050 | 00003 1 | 34715 0 | 04555 0 | C' 01732 0 | 34714 1 | 00008 1 | 01005 0 | 00008 1 |
| 04,2060 | 01008 0 | 30775 1 | 00008 1 | 12112 0 | 40076 1 | 74712 0 | 10000 0 | 12075 0 |
| 04,2070 | 05537 0 | C' 01520 1 | 04473 0 | 04574 0 | C' 21176 1 | 32475 0 | 54155 1 | 50155 0 |
| 04,2100 | 32440 0 | 76043 1 | 40000 0 | 60775 1 | 10000 0 | 10155 1 | 12076 0 | 12257 1 |
| 04,2110 | 30155 0 | 54774 1 | 40103 1 | 74705 0 | 10000 0 | 12123 1 | 00004 0 | 44712 0 |
| 04,2120 | 70075 1 | 54075 1 | 15112 1 | 32377 0 | 54374 0 | 05301 0 | C' 00014 1 | 06008 1 |
| 04,2130 | I' 77624 1 | C' 27371 1 | I' 77776 1 | 02315 1 | 05447 0 | C' 00020 0 | 04555 0 | C' 57750 1 |
| 04,2140 | 05447 0 | C' 00215 1 | 05447 0 | C' 00037 0 | 10775 0 | 12245 1 | 04473 0 | 34754 0 |
| 04,2150 | 55058 1 | 00004 0 | 44712 0 | 70076 1 | 54076 1 | 34715 0 | 54001 1 | 40000 0 |
| 04,2160 | 52755 1 | 42374 1 | 70074 0 | 54074 0 | 34714 1 | 54332 1 | 42375 0 | 55071 1 |
| 04,2170 | 70075 1 | 54075 1 | 04633 0 | C' 12506 1 | 10775 0 | 12204 1 | 04633 0 | C' 12500 1 |
| 04,2200 | 30775 1 | 55011 1 | 04574 0 | C' 12641 1 | 40775 0 | 64112 1 | 00008 1 | 12211 0 |
| 04,2210 | 12221 0 | 40775 0 | 61011 0 | 00008 1 | 12225 1 | 30074 1 | 74704 1 | 10000 0 |
| 04,2220 | 12236 0 | 34704 0 | 70074 0 | 10000 0 | 12233 0 | 00008 1 | 34714 1 | 52753 1 |
| 04,2230 | 00006 1 | 34714 1 | 52755 1 | 32376 1 | 54374 0 | 12202 1 | 40075 1 | 74732 1 |
| 04,2240 | 26075 1 | 00006 1 | 34714 1 | 52761 0 | 12200 0 | 34704 0 | 70074 0 | 10000 0 |
| 04,2250 | 12253 0 | 05447 0 | C' 00007 0 | 50774 0 | 32476 0 | 00004 0 | 12165 0 | 04400 1 |
| 04,2260 | 12072 1 | 00004 0 | 50774 0 | 32440 0 | 55060 1 | 54020 1 | 30020 0 | 77674 1 |
| 04,2270 | 55062 0 | 54063 0 | 31060 0 | 00008 1 | 74703 0 | 74716 1 | 54001 1 | 50774 0 |
| 04,2300 | 32403 1 | 55061 0 | 74364 0 | 26001 1 | 31061 1 | 74747 0 | 64700 1 | 05053 1 |
| 04,2310 | 31060 0 | 76043 1 | 05246 1 | 04473 0 | 05112 0 | 00008 1 | 22155 0 | 34752 0 |
| 04,2320 | 54003 0 | 00004 0 | 04555 0 | C' 45245 0 | 30105 0 | 74677 1 | 10000 0 | 12333 1 |
| 04,2330 | 04555 0 | C' 50213 1 | 12335 1 | 04555 0 | C' 50227 0 | 34717 1 | 54154 0 | 50154 1 |
| 04,2340 | 42358 1 | 50154 1 | 70074 0 | 50154 1 | 54074 0 | 10154 0 | 12336 1 | 00003 1 |
| 04,2350 | 05435 0 | C' 00044 1 | 05425 1 | 37716 0 | 55303 1 | 00155 0 | C' 00000 1 | C' 00040 0 |
| 04,2360 | C' 02000 0 | C' 00000 1 | C' 00000 1 | C' 04140 0 | C' 10000 0 | C' 16020 1 | C' 00000 1 | C' 42000 1 |
| 04,2370 | C' 00000 1 | C' 00000 1 | C' 03143 1 | C' 12066 1 | C' 00300 1 | C' 01120 0 | C' 10264 0 | C' 10132 0 |



CODAL LISTING FOR PARAGRAPH J 041, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED A1A (INTERPRETIVE OPERATOR WORDS) OR A0A (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 04,2400 | C' 02106 1 | C' 42066 1 | C' 37312 0 | C' 11334 0 | C' 11106 0 | C' 13433 1 | C' 26034 0 | C' 72157 1 |
| 04,2410 | C' 12002 0 | C' 54320 1 | C' 54211 1 | C' 32000 0 | C' 31054 1 | C' 32000 0 | C' 31054 1 | C' 80410 1 |
| 04,2420 | C' e0235 0 | C' 50002 0 | C' 11327 1 | C' 11103 0 | C' 14502 0 | C' 72153 0 | C' 72000 1 | C' 73620 1 |
| 04,2430 | C' 73604 1 | C' e2021 0 | C' 30000 1 | C' 76001 1 | C' 76207 0 | C' 73431 0 | C' 55655 1 | C' 66001 0 |
| 04,2440 | C' 27117 0 | C' 27116 1 | C' 27115 1 | C' 27114 0 | C' 27113 1 | C' 27112 0 | C' 27476 1 | C' 37475 1 |
| 04,2450 | C' 27266 0 | C' 27265 0 | C' 27264 1 | C' 27263 0 | C' 17657 0 | C' 17451 1 | C' 17450 0 | C' 17047 1 |
| 04,2460 | C' 27046 0 | C' 27045 0 | C' 27043 0 | C' 27042 1 | C' 27637 0 | C' 27634 1 | C' 27227 0 | C' 27226 1 |
| 04,2470 | C' 7125 0 | C' 27424 0 | C' no21 1 | C' 27006 1 | C' 41201 1 | C' 00034 0 | C' 00002 0 | C' 00002 0 |
| 04,2500 | C' 00002 0 | C' 00002 0 | C' 00002 0 | C' 00002 0 | C' 00001 0 | C' 00003 1 | C' 00000 1 | C' 00000 1 |
| 04,2510 | C' 00000 1 | C' 00000 1 | C' 00003 1 | C' 00003 1 | C' 00003 1 | C' 00000 0 | C' 00002 0 | C' 00002 0 |
| 04,2520 | C' 00002 0 | C' 00002 0 | C' 00002 0 | C' 00002 0 | C' 00002 0 | C' 00004 0 | C' 00002 0 | C' 00002 0 |
| 04,2530 | C' 00002 0 | C' 00000 1 | C' 00000 1 | C' 00465 0 | C' 32324 0 | C' 00333 1 | C' 01733 1 | 56002 0 |
| 04,2540 | 54154 0 | 00004 0 | 34371 0 | 05027 1 | C' 03435 0 | C' 60101 1 | 00003 1 | 00154 1 |
| 04,2550 | 54001 1 | 04234 0 | 04240 0 | 04410 0 | 30001 0 | 55043 0 | 05070 0 | 52134 0 |
| 04,2560 | 52365 0 | 24364 0 | 30006 1 | 74747 0 | 26365 0 | 50364 0 | 27777 0 | 04561 1 |
| 04,2570 | 0174 0 | 02573 1 | 24384 0 | 24364 0 | 52365 0 | 52006 0 | 22164 1 | 50001 0 |
| 04,2600 | 30001 0 | 24001 0 | 24001 0 | 52365 0 | 06006 1 | I' 17624 1 | C' 00364 0 | I' 77770 1 |
| 04,2610 | 22365 1 | 16010 1 | 05074 1 | 44700 0 | 50064 0 | 28164 0 | 00072 1 | I' 62545 1 |
| 04,2620 | C' 02403 1 | C' 15047 0 | C' 02401 0 | I' 77434 1 | C' 45543 1 | 56154 1 | 55045 0 | 04555 0 |
| 04,2630 | C' 20607 1 | 32650 0 | 04555 0 | C' 20624 0 | 02838 0 | 02637 1 | 02631 1 | 06008 1 |
| 04,2640 | I' 47135 0 | C' 01046 1 | C' 45510 1 | C' 02401 0 | I' 60535 1 | C' 01047 0 | C' 02403 1 | I' 77616 0 |
| 04,2650 | C' 01451 0 | C' 20000 0 | C' 00000 1 | I' 43014 0 | C' 01312 0 | C' 10673 1 | C' 02747 1 | C' 10676 1 |
| 04,2660 | I' 53575 0 | I' 72441 0 | C' 01744 1 | I' 51136 1 | C' 10870 1 | I' 43215 0 | C' 10852 1 | C' 10652 1 |
| 04,2670 | C' 03626 0 | I' 43414 1 | C' 02675 1 | I' 77614 1 | C' 02747 1 | C' 10660 0 | I' 53575 0 | C' 03570 0 |
| 04,2700 | I' 77676 0 | C' 00023 0 | I' 53435 0 | C' 03576 0 | C' 00015 0 | I' 53435 0 | C' 00023 0 | C' 24007 0 |
| 04,2710 | C' 00001 0 | I' 76521 0 | C' 00007 0 | C' 03405 0 | I' 43414 1 | C' 02475 0 | I' 77180 0 | C' 00002 0 |
| 04,2720 | C' 00000 1 | I' 77614 1 | C' 04343 1 | C' 10727 1 | I' 77160 0 | C' 00012 1 | C' 00002 0 | I' 06143 1 |
| 04,2730 | C' 11635 1 | C' 03745 1 | C' 23752 0 | C' 11627 1 | I' 54214 1 | C' 04343 1 | C' 10740 0 | C' 20807 1 |
| 04,2740 | C' 03750 0 | I' 43134 0 | C' 03746 1 | C' 01271 1 | I' 77650 1 | C' 13005 0 | 22007 0 | 34714 1 |
| 04,2750 | 53052 0 | 33101 1 | 04555 0 | C' 20465 1 | C' 15423 0 | 12757 1 | 12751 1 | 53052 0 |
| 04,2760 | 00006 1 | 13070 1 | 52155 1 | 06006 1 | I' 77634 0 | C' 45713 0 | C' 34041 0 | C' 27036 1 |
| 04,2770 | I' e3375 0 | C' 00007 0 | C' 00001 0 | C' 02327 0 | I' 63256 0 | I' 53435 0 | I' 77626 0 | C' 61442 1 |



OCTAL LISTING FOR PARAGRAPH J 042, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #1# (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 04,3000 | C' 00015 0 | C' 34041 0 | C' 27022 1 | I' 03375 0 | C' 00007 0 | C' 00001 0 | I' 77725 1 | C' 00015 0 |
| 04,3010 | C' 24037 0 | I' 41406 0 | I' 03245 1 | C' 02327 0 | I' 72441 0 | C' 02335 0 | C' 20321 0 | C' 00001 0 |
| 04,3020 | I' 72441 0 | C' 02335 0 | C' 26323 1 | C' 00007 0 | I' 41456 0 | I' 47235 0 | C' 00001 0 | C' 00023 0 |
| 04,3030 | I' 53552 0 | I' 77656 1 | C' 24001 0 | C' 00023 0 | I' 74241 0 | C' 00015 0 | I' 77752 1 | I' 53445 1 |
| 04,3040 | I' 77656 1 | I' 50206 0 | C' 00001 0 | I' 05552 0 | C' 26325 1 | I' 50235 0 | C' 00001 0 | I' 71244 0 |
| 04,3050 | C' 11055 1 | C' 11467 1 | I' 77625 0 | C' 02325 1 | C' 02325 1 | I' 47145 1 | C' 00037 0 | C' 45541 0 |
| 04,3060 | C' 01052 1 | I' 77776 1 | 33102 1 | 04555 0 | C' 20465 1 | 15423 0 | 15423 0 | 12751 1 |
| 04,3070 | 56001 0 | 00006 1 | 13075 1 | 56001 0 | 12762 1 | 06006 1 | I' 52034 1 | C' 45505 0 |
| 04,3100 | C' 10766 1 | C' 01420 0 | C' 01532 1 | 04555 0 | C' 73726 0 | 03110 1 | 04555 0 | C' 73741 1 |
| 04,3110 | 04555 0 | C' 73746 0 | 33440 1 | 03427 0 | 33441 0 | 04555 0 | C' 20763 1 | 14106 0 |
| 04,3120 | 13125 0 | 13114 1 | 36214 0 | 05415 1 | 15112 1 | 34715 0 | 55131 1 | 34712 1 |
| 04,3130 | 55132 1 | 33442 0 | 04555 0 | C' 20763 1 | 14106 0 | 13142 1 | 13131 0 | 34710 0 |
| 04,3140 | 05415 1 | 15112 1 | 06006 1 | I' 70535 0 | C' 01133 1 | I' 71230 0 | C' 11154 1 | C' 03656 1 |
| 04,3150 | C' 02611 0 | I' 77614 1 | C' 01230 1 | C' 11203 0 | I' 43014 0 | C' 01070 1 | C' 00670 0 | I' 77624 1 |
| 04,3160 | C' 11362 0 | I' 43214 1 | C' 00470 1 | C' 03413 1 | C' 03656 1 | C' 01046 1 | I' 77776 1 | 33443 1 |
| 04,3170 | 04555 0 | C' 20763 1 | 14106 0 | 13200 1 | 13167 0 | 36211 0 | 05415 1 | 15112 1 |
| 04,3200 | 33444 0 | 03427 0 | 06006 1 | I' 45014 0 | C' 04266 1 | C' 10716 0 | I' 77624 1 | C' 11362 0 |
| 04,3210 | I' 71214 0 | C' 01350 0 | C' 11232 1 | C' 03656 1 | C' 34041 0 | C' 11413 1 | I' 53575 0 | C' 00001 0 |
| 04,3220 | I' 47315 0 | C' 00007 0 | I' 60246 1 | C' 00047 1 | I' 56325 0 | C' 02611 0 | I' 77657 0 | C' 20172 1 |
| 04,3230 | C' 36613 0 | C' 11236 0 | I' 43345 1 | C' 02611 0 | C' 00037 0 | C' 03656 1 | I' 45345 1 | C' 03656 1 |
| 04,3240 | C' 02613 1 | C' 02615 1 | C' 34041 0 | C' 11413 1 | I' 77745 1 | C' 03413 1 | C' 03503 1 | I' 77331 0 |
| 04,3250 | C' 02371 0 | C' 11255 0 | C' 00001 0 | I' 77624 1 | C' 72547 1 | I' 43014 0 | C' 04346 1 | C' 11266 0 |
| 04,3260 | C' 01311 0 | C' 11264 1 | I' 77614 1 | C' 00470 1 | I' 77776 1 | 03313 0 | I' 51575 1 | C' 03646 0 |
| 04,3270 | C' 26635 0 | C' 03640 0 | I' 51451 0 | C' 03620 0 | C' 26637 1 | C' 03540 0 | I' 45115 0 | C' 03612 1 |
| 04,3300 | C' 45312 0 | I' 77624 1 | C' 45422 1 | C' 02641 0 | I' 43014 0 | C' 01311 0 | C' 11310 0 | C' 00470 1 |
| 04,3310 | I' 77776 1 | 33445 1 | 03427 0 | 33446 1 | 03427 0 | 06006 1 | I' 77214 0 | C' 01267 0 |
| 04,3320 | C' 03646 0 | C' 37646 1 | C' 73005 0 | I' 52014 0 | C' 04306 0 | C' 11347 1 | C' 11206 0 | 04555 0 |
| 04,3330 | C' 73726 0 | 00006 1 | 31422 1 | 03340 0 | 04555 0 | C' 73741 1 | 00006 1 | 31424 1 |
| 04,3340 | 53764 1 | 04555 0 | C' 73746 0 | 06006 1 | I' 45014 0 | C' 04066 0 | C' 10716 0 | I' 43234 0 |
| 04,3350 | C' 45505 0 | C' 02364 1 | C' 03413 1 | C' 34041 0 | C' 45354 1 | I' 77624 1 | C' 72522 1 | I' 52145 0 |
| 04,3360 | C' 02615 1 | C' 11242 0 | I' 71220 1 | C' 02367 1 | C' 03413 1 | C' 34041 0 | C' 45354 1 | I' 53775 1 |
| 04,3370 | C' 03554 0 | C' 57176 0 | C' 16657 1 | C' 03754 1 | I' 71406 0 | C' 18734 0 | I' 43156 1 | C' 03466 0 |



OCTAL LISTING FOR PARAGRAPH J 044, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, # DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #I# (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 05,2000 | C' 77340 0 | C' 32047 0 | C' 24340 0 | C' 32050 0 | C' 14340 0 | C' 32063 0 | C' 03412 0 | C' 03422 0 |
| 05,2010 | C' 13414 1 | C' 03427 0 | C' 01245 0 | C' 11162 1 | C' 03025 0 | C' 03231 1 | C' 03702 1 | C' 00007 0 |
| 05,2020 | C' 00007 0 | C' 00007 0 | C' 25735 1 | C' 32005 0 | C' 00024 1 | C' 32007 1 | C' 24340 0 | C' 32050 0 |
| 05,2030 | C' 14340 0 | C' 32063 0 | C' 32010 1 | C' 03743 1 | C' 03753 0 | C' 02610 1 | C' 00106 0 | C' 01330 0 |
| 05,2040 | C' 03231 1 | C' 01331 1 | C' 32101 0 | C' 13720 0 | C' 00001 0 | C' 00007 0 | C' 77170 1 | C' 76605 0 |
| 05,2050 | C' 01174 1 | C' 01176 0 | C' 01200 1 | C' 01202 0 | C' 01204 0 | C' 76607 1 | C' 77743 1 | C' 03133 0 |
| 05,2060 | C' 03135 0 | C' 03137 1 | C' 77745 1 | C' 07076 1 | C' 70605 0 | C' 20074 0 | C' 52754 0 | C' 70054 1 |
| 05,2070 | C' 01725 0 | C' 01727 1 | C' 01731 0 | C' 01733 1 | C' 01642 0 | C' 76056 0 | C' 01432 0 | C' 10312 0 |
| 05,2100 | C' 73141 1 | C' 03073 0 | C' 03000 1 | C' 07107 0 | C' 13125 0 | C' 05154 1 | C' 01320 1 | C' 34011 0 |
| 05,2110 | C' 34013 1 | C' 34030 0 | C' 43145 0 | C' 32047 0 | C' 24340 0 | C' 32056 0 | C' 14340 0 | C' 32063 0 |
| 05,2120 | C' 03412 0 | C' 00302 0 | C' 17074 1 | C' 17502 0 | C' 00303 1 | C' 02355 0 | C' 13720 0 | C' 25735 1 |
| 05,2130 | C' 32065 0 | C' 00024 1 | C' 32067 1 | C' 24340 0 | C' 32056 0 | C' 14340 0 | C' 32003 0 | C' 32070 1 |
| 05,2140 | C' 12757 1 | C' 00100 0 | C' 01330 0 | C' 02633 0 | C' 01331 1 | C' 32101 0 | C' 52754 0 | C' 32047 0 |
| 05,2150 | C' 24340 0 | C' 32056 0 | C' 14340 0 | C' 32063 0 | C' 03412 0 | C' 03422 0 | C' 13414 1 | C' 01151 0 |
| 05,2100 | C' 17674 1 | C' 01125 0 | C' 03602 0 | C' 03424 0 | C' 02636 0 | C' 00007 0 | C' 00001 0 | C' 03655 1 |
| 05,2170 | C' 13404 0 | C' 06320 0 | C' 32005 0 | C' 00024 1 | C' 32067 1 | C' 24340 0 | C' 32050 0 | C' 14340 0 |
| 05,2200 | C' 32003 0 | C' 32076 1 | C' 03743 1 | C' 03753 0 | C' 02610 1 | C' 13645 1 | C' 01331 1 | C' 32101 0 |
| 05,2210 | C' 02324 0 | C' 07400 1 | C' 01766 1 | C' 77371 1 | C' 32047 0 | C' 24340 0 | C' 32056 0 | C' 14340 0 |
| 05,2220 | C' 32063 0 | C' 01300 0 | C' 03635 1 | C' 24304 0 | C' 14320 0 | C' 04300 0 | C' 03313 0 | C' 13675 1 |
| 05,2230 | C' 07400 1 | C' 03285 0 | C' 32065 0 | C' 00024 1 | C' 32264 0 | C' 24340 0 | C' 32056 0 | C' 14340 0 |
| 05,2240 | C' 07076 1 | C' 13161 0 | C' 07300 0 | C' 24304 0 | C' 14320 0 | C' 03073 0 | C' 03066 1 | C' 03314 1 |
| 05,2250 | C' 01331 1 | C' 13125 0 | C' 05154 1 | C' 01320 1 | C' 34011 0 | C' 34013 1 | C' 34030 0 | C' 34032 1 |
| 05,2260 | C' 01432 0 | C' 10312 0 | C' 00106 0 | C' 74007 0 | C' 16615 1 | C' 01104 0 | C' 01166 1 | C' 03726 1 |
| 05,2270 | C' 0n24 0 | C' 03768 0 | C' 76532 1 | C' 32047 0 | C' 24340 0 | C' 32056 0 | C' 14340 0 | C' 32063 0 |
| 05,2300 | C' 27537 0 | C' 27553 1 | C' 27567 0 | C' 02751 0 | C' 00007 0 | C' 00007 0 | C' 00007 0 | C' 32065 0 |
| 05,2310 | C' 00024 1 | C' 32337 1 | C' 04340 1 | C' 00001 0 | C' 00001 0 | C' 00007 0 | C' 00001 0 | C' 32056 0 |
| 05,2320 | C' 14340 0 | C' 32063 0 | C' 32010 1 | C' 02747 1 | C' 00106 0 | C' 12025 0 | C' 00007 0 | C' 01331 1 |
| 05,2330 | C' 32101 0 | C' 00001 0 | C' 00007 0 | C' 00007 0 | C' 00001 0 | C' 00007 0 | C' 77770 1 | C' 76672 0 |
| 05,2340 | C' 01107 0 | C' 76614 0 | C' 02113 0 | C' 02214 1 | C' 02147 1 | C' 02001 1 | C' 02273 0 | 00004 0 |
| 05,2350 | 02767 0 | 12356 1 | 34675 1 | 05042 1 | 77777 0 | 77777 0 | 31038 0 | 74728 0 |
| 05,2300 | 04014 0 | 55038 1 | 34714 1 | 55365 1 | 54375 1 | 54376 1 | 54317 0 | 55154 1 |
| 05,2370 | 44603 1 | 55302 0 | 34714 1 | 55360 1 | 55362 0 | 55501 0 | 00006 1 | 01005 0 |

OCTAL LISTING FOR PARAGRAPH J 045, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, 'A' DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED A₁ (INTERPRETIVE OPERATOR WORDS) OR A₂ (CONSTANTS)

| | | | | | | | | |
|---------|------------------------|---------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| 05,2400 | 00006 1 | 01006 0 | 00006 1 | 01011 0 | 00006 1 | 01012 0 | 00006 1 | 01013 1 |
| 05,2410 | 00006 1 | 01014 0 | 55316 0 | 54332 1 | 54371 0 | 55071 1 | 55130 0 | 55126 1 |
| 05,2420 | 55125 1 | 55044 1 | 41036 1 | 74726 1 | 10000 0 | 02431 0 | 34726 0 | 00006 1 |
| 05,2430 | 65012 1 | 02474 1 | 44714 0 | 55011 1 | 34371 0 | 54366 0 | 33167 1 | 55320 0 |
| 05,2440 | 37716 0 | 55303 1 | 33172 0 | 55331 0 | 34763 1 | 55321 1 | 00006 1 | 33146 1 |
| 05,2450 | 53313 0 | 00006 1 | 33175 1 | 52075 1 | 00006 1 | 33177 0 | 52077 0 | 00006 1 |
| 05,2460 | 33201 1 | 52101 0 | 00006 1 | 33203 0 | 52103 1 | 00006 1 | 33205 0 | 52105 1 |
| 05,2470 | 33206 0 | 54106 1 | 04574 0 | C ¹ 03225 1 | 00004 0 | 00006 1 | 34714 1 | 52755 1 |
| 05,2500 | 00006 1 | 34714 1 | 52761 0 | 00006 1 | 34714 1 | 52753 1 | 00006 1 | 34714 1 |
| 05,2510 | 52757 0 | 00006 1 | 34714 1 | 52763 1 | 00006 1 | 34714 1 | 52765 1 | 00002 0 |
| 05,2520 | 25154 0 | 22002 0 | 00006 1 | 04007 1 | 53433 0 | 02767 0 | 34364 1 | 71360 1 |
| 05,2530 | 00006 1 | 12533 1 | 12372 1 | 41360 1 | 00006 1 | 12552 0 | 01377 0 | 00006 1 |
| 05,2540 | 12542 1 | 12372 1 | 31374 0 | 54003 0 | 00006 1 | 31376 1 | 51377 0 | 52001 1 |
| 05,2550 | 34714 1 | 55360 1 | 34674 0 | 00006 1 | 03033 1 | 00006 1 | 12564 0 | 34675 1 |
| 05,2560 | 00006 1 | 02033 0 | 00006 1 | 12372 1 | 02744 1 | 30102 1 | 00006 1 | 74710 1 |
| 05,2570 | 76211 1 | 00006 1 | 50000 1 | 33146 1 | 53313 0 | 44675 0 | 70106 1 | 54106 1 |
| 05,2600 | 31331 1 | 73173 0 | 64704 0 | 55331 0 | 34705 1 | 71321 1 | 64763 1 | 55321 1 |
| 05,2610 | 33171 0 | 71036 1 | 64674 0 | 57036 0 | 74707 1 | 00006 1 | 12625 0 | 04633 0 |
| 05,2620 | C ¹ 16746 0 | 36211 0 | 05140 1 | C ¹ 02742 1 | C ¹ 16063 0 | 33155 0 | 71320 0 | 63170 1 |
| 05,2630 | 55320 0 | 40101 0 | 74704 1 | 10000 0 | 12657 0 | 34676 1 | 00006 1 | 05011 1 |
| 05,2640 | 12657 0 | 00004 0 | 02744 1 | 02777 1 | 43162 0 | 70106 1 | 54106 1 | 40102 0 |
| 05,2650 | 74105 0 | 00006 1 | 62657 1 | 34731 0 | 05140 1 | C ¹ 02660 0 | C ¹ 34066 0 | 34715 0 |
| 05,2660 | 54161 0 | 60000 1 | 00006 1 | 50000 1 | 30753 0 | 00006 1 | 06001 0 | 10000 0 |
| 05,2670 | 12737 1 | 12737 1 | 12737 1 | 10161 0 | 12660 1 | 54162 0 | 05247 0 | 00004 0 |
| 05,2700 | 30102 1 | 74105 0 | 00006 1 | 62712 1 | 34752 0 | 54003 0 | 04633 0 | C ¹ 45245 0 |
| 05,2710 | 34744 1 | 54003 0 | 34715 0 | 54161 0 | 60000 1 | 50000 1 | 10753 1 | 12721 0 |
| 05,2720 | 12726 1 | 54154 0 | 24154 1 | 24162 1 | 32743 0 | 04561 1 | 10161 0 | 12713 1 |
| 05,2730 | 10162 0 | 12472 0 | 34674 0 | 71011 1 | 00006 1 | 14106 0 | 12472 0 | 05537 0 |
| 05,2740 | C ¹ 01107 0 | 12372 1 | C ¹ 07777 1 | C ¹ 03520 0 | 34704 0 | 00006 1 | 02016 1 | 00006 1 |
| 05,2750 | 12764 1 | 34362 1 | 00006 1 | 02016 1 | 63166 0 | 00006 1 | 12765 0 | 00006 1 |
| 05,2760 | 00015 0 | 63166 0 | 00006 1 | 12765 0 | 00002 0 | 02767 0 | 12372 1 | 33156 0 |
| 05,2770 | 54335 0 | 34672 0 | 54026 1 | 67715 0 | 54027 0 | 67716 0 | 54030 0 | 33163 0 |



SYMBOL LISTING FOR PARAGRAPH J 046. WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED A1A (INTERPRETIVE OPERATOR WORDS) OR ACB (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 05,3000 | 00006 1 | 03011 1 | 33184 1 | 00008 1 | 03013 0 | 44875 0 | 70078 1 | 54076 1 |
| 05,3010 | 33165 0 | 54003 0 | 34873 1 | 55407 1 | 55406 0 | 55405 0 | 55404 1 | 55403 0 |
| 05,3020 | 55402 1 | 55401 1 | 55400 0 | 45173 0 | 55410 1 | 55412 0 | 55414 0 | 55416 1 |
| 05,3030 | 55420 1 | 55422 0 | 55424 0 | 55426 1 | 55430 0 | 45174 1 | 55411 0 | 55413 1 |
| 05,3040 | 55415 1 | 55417 0 | 55421 0 | 55423 1 | 55425 1 | 55427 0 | 55431 1 | 44714 0 |
| 05,3050 | 54167 0 | 54203 1 | 54217 1 | 54233 1 | 54247 1 | 54263 1 | 54277 1 | 55302 0 |
| 05,3060 | 54067 1 | 33160 0 | 54400 1 | 63161 1 | 54454 0 | 63161 1 | 54530 0 | 63161 1 |
| 05,3070 | 54604 1 | 63161 1 | 54660 0 | 34377 0 | 54154 0 | 44677 1 | 50154 1 | 55023 0 |
| 05,3100 | 10154 0 | 13074 0 | 55141 0 | 55142 0 | 55143 1 | 55144 0 | 55073 0 | 54045 1 |
| 05,3110 | 54776 0 | 55042 1 | 55013 0 | 55015 0 | 55012 1 | 55020 0 | 55021 1 | 55001 0 |
| 05,3120 | 55002 0 | 55043 0 | 55330 1 | 55322 1 | 55323 0 | 55324 1 | 55325 0 | 55304 0 |
| 05,3130 | 54100 1 | 34717 1 | 55016 0 | 34675 1 | 71044 1 | 55044 1 | 33157 1 | 55361 0 |
| 05,3140 | 44374 1 | 54777 1 | 00002 0 | 30001 0 | 15225 0 | C' 03143 1 | C' 12066 1 | C' 02071 0 |
| 05,3150 | C' 42066 1 | C' 03165 0 | C' 34066 0 | C' 02765 1 | C' 46066 0 | C' 00435 0 | C' 03351 0 | C' 03334 0 |
| 05,3160 | C' 00400 0 | C' 00054 0 | C' 20100 1 | C' 77603 1 | C' 74777 0 | C' 01400 1 | C' 77755 0 | C' 37411 1 |
| 05,3170 | C' 37000 0 | C' 00450 0 | C' 00130 0 | C' 00430 0 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 |
| 05,3200 | C' 00000 1 | C' 00200 0 | C' 00000 1 | C' 00100 0 | C' 00000 1 | C' 00000 1 | C' 00000 1 | 34334 1 |
| 05,3210 | 55506 1 | 31466 1 | 74676 0 | 00006 1 | 13220 0 | 51506 0 | 33304 0 | 13230 1 |
| 05,3220 | 31473 0 | 60000 1 | 00006 1 | 51506 0 | 73326 1 | 20001 1 | 51506 0 | 63314 1 |
| 05,3230 | 51506 0 | 55511 1 | 11506 1 | 13210 0 | 11466 0 | 13243 0 | 13243 0 | 53522 1 |
| 05,3240 | 21513 0 | 33341 1 | 27520 0 | 34711 1 | 55506 1 | 55507 0 | 31474 1 | 63340 0 |
| 05,3250 | 60000 1 | 55510 0 | 00006 1 | 63256 0 | 37715 0 | 55506 1 | 51506 0 | 31516 1 |
| 05,3260 | 00006 1 | 71510 0 | 60000 1 | 51507 1 | 61511 0 | 51507 1 | 55470 1 | 11507 0 |
| 05,3270 | 13300 0 | 31466 1 | 74675 0 | 10000 0 | 31473 0 | 61474 1 | 55475 1 | 00002 0 |
| 05,3300 | 55507 0 | 00006 1 | 27506 1 | 13256 1 | C' 00616 0 | C' 02526 1 | C' 02352 1 | C' 01471 1 |
| 05,3310 | C' 00634 0 | C' 00612 1 | C' 03706 0 | C' 04425 0 | C' 00644 1 | C' 03710 1 | C' 04246 0 | C' 02011 0 |
| 05,3320 | C' 77501 0 | C' 00612 1 | C' 04656 0 | C' 10372 0 | C' 77126 1 | C' 76261 0 | C' 00787 1 | C' 15624 0 |
| 05,3330 | C' 03054 0 | C' 04532 1 | C' 10433 1 | C' 00000 1 | C' 22070 0 | C' 03204 1 | C' 77266 0 | C' 02476 0 |
| 05,3340 | C' 70364 1 | C' 75420 0 | 54016 1 | 00006 1 | 22012 1 | 34704 0 | 00006 1 | 05013 0 |
| 05,3350 | 00335 1 | 37716 0 | 54337 1 | 54336 0 | 33474 0 | 54335 0 | 13372 0 | 10336 0 |
| 05,3360 | 03507 0 | C' 77753 0 | 13363 0 | 10337 1 | 13522 0 | C' 74001 0 | 30334 0 | 00006 1 |
| 05,3370 | 63372 1 | 13377 0 | 50332 0 | 32342 0 | 54334 1 | 40332 1 | 13612 0 | 50334 0 |



OCTAL LISTING FOR PARAGRAPH J 050, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #1# (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|---------|------------|------------|------------|---------|------------|
| 06,2000 | 54016 1 | 00006 1 | 22012 1 | 11302 0 | 12010 0 | 12007 0 | 12136 0 | 34716 0 |
| 06,2010 | 54070 1 | 55302 0 | 11036 1 | 02063 0 | 02063 0 | 57036 0 | 74372 1 | 55036 1 |
| 06,2020 | 64105 1 | 00006 1 | 01010 1 | 02071 0 | 55016 0 | 44714 0 | 54073 1 | 56776 1 |
| 06,2030 | 64713 0 | 54776 0 | 50776 1 | 11023 0 | 10776 0 | 12030 1 | 12047 1 | C' 00012 1 |
| 06,2040 | 10073 1 | C' 37764 0 | 55016 0 | 00002 0 | 54073 1 | 32037 1 | 12031 0 | 64712 1 |
| 06,2050 | 50776 1 | 55023 0 | 74372 1 | 54073 1 | 34364 1 | 50776 1 | 74072 1 | 60073 0 |
| 06,2060 | 00006 1 | 01010 1 | 16706 1 | 10101 0 | 34714 1 | 12132 1 | 11016 0 | 02024 0 |
| 06,2070 | 12132 1 | 42173 1 | 27302 0 | 37700 1 | 54027 0 | 31321 0 | 00006 1 | 06032 0 |
| 06,2100 | 74675 0 | 00006 1 | 12116 1 | 23321 0 | 00006 1 | 06001 0 | 55321 1 | 74675 0 |
| 06,2110 | 10000 0 | 12116 1 | 34371 0 | 05027 1 | C' 03353 1 | C' 60101 1 | 50070 0 | 12120 1 |
| 06,2120 | 12130 0 | 12765 0 | 12174 0 | 15222 1 | 12130 0 | 12765 0 | 12174 0 | 15222 1 |
| 06,2130 | 04633 0 | C' 20000 0 | 00006 1 | 01010 1 | 32041 0 | 12074 1 | 34675 1 | 71302 0 |
| 06,2140 | 00006 1 | 12167 1 | 11016 0 | 02024 0 | 12154 1 | 44675 0 | 27302 0 | 37700 1 |
| 06,2150 | 54027 0 | 34702 0 | 27302 0 | 05222 0 | 00006 1 | 01010 1 | 37700 1 | 26027 0 |
| 06,2160 | 34702 0 | 27302 0 | 11302 0 | 05222 0 | C' 37737 0 | 02156 1 | 05222 0 | 00006 1 |
| 06,2170 | 01010 1 | 34675 1 | 12146 1 | C' 22400 0 | 31320 1 | 00006 1 | 06030 1 | 72743 1 |
| 06,2200 | 00006 1 | 12231 1 | 54070 1 | 23320 1 | 00006 1 | 06001 0 | 55320 0 | 44712 0 |
| 06,2210 | 56070 0 | 00006 1 | 62507 1 | 12215 1 | 64712 1 | 24070 0 | 60000 1 | 54000 0 |
| 06,2220 | 12215 1 | 56071 1 | 50070 0 | 34675 1 | 71320 0 | 50070 0 | 02737 0 | 10071 0 |
| 06,2230 | 12214 0 | 41320 0 | 74704 1 | 10000 0 | 12367 0 | 34703 1 | 71320 0 | 10000 0 |
| 06,2240 | 12244 0 | 34703 1 | 27320 0 | 12367 0 | 42757 1 | 71320 0 | 55320 0 | 74675 0 |
| 06,2250 | 10000 0 | 12342 1 | 41320 0 | 74702 1 | 10000 0 | 12260 0 | 05637 0 | C' 00213 1 |
| 06,2260 | 02717 1 | 32764 0 | 05140 1 | C' 02270 0 | C' 14063 1 | 12367 0 | 32764 0 | 05161 1 |
| 06,2270 | 44711 0 | 71320 0 | 57320 1 | 74711 0 | 00006 1 | 12310 0 | 34675 1 | 71320 0 |
| 06,2300 | 00006 1 | 12266 0 | 40074 0 | 74703 0 | 10000 0 | 15213 0 | 04674 0 | C' 17441 0 |
| 06,2310 | 34674 0 | 00006 1 | 05012 1 | 04633 0 | C' 17070 0 | 05410 1 | 44722 0 | 00006 1 |
| 06,2320 | 03012 1 | 34700 1 | 05161 1 | 42754 1 | 71320 0 | 55320 0 | 44705 0 | 71321 1 |
| 06,2330 | 55321 1 | 02665 0 | 44674 1 | 00006 1 | 03012 1 | 34740 0 | 05140 1 | C' 03056 1 |
| 06,2340 | C' 16063 0 | 15213 0 | 34707 0 | 00006 1 | 02012 0 | 10000 0 | 12367 0 | 34703 1 |
| 06,2350 | 70074 0 | 10000 0 | 12367 0 | 02730 1 | 04633 0 | C' 17070 0 | 34706 1 | 00006 1 |
| 06,2360 | 05012 1 | 05410 1 | 34705 1 | 05140 1 | C' 02315 1 | C' 14062 0 | 12367 0 | 31321 0 |
| 06,2370 | 74763 0 | 54001 1 | 34763 1 | 00006 1 | 03033 1 | 00006 1 | 06001 0 | 00006 1 |

OCAL LISTING FOR PARAGRAPH j 051, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" DENOTES UNUSED FIXED MEMORY
 ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #1A (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 06,2400 | 12427 0 | 54010 1 | 23321 0 | 00005 1 | 00000 0 | 55321 1 | 34114 1 | 56070 0 |
| 06,2410 | 00000 1 | 12414 0 | 04712 1 | 24070 0 | 00000 1 | 54000 0 | 12413 1 | 56071 1 |
| 06,2420 | 50010 0 | 34676 1 | 71321 1 | 50010 0 | 02745 0 | 10011 0 | 12412 0 | 10034 1 |
| 06,2430 | 12434 1 | 12460 0 | 12434 1 | 12460 0 | 02505 0 | 00000 1 | 02457 0 | 02506 0 |
| 06,2440 | 00006 1 | 02455 1 | 34101 0 | 00000 1 | 02012 0 | 10000 0 | 12455 0 | 04633 0 |
| 06,2450 | C' 10746 0 | 30211 0 | 05140 1 | C' 02742 1 | C' 10303 0 | 34705 1 | 12460 0 | 34114 1 |
| 06,2460 | 01036 0 | 74705 0 | 00000 1 | 15222 1 | 71030 1 | 10000 0 | 12502 0 | 34705 1 |
| 06,2470 | 71320 0 | 10000 0 | 15222 1 | 41030 1 | 74705 0 | 04674 0 | 57036 0 | 72164 1 |
| 06,2500 | 27036 1 | 15222 1 | 02750 1 | 15222 1 | 12473 1 | C' 03434 1 | C' 75252 0 | 14672 1 |
| 06,2510 | 54071 0 | 11320 0 | 12520 0 | 12520 0 | 34707 0 | 00000 1 | 05011 1 | 12227 0 |
| 06,2520 | 02750 1 | 12227 0 | 44101 1 | 00000 1 | 03011 1 | 12227 0 | 34711 1 | 11320 0 |
| 06,2530 | 10000 0 | 12227 0 | 34615 1 | 11320 0 | 00000 1 | 12551 0 | 34674 0 | 00006 1 |
| 06,2540 | 02012 0 | 00000 1 | 12544 1 | 12227 0 | 34711 1 | 27320 0 | 05537 0 | C' 00207 1 |
| 06,2550 | 12227 0 | 41320 0 | 14104 1 | 27320 0 | 12227 0 | 10000 0 | 12354 0 | 42762 1 |
| 06,2560 | 00000 1 | 03014 1 | 42756 0 | 00000 1 | 03012 1 | 44676 0 | 00006 1 | 03011 1 |
| 06,2570 | 02725 0 | 04633 0 | C' 10777 1 | 44114 0 | 54050 0 | 54051 1 | 54052 1 | 54047 0 |
| 06,2600 | 42761 1 | 00000 1 | 03014 1 | 12227 0 | 00000 1 | 12025 0 | 41321 1 | 74705 0 |
| 06,2610 | 27321 1 | 04633 0 | C' 10777 1 | 42757 1 | 70074 0 | 58074 1 | 40000 0 | 74703 0 |
| 06,2620 | 10000 0 | 12227 0 | 05537 0 | C' 00214 0 | 12227 0 | 34711 1 | 71320 0 | 10000 0 |
| 06,2630 | 12227 0 | 12551 0 | 10000 0 | 34701 0 | 57320 1 | 72763 0 | 27320 0 | 02665 0 |
| 06,2640 | 41320 0 | 74712 0 | 10000 0 | 12425 1 | 31320 1 | 12760 0 | 10000 0 | 12425 1 |
| 06,2650 | 05537 0 | C' 00212 0 | 12425 1 | 10000 0 | 12425 1 | 05531 0 | C' 01105 1 | 12425 1 |
| 06,2660 | 10000 0 | 12425 1 | 05537 0 | C' 01106 1 | 12425 1 | 34720 0 | 11320 0 | 00000 1 |
| 06,2670 | 74701 1 | 31320 1 | 00000 1 | 04001 1 | 40000 0 | 74702 1 | 10000 0 | 12710, 1 |
| 06,2700 | 34712 1 | 11321 1 | 10000 0 | 00002 0 | 44712 0 | 00006 1 | 03011 1 | 00002 0 |
| 06,2710 | 00000 1 | 22066 1 | 05051 0 | 34712 1 | 00000 1 | 05011 1 | 00006 1 | 47703 0 |
| 06,2720 | 00006 1 | 03012 1 | 34122 1 | 00006 1 | 05012 1 | 41030 1 | 72753 0 | 21036 1 |
| 06,2730 | 41320 0 | 72755 0 | 27320 0 | 41321 1 | 74705 0 | 27321 1 | 00002 0 | 12526 0 |
| 06,2740 | 12665 1 | 12665 1 | 12555 1 | C' 70400 1 | 12604 0 | 12632 0 | 12653 1 | 12660 1 |
| 06,2750 | 41321 1 | 14712 0 | 13065 0 | C' 40010 1 | C' 00054 0 | C' 00075 0 | C' 00272 0 | C' 00300 1 |
| 06,2760 | C' 01120 0 | C' 00740 1 | C' 17000 1 | C' 70777 1 | C' 21450 0 | 31331 1 | 00006 1 | 06030 1 |
| 06,2770 | 14104 1 | 54010 1 | 10000 0 | 03224 0 | 11303 1 | 13001 1 | 13001 1 | 13001 1 |



OCTAL LISTING FOR PARAGRAPH J 052, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #1# (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|---------|------------|------------|---------|------------|------------|---------|---------|
| 06,3000 | 15222 1 | 31331 1 | 00006 1 | 06033 1 | 74722 0 | 26070 1 | 23331 1 | 00006 1 |
| 06,3010 | 06001 0 | 55331 0 | 40000 0 | 74722 0 | 00006 1 | 13022 0 | 74706 0 | 10000 0 |
| 06,3020 | 03022 1 | 37716 0 | 55314 1 | 11315 0 | 03125 1 | 03077 1 | 03027 1 | 11314 1 |
| 06,3030 | 03047 1 | 03037 0 | 03057 0 | 03154 1 | 11317 1 | 03153 0 | 03157 1 | 03057 0 |
| 06,3040 | 03154 1 | 05537 0 | C' 00116 1 | 34717 1 | 55316 0 | 03070 0 | 03154 1 | 03057 0 |
| 06,3050 | 03115 1 | 05537 0 | C' 00116 1 | 03070 0 | 03112 0 | 34702 0 | 13064 1 | 34712 1 |
| 06,3060 | 71331 0 | 10000 0 | 05222 0 | 34710 0 | 71331 0 | 10000 0 | 24002 0 | 00002 0 |
| 06,3070 | 46211 1 | 71331 0 | 55331 0 | 44712 0 | 00006 1 | 03012 1 | 00002 0 | 11314 1 |
| 06,3100 | 03112 0 | 03107 1 | 11316 0 | 03105 0 | 03151 1 | 03216 1 | 03154 1 | 11316 0 |
| 06,3110 | 55316 0 | 03154 1 | 34714 1 | 55316 0 | 55317 1 | 03055 1 | 03154 1 | 34712 1 |
| 06,3120 | 55303 1 | 34711 1 | 00006 1 | 05012 1 | 03154 1 | 11314 1 | 03154 1 | 03133 0 |
| 06,3130 | 34705 1 | 55317 1 | 03216 1 | 11303 1 | 03140 1 | 03140 1 | 03137 1 | 03154 1 |
| 06,3140 | 37716 0 | 55303 1 | 44711 0 | 00006 1 | 03012 1 | 41331 0 | 74702 1 | 27331 0 |
| 06,3150 | 03154 1 | 03216 1 | 34705 1 | 55317 1 | 31314 0 | 55315 0 | 05222 0 | 34712 1 |
| 06,3160 | 00006 1 | 05012 1 | 34112 1 | 05140 1 | C' 03172 0 | C' 14062 0 | 41331 0 | 74712 0 |
| 06,3170 | 27331 0 | 03154 1 | 03210 1 | 44712 0 | 00006 1 | 03012 1 | 34112 1 | 05161 1 |
| 06,3200 | 41331 0 | 74701 1 | 27331 0 | 44716 1 | 71331 0 | 55331 0 | 03224 0 | 05213 1 |
| 06,3210 | 34714 1 | 54036 0 | 55307 0 | 43261 0 | 54035 0 | 00002 0 | 34714 1 | 55316 0 |
| 06,3220 | 41331 0 | 76211 1 | 27331 0 | 00002 0 | 34704 0 | 00006 1 | 02030 0 | 10000 0 |
| 06,3230 | 13252 0 | 34711 1 | 71331 0 | 10000 0 | 00002 0 | 34703 1 | 61036 0 | 74703 0 |
| 06,3240 | 00006 1 | 16711 1 | 54001 1 | 31036 0 | 00006 1 | 06001 0 | 74672 1 | 64674 0 |
| 06,3250 | 55036 1 | 00002 0 | 34712 1 | 71321 1 | 10000 0 | 00002 0 | 34703 1 | 71036 1 |
| 06,3260 | 13240 0 | C' 16037 1 | 33516 0 | 56003 1 | 54163 1 | 11477 0 | 13271 1 | 13271 1 |
| 06,3270 | 13407 0 | 00004 0 | 34710 0 | 54132 0 | 50132 1 | 31453 1 | 00006 1 | 50132 1 |
| 06,3300 | 71162 1 | 54002 1 | 30001 0 | 00006 1 | 74705 0 | 50132 1 | 55163 0 | 30002 0 |
| 06,3310 | 00006 1 | 74705 0 | 50132 1 | 21163 0 | 50132 1 | 41452 1 | 00006 1 | 71074 1 |
| 06,3320 | 00006 1 | 74712 0 | 50132 1 | 21163 0 | 10132 0 | 67716 0 | 13273 0 | 13330 0 |
| 06,3330 | 00003 1 | 55477 0 | 54130 1 | 00006 1 | 41163 0 | 52155 1 | 31463 1 | 03412 0 |
| 06,3340 | 00006 1 | 41165 0 | 52155 1 | 41466 0 | 03412 0 | 41460 0 | 03441 0 | 00006 1 |
| 06,3350 | 41165 0 | 52155 1 | 31464 0 | 03412 0 | 00006 1 | 41167 1 | 52155 1 | 41467 1 |
| 06,3360 | 03412 0 | 41461 1 | 03441 0 | 00006 1 | 41165 0 | 52155 1 | 31470 0 | 03412 0 |
| 06,3370 | 00006 1 | 41167 1 | 52155 1 | 31465 1 | 03412 0 | 31462 0 | 03441 0 | 11477 0 |



OCAL LISTING FOR PARAGRAPH J 054, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED AIA (INTERPRETIVE OPERATOR WORDS) OR ACA (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 07,2000 | C' 03874 1 | C' 03725 1 | 00004 0 | 54070 1 | 38211 0 | 71044 1 | 10000 0 | 02013 1 |
| 07,2010 | 34711 1 | 27044 1 | 02015 1 | 05604 0 | C' 01211 1 | 10400 1 | 02031 1 | 10454 0 |
| 07,2020 | 02031 1 | 10530 0 | 02031 1 | 10604 1 | 02031 1 | 10660 0 | 02031 1 | 05604 0 |
| 07,2030 | C' 01207 0 | 84711 1 | 55330 1 | 50000 1 | 54052 1 | 34714 1 | 51330 0 | 53777 0 |
| 07,2040 | 05253 0 | C' 00065 1 | 12044 1 | 14570 0 | 05253 0 | C' 00068 1 | 12050 1 | 14570 0 |
| 07,2050 | 34677 0 | 00006 1 | 70070 1 | 56001 0 | 27330 1 | 37667 1 | 05027 1 | C' 02346 1 |
| 07,2060 | C' 16062 1 | 00003 1 | 14570 0 | 34714 1 | 57330 0 | 10000 0 | 50000 1 | 54000 0 |
| 07,2070 | 00004 0 | 44702 1 | 71331 0 | 55331 0 | 37716 0 | 55303 1 | 44711 0 | 00006 1 |
| 07,2100 | 03012 1 | 00003 1 | 04570 1 | 54016 1 | 30035 1 | 54362 1 | 30036 1 | 54360 0 |
| 07,2110 | 30033 1 | 54357 1 | 30034 0 | 54361 1 | 30032 0 | 54363 0 | 00006 1 | 30025 0 |
| 07,2120 | 52356 0 | 00006 1 | 30356 1 | 52014 0 | 56002 0 | 54012 0 | 34705 1 | 00006 1 |
| 07,2130 | 02016 1 | 10000 0 | 02427 1 | 34704 0 | 00006 1 | 02016 1 | 10000 0 | 02300 0 |
| 07,2140 | 34362 1 | 00006 1 | 02016 1 | 00006 1 | 12147 0 | 04574 0 | C' 17622 1 | 05537 0 |
| 07,2150 | C' 00113 1 | 05222 0 | 34675 1 | 70076 1 | 00006 1 | 12167 1 | 36211 0 | 05475 1 |
| 07,2160 | C' 01725 0 | C' 01734 0 | 36211 0 | 05475 1 | C' 00355 1 | C' 01725 0 | 15213 0 | 11330 1 |
| 07,2170 | 02224 1 | 34711 1 | 71044 1 | 00006 1 | 12216 1 | 34677 0 | 70101 0 | 00006 1 |
| 07,2200 | 12216 1 | 34754 0 | 05027 1 | C' 02405 1 | C' 76067 1 | 36211 0 | 05475 1 | C' 00355 1 |
| 07,2210 | C' 01674 0 | 36211 0 | 05475 1 | C' 00355 1 | C' 01725 0 | 15213 0 | 05537 0 | C' 00122 0 |
| 07,2220 | 15213 0 | 05537 0 | C' 00114 0 | 15213 0 | 67711 1 | 00006 1 | 62221 1 | 55330 1 |
| 07,2230 | 40000 0 | 74701 1 | 27330 1 | 74741 0 | 54061 1 | 50000 1 | 56052 0 | 54062 1 |
| 07,2240 | 64716 0 | 50061 0 | 54052 1 | 00006 1 | 30356 1 | 50062 0 | 52001 1 | 30357 0 |
| 07,2250 | 50062 0 | 54002 1 | 30360 1 | 50062 0 | 54003 0 | 30361 0 | 50062 0 | 54004 1 |
| 07,2260 | 30362 0 | 50062 0 | 54005 0 | 30363 1 | 50062 0 | 54006 0 | 37671 0 | 71330 1 |
| 07,2270 | 00006 1 | 12273 1 | 15213 0 | 37667 1 | 05027 1 | C' 02421 1 | C' 16062 1 | 15213 0 |
| 07,2300 | 34675 1 | 70076 1 | 00006 1 | 12307 0 | 37716 0 | 55725 1 | 05222 0 | 11330 1 |
| 07,2310 | 02314 0 | 05537 0 | C' 00112 0 | 05222 0 | 44701 1 | 71330 1 | 57330 0 | 74701 1 |
| 07,2320 | 10000 0 | 02325 1 | 05537 0 | C' 00110 1 | 05222 0 | 34741 1 | 71330 1 | 54061 1 |
| 07,2330 | 44716 1 | 50061 0 | 26052 1 | 34677 0 | 61330 0 | 57330 0 | 77671 1 | 10000 0 |
| 07,2340 | 05222 0 | 37667 1 | 05027 1 | C' 02346 1 | C' 16062 1 | 05222 0 | 04555 0 | C' 20464 0 |
| 07,2350 | 32426 0 | 04555 0 | C' 20476 0 | 12356 1 | 12367 0 | 12415 1 | 05425 1 | 05253 0 |
| 07,2360 | C' 00003 1 | 12363 1 | 02365 0 | 04574 0 | C' 30176 1 | 05435 0 | C' 00032 0 | 34741 1 |
| 07,2370 | 71330 1 | 55330 1 | 40000 0 | 51330 0 | 60052 0 | 00006 1 | 62402 0 | 00006 1 |

OPTAL LISTING FOR PARAGRAPH J 055, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A'S DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED I'S (INTERPRETIVE OPERATOR WORDS) OR C'S (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 07,2400 | 74677 1 | 04712 1 | 51330 0 | 54052 1 | 00004 0 | 34715 0 | 05140 1 | C' 02412 1 |
| 07,2410 | C' 16062 1 | 05423 1 | 34712 1 | 04633 0 | C' 17467 1 | 37671 0 | 71330 1 | 10000 0 |
| 07,2420 | 12346 0 | 34333 0 | 55045 0 | 32425 0 | 12351 0 | C' 14431 1 | C' 14600 1 | 11341 1 |
| 07,2430 | 12433 0 | 12433 0 | 34714 1 | 04712 1 | 05140 1 | C' 02203 1 | C' 20067 1 | 15222 1 |
| 07,2440 | I' 40220 0 | C' 02370 1 | C' 00001 0 | I' 73150 1 | C' 03745 1 | C' 03746 1 | I' 53775 1 | C' 03640 0 |
| 07,2450 | C' 57176 0 | C' 22746 1 | C' 11633 1 | I' 53715 1 | C' 03632 0 | C' 57176 0 | I' 64646 1 | C' 11631 0 |
| 07,2460 | I' 47515 0 | C' 02746 0 | I' 57301 1 | C' 00047 1 | I' 53605 1 | C' 00003 1 | C' 21576 0 | I' 77621 1 |
| 07,2470 | C' 11506 1 | I' 65301 0 | C' 00047 1 | I' 56362 0 | I' 41457 1 | C' 20174 1 | I' 75542 0 | I' 77605 1 |
| 07,2500 | I' 65301 0 | C' 00047 1 | I' 56342 1 | I' 53605 1 | C' 03752 1 | C' 20201 0 | I' 60325 0 | C' 11520 0 |
| 07,2510 | C' 00047 1 | I' 56325 0 | I' 77657 0 | C' 20176 0 | C' 37754 0 | C' 02370 1 | 00004 0 | 41036 1 |
| 07,2520 | 74726 1 | 10000 0 | 12526 0 | 05537 0 | C' 00206 0 | 13461 0 | 03455 0 | 41321 1 |
| 07,2530 | 74730 0 | 27321 1 | 41320 0 | 75656 0 | 27320 0 | 44726 1 | 00006 1 | 03012 1 |
| 07,2540 | 03070 0 | 34706 1 | 00006 1 | 05012 1 | 05410 1 | 34705 1 | 05140 1 | C' 02561 1 |
| 07,2550 | C' 16103 1 | 41320 0 | 74702 1 | 10000 0 | 12557 0 | 05537 0 | C' 00210 1 | 00003 1 |
| 07,2560 | 14570 0 | 03443 1 | 05410 1 | 44706 0 | 00006 1 | 03012 1 | 34700 1 | 05161 1 |
| 07,2570 | 03443 1 | 45656 0 | 71320 0 | 55320 0 | 44730 0 | 71321 1 | 55321 1 | 04633 0 |
| 07,2600 | C' 14665 1 | 13433 1 | 00004 0 | 03455 0 | 02746 0 | 36211 0 | 05140 1 | C' 02612 0 |
| 07,2610 | C' 16103 1 | 12557 0 | 03443 1 | 34705 1 | 00006 1 | 05012 1 | 34711 1 | 55474 0 |
| 07,2620 | 51474 1 | 31155 1 | 00006 1 | 51474 1 | 20032 1 | 00006 1 | 74676 0 | 56001 0 |
| 07,2630 | 00000 1 | 54061 1 | 12634 0 | 26001 1 | 51474 1 | 23471 1 | 11474 0 | 02617 0 |
| 07,2640 | 34711 1 | 05161 1 | 03443 1 | 54061 1 | 34711 1 | 55474 0 | 51474 1 | 11471 0 |
| 07,2650 | 02654 1 | 02663 0 | 02721 1 | 02663 0 | 63544 1 | 00006 1 | 62731 0 | 51474 1 |
| 07,2660 | 55471 0 | 43545 1 | 24061 0 | 84713 0 | 51474 1 | 54050 0 | 11474 0 | 02645 1 |
| 07,2670 | 10061 1 | 12735 0 | 05156 0 | C' 00226 1 | 34711 1 | 54061 1 | 50000 1 | 30032 0 |
| 07,2700 | 00006 1 | 50061 0 | 21155 0 | 10000 0 | 12712 0 | 12707 1 | 12712 0 | 10061 1 |
| 07,2710 | 12675 0 | 13433 1 | 62720 0 | 00006 1 | 62707 0 | 05537 0 | C' 00211 0 | 13441 1 |
| 07,2720 | C' 77511 1 | 63544 1 | 00006 1 | 62731 0 | 40000 0 | 51474 1 | 55471 0 | 33545 0 |
| 07,2730 | 02662 1 | 34714 1 | 51474 1 | 57471 1 | 02662 1 | 37707 0 | 00006 1 | 05014 1 |
| 07,2740 | 33546 0 | 12641 1 | 34705 1 | 00006 1 | 05012 1 | 05213 1 | 34707 0 | 00006 1 |
| 07,2750 | 02012 0 | 10000 0 | 00002 0 | 44705 0 | 00006 1 | 03012 1 | 44701 1 | 00006 1 |
| 07,2760 | 03014 1 | 44714 0 | 54047 0 | 34707 0 | 00006 1 | 05012 1 | 41036 1 | 73011 0 |
| 07,2770 | 27036 1 | 41321 1 | 74705 0 | 27321 1 | 41320 0 | 74707 1 | 27320 0 | 44706 0 |



ODDAL LISTING FOR PARAGRAPH J 058, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED A/A (INTERPRETIVE OPERATOR WORDS) OR A/Ca (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 07,3000 | 70075 1 | 54075 1 | 44674 1 | 70076 1 | 54076 1 | 44676 0 | 70077 0 | 54077 0 |
| 07,3010 | 00002 0 | C' 40010 1 | 00004 0 | 03455 0 | 43543 1 | 00006 1 | 03012 1 | 44705 0 |
| 07,3020 | 71321 1 | 55321 1 | 03070 0 | 34701 0 | 05140 1 | C' 03036 1 | C' 16103 1 | 34735 1 |
| 07,3030 | 05140 1 | C' 03034 0 | C' 16103 1 | 12557 0 | 03443 1 | 13433 1 | 03450 0 | 15213 0 |
| 07,3040 | 34707 0 | 00006 1 | 02012 0 | 10000 0 | 15213 0 | 41320 0 | 74676 0 | 27320 0 |
| 07,3050 | 44707 1 | 71320 0 | 55320 0 | 04633 0 | C' 14665 1 | 15213 0 | 03450 0 | 15213 0 |
| 07,3060 | 41320 0 | 74701 1 | 27320 0 | 41321 1 | 74676 0 | 27321 1 | 44706 0 | 13051 1 |
| 07,3070 | 43011 0 | 71036 1 | 64674 0 | 55036 1 | 00002 0 | 44714 0 | 54037 1 | 54040 1 |
| 07,3100 | 54041 0 | 03450 0 | 14570 0 | 00004 0 | 44712 0 | 71320 0 | 55320 0 | 04633 0 |
| 07,3110 | C' 14665 1 | 12557 0 | 00004 0 | 41320 0 | 74712 0 | 27320 0 | 74701 1 | 10000 0 |
| 07,3120 | 12557 0 | 05537 0 | C' 00212 0 | 00004 0 | 13107 0 | 54161 0 | 03455 0 | 11304 0 |
| 07,3130 | 03171 0 | 54156 1 | 34705 1 | 00006 1 | 05014 1 | 34710 0 | 05140 1 | C' 03207 1 |
| 07,3140 | C' 16103 1 | 30161 1 | 56003 1 | 56161 1 | 55304 0 | 74373 0 | 54061 1 | 34711 1 |
| 07,3150 | 54157 0 | 60000 1 | 60061 0 | 54160 1 | 00006 1 | 50000 1 | 31401 0 | 52155 1 |
| 07,3160 | 07226 0 | 52155 1 | 50160 0 | 53401 1 | 10157 0 | 13150 1 | 30161 1 | 54003 0 |
| 07,3170 | 12557 0 | 00006 1 | 30134 1 | 52155 1 | 33206 0 | 15070 1 | 11304 0 | 13174 1 |
| 07,3200 | 54156 1 | 00006 1 | 30155 0 | 52134 0 | 34712 1 | 13136 1 | C' 17176 1 | 43430 1 |
| 07,3210 | 00006 1 | 03014 1 | 03443 1 | 31304 1 | 00006 1 | 74707 1 | 50000 1 | 13220 0 |
| 07,3220 | 03235 0 | C' 00202 1 | 03235 0 | C' 00302 0 | 03233 0 | C' 00100 0 | 34714 1 | 55304 0 |
| 07,3230 | 33206 0 | 05074 1 | 13034 1 | 44710 1 | 27304 0 | 50002 0 | 30000 1 | 54064 1 |
| 07,3240 | 74716 1 | 64676 1 | 27304 0 | 54003 0 | 74373 0 | 54061 1 | 44716 1 | 70064 1 |
| 07,3250 | 54064 1 | 00006 1 | 50061 0 | 31401 0 | 52071 0 | 10070 1 | 13271 1 | 13261 0 |
| 07,3260 | 13411 1 | 10071 0 | 13266 1 | 13213 0 | 13406 1 | 13213 0 | 63322 1 | 00006 1 |
| 07,3270 | 63213 1 | 00006 1 | 33432 1 | 20071 0 | 30064 0 | 00006 1 | 05014 1 | 36043 0 |
| 07,3300 | 70071 0 | 56071 1 | 00006 1 | 74703 0 | 54062 1 | 30070 0 | 00006 1 | 74702 1 |
| 07,3310 | 54070 1 | 30001 0 | 00006 1 | 74675 0 | 26062 1 | 00006 1 | 30071 1 | 67716 0 |
| 07,3320 | 10000 0 | 13345 1 | C' 77601 0 | 13327 0 | 34675 1 | 26062 1 | 34714 1 | 50061 0 |
| 07,3330 | 53401 1 | 30062 0 | 54047 0 | 00006 1 | 74701 1 | 66214 0 | 05140 1 | C' 03207 1 |
| 07,3340 | C' 16103 1 | 34701 0 | 00006 1 | 05014 1 | 15213 0 | 50061 0 | 53401 1 | 34675 1 |
| 07,3350 | 60062 0 | 54047 0 | 00006 1 | 74701 1 | 67714 1 | 05140 1 | C' 03361 0 | C' 16103 1 |
| 07,3360 | 13341 0 | 03443 1 | 34707 0 | 00006 1 | 02012 0 | 10000 0 | 13441 1 | 31304 1 |
| 07,3370 | 54003 0 | 74373 0 | 54061 1 | 50061 0 | 11400 0 | 13401 0 | 34675 1 | 26047 0 |



OCTAL LISTING FOR PARAGRAPH J 060, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A'S DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED AIA (INTERPRETIVE OPERATOR WORDS) OR ACA (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 10,2000 | 30038 1 | 54001 1 | 10000 0 | 67707 0 | 12006 1 | 12003 1 | 00006 1 | 62016 1 |
| 10,2010 | 31307 1 | 00006 1 | 12014 1 | 12020 0 | 56001 0 | 12017 1 | 34714 1 | 55307 0 |
| 10,2020 | 11303 1 | 02025 1 | 02025 1 | 05222 0 | 05222 0 | 31314 0 | 00006 1 | 65222 0 |
| 10,2030 | 34701 0 | 71331 0 | 10000 0 | 02036 0 | 05537 0 | C' 00120 1 | 34711 1 | 00006 1 |
| 10,2040 | 02012 0 | 00006 1 | 12175 1 | 34712 1 | 55303 1 | 00006 1 | 12132 1 | 51303 0 |
| 10,2050 | 31180 1 | 00006 1 | 51303 0 | 20035 0 | 00006 1 | 74676 0 | 56001 0 | 60000 1 |
| 10,2080 | 54061 1 | 12063 1 | 26001 1 | 51303 0 | 23305 0 | 11303 1 | 12044 1 | 54061 1 |
| 10,2010 | 10036 0 | 64673 1 | 12074 1 | 12071 1 | 00006 1 | 62122 1 | 31307 1 | 00006 1 |
| 10,2100 | 12122 0 | 74674 1 | 54001 1 | 31306 0 | 74674 1 | 00006 1 | 06001 0 | 10000 0 |
| 10,2110 | 12122 0 | 11161 1 | 64673 1 | 12115 1 | 12112 0 | 00006 1 | 62120 0 | 12122 0 |
| 10,2120 | 41306 1 | 55306 1 | 34712 1 | 55303 1 | 50000 1 | 11305 1 | 02144 1 | 02151 0 |
| 10,2130 | 02181 0 | 02151 0 | 40035 0 | 61160 1 | 54002 1 | 02047 0 | 10000 0 | 34672 0 |
| 10,2140 | 02142 1 | 44672 1 | 54001 1 | 02063 0 | 62202 0 | 00006 1 | 62166 1 | 42201 1 |
| 10,2150 | 24081 0 | 64713 0 | 51303 0 | 54053 0 | 11303 1 | 02123 0 | 10061 1 | 12171 0 |
| 10,2160 | 05222 0 | 62202 0 | 00006 1 | 62166 1 | 32201 0 | 12150 0 | 51303 0 | 57305 0 |
| 10,2110 | 12150 0 | 34755 1 | 00006 1 | 05014 1 | 05222 0 | 34711 1 | 00006 1 | 05012 1 |
| 10,2200 | 05222 0 | C' 77532 0 | C' 77533 1 | 31341 0 | 00006 1 | 62216 0 | 44712 0 | 54354 1 |
| 10,2210 | 30383 1 | 02220 0 | 30357 0 | 02220 0 | 30361 0 | 02220 0 | 04633 0 | C' 16152 0 |
| 10,2220 | 24354 0 | 00006 1 | 50354 0 | 20032 1 | 10000 0 | 12231 1 | 00002 0 | 12231 1 |
| 10,2230 | 00002 0 | 67715 0 | 00006 1 | 62230 1 | 05537 0 | C' 00121 0 | 15213 0 | I' 43414 1 |
| 10,2240 | C' 04756 1 | C' 20242 1 | I' 53775 1 | C' 01521 0 | C' 57605 0 | I' 53655 1 | C' 01535 0 | C' 57576 1 |
| 10,2250 | C' 25171 1 | C' 01527 0 | I' 53257 1 | C' 57602 1 | C' 01543 1 | I' 77657 0 | C' 57576 1 | C' 15177 1 |
| 10,2280 | C' 01517 0 | C' 01205 1 | I' 77616 0 | I' 53775 1 | C' 01521 0 | C' 57605 0 | I' 53655 1 | C' 01535 0 |
| 10,2270 | C' 57576 1 | C' 25722 1 | C' 01527 0 | I' 53257 1 | C' 57602 1 | C' 01543 1 | I' 77657 0 | C' 57576 1 |
| 10,2300 | C' 01730 1 | I' 77616 0 | I' 67201 0 | C' 00001 0 | C' 03012 1 | I' 41542 1 | I' 65346 0 | I' 65356 1 |
| 10,2310 | C' 03318 0 | I' 74346 0 | C' 03550 1 | I' 73525 1 | C' 03316 0 | I' 53361 0 | C' 03556 1 | I' 77772 0 |
| 10,2320 | C' 0n22 1 | I' 76435 1 | C' 03542 1 | I' 65361 0 | I' 53361 0 | C' 03542 1 | I' 77772 0 | C' 02714 1 |
| 10,2330 | I' 76435 1 | C' 02722 1 | C' 26730 1 | C' 01736 1 | C' 26672 0 | C' 01744 1 | C' 26700 1 | C' 01752 0 |
| 10,2340 | C' 02706 1 | I' 52014 0 | C' 00260 0 | C' 47244 0 | 00004 0 | 52071 0 | 34371 0 | 05027 1 |
| 10,2350 | C' 03435 0 | C' 60102 1 | 52071 0 | 00003 1 | 52006 0 | 22073 0 | 30065 1 | 74716 1 |
| 10,2360 | 80000 1 | 54061 1 | 30065 1 | 74765 0 | 00006 1 | 74677 1 | 54062 1 | 30065 1 |
| 10,2370 | 74105 0 | 56065 1 | 74761 1 | 10000 0 | 15315 1 | 30062 0 | 50061 0 | 54751 0 |



OCAL LISTING FOR PARAGRAPH J 061, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A'S DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED A/A (INTERPRETIVE OPERATOR WORDS) OR A/C (CONSTANTS)

| | | | | | | | | |
|---------|---------|---------|---------|---------|------------|---------|---------|------------|
| 10,2400 | 10066 0 | 12415 1 | 12403 0 | 40072 0 | 22072 1 | 50071 1 | 52751 0 | 10066 0 |
| 10,2410 | 12411 0 | 12415 1 | 40025 1 | 50071 1 | 55051 0 | 10065 0 | 12431 1 | 12434 1 |
| 10,2420 | 40025 1 | 50061 0 | 55051 0 | 30065 1 | 62427 1 | 10000 0 | 12427 0 | C' 17777 0 |
| 10,2430 | 12434 1 | 60006 1 | 30025 0 | 53136 0 | 40062 1 | 50061 0 | 54750 1 | 30002 0 |
| 10,2440 | 22073 0 | 00003 1 | 52006 0 | 22073 0 | 30062 0 | 50061 0 | 54751 0 | 30070 0 |
| 10,2450 | 50061 0 | 55052 0 | 60006 1 | 30064 0 | 50061 0 | 53435 0 | 12400 0 | 05425 1 |
| 10,2460 | 13547 0 | 54155 1 | 34674 0 | 12626 0 | 34714 1 | 54155 1 | 33157 1 | 12626 0 |
| 10,2470 | 54155 1 | 33646 0 | 12626 0 | 54155 1 | 33633 1 | 12626 0 | 54155 1 | 33634 0 |
| 10,2500 | 12626 0 | 54155 1 | 34674 0 | 12604 0 | 54155 1 | 33157 1 | 12765 0 | 54155 1 |
| 10,2510 | 33646 0 | 12765 0 | 54155 1 | 33633 1 | 12765 0 | 34712 1 | 03063 1 | 30100 0 |
| 10,2520 | 73647 0 | 10000 0 | 12560 1 | 30100 0 | 74702 1 | 00006 1 | 12530 1 | 15112 1 |
| 10,2530 | 00004 0 | 44715 1 | 70100 1 | 64712 1 | 54100 1 | 00003 1 | 41070 0 | 74706 0 |
| 10,2540 | 10000 0 | 12544 1 | 40370 1 | 54370 1 | 34712 1 | 12744 0 | 30165 0 | 54156 1 |
| 10,2550 | 50164 1 | 33657 0 | 54162 0 | 50164 1 | 31067 1 | 54160 1 | 54003 0 | 00002 0 |
| 10,2560 | 30100 0 | 73402 0 | 10000 0 | 13602 1 | 40100 1 | 74710 1 | 00004 0 | 26100 1 |
| 10,2570 | 12662 0 | 30370 0 | 74160 0 | 13246 0 | 54155 1 | 34714 1 | 12626 0 | 54155 1 |
| 10,2600 | 34705 1 | 12626 0 | 54155 1 | 34714 1 | 54160 1 | 34714 1 | 12767 1 | 34714 1 |
| 10,2610 | 54155 1 | 33632 0 | 12626 0 | 54155 1 | 33632 0 | 12765 0 | 54155 1 | 34675 1 |
| 10,2620 | 12626 0 | 54155 1 | 34675 1 | 12604 0 | 54155 1 | 34707 0 | 54160 1 | 03050 1 |
| 10,2630 | 00003 1 | 12674 1 | 54155 1 | 33651 0 | 12765 0 | 54155 1 | 33651 0 | 12626 0 |
| 10,2640 | 34714 1 | 54164 0 | 03522 1 | 12650 1 | 30100 0 | 73670 1 | 10000 0 | 12723 1 |
| 10,2650 | 30100 0 | 75612 0 | 00006 1 | 12656 1 | 34714 1 | 13122 1 | 30100 0 | 73666 0 |
| 10,2660 | 00006 1 | 12664 0 | 34712 1 | 13122 1 | 03062 0 | 03333 1 | 05074 1 | 03350 1 |
| 10,2670 | 30025 0 | 55147 0 | 34714 1 | 12744 0 | 30167 1 | 77674 1 | 54163 1 | 37670 1 |
| 10,2700 | 05103 0 | 30160 0 | 73650 0 | 10000 0 | 12640 0 | 12707 1 | 12515 0 | 34711 1 |
| 10,2710 | 54164 0 | 03522 1 | 12725 1 | 41071 1 | 74707 1 | 10000 0 | 12725 0 | 30100 0 |
| 10,2720 | 73641 0 | 00006 1 | 12725 1 | 05622 1 | C' 01502 1 | 03064 0 | 30163 0 | 00006 1 |
| 10,2730 | 04007 1 | 54366 0 | 30160 0 | 73642 0 | 10000 0 | 13102 0 | 12740 1 | 13102 0 |
| 10,2740 | 03333 1 | 05074 1 | 03350 1 | 34711 1 | 54164 0 | 13216 0 | 54155 1 | 37703 1 |
| 10,2750 | 12626 0 | 55045 0 | 33624 1 | 54155 1 | 33623 0 | 12626 0 | 54155 1 | 33627 1 |
| 10,2760 | 12626 0 | 03043 0 | 12626 0 | 54155 1 | 34707 0 | 54160 1 | 36214 0 | 00004 0 |
| 10,2770 | 54072 0 | 30167 1 | 77674 1 | 54063 0 | 30160 0 | 74707 1 | 10000 0 | 13005 0 |



NOTAL LISTING FOR PARAGRAPH J 062, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, #A DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #A (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|------------|---------|------------|------------|------------|------------|------------|------------|
| 10,3000 | 30063 1 | 05027 1 | C' 02674 0 | C' 20107 0 | 13013 1 | 30006 1 | 00006 1 | 04007 1 |
| 10,3010 | 54001 1 | 33665 1 | 05053 1 | 03050 1 | 00006 1 | 30156 0 | 50064 0 | 52156 1 |
| 10,3020 | 90006 1 | 30160 0 | 50064 0 | 52160 1 | 30064 0 | 54161 0 | 03055 1 | 00003 1 |
| 10,3030 | 14577 1 | 55045 0 | 33624 1 | 54155 1 | 33623 0 | 12765 0 | 54155 1 | 33627 1 |
| 10,3040 | 12765 0 | 03043 0 | 12765 0 | 55131 1 | 33630 1 | 54155 1 | 33631 0 | 00002 0 |
| 10,3050 | 90004 0 | 43640 1 | 70160 1 | 60003 1 | 54160 1 | 22002 0 | 04604 1 | 54157 0 |
| 10,3060 | 80072 1 | 00001 0 | 34714 1 | 54164 0 | 00004 0 | 30160 0 | 50164 1 | 55067 0 |
| 10,3070 | 73656 0 | 00006 1 | 13076 1 | 30157 1 | 50164 1 | 54372 0 | 30155 0 | 50164 1 |
| 10,3100 | 54367 1 | 13357 1 | 50164 1 | 33657 0 | 73106 1 | 07717 1 | C' 03004 0 | 44712 0 |
| 10,3110 | 60164 1 | 54154 0 | 50154 1 | 33636 1 | 00004 0 | 05074 1 | 03350 1 | 50154 1 |
| 10,3120 | 33636 1 | 15070 1 | 54154 0 | 03333 1 | 05074 1 | 30154 1 | 50064 0 | 54154 0 |
| 10,3130 | 33143 1 | 03351 0 | 50154 1 | 33660 1 | 73662 1 | 07735 1 | C' 74004 0 | 50154 1 |
| 10,3140 | 34706 1 | 64710 0 | 07717 1 | C' 03112 0 | 30100 0 | 74710 1 | 10000 0 | 02530 0 |
| 10,3150 | 12664 0 | 34714 1 | 54160 1 | 50160 0 | 33652 0 | 64710 0 | 07735 1 | C' 40010 1 |
| 10,3160 | 50160 0 | 33636 1 | 00004 0 | 05074 1 | 13463 1 | 31071 0 | 54003 0 | 30366 1 |
| 10,3170 | 04666 0 | 77674 1 | 05103 0 | 46214 1 | 60374 1 | 14577 1 | 00003 1 | 31072 0 |
| 10,3200 | 54156 1 | 30100 0 | 77707 1 | 10000 0 | 13207 0 | 13617 0 | 12530 1 | 05435 0 |
| 10,3210 | C' 00105 0 | 34675 1 | 70100 1 | 10000 0 | 12672 1 | 12743 1 | 02550 0 | 30160 0 |
| 10,3220 | 74716 1 | 54001 1 | 44676 0 | 50164 1 | 71067 0 | 50164 1 | 55067 0 | 74703 0 |
| 10,3230 | 54141 1 | 30156 0 | 54165 1 | 55072 1 | 50164 1 | 10367 1 | 13245 0 | 13361 1 |
| 10,3240 | 40370 1 | 54370 1 | 76043 1 | 63643 0 | 60141 0 | 64712 1 | 04171 1 | 13373 1 |
| 10,3250 | 04447 1 | 02546 1 | 05447 0 | C' 00102 1 | 05447 0 | C' 00103 0 | 05447 0 | C' 00104 1 |
| 10,3260 | 30160 0 | 04271 1 | 13216 0 | 34706 1 | 70160 1 | 10000 0 | 13311 0 | 34707 0 |
| 10,3270 | 70160 1 | 10000 0 | 13406 1 | 40160 1 | 74705 0 | 10000 0 | 13303 0 | 50164 1 |
| 10,3300 | 30372 1 | 54157 0 | 13501 1 | 50164 1 | 30367 0 | 76043 1 | 00006 1 | 13406 1 |
| 10,3310 | 15112 1 | 30160 0 | 74676 0 | 10000 0 | 13267 0 | 34676 1 | 50164 1 | 27067 0 |
| 10,3320 | 22007 0 | 00006 1 | 62571 0 | 74677 1 | 00006 1 | 13331 1 | 41145 1 | 63667 0 |
| 10,3330 | 13246 0 | 33626 0 | 13246 0 | 44706 0 | 00006 1 | 03011 1 | 30100 0 | 73644 0 |
| 10,3340 | 10000 0 | 34712 1 | 54001 1 | 34714 1 | 50001 0 | 57042 0 | 00004 0 | 00002 0 |
| 10,3350 | 34233 1 | 56064 0 | 00006 1 | 63357 0 | 56064 0 | 50064 0 | 54164 0 | 00003 1 |
| 10,3360 | 00002 0 | 37667 1 | 05042 1 | C' 04245 0 | C' 04100 1 | 13407 0 | 30100 0 | 73414 1 |
| 10,3370 | 00006 1 | 12723 1 | 15112 1 | 11042 1 | 15112 1 | 13377 0 | 15112 1 | 30162 1 |



COAL LISTING FOR PARAGRAPH J 064, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A'S DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED A'S (INTERPRETIVE OPERATOR WORDS) OR C'S (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 11,2000 | I' 77614 1 | C' 00475 1 | I' 44175 1 | C' 03415 1 | C' 01340 1 | C' 03604 0 | I' 46135 1 | C' 03747 0 |
| 11,2010 | C' 22022 1 | I' 72575 0 | C' 03570 0 | C' 27570 0 | C' 03576 0 | I' 77752 1 | C' 27578 0 | C' 03604 0 |
| 11,2020 | I' 77752 1 | C' 03604 0 | I' 71331 0 | C' 03505 1 | C' 77776 1 | I' 70546 1 | C' 17630 1 | I' 67154 0 |
| 11,2030 | C' 00154 1 | C' 02703 1 | I' 77775 1 | C' 03570 0 | C' 26657 1 | C' 03604 0 | C' 16685 0 | C' 03423 1 |
| 11,2040 | C' 02673 1 | I' 77201 1 | C' 00001 0 | C' 03570 0 | I' 41456 0 | I' 53435 0 | C' 03578 0 | C' 26676 1 |
| 11,2050 | C' 03604 0 | I' 50256 0 | I' 43015 1 | C' 03630 1 | C' 03665 1 | C' 03630 1 | I' 43044 0 | C' 22101 1 |
| 11,2060 | C' 03465 0 | I' 41575 0 | C' 02665 0 | I' 63246 1 | I' 46206 1 | C' 02676 1 | I' 51352 1 | I' 74256 0 |
| 11,2070 | I' 77772 0 | C' 02665 0 | I' 67351 1 | C' 11456 0 | C' 03505 1 | I' 77244 0 | C' 22101 1 | C' 02665 0 |
| 11,2100 | C' 03604 0 | I' 63345 0 | C' 27736 0 | C' 02665 0 | I' 63256 0 | C' 02657 1 | I' 41456 0 | I' 57435 1 |
| 11,2110 | C' 00003 1 | I' 77606 1 | I' 71350 1 | C' 03745 1 | C' 00023 0 | I' 62040 1 | C' 22120 1 | C' 77767 1 |
| 11,2120 | I' 67310 1 | C' 00012 1 | C' 00047 1 | I' 77230 0 | C' 22126 1 | I' 41476 1 | I' 77775 1 | I' 50235 0 |
| 11,2130 | I' 71244 0 | C' 22133 0 | I' 41476 1 | I' 67154 0 | C' 00000 1 | C' 02674 0 | I' 45150 1 | C' 03745 1 |
| 11,2140 | C' 25215 0 | I' 77214 0 | C' 00675 0 | C' 02746 0 | C' 17612 1 | C' 02704 0 | I' 45030 0 | C' 22224 0 |
| 11,2150 | C' 27371 1 | I' 43135 1 | C' 03747 0 | C' 00263 0 | I' 43030 0 | C' 22157 1 | C' 00063 1 | I' 77775 1 |
| 11,2160 | C' 03570 0 | C' 02657 1 | C' 25535 0 | C' 03612 1 | C' 15543 1 | C' 03503 1 | C' 01517 0 | I' 43015 1 |
| 11,2170 | C' 03423 1 | C' 01673 1 | C' 34041 0 | C' 27066 1 | I' 77775 1 | C' 00025 0 | C' 02705 1 | I' 63154 1 |
| 11,2200 | C' 03504 0 | C' 00001 0 | I' 55134 1 | C' 03504 0 | C' 02703 1 | I' 46135 1 | C' 00050 1 | C' 22221 0 |
| 11,2210 | I' 52375 1 | C' 03604 0 | C' 00017 1 | I' 77655 1 | C' 02665 0 | C' 16665 0 | C' 03630 1 | I' 77650 1 |
| 11,2220 | C' 22056 1 | I' 77775 1 | C' 02665 0 | C' 03604 0 | I' 52375 1 | C' 03612 1 | C' 03578 0 | C' 27646 0 |
| 11,2230 | C' 02705 1 | C' 03620 0 | I' 46135 1 | C' 03747 0 | C' 22251 1 | I' 70575 1 | C' 03620 0 | C' 27620 0 |
| 11,2240 | C' 03612 1 | I' 77742 0 | C' 27612 1 | C' 03604 0 | I' 77742 0 | C' 27604 0 | C' 03646 0 | I' 77742 0 |
| 11,2250 | C' 03646 0 | I' 77201 1 | C' 00001 0 | C' 03604 0 | C' 37415 0 | C' 01340 1 | I' 77620 0 | C' 00300 1 |
| 11,2260 | I' 77624 1 | C' 47432 1 | I' 77624 1 | C' 34567 1 | I' 66370 0 | C' 00022 1 | C' 00051 0 | C' 00006 1 |
| 11,2270 | I' 61373 1 | C' 02736 1 | C' 01736 1 | I' 77656 1 | C' 06736 0 | I' 77700 0 | C' 22270 1 | I' 75160 1 |
| 11,2300 | C' 00306 1 | C' 02671 0 | I' 77624 1 | C' 31040 1 | I' 77624 1 | C' 47244 0 | I' 77650 1 | C' 00300 1 |
| 11,2310 | I' 40354 1 | C' 02150 1 | C' 00001 0 | I' 75543 1 | C' 50041 1 | I' 53515 0 | C' 01535 0 | I' 60325 0 |
| 11,2320 | C' 00045 0 | C' 00047 1 | I' 77715 1 | I' 65241 0 | C' 01543 1 | C' 02312 0 | I' 60225 1 | C' 01551 1 |
| 11,2330 | C' 00051 0 | I' 77742 0 | I' 65271 0 | C' 00003 1 | I' 41405 0 | C' 00005 1 | I' 65316 0 | C' 00005 1 |
| 11,2340 | I' 64716 0 | C' 50041 1 | I' 40442 1 | I' 47515 0 | C' 01543 1 | I' 44205 0 | C' 00045 0 | I' 41271 0 |
| 11,2350 | C' 00003 1 | I' 53605 1 | C' 23717 1 | C' 20176 0 | I' 43260 1 | C' 00050 1 | I' 45257 0 | C' 20211 1 |
| 11,2360 | I' 41205 0 | C' 00001 0 | C' 00005 1 | I' 53657 0 | C' 20211 1 | C' 20201 0 | I' 65213 1 | C' 01553 0 |
| 11,2370 | I' 53605 1 | C' 00001 0 | C' 20202 0 | I' 43204 0 | C' 57343 1 | I' 77626 0 | C' 75471 1 | I' 74020 0 |



OPTAL LISTING FOR PARAGRAPH J 065, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #1A (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 11,2400 | C' 02270 0 | C' 00012 1 | I' 74014 1 | C' 00303 1 | C' 24000 1 | C' 00002 0 | I' 77650 1 | C' 24000 1 |
| 11,2410 | I' 88350 1 | C' 01500 0 | C' 00051 0 | C' 77762 1 | I' 54345 1 | C' 02314 0 | C' 20812 0 | I' 61500 0 |
| 11,2420 | C' 22421 0 | I' 43208 1 | C' 01551 1 | C' 16312 0 | I' 77615 0 | C' 01517 0 | C' 35517 1 | C' 22310 0 |
| 11,2430 | I' 73150 1 | C' 02150 1 | C' 02150 1 | I' 77775 1 | C' 11456 0 | C' 26202 0 | C' 02152 0 | I' 53257 1 |
| 11,2440 | C' 57605 0 | C' 01535 0 | C' 02160 1 | I' 65014 1 | C' 01756 1 | C' 22452 1 | C' 01500 0 | C' 12217 0 |
| 11,2450 | I' 77724 0 | C' 01500 0 | I' 53575 0 | C' 02152 0 | C' 16152 0 | C' 00045 0 | C' 02310 1 | I' 77624 1 |
| 11,2460 | C' 22562 0 | I' 66175 1 | C' 02160 1 | C' 00051 0 | C' 16152 0 | C' 02210 0 | C' 02310 1 | I' 71214 0 |
| 11,2470 | C' 00342 1 | C' 22725 1 | C' 01517 0 | I' 77624 1 | C' 54110 0 | I' 72174 0 | C' 00002 0 | C' 00051 0 |
| 11,2500 | I' 77614 1 | C' 00343 0 | C' 22505 1 | I' 77076 0 | C' 60000 1 | C' 02160 1 | C' 26263 1 | C' 00003 1 |
| 11,2510 | C' 02300 0 | I' 45335 0 | C' 01012 0 | C' 23721 1 | I' 43030 0 | C' 22520 0 | C' 01756 1 | C' 22534 0 |
| 11,2520 | I' 74375 0 | C' 02152 0 | C' 02310 1 | I' 52257 0 | C' 57175 0 | C' 02160 1 | I' 77724 0 | C' 01500 0 |
| 11,2530 | C' 12225 1 | C' 02272 1 | I' 77724 0 | C' 01500 0 | I' 62175 0 | C' 02263 1 | C' 00004 0 | I' 43014 0 |
| 11,2540 | C' 04260 1 | C' 00343 0 | C' 22547 1 | I' 53261 1 | C' 20812 0 | C' 02300 0 | C' 02300 0 | I' 77624 1 |
| 11,2550 | C' 22562 0 | I' 62174 1 | C' 00004 0 | C' 00004 0 | I' 77775 1 | C' 02300 0 | C' 36160 0 | C' 22562 0 |
| 11,2560 | I' 77650 1 | C' 22725 1 | I' 74575 0 | C' 02160 1 | I' 40236 1 | C' 00001 0 | I' 61501 1 | C' 00040 0 |
| 11,2570 | I' 60325 0 | C' 02310 1 | C' 00041 1 | I' 63342 1 | C' 02160 1 | I' 77656 1 | C' 16160 1 | C' 00045 0 |
| 11,2600 | C' 02210 0 | I' 55301 0 | C' 00042 1 | I' 41562 0 | I' 77743 1 | C' 27730 0 | C' 00051 0 | I' 57124 1 |
| 11,2610 | C' 00050 1 | C' 00040 0 | I' 71264 1 | C' 00041 1 | C' 00003 1 | I' 65057 0 | C' 57177 1 | C' 00050 1 |
| 11,2620 | I' 74406 0 | I' 50315 0 | C' 02152 0 | C' 02160 1 | I' 44372 1 | I' 57206 1 | C' 00005 1 | I' 77752 1 |
| 11,2630 | I' 43208 1 | C' 23701 0 | I' 75406 1 | I' 41475 1 | C' 00013 0 | I' 43352 1 | C' 23701 0 | I' 43325 1 |
| 11,2640 | C' 00013 0 | C' 11454 1 | I' 72475 1 | C' 00011 1 | I' 56215 1 | C' 23673 1 | C' 00017 1 | I' 74275 1 |
| 11,2650 | C' 00007 0 | C' 02160 1 | I' 64515 1 | C' 02152 0 | I' 41455 0 | I' 41345 0 | C' 00001 0 | C' 00015 0 |
| 11,2660 | I' 61501 1 | C' 00037 0 | I' 40665 0 | C' 00003 1 | C' 50041 1 | I' 74276 1 | I' 57124 1 | C' 00050 1 |
| 11,2670 | C' 00051 0 | I' 55064 0 | C' 00036 1 | C' 00037 0 | I' 77600 1 | C' 22676 0 | I' 65057 0 | C' 57177 1 |
| 11,2700 | C' 00050 1 | I' 77655 1 | C' 02202 0 | C' 02202 0 | I' 43400 1 | C' 22706 0 | I' 54345 1 | C' 02212 1 |
| 11,2710 | C' 20812 0 | I' 44206 0 | C' 01551 1 | C' 16312 0 | C' 01517 0 | I' 45425 0 | C' 42260 0 | C' 22310 0 |
| 11,2720 | I' 77624 1 | C' 23344 0 | I' 77614 1 | C' 04020 1 | C' 27234 1 | I' 71354 0 | C' 02150 1 | C' 02310 1 |
| 11,2730 | I' 44601 0 | C' 00001 0 | C' 50007 0 | I' 43044 0 | C' 23135 1 | C' 00343 0 | C' 23144 1 | I' 65375 0 |
| 11,2740 | C' 02152 0 | C' 01517 0 | I' 45125 0 | C' 23671 0 | C' 55366 1 | C' 00017 1 | I' 47375 0 | C' 02012 0 |
| 11,2750 | C' 11450 0 | I' 61255 1 | C' 11450 0 | C' 00025 0 | I' 77656 1 | C' 00025 0 | I' 57345 1 | C' 00023 0 |
| 11,2760 | C' 23703 1 | I' 63525 0 | C' 00023 0 | I' 45275 0 | C' 23705 1 | C' 23677 0 | I' 57206 1 | C' 00023 0 |
| 11,2770 | I' 76405 1 | C' 23711 1 | I' 57325 1 | C' 00001 0 | C' 23717 1 | I' 41421 0 | I' 57275 0 | C' 00023 0 |



TOTAL LISTING FOR PARAGRAPH J 066, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A'S DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #A (INTERPRETIVE OPERATOR WORDS) OR #C (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 11,3000 | C' 23713 0 | I' 57325 1 | C' 00003 1 | C' 23715 0 | I' 77621 1 | I' 77603 1 | C' 50035 1 | I' 43271 1 |
| 11,3010 | C' 02310 1 | C' 00005 1 | I' 56273 1 | C' 50031 0 | C' 02310 1 | I' 74215 1 | C' 00003 1 | C' 02152 0 |
| 11,3020 | C' 14033 1 | I' 70403 1 | C' 50035 1 | I' 43271 1 | C' 02310 1 | I' 50473 1 | C' 50031 0 | I' 43271 1 |
| 11,3030 | C' 02310 1 | I' 76561 1 | C' 00025 0 | I' 77645 0 | C' 00033 1 | C' 14033 1 | C' 02310 1 | I' 63501 0 |
| 11,3040 | C' 00047 1 | I' 60316 0 | C' 00051 0 | I' 54606 0 | C' 50025 0 | I' 77761 1 | C' 00033 1 | C' 00033 1 |
| 11,3050 | I' 56070 0 | C' 00046 0 | C' 00046 0 | I' 43070 1 | C' 00050 1 | C' 00343 0 | C' 23125 0 | I' 63545 0 |
| 11,3060 | C' 00017 1 | I' 63525 0 | C' 00021 1 | I' 65215 1 | C' 00003 1 | I' 45352 1 | C' 00003 1 | I' 41525 0 |
| 11,3070 | C' 00023 0 | I' 65361 0 | C' 00025 0 | I' 45316 1 | C' 23671 0 | I' 52405 1 | C' 27756 0 | I' 52361 1 |
| 11,3100 | C' 02152 0 | I' 72561 0 | I' 77725 1 | C' 00017 1 | I' 63205 0 | C' 00021 1 | C' 02152 0 | I' 74235 0 |
| 11,3110 | C' 00025 0 | I' 53332 0 | I' 77725 1 | I' 41301 0 | C' 00050 1 | C' 00001 0 | I' 74265 0 | C' 27754 1 |
| 11,3120 | I' 53257 1 | C' 57605 0 | C' 00033 1 | I' 77754 1 | C' 02150 1 | I' 77600 1 | C' 23127 1 | I' 53257 1 |
| 11,3130 | C' 20153 1 | C' 02202 0 | C' 02202 0 | I' 77600 1 | C' 22706 0 | I' 72135 0 | C' 01501 1 | C' 00154 1 |
| 11,3140 | I' 73205 1 | C' 27760 0 | C' 00155 0 | C' 23152 0 | I' 77745 1 | C' 02156 1 | C' 24023 0 | C' 11450 0 |
| 11,3150 | I' 77650 1 | C' 22755 0 | C' 23371 0 | C' 23375 1 | C' 23406 1 | I' 77214 0 | C' 00342 1 | C' 23206 1 |
| 11,3160 | C' 01535 0 | I' 41241 0 | C' 01543 1 | C' 02314 0 | I' 77640 0 | C' 23206 1 | I' 43014 0 | C' 00303 1 |
| 11,3170 | C' 23263 1 | C' 04340 1 | C' 23260 1 | I' 45145 0 | C' 01517 0 | C' 54110 0 | C' 02263 1 | I' 77754 1 |
| 11,3200 | C' 02150 1 | I' 51445 0 | C' 01535 0 | I' 50025 0 | C' 27764 1 | C' 23300 0 | I' 51575 1 | C' 01521 0 |
| 11,3210 | I' 77600 1 | C' 23234 0 | I' 51025 1 | C' 23707 0 | C' 23234 0 | I' 53615 0 | C' 23707 0 | C' 57605 0 |
| 11,3220 | I' 45271 1 | C' 00013 0 | C' 27762 1 | I' 77244 0 | C' 23234 0 | C' 01527 0 | I' 45246 0 | C' 23707 0 |
| 11,3230 | I' 77600 1 | C' 23234 0 | I' 77640 0 | C' 23236 1 | I' 77624 1 | C' 23344 0 | I' 77775 1 | C' 01527 0 |
| 11,3240 | C' 25120 0 | C' 01521 0 | C' 01112 1 | I' 77614 1 | C' 00261 1 | I' 66375 0 | C' 01112 1 | C' 01501 1 |
| 11,3250 | C' 00000 1 | C' 16152 0 | C' 11456 0 | C' 02212 1 | I' 52014 0 | C' 00301 0 | C' 23610 1 | C' 22430 0 |
| 11,3260 | I' 52175 0 | C' 02263 1 | C' 23201 0 | I' 60545 0 | C' 00013 0 | I' 50025 0 | C' 27764 1 | C' 23206 1 |
| 11,3270 | I' 71214 0 | C' 04340 1 | C' 23300 0 | C' 01517 0 | I' 77624 1 | C' 54115 0 | I' 77676 0 | C' 02263 1 |
| 11,3300 | I' 77624 1 | C' 23304 1 | I' 77650 1 | C' 23236 1 | I' 45020 1 | C' 02270 0 | C' 23344 0 | I' 53775 1 |
| 11,3310 | C' 01535 0 | C' 57576 1 | I' 53651 0 | C' 02263 1 | C' 57574 0 | C' 01503 0 | C' 15535 0 | C' 01517 0 |
| 11,3320 | I' 77624 1 | C' 54120 0 | I' 57414 1 | C' 00343 0 | C' 23325 1 | I' 53715 1 | C' 01543 1 | C' 57576 1 |
| 11,3330 | I' 77651 0 | I' 77657 0 | C' 57574 0 | C' 01511 0 | C' 01543 1 | I' 67154 0 | C' 02270 0 | C' 00052 0 |
| 11,3340 | I' 52014 0 | C' 00303 1 | C' 26666 0 | C' 26673 1 | I' 77354 0 | C' 02150 1 | C' 01521 0 | I' 53257 1 |
| 11,3350 | C' 57605 0 | C' 01535 0 | C' 01503 0 | C' 25535 0 | C' 01527 0 | I' 53257 1 | C' 57602 1 | C' 01543 1 |
| 11,3360 | C' 01511 0 | C' 25543 1 | C' 11456 0 | C' 01521 0 | C' 15527 0 | C' 11456 0 | C' 01551 1 | C' 01553 0 |
| 11,3370 | I' 77616 0 | I' 64575 1 | C' 02202 0 | C' 36166 0 | C' 23551 1 | I' 74575 0 | C' 02202 0 | I' 53206 0 |



COML LISTING FOR PARAGRAPH J 676, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" A DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED AIA (INTERPRETIVE OPERATOR WORDS) OR ACA (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 12,2000 | I' 71201 1 | C' 00001 0 | C' 11456 0 | C' 01344 0 | C' 31346 1 | C' 11631 0 | C' 24017 1 | C' 01503 0 |
| 12,2010 | I' 86256 0 | C' 00027 1 | C' 00024 1 | C' 10047 0 | C' 00045 0 | C' 24041 1 | C' 01503 0 | I' 70441 1 |
| 12,2020 | C' 01511 0 | I' 76405 1 | C' 00023 0 | C' 24043 0 | C' 01511 0 | I' 67230 1 | C' 00017 1 | I' 52405 1 |
| 12,2030 | C' 00041 1 | I' 61425 0 | C' 11500 1 | C' 00045 0 | I' TU21 0 | C' 11500 1 | I' 77671 1 | C' 00041 1 |
| 12,2040 | C' 00011 1 | I' 71244 0 | C' 24051 0 | C' 11516 0 | I' 40071 0 | C' 00011 1 | C' 24055 1 | I' 52100 1 |
| 12,2050 | C' 24055 1 | I' 55386 1 | C' 11520 0 | I' 77600 1 | C' 24055 1 | I' 50165 0 | C' 02312 0 | C' 24272 0 |
| 12,2080 | C' 00013 0 | I' 65205 0 | C' 00023 0 | C' 00011 1 | I' 65301 0 | C' 00017 1 | I' 56257 1 | C' 20173 0 |
| 12,2070 | I' 50000 1 | C' 24112 0 | C' 24112 0 | I' 77606 1 | I' 50021 1 | C' 02312 0 | C' 24112 0 | C' 16312 0 |
| 12,2100 | C' 00013 0 | I' 77615 0 | C' 01344 0 | C' 15344 0 | C' 00001 0 | I' 17015 0 | C' 01346 1 | C' 15346 1 |
| 12,2110 | I' 77650 1 | C' 24070 0 | I' 71201 1 | C' 00001 0 | C' 11456 0 | C' 14015 0 | C' 02300 0 | I' 71025 0 |
| 12,2120 | C' 01344 0 | C' 00025 0 | I' 50054 0 | C' 24285 0 | C' 24285 0 | I' 51025 1 | C' 00013 0 | C' 24285 0 |
| 12,2130 | I' 57345 1 | C' 02312 0 | C' 11511 1 | I' 77646 0 | C' 15350 0 | C' 01551 1 | I' 45284 0 | C' 24141 0 |
| 12,2140 | C' 01346 1 | C' 15551 1 | C' 01553 0 | I' 45254 0 | C' 24146 1 | C' 01344 0 | I' 77621 1 | C' 00025 0 |
| 12,2150 | C' 02643 1 | I' 63545 0 | C' 00025 0 | I' 41501 0 | C' 00047 1 | I' 53605 1 | C' 00011 1 | C' 21513 0 |
| 12,2100 | C' 34031 1 | C' 24426 1 | I' 44200 0 | C' 24312 1 | C' 02312 0 | C' 02845 1 | I' 44248 1 | C' 01350 0 |
| 12,2170 | I' 71244 0 | C' 24334 0 | C' 00037 0 | I' 60225 1 | C' 01551 1 | C' 00041 1 | I' 60325 0 | C' 02843 1 |
| 12,2200 | C' 00050 1 | I' 41260 0 | C' 00047 1 | C' 02645 1 | I' 56257 1 | C' 21202 1 | I' 41542 1 | I' 71244 0 |
| 12,2210 | C' 24231 1 | C' 00025 0 | C' 00013 0 | I' 45221 1 | C' 00015 0 | I' 51000 0 | C' 24223 1 | C' 24223 1 |
| 12,2220 | I' 52145 0 | C' 00001 0 | C' 24243 1 | I' 45345 1 | C' 00015 0 | C' 00025 0 | I' 52075 1 | C' 11514 1 |
| 12,2230 | C' 24243 1 | I' 77745 1 | C' 00025 0 | C' 00015 0 | I' 45221 1 | C' 00013 0 | I' 50000 1 | C' 24251 1 |
| 12,2240 | C' 24257 1 | I' 77745 1 | C' 00001 0 | C' 02643 1 | I' 43254 0 | C' 24334 0 | C' 00025 0 | C' 14025 0 |
| 12,2250 | C' 00037 0 | C' 01551 1 | I' 46034 1 | C' 24651 0 | C' 24334 0 | I' 77650 1 | C' 24151 1 | I' 45345 1 |
| 12,2260 | C' 00013 0 | C' 00025 0 | I' 52075 1 | C' 11514 1 | C' 24243 1 | I' 70545 1 | C' 00013 0 | C' 00025 0 |
| 12,2270 | I' 77850 1 | C' 24130 0 | C' 14015 0 | C' 11456 0 | C' 14013 0 | C' 02308 0 | C' 00025 0 | I' 51054 1 |
| 12,2300 | C' 24305 1 | C' 24305 1 | I' 51025 1 | C' 00015 0 | C' 24130 0 | I' 10545 1 | C' 00015 0 | C' 00025 0 |
| 12,2310 | I' 77650 1 | C' 24130 0 | I' 50145 1 | C' 00025 0 | C' 24331 0 | C' 00013 0 | I' 70545 1 | C' 02843 1 |
| 12,2320 | C' 02643 1 | I' 44254 1 | C' 02270 0 | C' 00025 0 | C' 14025 0 | C' 01551 1 | C' 00037 0 | I' 77650 1 |
| 12,2330 | C' 24252 1 | C' 00015 0 | I' 77850 1 | C' 24316 0 | I' 44545 0 | C' 00041 1 | I' 74225 1 | C' 00035 1 |
| 12,2340 | C' 02647 0 | I' 65372 1 | C' 00025 0 | I' 60316 0 | C' 00041 1 | I' 57275 0 | C' 00023 0 | C' 00025 0 |
| 12,2350 | I' 53605 1 | C' 00033 1 | C' 21572 1 | I' 77621 1 | C' 00037 0 | I' 14352 0 | C' 01511 0 | I' 53312 1 |
| 12,2380 | I' 77712 0 | C' 01535 0 | I' 00248 1 | C' 00050 1 | C' 16655 0 | C' 00031 0 | I' 45275 0 | C' 00033 1 |
| 12,2310 | C' 11476 1 | I' 76405 1 | C' 00021 1 | I' 53605 1 | C' 00025 0 | C' 56601 0 | I' 74271 0 | C' 02655 0 |

TOTAL LISTING FOR PARAGRAPH J 071, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, S'S DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED SIA (INTERPRETIVE OPERATOR WORDS) OR SCB (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 12,2400 | C' 02647 0 | I' 65372 1 | C' 00035 1 | I' 56257 1 | C' 56602 0 | C' 62855 0 | I' 74221 0 | C' 11512 1 |
| 12,2410 | C' 01511 0 | I' 42455 0 | I' 77626 0 | C' 62234 0 | C' 00037 0 | I' 77615 0 | C' 01346 1 | C' 15551 1 |
| 12,2420 | C' 00025 0 | I' 77615 0 | C' 01344 0 | C' 01553 0 | I' 77650 1 | C' 62270 0 | I' 77776 1 | 07171 1 |
| 12,2430 | C' 60010 0 | C' 02525 1 | C' 12526 0 | C' 67356 0 | C' 75666 0 | C' 15001 1 | C' 23771 1 | C' 64342 0 |
| 12,2440 | C' 43674 0 | C' 06563 1 | C' 04645 1 | C' 75173 0 | C' 52672 0 | C' 00656 1 | C' 14331 0 | C' 77633 1 |
| 12,2450 | C' 40512 0 | C' 00023 0 | C' 11210 1 | C' 77774 0 | C' 67506 0 | 06006 1 | C' 14033 1 | C' 00031 0 |
| 12,2460 | I' 77776 1 | 07171 1 | C' 00010 0 | C' 01000 0 | C' 00000 1 | C' 72525 0 | C' 52506 0 | C' 13301 1 |
| 12,2470 | C' 15337 1 | C' 62776 0 | C' 54733 1 | C' 11176 1 | C' 13267 0 | C' 73410 0 | C' 51674 0 | C' 01446 0 |
| 12,2500 | C' 33641 1 | C' 77451 1 | C' 65233 0 | C' 00055 1 | C' 37266 1 | C' 77767 1 | C' 52336 0 | 06006 1 |
| 12,2510 | I' 53605 1 | C' 00001 0 | C' 21574 1 | C' 00035 1 | I' 72405 0 | C' 00043 0 | I' 65234 1 | C' 45562 1 |
| 12,2520 | I' 53605 1 | C' 00033 1 | C' 21574 1 | I' 72405 0 | C' 00045 0 | I' 65234 1 | C' 45562 1 | C' 00041 1 |
| 12,2530 | I' 76261 0 | C' 20607 1 | I' 41301 0 | C' 00047 1 | C' 00025 0 | I' 76257 0 | C' 20576 1 | I' 57232 0 |
| 12,2540 | C' 00023 0 | C' 00037 0 | I' 77616 0 | I' 71214 0 | C' 00614 1 | C' 24613 0 | C' 00037 0 | I' 60225 1 |
| 12,2550 | C' 02764 0 | C' 00047 1 | I' 60325 0 | C' 00015 0 | C' 00050 1 | I' 41260 0 | C' 00047 1 | C' 02762 0 |
| 12,2560 | I' 56257 1 | C' 21202 1 | I' 43142 1 | C' 04351 1 | C' 24567 0 | I' 75246 0 | C' 02762 0 | I' 51006 0 |
| 12,2570 | C' 24625 0 | I' 43145 0 | C' 03775 1 | C' 04311 0 | C' 24576 0 | C' 00017 1 | I' 45221 1 | C' 00011 1 |
| 12,2600 | I' 51000 0 | C' 24605 1 | C' 24605 1 | I' 77650 1 | C' 24637 0 | I' 45345 1 | C' 00011 1 | C' 03775 1 |
| 12,2610 | I' 52005 0 | C' 11514 1 | C' 24641 1 | I' 41345 0 | C' 00011 1 | C' 00051 0 | I' 41325 0 | C' 00017 1 |
| 12,2620 | C' 00051 0 | I' 77625 0 | I' 52165 1 | C' 02762 0 | C' 24567 0 | I' 43145 0 | C' 03775 1 | C' 04311 0 |
| 12,2630 | C' 24632 0 | C' 00011 1 | I' 45221 1 | C' 00017 1 | I' 50000 1 | C' 24643 0 | C' 24643 0 | I' 77745 1 |
| 12,2640 | C' 00001 0 | C' 00015 0 | I' 77616 0 | I' 45345 1 | C' 00017 1 | C' 03775 1 | I' 52005 0 | C' 11514 1 |
| 12,2650 | C' 24641 1 | 44712 0 | 50120 1 | 60026 0 | 50120 1 | 54026 1 | 54154 0 | 06030 1 |
| 12,2660 | I' 44545 0 | C' 00041 1 | I' 74225 1 | C' 00035 1 | C' 02724 1 | I' 65372 1 | C' 00025 0 | I' 60316 0 |
| 12,2670 | C' 00047 1 | I' 57275 0 | C' 00023 0 | C' 00025 0 | I' 53605 1 | C' 00033 1 | C' 21572 1 | I' 77621 1 |
| 12,2700 | C' 00037 0 | I' 74352 0 | C' 02746 0 | I' 53372 1 | I' 41512 1 | I' 77646 0 | I' 77701 1 | C' 00047 1 |
| 12,2710 | C' 16722 1 | C' 00031 0 | I' 45205 1 | C' 00033 1 | C' 11476 1 | I' 76405 1 | C' 00021 1 | I' 53605 1 |
| 12,2720 | C' 00025 0 | C' 21176 1 | I' 74271 0 | C' 02722 1 | C' 02724 1 | I' 65372 1 | C' 00035 1 | I' 56257 1 |
| 12,2730 | C' 21175 1 | C' 02722 1 | I' 77621 1 | C' 11512 1 | I' 53361 0 | C' 02746 0 | I' 43412 1 | I' 40220 0 |
| 12,2740 | C' 02712 1 | C' 00001 0 | I' 63375 0 | C' 02657 1 | C' 02746 0 | I' 77624 1 | C' 11527 1 | I' 45000 0 |
| 12,2750 | C' 24767 1 | C' 24772 0 | I' 43145 0 | C' 00031 0 | C' 04310 1 | C' 02712 1 | I' 45014 0 | C' 04273 0 |
| 12,2760 | C' 24426 1 | I' 45014 0 | C' 03706 0 | C' 02712 1 | C' 24660 1 | I' 77650 1 | C' 02712 1 | I' 77614 1 |
| 12,2770 | C' 04033 0 | C' 02712 1 | I' 66374 1 | C' 00003 1 | C' 00052 0 | C' 00001 0 | I' 77614 1 | C' 04276 0 |



COAL LISTING FOR PARAGRAPH J 072, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A'S DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED I'S (INTERPRETIVE OPERATOR WORDS) OR A'S (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 12,3000 | I' 85388 1 | C' 01734 0 | I' 44342 1 | C' 11502 0 | I' 84325 1 | C' 01732 0 | C' 21607 0 | I' 77871 1 |
| 12,3010 | I' 77600 1 | C' 25125 0 | I' 41225 1 | C' 03175 1 | I' 40132 0 | C' 25125 0 | I' 63406 0 | I' 65351 0 |
| 12,3020 | C' 00155 0 | C' 01744 1 | I' 70202 0 | I' 75440 0 | C' 25210 0 | I' 43306 0 | I' 01000 0 | C' 25123 0 |
| 12,3030 | C' 25016 1 | I' 40005 0 | C' 11470 1 | C' 25210 0 | I' 41440 1 | C' 25210 0 | I' 77716 1 | I' 41301 0 |
| 12,3040 | C' 00047 1 | C' 03744 1 | I' 77457 1 | C' 21587 0 | I' 07171 1 | C' 00005 1 | C' 20000 0 | C' 00000 1 |
| 12,3050 | C' 72525 0 | C' 52471 1 | C' 03140 1 | C' 15003 0 | C' 75556 0 | C' 45210 0 | C' 01015 1 | C' 13553 0 |
| 12,3060 | C' 78371 0 | C' 63777 0 | C' 01232 0 | C' 27387 0 | C' 00000 1 | I' 70405 1 | I' 43000 0 | C' 04316 1 |
| 12,3070 | C' 25175 0 | I' 00310 0 | C' 00047 1 | I' 53805 1 | C' 03744 1 | C' 21505 1 | C' 14031 0 | C' 00041 1 |
| 12,3100 | I' 75542 0 | I' 41300 1 | I' 77032 0 | C' 00025 0 | I' 00310 0 | C' 00047 1 | I' 41325 0 | C' 02742 1 |
| 12,3110 | C' 00041 1 | I' 75452 0 | I' 88405 0 | C' 03775 1 | C' 14043 0 | C' 02744 1 | I' 43021 0 | C' 11500 1 |
| 12,3120 | C' 84270 0 | C' 00045 0 | I' 77816 0 | C' 17774 0 | C' 00003 1 | I' 51001 1 | C' 00001 0 | C' 25132 0 |
| 12,3130 | I' 77014 1 | C' 04070 1 | I' 75545 1 | C' 02742 1 | I' 41325 0 | C' 03732 0 | C' 03775 1 | I' 65352 0 |
| 12,3140 | C' 02734 0 | I' 43202 0 | C' 11506 1 | I' 41225 1 | I' 55301 0 | C' 00047 1 | C' 03732 0 | I' 51457 0 |
| 12,3150 | C' 21174 0 | I' 63406 0 | C' 14043 0 | C' 11504 0 | I' 63406 0 | I' 03234 1 | C' 45562 1 | C' 02744 1 |
| 12,3160 | I' 40405 1 | C' 00043 0 | I' 77771 0 | I' 75440 0 | C' 25210 0 | I' 77615 0 | I' 00304 0 | C' 25154 0 |
| 12,3170 | C' 00047 1 | I' 77003 1 | I' 52057 1 | C' 21172 0 | C' 25034 1 | I' 50145 1 | C' 03744 1 | C' 25210 0 |
| 12,3200 | I' 60366 1 | C' 00047 1 | I' 53865 1 | C' 11520 0 | C' 20170 0 | I' 41425 1 | I' 77650 1 | C' 25071 0 |
| 12,3210 | I' 40001 1 | C' 00001 0 | C' 25213 0 | I' 43414 1 | C' 04070 1 | I' 40220 0 | C' 0012 1 | C' 00001 0 |
| 12,3220 | I' 78731 0 | C' 00027 1 | C' 00024 1 | C' 11631 0 | C' 14017 1 | C' 02673 1 | I' 77675 0 | C' 11505 1 |
| 12,3230 | C' 63777 0 | I' 77214 0 | C' 00474 0 | C' 02637 1 | I' 45115 0 | C' 02865 0 | C' 11573 0 | C' 16732 0 |
| 12,3240 | C' 03722 1 | I' 05301 0 | C' 00047 1 | C' 00041 1 | I' 56342 1 | I' 65257 1 | C' 20173 0 | I' 77626 0 |
| 12,3250 | C' 75043 1 | I' 44342 1 | C' 11302 0 | C' 02736 1 | I' 53100 0 | C' 25465 1 | I' 65301 0 | C' 00047 1 |
| 12,3260 | C' 00001 0 | I' 36342 1 | I' 73457 0 | C' 20176 0 | I' 54323 1 | C' 03732 0 | C' 20607 1 | I' 43271 1 |
| 12,3270 | C' 02736 1 | I' 77626 0 | C' 77760 0 | I' 50000 1 | C' 25301 1 | C' 25304 1 | I' 50025 0 | C' 11524 1 |
| 12,3300 | C' 25304 1 | I' 77745 1 | C' 11324 1 | C' 00017 1 | I' 77745 1 | C' 02734 0 | I' 45261 0 | C' 20607 1 |
| 12,3310 | I' 77626 0 | C' 01037 1 | C' 02675 1 | I' 71240 1 | C' 25505 0 | C' 03740 0 | I' 56352 0 | C' 02732 0 |
| 12,3320 | I' 77600 1 | C' 25505 0 | C' 00011 1 | I' 00214 0 | C' 00715 1 | C' 25471 1 | C' 00051 0 | C' 00001 0 |
| 12,3330 | I' 77745 1 | C' 03775 1 | I' 77605 1 | C' 03732 0 | I' 45342 0 | C' 02740 0 | I' 03301 0 | C' 00047 1 |
| 12,3340 | C' 02736 1 | I' 56257 1 | C' 20170 0 | I' 53040 0 | C' 25421 1 | C' 25421 1 | C' 10742 1 | C' 03775 1 |
| 12,3350 | I' 43310 1 | C' 11510 0 | I' 41301 0 | C' 00047 1 | C' 02742 1 | I' 44257 1 | C' 20571 0 | C' 11506 1 |
| 12,3360 | C' 10744 1 | C' 03742 1 | I' 45000 0 | C' 25424 1 | C' 24772 0 | I' 77745 1 | C' 00037 0 | C' 16764 0 |
| 12,3370 | C' 00031 0 | I' 45014 0 | C' 04310 1 | C' 25421 1 | C' 24426 1 | I' 44200 0 | C' 25441 1 | C' 02873 1 |

OCAL LISTING FOR PARAGRAPH J 074, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A'S DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED AIA (INTERPRETIVE OPERATOR WORDS) OR ACA (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 13,2000 | I' 43014 0 | C' 01474 1 | C' 01751 0 | C' 26006 0 | I' 77614 1 | C' 01476 0 | I' 45014 0 | C' 01667 1 |
| 13,2010 | C' 27113 1 | I' 71114 0 | C' 04307 1 | C' 26031 1 | C' 01571 0 | C' 34041 0 | C' 27371 1 | I' 45014 0 |
| 13,2020 | C' 01674 0 | C' 26621 0 | I' 43014 0 | C' 02756 1 | C' 26026 1 | C' 01476 0 | I' 45014 0 | C' 01467 0 |
| 13,2030 | C' 27113 1 | I' 77614 1 | C' 01236 1 | C' 26607 1 | I' 43414 1 | C' 01474 1 | 05435 0 | C' 00031 0 |
| 13,2040 | 32163 1 | 04555 0 | C' 20624 0 | 12155 0 | 02046 1 | 02040 1 | 32164 0 | 04555 0 |
| 13,2050 | C' 20624 0 | 12155 0 | 02054 1 | 02046 1 | 06006 1 | I' 77745 1 | C' 03413 1 | C' 34041 0 |
| 13,2060 | C' 27038 1 | I' 53575 0 | C' 00001 0 | I' 77676 0 | C' 00031 0 | I' 53435 0 | C' 00007 0 | C' 00023 0 |
| 13,2070 | I' 53435 0 | C' 00031 0 | C' 24015 0 | C' 03540 0 | I' 76505 0 | C' 00015 0 | I' 77655 1 | C' 00007 0 |
| 13,2100 | C' 00007 0 | I' 77624 1 | C' 27371 1 | I' 77624 1 | C' 26165 1 | I' 53775 1 | C' 00007 0 | C' 57176 0 |
| 13,2110 | C' 25543 1 | C' 00001 0 | I' 77657 0 | C' 57176 0 | C' 15535 0 | C' 03413 1 | C' 01517 0 | I' 71214 0 |
| 13,2120 | C' 01673 1 | C' 01571 0 | C' 34041 0 | C' 27066 1 | I' 77624 1 | C' 27371 1 | I' 77775 1 | C' 00017 1 |
| 13,2130 | C' 01503 0 | C' 15535 0 | C' 00015 0 | C' 25517 0 | C' 00025 0 | I' 77624 1 | C' 23360 0 | I' 77776 1 |
| 13,2140 | 05301 0 | C' 04024 0 | 05435 0 | C' 00236 0 | 06006 1 | I' 77624 1 | C' 26711 1 | I' 77531 0 |
| 13,2150 | C' 00053 1 | C' 26154 0 | 04555 0 | C' 27426 1 | I' 77776 1 | 34714 1 | 55126 0 | 55125 1 |
| 13,2160 | I' 37716 0 | 55734 1 | 14106 0 | C' 01524 0 | C' 01441 1 | I' 43174 1 | C' 00002 0 | C' 00063 1 |
| 13,2170 | I' 77014 1 | C' 04303 0 | C' 00052 0 | C' 00000 1 | I' 43414 1 | C' 00263 0 | 04604 1 | 55777 0 |
| 13,2200 | 06006 1 | I' 43234 0 | C' 45505 0 | C' 26317 0 | C' 02356 0 | I' 43014 0 | C' 00705 0 | C' 26214 1 |
| 13,2210 | C' 00706 0 | C' 28224 1 | I' 77650 1 | C' 26245 0 | I' 77745 1 | C' 02356 0 | C' 34041 0 | C' 27057 0 |
| 13,2220 | I' 77775 1 | C' 00001 0 | I' 77650 1 | C' 26234 0 | I' 71214 0 | C' 04305 0 | C' 54000 0 | C' 02356 0 |
| 13,2230 | I' 77624 1 | C' 26373 1 | I' 77775 1 | C' 02152 0 | C' 16766 1 | C' 02356 0 | C' 34041 0 | C' 27045 0 |
| 13,2240 | I' 52375 1 | C' 02788 1 | C' 00001 0 | I' 52056 0 | C' 26260 1 | I' 72131 1 | C' 00051 0 | C' 00000 1 |
| 13,2250 | C' 00304 0 | I' 77700 0 | C' 26256 1 | I' 52175 0 | C' 02617 0 | C' 26260 1 | I' 77775 1 | C' 02611 0 |
| 13,2260 | I' 53521 1 | C' 01738 1 | C' 02766 1 | I' 45001 1 | C' 00001 0 | C' 47432 1 | I' 77624 1 | C' 46034 1 |
| 13,2270 | I' 77414 0 | C' 01750 1 | C' 26274 1 | 02312 0 | I' 45345 1 | C' 02776 0 | C' 26315 1 | I' 71244 0 |
| 13,2300 | C' 26305 0 | C' 02776 0 | I' 51025 1 | C' 26321 0 | C' 26307 1 | I' 77776 1 | 02311 0 | I' 77776 1 |
| 13,2310 | 25777 1 | 25777 1 | 31777 1 | 04561 1 | C' 25252 0 | C' 25254 0 | C' 00000 1 | C' 00202 1 |
| 13,2320 | C' 61740 0 | C' 77777 0 | I' 40220 0 | C' 02242 1 | C' 00001 0 | C' 24007 0 | C' 02152 0 | I' 51406 1 |
| 13,2330 | C' 16310 1 | C' 11456 0 | I' 71414 0 | C' 01743 0 | C' 26335 0 | I' 77624 1 | C' 55366 1 | I' 77656 1 |
| 13,2340 | C' 36152 1 | C' 26523 1 | I' 77624 1 | C' 26533 0 | I' 63545 0 | C' 02152 0 | I' 63525 0 | C' 02154 0 |
| 13,2350 | I' 75415 0 | I' 78405 1 | C' 00011 1 | C' 14021 1 | C' 02156 1 | C' 34023 1 | C' 26463 1 | C' 15104 0 |
| 13,2360 | C' 02152 0 | C' 14021 1 | C' 02154 0 | C' 34023 1 | C' 26463 1 | C' 15106 1 | C' 02310 1 | I' 77625 0 |
| 13,2370 | C' 02241 1 | C' 35110 1 | C' 02242 1 | I' 40220 0 | C' 02242 1 | C' 00001 0 | C' 34007 1 | C' 26523 1 |

GENERAL LISTING FOR PARAGRAPH J 075, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED IIA (INTERPRETIVE OPERATOR WORDS) OR ICA (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 13,2400 | I' 73545 1 | C' 01104 0 | I' 65275 1 | C' 00011 1 | C' 01104 0 | I' 85346 0 | C' 01106 1 | I' 57356 0 |
| 13,2410 | I' 71525 0 | C' 01104 0 | I' 71525 0 | C' 01106 1 | I' 55475 1 | I' 41456 0 | C' 36152 1 | C' 26533 0 |
| 13,2420 | I' 43145 0 | C' 11456 0 | C' 01743 0 | C' 26425 0 | I' 77746 1 | I' 77624 1 | C' 55341 1 | C' 16152 0 |
| 13,2430 | C' 02241 1 | I' 74215 1 | C' 01110 0 | C' 02152 0 | I' 77772 0 | C' 36152 1 | C' 02242 1 | I' 63545 0 |
| 13,2440 | C' 02156 1 | I' 44352 0 | C' 11454 1 | I' 44275 1 | C' 26460 1 | C' 11454 1 | I' 75465 1 | C' 26454 0 |
| 13,2450 | I' 77622 1 | C' 02241 1 | I' 77616 0 | C' 00446 1 | C' 00305 1 | C' 17711 0 | C' 05264 1 | C' 00155 0 |
| 13,2460 | C' 25250 1 | C' 00302 0 | C' 17755 0 | I' 77600 1 | C' 26465 1 | I' 63545 0 | C' 00023 0 | I' 63525 0 |
| 13,2470 | C' 00021 1 | I' 77616 0 | I' 75454 0 | C' 26511 0 | I' 40065 0 | C' 00023 0 | C' 26516 1 | I' 67542 0 |
| 13,2500 | C' 00025 0 | I' 50125 1 | C' 00021 1 | C' 26505 0 | I' 43545 1 | I' 57545 1 | I' 43244 1 | C' 26513 1 |
| 13,2510 | C' 11454 1 | C' 00025 0 | I' 77616 0 | I' 52025 1 | C' 11454 1 | C' 26511 0 | I' 75345 1 | C' 11502 0 |
| 13,2520 | C' 00023 0 | C' 00025 0 | I' 77616 0 | I' 43145 0 | C' 26456 1 | C' 01743 0 | C' 26531 1 | I' 77735 0 |
| 13,2530 | C' 11454 1 | C' 00011 1 | I' 77616 0 | I' 71220 1 | C' 00051 0 | C' 26560 0 | I' 71214 0 | C' 01703 1 |
| 13,2540 | C' 26550 0 | C' 26462 0 | I' 45014 0 | C' 00742 0 | C' 26546 1 | C' 26437 0 | C' 36241 0 | C' 00051 0 |
| 13,2550 | I' 77214 0 | C' 00702 1 | C' 26546 1 | C' 02026 1 | I' 64446 0 | I' 77650 1 | C' 26546 1 | C' 00065 1 |
| 13,2560 | C' 01265 1 | 05301 0 | C' 00052 0 | 34754 0 | 05042 1 | C' 02570 1 | C' 26063 0 | 05213 1 |
| 13,2570 | 06006 1 | I' 47014 1 | C' 04712 1 | C' 26630 0 | C' 45505 0 | C' 00041 1 | I' 77624 1 | C' 27371 1 |
| 13,2600 | I' 45014 0 | C' 01076 1 | C' 26621 0 | I' 77650 1 | C' 26000 0 | C' 00003 1 | C' 25140 0 | I' 77414 0 |
| 13,2610 | C' 01672 0 | 05301 0 | C' 20032 1 | 00006 1 | 32606 0 | 05231 1 | C' 02561 1 | C' 26063 0 |
| 13,2620 | 05112 0 | I' 43014 0 | C' 01472 1 | C' 01673 1 | I' 43014 0 | C' 01676 1 | C' 01675 1 | I' 77616 0 |
| 13,2630 | I' 77776 1 | 05301 0 | C' 00002 0 | 05447 0 | C' 00221 0 | 05112 0 | I' 47020 0 | C' 00051 0 |
| 13,2640 | C' 26651 1 | I' 45014 0 | C' 04063 0 | C' 20237 0 | I' 43014 0 | C' 00303 1 | C' 00051 0 | C' 04223 0 |
| 13,2650 | C' 00051 0 | 03015 0 | 55500 1 | 51500 0 | 31502 1 | 51500 0 | 55554 0 | 11500 1 |
| 13,2660 | 12652 0 | 06030 1 | I' 43034 1 | C' 26700 1 | C' 04303 0 | C' 26673 1 | I' 66214 0 | C' 00263 0 |
| 13,2670 | C' 02151 0 | C' 00000 1 | I' 77616 0 | I' 66214 0 | C' 00063 1 | C' 02151 0 | C' 00002 0 | I' 77616 0 |
| 13,2700 | 03015 0 | 55500 1 | 51500 0 | 31554 1 | 51500 0 | 55502 0 | 11500 1 | 12701 1 |
| 13,2710 | 06030 1 | I' 47020 0 | C' 00051 0 | C' 26724 1 | I' 45014 0 | C' 04064 1 | C' 20263 1 | I' 43014 0 |
| 13,2720 | C' 00303 1 | C' 00051 0 | C' 04224 1 | C' 00051 0 | 03015 0 | 55500 1 | 51500 0 | 31502 1 |
| 13,2730 | 51500 0 | 55626 0 | 11500 1 | 12725 1 | 06030 1 | I' 47014 1 | C' 04307 1 | C' 26756 1 |
| 13,2740 | C' 26745 0 | I' 52014 0 | C' 04304 1 | C' 26673 1 | C' 26666 0 | 03015 0 | 55500 1 | 51500 0 |
| 13,2750 | 31626 1 | 51500 0 | 55502 0 | 11500 1 | 12746 1 | 06030 1 | I' 77201 1 | C' 00001 0 |
| 13,2760 | C' 02026 1 | I' 41525 0 | C' 00041 1 | C' 15517 0 | C' 27756 0 | I' 77624 1 | C' 55341 1 | C' 25535 0 |
| 13,2770 | C' 11450 0 | C' 14001 0 | C' 01517 0 | C' 14007 0 | C' 27756 0 | I' 45014 0 | C' 00063 1 | C' 55341 1 |

OCTAL LISTING FOR PARAGRAPH J 076, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #I# (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 13,3000 | I' 74235 0 | C' 01535 0 | C' 27014 1 | C' 25543 1 | C' 11456 0 | C' 01521 0 | I' 67174 1 | C' 00002 0 |
| 13,3010 | C' 02150 1 | C' 35527 1 | C' 27136 0 | C' 07112 1 | C' 06620 0 | 33021 1 | 54006 0 | 33436 0 |
| 13,3020 | 00002 0 | C' 26063 0 | I' 45020 1 | C' 00046 0 | C' 27371 1 | I' 43130 1 | C' 02214 1 | C' 01474 1 |
| 13,3030 | I' 43014 0 | C' 01467 0 | C' 01676 1 | I' 77614 1 | C' 01633 0 | C' 27115 1 | I' 45020 1 | C' 00046 0 |
| 13,3040 | C' 27371 1 | I' 43130 1 | C' 02214 1 | C' 01634 1 | C' 27030 1 | I' 45020 1 | C' 00046 0 | C' 27371 1 |
| 13,3050 | I' 43130 1 | C' 02214 1 | C' 01474 1 | I' 43014 0 | C' 01676 1 | C' 01433 1 | C' 27115 1 | I' 45020 1 |
| 13,3060 | C' 00046 0 | C' 27371 1 | I' 43130 1 | C' 02214 1 | C' 01634 1 | C' 27053 1 | I' 66214 0 | C' 01467 0 |
| 13,3070 | C' 02151 0 | C' 00000 1 | I' 66214 0 | C' 00343 0 | C' 27077 1 | C' 02151 0 | C' 00002 0 | I' 77220 1 |
| 13,3100 | C' 02214 1 | C' 11456 0 | C' 01521 0 | C' 35527 1 | C' 23344 0 | I' 43014 0 | C' 01676 1 | C' 04062 1 |
| 13,3110 | I' 77614 1 | C' 04020 1 | C' 27127 0 | I' 77620 0 | C' 02214 1 | I' 43014 0 | C' 04060 0 | C' 04062 1 |
| 13,3120 | I' 77731 1 | C' 00053 1 | C' 27127 0 | I' 52014 0 | C' 01714 1 | C' 26662 1 | C' 26735 1 | I' 77745 1 |
| 13,3130 | C' 00041 1 | C' 01101 0 | I' 52014 0 | C' 01753 1 | C' 27234 1 | C' 27220 1 | I' 77414 0 | C' 01652 1 |
| 13,3140 | C' 27157 1 | 05301 0 | C' 04022 0 | 05435 0 | C' 00236 0 | 06006 1 | I' 77731 1 | C' 00053 1 |
| 13,3150 | C' 27155 0 | I' 52014 0 | C' 01714 1 | C' 26636 0 | C' 26711 1 | I' 77624 1 | C' 56741 0 | I' 45001 1 |
| 13,3160 | C' 00001 0 | C' 23344 0 | I' 53775 1 | C' 01503 0 | C' 57576 1 | I' 53715 1 | C' 01511 0 | C' 57576 1 |
| 13,3170 | I' 63325 0 | C' 01517 0 | C' 01503 0 | I' 64715 0 | C' 01511 0 | C' 50041 1 | I' 76006 0 | C' 77765 0 |
| 13,3200 | I' 76014 0 | C' 00303 1 | C' 27204 1 | C' 77775 1 | I' 40001 1 | C' 00001 0 | C' 27207 1 | I' 43014 0 |
| 13,3210 | C' 04676 1 | C' 01667 1 | I' 77535 1 | C' 02215 0 | 30154 1 | 50120 1 | 54052 1 | 03406 0 |
| 13,3220 | I' 45345 1 | C' 01101 0 | C' 01517 0 | C' 36312 1 | C' 23344 0 | I' 77624 1 | C' 22310 0 | I' 43345 1 |
| 13,3230 | C' 01551 1 | C' 01517 0 | C' 35517 1 | C' 27157 1 | I' 43014 0 | C' 04752 0 | C' 27241 0 | C' 01632 1 |
| 13,3240 | C' 27204 1 | I' 73001 1 | C' 00013 0 | C' 02150 1 | I' 51575 1 | C' 01535 0 | I' 43006 0 | C' 00262 1 |
| 13,3250 | I' 50023 0 | C' 67241 1 | C' 27255 0 | I' 77614 1 | C' 00082 0 | I' 41345 0 | C' 00013 0 | C' 00043 0 |
| 13,3260 | I' 55762 1 | C' 50041 1 | I' 41366 1 | C' 23675 1 | I' 40442 1 | I' 54345 1 | C' 00155 0 | C' 20220 0 |
| 13,3270 | I' 40006 0 | C' 27316 0 | I' 50021 1 | C' 27370 0 | C' 27316 0 | I' 45345 1 | C' 01101 0 | C' 01517 0 |
| 13,3300 | I' 54234 0 | C' 45541 0 | C' 20211 1 | C' 02314 0 | I' 51400 1 | C' 27322 1 | I' 50025 0 | C' 00015 0 |
| 13,3310 | C' 27326 0 | I' 75345 1 | C' 00015 0 | C' 02314 0 | C' 36314 1 | C' 27326 0 | I' 65345 0 | C' 27370 0 |
| 13,3320 | I' 77650 1 | C' 27275 1 | I' 77634 0 | C' 45707 0 | C' 36314 1 | C' 27311 1 | I' 51545 1 | C' 02314 0 |
| 13,3330 | I' 50025 0 | C' 27366 1 | C' 27136 0 | I' 46135 1 | C' 01012 0 | C' 27340 0 | I' 77650 1 | C' 23155 1 |
| 13,3340 | I' 77614 1 | C' 01707 0 | C' 23155 1 | I' 45345 1 | C' 02314 0 | C' 00015 0 | I' 43040 1 | C' 27136 0 |
| 13,3350 | C' 04242 1 | C' 23155 1 | I' 45345 1 | C' 01101 0 | C' 01517 0 | I' 77640 0 | C' 27204 1 | I' 40525 1 |
| 13,3360 | C' 02314 0 | I' 44322 1 | I' 52040 1 | C' 27204 1 | C' 23155 1 | C' 00000 1 | C' 01400 1 | C' 14152 1 |
| 13,3370 | C' 00000 1 | I' 77776 1 | 34714 1 | 54001 1 | 30106 0 | 50001 0 | 73467 0 | 00006 1 |



DATA LISTING FOR PARAGRAPH J 077, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #1 (INTERPRETIVE OPERATOR WORDS) OR #C (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|--------------|------------|------------|------------|------------|
| 13,3400 | 13445 0 | 50001 0 | 33464 1 | 05070 0 | I' 77776 1 | 13426 0 | 40106 1 | 74704 1 |
| 13,3410 | 10000 0 | 03426 1 | 50120 1 | 30052 0 | 55055 1 | 05301 0 | C' 04022 0 | 31055 0 |
| 13,3420 | 50120 1 | 54052 1 | 34704 0 | 70106 1 | 00006 1 | 13450 1 | 34714 1 | 54154 0 |
| 13,3430 | 50154 1 | 33464 1 | 00004 0 | 05074 1 | 10064 1 | 13430 1 | C' 00051 0 | 50154 1 |
| 13,3440 | 43467 0 | 70106 1 | 54106 1 | 00003 1 | 13450 1 | 50001 0 | 34675 1 | 26106 1 |
| 13,3450 | 00006 1 | I' 77616 0 | I' 77776 1 | 34712 1 | 13373 1 | I' 77776 1 | 34711 1 | 13373 1 |
| 13,3460 | 34712 1 | 13427 1 | 34711 1 | 13427 1 | C' 27372 1 | C' 27453 0 | C' 27456 0 | C' 20100 1 |
| 13,3470 | C' 10040 1 | C' 04020 1 | I' 43020 1 | C' 02317 0 | C' 02716 0 | C' 27550 1 | I' 77614 1 | C' 01711 1 |
| 13,3500 | C' 27550 1 | I' 77614 1 | C' 04307 1 | C' 27520 0 | I' 45145 0 | C' 01205 1 | C' 27371 1 | I' 45014 0 |
| 13,3510 | C' 01474 1 | C' 26621 0 | I' 43014 0 | C' 02747 1 | C' 27516 0 | C' 01674 0 | C' 34041 0 | C' 27113 1 |
| 13,3520 | I' 45174 1 | C' 00002 0 | C' 27371 1 | I' 77014 1 | C' 04303 0 | C' 27527 1 | C' 00000 1 | I' 53775 1 |
| 13,3530 | C' 01171 1 | C' 57176 0 | C' 01503 0 | C' 15535 0 | C' 01205 1 | C' 25517 0 | C' 01177 1 | I' 45057 1 |
| 13,3540 | C' 57176 0 | C' 23360 0 | I' 66234 1 | C' 26651 1 | C' 01127 1 | C' 00000 1 | I' 77650 1 | C' 75745 0 |
| 13,3550 | I' 45145 0 | C' 01205 1 | C' 27371 1 | I' 43014 0 | C' 01476 0 | C' 04476 0 | I' 43014 0 | C' 01475 0 |
| 13,3560 | C' 01674 0 | I' 43014 0 | C' 02747 1 | C' 27567 0 | C' 01474 1 | I' 77614 1 | C' 01675 1 | C' 34041 0 |
| 13,3570 | C' 27113 1 | I' 77650 1 | C' 27501 0 | I' 43020 1 | C' 01127 1 | C' 04634 1 | C' 27612 1 | I' 43020 1 |
| 13,3600 | C' 01127 1 | C' 04474 1 | I' 43234 0 | C' 45505 0 | C' 27714 0 | I' 51021 0 | C' 00041 1 | C' 27616 0 |
| 13,3610 | I' 77624 1 | C' 27702 1 | I' 43234 0 | C' 45505 0 | C' 27714 0 | C' 03041 1 | I' 77624 1 | C' 27371 1 |
| 13,3620 | I' 45014 0 | C' 01676 1 | C' 26034 1 | I' 43014 0 | C' 01673 1 | C' 04475 0 | I' 77624 1 | C' 27113 1 |
| 13,3630 | I' 77214 0 | C' 04675 1 | C' 00001 0 | C' 25232 0 | C' 00007 0 | C' 15240 0 | C' 00015 0 | C' 01246 0 |
| 13,3640 | I' 66134 1 | C' 03746 1 | C' 03745 1 | I' 77776 1 | 00004 0 | 00006 1 | 40025 1 | 20155 1 |
| 13,3650 | 07226 0 | 31127 1 | 04577 0 | I' 47014 1 | C' 04754 0 | C' 27672 1 | C' 45505 0 | I' 44215 1 |
| 13,3660 | C' 27714 0 | C' 01101 0 | I' 45044 0 | C' 27234 1 | C' 27702 1 | I' 43234 0 | C' 45505 0 | C' 27714 0 |
| 13,3670 | C' 35101 1 | C' 27234 1 | I' 45345 1 | C' 01101 0 | C' 01517 0 | I' 45246 0 | C' 27712 0 | I' 52040 1 |
| 13,3700 | C' 27136 0 | C' 27665 1 | I' 77414 0 | C' 04674 0 | 25127 1 | 05537 0 | C' 01703 1 | 06006 1 |
| 13,3710 | I' 77616 0 | C' 00000 1 | C' 00003 1 | C' 00006 1 | C' 02342 0 | C' 77764 1 | C' 77775 1 | C' 77766 0 |
| 13,3720 | C' 77771 0 | C' 77775 1 | C' 77775 1 | C' 00000 1 | C' 77763 0 | C' 77766 0 | C' 77773 1 | C' 77770 1 |
| 13,3730 | C' 77771 0 | C' 27446 1 | C' 14620 0 | C' 16471 1 | C' 01352 1 | C' 22437 1 | C' 16067 1 | C' 00000 1 |
| 13,3740 | C' 00000 1 | C' 02302 1 | C' 24736 0 | C' 00000 1 | C' 00000 1 | C' 77776 1 | C' 53032 0 | C' 10407 0 |
| 13,3750 | C' 05344 1 | C' 13710 0 | C' 35320 0 | C' 12160 0 | C' 12124 0 | C' 24000 1 | C' 00000 1 | C' 74631 0 |
| 13,3760 | C' 63145 1 | C' 00243 1 | C' 32703 1 | C' 03654 0 | C' 21000 1 | C' 03654 0 | C' 21000 1 | C' 04627 0 |
| 13,3770 | C' 25200 1 | C' 03771 0 | C' 03772 0 | CKEN 74774 0 | " | " | " | " |



OCTAL LISTING FOR PARAGRAPH J 100, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #I# (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 14,2000 | I' 43573 1 | C' 31744 1 | I' 43020 1 | C' 02576 1 | C' 04265 1 | I' 77776 1 | 00006 1 | 30036 1 |
| 14,2010 | 53181 1 | 06006 1 | I' 43131 0 | C' 01304 1 | C' 00000 1 | C' 00271 0 | I' 77776 1 | 06006 1 |
| 14,2020 | I' 43014 0 | C' 00073 0 | C' 00705 0 | C' 30103 0 | I' 77414 0 | C' 03660 1 | 31314 0 | 00006 1 |
| 14,2030 | 62131 0 | 04555 0 | C' 26176 0 | 12161 1 | 12124 0 | 05435 0 | C' 00013 0 | 34701 0 |
| 14,2040 | 70075 1 | 10000 0 | 02052 1 | 34705 1 | 70074 0 | 10000 0 | 12052 0 | 32151 0 |
| 14,2050 | 04555 0 | C' 20602 1 | 31314 0 | 00006 1 | 62065 0 | 40074 0 | 74707 1 | 10000 0 |
| 14,2060 | 02063 0 | 31775 0 | 55160 0 | 31773 0 | 55161 1 | 34731 0 | 04555 0 | C' 01732 0 |
| 14,2070 | 34701 0 | 70075 1 | 10000 0 | 12104 1 | 34674 0 | 70103 1 | 00006 1 | 12026 0 |
| 14,2100 | 06006 1 | I' 77650 1 | C' 02576 1 | I' 77776 1 | 04555 0 | C' 76536 0 | 30075 0 | 74706 0 |
| 14,2110 | 00006 1 | 12100 0 | 40075 1 | 74704 1 | 10000 0 | 12122 0 | 30101 1 | 74701 1 |
| 14,2120 | 10000 0 | 02031 1 | 32175 0 | 12066 1 | 05447 0 | C' 00013 0 | 05537 0 | C' 00407 1 |
| 14,2130 | 02037 1 | 34705 1 | 70074 0 | 10000 0 | 02065 0 | 00004 0 | 37661 1 | 05042 1 |
| 14,2140 | C' 02144 1 | C' 30085 1 | 00003 1 | 12085 1 | 06006 1 | I' 77624 1 | C' 31322 0 | I' 77776 1 |
| 14,2150 | 05112 0 | C' 01534 1 | C' 01531 1 | C' 10464 0 | C' 12470 1 | C' 00000 1 | C' 00000 1 | C' 15373 1 |
| 14,2160 | C' 11554 0 | 34701 0 | 70075 1 | 10000 0 | 02124 1 | 32174 1 | 04555 0 | C' 21671 1 |
| 14,2170 | 12176 1 | 12065 1 | 12065 1 | 15112 1 | C' 00404 1 | C' 00264 1 | 05425 1 | 04555 0 |
| 14,2200 | C' 16063 0 | 34714 1 | 55323 0 | 04555 0 | C' 20464 0 | 04106 1 | I' 43020 1 | C' 02576 1 |
| 14,2210 | C' 04065 0 | I' 43014 0 | C' 01463 1 | C' 00462 1 | I' 77650 1 | C' 30005 1 | I' 77620 0 | C' 00300 1 |
| 14,2220 | C' 36607 0 | C' 54110 0 | C' 26752 0 | C' 00003 1 | C' 16744 1 | C' 02607 1 | C' 34041 0 | C' 27045 0 |
| 14,2230 | I' 61131 0 | C' 00052 0 | C' 00000 1 | C' 30256 0 | I' 52375 1 | C' 02752 0 | C' 00001 0 | I' 77656 1 |
| 14,2240 | C' 26752 0 | C' 00001 0 | I' 57456 1 | C' 16736 1 | C' 32162 0 | I' 77624 1 | C' 30316 0 | C' 14017 1 |
| 14,2250 | C' 32200 1 | C' 24023 0 | C' 02744 1 | I' 77656 1 | C' 36744 0 | C' 30303 1 | I' 40575 1 | C' 02752 0 |
| 14,2260 | I' 51362 1 | C' 02744 1 | I' 77656 1 | C' 26744 1 | C' 02752 0 | I' 53455 0 | C' 00001 0 | I' 77676 0 |
| 14,2270 | C' 26736 1 | C' 00001 0 | I' 57456 1 | C' 16752 0 | C' 32160 1 | I' 77624 1 | C' 30316 0 | C' 14023 0 |
| 14,2300 | C' 32200 1 | C' 24017 1 | C' 02744 1 | I' 77635 1 | C' 32170 0 | C' 27474 0 | C' 00007 0 | I' 53361 0 |
| 14,2310 | C' 32166 1 | C' 03474 0 | C' 17474 0 | C' 32202 0 | C' 34021 0 | C' 00300 1 | I' 70471 1 | C' 00045 0 |
| 14,2320 | I' 43336 0 | C' 32164 0 | I' 70546 1 | I' 77616 0 | 04604 1 | 55777 0 | 06006 1 | I' 77624 1 |
| 14,2330 | C' 47432 1 | I' 77624 1 | C' 34567 1 | I' 77601 0 | C' 00001 0 | I' 71214 0 | C' 01465 1 | C' 11456 0 |
| 14,2340 | C' 24303 1 | C' 02714 1 | I' 63361 0 | C' 30502 0 | C' 02730 1 | I' 74370 0 | C' 00344 1 | C' 30504 0 |
| 14,2350 | I' 77655 1 | I' 53505 1 | C' 01736 1 | C' 02760 1 | I' 66331 0 | C' 00051 0 | C' 00006 1 | C' 00052 0 |
| 14,2360 | C' 00006 1 | I' 52100 1 | C' 30364 0 | C' 30513 0 | I' 45173 0 | C' 31744 1 | C' 30457 1 | I' 73014 0 |
| 14,2370 | C' 01710 0 | C' 30361 0 | C' 00046 0 | I' 52104 0 | C' 30376 0 | C' 30361 0 | I' 45173 0 | C' 46033 0 |

GLOBAL LISTING FOR PARAGRAPH J 101, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, S'S DENOTES UNUSED FIXED MEMORY
 ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED IIA (INTERPRETIVE OPERATOR WORDS) OR ICA (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 14,2400 | C' 30457 1 | I' 76614 0 | C' 01710 0 | C' 30373 0 | C' 31744 1 | I' 45237 0 | C' 46033 0 | C' 30506 1 |
| 14,2410 | I' 43240 0 | C' 30373 0 | C' 30510 0 | I' 77644 1 | C' 30373 0 | I' 50373 0 | C' 31744 1 | C' 02760 1 |
| 14,2420 | I' 50025 0 | C' 30512 1 | C' 30361 0 | I' 50373 0 | C' 46033 0 | C' 02760 1 | I' 51025 1 | C' 30512 1 |
| 14,2430 | C' 30433 0 | I' 77650 1 | C' 30373 0 | I' 77614 1 | C' 01605 0 | C' 30452 1 | I' 65120 1 | C' 00302 0 |
| 14,2440 | C' 00303 1 | I' 47773 1 | C' 31744 1 | C' 46033 0 | I' 43006 0 | C' 01545 1 | C' 30436 0 | I' 45345 1 |
| 14,2450 | I' 77644 1 | C' 30373 0 | I' 67130 1 | C' 00302 0 | C' 00303 1 | I' 77650 1 | C' 30373 0 | I' 51321 0 |
| 14,2460 | C' 02736 1 | C' 00017 1 | I' 77654 0 | C' 30476 1 | I' 75240 0 | C' 30476 1 | C' 00160 0 | I' 75240 0 |
| 14,2470 | C' 30476 1 | C' 00162 1 | I' 43040 1 | C' 30476 1 | C' 01630 0 | C' 00052 0 | I' 77614 1 | C' 01430 1 |
| 14,2500 | C' 00052 0 | C' 21150 0 | C' 25157 0 | C' 32766 1 | C' 22713 1 | C' 01736 1 | C' 35137 1 | C' 73003 0 |
| 14,2510 | C' 65403 0 | C' 06233 0 | C' 26112 1 | I' 77414 0 | C' 01745 0 | C' 30517 1 | 02521 0 | I' 77776 1 |
| 14,2520 | 25777 1 | 31777 1 | 04561 1 | I' 77776 1 | 34712 1 | 54304 1 | 54301 1 | 06006 1 |
| 14,2530 | I' 43014 0 | C' 00666 1 | C' 00665 1 | I' 77776 1 | 05301 0 | C' 05024 1 | C' 13000 0 | 50304 0 |
| 14,2540 | 30302 0 | 00006 1 | 72701 1 | 54735 1 | 32700 1 | 04555 0 | C' 20763 1 | 04106 1 |
| 14,2550 | 02555 0 | 02544 0 | 36211 0 | 05415 1 | 15112 1 | 06006 1 | I' 45034 1 | C' 45505 0 |
| 14,2560 | C' 32363 0 | I' 72131 1 | C' 00051 0 | C' 00000 1 | C' 00304 0 | I' 77700 0 | C' 30571 1 | C' 36617 1 |
| 14,2570 | C' 30572 1 | C' 02611 0 | I' 77776 1 | 41011 1 | 62677 0 | 00006 1 | 12672 1 | 06006 1 |
| 14,2600 | I' 77624 1 | C' 30002 0 | I' 77624 1 | C' 31266 1 | C' 02617 0 | I' 77776 1 | 04555 0 | C' 18063 0 |
| 14,2610 | 06006 1 | I' 45145 0 | C' 02607 1 | C' 32363 0 | I' 77776 1 | 10304 1 | 02657 1 | 06006 1 |
| 14,2620 | I' 53521 1 | C' 01736 1 | C' 02736 1 | I' 77775 1 | C' 02617 0 | C' 24007 0 | C' 02611 0 | C' 24015 0 |
| 14,2630 | C' 02601 1 | C' 36744 0 | C' 30702 1 | I' 45014 0 | C' 00354 0 | C' 30643 0 | C' 47334 0 | I' 77624 1 |
| 14,2640 | C' 32203 1 | I' 77614 1 | C' 01273 0 | I' 77776 1 | 35656 1 | 04555 0 | C' 20751 0 | 04106 1 |
| 14,2650 | 02652 1 | 02654 1 | 04555 0 | C' 32120 0 | 06006 1 | I' 77650 1 | C' 32143 0 | 06006 1 |
| 14,2660 | I' 53521 1 | C' 01736 1 | C' 26601 1 | C' 02617 0 | C' 02611 0 | I' 77731 1 | C' 00305 1 | C' 00000 1 |
| 14,2670 | I' 77650 1 | C' 30530 1 | 06006 1 | I' 77624 1 | C' 32252 0 | I' 77650 1 | C' 30802 0 | C' 00066 1 |
| 14,2700 | C' 00306 1 | C' 05253 0 | I' 43020 1 | C' 02777 1 | C' 00074 1 | I' 77760 0 | C' 02735 1 | I' 47773 1 |
| 14,2710 | C' 00001 0 | C' 00007 0 | I' 65552 0 | C' 00025 0 | I' 43014 0 | C' 00354 0 | C' 30726 1 | C' 00174 0 |
| 14,2720 | I' 71360 1 | C' 00006 1 | C' 00025 0 | C' 00023 0 | I' 77650 1 | C' 30707 1 | I' 45345 1 | C' 00025 0 |
| 14,2730 | C' 00023 0 | I' 47046 0 | C' 45541 0 | C' 01046 1 | I' 77414 0 | C' 00074 1 | 34714 1 | 04555 0 |
| 14,2740 | C' 20607 1 | 32755 1 | 04555 0 | C' 20624 0 | 14106 0 | 02752 0 | 06006 1 | I' 52014 0 |
| 14,2750 | C' 00274 0 | C' 02777 1 | 06006 1 | I' 77650 1 | C' 02777 1 | C' 01405 1 | I' 45020 1 | C' 00035 1 |
| 14,2760 | C' 22256 0 | I' 66234 1 | C' 32236 1 | C' 00051 0 | C' 00001 0 | I' 40370 1 | C' 00003 1 | C' 00005 1 |
| 14,2770 | I' 70543 1 | C' 01161 0 | I' 70523 1 | C' 00005 1 | I' 51425 0 | I' 45206 1 | C' 31053 0 | I' 71240 1 |

DATA LISTING FOR PARAGRAPH J 102, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #I# (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 14,3000 | C' 31027 0 | I' 51025 1 | C' 31054 1 | C' 31027 0 | I' 77776 1 | 04555 0 | C' 18802 1 | 04555 0 |
| 14,3010 | C' 17516 0 | 05644 1 | 04555 0 | C' 17012 1 | 04555 0 | C' 17516 0 | 05644 1 | 06006 1 |
| 14,3020 | I' 77234 1 | C' 31263 1 | C' 11456 0 | C' 01472 1 | I' 52014 0 | C' 01060 0 | C' 31031 1 | I' 77700 0 |
| 14,3030 | C' 30770 1 | I' 75160 1 | C' 02671 0 | C' 01735 1 | I' 77624 1 | C' 31040 1 | I' 77650 1 | C' 00035 1 |
| 14,3040 | I' 77773 1 | C' 00001 0 | C' 10001 1 | I' 77773 1 | C' 00007 0 | C' 10007 1 | I' 77773 1 | C' 00015 0 |
| 14,3050 | C' 10015 1 | I' 77616 0 | C' 00056 1 | C' 37722 1 | 41320 0 | 74702 1 | 10000 0 | 03063 1 |
| 14,3060 | 05537 0 | C' 00210 1 | 04106 1 | 04555 0 | C' 17607 0 | 34720 0 | 04555 0 | C' 20751 0 |
| 14,3070 | 04106 1 | 03134 1 | 05301 0 | C' 05024 1 | C' 13000 0 | 34714 1 | 55155 0 | 55156 0 |
| 14,3100 | 55157 1 | 33261 1 | 04555 0 | C' 20577 0 | 33262 1 | 04555 0 | C' 20577 0 | 04555 0 |
| 14,3110 | C' 16602 1 | 04555 0 | C' 17516 0 | 05644 1 | 04555 0 | C' 17012 1 | 04555 0 | C' 17516 0 |
| 14,3120 | 05644 1 | 06006 1 | I' 77234 1 | C' 31263 1 | C' 11456 0 | C' 01472 1 | I' 77414 0 | C' 01060 0 |
| 14,3130 | 05301 0 | C' 05024 1 | C' 13000 0 | 13065 0 | 05301 0 | C' 00014 1 | 06006 1 | I' 40331 1 |
| 14,3140 | C' 00305 1 | C' 00000 1 | C' 00001 0 | I' 77414 0 | C' 00666 1 | 34712 1 | 54301 1 | 05301 0 |
| 14,3150 | C' 05024 1 | C' 13000 0 | 05253 0 | C' 00065 1 | 13162 0 | 06006 1 | I' 77624 1 | C' 32252 0 |
| 14,3160 | I' 77650 1 | C' 31165 1 | 06006 1 | I' 77624 1 | C' 31322 0 | I' 77624 1 | C' 31266 1 | I' 77606 1 |
| 14,3170 | I' 53135 0 | C' 00305 1 | C' 31177 1 | I' 45575 1 | C' 75160 1 | I' 77650 1 | C' 31205 1 | I' 45575 1 |
| 14,3200 | C' 81166 1 | C' 02607 1 | I' 77624 1 | C' 32363 0 | C' 02601 1 | I' 77776 1 | 05301 0 | C' 05024 1 |
| 14,3210 | C' 13000 0 | 04555 0 | C' 16063 0 | 10304 1 | 13223 0 | 05301 0 | C' 05024 1 | C' 13000 0 |
| 14,3220 | 34712 1 | 54304 1 | 13147 1 | 05301 0 | C' 05024 1 | C' 13000 0 | 06006 1 | I' 45145 0 |
| 14,3230 | C' 02607 1 | C' 32363 0 | C' 24015 0 | C' 02601 1 | C' 24007 0 | C' 02611 0 | C' 26736 1 | C' 02617 0 |
| 14,3240 | C' 36744 0 | C' 30702 1 | I' 77414 0 | C' 00314 1 | C' 31246 0 | 03065 1 | I' 77624 1 | C' 47334 0 |
| 14,3250 | I' 75160 1 | C' 02713 0 | C' 01735 1 | I' 45014 0 | C' 01662 1 | C' 31040 1 | I' 52014 0 | C' 01462 0 |
| 14,3260 | C' 32143 0 | C' 01426 0 | C' 12200 0 | 30025 0 | 55074 1 | 16030 0 | I' 77620 0 | C' 00300 1 |
| 14,3270 | I' 70740 0 | C' 01330 0 | C' 00001 0 | C' 02607 1 | I' 66744 0 | C' 00304 0 | C' 48456 1 | I' 76744 1 |
| 14,3300 | C' 00154 1 | C' 00001 0 | C' 10001 1 | I' 77743 1 | C' 00006 1 | C' 10006 0 | I' 77624 1 | C' 48000 0 |
| 14,3310 | I' 82150 1 | C' 01330 0 | C' 00002 0 | I' 45130 1 | C' 00050 1 | C' 47541 1 | I' 77650 1 | C' 00300 1 |
| 14,3320 | C' 03674 1 | C' 03502 0 | I' 43020 1 | C' 03501 0 | C' 00071 1 | I' 77776 1 | 30301 0 | 74716 1 |
| 14,3330 | 04555 0 | C' 18002 1 | 04555 0 | C' 17512 1 | 05644 1 | 51330 0 | 10052 1 | 13350 0 |
| 14,3340 | 13342 0 | 13342 0 | 34714 1 | 57330 0 | 10000 0 | 50000 1 | 54000 0 | 13326 1 |
| 14,3350 | 05253 0 | C' 00026 0 | 13354 1 | 13400 1 | 05253 0 | C' 00027 1 | 13360 0 | 13400 1 |
| 14,3360 | 33404 1 | 04555 0 | C' 20763 1 | 04106 1 | 13371 0 | 03360 1 | 36211 0 | 05415 1 |
| 14,3370 | 05112 0 | 47713 1 | 70735 1 | 00006 1 | 76211 1 | 56001 0 | 50304 0 | 54302 1 |



CODAL LISTING FOR PARAGRAPH J 104, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED A1 (INTERPRETIVE OPERATOR WORDS) OR A2 (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 15,2000 | 05301 0 | C' 00254 1 | 05447 0 | C' 00027 1 | 05447 0 | C' 00031 0 | 04555 0 | C' 17573 0 |
| 15,2010 | 34707 0 | 70076 1 | 10000 0 | 02016 1 | 34711 1 | 02017 0 | 34712 1 | 55132 1 |
| 15,2020 | 34712 1 | 04555 0 | C' 21041 1 | 04106 1 | 02031 1 | 02020 1 | 05301 0 | C' 00014 1 |
| 15,2030 | 05112 0 | 31132 0 | 18214 1 | 50000 1 | 02035 0 | 02041 0 | 02110 0 | 02041 0 |
| 15,2040 | 12120 1 | 00000 1 | 34714 1 | 53046 0 | 32155 1 | 04555 0 | C' 20624 0 | 04106 1 |
| 15,2050 | 02052 1 | 02044 0 | 00004 1 | 31046 1 | 00006 1 | 12057 0 | 12062 0 | 00006 1 |
| 15,2060 | 30025 0 | 53046 0 | 31132 0 | 74711 0 | 10000 0 | 12073 0 | 06006 1 | I' 77624 1 |
| 15,2070 | C' 34506 0 | I' 77650 1 | C' 32100 1 | 06006 1 | I' 77745 1 | C' 01046 1 | I' 77624 1 | C' 34636 0 |
| 15,2100 | I' 77624 1 | C' 22256 0 | I' 77776 1 | 32156 1 | 04555 0 | C' 20624 0 | 04106 1 | 02113 0 |
| 15,2110 | 06006 1 | I' 77650 1 | C' 32100 1 | 06006 1 | I' 77624 1 | C' 30756 0 | I' 77414 0 | C' 01462 0 |
| 15,2120 | 34720 0 | 04555 0 | C' 20751 0 | 04106 1 | 02126 0 | 02140 0 | 06006 1 | I' 43234 0 |
| 15,2130 | C' 45505 0 | C' 32176 0 | I' 17624 1 | C' 30216 1 | I' 77776 1 | 04555 0 | C' 30324 1 | 02145 0 |
| 15,2140 | 06006 1 | I' 77624 1 | C' 30523 0 | I' 77776 1 | 04106 1 | 05537 0 | C' 00405 0 | 34743 0 |
| 15,2150 | 04555 0 | C' 20624 0 | 04106 1 | 02140 0 | 02120 0 | C' 01442 1 | C' 01426 0 | C' 00065 1 |
| 15,2160 | C' 01265 1 | C' 00302 0 | C' 24533 1 | C' 00343 0 | C' 21616 0 | C' 00000 1 | C' 13143 0 | C' 00000 1 |
| 15,2170 | C' 00000 1 | C' 77777 0 | C' 53231 1 | C' 00001 0 | C' 17570 0 | C' 00001 0 | C' 16700 1 | C' 07760 1 |
| 15,2200 | C' 14473 1 | C' 07564 1 | C' 15042 0 | I' 77620 0 | C' 02777 1 | I' 77624 1 | C' 47140 1 | I' 77776 1 |
| 15,2210 | 32234 0 | 04555 0 | C' 20624 0 | 04106 1 | 02216 0 | 02231 0 | 05301 0 | C' 00314 1 |
| 15,2220 | 32235 1 | 04555 0 | C' 17125 1 | 04555 0 | C' 17516 0 | 05644 1 | 05301 0 | C' 05024 1 |
| 15,2230 | C' 13000 0 | 06006 1 | I' 77650 1 | C' 02777 1 | C' 01535 0 | C' 02757 0 | 00004 0 | 30032 0 |
| 15,2240 | 50120 1 | 54001 1 | 30033 1 | 50120 1 | 54002 1 | 30034 0 | 50120 1 | 54003 0 |
| 15,2250 | 00003 1 | 06030 1 | I' 77776 1 | 32362 1 | 04555 0 | C' 20624 0 | 04106 1 | 02261 0 |
| 15,2260 | 02253 1 | 04555 0 | C' 16004 1 | 34714 1 | 04555 0 | C' 20607 1 | 32360 0 | 04555 0 |
| 15,2270 | C' 20470 0 | 14106 0 | 12263 0 | 06006 1 | I' 77745 1 | C' 03731 1 | C' 16774 1 | C' 03733 0 |
| 15,2300 | C' 02776 0 | I' 77776 1 | 00004 0 | 00006 1 | 30025 0 | 51330 0 | 52001 1 | 30033 1 |
| 15,2310 | 51330 0 | 54002 1 | 31773 0 | 51330 0 | 54003 0 | 30034 0 | 51330 0 | 54004 1 |
| 15,2320 | 31715 0 | 51330 0 | 54005 0 | 30032 0 | 51330 0 | 54006 0 | 00003 1 | 05425 1 |
| 15,2330 | 34333 0 | 04555 0 | C' 20751 0 | 04106 1 | 12336 1 | 12263 0 | 34714 1 | 04555 0 |
| 15,2340 | C' 20607 1 | 32361 1 | 04555 0 | C' 20624 0 | 04106 1 | 02347 0 | 12336 1 | 47713 1 |
| 15,2350 | 70735 1 | 00006 1 | 76211 1 | 56001 0 | 50304 0 | 54302 1 | 06006 1 | I' 77616 0 |
| 15,2360 | C' 15200 1 | C' 00307 0 | C' 01536 0 | C' 02607 1 | I' 45020 1 | C' 02777 1 | C' 30216 1 | I' 77775 1 |
| 15,2370 | C' 02736 1 | C' 24001 0 | C' 02744 1 | C' 26736 1 | C' 00001 0 | C' 02744 1 | I' 77776 1 | 47713 1 |

OCAL LISTING FOR PARAGRAPH J 105, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #I# (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 15,2400 | 70735 1 | 00006 1 | 76211 1 | 56001 0 | 50304 0 | 54302 1 | 10000 0 | 12423 1 |
| 15,2410 | 32453 1 | 04555 0 | C' 20624 0 | 04106 1 | 02416 0 | 02410 0 | 08006 1 | I' 53575 0 |
| 15,2420 | C' 02766 1 | I' 77650 1 | C' 32446 0 | 40000 0 | 62452 0 | 00006 1 | 62437 0 | 50304 0 |
| 15,2430 | 30302 0 | 50120 1 | 54046 1 | 06006 1 | I' 52173 0 | C' 31744 1 | C' 32446 0 | 06006 1 |
| 15,2440 | I' 70740 0 | C' 00304 0 | C' 00303 1 | I' 76740 0 | C' 00154 1 | C' 02372 0 | I' 53455 0 | C' 03474 0 |
| 15,2450 | I' 77650 1 | C' 02777 1 | C' 00343 0 | C' 01530 0 | 34377 0 | 27725 1 | 34705 1 | 71321 1 |
| 15,2460 | 00006 1 | 12467 1 | 44712 0 | 70102 0 | 54102 0 | 08000 1 | 02534 1 | 30032 0 |
| 15,2470 | 57661 1 | 00006 1 | 21661 0 | 55675 0 | 30033 1 | 57662 1 | 00006 1 | 21662 0 |
| 15,2500 | 55676 0 | 30034 0 | 57663 0 | 00006 1 | 21663 1 | 55677 1 | 40102 0 | 76214 1 |
| 15,2510 | 50000 1 | 02512 0 | 02521 0 | 02532 1 | 12515 0 | 06000 1 | 05301 0 | C' 00006 1 |
| 15,2520 | 05213 1 | 34712 1 | 55720 1 | 34377 0 | 05140 1 | C' 02454 0 | C' 32066 0 | 11720 1 |
| 15,2530 | 02556 0 | 05213 1 | 26102 0 | 34714 1 | 55711 0 | 55706 0 | 55707 1 | 55710 1 |
| 15,2540 | 55723 1 | 02522 0 | 54001 1 | 00002 0 | 50000 1 | 34673 1 | 26001 1 | 00002 0 |
| 15,2550 | 40000 0 | 61720 0 | 00006 1 | 74675 0 | 61720 0 | 00002 0 | 31663 0 | 04767 0 |
| 15,2560 | 55511 1 | 31661 1 | 04770 0 | 55512 1 | 00006 1 | 71511 1 | 55514 1 | 31661 1 |
| 15,2570 | 04767 0 | 55513 0 | 00006 1 | 71511 1 | 55515 0 | 41677 1 | 00006 1 | 71512 1 |
| 15,2600 | 53721 0 | 41676 0 | 00006 1 | 71515 0 | 21721 0 | 31720 0 | 57707 0 | 02550 0 |
| 15,2610 | 55702 1 | 41677 1 | 00006 1 | 71513 0 | 53721 0 | 31676 1 | 00006 1 | 71514 1 |
| 15,2620 | 21721 0 | 31720 0 | 57710 0 | 02550 0 | 55703 0 | 31663 0 | 04770 0 | 55510 0 |
| 15,2630 | 00006 1 | 71676 0 | 55720 1 | 34714 1 | 20001 1 | 61675 1 | 61720 0 | 40000 0 |
| 15,2640 | 55720 1 | 57706 1 | 02550 0 | 55701 1 | 11723 1 | 02647 0 | 02671 0 | 41664 0 |
| 15,2650 | 04770 0 | 00006 1 | 71723 1 | 55721 0 | 00006 1 | 73217 1 | 27701 1 | 31664 1 |
| 15,2660 | 04767 0 | 40000 0 | 00006 1 | 71723 1 | 27702 1 | 41721 0 | 00006 1 | 73220 0 |
| 15,2670 | 27703 0 | 34677 0 | 70102 0 | 00006 1 | 15213 0 | 34672 0 | 54030 0 | 00006 1 |
| 15,2700 | 32704 0 | 53313 0 | 05213 1 | C' 02705 1 | C' 32066 0 | 22016 0 | 00006 1 | 22012 1 |
| 15,2710 | 30021 1 | 60000 1 | 55623 0 | 31702 0 | 61665 0 | 02542 0 | 55665 1 | 04767 0 |
| 15,2720 | 55506 1 | 55705 0 | 00006 1 | 71701 1 | 57705 1 | 00006 1 | 71703 0 | 55704 1 |
| 15,2730 | 31665 0 | 04770 0 | 55507 0 | 00006 1 | 71703 0 | 27705 0 | 41507 0 | 00006 1 |
| 15,2740 | 71701 1 | 27704 1 | 27666 1 | 04770 0 | 00006 1 | 71705 0 | 61665 0 | 02542 0 |
| 15,2750 | 55665 1 | 40000 0 | 61603 0 | 02542 0 | 55477 0 | 55572 1 | 31705 1 | 61664 1 |
| 15,2760 | 02542 0 | 55714 0 | 55664 0 | 34710 0 | 70102 0 | 00006 1 | 13054 1 | 44712 0 |
| 15,2770 | 55700 0 | 55477 0 | 55500 1 | 41701 1 | 00006 1 | 73217 1 | 61703 1 | 03044 1 |



OCTAL LISTING FOR PARAGRAPH J 106, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #1# (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 15,3000 | 60000 1 | 33222 0 | 55720 1 | 31702 0 | 03044 1 | 50000 1 | 33225 1 | 27720 1 |
| 15,3010 | 00006 1 | 01005 0 | 11711 0 | 03236 0 | 03716 1 | 03723 1 | 10000 0 | 63215 1 |
| 15,3020 | 13050 0 | 63215 1 | 13051 1 | 55624 1 | 10000 0 | 43214 1 | 13030 0 | 33214 0 |
| 15,3030 | 60001 0 | 22002 0 | 63016 0 | 52002 1 | 11624 1 | 63212 0 | 13040 1 | 63212 0 |
| 15,3040 | 54000 0 | 13043 1 | 22007 0 | 57624 0 | 10000 0 | 63213 1 | 13051 1 | 63213 1 |
| 15,3050 | 40000 0 | 55721 0 | 34714 1 | 00002 0 | 55700 0 | 41666 1 | 61604 1 | 55721 0 |
| 15,3060 | 11506 1 | 63216 1 | 13064 1 | 63216 1 | 54000 0 | 13146 0 | 11506 1 | 13070 1 |
| 15,3070 | 11727 0 | 03104 1 | 03074 1 | 03104 1 | 05301 0 | C' 40334 1 | 44712 0 | 55727 0 |
| 15,3100 | 33211 0 | 05140 1 | C' 02374 0 | C' 54066 0 | 11711 0 | 13113 0 | 13113 0 | 34714 1 |
| 15,3110 | 00006 1 | 01006 0 | 55711 0 | 11506 1 | 31721 1 | 13121 1 | 44714 0 | 55700 0 |
| 15,3120 | 41721 0 | 55573 0 | 55500 1 | 54001 1 | 11700 0 | 03130 0 | 34712 1 | 50000 1 |
| 15,3130 | 31703 1 | 03023 0 | 00006 1 | 04001 1 | 50000 1 | 33222 0 | 55720 1 | 31572 0 |
| 15,3140 | 54001 1 | 31702 0 | 03023 0 | 00006 1 | 04001 1 | 13005 0 | 25700 1 | 44712 0 |
| 15,3150 | 55711 0 | 11727 0 | 55727 0 | 13154 0 | 11507 0 | 41721 0 | 13160 1 | 31721 1 |
| 15,3160 | 55713 1 | 00006 1 | 74675 0 | 57713 0 | 54001 1 | 11507 0 | 41704 1 | 03171 0 |
| 15,3170 | 31704 0 | 03023 0 | 00006 1 | 04001 1 | 50000 1 | 33225 1 | 00006 1 | 01006 0 |
| 15,3200 | 31717 1 | 00006 1 | 21664 0 | 54001 1 | 11507 0 | 30001 0 | 03121 0 | 40001 1 |
| 15,3210 | 03121 0 | C' 04064 1 | C' 37734 0 | C' 37756 1 | C' 00067 0 | C' 37267 0 | C' 11277 0 | C' 65033 1 |
| 15,3220 | C' 36044 1 | C' 00120 1 | C' 00000 1 | C' 00240 1 | C' 00005 1 | C' 00000 1 | C' 00012 1 | 40025 1 |
| 15,3230 | 55712 0 | 34712 1 | 55711 0 | 05301 0 | C' 00001 0 | 05213 1 | 44712 0 | 55617 1 |
| 15,3240 | 44726 1 | 00006 1 | 71701 1 | 60001 0 | 55613 0 | 41664 0 | 54021 0 | 40102 0 |
| 15,3250 | 74707 1 | 00006 1 | 13260 1 | 26102 0 | 31715 0 | 60021 1 | 57614 0 | 13320 1 |
| 15,3260 | 34675 1 | 60000 1 | 61715 0 | 57614 0 | 30021 1 | 64673 1 | 64673 1 | 57614 0 |
| 15,3270 | 27614 1 | 11613 0 | 64712 1 | 13275 0 | 64712 1 | 00006 1 | 71613 0 | 00006 1 |
| 15,3300 | 73767 0 | 00006 1 | 11506 1 | 54001 1 | 11614 1 | 34675 1 | 13310 1 | 44675 0 |
| 15,3310 | 61614 0 | 60001 0 | 54001 1 | 13320 1 | 50000 1 | 44674 1 | 60000 1 | 27614 1 |
| 15,3320 | 31614 0 | 00006 1 | 71506 1 | 55614 1 | 11700 0 | 03714 0 | 03327 1 | 31614 0 |
| 15,3330 | 55614 1 | 55713 1 | 31613 1 | 54021 0 | 30021 1 | 55570 0 | 57613 1 | 00006 1 |
| 15,3340 | 71613 0 | 00006 1 | 73767 0 | 55616 0 | 60000 1 | 40000 0 | 63773 1 | 54001 1 |
| 15,3350 | 11613 0 | 40001 1 | 13354 1 | 30001 0 | 61614 0 | 63773 1 | 00006 1 | 63374 1 |
| 15,3360 | 40000 0 | 63773 1 | 63773 1 | 00006 1 | 63403 0 | 43766 1 | 61616 1 | 00006 1 |
| 15,3370 | 63676 0 | 41617 1 | 55620 0 | 03456 0 | 41613 0 | 55613 0 | 54021 0 | 41614 1 |

ODD LISTING FOR PARAGRAPH J 107, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, a" denotes UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED aIa (INTERPRETIVE OPERATOR WORDS) OR aCa (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 15,3400 | 55814 1 | 41517 1 | 55517 1 | 43764 1 | 61818 1 | 00008 1 | 63410 1 | 13415 0 |
| 15,3410 | 43771 1 | 61614 0 | 00021 1 | 00006 1 | 63076 0 | 41817 1 | 55820 0 | 43773 0 |
| 15,3420 | 61818 1 | 61614 0 | 55815 0 | 63171 0 | 40000 0 | 00008 1 | 63434 1 | 31615 1 |
| 15,3430 | 00006 1 | 14676 0 | 10001 1 | 03431 1 | 00006 1 | 22007 0 | 43772 1 | 55587 0 |
| 15,3440 | 61813 1 | 60000 1 | 00005 1 | 73767 0 | 55821 1 | 00008 1 | 63450 0 | 03462 1 |
| 15,3450 | 10002 1 | 13466 1 | 31820 1 | 55817 1 | 41611 1 | 13461 0 | 41813 0 | 55587 0 |
| 15,3460 | 34714 1 | 55821 1 | 31567 1 | 00000 1 | 00008 1 | 73767 0 | 00000 1 | 55607 0 |
| 15,3470 | 40000 0 | 00008 1 | 63475 1 | 55807 0 | 31617 0 | 55820 0 | 41807 0 | 00008 1 |
| 15,3500 | 11567 0 | 55615 0 | 41887 0 | 00008 1 | 11110 1 | 61813 1 | 00008 1 | 71621 1 |
| 15,3510 | 61615 1 | 51614 0 | 22007 0 | 54001 0 | 00008 1 | 11567 0 | 00008 1 | 13522 0 |
| 15,3510 | 34740 0 | 13537 0 | 56001 0 | 00008 1 | 11557 0 | 00008 1 | 74740 1 | 55605 1 |
| 15,3530 | 15170 1 | 00008 1 | 71621 1 | 55421 1 | 33770 1 | 00008 1 | 71887 0 | 55607 0 |
| 15,3540 | 34714 1 | 55711 0 | 34712 1 | 54305 0 | 30025 0 | 64875 1 | 64875 1 | 27712 0 |
| 15,3550 | 33765 0 | 27712 0 | 44111 0 | 61821 0 | 00006 1 | 63587 0 | 31817 0 | 33225 1 |
| 15,3580 | 55822 1 | 31821 0 | 37112 0 | 00001 1 | 63571 1 | 34714 1 | 13822 0 | 44712 0 |
| 15,3570 | 55821 1 | 44711 0 | 61605 0 | 00008 1 | 53003 1 | 31805 0 | 27712 0 | 00008 1 |
| 15,3600 | 63605 1 | 34714 1 | 13024 0 | 44712 0 | 55805 1 | 44711 0 | 61807 1 | 00008 1 |
| 15,3610 | 63025 0 | 51820 1 | 33225 1 | 55810 0 | 31601 1 | 27712 0 | 00008 1 | 63827 1 |
| 15,3610 | 34714 1 | 13828 1 | 55621 1 | 44712 0 | 55805 1 | 44712 0 | 55607 0 | 34714 1 |
| 15,3630 | 55811 1 | 55612 1 | 55506 1 | 53822 1 | 10000 0 | 13852 1 | 23812 0 | 44712 0 |
| 15,3640 | 53808 1 | 10000 0 | 13652 1 | 23612 0 | 44712 0 | 53810 0 | 10000 0 | 13852 1 |
| 15,3650 | 13012 0 | 03861 0 | 56001 0 | 27812 1 | 56001 0 | 64712 1 | 05140 1 | C' 03867 0 |
| 15,3660 | C' 31066 0 | 31612 0 | 00006 1 | 61006 0 | 11611 1 | 05213 1 | 03724 0 | 34711 1 |
| 15,3670 | 55811 1 | 70102 0 | 00005 1 | 13882 1 | 22007 0 | 13836 0 | 41700 0 | 74712 0 |
| 15,3700 | 54001 1 | 50000 1 | 31714 1 | 50001 0 | 54000 0 | 00001 0 | 02542 0 | 55717 0 |
| 15,3710 | 34714 1 | 00006 1 | 01006 0 | 55587 0 | 55711 0 | 03866 1 | 41785 0 | 00008 1 |
| 15,3720 | 71808 1 | 00006 1 | 74675 0 | M I 3 1 | 34675 1 | 00008 1 | 71713 1 | 55476 1 |
| 15,3730 | 40305 0 | 54305 0 | 00006 1 | 63131 1 | 04633 0 | C' 42404 1 | 03755 0 | 66214 0 |
| 15,3740 | 00006 1 | 63745 1 | 30025 0 | 54304 1 | 44720 1 | 54305 0 | 00008 1 | 31702 0 |
| 15,3750 | 50305 1 | 52324 0 | 31103 1 | 50305 1 | 54325 1 | 31823 1 | 54021 0 | 00008 1 |
| 15,3760 | 33764 1 | 53313 0 | 05222 0 | C' 03143 1 | C' 12082 0 | C' 77464 1 | C' 00012 1 | C' 23817 0 |
| 15,3770 | C' 01440 0 | C' 00266 0 | C' 70708 1 | C' 00133 0 | C' 03774 0 | C' 03775 1 | C' 52523 1 | " |



OPTAL LISTING FOR PARAGRAPH j 110, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED A1A (INTERPRETIVE OPERATOR WORDS) OR ACB (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 16,2000 | I' 77214 0 | C' 01070 1 | C' 11456 0 | C' 03705 0 | I' 43020 1 | C' 03857 0 | C' 01347 0 | C' 34073 1 |
| 16,2010 | I' 77201 1 | C' 00001 0 | C' 03640 0 | C' 03576 0 | I' 53435 0 | C' 03632 0 | C' 27713 1 | C' 03632 0 |
| 16,2020 | C' 03570 0 | I' 65236 0 | C' 00045 0 | I' 56205 0 | C' 34127 1 | I' 41205 0 | C' 03654 0 | C' 03076 0 |
| 16,2030 | I' 77671 1 | C' 03727 0 | C' 24017 1 | C' 03646 0 | I' 74241 0 | C' 03713 1 | C' 03713 1 | I' 41552 0 |
| 16,2040 | I' 65245 1 | C' 03646 0 | C' 00017 1 | I' 63356 1 | C' 00007 0 | I' 53435 0 | C' 03713 1 | I' 45561 1 |
| 16,2050 | C' 50056 1 | I' 65256 0 | C' 00017 1 | I' 74346 0 | I' 74256 0 | C' 03721 0 | C' 00045 0 | I' 53352 0 |
| 16,2060 | I' 77626 0 | C' 74056 1 | I' 77656 1 | C' 27713 1 | C' 03721 0 | I' 43006 0 | C' 01072 0 | I' 77624 1 |
| 16,2070 | C' 10653 0 | I' 77650 1 | C' 03657 0 | I' 45345 1 | C' 03413 1 | C' 36001 0 | C' 14041 1 | C' 03656 1 |
| 16,2100 | I' 77625 0 | C' 00041 1 | C' 37423 0 | C' 61663 0 | I' 77775 1 | C' 03612 1 | C' 17713 1 | C' 03413 1 |
| 16,2110 | C' 00041 1 | I' 77621 1 | C' 03656 1 | C' 37423 0 | C' 61663 0 | I' 41575 0 | C' 03646 0 | C' 03721 0 |
| 16,2120 | I' 45014 0 | C' 01072 0 | C' 10653 0 | I' 52001 1 | C' 00001 0 | C' 61716 0 | C' 00024 1 | C' 13714 1 |
| 16,2130 | I' 44001 0 | C' 00001 0 | C' 03657 0 | I' 51375 1 | C' 03433 0 | C' 03705 0 | I' 77655 1 | C' 03721 0 |
| 16,2140 | C' 03460 0 | I' 77646 0 | C' 03654 0 | I' 77776 1 | 05301 0 | C' 10035 0 | 06006 1 | I' 77775 1 |
| 16,2150 | C' 03460 0 | C' 03721 0 | I' 77214 0 | C' 01344 0 | C' 03657 0 | C' 03433 0 | I' 41446 1 | I' 41335 1 |
| 16,2160 | C' 01354 1 | C' 36011 1 | I' 77621 1 | I' 77440 1 | C' 40021 0 | 31466 1 | 74675 0 | 10000 0 |
| 16,2170 | 34712 1 | 50000 1 | 31423 0 | 55652 0 | 06006 1 | I' 51375 1 | C' 03433 0 | C' 03705 0 |
| 16,2200 | I' 77656 1 | I' 41441 0 | C' 03460 0 | I' 56244 0 | C' 40013 1 | C' 36005 1 | I' 41215 1 | C' 11454 1 |
| 16,2210 | I' 70501 1 | C' 00047 1 | I' 60325 0 | C' 00045 0 | C' 00050 1 | I' 77665 1 | I' 53664 0 | C' 00046 0 |
| 16,2220 | C' 57607 1 | I' 41405 0 | C' 36003 1 | I' 54335 0 | C' 03016 0 | C' 20617 0 | I' 45421 1 | C' 74347 1 |
| 16,2230 | I' 77615 0 | C' 01205 1 | C' 17413 1 | C' 03430 0 | I' 50025 0 | C' 36007 0 | C' 40000 0 | I' 74375 0 |
| 16,2240 | C' 03705 0 | C' 03703 0 | I' 52352 1 | C' 03433 0 | I' 63256 0 | C' 03460 0 | I' 47256 0 | I' 45121 1 |
| 16,2250 | C' 01736 1 | C' 47577 1 | I' 77761 1 | C' 03245 1 | C' 03126 1 | I' 77650 1 | C' 03657 0 | 06006 1 |
| 16,2260 | I' 71201 1 | C' 00001 0 | C' 11456 0 | I' 77725 1 | C' 34401 0 | I' 71214 0 | C' 03705 0 | C' 34271 1 |
| 16,2270 | C' 34403 1 | I' 77606 1 | I' 45014 0 | C' 00675 0 | C' 22002 0 | I' 77776 1 | 05301 0 | C' 05021 1 |
| 16,2300 | C' 10000 0 | 06006 1 | I' 77614 1 | C' 01310 1 | C' 34322 0 | I' 52375 1 | C' 03612 1 | C' 03466 0 |
| 16,2310 | I' 45325 1 | C' 03474 0 | C' 03476 1 | I' 55261 1 | C' 20222 1 | C' 34375 1 | I' 77761 1 | I' 76451 0 |
| 16,2320 | C' 01207 0 | C' 03705 0 | I' 57535 0 | C' 03747 0 | I' 77646 0 | C' 34342 0 | I' 53575 0 | C' 01171 1 |
| 16,2330 | I' 45345 1 | C' 01205 1 | C' 03450 0 | I' 56205 0 | C' 34377 0 | C' 00043 0 | I' 53381 0 | C' 01215 0 |
| 16,2340 | C' 03646 0 | C' 03646 0 | I' 77776 1 | 05301 0 | C' 04021 0 | 06006 1 | I' 77745 1 | C' 03474 0 |
| 16,2350 | C' 27476 1 | C' 03612 1 | C' 03466 0 | I' 77414 0 | C' 01270 0 | 44712 0 | 55746 1 | 05301 0 |
| 16,2360 | C' 00001 0 | 15112 1 | 06006 1 | I' 77775 1 | C' 11456 0 | C' 17351 0 | C' 11456 0 | C' 27347 1 |
| 16,2370 | C' 03721 0 | C' 03646 0 | I' 77776 1 | 12355 1 | C' 01440 0 | C' 00000 1 | C' 55340 0 | C' 61710 0 |

OCAL LISTING FOR PARAGRAPH J 111, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED AIA (INTERPRETIVE OPERATOR WORDS) OR ACA (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 16,2400 | C' 04000 0 | C' 00000 1 | C' 00701 1 | C' 03434 1 | 08008 1 | I' 43001 1 | C' 00001 0 | C' 01088 0 |
| 16,2410 | I' 51575 1 | C' 03721 0 | I' 11118 1 | 34104 0 | 00008 1 | 08031 0 | 74704 1 | 00008 1 |
| 16,2420 | 12502 0 | 08008 1 | I' 58325 0 | C' 36027 1 | C' 03078 0 | I' 72414 0 | C' 00700 0 | C' 34430 1 |
| 16,2430 | I' 11821 1 | I' 88325 0 | C' 36013 0 | C' 03076 0 | I' 50021 1 | C' 00001 0 | C' 34481 0 | I' 41325 0 |
| 16,2440 | C' 00111 0 | C' 38023 0 | I' 85221 0 | C' 03076 0 | C' 03727 0 | I' 80405 0 | C' 36025 0 | I' 41471 0 |
| 16,2450 | I' 51021 0 | C' 00003 1 | C' 34415 0 | I' 55345 0 | I' 43205 1 | C' 36025 0 | C' 38021 1 | I' 77650 1 |
| 16,2460 | C' 34466 1 | I' 41345 0 | C' 03018 0 | I' 58215 1 | C' 36015 0 | C' 38017 1 | I' 77778 1 | 07228 0 |
| 16,2470 | 30154 1 | 66001 0 | 34714 1 | 53430 0 | 02411 1 | I' 77414 0 | C' 01288 1 | 05301 0 |
| 16,2500 | C' 00003 1 | 15112 1 | 66008 1 | I' 77650 1 | C' 34431 0 | C' 01531 1 | I' 43020 1 | C' 00300 1 |
| 16,2510 | C' 01483 1 | I' 11745 1 | C' 01048 1 | C' 02007 1 | I' 43175 0 | C' 02028 1 | C' 00462 1 | C' 14001 0 |
| 16,2520 | C' 02607 1 | C' 34001 1 | C' 55341 1 | I' 77142 0 | C' 18152 0 | C' 02807 1 | I' 77824 1 | C' 26322 0 |
| 16,2530 | I' 11824 1 | C' 81338 0 | I' 17718 1 | 32505 0 | 04555 0 | C' 20824 0 | 04108 1 | 02541 0 |
| 16,2540 | 02533 0 | W008 1 | I' 77824 1 | C' 81345 1 | I' 45145 0 | C' 02807 1 | C' 28373 1 | I' 53575 0 |
| 16,2550 | C' 02152 0 | C' 14307 0 | C' 02807 1 | C' 34041 0 | C' 27022 1 | I' 47375 0 | C' 00001 0 | C' 00007 0 |
| 16,2560 | I' 53435 0 | C' 00307 0 | C' 00323 0 | I' 53435 0 | C' 00307 0 | C' 34315 1 | C' 00300 1 | I' 41345 0 |
| 16,2570 | C' 00737 1 | C' 00747 0 | I' 77878 0 | I' 70525 1 | C' 00741 0 | I' 41325 0 | C' 00745 1 | C' 00747 0 |
| 16,2600 | I' 78488 1 | C' 02714 1 | I' 41345 0 | C' 00743 1 | C' 00741 0 | I' 77752 1 | C' 00033 1 | I' 77605 1 |
| 16,2610 | C' 00737 1 | I' 41325 0 | C' 00751 1 | C' 00741 1 | I' 77025 0 | I' 41325 0 | C' 00743 1 | C' 00747 0 |
| 16,2620 | I' 77676 0 | I' 41325 0 | C' 00751 1 | C' 00737 1 | I' 41325 0 | C' 00745 1 | C' 00033 1 | I' 55415 1 |
| 16,2630 | I' 77772 0 | C' 02730 1 | I' 78435 1 | C' 03714 1 | C' 03722 1 | I' 77818 0 | I' 77620 0 | C' 00300 1 |
| 16,2640 | C' 34041 0 | C' 27045 0 | I' 77601 0 | C' 00001 0 | I' 57575 1 | C' 00001 0 | I' 77656 1 | C' 24323 0 |
| 16,2650 | C' 00007 0 | I' 53435 0 | C' 00001 0 | C' 00315 0 | I' 53435 0 | C' 00323 0 | C' 34307 1 | C' 00300 1 |
| 16,2660 | 40102 0 | 14105 0 | 00008 1 | 83142 0 | 34731 0 | 05140 1 | C' 02880 0 | C' 34066 0 |
| 16,2670 | 30032 0 | 57872 0 | 57873 1 | 31450 1 | 00008 1 | 21872 1 | 55476 1 | 00008 1 |
| 16,2700 | 77705 0 | 55874 1 | 36214 0 | 05140 1 | C' 03313 0 | C' 34066 0 | 04833 0 | C' 42404 1 |
| 16,2710 | 34678 1 | 00007 1 | 02011 0 | 10000 0 | 12720 1 | 34711 1 | 55661 0 | 12750 0 |
| 16,2720 | 11853 1 | 12725 1 | 12731 1 | 12723 1 | 12715 1 | 55663 1 | 31474 1 | 55662 0 |
| 16,2730 | 12741 0 | 04833 0 | C' 13243 0 | 03145 1 | 41847 1 | 61474 1 | 55662 0 | 34374 0 |
| 16,2740 | 55663 1 | 25881 1 | 31882 1 | 55474 0 | 31883 0 | 55853 1 | 55444 0 | 25661 1 |
| 16,2750 | 11447 0 | 12755 0 | 12773 1 | 12761 1 | 12773 1 | 55707 1 | 34716 0 | 55661 0 |
| 16,2760 | 13122 1 | 31852 1 | 00008 1 | 62770 0 | 55448 1 | 34715 0 | 55661 0 | 13053 0 |
| 16,2770 | 34707 0 | 55661 0 | 13125 0 | 34878 1 | 00008 1 | 02011 0 | 10000 0 | 13001 1 |

COAL LISTING FOR PARAGRAPH J 112, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A'S DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED *ai* (INTERPRETIVE OPERATOR WORDS) OR *ac* (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 16,3000 | 13142 1 | 40105 1 | 74674 1 | 28105 1 | 31466 1 | 74676 0 | 00006 1 | 13013 1 |
| 16,3010 | 34710 0 | 55661 0 | 13050 0 | 31420 0 | 00006 1 | 74706 0 | 22000 1 | 00006 1 |
| 16,3020 | 70000 0 | 22000 1 | 00006 1 | 71646 0 | 20001 1 | 20001 1 | 55762 1 | 25661 1 |
| 16,3030 | 37677 0 | 55635 1 | 31414 1 | 60000 1 | 60000 1 | 55644 1 | 31702 0 | 55646 0 |
| 16,3040 | 03154 1 | 11614 1 | 13047 0 | 13047 0 | 13047 0 | 34707 0 | 55664 0 | 25661 1 |
| 16,3050 | 31422 1 | 55446 1 | 25661 1 | 31466 1 | 74676 0 | 00006 1 | 13060 0 | 31446 0 |
| 16,3060 | 61446 0 | 55445 1 | 37716 0 | 55707 1 | 00006 1 | 31626 1 | 53704 1 | 41425 1 |
| 16,3070 | 61621 0 | 00006 1 | 71445 1 | 20001 1 | 20001 1 | 21704 1 | 00006 1 | 31630 0 |
| 16,3100 | 53706 0 | 41426 1 | 61623 1 | 00006 1 | 71445 1 | 20001 1 | 20001 1 | 21706 0 |
| 16,3110 | 25661 1 | 00000 1 | 31704 0 | 55425 1 | 53626 0 | 00006 1 | 31706 1 | 55426 1 |
| 16,3120 | 53630 1 | 25661 1 | 31707 0 | 55447 0 | 25661 1 | 11664 0 | 13131 0 | 13133 1 |
| 16,3130 | 13142 1 | 55710 1 | 13137 0 | 31412 1 | 55614 1 | 37716 0 | 55710 1 | 25661 1 |
| 16,3140 | 31710 0 | 55664 0 | 34714 1 | 55661 0 | 15213 0 | 31470 0 | 00006 1 | 73164 0 |
| 16,3150 | 20001 1 | 20001 1 | 20001 1 | 55650 1 | 31646 1 | 00006 1 | 71472 0 | 20001 1 |
| 16,3160 | 20001 1 | 20001 1 | 55651 0 | 00002 0 | C' 33074 1 | 22016 0 | 00006 1 | 22012 1 |
| 16,3170 | 11661 0 | 13173 0 | 13177 1 | 34334 1 | 65140 1 | C' 03271 0 | C' 34066 0 | 47700 0 |
| 16,3200 | 71654 0 | 10000 0 | 13256 1 | 13205 1 | 13262 0 | 34703 1 | 64700 1 | 00006 1 |
| 16,3210 | os012 1 | 33215 1 | 55312 1 | 33301 0 | 54030 0 | 15222 1 | 22016 0 | 34711 1 |
| 16,3220 | 00006 1 | os012 1 | 33277 0 | 55312 1 | 37700 1 | 54030 0 | 15224 1 | 22016 0 |
| 16,3230 | 00000 1 | 22012 1 | 44714 0 | 61631 1 | 54054 1 | 44714 0 | 61632 1 | 54053 0 |
| 16,3240 | 34755 1 | 00000 1 | 05014 1 | 41654 0 | 00006 1 | 63250 0 | 04574 0 | C' 36033 1 |
| 16,3250 | 11014 1 | 13266 1 | 13254 0 | 13266 1 | 04574 0 | C' 36160 0 | 51654 1 | 33275 1 |
| 16,3260 | 04037 1 | 33205 1 | 00006 1 | 31426 0 | 53632 0 | 13205 1 | 34714 1 | 55614 1 |
| 16,3270 | 13254 0 | 51661 1 | 33301 0 | 56000 1 | 10000 0 | C' 03216 1 | C' 40561 1 | C' 03227 0 |
| 16,3300 | C' 41037 0 | C' 37772 1 | C' 02742 1 | C' 02750 1 | C' 03030 1 | C' 03050 1 | C' 03053 1 | C' 03111 0 |
| 16,3310 | C' 03122 0 | C' 03125 1 | C' 03140 1 | C' 31672 0 | 00006 1 | 21673 0 | 00006 1 | 74706 0 |
| 16,3320 | 22000 1 | 55533 1 | 31611 0 | 00006 1 | 13326 1 | 13334 1 | 31613 1 | 00006 1 |
| 16,3330 | 13334 1 | 34714 1 | 55613 0 | 15213 0 | 41533 1 | 00006 1 | 71650 1 | 00006 1 |
| 16,3340 | 71533 1 | 63727 0 | 55613 0 | 31533 0 | 00006 1 | 63350 1 | 34712 1 | 13351 1 |
| 16,3350 | 44712 0 | 55070 0 | 00006 1 | 71613 0 | 40001 1 | 61674 0 | 55677 1 | 00006 1 |
| 16,3360 | 63363 1 | 34371 0 | 13364 1 | 34674 0 | 55700 0 | 51700 1 | 01676 1 | 40000 0 |
| 16,3370 | 00000 1 | 03442 0 | 51700 1 | 01533 0 | 55701 1 | 63735 0 | 00006 1 | 63521 1 |



OCAL LISTING FOR PARAGRAPH J 114, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, #A DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #I# (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 17,2000 | C' 00000 1 | C' 00310 0 | C' 77715 1 | C' 77777 0 | C' 17602 0 | C' 25124 1 | C' 00000 1 | C' 00820 0 |
| 17,2010 | C' 00040 0 | C' 00000 1 | C' 00001 0 | C' 27221 0 | C' 00000 1 | C' 22244 0 | C' 00570 0 | C' 33235 0 |
| 17,2020 | C' 00144 0 | C' 00000 1 | C' 01274 1 | C' 00000 1 | C' 00784 1 | C' 00000 1 | C' 00000 1 | C' 04283 1 |
| 17,2030 | 22016 0 | 00006 1 | 22012 1 | 32205 1 | 10000 0 | 55447 0 | 34714 1 | 54001 1 |
| 17,2040 | 51447 1 | 53530 1 | 11447 0 | 12034 0 | 00008 1 | 32212 1 | 53313 0 | 34672 0 |
| 17,2050 | 54030 0 | 15222 1 | 22016 0 | 00006 1 | 22012 1 | 04633 0 | C' 13207 0 | 30110 1 |
| 17,2060 | 00006 1 | 72206 0 | 55647 1 | 40000 0 | 61474 1 | 55662 0 | 31466 1 | 74875 0 |
| 17,2070 | 10000 0 | 34712 1 | 55447 0 | 51447 1 | 31416 0 | 55646 0 | 04633 0 | C' 35145 1 |
| 17,2100 | 31420 0 | 54001 1 | 34711 1 | 51447 1 | 30000 1 | 55644 1 | 40000 0 | 64672 0 |
| 17,2110 | 04712 1 | 55635 1 | 44674 1 | 70105 1 | 54105 1 | 51447 1 | 31413 0 | 00006 1 |
| 17,2120 | 71644 1 | 22000 1 | 53645 0 | 51447 1 | 31423 0 | 55652 0 | 37716 0 | 55664 0 |
| 17,2130 | 34374 0 | 55653 1 | 55444 0 | 31421 1 | 54001 1 | 00000 1 | 22000 1 | 51447 1 |
| 17,2140 | 30000 1 | 67716 0 | 55447 0 | 31425 0 | 55625 0 | 55631 0 | 55621 1 | 31426 0 |
| 17,2150 | 55627 1 | 55632 0 | 55623 0 | 41501 0 | 74710 1 | 27501 0 | 04633 0 | C' 42404 1 |
| 17,2160 | 34714 1 | 55654 0 | 30032 0 | 55672 1 | 34676 1 | 00006 1 | 02011 0 | 00006 1 |
| 17,2170 | 12173 1 | 31662 1 | 55474 0 | 34731 0 | 05140 1 | C' 02660 0 | C' 34066 0 | 00006 1 |
| 17,2200 | 32210 0 | 53313 0 | 31635 0 | 54030 0 | 15222 1 | C' 00101 1 | C' 03720 1 | C' 03111 0 |
| 17,2210 | C' 40066 0 | C' 02052 1 | C' 36066 1 | 00006 1 | 31564 1 | 20001 1 | 20001 1 | 53562 0 |
| 17,2220 | 31742 1 | 00006 1 | 71427 0 | 21562 0 | 31561 1 | 00006 1 | 71651 0 | 53745 1 |
| 17,2230 | 31562 1 | 00006 1 | 71651 0 | 22007 0 | 22000 1 | 21745 1 | 53745 1 | 20001 1 |
| 17,2240 | 20001 1 | 20001 1 | 20001 1 | 53745 1 | 04574 0 | C' 40441 1 | 00006 1 | 31542 0 |
| 17,2250 | 53737 1 | 41561 0 | 00006 1 | 71436 0 | 21737 1 | 41562 0 | 00006 1 | 71436 0 |
| 17,2260 | 27737 1 | 54001 1 | 12264 1 | 27736 0 | 41561 0 | 00006 1 | 71437 1 | 27737 1 |
| 17,2270 | 54001 1 | 12273 1 | 27736 0 | 31742 1 | 00006 1 | 71430 0 | 21737 1 | 31742 1 |
| 17,2300 | 00006 1 | 71431 1 | 27737 1 | 54001 1 | 12306 1 | 27736 0 | 00006 1 | 31544 0 |
| 17,2310 | 53712 0 | 41561 0 | 00006 1 | 71440 1 | 21712 0 | 41562 0 | 00006 1 | 71440 1 |
| 17,2320 | 27712 0 | 54001 1 | 12324 1 | 27711 0 | 41561 0 | 00006 1 | 71441 0 | 27712 0 |
| 17,2330 | 54001 1 | 12333 1 | 27711 0 | 31742 1 | 00006 1 | 71432 1 | 21712 0 | 31742 1 |
| 17,2340 | 00006 1 | 71433 0 | 27712 0 | 54001 1 | 12346 0 | 27711 0 | 41561 0 | 00006 1 |
| 17,2350 | 71442 0 | 53714 0 | 41562 0 | 00006 1 | 71442 0 | 27714 0 | 54001 1 | 12361 0 |
| 17,2360 | 27713 1 | 41561 0 | 00006 1 | 71443 1 | 27714 0 | 54001 1 | 12370 0 | 27713 1 |
| 17,2370 | 31742 1 | 00006 1 | 71434 1 | 21714 0 | 31742 1 | 00006 1 | 71435 0 | 27714 0 |



COAL LISTING FOR PARAGRAPH J 115, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" A DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED A/A (INTERPRETIVE OPERATOR WORDS) OR A/C (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 17,2400 | 54001 1 | 12403 0 | 27713 1 | 04574 0 | C' 40526 1 | 00006 1 | 31610 1 | 20001 1 |
| 17,2410 | 20001 1 | 53606 1 | 31742 1 | 00006 1 | 71427 0 | 21606 1 | 31605 0 | 00006 1 |
| 17,2420 | 71651 0 | 53745 1 | 31606 0 | 00006 1 | 71651 0 | 22007 0 | 22000 1 | 21745 1 |
| 17,2430 | 53745 1 | 20001 1 | 20001 1 | 20001 1 | 20001 1 | 53745 1 | 04574 0 | C' 40730 1 |
| 17,2440 | 00006 1 | 31566 0 | 53737 1 | 41605 1 | 00006 1 | 71436 0 | 21737 1 | 41606 1 |
| 17,2450 | 00006 1 | 71436 0 | 27737 1 | 54001 1 | 12456 0 | 27736 0 | 41605 1 | 00006 1 |
| 17,2460 | 71437 1 | 27737 1 | 54001 1 | 12465 0 | 27736 0 | 31742 1 | 00006 1 | 71430 0 |
| 17,2470 | 21737 1 | 31742 1 | 00006 1 | 71431 1 | 27737 1 | 54001 1 | 12500 1 | 27736 0 |
| 17,2500 | 00006 1 | 31570 1 | 53712 0 | 41605 1 | 00006 1 | 71440 1 | 21712 0 | 41606 1 |
| 17,2510 | 00006 1 | 71440 1 | 27712 0 | 54001 1 | 12516 0 | 27711 0 | 41605 1 | 00006 1 |
| 17,2520 | 71441 0 | 27712 0 | 54001 1 | 12525 0 | 27711 0 | 31742 1 | 00006 1 | 71432 1 |
| 17,2530 | 21712 0 | 31742 1 | 00006 1 | 71433 0 | 27712 0 | 54001 1 | 12540 0 | 27711 0 |
| 17,2540 | 41605 1 | 00006 1 | 71442 0 | 53714 0 | 41606 1 | 00006 1 | 71442 0 | 27714 0 |
| 17,2550 | 54001 1 | 12553 1 | 27713 1 | 41605 1 | 00006 1 | 71443 1 | 27714 0 | 54001 1 |
| 17,2560 | 12562 0 | 27713 1 | 31742 1 | 00006 1 | 71434 1 | 21714 0 | 31742 1 | 00006 1 |
| 17,2570 | 71435 0 | 27714 0 | 54001 1 | 12575 0 | 27713 1 | 04574 0 | C' 41015 0 | 22016 0 |
| 17,2600 | 32661 1 | 61634 1 | 54030 0 | 12606 1 | 32662 1 | 54030 0 | 33340 0 | 54031 1 |
| 17,2610 | 34674 0 | 00006 1 | 05013 0 | 00006 1 | 22012 1 | 32660 0 | 00006 1 | 06031 0 |
| 17,2620 | 72660 1 | 00006 1 | 12663 1 | 55502 0 | 00006 1 | 74702 1 | 76214 1 | 55513 0 |
| 17,2630 | 55514 1 | 31502 1 | 00006 1 | 74704 1 | 76214 1 | 55515 0 | 31502 1 | 00006 1 |
| 17,2640 | 74706 0 | 76214 1 | 55516 0 | 31466 1 | 74675 0 | 00006 1 | 12651 0 | 46214 1 |
| 17,2650 | 12652 0 | 44711 0 | 55617 1 | 11631 0 | 55513 0 | 12667 0 | 55514 1 | 12667 0 |
| 17,2660 | C' 07700 1 | C' 37772 1 | C' 37776 0 | 55513 0 | 55514 1 | 55515 0 | 55516 0 | 11562 0 |
| 17,2670 | 34712 1 | 12673 0 | 34711 1 | 55520 0 | 11626 0 | 12701 1 | 12711 0 | 12703 0 |
| 17,2700 | 12711 0 | 34334 1 | 12713 1 | 35656 1 | 12713 1 | C' 00000 1 | C' 00003 1 | C' 00006 1 |
| 17,2710 | C' 00000 1 | 51513 1 | 32705 1 | 61520 1 | 50000 1 | 32741 1 | 72760 0 | 55453 0 |
| 17,2720 | 00006 1 | 74704 1 | 55523 0 | 11563 1 | 34712 1 | 12727 0 | 34711 1 | 55521 1 |
| 17,2730 | 11627 1 | 12735 0 | 12762 1 | 12737 1 | 12762 1 | 34334 1 | 12764 1 | 35656 1 |
| 17,2740 | 12764 1 | C' 00000 1 | C' 05125 1 | C' 05252 1 | C' 00231 1 | C' 02421 1 | C' 02610 1 | C' 00146 1 |
| 17,2750 | C' 02504 1 | C' 02442 1 | C' 00000 1 | C' 02421 1 | C' 02442 1 | C' 00000 1 | C' 02504 1 | C' 02610 1 |
| 17,2760 | C' 01417 1 | C' 06360 1 | 51514 0 | 32705 1 | 61521 0 | 50000 1 | 32741 1 | 72761 1 |
| 17,2770 | 55455 0 | 00006 1 | 74706 0 | 55524 1 | 11561 0 | 34712 1 | 13000 0 | 34711 1 |



ODAL LISTING FOR PARAGRAPH J 116, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #1A (INTERPRETIVE OPERATOR WORDS) OR #CA (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 17,3000 | 55517 1 | 11630 1 | 13073 1 | 13073 1 | 13005 0 | 11628 0 | 13012 0 | 13022 0 |
| 17,3010 | 13014 0 | 13022 0 | 34334 1 | 13024 0 | 35656 1 | 13024 0 | C' 00000 1 | C' 00001 0 |
| 17,3020 | C' 00002 0 | C' 00000 1 | 51515 1 | 32705 1 | 61517 0 | 50000 1 | 33155 0 | 73174 1 |
| 17,3030 | 55451 1 | 31516 1 | 00006 1 | 63065 1 | 11627 1 | 36214 0 | 13040 1 | 36211 0 |
| 17,3040 | 51516 1 | 63016 0 | 50000 1 | 33176 1 | 73207 0 | 61451 0 | 55502 0 | 00006 1 |
| 17,3050 | 74704 1 | 66061 0 | 55522 1 | 00006 1 | 13060 0 | 31502 1 | 55451 1 | 13321 0 |
| 17,3060 | 11561 0 | 13065 0 | 13055 0 | 13065 0 | 13055 0 | 31451 0 | 00006 1 | 74704 1 |
| 17,3070 | 67715 0 | 55522 1 | 13321 0 | 11627 1 | 13100 1 | 13104 0 | 13102 0 | 13104 0 |
| 17,3100 | 34334 1 | 13106 1 | 35656 1 | 13106 1 | 61516 1 | 32705 1 | 61517 0 | 50000 1 |
| 17,3110 | 33155 0 | 73175 0 | 55451 1 | 31515 1 | 00006 1 | 13147 1 | 11628 0 | 36214 0 |
| 17,3120 | 13122 1 | 36211 0 | 51515 1 | 63016 0 | 50000 1 | 33176 1 | 73210 0 | 61451 0 |
| 17,3130 | 55502 0 | 00006 1 | 74707 1 | 66061 0 | 55522 1 | 00006 1 | 13142 1 | 31502 1 |
| 17,3140 | 55451 1 | 13321 0 | 11561 0 | 13147 1 | 13137 0 | 13147 1 | 13137 0 | 31451 0 |
| 17,3150 | 00006 1 | 74707 1 | 67715 0 | 55522 1 | 13321 0 | C' 11000 1 | C' 22125 1 | C' 00252 1 |
| 17,3160 | C' 11231 1 | C' 15421 1 | C' 04610 1 | C' 11146 1 | C' 15504 1 | C' 04442 1 | C' 11000 1 | C' 15504 1 |
| 17,3170 | C' 04610 1 | C' 11000 1 | C' 15421 1 | C' 04442 1 | C' 03760 0 | C' 34017 0 | C' 11000 1 | C' 11231 1 |
| 17,3200 | C' 11146 1 | C' 11000 1 | C' 04610 1 | C' 15504 1 | C' 11000 1 | C' 15421 1 | C' 04442 1 | C' 03417 0 |
| 17,3210 | C' 34360 0 | 11562 0 | 13221 1 | 13215 0 | 13217 1 | 55550 1 | 13417 1 | 41523 0 |
| 17,3220 | 55523 0 | 31562 1 | 00006 1 | 51523 1 | 73400 1 | 55461 1 | 63333 1 | 00006 1 |
| 17,3230 | 63241 0 | 51523 1 | 33334 0 | 55550 1 | 40000 0 | 27562 0 | 33335 1 | 55461 1 |
| 17,3240 | 13404 0 | 41461 1 | 63340 0 | 00006 1 | 63247 0 | 33340 0 | 55461 1 | 31461 0 |
| 17,3250 | 00006 1 | 71523 0 | 23550 0 | 55562 0 | 13404 0 | 11563 1 | 13265 1 | 13261 0 |
| 17,3260 | 13263 1 | 55551 0 | 13563 0 | 41524 1 | 55524 1 | 31563 0 | 00006 1 | 51524 0 |
| 17,3270 | 73400 1 | 55463 0 | 63333 1 | 00006 1 | 63305 1 | 51524 0 | 33334 0 | 55551 0 |
| 17,3300 | 40000 0 | 27563 1 | 33335 1 | 55463 0 | 13550 0 | 41463 0 | 63340 0 | 00006 1 |
| 17,3310 | 63313 0 | 33340 0 | 55463 0 | 31463 1 | 00006 1 | 71524 1 | 23551 1 | 55563 1 |
| 17,3320 | 13550 0 | 11561 0 | 13341 0 | 13325 1 | 13341 0 | 51522 0 | 33334 0 | 55547 1 |
| 17,3330 | 13543 1 | C' 77037 0 | C' 77277 0 | C' 77537 0 | C' 00000 1 | C' 00240 1 | C' 00500 1 | C' 00740 1 |
| 17,3340 | C' 00027 1 | 31561 1 | 00006 1 | 51522 0 | 73400 1 | 55457 1 | 63333 1 | 00006 1 |
| 17,3350 | 63361 0 | 51522 0 | 33334 0 | 55547 1 | 40000 0 | 27561 0 | 33335 1 | 55457 1 |
| 17,3360 | 13424 1 | 41457 1 | 63340 0 | 00006 1 | 63367 0 | 33340 0 | 55457 1 | 31457 0 |
| 17,3370 | 00006 1 | 71522 1 | 23547 0 | 55561 0 | 13424 1 | C' 65252 1 | C' 57777 1 | C' 40000 0 |



ODD LISTING FOR PARAGRAPH J 120, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A'S DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #I# (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 20,2000 | I' 77214 0 | C' 01066 0 | C' 15332 1 | C' 03126 1 | I' 77776 1 | 34672 0 | 55447 0 | 06006 1 |
| 20,2010 | I' 52014 0 | C' 01264 0 | C' 03857 0 | I' 77776 1 | 05537 0 | C' 01407 0 | 06006 1 | I' 77650 1 |
| 20,2020 | C' 03857 0 | I' 77214 0 | C' 00711 0 | C' 03657 0 | C' 15332 1 | C' 03126 1 | I' 77776 1 | 44714 0 |
| 20,2030 | 55653 1 | 55663 1 | 55652 0 | 55145 1 | 06006 1 | I' 52014 0 | C' 01264 0 | C' 03657 0 |
| 20,2040 | 40102 0 | 74105 0 | 00006 1 | 62045 1 | 15213 0 | 44712 0 | 55445 1 | 34712 1 |
| 20,2050 | 55447 0 | 44714 0 | 55303 1 | 44711 0 | 00006 1 | 03012 1 | 32143 0 | 00006 1 |
| 20,2060 | 05012 1 | 05156 0 | C' 00006 1 | 34711 1 | 00006 1 | 05012 1 | 05156 0 | C' 00002 0 |
| 20,2070 | 11447 0 | 12131 1 | 31445 0 | 55447 0 | 00006 1 | 62127 1 | 44714 0 | 55447 0 |
| 20,2100 | 32145 0 | 02114 1 | 32144 1 | 02114 1 | 32145 0 | 02114 1 | 41447 0 | 10000 0 |
| 20,2110 | 12127 0 | 44712 0 | 55447 0 | 12100 0 | 00006 1 | 23146 0 | 51447 1 | 54054 1 |
| 20,2120 | 51447 1 | 34700 1 | 00006 1 | 05014 1 | 05156 0 | C' 00310 0 | 01146 0 | 05156 0 |
| 20,2130 | C' 00620 0 | 44714 0 | 61425 0 | 54054 1 | 44714 0 | 61426 0 | 54053 0 | 34755 1 |
| 20,2140 | 00006 1 | 05014 1 | 15213 0 | C' 02200 1 | C' 77527 1 | C' 00124 0 | 31466 1 | 76214 1 |
| 20,2150 | 60000 1 | 55130 0 | 00004 0 | 31466 1 | 74371 1 | 67705 1 | 00006 1 | 12164 1 |
| 20,2160 | 44711 0 | 70103 1 | 54103 1 | 12167 1 | 40103 1 | 74711 0 | 26103 1 | 00003 1 |
| 20,2170 | 31466 1 | 74707 1 | 00006 1 | 62175 0 | 32275 0 | 62276 0 | 55655 1 | 31466 1 |
| 20,2200 | 74704 1 | 00006 1 | 62204 0 | 34712 1 | 55631 0 | 31466 1 | 74701 1 | 00006 1 |
| 20,2210 | 62212 1 | 44712 0 | 27631 0 | 00004 0 | 00006 1 | 12222 0 | 40075 1 | 74674 1 |
| 20,2220 | 26075 1 | 12225 1 | 44674 1 | 70075 1 | 54075 1 | 00003 1 | 31467 0 | 74676 0 |
| 20,2230 | 00006 1 | 62233 1 | 12234 1 | 44712 0 | 40000 0 | 55630 1 | 31467 0 | 74701 1 |
| 20,2240 | 10000 0 | 12245 1 | 34712 1 | 55626 0 | 12255 0 | 34714 1 | 55626 0 | 31467 0 |
| 20,2250 | 74707 1 | 10000 0 | 12255 0 | 44712 0 | 55626 0 | 31467 0 | 74704 1 | 10000 0 |
| 20,2260 | 12264 1 | 34712 1 | 55627 1 | 00002 0 | 34714 1 | 55627 1 | 31467 0 | 74712 0 |
| 20,2270 | 10000 0 | 00002 0 | 44712 0 | 55627 1 | 00002 0 | C' 00631 0 | C' 00056 1 | 31470 0 |
| 20,2300 | 00006 1 | 72324 1 | 55623 0 | 31471 1 | 00006 1 | 72324 1 | 55624 1 | 55625 0 |
| 20,2310 | 00006 1 | 32326 1 | 00006 1 | 11470 1 | 55620 0 | 00006 1 | 32326 1 | 00006 1 |
| 20,2320 | 11471 0 | 55621 1 | 55622 1 | 00002 0 | C' 25137 0 | C' 00023 0 | C' 12522 1 | 22016 0 |
| 20,2330 | 00006 1 | 22012 1 | 33420 1 | 55312 1 | 31635 0 | 54030 0 | 11614 1 | 03506 1 |
| 20,2340 | 12342 1 | 03506 1 | 30033 1 | 57655 0 | 00006 1 | 21655 1 | 02547 0 | 55657 0 |
| 20,2350 | 30034 0 | 57656 0 | 00006 1 | 21656 1 | 02547 0 | 55660 1 | 00006 1 | 31616 1 |
| 20,2360 | 53743 1 | 00006 1 | 31530 0 | 21743 1 | 40746 0 | 00006 1 | 70750 1 | 20001 1 |
| 20,2370 | 00006 1 | 71657 0 | 20001 1 | 53536 1 | 41660 1 | 00006 1 | 70742 1 | 20001 1 |

TOTAL LISTING FOR PARAGRAPH J 121, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A'S DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED A/A (INTERPRETIVE OPERATOR WORDS) OR A/C (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|---------|---------|---------|---------|------------|
| 20,2400 | 21538 1 | 00008 1 | 41838 1 | 21743 1 | 03128 1 | 31466 1 | 74875 0 | 10000 0 |
| 20,2410 | 12413 1 | 04574 0 | C' 36213 1 | 00008 1 | 41844 1 | 53745 1 | 31742 1 | 61541 0 |
| 20,2420 | 00008 1 | 74727 0 | 21745 1 | 31842 0 | 00008 1 | 74727 0 | 27745 1 | 54001 1 |
| 20,2430 | 12432 1 | 27744 0 | 00008 1 | 31745 0 | 20001 1 | 20001 1 | 20001 1 | 53727 0 |
| 20,2440 | 03141 0 | 00008 1 | 41745 1 | 53745 1 | 00008 1 | 31826 1 | 21745 1 | 31745 0 |
| 20,2450 | 60000 1 | 54001 1 | 34714 1 | 61744 1 | 03161 1 | 41831 0 | 61744 1 | 28054 1 |
| 20,2460 | 34700 1 | 00008 1 | 05014 1 | 31466 1 | 74875 0 | 10000 0 | 12471 0 | 04574 0 |
| 20,2470 | C' 36246 1 | 31742 1 | 60000 1 | 55717 0 | 00008 1 | 31846 1 | 53721 0 | 00008 1 |
| 20,2500 | 31550 0 | 53723 1 | 00008 1 | 31552 1 | 53725 1 | 03173 1 | 00008 1 | 31554 1 |
| 20,2510 | 53731 1 | 00008 1 | 31556 0 | 53733 0 | 00008 1 | 31560 0 | 53735 0 | 00008 1 |
| 20,2520 | 31562 1 | 53737 1 | 00008 1 | 31564 1 | 53741 0 | 03233 0 | 31744 1 | 00008 1 |
| 20,2530 | 73421 1 | 53716 1 | 31621 0 | 00008 1 | 73422 1 | 21716 1 | 31622 0 | 00008 1 |
| 20,2540 | 73422 1 | 27716 1 | 54001 1 | 12545 0 | 27715 1 | 02560 0 | 15222 1 | 55744 0 |
| 20,2550 | 00008 1 | 73415 0 | 00008 1 | 12556 1 | 34714 1 | 55744 0 | 31744 1 | 00002 0 |
| 20,2560 | 25654 1 | 00008 1 | 31720 0 | 53546 0 | 00008 1 | 31722 1 | 53550 1 | 00008 1 |
| 20,2570 | 31724 1 | 53552 0 | 00008 1 | 31727 1 | 53554 0 | 00008 1 | 31731 0 | 53556 1 |
| 20,2600 | 00008 1 | 31733 1 | 53560 1 | 00008 1 | 31735 1 | 53562 0 | 00008 1 | 31737 0 |
| 20,2610 | 53564 0 | 00008 1 | 31743 0 | 55477 0 | 53616 0 | 00008 1 | 31712 1 | 53542 1 |
| 20,2620 | 00008 1 | 31714 1 | 53544 1 | 31744 1 | 55631 0 | 00008 1 | 31716 0 | 53622 1 |
| 20,2630 | 25654 1 | 00002 0 | 22016 0 | 00008 1 | 22012 1 | 33416 1 | 55312 1 | 31635 0 |
| 20,2640 | 54030 0 | 11614 1 | 03506 1 | 12645 0 | 03506 1 | 00008 1 | 31620 1 | 53743 1 |
| 20,2650 | 00008 1 | 31532 1 | 21743 1 | 30746 1 | 00008 1 | 70742 1 | 20001 1 | 00006 1 |
| 20,2660 | 71657 0 | 20001 1 | 53540 0 | 41660 1 | 00008 1 | 70750 1 | 20001 1 | 21540 0 |
| 20,2670 | 00008 1 | 41540 0 | 21743 1 | 03126 1 | 31466 1 | 74875 0 | 10000 0 | 12702 1 |
| 20,2700 | 04574 0 | C' 36405 0 | 00008 1 | 41570 0 | 53745 1 | 31742 1 | 61565 0 | 00008 1 |
| 20,2710 | 74727 0 | 21745 1 | 31566 0 | 00008 1 | 74727 0 | 27745 1 | 54001 1 | 12721 0 |
| 20,2720 | 27744 0 | 00008 1 | 31745 0 | 20001 1 | 20001 1 | 20001 1 | 53727 0 | 03141 0 |
| 20,2730 | 00008 1 | 41745 1 | 53745 1 | 00008 1 | 31630 0 | 21745 1 | 31745 0 | 60000 1 |
| 20,2740 | 54001 1 | 34714 1 | 61744 1 | 03161 1 | 41632 0 | 61744 1 | 28053 0 | 34677 0 |
| 20,2750 | 00008 1 | 05014 1 | 31466 1 | 74875 0 | 10000 0 | 12760 0 | 04574 0 | C' 36440 1 |
| 20,2760 | 31742 1 | 60000 1 | 55717 0 | 00008 1 | 31572 0 | 53721 0 | 00008 1 | 31574 0 |
| 20,2770 | 53723 1 | 00008 1 | 31576 1 | 53725 1 | 03173 1 | 00008 1 | 31600 0 | 53731 1 |



OCTAL LISTING FOR PARAGRAPH J 122, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #I# (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 20,3000 | 00006 1 | 31602 1 | 53733 0 | 00006 1 | 31604 1 | 53735 0 | 00006 1 | 31606 0 |
| 20,3010 | 53737 1 | 00006 1 | 31610 1 | 53741 0 | 03233 0 | 31744 1 | 00006 1 | 73421 1 |
| 20,3020 | 53716 1 | 31623 1 | 00006 1 | 73422 1 | 21716 1 | 31624 0 | 00006 1 | 73422 1 |
| 20,3030 | 27716 1 | 54001 1 | 13034 1 | 27715 1 | 03036 1 | 15222 1 | 25654 1 | 00006 1 |
| 20,3040 | 31720 0 | 53572 1 | 00006 1 | 31722 1 | 53574 1 | 00006 1 | 31724 1 | 53576 0 |
| 20,3050 | 00006 1 | 31727 1 | 53600 1 | 00006 1 | 31731 0 | 53602 0 | 00006 1 | 31733 1 |
| 20,3060 | 53604 0 | 00006 1 | 31735 1 | 53606 1 | 00006 1 | 31737 0 | 53610 0 | 00006 1 |
| 20,3070 | 31743 0 | 55500 1 | 53620 0 | 00006 1 | 31712 1 | 53566 1 | 00006 1 | 31714 1 |
| 20,3100 | 53570 0 | 31744 1 | 55632 0 | 00006 1 | 31716 0 | 53624 1 | 34714 1 | 55654 0 |
| 20,3110 | 00002 0 | 22016 0 | 37716 0 | 61635 0 | 64674 0 | 61635 0 | 54030 0 | 33416 1 |
| 20,3120 | 55312 1 | 30033 1 | 55655 1 | 30034 0 | 55656 1 | 15224 1 | 31742 1 | 00006 1 |
| 20,3130 | 74710 1 | 00006 1 | 13140 0 | 11742 0 | 34676 1 | 13137 0 | 44676 0 | 55742 0 |
| 20,3140 | 00002 0 | 31744 1 | 00006 1 | 71651 0 | 53745 1 | 22000 1 | 00006 1 | 71651 0 |
| 20,3150 | 27745 1 | 54001 1 | 13154 0 | 27744 0 | 53745 1 | 20001 1 | 20001 1 | 53745 1 |
| 20,3160 | 00002 0 | 00006 1 | 73414 1 | 00006 1 | 13172 1 | 11744 0 | 33413 1 | 13171 1 |
| 20,3170 | 43413 0 | 55744 0 | 00002 0 | 31717 1 | 00006 1 | 73423 0 | 53712 0 | 31720 0 |
| 20,3200 | 00006 1 | 73424 1 | 21712 0 | 31721 1 | 00006 1 | 73425 0 | 21712 0 | 31722 1 |
| 20,3210 | 00006 1 | 73426 0 | 21712 0 | 31723 0 | 00006 1 | 73427 1 | 21712 0 | 31724 1 |
| 20,3220 | 00006 1 | 73430 1 | 21712 0 | 31725 0 | 00006 1 | 73431 0 | 21712 0 | 53712 0 |
| 20,3230 | 20001 1 | 53712 0 | 00002 0 | 31726 0 | 00006 1 | 73432 0 | 53714 0 | 31726 0 |
| 20,3240 | 00006 1 | 73433 1 | 27714 0 | 54001 1 | 13246 0 | 27713 1 | 31727 1 | 00006 1 |
| 20,3250 | 73432 0 | 27714 0 | 54001 1 | 13255 1 | 27713 1 | 31730 1 | 00006 1 | 73434 0 |
| 20,3260 | 21714 0 | 31730 1 | 00006 1 | 73435 1 | 27714 0 | 54001 1 | 13270 0 | 27713 1 |
| 20,3270 | 31731 0 | 00006 1 | 73434 0 | 27714 0 | 54001 1 | 13277 1 | 27713 1 | 31732 0 |
| 20,3300 | 00006 1 | 73436 1 | 21714 0 | 31732 0 | 00006 1 | 73437 0 | 27714 0 | 54001 1 |
| 20,3310 | 13312 0 | 27713 1 | 31733 1 | 00006 1 | 73436 1 | 27714 0 | 54001 1 | 13321 0 |
| 20,3320 | 27713 1 | 31734 0 | 00006 1 | 73440 0 | 21714 0 | 31734 0 | 00006 1 | 73441 1 |
| 20,3330 | 27714 0 | 54001 1 | 13334 1 | 27713 1 | 31735 1 | 00006 1 | 73440 0 | 27714 0 |
| 20,3340 | 54001 1 | 13343 1 | 27713 1 | 31736 1 | 00006 1 | 73442 1 | 21714 0 | 31736 1 |
| 20,3350 | 00006 1 | 73443 0 | 27714 0 | 54001 1 | 13356 0 | 27713 1 | 31737 0 | 00006 1 |
| 20,3360 | 73442 1 | 27714 0 | 54001 1 | 13365 0 | 27713 1 | 31740 0 | 00006 1 | 73444 1 |
| 20,3370 | 21714 0 | 31740 0 | 00006 1 | 73445 0 | 27714 0 | 54001 1 | 13400 1 | 27713 1 |



OCAL LISTING FOR PARAGRAPH J 124, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" A DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED aIa (INTERPRETIVE OPERATOR WORDS) OR aCa (CONSTANTS)

| | | | | | | | | |
|---------|---------|------------|------------|------------|------------|------------|------------|------------|
| 21,2000 | 22016 0 | 00006 1 | 22012 1 | 02010 1 | 15222 1 | C' 02106 1 | C' 42106 0 | C' 37704 0 |
| 21,2010 | 32007 1 | 54030 0 | 55465 0 | 41501 0 | 74710 1 | 27501 0 | 00006 1 | 32006 0 |
| 21,2020 | 53313 0 | 44105 0 | 70102 0 | 64675 1 | 54102 0 | 00002 0 | 55512 1 | 00006 1 |
| 21,2030 | 71511 1 | 55511 1 | 34714 1 | 57510 1 | 00006 1 | 71512 1 | 21511 1 | 00002 0 |
| 21,2040 | 21511 1 | 00006 1 | 12057 0 | 11510 0 | 12060 1 | 12047 1 | 12062 0 | 11511 1 |
| 21,2050 | 12065 1 | 12053 1 | 40000 0 | 64672 0 | 55511 1 | 34672 0 | 55510 0 | 00002 0 |
| 21,2060 | 64674 0 | 12056 1 | 40000 0 | 64672 0 | 12056 1 | 64674 0 | 55511 1 | 34674 0 |
| 21,2070 | 12056 1 | 22016 0 | 31465 1 | 00006 1 | 62076 1 | 12106 0 | 44712 0 | 55465 0 |
| 21,2100 | 00006 1 | 32105 1 | 53313 0 | 12107 1 | C' 02106 1 | C' 42066 1 | 22016 0 | 00006 1 |
| 21,2110 | 22012 1 | 34674 0 | 00006 1 | 02031 1 | 00006 1 | 12144 0 | 41501 0 | 74675 0 |
| 21,2120 | 27501 0 | 34672 0 | 55332 0 | 34714 1 | 55567 0 | 55570 0 | 55571 1 | 34675 0 |
| 21,2130 | 00006 1 | 02031 1 | 00006 1 | 12144 0 | 55465 0 | 37676 1 | 54030 0 | 02616 1 |
| 21,2140 | 12334 0 | C' 37770 0 | C' 37776 0 | C' 37634 1 | 11465 0 | 12530 1 | 12645 0 | 12532 0 |
| 21,2150 | 55465 0 | 30030 1 | 55634 0 | 32142 1 | 54030 0 | 41321 1 | 74705 0 | 10000 0 |
| 21,2160 | 12174 0 | 41501 0 | 74675 0 | 27501 0 | 34675 1 | 55332 0 | 00006 1 | 02031 1 |
| 21,2170 | 00006 1 | 12403 0 | 12520 0 | C' 00030 1 | 31501 1 | 74675 0 | 00006 1 | 12201 1 |
| 21,2200 | 12334 0 | 34711 1 | 55506 1 | 60000 1 | 55507 0 | 51507 1 | 41552 0 | 00006 1 |
| 21,2210 | 51617 0 | 73063 0 | 51507 1 | 21553 1 | 00006 1 | 51507 1 | 41534 0 | 53511 1 |
| 21,2220 | 34676 1 | 02026 1 | 53511 1 | 51507 1 | 21553 1 | 11506 1 | 12202 1 | 30032 0 |
| 21,2230 | 57635 0 | 00006 1 | 21635 1 | 40000 0 | 22007 0 | 53516 0 | 30033 1 | 57636 0 |
| 21,2240 | 00006 1 | 21636 1 | 40000 0 | 55502 0 | 00006 1 | 71640 0 | 21516 0 | 31641 0 |
| 21,2250 | 00006 1 | 71502 0 | 53520 0 | 31643 1 | 00006 1 | 71502 0 | 53522 1 | 30034 0 |
| 21,2260 | 57637 1 | 00006 1 | 21637 0 | 40000 0 | 55502 0 | 00006 1 | 71642 1 | 21520 0 |
| 21,2270 | 31644 0 | 00006 1 | 71502 0 | 21522 1 | 34711 1 | 55506 1 | 60000 1 | 55507 0 |
| 21,2300 | 00006 1 | 51507 1 | 31516 1 | 51507 1 | 21553 1 | 00006 1 | 51507 1 | 31516 1 |
| 21,2310 | 51507 1 | 21542 1 | 51507 1 | 31552 1 | 60000 1 | 60000 1 | 00006 1 | 51617 0 |
| 21,2320 | 73101 0 | 51507 1 | 21534 0 | 51506 0 | 31620 1 | 00006 1 | 51506 0 | 71547 1 |
| 21,2330 | 51507 1 | 21534 0 | 11506 1 | 12275 1 | 31560 0 | 74721 0 | 10000 0 | 12345 0 |
| 21,2340 | 37671 0 | 05027 1 | C' 03444 0 | C' 44066 1 | 34334 1 | 55560 1 | 41332 0 | 00006 1 |
| 21,2350 | 62375 1 | 34711 1 | 55506 1 | 60000 1 | 55507 0 | 00006 1 | 50000 1 | 31647 0 |
| 21,2360 | 53511 1 | 00006 1 | 51507 1 | 31576 1 | 02040 1 | 00006 1 | 31511 0 | 51506 0 |
| 21,2370 | 55572 1 | 51507 1 | 53647 1 | 11506 1 | 12352 0 | 41501 0 | 74707 1 | 00006 1 |

TOTAL LISTING FOR PARAGRAPH J 125, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #1# (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 21,2400 | 13144 1 | 27501 0 | 02404 0 | 15222 1 | 34707 0 | 00006 1 | 02012 0 | 00006 1 |
| 21,2410 | 12415 1 | 41501 0 | 74710 1 | 27501 0 | 00002 0 | 31501 1 | 76211 1 | 00006 1 |
| 21,2420 | 12455 0 | 74710 1 | 00006 1 | 12446 1 | 44705 0 | 00006 1 | 03012 1 | 44714 0 |
| 21,2430 | 55478 1 | 55477 0 | 55500 1 | 55503 1 | 55504 0 | 55505 1 | 54050 0 | 54051 1 |
| 21,2440 | 54052 1 | 46211 1 | 71501 0 | 64711 1 | 55501 0 | 00002 0 | 34705 1 | 00006 1 |
| 21,2450 | 05012 1 | 46211 1 | 71501 0 | 55501 0 | 00002 0 | 34705 1 | 00006 1 | 02012 0 |
| 21,2460 | 00006 1 | 12411 0 | 34711 1 | 55506 1 | 44676 0 | 00006 1 | 51506 0 | 71476 1 |
| 21,2470 | 54001 1 | 10000 0 | 32526 1 | 12475 1 | 42526 0 | 60001 0 | 55502 0 | 12503 1 |
| 21,2500 | 50000 1 | 32526 1 | 54001 1 | 51506 0 | 41503 1 | 60001 0 | 51506 0 | 26050 0 |
| 21,2510 | 51506 0 | 23503 0 | 11506 1 | 12463 0 | 37707 0 | 00006 1 | 05014 1 | 00002 0 |
| 21,2520 | 32524 0 | 54030 0 | 55465 0 | 15222 1 | C' 37754 0 | C' 77177 0 | C' 37200 1 | C' 00600 1 |
| 21,2530 | 34712 1 | 55332 0 | 04633 0 | C' 40146 0 | 04633 0 | C' 40277 1 | 32607 1 | 55506 1 |
| 21,2540 | 34714 1 | 51506 0 | 55525 0 | 11506 1 | 12537 0 | 02616 1 | 44714 0 | 55633 1 |
| 21,2550 | 55632 0 | 32610 1 | 55654 0 | 34710 0 | 55634 0 | 34717 1 | 55617 1 | 30032 0 |
| 21,2560 | 55635 1 | 30033 1 | 55636 1 | 30034 0 | 55637 0 | 34714 1 | 55465 0 | 41321 1 |
| 21,2570 | 74705 0 | 10000 0 | 12576 0 | 55617 1 | 32612 0 | 12603 1 | 37671 0 | 05027 1 |
| 21,2600 | C' 03444 0 | C' 44066 1 | 32611 0 | 55501 0 | 32613 1 | 54030 0 | 05222 0 | C' 00044 1 |
| 21,2610 | C' 07534 1 | C' 00004 0 | C' 20004 1 | C' 37772 1 | C' 03644 1 | C' 36066 1 | 34717 1 | 55506 1 |
| 21,2620 | 34714 1 | 51506 0 | 55451 1 | 11506 1 | 12617 1 | 34710 0 | 55462 1 | 34717 1 |
| 21,2630 | 55464 1 | 44712 0 | 71501 0 | 55501 0 | 00006 1 | 32615 1 | 53311 1 | 33034 0 |
| 21,2640 | 54031 1 | 34674 0 | 00006 1 | 05013 0 | 00002 0 | 11617 1 | 13132 0 | 12651 0 |
| 21,2650 | 12651 0 | 32142 1 | 56030 1 | 27634 0 | 31501 1 | 74674 1 | 00006 1 | 12661 0 |
| 21,2660 | 44712 0 | 55617 1 | 43016 1 | 71501 0 | 55501 0 | 00006 1 | 00031 0 | 54001 1 |
| 21,2670 | 31632 1 | 00006 1 | 06001 0 | 73022 0 | 00006 1 | 62710 0 | 22000 1 | 55632 0 |
| 21,2700 | 30001 0 | 00006 1 | 74706 0 | 30001 0 | 27501 0 | 41501 0 | 73023 1 | 27501 0 |
| 21,2710 | 41632 0 | 73022 0 | 00006 1 | 63234 1 | 55332 0 | 03114 0 | 40075 1 | 74675 0 |
| 21,2720 | 26075 1 | 34675 1 | 00006 1 | 02031 1 | 00006 1 | 63035 1 | 31501 1 | 74675 0 |
| 21,2730 | 10000 0 | 12520 0 | 44715 1 | 61130 1 | 00006 1 | 62740 0 | 44712 0 | 55617 1 |
| 21,2740 | 34711 1 | 55506 1 | 60000 1 | 55507 0 | 51506 0 | 31656 0 | 00006 1 | 12771 0 |
| 21,2750 | 61130 1 | 54002 1 | 50002 0 | 33023 0 | 00006 1 | 74702 1 | 51507 1 | 53526 0 |
| 21,2760 | 31501 1 | 73023 1 | 00006 1 | 13001 1 | 34714 1 | 22007 0 | 51507 1 | 53542 1 |
| 21,2770 | 13007 1 | 22007 0 | 51507 1 | 53526 0 | 31501 1 | 73023 1 | 00006 1 | 13007 1 |



ODD LISTING FOR PARAGRAPH J 126, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" A DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #A (INTERPRETIVE OPERATOR WORDS) OR #C (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 21,3000 | 12764 1 | 50002 0 | 43023 1 | 00006 1 | 74704 1 | 51507 1 | 21542 1 | 51507 1 |
| 21,3010 | 31541 0 | 51506 0 | 55567 0 | 11506 1 | 12741 0 | 13425 0 | C' 01760 1 | C' 01400 1 |
| 21,3020 | C' 00060 1 | C' 00300 1 | C' 00077 1 | C' 16000 0 | C' 00165 0 | C' 77612 1 | C' 00722 0 | C' 77055 1 |
| 21,3030 | C' 02215 0 | C' 75562 1 | C' 22151 1 | C' 55626 0 | C' 00027 1 | 51656 0 | 33047 1 | 55561 0 |
| 21,3040 | 51657 1 | 33047 1 | 55562 0 | 51660 0 | 33047 1 | 55563 1 | 13053 0 | C' 00000 1 |
| 21,3050 | C' 00740 1 | C' 77037 0 | C' 00000 1 | 34714 1 | 55567 0 | 55570 0 | 55571 1 | 13743 0 |
| 21,3060 | C' 06604 0 | C' 32703 1 | C' 06604 0 | C' 02031 1 | C' 12132 1 | C' 13030 0 | C' 14047 1 | C' 15241 1 |
| 21,3070 | C' 16650 0 | C' 20555 0 | C' 23065 0 | C' 26137 0 | C' 32053 0 | C' 35712 0 | C' 00435 0 | C' 13412 1 |
| 21,3100 | C' 00435 0 | C' 00032 0 | C' 01350 0 | C' 01575 1 | C' 02103 1 | C' 02523 1 | C' 03327 1 | C' 04432 0 |
| 21,3110 | C' 06264 1 | C' 11351 0 | C' 17324 1 | C' 33622 1 | 55502 0 | 76214 1 | 55657 0 | 31502 1 |
| 21,3120 | 00006 1 | 74676 0 | 55502 0 | 76214 1 | 55660 1 | 31502 1 | 00006 1 | 74676 0 |
| 21,3130 | 55656 1 | 00002 0 | 55617 1 | 32141 1 | 61634 1 | 54030 0 | 13141 1 | 32142 1 |
| 21,3140 | 54030 0 | 44714 0 | 55465 0 | 15222 1 | 44707 1 | 71501 0 | 55501 0 | 40074 0 |
| 21,3150 | 74702 1 | 00006 1 | 13161 0 | 00006 1 | 41570 0 | 53477 0 | 41571 1 | 55500 1 |
| 21,3160 | 15222 1 | 30105 0 | 74705 0 | 00006 1 | 13227 1 | 00006 1 | 31157 0 | 53514 1 |
| 21,3170 | 31155 1 | 00006 1 | 20032 1 | 55476 1 | 31513 1 | 00006 1 | 20033 0 | 55502 0 |
| 21,3200 | 00006 1 | 71640 0 | 27476 1 | 31502 1 | 00006 1 | 71641 1 | 55477 0 | 31502 1 |
| 21,3210 | 00006 1 | 71643 0 | 55500 1 | 31514 0 | 00006 1 | 20034 1 | 55502 0 | 00006 1 |
| 21,3220 | 71642 1 | 27477 0 | 31502 1 | 00006 1 | 71644 1 | 27500 1 | 15222 1 | 00006 1 |
| 21,3230 | 31335 0 | 53514 1 | 31333 0 | 13171 1 | 00006 1 | 00031 0 | 74675 0 | 00006 1 |
| 21,3240 | 63256 0 | 31501 1 | 74675 0 | 10000 0 | 12520 0 | 00006 1 | 00031 0 | 74676 0 |
| 21,3250 | 00006 1 | 63356 1 | 31332 1 | 00006 1 | 63306 1 | 13362 1 | 34712 1 | 55332 0 |
| 21,3260 | 00006 1 | 00032 0 | 54001 1 | 40000 0 | 73022 0 | 71633 1 | 23633 0 | 03114 0 |
| 21,3270 | 51656 0 | 33302 0 | 55561 0 | 51657 1 | 33302 0 | 55562 0 | 51660 0 | 33302 0 |
| 21,3300 | 55563 1 | 13053 0 | C' 00000 1 | C' 00027 1 | C' 77750 0 | C' 00000 1 | 30032 0 | 00006 1 |
| 21,3310 | 21572 1 | 55567 0 | 30033 1 | 00006 1 | 21573 0 | 55502 0 | 00006 1 | 71640 0 |
| 21,3320 | 27567 0 | 31502 1 | 00006 1 | 71641 1 | 55570 0 | 31502 1 | 00006 1 | 71643 0 |
| 21,3330 | 55571 1 | 30034 0 | 00006 1 | 21574 1 | 55502 0 | 00006 1 | 71642 1 | 27570 0 |
| 21,3340 | 31502 1 | 00006 1 | 71644 1 | 27571 1 | 41332 0 | 00006 1 | 63425 1 | 31564 1 |
| 21,3350 | 27567 0 | 31565 0 | 27570 0 | 31566 0 | 27571 1 | 13425 0 | 11332 0 | 13362 1 |
| 21,3360 | 13306 0 | 13362 1 | 34714 1 | 55525 0 | 55526 0 | 55527 1 | 55530 1 | 55531 0 |
| 21,3370 | 55532 0 | 55564 0 | 55565 1 | 55566 1 | 31501 1 | 73023 1 | 00006 1 | 13405 1 |



COAL LISTING FOR PARAGRAPH J 130, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A'S DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #A (INTERPRETIVE OPERATOR WORDS) OR #C (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 22,2000 | 06006 1 | I' 77634 0 | C' 44376 0 | C' 03262 1 | I' 72384 0 | C' 03320 0 | C' 03262 1 | I' 77624 1 |
| 22,2010 | C' 44405 0 | I' 72384 0 | C' 03425 1 | C' 01156 1 | I' 77624 1 | C' 44405 0 | I' 45160 1 | C' 03320 0 |
| 22,2020 | C' 44334 0 | I' 77775 1 | I' 77626 0 | C' 80474 0 | I' 77626 0 | C' 50502 0 | I' 77626 0 | C' 74510 0 |
| 22,2030 | I' 75160 1 | C' 03266 0 | C' 03425 1 | I' 77624 1 | C' 44304 0 | I' 45575 1 | C' 50335 1 | I' 77626 0 |
| 22,2040 | C' 50343 0 | I' 77626 0 | C' 74351 0 | I' 45001 1 | C' 00023 0 | C' 44343 0 | I' 45575 1 | C' 50474 0 |
| 22,2050 | I' 77626 0 | C' 50502 0 | I' 77626 0 | C' 74510 0 | I' 45345 1 | C' 03271 0 | C' 03430 0 | I' 45325 1 |
| 22,2060 | C' 03432 1 | C' 03273 1 | I' 45325 1 | C' 03301 0 | C' 03440 1 | I' 77666 1 | C' 03311 1 | I' 43345 1 |
| 22,2070 | C' 03426 1 | C' 03446 1 | I' 43225 0 | C' 15322 0 | C' 03436 0 | C' 03317 1 | I' 77726 1 | C' 03365 1 |
| 22,2100 | I' 51025 1 | C' 04367 1 | C' 44111 0 | I' 77776 1 | 00004 0 | 44712 0 | 55332 0 | 03301 0 |
| 22,2110 | I' 12727 0 | I' 45345 1 | C' 03365 1 | C' 04370 1 | I' 77244 0 | C' 44123 1 | C' 03311 1 | I' 77656 1 |
| 22,2120 | C' 03343 0 | I' 77650 1 | C' 44736 0 | I' 53375 0 | C' 03426 1 | C' 03267 1 | I' 77762 1 | C' 27267 1 |
| 22,2130 | C' 03434 1 | I' 74455 0 | C' 03275 1 | C' 27275 1 | C' 03442 0 | I' 74455 0 | C' 03303 1 | C' 03303 1 |
| 22,2140 | I' 70645 1 | C' 03317 1 | I' 45325 1 | C' 15330 0 | C' 03317 1 | I' 65204 1 | C' 45707 0 | C' 03307 0 |
| 22,2150 | I' 56225 1 | C' 00001 0 | C' 00003 1 | I' 65366 1 | C' 03277 0 | I' 56225 1 | C' 00001 0 | C' 00003 1 |
| 22,2160 | I' 65366 1 | C' 03267 1 | I' 56225 1 | C' 00001 0 | C' 00003 1 | I' 55566 1 | I' 77656 1 | C' 03343 0 |
| 22,2170 | I' 45345 1 | C' 03343 0 | C' 03345 0 | I' 71240 1 | C' 44203 0 | C' 03343 0 | I' 50025 0 | C' 03347 1 |
| 22,2200 | C' 44260 0 | I' 77650 1 | C' 44234 1 | I' 45345 1 | C' 03345 0 | C' 03347 1 | I' 77640 0 | C' 44260 0 |
| 22,2210 | I' 51145 0 | C' 03313 0 | C' 44216 1 | I' 57575 1 | C' 03343 0 | C' 03343 0 | I' 51145 0 | C' 03271 0 |
| 22,2220 | C' 44224 0 | I' 57545 1 | C' 03343 0 | C' 03343 0 | I' 51145 0 | C' 03301 0 | C' 44736 0 | I' 57545 1 |
| 22,2230 | C' 03347 1 | C' 03347 1 | I' 77650 1 | C' 44736 0 | I' 51145 0 | C' 03311 1 | C' 44242 0 | I' 57575 1 |
| 22,2240 | C' 03343 0 | C' 03343 0 | I' 51145 0 | C' 03271 0 | C' 44250 0 | I' 57545 1 | C' 03345 0 | C' 03345 0 |
| 22,2250 | I' 51145 0 | C' 03273 1 | C' 44736 0 | I' 57545 1 | C' 03347 1 | C' 03347 1 | I' 77650 1 | C' 44736 0 |
| 22,2260 | I' 51145 0 | C' 03315 0 | C' 44266 0 | I' 57575 1 | C' 03343 0 | C' 03343 0 | I' 51145 0 | C' 03273 1 |
| 22,2270 | C' 44274 0 | I' 57545 1 | C' 03343 0 | C' 03343 0 | I' 51145 0 | C' 03301 0 | C' 44736 0 | I' 57545 1 |
| 22,2300 | C' 03345 0 | C' 03345 0 | I' 77650 1 | C' 44736 0 | I' 77601 0 | C' 00001 0 | I' 64743 0 | C' 77762 1 |
| 22,2310 | C' 77770 1 | I' 55523 0 | C' 77776 1 | I' 64717 1 | C' 00001 0 | C' 77760 0 | I' 64723 0 | C' 77766 0 |
| 22,2320 | C' 77774 0 | I' 63666 1 | C' 00001 0 | I' 64723 0 | C' 77756 0 | C' 77764 1 | I' 55523 0 | C' 77772 0 |
| 22,2330 | I' 41517 1 | C' 00001 0 | I' 77650 1 | C' 44343 0 | I' 76601 1 | C' 00001 0 | C' 00001 0 | I' 62713 0 |
| 22,2340 | C' 00007 0 | C' 00015 0 | I' 77606 1 | I' 65345 0 | C' 00003 1 | C' 00007 0 | C' 14003 1 | I' 77626 0 |
| 22,2350 | C' 63770 1 | C' 00005 1 | I' 77725 1 | C' 00015 0 | C' 14005 1 | I' 77626 0 | C' 63762 1 | C' 00013 0 |
| 22,2360 | I' 77725 1 | C' 00017 1 | C' 14013 0 | I' 77626 0 | C' 77760 0 | I' 77616 0 | C' 00013 0 | C' 17071 1 |
| 22,2370 | C' 15667 1 | C' 33555 1 | C' 67777 1 | C' 04000 0 | C' 00217 0 | C' 17773 1 | 00004 0 | 30034 0 |



CODAL LISTING FOR PARAGRAPH J 131, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, #A DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #IA (INTERPRETIVE OPERATOR WORDS) OR #CA (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 22,2400 | 84156 1 | 00006 1 | 30033 1 | 00003 1 | 16445 0 | I' 66370 0 | C' 00003 1 | C' 00051 0 |
| 22,2410 | C' 00001 0 | C' 00010 0 | I' 77801 0 | C' 00001 0 | I' 47133 0 | C' 00013 0 | C' 45510 1 | C' 00013 0 |
| 22,2420 | I' 65356 1 | C' 00013 0 | I' 41846 0 | I' 71300 1 | C' 44414 0 | C' 00007 0 | I' 72405 0 | C' 00013 0 |
| 22,2430 | C' 10001 1 | I' 77745 1 | C' 00005 1 | I' 65205 0 | C' 00001 0 | C' 00007 0 | I' 41205 0 | C' 00011 1 |
| 22,2440 | C' 00003 1 | I' 44352 0 | C' 00015 0 | I' 77752 1 | C' 10003 0 | I' 77745 1 | C' 00003 1 | I' 65205 0 |
| 22,2450 | C' 00005 1 | C' 00007 0 | I' 41205 0 | C' 00011 1 | C' 00001 0 | I' 77752 1 | I' 72415 1 | C' 00017 1 |
| 22,2460 | C' 10005 0 | I' 77745 1 | C' 00011 1 | C' 10007 1 | I' 77745 1 | C' 00013 0 | I' 72405 0 | C' 00003 1 |
| 22,2470 | C' 10011 0 | I' 77745 1 | C' 00013 0 | I' 57405 1 | C' 00001 0 | I' 77752 1 | C' 10013 1 | I' 77745 1 |
| 22,2500 | C' 00005 1 | I' 57405 1 | C' 00013 0 | I' 77752 1 | C' 10015 1 | I' 77745 1 | I' 72405 0 | C' 00011 1 |
| 22,2510 | I' 41325 0 | C' 00007 0 | C' 00001 0 | I' 72415 1 | I' 77626 0 | C' 67760 1 | I' 77745 1 | I' 72405 0 |
| 22,2520 | C' 00011 1 | I' 41325 0 | C' 00007 0 | C' 00003 1 | I' 72425 1 | I' 77626 0 | C' 67756 1 | I' 77616 0 |
| 22,2530 | I' 41401 1 | C' 00001 0 | I' 65356 1 | I' 41846 0 | I' 65302 0 | I' 41021 1 | C' 15330 0 | C' 45707 0 |
| 22,2540 | I' 77725 1 | C' 03343 0 | I' 41316 0 | C' 00005 1 | I' 52415 0 | C' 00003 1 | I' 77604 0 | C' 45707 0 |
| 22,2550 | C' 17426 1 | C' 03345 0 | I' 41316 0 | C' 00005 1 | I' 52415 0 | C' 00003 1 | I' 77604 0 | C' 45707 0 |
| 22,2560 | C' 17436 0 | C' 03347 1 | I' 41316 0 | C' 00005 1 | I' 52415 0 | C' 00003 1 | I' 77604 0 | C' 45707 0 |
| 22,2570 | C' 03446 1 | I' 41345 0 | C' 03343 0 | C' 03345 0 | I' 72405 0 | C' 00005 1 | I' 41325 0 | C' 03347 1 |
| 22,2600 | C' 00001 0 | I' 43206 1 | C' 00007 0 | I' 41112 0 | C' 45707 0 | C' 17434 1 | I' 62421 1 | I' 77604 0 |
| 22,2610 | C' 45707 0 | C' 17430 0 | C' 03343 0 | I' 41205 0 | C' 03347 1 | C' 00005 1 | I' 65352 0 | C' 03345 0 |
| 22,2620 | I' 41405 0 | C' 00001 0 | I' 62415 0 | C' 00007 0 | I' 77604 0 | C' 45707 0 | C' 17432 1 | I' 62421 1 |
| 22,2630 | I' 77604 0 | C' 45707 0 | C' 17442 0 | C' 03345 0 | I' 41205 0 | C' 03347 1 | C' 00005 1 | I' 65352 0 |
| 22,2640 | C' 03343 0 | I' 41405 0 | C' 00001 0 | I' 62415 0 | C' 00007 0 | I' 77604 0 | C' 45707 0 | C' 17444 0 |
| 22,2650 | I' 62421 1 | I' 77604 0 | C' 45707 0 | C' 03440 1 | I' 77616 0 | I' 67543 1 | C' 00007 0 | I' 71406 0 |
| 22,2660 | I' 41152 1 | C' 45707 0 | C' 00051 0 | I' 57543 1 | C' 00015 0 | I' 67471 1 | C' 00051 0 | I' 51123 0 |
| 22,2670 | C' 00001 0 | C' 44703 0 | I' 57545 1 | I' 43244 1 | C' 44700 0 | C' 15330 0 | I' 77650 1 | C' 44702 1 |
| 22,2700 | I' 77625 0 | C' 15330 0 | I' 77606 1 | I' 57543 1 | C' 00013 0 | I' 67471 1 | C' 00051 0 | I' 51123 0 |
| 22,2710 | C' 00011 1 | C' 44723 1 | I' 57545 1 | I' 43244 1 | C' 44720 1 | C' 15330 0 | I' 77650 1 | C' 44724 0 |
| 22,2720 | I' 62025 1 | C' 15330 0 | C' 44724 0 | I' 77745 1 | I' 43466 1 | 00004 0 | 03272 0 | 00004 0 |
| 22,2730 | 03245 1 | 34711 1 | 05140 1 | C' 03237 1 | C' 44106 0 | 15112 1 | I' 77614 1 | C' 01074 0 |
| 22,2740 | I' 70740 0 | C' 01130 1 | C' 04772 1 | I' 45002 1 | C' 44530 1 | I' 74343 0 | C' 04772 1 | C' 03343 0 |
| 22,2750 | I' 77721 0 | C' 05004 0 | C' 17311 1 | C' 03365 1 | I' 55605 1 | C' 05002 0 | C' 04772 1 | I' 77661 0 |
| 22,2760 | C' 20606 0 | C' 27317 1 | C' 03311 1 | I' 77761 1 | C' 05026 0 | C' 03275 1 | I' 77614 1 | C' 01035 0 |
| 22,2770 | C' 45033 0 | C' 00044 1 | C' 15053 0 | C' 00221 0 | C' 24255 0 | C' 00554 0 | C' 02860 0 | C' 05540 0 |

OCTAL LISTING FOR PARAGRAPH J 132, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, # DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED # (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 22,3000 | C' 26603 0 | C' 00003 1 | C' 04000 0 | C' 03146 1 | C' 14632 0 | C' 00000 1 | C' 00000 1 | C' 00000 1 |
| 22,3010 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 03131 1 | C' 11275 1 | C' 77461 1 | C' 47370 0 | C' 00000 1 |
| 22,3020 | C' 00000 1 | C' 00316 0 | C' 30407 1 | C' 03131 1 | C' 11275 1 | C' 00004 0 | C' 05253 0 | C' 41332 0 |
| 22,3030 | 00006 1 | 62725 0 | 06006 1 | I' 75160 1 | C' 03320 0 | C' 03425 1 | I' 77624 1 | C' 44304 0 |
| 22,3040 | I' 45575 1 | C' 50442 0 | I' 77626 0 | C' 50450 0 | I' 77626 0 | C' 74456 0 | I' 45160 1 | C' 03320 0 |
| 22,3050 | C' 44653 1 | I' 77634 0 | C' 45547 0 | C' 03287 1 | I' 77414 0 | C' 01215 0 | C' 45142 1 | 34711 1 |
| 22,3060 | 55664 0 | 00000 1 | 55665 1 | 51664 1 | 31666 0 | 00006 1 | 51664 1 | 21661 0 |
| 22,3070 | 00006 1 | 73141 1 | 51665 0 | 53576 0 | 51664 1 | 31666 0 | 51664 1 | 57661 1 |
| 22,3100 | 51665 0 | 55646 0 | 11664 0 | 13060 0 | 00003 1 | 03115 1 | 13206 1 | 34712 1 |
| 22,3110 | 05140 1 | C' 03232 1 | C' 44106 0 | 00003 1 | 15112 1 | 00006 1 | 40025 1 | 53673 0 |
| 22,3120 | 00006 1 | 31717 1 | 21673 0 | 11672 1 | 00002 0 | 13127 1 | 13137 0 | 11673 0 |
| 22,3130 | 00002 0 | 13133 1 | 40000 0 | 03205 0 | 00006 1 | 63137 1 | 24002 0 | 24002 0 |
| 22,3140 | 00002 0 | C' 03146 1 | I' 77776 1 | 00006 1 | 30025 0 | 21717 0 | 00006 1 | 43205 1 |
| 22,3150 | 21717 0 | 00004 0 | 44712 0 | 55332 0 | 41130 0 | 66211 0 | 00006 1 | 63161 1 |
| 22,3160 | 13164 0 | 41501 0 | 74674 1 | 27501 0 | 53711 0 | 53526 0 | 53713 1 | 53530 1 |
| 22,3170 | 53715 1 | 53532 0 | 31675 1 | 55564 0 | 31677 0 | 55565 1 | 31701 0 | 55566 1 |
| 22,3200 | 30025 0 | 03205 0 | 57671 0 | 13057 1 | C' 00000 1 | C' 00144 0 | 00004 0 | 40025 1 |
| 22,3210 | 61671 0 | 10000 0 | 64712 1 | 13216 0 | 64674 0 | 40000 0 | 05140 1 | C' 03225 1 |
| 22,3220 | C' 44106 0 | 00003 1 | 33205 0 | 27671 1 | 15112 1 | 37663 0 | 05042 1 | C' 03027 1 |
| 22,3230 | C' 44106 0 | 05213 1 | 03256 0 | 03303 1 | 31155 1 | 55646 0 | 03245 1 | 31327 0 |
| 22,3240 | 54063 0 | 34714 1 | 53326 0 | 05053 1 | 05213 1 | 34714 1 | 55575 0 | 55576 0 |
| 22,3250 | 55525 0 | 55526 0 | 55564 0 | 44674 1 | 71501 0 | 55501 0 | 34714 1 | 55577 1 |
| 22,3260 | 55600 1 | 55601 0 | 55602 0 | 55527 1 | 55530 1 | 55531 0 | 55532 0 | 55565 1 |
| 22,3270 | 55566 1 | 00002 0 | 30032 0 | 55646 0 | 30033 1 | 55650 1 | 30034 0 | 55652 0 |
| 22,3300 | 00002 0 | 31155 1 | 55646 0 | 31156 1 | 55650 1 | 31157 0 | 55652 0 | 00002 0 |
| 22,3310 | C' 00302 0 | C' 17755 0 | I' 53754 1 | C' 03746 1 | C' 57176 0 | C' 26746 0 | I' 53750 0 | C' 03745 1 |
| 22,3320 | C' 57176 0 | C' 02657 1 | I' 45020 1 | C' 01340 1 | C' 45340 1 | C' 37456 1 | C' 25671 0 | I' 41401 1 |
| 22,3330 | C' 00003 1 | I' 65225 1 | C' 03456 0 | C' 00001 0 | I' 45206 1 | C' 03456 0 | I' 52006 0 | C' 01340 1 |
| 22,3340 | I' 41545 0 | C' 05311 1 | I' 63130 0 | C' 00047 1 | C' 00002 0 | I' 46135 1 | C' 00050 1 | C' 45353 0 |
| 22,3350 | I' 51575 1 | C' 02026 1 | I' 77725 1 | I' 43545 1 | I' 77620 0 | C' 01340 1 | C' 36635 1 | C' 27036 1 |
| 22,3360 | I' 77624 1 | C' 45372 0 | I' 77745 1 | C' 02635 0 | C' 34041 0 | C' 27022 1 | I' 77624 1 | C' 45402 0 |
| 22,3370 | I' 77650 1 | C' 01340 1 | I' 43175 0 | C' 00001 0 | C' 01352 1 | C' 45406 1 | C' 27540 0 | C' 00007 0 |



GENERAL LISTING FOR PARAGRAPH J 133, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #1A (INTERPRETIVE OPERATOR WORDS) OR #CA (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|--------------|------------|------------|------------|
| 22,3400 | C' 03546 0 | I' 77616 0 | I' 43175 0 | C' 00001 0 | C' 01352 1 | C' 45376 1 | C' 27554 0 | C' 00007 0 |
| 22,3410 | C' 03562 0 | I' 77616 0 | I' 53754 1 | C' 03746 1 | C' 57176 0 | I' 83350 1 | C' 03745 1 | I' 83257 1 |
| 22,3420 | C' 57176 0 | I' 77616 0 | I' 53754 1 | C' 03746 1 | C' 57576 1 | I' 77616 0 | I' 45020 1 | C' 03657 0 |
| 22,3430 | C' 47432 1 | I' 77775 1 | I' 45121 1 | C' 01736 1 | C' 47577 1 | I' 74321 1 | C' 05004 0 | C' 05443 1 |
| 22,3440 | I' 52072 0 | C' 03657 0 | C' 24000 1 | C' 00000 1 | 30102 1 | 00006 1 | 85112 0 | 74875 0 |
| 22,3450 | 00006 1 | 15112 1 | 30034 0 | 64770 0 | 55640 0 | 30034 0 | 04767 0 | 55645 0 |
| 22,3460 | 33504 0 | 00006 1 | 20032 1 | 40000 0 | 04767 0 | 55644 1 | 00006 1 | 71845 0 |
| 22,3470 | 55641 1 | 33504 0 | 00006 1 | 20032 1 | 40000 0 | 04770 0 | 55642 1 | 00006 1 |
| 22,3500 | 71645 0 | 40000 0 | 55643 0 | 15112 1 | C' 01224 1 | 00006 1 | 30025 0 | 16024 0 |
| 22,3510 | 10154 0 | 34714 1 | 13515 1 | 13514 0 | 44675 0 | 54155 1 | 34714 1 | 56154 1 |
| 22,3520 | 00006 1 | 74875 0 | 20155 1 | 16030 0 | 00004 0 | 30037 0 | 54154 0 | 30040 0 |
| 22,3530 | 54157 0 | 30041 1 | 00003 1 | 54161 0 | 34714 1 | 54155 1 | 54160 1 | 54162 0 |
| 22,3540 | 16470 0 | 07226 0 | 16030 0 | 03573 0 | 34714 1 | 54155 1 | 16027 0 | 03573 0 |
| 22,3550 | 52162 0 | 52155 1 | 03573 0 | 54156 1 | 52160 1 | 52155 1 | 03573 0 | 54155 1 |
| 22,3560 | 30161 1 | 54154 0 | 34712 1 | 16027 0 | 03573 0 | 52160 1 | 52155 1 | 03573 0 |
| 22,3570 | 54001 1 | 30157 1 | 16024 0 | 52155 1 | 20001 1 | 10000 0 | 64712 1 | 13601 1 |
| 22,3600 | 40000 0 | 54154 0 | 00002 0 | 50000 1 | 34673 1 | 26154 0 | 00002 0 | 33622 1 |
| 22,3610 | 54130 1 | 30154 1 | 03623 0 | 24130 0 | 30157 1 | 03623 0 | 24130 0 | 30161 1 |
| 22,3620 | 03623 0 | 13540 1 | C' 01155 1 | 54142 1 | 50130 0 | 10000 0 | 64712 1 | 13633 0 |
| 22,3630 | 64712 1 | 64712 1 | 40000 0 | 60142 0 | 10000 0 | 64712 1 | 13640 1 | 40000 0 |
| 22,3640 | 54142 1 | 13645 1 | 50000 1 | 34673 1 | 60142 0 | 50130 0 | 54000 0 | 00002 0 |
| 22,3650 | 50120 1 | 30046 0 | 04555 0 | C' 17125 1 | 16030 0 | C' 02713 0 | C' 02554 1 | 33655 1 |
| 22,3660 | 54003 0 | 53716 1 | 53722 0 | 53716 1 | 53720 1 | 53730 0 | 53720 1 | 53726 1 |
| 22,3670 | 53732 1 | 53726 1 | 16030 0 | 33656 1 | 54003 0 | 53567 0 | 53563 1 | 53557 0 |
| 22,3700 | 53561 0 | 53571 1 | 53561 0 | 53567 0 | 53573 0 | 53567 0 | 16030 0 | 00006 1 |
| 22,3710 | 34672 0 | 52155 1 | 10000 0 | 34714 1 | 16026 1 | 13716 0 | 00006 1 | 44672 1 |
| 22,3720 | 16024 0 | 34712 1 | 13724 1 | 34714 1 | 60120 1 | 54156 1 | 04555 0 | C' 01010 1 |
| 22,3730 | 10154 0 | 13765 1 | 13734 0 | 13765 1 | 10157 0 | 13765 1 | 13740 0 | 13765 1 |
| 22,3740 | 10161 0 | 13765 1 | 13744 1 | 13765 1 | 30155 0 | 00006 1 | 74675 0 | 20155 1 |
| 22,3750 | 30160 0 | 00006 1 | 74675 0 | 20160 1 | 30162 1 | 00006 1 | 74675 0 | 20162 0 |
| 22,3760 | 34720 0 | 50156 0 | 54045 1 | 04574 0 | C' 01024 0 | 34714 1 | 13761 0 | 04555 0 |
| 22,3770 | C' 01010 1 | 06030 1 | C' 03772 0 | C' 03773 1 | CKSM 75664 1 | " | " | " |



OPTAL LISTING FOR PARAGRAPH J 134, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, #A DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #I (INTERPRETIVE OPERATOR WORDS) OR #C (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 23,2000 | I' 47133 0 | C' 00006 1 | C' 45510 1 | I' 41434 1 | C' 46027 0 | I' 72558 1 | I' 86608 1 | C' 00004 0 |
| 23,2010 | I' 41434 1 | C' 45510 1 | I' 41346 0 | C' 00003 1 | C' 14041 1 | I' 41358 1 | I' 77628 0 | C' 63734 1 |
| 23,2020 | I' 77748 1 | C' 24045 0 | C' 00041 1 | I' 76521 0 | C' 06302 0 | C' 00041 1 | I' 77618 0 | C' 32323 1 |
| 23,2030 | 26154 0 | 34676 1 | 07256 1 | 06030 1 | I' 77220 1 | C' 00034 0 | C' 02766 1 | I' 77624 1 |
| 23,2040 | C' 47577 1 | I' 76521 0 | C' 06260 0 | C' 26766 1 | C' 15330 0 | C' 26555 0 | C' 15326 1 | C' 26563 0 |
| 23,2050 | C' 15324 0 | C' 36571 1 | C' 46076 1 | I' 47020 0 | C' 00034 0 | C' 45657 1 | I' 64375 1 | C' 02714 1 |
| 23,2060 | C' 06260 0 | I' 77772 0 | C' 26555 0 | C' 02722 1 | I' 76521 0 | C' 06260 0 | C' 26563 0 | C' 02730 1 |
| 23,2070 | I' 76521 0 | C' 06260 0 | C' 02571 0 | I' 47034 0 | C' 45657 1 | C' 45673 1 | I' 47375 0 | C' 02571 0 |
| 23,2100 | C' 02766 1 | I' 77600 1 | C' 46103 1 | I' 40056 0 | C' 46145 0 | C' 00027 1 | I' 57441 1 | C' 02565 0 |
| 23,2110 | C' 24023 0 | C' 00027 1 | I' 77641 1 | C' 02563 0 | C' 34021 0 | C' 47211 0 | I' 77634 0 | C' 45543 1 |
| 23,2120 | C' 26774 1 | C' 02766 1 | I' 77600 1 | C' 46124 1 | I' 72441 0 | C' 02571 0 | I' 77726 1 | I' 62440 0 |
| 23,2130 | C' 46142 1 | I' 45200 1 | C' 46142 1 | C' 06331 0 | I' 77634 0 | C' 45543 1 | C' 02776 0 | I' 77614 1 |
| 23,2140 | C' 01630 0 | C' 00034 0 | I' 77614 1 | C' 01430 1 | C' 00034 0 | I' 77745 1 | C' 06325 0 | C' 16774 1 |
| 23,2150 | C' 06327 1 | C' 02776 0 | I' 77614 1 | C' 01630 0 | C' 00034 0 | I' 44301 0 | C' 00160 0 | C' 06212 0 |
| 23,2160 | I' 77776 1 | 07171 1 | C' 00002 0 | C' 00000 1 | C' 00000 1 | C' 01001 1 | C' 14636 1 | C' 00325 0 |
| 23,2170 | C' 07310 1 | C' 00541 1 | C' 16735 1 | 34714 1 | 54156 1 | 00006 1 | 32214 1 | 52155 1 |
| 23,2200 | 52160 1 | 40000 0 | 07256 1 | 52156 1 | 52155 1 | 52160 1 | 20155 1 | 06006 1 |
| 23,2210 | I' 77618 0 | C' 37777 1 | C' 37777 1 | C' 00542 1 | C' 34414 1 | I' 47375 0 | C' 01714 1 | C' 03452 1 |
| 23,2220 | C' 03460 0 | I' 77635 1 | C' 01714 1 | C' 17466 0 | C' 03606 1 | I' 56204 1 | C' 57343 1 | C' 06256 0 |
| 23,2230 | I' 41400 0 | C' 46245 0 | I' 45346 1 | C' 15330 0 | I' 65361 0 | C' 03466 0 | I' 74356 1 | C' 03460 0 |
| 23,2240 | I' 76455 1 | I' 53455 0 | C' 03452 1 | C' 03474 0 | I' 77616 0 | I' 75345 1 | C' 06256 0 | C' 03606 1 |
| 23,2250 | I' 77621 1 | C' 03606 1 | C' 03606 1 | I' 77650 1 | C' 46225 0 | C' 01015 1 | C' 34732 0 | C' 15373 1 |
| 23,2260 | C' 11346 0 | C' 00000 1 | C' 00000 1 | C' 87313 1 | C' 65307 0 | C' 00000 1 | C' 00000 1 | C' 20000 0 |
| 23,2270 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 10464 0 | C' 12470 1 | C' 00000 1 | C' 00000 1 | C' 15373 1 |
| 23,2300 | C' 11346 0 | C' 15373 1 | C' 11346 0 | C' 00000 1 | C' 00000 1 | C' 10464 0 | C' 12470 1 | C' 00000 1 |
| 23,2310 | C' 00000 1 | C' 20000 0 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 87313 1 | C' 65307 0 | C' 00000 1 |
| 23,2320 | C' 00000 1 | C' 15373 1 | C' 11346 0 | C' 07020 1 | C' 60000 1 | C' 00000 1 | C' 61740 0 | C' 77777 0 |
| 23,2330 | C' 07020 1 | C' 00000 1 | 06006 1 | I' 52014 0 | C' 00716 1 | C' 46566 0 | C' 46337 1 | I' 77776 1 |
| 23,2340 | 34711 1 | 55051 0 | 34712 1 | 55052 0 | 32406 1 | 04555 0 | C' 20465 1 | 05423 1 |
| 23,2350 | 02352 1 | 02344 0 | 34707 0 | 05140 1 | C' 02531 1 | C' 46064 1 | 00003 1 | 32410 0 |
| 23,2360 | 54003 0 | 34714 1 | 55742 0 | 34756 1 | 05042 1 | C' 02411 1 | C' 46064 1 | 00003 1 |
| 23,2370 | 36214 0 | 71742 0 | 10000 0 | 02400 1 | 34734 0 | 04555 0 | C' 01732 0 | 02370 1 |



TOTAL LISTING FOR PARAGRAPH J 135, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED A/A (INTERPRETIVE OPERATOR WORDS) OR A/C (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|----------|
| 23,2400 | 32407 0 | 04555 0 | C' 20465 1 | 05514 1 | 05514 1 | 02357 1 | C' 01014 0 | C' 04054 |
| 23,2410 | C' 02343 1 | 06006 1 | I' 77634 0 | C' 45505 0 | C' 00041 1 | C' 02325 1 | I' 77776 1 | 41052 |
| 23,2420 | 04712 1 | 00006 1 | 12448 1 | 06006 1 | I' 77624 1 | C' 27036 1 | I' 77775 1 | C' 00001 |
| 23,2430 | C' 26327 0 | C' 00007 0 | C' 02335 0 | I' 77743 1 | C' 71321 1 | C' 00037 0 | I' 77743 1 | C' 71315 |
| 23,2440 | C' 02321 0 | I' 48135 1 | C' 00050 1 | C' 46463 1 | I' 77650 1 | C' 46467 0 | 06006 1 | I' 77624 |
| 23,2450 | C' 27022 1 | I' 77650 1 | C' 46426 0 | C' 27533 1 | C' 07571 0 | C' 25004 1 | C' 06702 1 | C' 00001 |
| 23,2460 | C' 11530 1 | C' 06002 0 | C' 31230 1 | I' 43145 0 | C' 05311 1 | C' 04622 0 | C' 48473 0 | I' 51575 |
| 23,2470 | C' 02026 1 | I' 77614 1 | C' 04462 0 | C' 36323 0 | C' 46667 1 | I' 77776 1 | 31011 0 | 00006 |
| 23,2500 | 12645 0 | 06006 1 | I' 45234 0 | C' 45505 0 | C' 02325 1 | C' 02325 1 | I' 53145 1 | C' 02346 |
| 23,2510 | C' 46521 0 | I' 43345 1 | C' 02346 1 | C' 02325 1 | C' 02346 1 | I' 77776 1 | 34712 1 | 55742 |
| 23,2520 | 05112 0 | I' 43345 1 | C' 02344 0 | C' 02325 1 | C' 02344 0 | I' 77776 1 | 34711 1 | 55742 |
| 23,2530 | 05112 0 | 34706 1 | 71044 1 | 10000 0 | 02542 0 | 37662 1 | 05027 1 | C' 05423 |
| 23,2540 | C' 04062 1 | 05213 1 | 34734 0 | 05140 1 | C' 02531 1 | C' 46064 1 | 36214 0 | 71742 |
| 23,2550 | 50000 1 | 02552 1 | 05213 1 | 02561 1 | 34734 0 | 54001 1 | 34714 1 | 21744 |
| 23,2560 | 05213 1 | 34734 0 | 54001 1 | 34714 1 | 21746 1 | 05213 1 | I' 77776 1 | 34756 |
| 23,2570 | 05042 1 | C' 02604 1 | C' 46064 1 | 00003 1 | 10067 1 | 05057 0 | 32407 0 | 04555 |
| 23,2600 | C' 20465 1 | 05514 1 | 05514 1 | 02576 1 | 06006 1 | I' 52175 0 | C' 01171 1 | C' 46610 |
| 23,2610 | C' 26327 0 | C' 01177 1 | C' 02335 0 | I' 52014 0 | C' 04303 0 | C' 46617 0 | C' 46630 0 | I' 71214 |
| 23,2620 | C' 04462 0 | C' 06454 1 | C' 14037 0 | C' 06460 0 | C' 26321 0 | C' 02026 1 | I' 52046 1 | C' 46637 |
| 23,2630 | I' 71214 0 | C' 04662 1 | C' 06456 0 | C' 14037 0 | C' 06462 1 | C' 16321 0 | C' 05311 1 | C' 36323 |
| 23,2640 | C' 46667 1 | I' 77776 1 | 05253 0 | C' 00013 0 | 02657 1 | 06006 1 | I' 77624 1 | C' 27371 |
| 23,2650 | I' 45145 0 | C' 02344 0 | C' 64017 0 | I' 77776 1 | 31011 0 | 00006 1 | 12501 0 | 34706 |
| 23,2660 | 71044 1 | 00006 1 | 15423 0 | 34734 0 | 04555 0 | C' 01732 0 | 02604 1 | I' 44001 |
| 23,2670 | C' 00001 0 | C' 00051 0 | I' 77214 0 | C' 04742 1 | C' 46703 1 | C' 02327 0 | I' 77752 1 | C' 26327 |
| 23,2700 | C' 02335 0 | I' 77752 1 | C' 02335 0 | I' 77624 1 | C' 56751 1 | I' 77624 1 | C' 57017 0 | I' 77625 |
| 23,2710 | C' 02323 1 | I' 64414 1 | C' 04742 1 | C' 46714 1 | I' 77624 1 | C' 46754 0 | C' 16352 1 | C' 00017 |
| 23,2720 | I' 77625 0 | C' 02323 1 | C' 00161 1 | I' 64414 1 | C' 04742 1 | C' 46726 0 | I' 77624 1 | C' 46754 |
| 23,2730 | C' 16354 1 | C' 00161 1 | I' 51025 1 | C' 02321 0 | C' 46740 0 | I' 52145 0 | C' 15332 1 | C' 46744 |
| 23,2740 | I' 45145 0 | C' 00017 1 | C' 57055 0 | I' 77676 0 | C' 16346 1 | C' 02321 0 | I' 45015 1 | C' 02323 |
| 23,2750 | C' 57060 0 | I' 77676 0 | C' 36344 1 | C' 00051 0 | I' 51025 1 | C' 06764 1 | C' 46761 0 | I' 43415 |
| 23,2760 | C' 06764 1 | I' 43545 1 | C' 06764 1 | C' 01065 0 | C' 05603 1 | 22016 0 | 00006 1 | 22012 |
| 23,2770 | 41501 0 | 74710 1 | 27501 0 | 04633 0 | C' 42404 1 | 34702 0 | 00006 1 | 05012 |



OCAL LISTING FOR PARAGRAPH J 136, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, a"b DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED aIa (INTERPRETIVE OPERATOR WORDS) OR aCa (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 23,3000 | 00008 1 | 33048 0 | 53313 0 | 33044 1 | 54030 0 | 15222 1 | 22016 0 | 00006 1 |
| 23,3010 | 22012 1 | 33045 0 | 55312 1 | 33044 1 | 54030 0 | 33043 0 | 00006 1 | 06031 0 |
| 23,3020 | 73043 1 | 04633 0 | C' 43114 1 | 51656 0 | 33037 0 | 55476 1 | 51657 1 | 33037 0 |
| 23,3030 | 55477 0 | 51660 0 | 33037 0 | 55500 1 | 04633 0 | C' 42404 1 | 15222 1 | C' 00000 1 |
| 23,3040 | C' 00476 1 | C' 77301 0 | C' 00000 1 | C' 00077 1 | C' 37766 1 | C' 03006 1 | C' 46106 1 | I' 77620 0 |
| 23,3050 | C' 02317 0 | I' 53575 0 | C' 03531 0 | C' 14033 1 | C' 00045 0 | C' 25301 1 | C' 01245 0 | I' 53435 0 |
| 23,3060 | C' 00033 1 | C' 37502 1 | C' 56741 0 | I' 77775 1 | C' 03502 0 | C' 01245 0 | I' 72441 0 | C' 01235 1 |
| 23,3070 | I' 45326 1 | C' 15322 0 | I' 41301 0 | C' 00047 1 | C' 07107 0 | I' 53605 1 | C' 01301 1 | C' 21576 0 |
| 23,3100 | C' 27524 1 | C' 15332 1 | C' 03510 0 | C' 03516 0 | I' 77650 1 | C' 02317 0 | C' 31103 1 | C' 36652 0 |
| 23,3110 | I' 40220 0 | C' 02317 0 | C' 00001 0 | I' 76740 0 | C' 01242 1 | C' 00002 0 | C' 23676 1 | C' 00001 0 |
| 23,3120 | C' 03675 0 | I' 77774 0 | C' 00002 0 | I' 67064 1 | C' 00046 0 | C' 00050 1 | I' 77624 1 | C' 46000 0 |
| 23,3130 | I' 77624 1 | C' 47541 1 | I' 76505 0 | C' 01736 1 | I' 77650 1 | C' 02317 0 | C' 00000 1 | C' 13560 0 |
| 23,3140 | I' 71220 1 | C' 00051 0 | C' 02714 1 | I' 65325 0 | C' 15332 1 | C' 02720 0 | I' 55476 1 | I' 77656 1 |
| 23,3150 | C' 14027 1 | C' 00027 1 | I' 77742 0 | C' 14023 0 | C' 00033 1 | I' 77742 0 | C' 34021 0 | C' 47211 0 |
| 23,3160 | C' 16762 0 | C' 02716 0 | I' 77742 0 | C' 14023 0 | C' 00027 1 | I' 65205 0 | C' 02720 0 | C' 00033 1 |
| 23,3170 | I' 45205 1 | C' 02714 1 | I' 77626 0 | C' 43756 1 | C' 47211 0 | C' 26764 0 | C' 00027 1 | I' 77641 1 |
| 23,3200 | C' 02730 1 | C' 24021 1 | C' 00027 1 | I' 77641 1 | C' 02722 1 | C' 34023 1 | C' 47211 0 | C' 36760 0 |
| 23,3210 | C' 00051 0 | I' 51545 1 | C' 00023 0 | I' 50025 0 | C' 07427 1 | C' 47224 0 | I' 72545 0 | C' 00021 1 |
| 23,3220 | I' 75326 1 | C' 00023 0 | C' 00025 0 | I' 77616 0 | I' 72545 0 | C' 00023 0 | I' 77736 0 | C' 14025 0 |
| 23,3230 | C' 00021 1 | I' 77640 0 | C' 47235 0 | I' 43545 1 | C' 00025 0 | I' 75345 1 | C' 15330 0 | C' 00023 0 |
| 23,3240 | I' 77625 0 | C' 00025 0 | C' 00025 0 | I' 77616 0 | I' 77601 0 | C' 00001 0 | I' 47375 0 | C' 02714 1 |
| 23,3250 | C' 02700 1 | I' 41456 0 | I' 44041 1 | C' 02730 1 | C' 00051 0 | C' 24021 1 | C' 00001 0 | I' 77641 1 |
| 23,3260 | C' 02722 1 | C' 34023 1 | C' 47211 0 | C' 26760 1 | C' 00001 0 | I' 50235 0 | C' 02714 1 | C' 02700 1 |
| 23,3270 | I' 77752 1 | C' 24021 1 | C' 02700 1 | I' 77641 1 | C' 02714 1 | C' 34023 1 | C' 47211 0 | C' 02764 0 |
| 23,3300 | I' 45246 0 | C' 07431 0 | I' 77644 1 | C' 47324 1 | I' 50375 0 | C' 02706 1 | C' 00001 0 | C' 24021 1 |
| 23,3310 | C' 02672 0 | I' 45441 1 | C' 43754 0 | C' 47211 0 | C' 26762 0 | C' 02760 1 | I' 43034 1 | C' 45547 0 |
| 23,3320 | C' 00200 0 | C' 00051 0 | C' 35156 0 | C' 00051 0 | I' 77776 1 | 05537 0 | C' 00401 1 | 05435 0 |
| 23,3330 | C' 00056 1 | 06006 1 | I' 77650 1 | C' 47304 0 | I' 66370 0 | C' 02743 0 | C' 00051 0 | C' 02727 1 |
| 23,3340 | I' 77601 0 | C' 00001 0 | I' 46773 0 | C' 02752 0 | C' 02760 1 | I' 77656 1 | C' 06760 0 | I' 77773 1 |
| 23,3350 | C' 02752 0 | I' 76433 1 | C' 02760 1 | C' 06766 0 | I' 77700 0 | C' 47342 1 | I' 66160 0 | C' 00006 1 |
| 23,3360 | C' 00036 1 | I' 66370 0 | C' 00022 1 | C' 00051 0 | C' 00006 1 | I' 66374 1 | C' 00006 1 | C' 00052 0 |
| 23,3370 | C' 00002 0 | I' 76720 0 | C' 00036 1 | C' 00001 0 | I' 62757 0 | C' 75033 0 | C' 00007 0 | I' 77757 1 |



ODAL LISTING FOR PARAGRAPH J 140, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED AIA (INTERPRETIVE OPERATOR WORDS) OR ACa (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 24,2000 | C' 03431 1 | C' 03672 1 | 05447 0 | C' 00023 0 | 06006 1 | I' 43135 1 | C' 03425 1 | C' 01347 0 |
| 24,2010 | C' 50013 0 | I' 77745 1 | C' 15332 1 | C' 17703 0 | C' 10335 0 | C' 17727 0 | C' 03413 1 | C' 03450 0 |
| 24,2020 | I' 77776 1 | 04555 0 | C' 17573 0 | 06006 1 | I' 77624 1 | C' 34000 0 | I' 77624 1 | C' 51512 0 |
| 24,2030 | I' 77414 0 | C' 01073 1 | 02212 1 | 00003 1 | 04555 0 | C' 56000 1 | 44712 0 | 55746 1 |
| 24,2040 | 05435 0 | C' 00155 0 | 02252 0 | 02267 0 | 32351 1 | 55145 1 | 06006 1 | I' 51575 1 |
| 24,2050 | C' 03721 0 | C' 17654 0 | C' 15332 1 | C' 03426 1 | I' 77776 1 | 00006 1 | 32773 0 | 53223 1 |
| 24,2060 | 32344 0 | 04555 0 | C' 20751 0 | 12204 1 | 12362 0 | 44712 0 | 55445 1 | 34714 1 |
| 24,2070 | 55447 0 | 34712 1 | 05140 1 | C' 02051 1 | C' 40066 0 | 11445 1 | 32343 1 | 12101 1 |
| 24,2100 | 32776 0 | 04555 0 | C' 01732 0 | 05261 1 | C' 40026 1 | C' 00234 1 | 34712 1 | 05140 1 |
| 24,2110 | C' 03172 0 | C' 50067 0 | 00003 1 | 03304 0 | 06006 1 | I' 45345 1 | C' 03413 1 | C' 10342 0 |
| 24,2120 | C' 00041 1 | I' 77624 1 | C' 27577 1 | 12125 1 | 02146 0 | 00006 1 | 30155 0 | 53673 0 |
| 24,2130 | 00006 1 | 42776 1 | 21673 0 | 00006 1 | 31673 1 | 05231 1 | C' 02364 1 | C' 50067 0 |
| 24,2140 | 05301 0 | C' 20214 1 | 15112 1 | 04555 0 | C' 20607 1 | 15112 1 | 00006 1 | 31246 0 |
| 24,2150 | 53413 1 | 00006 1 | 32342 0 | 21413 1 | 12125 1 | 32353 0 | 04555 0 | C' 20610 1 |
| 24,2160 | 12204 1 | 12163 0 | 12155 0 | 00006 1 | 32407 0 | 53223 1 | 34735 1 | 04555 0 |
| 24,2170 | C' 01732 0 | 02212 1 | 00003 1 | 05301 0 | C' 05024 1 | C' 20000 0 | 32350 0 | 04555 0 |
| 24,2200 | C' 20610 1 | 12204 1 | 12204 1 | 12173 1 | 00006 1 | 32405 1 | 53223 1 | 14106 0 |
| 24,2210 | C' 00056 1 | C' 00707 1 | 00004 0 | 30032 0 | 55572 1 | 00006 1 | 30034 0 | 53574 1 |
| 24,2220 | 32210 0 | 55655 1 | 44707 1 | 71466 0 | 55466 0 | 00002 0 | 00004 0 | 32211 1 |
| 24,2230 | 55655 1 | 41466 0 | 74707 1 | 27466 0 | 00002 0 | 05435 0 | C' 00023 0 | 06006 1 |
| 24,2240 | I' 77745 1 | C' 15332 1 | C' 03703 0 | I' 43145 0 | C' 10337 1 | C' 00700 0 | C' 50015 0 | I' 52015 1 |
| 24,2250 | C' 10337 1 | C' 50015 0 | 41011 1 | 74712 0 | 00006 1 | 12257 1 | 24002 0 | 00002 0 |
| 24,2260 | 34675 1 | 05027 1 | C' 02173 0 | C' 50066 1 | 05447 0 | C' 00155 0 | 15213 0 | 32347 0 |
| 24,2270 | 55145 1 | 06006 1 | I' 77624 1 | C' 50314 1 | I' 77776 1 | 00006 1 | 32407 0 | 53223 1 |
| 24,2300 | 05261 1 | C' 40036 0 | C' 00234 1 | 12106 0 | 32350 0 | 55145 1 | 32342 0 | 05140 1 |
| 24,2310 | C' 02260 1 | C' 50066 1 | 44710 1 | 12513 0 | I' 40220 0 | C' 03730 0 | C' 00001 0 | I' 41575 0 |
| 24,2320 | C' 03721 0 | I' 77624 1 | C' 45426 0 | C' 37665 0 | C' 03730 0 | 06006 1 | I' 77624 1 | C' 51016 1 |
| 24,2330 | I' 77624 1 | C' 50314 1 | I' 77776 1 | 03127 0 | C' 02217 1 | C' 06650 1 | C' 00013 0 | C' 06112 0 |
| 24,2340 | C' 04700 1 | C' 00000 1 | C' 05664 0 | C' 03410 1 | C' 00204 1 | C' 37730 1 | C' 04123 0 | C' 01525 1 |
| 24,2350 | C' 04125 0 | C' 01450 1 | C' 24020 0 | C' 04050 0 | C' 00027 1 | C' 00053 1 | C' 00035 1 | C' 03143 1 |
| 24,2360 | C' 12066 1 | C' 00026 0 | 34712 1 | 12066 1 | 32776 0 | 05140 1 | C' 02502 1 | C' 50067 0 |
| 24,2370 | 34714 1 | 55145 1 | 34761 0 | 05027 1 | C' 02143 0 | C' 50067 0 | 44362 0 | 04114 1 |

ODD LISTING FOR PARAGRAPH J 141, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A'S DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #A (INTERPRETIVE OPERATOR WORDS) OR #CA (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 24,2400 | C' 00004 0 | 05213 1 | C' 02436 1 | C' 50067 0 | C' 03132 1 | C' 76067 1 | C' 02325 1 | C' 50066 1 |
| 24,2410 | 04555 0 | C' 17573 0 | 06006 1 | I' 77624 1 | C' 27573 0 | 30155 0 | 55672 1 | 05149 1 |
| 24,2420 | C' 02425 0 | C' 50067 0 | 05301 0 | C' 40574 0 | 15112 1 | 00006 1 | 32403 1 | 53223 1 |
| 24,2430 | 34371 0 | 05027 1 | C' 02461 0 | C' 50067 0 | 44711 0 | 12513 0 | 06006 1 | I' 77661 0 |
| 24,2440 | C' 00001 0 | I' 53375 0 | C' 02665 1 | C' 03433 0 | C' 03460 0 | I' 45006 0 | C' 45426 0 | C' 37675 1 |
| 24,2450 | C' 70438 1 | I' 77776 1 | 05301 0 | C' 10035 0 | 34715 0 | 05475 1 | C' 01467 0 | C' 01664 1 |
| 24,2460 | 03127 0 | 06006 1 | I' 77775 1 | C' 15332 1 | C' 03675 0 | C' 03665 1 | I' 77776 1 | 34762 0 |
| 24,2470 | 05103 0 | 05301 0 | C' 05024 1 | C' 15000 0 | 32346 1 | 04555 0 | C' 20624 0 | 04106 1 |
| 24,2500 | 04106 1 | 12461 1 | 02252 0 | 12304 0 | 32351 1 | 55145 1 | 32340 1 | 05140 1 |
| 24,2510 | C' 02521 0 | C' 50067 0 | 46211 1 | 04114 1 | C' 00004 0 | 10763 1 | 15213 0 | 04574 0 |
| 24,2520 | C' 76604 1 | 32776 0 | 05140 1 | C' 02537 1 | C' 50066 1 | 44702 1 | 55145 1 | 05261 1 |
| 24,2530 | C' 40074 0 | C' 00033 1 | 34675 1 | 05042 1 | C' 02404 0 | C' 34067 1 | 15213 0 | 40103 1 |
| 24,2540 | 74676 0 | 26103 1 | 30103 0 | 74677 1 | 00006 1 | 15213 0 | 32351 1 | 55145 1 |
| 24,2550 | 05301 0 | C' 00614 1 | 30032 0 | 55450 0 | 00006 1 | 30025 0 | 53337 0 | 40101 0 |
| 24,2560 | 74704 1 | 26101 0 | 34676 1 | 00006 1 | 05011 1 | 34702 0 | 70076 1 | 10000 0 |
| 24,2570 | 12655 1 | 40102 0 | 74676 0 | 26102 0 | 44105 0 | 70102 0 | 54102 0 | 00006 1 |
| 24,2600 | 32360 0 | 53313 0 | 46214 1 | 04114 1 | C' 00004 0 | 05156 0 | C' 00050 1 | 44712 0 |
| 24,2610 | 55654 0 | 34714 1 | 55661 0 | 44105 0 | 70102 0 | 64674 0 | 54102 0 | 36214 0 |
| 24,2620 | 54001 1 | 40000 0 | 52765 1 | 44715 1 | 04114 1 | C' 00004 0 | 34672 0 | 54030 0 |
| 24,2630 | 00006 1 | 33001 0 | 53313 0 | 05156 0 | C' 00240 1 | 34676 1 | 70102 0 | 10000 0 |
| 24,2640 | 02646 1 | 02651 1 | 00006 1 | 34714 1 | 52761 0 | 15213 0 | 40076 1 | 74700 0 |
| 24,2650 | 26076 1 | 34714 1 | 00006 1 | 01005 0 | 00002 0 | 44676 0 | 70102 0 | 54102 0 |
| 24,2660 | 03304 0 | 00006 1 | 31430 1 | 53413 1 | 00006 1 | 30025 0 | 21413 1 | 31430 1 |
| 24,2670 | 05140 1 | C' 02706 1 | C' 50067 0 | 05261 1 | C' 40153 1 | C' 05014 1 | C' 77777 0 | 44702 1 |
| 24,2700 | 70076 1 | 54076 1 | 03307 0 | 34714 1 | 55444 0 | 12274 1 | 03307 0 | 31474 1 |
| 24,2710 | 55662 0 | 05261 1 | C' 00003 1 | C' 40634 1 | 02737 0 | 42354 0 | 04114 1 | C' 00004 0 |
| 24,2720 | 05156 0 | C' 00372 1 | 02227 1 | 04633 0 | C' 42010 0 | 04633 0 | C' 13207 0 | 03003 1 |
| 24,2730 | 05301 0 | C' 00354 0 | 34603 0 | 05027 1 | C' 02155 1 | C' 50066 1 | 15213 0 | 00006 1 |
| 24,2740 | 30025 0 | 53337 0 | 44704 1 | 70101 0 | 54101 0 | 44676 0 | 00006 1 | 03011 1 |
| 24,2750 | 31444 1 | 00006 1 | 70110 0 | 22000 1 | 00006 1 | 74734 1 | 61662 1 | 55474 0 |
| 24,2760 | 34674 0 | 70105 1 | 00006 1 | 12765 0 | 00002 0 | 31621 0 | 55425 1 | 31623 1 |
| 24,2770 | 55426 1 | 00002 0 | C' 03117 0 | C' 50066 1 | C' 37703 1 | C' 00000 1 | C' 00764 1 | C' 02202 0 |



OCAL LISTING FOR PARAGRAPH J 142, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #1A (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 24,3000 | C' 02030 0 | C' 36066 1 | 00004 0 | 42777 0 | 00006 1 | 03012 1 | 44712 0 | 55303 1 |
| 24,3010 | 34714 1 | 55145 1 | 44700 0 | 70103 1 | 54103 1 | 00002 0 | I' 43020 1 | C' 03730 0 |
| 24,3020 | C' 01307 1 | C' 51045 1 | I' 50135 0 | C' 03347 1 | C' 51051 1 | I' 53375 0 | C' 03351 0 | C' 03433 0 |
| 24,3030 | C' 03357 0 | I' 77776 1 | 34712 1 | 61746 0 | 55747 0 | 05301 0 | C' 10035 0 | 31747 1 |
| 24,3040 | 55746 1 | 06006 1 | I' 77775 1 | C' 03357 0 | C' 03351 0 | I' 77624 1 | C' 34130 1 | I' 77650 1 |
| 24,3050 | C' 03730 0 | I' 07214 1 | C' 01310 1 | C' 51066 0 | C' 03350 1 | I' 74301 0 | C' 00047 1 | C' 03705 0 |
| 24,3060 | I' 53257 1 | C' 20563 0 | C' 03646 0 | I' 77651 0 | C' 03351 0 | C' 03721 0 | I' 77776 1 | 34676 1 |
| 24,3070 | 05042 1 | C' 02257 0 | C' 34066 0 | 05261 1 | C' 00051 0 | C' 10035 0 | 06006 1 | I' 77775 1 |
| 24,3100 | C' 01171 1 | C' 27570 0 | C' 01177 1 | C' 17576 0 | C' 01205 1 | C' 03474 0 | I' 77621 1 | C' 03656 1 |
| 24,3110 | C' 27423 1 | C' 15332 1 | C' 17351 0 | C' 15332 1 | C' 03347 1 | I' 77650 1 | C' 51045 1 | 06006 1 |
| 24,3120 | I' 77624 1 | C' 51016 1 | I' 77776 1 | 34702 0 | 70076 1 | 10000 0 | 13131 0 | 04574 0 |
| 24,3130 | C' 77132 1 | 34676 1 | 00006 1 | 02011 0 | 00006 1 | 13127 1 | 03304 0 | 00004 0 |
| 24,3140 | 00006 1 | 31413 0 | 52155 1 | 00006 1 | 40025 1 | 20155 1 | 07224 1 | 30155 0 |
| 24,3150 | 10000 0 | 13154 0 | 13154 0 | 34714 1 | 64712 1 | 56001 0 | 34714 1 | 53430 0 |
| 24,3160 | 31430 1 | 05140 1 | C' 02706 1 | C' 50067 0 | 05261 1 | C' 40153 1 | C' 10035 0 | 05447 0 |
| 24,3170 | C' 00044 1 | 13127 1 | 34700 1 | 70103 1 | 10000 0 | 13201 0 | 05301 0 | C' 00006 1 |
| 24,3200 | 05213 1 | 00006 1 | 30025 0 | 53661 0 | 00006 1 | 41413 1 | 21661 0 | 34734 0 |
| 24,3210 | 05140 1 | C' 03172 0 | C' 50067 0 | 11145 1 | 13217 1 | 13227 1 | 13217 1 | 42347 1 |
| 24,3220 | 61145 0 | 00006 1 | 13232 0 | 37664 1 | 05027 1 | C' 03244 0 | C' 50066 1 | 40025 1 |
| 24,3230 | 55065 1 | 15213 0 | 37664 1 | 05042 1 | C' 03237 1 | C' 50066 1 | 13227 1 | 06006 1 |
| 24,3240 | I' 77624 1 | C' 50314 1 | I' 77776 1 | 13254 0 | 30032 0 | 54772 1 | 30033 1 | 54766 1 |
| 24,3250 | 30034 0 | 54770 0 | 04555 0 | C' 47510 0 | 00004 0 | 11145 1 | 13301 1 | 15112 1 |
| 24,3260 | 13270 0 | 32351 1 | 04555 0 | C' 20763 1 | 13350 0 | 13403 1 | 13432 0 | 13276 0 |
| 24,3270 | 32351 1 | 04555 0 | C' 20763 1 | 13320 1 | 13326 1 | 13312 0 | 32352 1 | 05415 1 |
| 24,3300 | 15112 1 | 31145 0 | 04555 0 | C' 20616 1 | 34753 1 | 54003 0 | 00002 0 | 34752 0 |
| 24,3310 | 54003 0 | 00002 0 | 05261 1 | C' 00006 1 | C' 05024 1 | C' 27000 1 | 03002 0 | 12163 0 |
| 24,3320 | 05261 1 | C' 00006 1 | C' 05024 1 | C' 27000 1 | 03002 0 | 12204 1 | 00004 0 | 30103 0 |
| 24,3330 | 74677 1 | 10000 0 | 13345 1 | 34677 0 | 26103 1 | 30103 0 | 74676 0 | 00006 1 |
| 24,3340 | 13345 1 | 34712 1 | 05140 1 | C' 02552 1 | C' 50066 1 | 32351 1 | 55145 1 | 15112 1 |
| 24,3350 | 05261 1 | C' 00006 1 | C' 40674 0 | 34712 1 | 05130 0 | C' 03357 0 | 15112 1 | 34714 1 |
| 24,3360 | 55145 1 | 32361 1 | 01474 1 | 55662 0 | 05301 0 | C' 05014 1 | C' 77777 0 | 02737 0 |
| 24,3370 | 05301 0 | C' 00714 0 | 05156 0 | C' 00372 1 | 04633 0 | C' 42010 0 | 37664 1 | 05027 1 |



TOTAL LISTING FOR PARAGRAPH J 144, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED A/A (INTERPRETIVE OPERATOR WORDS) OR A/A (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 25,2000 | I' 77776 1 | 42113 1 | 00004 0 | 70102 0 | 62114 1 | 54102 0 | 00003 1 | 06006 1 |
| 25,2010 | I' 77735 0 | C' 03011 1 | C' 03626 0 | I' 77735 0 | C' 03010 0 | C' 03624 1 | I' 77605 1 | C' 15320 1 |
| 25,2020 | C' 17630 1 | C' 15145 0 | I' 70405 1 | C' 03624 1 | C' 17632 0 | C' 15176 0 | C' 17175 1 | C' 17363 1 |
| 25,2030 | C' 17614 1 | C' 03624 1 | I' 57565 0 | C' 03327 1 | C' 37634 1 | C' 52063 0 | I' 47375 0 | C' 01177 1 |
| 25,2040 | C' 01760 1 | I' 50256 0 | C' 03474 0 | C' 03676 0 | I' 47076 0 | C' 45707 0 | C' 17644 1 | C' 03624 1 |
| 25,2050 | I' 43205 1 | C' 15200 1 | C' 15202 0 | C' 03712 0 | I' 66331 0 | C' 03646 0 | C' 52260 1 | C' 03325 0 |
| 25,2060 | C' 52115 0 | I' 77634 0 | C' 53603 1 | I' 77220 1 | C' 03645 0 | C' 03401 1 | I' 43014 0 | C' 00662 0 |
| 25,2070 | C' 01663 0 | C' 15104 0 | C' 15332 1 | I' 15110 0 | C' 01205 1 | C' 37524 0 | C' 26373 1 | I' 77656 1 |
| 25,2100 | C' 17452 1 | C' 12112 0 | C' 37606 0 | C' 46215 0 | I' 72441 0 | C' 01760 1 | I' 77726 1 | C' 37702 0 |
| 25,2110 | C' 03645 0 | C' 00003 1 | C' 01520 1 | C' 11774 0 | C' 11010 0 | I' 77624 1 | C' 52125 0 | I' 77776 1 |
| 25,2120 | 05301 0 | C' 10035 0 | 06008 1 | I' 77650 1 | C' 03645 0 | I' 77214 0 | C' 03346 0 | C' 52133 1 |
| 25,2130 | C' 03526 0 | I' 52076 1 | C' 52136 1 | I' 74375 0 | C' 01177 1 | C' 15230 1 | C' 03516 0 | I' 44056 1 |
| 25,2140 | C' 03373 0 | C' 17510 0 | C' 00043 0 | C' 03622 1 | I' 77625 0 | C' 15322 0 | C' 17654 0 | C' 00045 0 |
| 25,2150 | C' 27674 1 | C' 03516 0 | I' 72441 0 | C' 01760 1 | C' 27700 0 | C' 01163 1 | I' 41246 1 | C' 15232 0 |
| 25,2160 | I' 53152 1 | C' 55132 1 | C' 27640 0 | C' 03516 0 | I' 53435 0 | C' 01760 1 | C' 03502 0 | I' 71214 0 |
| 25,2170 | C' 03346 0 | C' 55073 0 | C' 15332 1 | I' 43225 0 | C' 03524 1 | C' 01205 1 | C' 37606 0 | C' 46225 0 |
| 25,2200 | I' 40241 1 | C' 03502 0 | C' 00001 0 | C' 27676 0 | C' 03474 0 | I' 77614 1 | C' 03667 0 | I' 50235 0 |
| 25,2210 | C' 01760 1 | C' 03502 0 | I' 43044 0 | C' 52215 0 | C' 03467 1 | I' 77775 1 | C' 03474 0 | I' 45241 1 |
| 25,2220 | C' 01760 1 | C' 15162 0 | I' 43244 1 | C' 55135 0 | C' 15162 0 | I' 65552 0 | C' 03702 1 | I' 57414 1 |
| 25,2230 | C' 03707 1 | C' 52232 0 | C' 17714 0 | C' 03640 0 | I' 50025 0 | C' 15240 0 | C' 52255 1 | I' 77214 0 |
| 25,2240 | C' 03074 1 | C' 03433 0 | I' 50208 0 | C' 03542 1 | I' 63552 0 | I' 47515 0 | I' 56225 1 | C' 00001 0 |
| 25,2250 | I' 75400 1 | C' 52253 1 | C' 03727 0 | I' 77650 1 | C' 03373 0 | I' 52014 0 | C' 03274 0 | C' 52253 1 |
| 25,2260 | I' 43014 0 | C' 03312 1 | C' 52354 1 | C' 03354 0 | C' 53520 0 | I' 63545 0 | C' 03654 0 | I' 56205 0 |
| 25,2270 | C' 03654 0 | C' 15304 1 | I' 47015 0 | C' 15306 0 | C' 54432 0 | C' 03720 1 | I' 45345 1 | C' 03674 1 |
| 25,2300 | C' 15302 1 | I' 51014 0 | C' 03265 0 | C' 52310 1 | I' 52131 0 | C' 03646 0 | C' 53311 1 | C' 52343 1 |
| 25,2310 | I' 41345 0 | C' 03654 0 | C' 15310 1 | I' 77615 0 | C' 15312 0 | C' 03710 1 | I' 40065 0 | C' 15266 1 |
| 25,2320 | C' 52321 0 | C' 17706 0 | C' 03624 1 | C' 17634 0 | C' 03700 0 | I' 41471 0 | C' 03674 1 | I' 41316 0 |
| 25,2330 | I' 45271 1 | C' 15276 0 | C' 15300 0 | I' 40015 1 | C' 03674 1 | C' 52343 1 | I' 71240 1 | C' 52343 1 |
| 25,2340 | C' 03624 1 | I' 77676 0 | C' 03634 0 | I' 77614 1 | C' 03052 0 | C' 53520 0 | I' 45345 1 | C' 03720 1 |
| 25,2350 | C' 03640 0 | I' 52044 0 | C' 53520 0 | C' 53224 0 | I' 43345 1 | C' 03700 0 | C' 15260 1 | I' 45040 1 |
| 25,2360 | C' 52346 1 | C' 53014 1 | I' 77731 1 | C' 03646 0 | C' 52365 0 | I' 77745 1 | C' 03640 0 | C' 17664 0 |
| 25,2370 | C' 03624 1 | C' 17647 1 | C' 03700 0 | I' 71240 1 | C' 52400 1 | C' 03725 1 | C' 17647 1 | C' 03700 0 |

TOTAL LISTING FOR PARAGRAPH J 145, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A'S DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED A1 (INTERPRETIVE OPERATOR WORDS) OR A0 (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 25,2400 | I' 43271 1 | C' 03647 1 | C' 03674 1 | C' 14328 0 | C' 03700 0 | I' 56318 0 | C' 03647 1 | I' 43271 1 |
| 25,2410 | C' 15272 1 | C' 03640 0 | I' 41205 0 | C' 00328 0 | C' 00328 0 | I' 77671 1 | C' 03622 1 | C' 14330 1 |
| 25,2420 | C' 03700 0 | I' 71244 0 | C' 52425 0 | C' 00330 1 | C' 03664 0 | I' 51145 0 | C' 03634 0 | C' 52434 0 |
| 25,2430 | I' 45345 1 | C' 00328 0 | C' 15214 1 | C' 00328 0 | I' 41345 0 | C' 00330 1 | C' 15272 1 | I' 40271 1 |
| 25,2440 | C' 00328 0 | C' 00001 0 | I' 56271 0 | C' 00328 0 | C' 03725 1 | C' 03704 1 | I' 55221 0 | C' 17363 1 |
| 25,2450 | C' 00328 0 | C' 17616 0 | C' 03704 1 | I' 41225 1 | C' 17363 1 | C' 03704 1 | I' 77671 1 | C' 00330 1 |
| 25,2460 | C' 03620 0 | I' 43205 1 | C' 03175 1 | C' 03704 1 | I' 44366 1 | C' 17363 1 | I' 77605 1 | C' 03616 0 |
| 25,2470 | C' 03767 1 | I' 41221 0 | C' 00328 0 | C' 03725 1 | I' 77671 1 | C' 03767 1 | C' 14027 1 | C' 03767 1 |
| 25,2500 | I' 50025 0 | C' 15204 0 | C' 53325 0 | I' 63545 0 | C' 03767 1 | C' 17666 1 | C' 15330 0 | I' 50025 0 |
| 25,2510 | C' 03767 1 | C' 53220 1 | C' 17662 0 | C' 15330 0 | C' 03672 1 | I' 50025 0 | C' 00328 0 | C' 52525 1 |
| 25,2520 | I' 77621 1 | C' 03662 0 | C' 17662 0 | C' 00328 0 | C' 03672 1 | I' 45145 0 | C' 03672 1 | C' 52776 0 |
| 25,2530 | C' 03656 1 | I' 56281 1 | C' 20607 1 | C' 03175 1 | I' 77625 0 | C' 15250 1 | C' 03660 1 | I' 41215 1 |
| 25,2540 | C' 17357 0 | C' 15254 0 | I' 41205 0 | C' 03662 0 | C' 03662 0 | I' 56271 0 | C' 03656 1 | C' 03666 1 |
| 25,2550 | I' 50021 1 | C' 00027 1 | C' 52743 0 | C' 03771 0 | I' 77625 0 | C' 00027 1 | I' 43205 1 | C' 15330 0 |
| 25,2560 | C' 00027 1 | C' 14027 1 | C' 03771 0 | I' 60516 0 | I' 77621 1 | C' 15330 0 | C' 17670 0 | C' 03666 1 |
| 25,2570 | I' 41225 1 | C' 15330 0 | C' 03666 1 | I' 41205 0 | C' 03670 0 | C' 03670 0 | I' 43312 0 | C' 17357 0 |
| 25,2600 | I' 65366 1 | C' 03666 1 | I' 41205 0 | C' 03670 0 | C' 03771 0 | I' 67471 1 | I' 41552 0 | C' 17731 1 |
| 25,2610 | C' 03767 1 | I' 43205 1 | C' 15170 0 | C' 03712 0 | C' 03732 1 | I' 63525 0 | C' 00328 0 | I' 56205 0 |
| 25,2620 | C' 03175 1 | C' 03666 1 | I' 45071 0 | C' 00330 1 | C' 46155 1 | I' 56205 0 | C' 15206 1 | C' 00027 1 |
| 25,2630 | C' 03733 0 | I' 41325 0 | C' 15266 1 | C' 03700 0 | I' 56205 0 | C' 03674 1 | C' 00330 1 | I' 41471 0 |
| 25,2640 | C' 03624 1 | C' 17734 1 | C' 15174 1 | I' 41225 1 | C' 03771 0 | C' 15172 1 | C' 27735 0 | C' 03731 1 |
| 25,2650 | C' 17126 1 | C' 03735 0 | I' 43215 0 | I' 43215 0 | I' 41025 0 | C' 03702 1 | C' 57343 1 | C' 03610 0 |
| 25,2660 | I' 45246 0 | C' 15222 1 | I' 43040 1 | C' 53025 0 | C' 03311 1 | C' 52671 0 | I' 51145 0 | C' 03610 0 |
| 25,2670 | C' 53213 1 | I' 41345 0 | C' 03642 1 | C' 03610 0 | I' 45325 1 | C' 03612 1 | C' 03610 0 | I' 77665 1 |
| 25,2700 | I' 77625 0 | C' 74135 0 | I' 50015 0 | C' 03725 1 | C' 52737 0 | I' 77600 1 | C' 52733 1 | C' 03725 1 |
| 25,2710 | I' 77776 1 | 34753 1 | 54003 0 | 34763 1 | 55064 0 | 05301 0 | C' 00474 0 | 34763 1 |
| 25,2720 | 05103 0 | 33024 1 | 55645 0 | 06006 1 | I' 43145 0 | C' 03610 0 | C' 03071 1 | C' 17612 1 |
| 25,2730 | C' 15176 0 | C' 37175 0 | C' 52365 0 | I' 77745 1 | C' 17363 1 | C' 37725 0 | C' 53213 1 | I' 70545 1 |
| 25,2740 | C' 03725 1 | I' 52076 1 | C' 52700 1 | I' 41205 0 | C' 03767 1 | C' 15146 0 | I' 41325 0 | C' 03725 1 |
| 25,2750 | C' 15146 0 | I' 43325 1 | C' 03660 1 | C' 15252 0 | I' 41205 0 | C' 03662 0 | C' 15254 0 | I' 56271 0 |
| 25,2760 | C' 03656 1 | C' 03767 1 | I' 55221 0 | I' 77615 0 | C' 03767 1 | C' 37767 0 | C' 52776 0 | C' 17175 1 |
| 25,2770 | C' 03767 1 | I' 77716 1 | C' 17666 1 | C' 15332 1 | I' 77650 1 | C' 52553 0 | I' 56342 1 | C' 03616 0 |



ODAL LISTING FOR PARAGRAPH J 146, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" A DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #I# (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 25,3000 | I' 72421 0 | C' 15330 0 | I' 45316 1 | C' 03704 1 | I' 43471 1 | C' 03620 0 | 06006 1 | I' 45014 0 |
| 25,3010 | C' 03271 0 | C' 53014 1 | I' 77650 1 | C' 52365 0 | I' 77745 1 | C' 15332 1 | C' 17612 1 | C' 15156 1 |
| 25,3020 | C' 17642 1 | C' 15150 1 | C' 03725 1 | I' 77616 0 | C' 53570 0 | I' 77634 0 | C' 54440 0 | I' 45345 1 |
| 25,3030 | C' 03640 0 | C' 15220 0 | I' 43040 1 | C' 53035 1 | C' 03070 0 | I' 45345 1 | C' 03674 1 | C' 00326 0 |
| 25,3040 | I' 71244 0 | C' 53252 1 | C' 03640 0 | I' 50025 0 | C' 03175 1 | C' 53305 1 | I' 51145 0 | C' 03700 0 |
| 25,3050 | C' 53057 0 | I' 45345 1 | C' 03674 1 | C' 03767 1 | I' 50025 0 | C' 15164 0 | C' 53325 0 | I' 77745 1 |
| 25,3060 | C' 03640 0 | I' 50025 0 | C' 00330 1 | C' 53067 0 | I' 52145 0 | C' 03624 1 | C' 53517 1 | I' 41345 0 |
| 25,3070 | C' 03640 0 | C' 03620 0 | I' 75415 0 | C' 03704 1 | I' 41221 0 | C' 17363 1 | C' 03616 0 | C' 01160 1 |
| 25,3100 | I' 41221 0 | C' 00326 0 | C' 03725 1 | C' 15156 1 | C' 03672 1 | I' 50025 0 | C' 01160 1 | C' 53126 1 |
| 25,3110 | I' 41406 0 | I' 56205 0 | C' 03660 1 | C' 03662 0 | I' 41215 1 | C' 17357 0 | C' 15254 0 | I' 41205 0 |
| 25,3120 | I' 77671 1 | C' 03656 1 | I' 44271 0 | C' 01160 1 | C' 01156 1 | C' 01156 1 | I' 45345 1 | C' 03640 0 |
| 25,3130 | C' 15312 0 | I' 50004 0 | C' 57343 1 | C' 53144 0 | I' 45345 1 | C' 03664 0 | C' 03175 1 | I' 45325 1 |
| 25,3140 | C' 03640 0 | C' 03175 1 | I' 45471 1 | C' 74163 0 | I' 77745 1 | C' 03700 0 | I' 41225 1 | C' 01156 1 |
| 25,3150 | C' 03614 1 | I' 43271 1 | C' 15210 0 | C' 03674 1 | I' 41225 1 | C' 01160 1 | C' 03614 1 | I' 41471 0 |
| 25,3160 | C' 15212 1 | I' 51400 1 | C' 53464 1 | I' 50025 0 | C' 15274 1 | C' 53172 0 | I' 43205 1 | C' 15152 0 |
| 25,3170 | C' 15274 1 | I' 41585 1 | I' 42545 0 | I' 77615 0 | C' 03725 1 | I' 41400 0 | C' 53464 1 | C' 17634 0 |
| 25,3200 | C' 03640 0 | I' 50025 0 | C' 15216 0 | C' 53520 0 | I' 71214 0 | C' 03273 1 | I' 71244 0 | C' 53520 0 |
| 25,3210 | C' 15332 1 | C' 37634 1 | C' 53520 0 | I' 77745 1 | C' 03610 0 | C' 17612 1 | C' 15176 0 | C' 03175 1 |
| 25,3220 | I' 47131 1 | C' 03646 0 | C' 52365 0 | C' 54505 0 | I' 77604 0 | C' 57343 1 | I' 41345 0 | C' 03654 0 |
| 25,3230 | C' 03706 0 | I' 41325 0 | C' 15262 0 | C' 03710 1 | I' 43271 1 | C' 03674 1 | C' 03700 0 | I' 43205 1 |
| 25,3240 | C' 15226 0 | I' 77725 1 | C' 03710 1 | I' 77621 1 | C' 03640 0 | I' 43205 1 | C' 15224 1 | I' 52061 1 |
| 25,3250 | C' 20211 1 | C' 53175 1 | I' 77604 0 | C' 57343 1 | I' 54345 1 | C' 03624 1 | C' 20611 0 | I' 45325 1 |
| 25,3260 | C' 03674 1 | C' 00326 0 | I' 43205 1 | C' 03624 1 | C' 03700 0 | I' 43205 1 | C' 15226 0 | I' 45325 1 |
| 25,3270 | C' 00326 0 | C' 03674 1 | I' 41316 0 | C' 03624 1 | I' 65271 0 | C' 15272 1 | C' 00326 0 | I' 56316 0 |
| 25,3300 | C' 03622 1 | I' 45265 1 | C' 00330 1 | I' 77650 1 | C' 53243 1 | I' 66234 1 | C' 54473 0 | C' 03646 0 |
| 25,3310 | C' 53311 1 | I' 45345 1 | C' 15166 1 | C' 03640 0 | I' 72240 1 | C' 53325 0 | C' 03316 0 | I' 72214 0 |
| 25,3320 | C' 03314 1 | C' 53323 0 | C' 15332 1 | C' 37316 1 | C' 54402 0 | I' 47131 1 | C' 03646 0 | C' 53325 0 |
| 25,3330 | C' 54477 1 | I' 66214 0 | C' 03067 0 | C' 03646 0 | C' 53335 1 | I' 45345 1 | C' 03674 1 | C' 15214 1 |
| 25,3340 | I' 77440 1 | C' 53605 1 | 34753 1 | 54003 0 | 35656 1 | 55771 0 | 41673 0 | 51771 1 |
| 25,3350 | 63631 0 | 10000 0 | 11771 0 | 13345 1 | 64712 1 | 55646 0 | 51771 1 | 43631 1 |
| 25,3360 | 51771 1 | 63632 0 | 57646 1 | 22007 0 | 00006 1 | 11646 0 | 55651 0 | 34715 0 |
| 25,3370 | 55650 1 | 34720 0 | 27771 0 | 50000 1 | 43631 1 | 51771 1 | 63632 0 | 00006 1 |



CODAL LISTING FOR PARAGRAPH J 147, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED I" (INTERPRETIVE OPERATOR WORDS) OR C" (CONSTANTS)

| | | | | | | | | |
|---------|-------------|------------|------------|------------|------------|------------|------------|------------|
| 25,3400 | 71651 0 | 51771 1 | 63631 0 | 51650 0 | 55652 0 | 11650 1 | 13370 1 | 57653 0 |
| 25,3410 | 61637 1 | 00006 1 | 71657 0 | 52155 1 | 00006 1 | 41700 0 | 20001 1 | 20001 1 |
| 25,3420 | 20001 1 | 61655 0 | 00006 1 | 71656 1 | 61654 1 | 20155 1 | 30154 1 | 55770 1 |
| 25,3430 | 66006 1 | I' 45242 1 | C' 03702 1 | I' 43014 0 | C' 03305 1 | C' 53462 1 | C' 03747 0 | C' 53445 1 |
| 25,3440 | I' 43145 0 | C' 13765 1 | C' 03065 1 | C' 37716 0 | C' 53462 1 | C' 03716 1 | I' 77676 0 | I' 56204 1 |
| 25,3450 | C' 57343 1 | C' 03653 1 | I' 40061 1 | C' 20206 1 | C' 53464 1 | I' 40015 1 | C' 03626 0 | C' 53464 1 |
| 25,3460 | C' 37634 1 | C' 53470 1 | I' 77745 1 | C' 13463 1 | I' 41234 1 | C' 45707 0 | C' 03624 1 | C' 03634 0 |
| 25,3470 | I' 45345 1 | C' 15160 1 | C' 03640 0 | I' 43244 1 | C' 53520 0 | C' 15160 1 | I' 41240 1 | C' 53515 0 |
| 25,3500 | C' 15282 0 | I' 41325 0 | C' 03654 0 | C' 15330 0 | I' 41215 1 | C' 03624 1 | I' 56325 0 | C' 15284 0 |
| 25,3510 | C' 03622 1 | I' 75415 0 | I' 51015 1 | C' 03700 0 | C' 53520 0 | I' 77745 1 | C' 03624 1 | C' 03634 0 |
| 25,3520 | I' 77745 1 | C' 03634 0 | C' 17636 1 | C' 03622 1 | I' 77614 1 | C' 03305 1 | C' 53560 1 | I' 43205 1 |
| 25,3530 | C' 03632 0 | C' 15242 1 | I' 51525 1 | C' 03634 0 | I' 50025 0 | C' 03630 1 | C' 53545 0 | I' 75345 1 |
| 25,3540 | C' 03676 0 | C' 03644 1 | I' 71240 1 | C' 53624 1 | I' 41542 1 | I' 75345 1 | C' 03676 0 | C' 03644 1 |
| 25,3550 | I' 77625 0 | I' 71240 1 | C' 53560 1 | C' 03644 1 | I' 57414 1 | C' 03210 1 | C' 53560 1 | C' 03644 1 |
| 25,3560 | I' 56345 0 | C' 03636 1 | C' 03624 1 | I' 65542 1 | I' 43165 1 | C' 03644 1 | C' 03270 1 | C' 03316 0 |
| 25,3570 | I' 77776 1 | 34676 1 | 70102 0 | 00006 1 | 13600 0 | 31263 1 | 04555 0 | C' 20621 0 |
| 25,3600 | 66004 0 | 10067 1 | 05057 0 | 04574 0 | C' 77132 1 | I' 77776 1 | 34753 1 | 54003 0 |
| 25,3610 | 34763 1 | 05027 1 | C' 02511 0 | C' 54066 0 | 05261 1 | C' 00414 0 | C' 10035 0 | 33623 0 |
| 25,3620 | 55645 0 | 06006 1 | I' 77650 1 | C' 54530 0 | I' 75345 1 | C' 03630 1 | C' 03634 0 | C' 37636 0 |
| 25,3630 | C' 53560 1 | C' 00474 0 | C' 01235 1 | C' 02337 1 | C' 03721 0 | C' 05230 0 | C' 06213 1 | C' 10550 0 |
| 25,3640 | C' 11717 0 | C' 13314 0 | C' 14736 0 | C' 16255 1 | C' 16457 0 | C' 25570 1 | C' 77526 0 | C' 77360 1 |
| 25,3650 | C' 77106 0 | C' 76516 1 | C' 76071 0 | C' 75570 1 | C' 74661 0 | C' 74436 0 | C' 73212 1 | C' 71640 0 |
| 25,3660 | C' 54557 1 | C' 40000 0 | C' 40000 0 | C' 77635 1 | C' 77563 1 | C' 77354 0 | C' 76712 1 | C' 76066 0 |
| 25,3670 | C' 75322 0 | C' 73237 0 | C' 72104 1 | C' 70301 1 | C' 65635 1 | C' 57311 0 | C' 50575 0 | C' 50575 0 |
| 25,3700 | C' 74443 1 | C' 74333 1 | C' 74433 0 | C' 74763 0 | C' 75432 0 | C' 75735 1 | C' 76200 1 | C' 75735 1 |
| 25,3710 | C' 75140 0 | C' 74075 0 | C' 73312 0 | C' 73732 0 | C' 73732 0 | C' 00015 0 | C' 00066 1 | C' 00206 0 |
| 25,3720 | C' 00431 1 | C' 00712 0 | C' 01136 1 | C' 02015 1 | C' 02374 0 | C' 03123 1 | C' 04051 1 | C' 05767 1 |
| 25,3730 | C' 07476 0 | C' 11324 1 | C' 76272 1 | C' 75472 1 | C' 74604 0 | C' 74210 1 | C' 74052 0 | C' 73735 1 |
| 25,3740 | C' 73217 1 | C' 73013 1 | C' 73155 1 | C' 74151 1 | C' 76703 1 | C' 77575 0 | C' 77575 0 | C' 00112 0 |
| 25,3750 | C' 00204 1 | C' 00407 1 | C' 01113 0 | C' 02161 0 | C' 03260 0 | C' 03717 0 | C' 05411 0 | C' 10057 1 |
| 25,3760 | C' 13476 0 | C' 20324 0 | C' 21677 1 | C' 21677 1 | C' 16631 1 | C' 06755 0 | C' 03766 0 | C' 03767 1 |
| 25,3770 | QCM 60227 0 | " | " | " | " | " | " | " |



OCTAL LISTING FOR PARAGRAPH J 150, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #I# (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 26,2000 | I' 77601 0 | C' 00001 0 | I' 41575 0 | C' 15324 0 | I' 41434 1 | C' 45505 0 | C' 36356 1 | C' 55341 1 |
| 26,2010 | C' 16766 1 | C' 02356 0 | C' 34041 0 | C' 27045 0 | I' 47375 0 | C' 00007 0 | C' 00001 0 | I' 77656 1 |
| 26,2020 | C' 24031 0 | C' 00001 0 | I' 57456 1 | I' 41401 1 | C' 00001 0 | I' 77776 1 | 31751 0 | 74716 1 |
| 26,2030 | 00006 1 | 74700 0 | 56001 0 | 50120 1 | 54036 0 | 06006 1 | I' 41335 1 | C' 00037 0 |
| 26,2040 | C' 14107 1 | C' 36356 1 | C' 54057 1 | I' 77775 1 | C' 00031 0 | C' 16766 1 | C' 14105 0 | I' 77625 0 |
| 26,2050 | C' 02356 0 | C' 36356 1 | C' 54057 1 | I' 77775 1 | C' 00001 0 | C' 36766 0 | C' 26260 1 | I' 73545 1 |
| 26,2060 | C' 02356 0 | I' 47315 0 | C' 02766 1 | C' 00001 0 | I' 72561 0 | I' 50315 0 | C' 02766 1 | C' 00001 0 |
| 26,2070 | I' 72561 0 | C' 02766 1 | I' 71525 0 | C' 02356 0 | I' 51315 1 | C' 00015 0 | C' 00001 0 | I' 76561 1 |
| 26,2100 | I' 53255 0 | I' 40256 1 | C' 00001 0 | I' 43406 1 | C' 05252 1 | C' 25251 0 | C' 01414 1 | C' 06044 1 |
| 26,2110 | I' 77774 0 | C' 54161 0 | I' 52170 0 | C' 54143 0 | C' 54126 0 | I' 52170 0 | C' 54162 0 | C' 54126 0 |
| 26,2120 | I' 52170 0 | C' 54173 0 | C' 54126 0 | I' 76020 1 | C' 00047 1 | C' 54143 0 | I' 54201 0 | C' 00001 0 |
| 26,2130 | C' 20617 0 | I' 57571 0 | C' 01707 0 | I' 57571 0 | C' 02034 1 | I' 66261 1 | C' 20221 1 | C' 00051 0 |
| 26,2140 | C' 00006 1 | I' 77650 1 | C' 00046 0 | I' 41206 0 | C' 02147 1 | I' 71406 0 | I' 85361 0 | C' 02133 1 |
| 26,2150 | I' 63356 1 | C' 02133 1 | I' 53406 0 | I' 53435 0 | C' 02141 1 | I' 76435 1 | I' 53361 0 | I' 52172 1 |
| 26,2160 | C' 00047 1 | C' 14003 1 | I' 63370 0 | C' 00066 1 | C' 02037 1 | I' 52761 0 | C' 00001 0 | C' 02133 1 |
| 26,2170 | I' 72500 1 | C' 54165 1 | I' 77616 0 | I' 65370 0 | C' 00060 1 | C' 14214 0 | I' 74206 0 | C' 02037 1 |
| 26,2200 | I' 77761 1 | C' 00001 0 | C' 14005 1 | I' 41425 1 | C' 14216 1 | I' 53357 0 | C' 02125 0 | C' 00005 1 |
| 26,2210 | I' 72500 1 | C' 54200 1 | I' 77616 0 | C' 22000 1 | C' 00000 1 | C' 02000 0 | C' 00000 1 | 34675 1 |
| 26,2220 | 55044 1 | 44712 0 | 55726 1 | 02543 1 | 32424 1 | 04555 0 | C' 20763 1 | 04106 1 |
| 26,2230 | 02235 1 | 02224 1 | 05301 0 | C' 00014 1 | 05112 0 | 22007 0 | 11726 1 | 34675 1 |
| 26,2240 | 12241 0 | 53716 1 | 06006 1 | I' 77745 1 | C' 01205 1 | C' 37651 1 | C' 52063 0 | I' 77775 1 |
| 26,2250 | C' 01171 1 | C' 02327 0 | I' 77656 1 | C' 26343 1 | C' 01177 1 | C' 02335 0 | I' 53435 0 | C' 02343 1 |
| 26,2260 | C' 03502 0 | I' 45345 1 | C' 03651 0 | C' 01205 1 | I' 45040 1 | C' 54243 0 | C' 54650 0 | 05425 1 |
| 26,2270 | 32423 0 | 04555 0 | C' 20624 0 | 04106 1 | 02276 0 | 02270 0 | 06006 1 | I' 45234 0 |
| 26,2300 | C' 45505 0 | C' 03651 0 | I' 77615 0 | C' 03733 0 | C' 03727 0 | I' 77776 1 | 32425 0 | 04555 0 |
| 26,2310 | C' 20624 0 | 04106 1 | 02314 0 | 02276 0 | 05243 1 | C' 00076 0 | 34712 1 | 54332 1 |
| 26,2320 | 02543 1 | 06006 1 | I' 47131 1 | C' 03325 0 | C' 54402 0 | C' 41645 0 | 00006 1 | 32431 0 |
| 26,2330 | 53223 1 | 34270 0 | 04555 0 | C' 21031 0 | 04106 1 | 02340 1 | 02331 1 | 02232 0 |
| 26,2340 | 04574 0 | C' 41565 1 | 32424 1 | 04555 0 | C' 20624 0 | 02342 0 | 02350 0 | 02342 0 |
| 26,2350 | 05301 0 | C' 04024 0 | 11726 1 | 34675 1 | 12355 1 | 55715 1 | 31411 1 | 22007 0 |
| 26,2360 | 53604 0 | 34712 1 | 55727 0 | 34745 0 | 55263 0 | 05435 0 | C' 00134 1 | 41700 0 |
| 26,2370 | 74712 0 | 00006 1 | 12420 1 | 02406 1 | 34760 1 | 05027 1 | C' 02406 1 | C' 54066 0 |

ODD LISTING FOR PARAGRAPH J 151, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED I" (INTERPRETIVE OPERATOR WORDS) OR A" (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 26,2400 | 05213 1 | C' 54492 0 | I' 52131 0 | C' 00053 1 | C' 53570 0 | C' 20302 1 | 05243 1 | C' 00077 1 |
| 26,2410 | 04555 0 | C' 20607 1 | 32427 1 | 55724 0 | 32426 0 | 55263 0 | 44712 0 | 55727 0 |
| 26,2420 | 05301 0 | C' 00094 0 | 05112 0 | C' 01474 1 | C' 01475 0 | C' 01477 1 | C' 01500 0 | C' 52000 0 |
| 26,2430 | C' 03373 0 | C' 76067 1 | 05243 1 | C' 00100 0 | 32437 0 | 55263 0 | 06030 1 | C' 01504 1 |
| 26,2440 | 05243 1 | C' 00101 1 | 34760 1 | 05027 1 | C' 02456 1 | C' 54062 1 | 05261 1 | C' 00554 0 |
| 26,2450 | C' 10035 0 | 06006 1 | I' 47131 1 | C' 03646 0 | C' 53027 1 | C' 52120 0 | 05447 0 | C' 00134 1 |
| 26,2460 | 32472 1 | 04555 0 | C' 20763 1 | 02460 1 | 02467 0 | 02460 1 | 02232 0 | 05435 0 |
| 26,2470 | C' 00134 1 | 02420 0 | C' 04105 1 | 05243 1 | C' 00102 1 | 34745 0 | 02502 1 | 05243 1 |
| 26,2500 | C' 00103 0 | 32510 1 | 55263 0 | 05435 0 | C' 00134 1 | 05301 0 | C' 00004 0 | 06030 1 |
| 26,2510 | C' 01502 1 | 32542 0 | 04555 0 | C' 20624 0 | 02517 0 | 02517 0 | 02511 0 | 46214 1 |
| 26,2520 | 00004 0 | 70102 0 | 54102 0 | 00003 1 | 00006 1 | 32642 0 | 53223 1 | 14106 0 |
| 26,2530 | I' 43175 0 | C' 01171 1 | C' 00662 0 | C' 16152 0 | C' 01205 1 | I' 45014 0 | C' 01663 0 | C' 26322 0 |
| 26,2540 | I' 77634 0 | C' 53603 1 | C' 04103 1 | 00006 1 | 23773 0 | 04555 0 | C' 17573 0 | 06006 1 |
| 26,2550 | I' 45014 0 | C' 00716 1 | C' 54603 0 | C' 27573 0 | 30155 0 | 55774 0 | 05140 1 | C' 02564 1 |
| 26,2560 | C' 54067 1 | 05301 0 | C' 48434 0 | 05112 0 | 34760 1 | 05042 1 | C' 02602 1 | C' 54066 0 |
| 26,2570 | 00006 1 | 32642 0 | 53223 1 | 05261 1 | C' 00454 1 | C' 00415 1 | 34753 1 | 54003 0 |
| 26,2600 | 04574 0 | C' 76604 1 | 06006 1 | I' 77204 1 | C' 57343 1 | C' 01177 1 | I' 64235 1 | C' 01171 1 |
| 26,2610 | C' 01736 1 | I' 71256 0 | C' 00160 0 | I' 43240 0 | C' 54621 0 | C' 14644 1 | I' 47004 0 | C' 54640 1 |
| 26,2620 | C' 54625 1 | I' 43276 0 | C' 14644 1 | I' 77404 1 | C' 54630 0 | 05537 0 | C' 01426 0 | 02632 1 |
| 26,2630 | 05537 0 | C' 01427 1 | 34743 0 | 04555 0 | C' 20602 1 | 32645 1 | 04555 0 | C' 01732 0 |
| 26,2640 | 01773 0 | C' 03132 1 | C' 76067 1 | C' 22111 0 | C' 17335 1 | C' 01750 1 | C' 00000 1 | C' 13560 0 |
| 26,2650 | I' 45345 1 | C' 02020 1 | C' 15000 0 | I' 71244 0 | C' 54774 1 | C' 17345 0 | I' 77624 1 | C' 56750 0 |
| 26,2660 | I' 45145 0 | C' 15020 1 | C' 57060 0 | I' 77624 1 | C' 56573 0 | I' 77624 1 | C' 55027 1 | I' 45015 1 |
| 26,2670 | C' 02020 1 | C' 57060 0 | I' 77676 0 | C' 03733 0 | C' 37727 1 | C' 56573 0 | I' 77624 1 | C' 55027 1 |
| 26,2700 | I' 77624 1 | C' 56626 0 | I' 77624 1 | C' 56613 0 | I' 77624 1 | C' 56613 0 | C' 37714 1 | C' 55050 1 |
| 26,2710 | I' 77605 1 | I' 43265 1 | C' 15026 1 | C' 00001 0 | C' 17725 1 | C' 02241 1 | I' 77615 0 | C' 06462 1 |
| 26,2720 | C' 34023 1 | C' 55045 0 | I' 45325 1 | C' 00001 0 | C' 15004 1 | I' 63471 0 | C' 15006 0 | C' 00001 0 |
| 26,2730 | I' 43205 1 | C' 15010 1 | I' 41215 1 | C' 15012 0 | C' 15014 0 | I' 77725 1 | I' 43271 1 | C' 15024 0 |
| 26,2740 | C' 17357 0 | I' 77665 1 | I' 51015 1 | C' 15016 1 | C' 54747 1 | I' 77745 1 | C' 15332 1 | C' 17722 0 |
| 26,2750 | C' 02241 1 | I' 45015 1 | C' 15022 0 | C' 57060 0 | I' 77624 1 | C' 56573 0 | I' 77624 1 | C' 55027 1 |
| 26,2760 | I' 73015 1 | C' 15022 0 | C' 03713 1 | C' 34023 1 | C' 55045 0 | I' 67076 1 | C' 00155 0 | C' 17771 0 |
| 26,2770 | I' 77626 0 | C' 74010 0 | I' 77634 0 | C' 54267 0 | I' 52145 0 | C' 06456 0 | C' 54656 0 | C' 00002 0 |



OCTAL LISTING FOR PARAGRAPH J 152, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #1A (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 26,3000 | C' 26244 1 | C' 00052 0 | C' 05716 1 | C' 33335 1 | C' 05707 1 | C' 36385 1 | C' 30244 0 | C' 77113 1 |
| 26,3010 | C' 42770 1 | C' 77354 0 | C' 65030 1 | C' 21450 0 | C' 00001 0 | C' 01750 1 | C' 00000 1 | C' 00305 1 |
| 26,3020 | C' 04541 0 | C' 00003 1 | C' 27040 0 | C' 32525 1 | C' 12525 0 | C' 77777 0 | C' 76801 1 | I' 47315 0 |
| 26,3030 | C' 02343 1 | C' 03502 0 | I' 76561 1 | I' 74315 0 | C' 02343 1 | C' 00017 1 | I' 45455 1 | C' 74235 0 |
| 26,3040 | I' 72441 0 | C' 01714 1 | C' 02156 1 | I' 77650 1 | C' 26437 0 | I' 77657 0 | C' 20201 0 | C' 00021 1 |
| 26,3050 | I' 41345 0 | C' 00041 1 | C' 00021 1 | I' 45325 1 | C' 00041 1 | C' 00021 1 | I' 56257 1 | C' 20171 1 |
| 26,3060 | I' 77625 0 | C' 00025 0 | I' 41566 1 | I' 65271 0 | C' 00037 0 | I' 65205 0 | C' 00021 1 | C' 00035 1 |
| 26,3070 | I' 56366 1 | I' 65542 1 | I' 77616 0 | I' 56345 0 | C' 03700 0 | C' 15314 0 | I' 41325 0 | C' 03640 0 |
| 26,3100 | C' 15316 1 | I' 43271 1 | C' 03674 1 | I' 43205 1 | C' 03640 0 | C' 03640 0 | C' 03640 0 | I' 71214 0 |
| 26,3110 | C' 03307 0 | C' 55116 1 | C' 03702 1 | I' 52005 0 | C' 15234 0 | C' 52173 0 | I' 45345 1 | C' 03674 1 |
| 26,3120 | C' 15322 0 | I' 43044 0 | C' 55124 0 | C' 03066 1 | I' 41345 0 | C' 03702 1 | C' 15236 1 | I' 52071 0 |
| 26,3130 | C' 03674 1 | C' 52173 0 | I' 52145 0 | C' 16326 1 | C' 52162 0 | I' 51425 0 | C' 16327 0 | I' 75461 0 |
| 26,3140 | C' 20216 0 | I' 52005 0 | C' 15246 0 | C' 52226 0 | C' 02525 1 | C' 12525 0 | C' 12525 0 | C' 04631 1 |
| 26,3150 | C' 23146 0 | C' 03146 1 | C' 14632 0 | C' 06314 1 | C' 31463 1 | C' 76314 0 | C' 71462 1 | C' 05075 0 |
| 26,3160 | C' 16051 1 | C' 07777 1 | C' 00000 1 | C' 00236 0 | C' 36763 0 | C' 00204 1 | C' 11303 1 | C' 05260 0 |
| 26,3170 | C' 05572 1 | C' 12343 0 | C' 21616 0 | C' 01073 1 | C' 31515 1 | C' 00172 0 | C' 03571 1 | C' 00573 0 |
| 26,3200 | C' 10230 1 | C' 76226 0 | C' 45761 0 | C' 13132 0 | C' 33062 0 | C' 00160 0 | C' 05104 1 | C' 11322 1 |
| 26,3210 | C' 32265 1 | C' 75047 0 | C' 72454 1 | C' 00475 1 | C' 35746 1 | C' 06751 1 | C' 27515 0 | C' 05441 0 |
| 26,3220 | C' 14412 0 | C' 00022 1 | C' 36641 1 | C' 01003 0 | C' 06315 0 | C' 71435 0 | C' 75516 1 | C' 32047 0 |
| 26,3230 | C' 24367 0 | C' 37200 1 | C' 05636 1 | C' 00046 0 | C' 13137 0 | C' 00017 1 | C' 30730 0 | C' 00040 0 |
| 26,3240 | C' 30447 0 | C' 00000 1 | C' 17565 1 | C' 01727 1 | C' 20103 1 | C' 00121 0 | C' 17460 0 | C' 00400 0 |
| 26,3250 | C' 00000 1 | C' 01252 0 | C' 25253 1 | C' 24365 1 | C' 30244 0 | C' 77152 1 | C' 51354 1 | C' 00336 1 |
| 26,3260 | C' 21610 0 | C' 00433 0 | C' 02775 0 | C' 00000 1 | C' 20017 0 | C' 77765 0 | C' 70243 0 | C' 31463 1 |
| 26,3270 | C' 06315 0 | C' 00541 1 | C' 33575 0 | C' 00146 1 | C' 14632 0 | C' 00052 0 | C' 30013 0 | C' 20411 1 |
| 26,3300 | C' 03041 1 | C' 20610 1 | C' 10513 1 | C' 11473 1 | C' 02355 0 | C' 00203 0 | C' 02234 0 | C' 16237 0 |
| 26,3310 | C' 00146 1 | C' 01456 1 | C' 03450 0 | C' 56232 1 | C' 72332 0 | C' 77000 1 | C' 43741 1 | C' 36702 1 |
| 26,3320 | C' 21727 0 | C' 10000 0 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 20000 0 |
| 26,3330 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 37777 1 |
| 26,3340 | C' 37777 1 | I' 46020 1 | C' 00050 1 | C' 55356 1 | I' 77624 1 | C' 55416 1 | I' 77775 1 | C' 02012 0 |
| 26,3350 | I' 53235 0 | C' 00001 0 | C' 00001 0 | I' 52105 1 | C' 00025 0 | C' 55404 1 | I' 77624 1 | C' 55570 0 |
| 26,3360 | I' 77624 1 | C' 55622 1 | I' 76521 0 | C' 00025 0 | I' 77650 1 | C' 55350 1 | I' 46020 1 | C' 00050 1 |
| 26,3370 | C' 55410 1 | I' 77624 1 | C' 55416 1 | I' 61375 1 | C' 02012 0 | C' 00025 0 | I' 77772 0 | I' 51235 1 |



TOTAL LISTING FOR PARAGRAPH J 153, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #I# (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|--------------|------------|
| 28,3400 | C' 00001 0 | C' 00001 0 | I' 77721 0 | C' 00025 0 | I' 40372 0 | C' 00001 0 | I' 77650 1 | C' 00050 1 |
| 28,3410 | I' 77624 1 | C' 55570 0 | I' 77624 1 | C' 55622 1 | I' 77650 1 | C' 55377 1 | I' 40220 0 | C' 00051 0 |
| 28,3420 | C' 00011 1 | I' 77770 1 | C' 00005 1 | I' 65345 0 | C' 15652 1 | C' 15644 0 | I' 45006 0 | C' 55543 0 |
| 28,3430 | I' 71406 0 | C' 14041 1 | I' 77756 0 | C' 14043 0 | C' 15650 0 | I' 41525 0 | C' 15642 0 | I' 45170 0 |
| 28,3440 | C' 00004 0 | C' 55543 0 | C' 14027 1 | C' 15646 1 | I' 41525 0 | C' 15640 1 | I' 45170 0 | C' 00005 1 |
| 28,3450 | C' 55543 0 | I' 71406 0 | I' 77606 1 | C' 00025 0 | I' 76405 1 | C' 00041 1 | C' 14035 1 | I' 76405 1 |
| 28,3460 | C' 00043 0 | C' 14037 0 | I' 41556 1 | I' 77676 0 | C' 14033 1 | C' 00027 1 | C' 14007 0 | I' 76405 1 |
| 28,3470 | C' 00041 1 | C' 14027 1 | C' 00011 1 | I' 76405 1 | C' 00043 0 | C' 14031 0 | C' 15332 1 | I' 67525 1 |
| 28,3500 | C' 00043 0 | I' 63325 0 | C' 00041 1 | C' 00033 1 | I' 63361 0 | C' 15636 0 | C' 00011 1 | I' 53361 0 |
| 28,3510 | C' 15634 1 | I' 77772 0 | C' 24041 1 | I' 63361 0 | C' 15636 0 | C' 00033 1 | I' 52361 1 | C' 15634 1 |
| 28,3520 | I' 65372 1 | C' 00007 0 | I' 74346 0 | C' 00011 1 | I' 73525 1 | C' 00007 0 | I' 52361 1 | C' 00025 0 |
| 28,3530 | I' 77772 0 | C' 14033 1 | C' 00007 0 | I' 74356 1 | I' 71525 0 | C' 00007 0 | I' 53361 0 | C' 00025 0 |
| 28,3540 | I' 57572 0 | C' 34025 1 | C' 00051 0 | I' 54345 1 | C' 00007 0 | C' 20617 0 | I' 72371 1 | C' 01707 0 |
| 28,3550 | C' 00155 0 | C' 14017 1 | C' 00020 0 | I' 77605 1 | I' 43257 0 | C' 20206 1 | I' 67206 1 | C' 00017 1 |
| 28,3560 | I' 41261 1 | C' 20212 1 | C' 00013 0 | I' 43257 0 | C' 20213 0 | I' 77600 1 | C' 55567 0 | I' 77616 0 |
| 28,3570 | I' 40220 0 | C' 00051 0 | C' 00011 1 | I' 77770 1 | C' 00000 1 | I' 65345 0 | C' 01712 1 | C' 15654 1 |
| 28,3600 | I' 45006 0 | C' 55543 0 | I' 41401 1 | C' 00023 0 | I' 65346 0 | C' 00023 0 | I' 65356 1 | C' 15332 1 |
| 28,3610 | I' 73525 1 | C' 00023 0 | I' 65276 1 | C' 00023 0 | I' 63346 0 | C' 15332 1 | I' 41525 0 | C' 15330 0 |
| 28,3620 | I' 77650 1 | C' 00051 0 | I' 57545 1 | C' 01716 0 | C' 14017 1 | C' 01714 1 | C' 14021 1 | C' 15332 1 |
| 28,3630 | C' 24023 0 | C' 00017 1 | I' 77616 0 | C' 17775 1 | C' 01734 0 | C' 00333 1 | C' 16153 1 | C' 77665 1 |
| 28,3640 | C' 42175 1 | C' 22211 0 | C' 00265 0 | C' 77777 0 | C' 77767 1 | C' 41215 1 | C' 66331 0 | C' 15237 0 |
| 28,3650 | C' 26751 0 | C' 02052 1 | C' 35713 1 | C' 37116 0 | C' 32630 0 | 05435 0 | C' 00054 0 | 00004 0 |
| 28,3660 | 00006 1 | 30025 0 | 53151 1 | 03714 0 | 03657 0 | 52155 1 | 53153 0 | 00004 0 |
| 28,3670 | 04555 0 | C' 16777 1 | 05447 0 | C' 00007 0 | 05447 0 | C' 00010 0 | 34700 1 | 00006 1 |
| 28,3700 | 05013 0 | 05301 0 | C' 07024 0 | C' 20000 0 | C' 03734 1 | C' 54102 0 | 34731 0 | 04555 0 |
| 28,3710 | C' 20751 0 | 13706 1 | 13706 1 | 13706 1 | 00006 1 | 22156 0 | 04527 0 | 00003 1 |
| 28,3720 | 52155 1 | 34706 1 | 54001 1 | 34714 1 | 20155 1 | 44362 0 | 70155 1 | 56155 0 |
| 28,3730 | 74362 0 | 10000 0 | 24156 0 | 00156 0 | 44700 0 | 00006 1 | 03013 0 | 00004 0 |
| 28,3740 | 34714 1 | 54001 1 | 52025 1 | 03714 0 | 03737 1 | 00006 1 | 41153 0 | 20155 1 |
| 28,3750 | 34701 0 | 07256 1 | 34714 1 | 54156 1 | 07226 0 | 10154 0 | 03763 0 | 03763 0 |
| 28,3760 | 03761 1 | 34701 0 | 26154 0 | 00006 1 | 31151 0 | 20155 1 | 07226 0 | 52155 1 |
| 28,3770 | 20025 1 | 05447 0 | C' 00054 0 | 04106 1 | C' 03774 0 | C' 03775 1 | CKSM 53035 1 | " |



OCTAL LISTING FOR PARAGRAPH J 154, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #IA (INTERPRETIVE OPERATOR WORDS) OR #CA (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 27,2000 | 04604 1 | 55146 1 | 34705 1 | 70101 0 | 10000 0 | 12013 0 | 06006 1 | I' 77624 1 |
| 27,2010 | C' 56126 1 | C' 01156 1 | I' 77776 1 | 32125 0 | 04555 0 | C' 21036 1 | 02114 1 | 02023 1 |
| 27,2020 | 12052 0 | 02056 0 | 05112 0 | 34705 1 | 70101 0 | 10000 0 | 12034 0 | 06006 1 |
| 27,2030 | I' 77624 1 | C' 56126 1 | C' 01156 1 | I' 77776 1 | 34371 0 | 00006 1 | 06031 0 | 77707 1 |
| 27,2040 | 00006 1 | 12043 0 | 12013 0 | 32125 0 | 04555 0 | C' 20602 1 | 02056 0 | 04555 0 |
| 27,2050 | C' 17547 1 | 12013 0 | 05447 0 | C' 00124 0 | 31146 0 | 04577 0 | 40100 1 | 74677 1 |
| 27,2060 | 10000 0 | 00002 0 | 30002 0 | 54156 1 | 46214 1 | 60133 0 | 55053 1 | 05301 0 |
| 27,2070 | C' 00071 1 | 34704 0 | 05415 1 | 00156 0 | 34706 1 | 70075 1 | 00006 1 | 12111 0 |
| 27,2100 | 05435 0 | C' 00077 1 | 05435 0 | C' 00024 1 | 34714 1 | 55303 1 | 34761 0 | 05103 0 |
| 27,2110 | 01053 0 | 05301 0 | C' 00111 0 | 05112 0 | 31011 0 | 00006 1 | 12052 0 | 30100 0 |
| 27,2120 | 74677 1 | 00006 1 | 14100 0 | 04550 0 | C' 20100 1 | C' 01422 1 | I' 40020 1 | C' 03310 0 |
| 27,2130 | C' 56131 1 | I' 47164 1 | C' 03320 0 | C' 44376 0 | C' 34032 1 | C' 44405 0 | I' 61375 1 | C' 03357 0 |
| 27,2140 | C' 03321 1 | I' 77656 1 | C' 00035 1 | I' 53435 0 | C' 03351 0 | I' 57400 1 | C' 56256 0 | C' 17343 0 |
| 27,2150 | C' 00045 0 | I' 50025 0 | C' 16327 0 | C' 56256 0 | I' 50375 0 | C' 03351 0 | C' 00035 1 | I' 65552 0 |
| 27,2160 | I' 77624 1 | C' 44530 1 | I' 75160 1 | C' 03320 0 | C' 03425 1 | I' 77624 1 | C' 44304 0 | I' 51545 1 |
| 27,2170 | C' 00007 0 | I' 50025 0 | C' 16314 0 | C' 56246 1 | I' 51545 1 | C' 03351 0 | I' 51025 1 | C' 16316 1 |
| 27,2200 | C' 56246 1 | I' 77775 1 | I' 77626 0 | C' 50442 0 | I' 77626 0 | C' 50450 0 | I' 77626 0 | C' 50456 0 |
| 27,2210 | C' 03327 1 | I' 57444 1 | C' 56213 1 | I' 50035 1 | C' 03351 0 | C' 56222 0 | I' 57575 1 | C' 03351 0 |
| 27,2220 | C' 37343 1 | C' 56225 1 | I' 77775 1 | C' 03351 0 | C' 03343 0 | I' 51545 1 | C' 03351 0 | I' 51025 1 |
| 27,2230 | C' 16320 1 | C' 56235 0 | I' 52145 0 | C' 16324 0 | C' 56237 1 | I' 77745 1 | C' 16322 0 | I' 77624 1 |
| 27,2240 | C' 44530 1 | I' 75160 1 | C' 03320 0 | C' 03425 1 | I' 77624 1 | C' 44304 0 | I' 45160 1 | C' 00000 1 |
| 27,2250 | C' 44655 1 | I' 40234 0 | C' 45547 0 | C' 00001 0 | I' 77650 1 | C' 03310 0 | I' 50375 0 | C' 00035 1 |
| 27,2260 | C' 03351 0 | I' 72240 1 | C' 56266 0 | C' 00032 0 | I' 77650 1 | C' 03310 0 | I' 47375 0 | C' 03327 1 |
| 27,2270 | C' 15330 0 | I' 47256 0 | C' 03351 0 | I' 40056 0 | C' 56310 0 | C' 17343 0 | C' 00045 0 | I' 50025 0 |
| 27,2300 | C' 16327 0 | C' 56310 0 | I' 77775 1 | C' 03343 0 | C' 17343 0 | C' 15330 0 | I' 77650 1 | C' 56160 0 |
| 27,2310 | I' 52175 0 | C' 15330 0 | C' 56304 0 | C' 15555 0 | C' 35172 0 | C' 14113 1 | C' 36326 0 | C' 07701 0 |
| 27,2320 | C' 35703 0 | C' 04343 1 | C' 21616 0 | C' 03070 0 | C' 34344 0 | C' 00000 1 | C' 00001 0 | C' 00000 1 |
| 27,2330 | 34745 0 | 04555 0 | C' 20624 0 | 16423 0 | 12336 1 | 12330 1 | 05435 0 | C' 00124 0 |
| 27,2340 | 04555 0 | C' 56000 1 | 15423 0 | I' 45020 1 | C' 02317 0 | C' 27371 1 | I' 43145 0 | C' 01225 0 |
| 27,2350 | C' 01472 1 | C' 00041 1 | I' 43014 0 | C' 01673 1 | C' 01676 1 | I' 43014 0 | C' 01474 1 | C' 01635 0 |
| 27,2360 | C' 02317 0 | I' 77620 0 | C' 01150 1 | I' 77614 1 | C' 01742 1 | C' 30147 0 | I' 50135 0 | C' 03376 0 |
| 27,2370 | C' 56406 0 | I' 43014 0 | C' 00710 1 | C' 01150 1 | C' 00752 1 | C' 30147 0 | I' 77776 1 | 05301 0 |

ODD-LISTING FOR PARAGRAPH J 185, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A'S DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED I/A (INTERPRETIVE OPERATOR WORDS) OR A/C (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 27,2400 | C' 00132 1 | 37663 0 | 05103 0 | 02407 0 | I' 77620 0 | C' 01150 1 | I' 77776 1 | 34740 0 |
| 27,2410 | 04555 0 | C' 01732 0 | 06008 1 | I' 77650 1 | C' 56383 1 | I' 77776 1 | 00004 0 | 42472 0 |
| 27,2420 | 00006 1 | 03013 0 | 34334 1 | 00006 1 | 05013 0 | 00003 1 | 00006 1 | 30025 0 |
| 27,2430 | 53225 1 | 04855 0 | C' 17614 1 | 02461 0 | 05520 0 | 06006 1 | I' 50135 0 | C' 03704 1 |
| 27,2440 | C' 56447 0 | I' 77605 1 | C' 16475 0 | I' 77614 1 | C' 04467 0 | C' 01257 0 | I' 77616 0 | I' 77776 1 |
| 27,2450 | 30154 1 | 74672 1 | 54154 0 | 06006 1 | I' 77605 1 | C' 16475 0 | I' 52015 1 | C' 16471 1 |
| 27,2460 | C' 56443 1 | 05532 0 | 06006 1 | I' 77745 1 | C' 01225 0 | C' 01152 0 | I' 77650 1 | C' 70523 1 |
| 27,2470 | C' 00045 0 | C' 01217 1 | C' 00017 1 | C' 40200 1 | C' 00045 0 | C' 01217 1 | 00006 1 | 04007 1 |
| 27,2500 | 54016 1 | 44714 0 | 54734 0 | 00006 1 | 22012 1 | 34704 0 | 70075 1 | 00006 1 |
| 27,2510 | 12520 0 | 30046 0 | 55703 0 | 34711 1 | 00006 1 | 02033 0 | 00006 1 | 12523 0 |
| 27,2520 | 34711 1 | 04574 0 | C' 17494 1 | 34711 1 | 04574 0 | C' 17467 1 | I' 43174 1 | C' 00000 1 |
| 27,2530 | C' 00707 1 | C' 56537 0 | I' 43414 1 | C' 04304 1 | C' 56535 1 | I' 43514 0 | C' 77775 1 | I' 43414 1 |
| 27,2540 | C' 04303 0 | C' 56542 1 | I' 43514 0 | C' 77775 1 | I' 66370 0 | C' 00044 1 | C' 00051 0 | C' 00006 1 |
| 27,2550 | I' 77775 1 | C' 15332 1 | C' 06445 1 | I' 76100 1 | C' 56552 0 | C' 00044 1 | C' 06533 1 | I' 67300 0 |
| 27,2560 | C' 56556 1 | C' 00001 0 | C' 02401 0 | C' 02411 1 | C' 02421 1 | I' 77735 0 | C' 00002 0 | C' 02511 0 |
| 27,2570 | C' 02521 0 | C' 02531 1 | I' 77616 0 | I' 70545 1 | C' 00043 0 | I' 41215 1 | C' 15330 0 | C' 00041 1 |
| 27,2600 | I' 55205 0 | C' 00021 1 | C' 00045 0 | I' 44246 1 | C' 15330 0 | C' 00017 1 | I' 57516 1 | I' 75415 0 |
| 27,2610 | C' 15322 0 | I' 43565 0 | C' 00045 0 | I' 77620 0 | C' 03373 0 | I' 45205 1 | C' 15002 1 | C' 03733 0 |
| 27,2620 | C' 37806 0 | C' 46225 0 | I' 77624 1 | C' 56626 0 | I' 77650 1 | C' 03373 0 | I' 50375 0 | C' 03542 1 |
| 27,2630 | C' 03474 0 | I' 65512 1 | I' 77616 0 | I' 71220 1 | C' 00024 1 | C' 03636 1 | I' 44342 1 | I' 65301 0 |
| 27,2640 | C' 00050 1 | I' 70525 1 | C' 03646 0 | I' 56221 0 | I' 41257 1 | C' 57577 0 | C' 00035 1 | I' 77657 0 |
| 27,2650 | C' 20172 1 | I' 50025 0 | C' 31663 0 | C' 56656 1 | I' 52166 1 | C' 56660 1 | I' 77745 1 | C' 31677 0 |
| 27,2660 | I' 77650 1 | C' 00024 1 | 00003 1 | 00006 1 | 22330 1 | 06006 1 | I' 53135 0 | C' 01502 1 |
| 27,2670 | C' 56727 0 | I' 77775 1 | C' 01503 0 | C' 25535 0 | C' 01511 0 | I' 77624 1 | C' 23361 1 | I' 51535 0 |
| 27,2700 | C' 01502 1 | I' 53025 0 | C' 16740 0 | C' 56710 1 | I' 43174 1 | C' 00000 1 | C' 00223 1 | C' 56713 1 |
| 27,2710 | I' 43174 1 | C' 00002 0 | C' 00063 1 | I' 50135 0 | C' 01502 1 | C' 56723 1 | I' 77624 1 | C' 26636 0 |
| 27,2720 | I' 52914 0 | C' 01671 0 | C' 56725 1 | I' 77624 1 | C' 26711 1 | I' 77614 1 | C' 02676 1 | I' 45131 0 |
| 27,2730 | C' 01502 1 | C' 00000 1 | C' 27404 1 | I' 77776 1 | 05301 0 | C' 04026 1 | 00330 1 | C' 00002 0 |
| 27,2740 | C' 00000 1 | I' 77420 1 | C' 03536 1 | 05301 0 | C' 04022 0 | 06006 1 | I' 77650 1 | C' 03536 1 |
| 27,2750 | C' 00037 0 | I' 53575 0 | C' 02327 0 | I' 77725 1 | C' 00045 0 | C' 00015 0 | I' 77701 1 | C' 00047 1 |
| 27,2760 | C' 24041 1 | C' 02335 0 | I' 77761 1 | C' 00037 0 | C' 02372 0 | I' 47361 0 | C' 00041 1 | I' 47572 1 |
| 27,2770 | C' 14035 1 | C' 15322 0 | I' 63271 0 | C' 00041 1 | C' 02372 0 | I' 57436 1 | C' 00025 0 | I' 43257 0 |



OCAL LISTING FOR PARAGRAPH J 156, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A'S DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED AIA (INTERPRETIVE OPERATOR WORDS) OR ACA (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 27,3000 | C' 20573 1 | I' 77628 0 | C' 77744 0 | I' 41457 1 | C' 20173 0 | I' 75446 0 | I' 77701 1 | C' 00050 1 |
| 27,3010 | C' 00031 0 | I' 75316 1 | I' 55254 1 | C' 57015 1 | C' 15322 0 | C' 00027 1 | I' 77616 0 | I' 41345 0 |
| 27,3020 | C' 00033 1 | C' 00035 1 | I' 57457 0 | C' 20571 0 | I' 51415 0 | C' 17357 0 | I' 43366 0 | C' 15322 0 |
| 27,3030 | I' 55206 0 | C' 00035 1 | I' 53657 0 | C' 20601 1 | C' 20572 0 | C' 14017 1 | I' 41005 1 | C' 00027 1 |
| 27,3040 | C' 57343 1 | I' 53654 0 | C' 57051 1 | C' 57603 0 | I' 40057 1 | C' 57576 1 | C' 57051 1 | I' 77644 1 |
| 27,3050 | C' 57053 0 | I' 77745 1 | C' 17363 1 | C' 00021 1 | I' 77616 0 | I' 77614 1 | C' 03436 0 | C' 57062 1 |
| 27,3060 | I' 77614 1 | C' 03676 0 | C' 00023 0 | I' 77657 0 | C' 20201 0 | C' 00021 1 | I' 44205 0 | C' 00033 1 |
| 27,3070 | C' 15322 0 | I' 41206 0 | C' 00021 1 | I' 53725 1 | C' 00035 1 | C' 20573 1 | I' 43276 0 | I' 77657 0 |
| 27,3100 | C' 20601 1 | I' 71214 0 | C' 03756 0 | C' 57105 1 | C' 15332 1 | I' 75440 0 | C' 57240 0 | I' 41076 0 |
| 27,3110 | C' 57343 1 | C' 24045 0 | C' 02372 0 | I' 52441 1 | C' 02327 0 | C' 00017 1 | I' 44240 1 | C' 57140 0 |
| 27,3120 | C' 00045 0 | C' 14043 0 | C' 00033 1 | I' 44205 0 | C' 00041 1 | I' 51406 1 | I' 40015 1 | C' 17351 0 |
| 27,3130 | C' 57151 0 | I' 65345 0 | C' 15332 1 | I' 57545 1 | C' 00033 1 | I' 71240 1 | C' 57245 0 | I' 77616 0 |
| 27,3140 | I' 77745 1 | I' 45345 1 | C' 00023 0 | C' 00015 0 | C' 14043 0 | C' 00045 0 | I' 52015 1 | C' 00017 1 |
| 27,3150 | C' 57125 0 | I' 65215 1 | C' 17353 1 | C' 00043 0 | I' 53605 1 | C' 00031 0 | C' 57201 0 | I' 77671 1 |
| 27,3160 | I' 40145 0 | C' 00043 0 | C' 57243 0 | I' 45471 1 | C' 77732 1 | I' 63406 0 | I' 41206 0 | C' 00035 1 |
| 27,3170 | I' 75261 0 | C' 20206 1 | C' 00045 0 | C' 14045 0 | I' 41206 0 | C' 00033 1 | I' 77657 0 | C' 20201 0 |
| 27,3200 | C' 00043 0 | I' 41234 1 | C' 57325 1 | I' 44302 0 | C' 00023 0 | I' 41215 1 | C' 00015 0 | I' 51042 0 |
| 27,3210 | C' 57231 0 | I' 75206 1 | C' 00017 1 | I' 71244 0 | C' 57235 1 | C' 00027 1 | I' 51076 1 | C' 57235 1 |
| 27,3220 | I' 77676 0 | I' 56205 0 | C' 17347 1 | C' 00031 0 | I' 53657 0 | C' 57602 1 | C' 57602 1 | I' 43257 0 |
| 27,3230 | C' 57576 1 | I' 40005 0 | C' 00037 0 | C' 57241 1 | I' 77616 0 | I' 77745 1 | I' 77650 1 | C' 57231 0 |
| 27,3240 | I' 77745 1 | I' 43545 1 | C' 17363 1 | I' 77712 0 | I' 41465 0 | I' 45345 1 | C' 00045 0 | C' 00017 1 |
| 27,3250 | C' 14013 0 | I' 77626 0 | C' 77732 1 | I' 53605 1 | C' 00027 1 | C' 57576 1 | I' 41206 0 | C' 00045 0 |
| 27,3260 | I' 41057 0 | C' 57576 1 | C' 45707 0 | C' 00043 0 | I' 41234 1 | C' 57325 1 | C' 00043 0 | I' 45242 1 |
| 27,3270 | C' 17355 1 | I' 41405 0 | I' 41345 0 | C' 00045 0 | C' 00015 0 | I' 43312 0 | C' 00017 1 | C' 14045 0 |
| 27,3300 | C' 00035 1 | I' 53605 1 | C' 00027 1 | C' 57575 1 | I' 53765 0 | C' 00045 0 | C' 57576 1 | C' 14045 0 |
| 27,3310 | C' 00027 1 | I' 41366 1 | C' 17347 1 | I' 77615 0 | I' 45257 0 | C' 57577 0 | C' 00013 0 | I' 53605 1 |
| 27,3320 | C' 00027 1 | C' 57601 1 | I' 52057 1 | C' 57602 1 | C' 57231 0 | C' 07171 1 | C' 00004 0 | C' 12525 0 |
| 27,3330 | C' 12525 0 | C' 71463 0 | C' 57703 1 | C' 04423 0 | C' 17645 0 | C' 74604 0 | C' 43667 1 | C' 01626 1 |
| 27,3340 | C' 37256 1 | C' 77404 1 | C' 52071 0 | 06030 1 | C' 24775 1 | C' 30424 0 | C' 06220 1 | C' 37553 0 |
| 27,3350 | C' 37777 1 | C' 37700 1 | C' 00000 1 | C' 00100 0 | C' 04000 0 | C' 00000 1 | C' 02000 0 | C' 00000 1 |
| 27,3360 | C' 00305 1 | C' 11205 0 | C' 37777 1 | C' 37777 1 | 05301 0 | C' 07026 1 | C' 30000 1 | C' 03675 0 |
| 27,3370 | C' 56100 0 | 34712 1 | 54332 1 | 05243 1 | C' 00033 1 | 50302 0 | 13377 0 | 13402 0 |



OCTAL LISTING FOR PARAGRAPH J 160, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, #A DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #A (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 30,2000 | 05447 0 | C' 00010 0 | 05435 0 | C' 00025 0 | 04555 0 | C' 17573 0 | 06008 1 | I' 77634 0 |
| 30,2010 | C' 45505 0 | C' 34041 0 | C' 27045 0 | I' 47375 0 | C' 00007 0 | C' 00001 0 | I' 50258 0 | C' 01744 1 |
| 30,2020 | I' 77646 0 | I' 85552 0 | C' 03628 0 | I' 77414 0 | C' 02878 1 | 32162 0 | 04555 0 | C' 20763 1 |
| 30,2030 | 04106 1 | 02036 0 | 02025 1 | 36214 0 | 05415 1 | 05112 0 | 42172 0 | 71751 1 |
| 30,2040 | 55751 1 | 06006 1 | I' 77614 1 | C' 01664 1 | I' 43014 0 | C' 00462 1 | C' 04343 1 | C' 60113 1 |
| 30,2050 | I' 77614 1 | C' 01483 1 | I' 77776 1 | 32163 1 | 04555 0 | C' 20763 1 | 04106 1 | 02064 1 |
| 30,2060 | 02053 0 | 34715 0 | 05415 1 | 05112 0 | 34715 0 | 54301 1 | 06006 1 | I' 77624 1 |
| 30,2070 | C' 60234 1 | I' 45335 0 | C' 02745 0 | C' 20166 1 | I' 45044 0 | C' 60101 1 | C' 76333 0 | I' 77650 1 |
| 30,2100 | C' 60120 1 | I' 77624 1 | C' 30206 0 | I' 77776 1 | 05261 1 | C' 00004 0 | C' 05022 1 | C' 13000 0 |
| 30,2110 | 06006 1 | I' 77650 1 | C' 60132 1 | I' 43014 0 | C' 01683 0 | C' 03087 0 | I' 77624 1 | C' 60217 0 |
| 30,2120 | I' 77776 1 | 05261 1 | C' 00004 0 | C' 05022 1 | C' 13000 0 | 34715 0 | 54301 1 | 06006 1 |
| 30,2130 | I' 77624 1 | C' 30082 0 | I' 77776 1 | 32164 0 | 04555 0 | C' 20763 1 | 04106 1 | 02144 1 |
| 30,2140 | 02133 1 | 34715 0 | 05415 1 | 05112 0 | 06006 1 | I' 77624 1 | C' 60234 1 | I' 77624 1 |
| 30,2150 | C' 76333 0 | I' 66744 0 | C' 01330 0 | C' 77724 0 | C' 36750 0 | C' 60255 0 | I' 77776 1 | 05301 0 |
| 30,2160 | C' 04022 0 | 02036 0 | C' 01455 1 | C' 01306 0 | C' 01307 1 | C' 00033 1 | C' 00000 1 | C' 01531 1 |
| 30,2170 | C' 00077 1 | C' 00700 0 | C' 07000 0 | I' 77634 0 | C' 45505 0 | C' 24007 0 | C' 02026 1 | C' 14001 0 |
| 30,2200 | C' 15330 0 | I' 77624 1 | C' 55341 1 | I' 77742 0 | C' 02152 0 | I' 77634 0 | C' 45505 0 | I' 77624 1 |
| 30,2210 | C' 26322 0 | I' 77650 1 | C' 03667 0 | I' 77624 1 | C' 60217 0 | I' 77650 1 | C' 03667 0 | I' 77420 1 |
| 30,2220 | C' 03670 0 | 33856 1 | 04555 0 | C' 20624 0 | 04106 1 | 02227 1 | 02221 1 | 06006 1 |
| 30,2230 | I' 77624 1 | C' 61345 1 | I' 77650 1 | C' 03670 0 | I' 77776 1 | 31751 0 | 72170 1 | 55744 0 |
| 30,2240 | 31751 0 | 72172 0 | 55745 1 | 05435 0 | C' 00141 0 | 31751 0 | 74675 0 | 00006 1 |
| 30,2250 | 12253 0 | 05447 0 | C' 00141 0 | 06006 1 | I' 77616 0 | I' 66220 1 | C' 03703 0 | C' 00051 0 |
| 30,2260 | C' 00006 1 | I' 66331 0 | C' 02747 1 | C' 00001 0 | C' 02751 0 | C' 03537 0 | I' 76144 1 | C' 01330 0 |
| 30,2270 | C' 00044 1 | I' 77773 1 | C' 77776 1 | C' 07604 1 | I' 60114 0 | C' 77771 0 | C' 60271 0 | I' 77414 0 |
| 30,2300 | C' 01464 0 | 04555 0 | C' 16063 0 | 05261 1 | C' 00004 0 | C' 05022 1 | C' 13000 0 | 06006 1 |
| 30,2310 | I' 43170 0 | C' 00000 1 | C' 04343 1 | C' 60316 0 | I' 77710 1 | C' 77775 1 | I' 40330 0 | C' 03673 0 |
| 30,2320 | C' 00001 0 | I' 77624 1 | C' 27371 1 | I' 77624 1 | C' 61326 1 | I' 43014 0 | C' 01751 0 | C' 60332 0 |
| 30,2330 | C' 01635 0 | C' 60357 0 | I' 77614 1 | C' 01876 1 | I' 66370 0 | C' 00154 1 | C' 00051 0 | C' 00006 1 |
| 30,2340 | I' 77214 0 | C' 02676 1 | C' 15332 1 | C' 06555 1 | I' 67300 0 | C' 60343 0 | C' 02005 0 | C' 02401 0 |
| 30,2350 | C' 02411 1 | C' 02421 1 | I' 77735 0 | C' 02006 0 | C' 02511 0 | C' 02521 0 | C' 02531 1 | I' 77614 1 |
| 30,2360 | C' 02666 0 | I' 77624 1 | C' 61322 0 | C' 34041 0 | C' 27113 1 | I' 77624 1 | C' 61273 0 | I' 66150 0 |
| 30,2370 | C' 02750 1 | C' 01242 1 | I' 77624 1 | C' 47110 1 | C' 01235 1 | I' 41535 1 | C' 02747 1 | I' 50535 1 |



TOTAL LISTING FOR PARAGRAPH J 161, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A'S DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED A's (INTERPRETIVE OPERATOR WORDS) OR #C's (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 30,2400 | C' 02746 0 | I' 50442 0 | I' 77625 0 | I' 43030 0 | C' 60720 1 | C' 02706 1 | C' 60726 1 | I' 77624 1 |
| 30,2410 | C' 58741 0 | I' 77614 1 | C' 01471 1 | I' 43014 0 | C' 02466 1 | C' 01062 1 | I' 43014 0 | C' 00462 1 |
| 30,2420 | C' 93307 0 | C' 61070 1 | I' 53575 0 | C' 01207 0 | C' 02152 0 | I' 43014 0 | C' 01663 0 | C' 04343 1 |
| 30,2430 | C' 60433 0 | I' 77614 1 | C' 01463 1 | I' 77624 1 | C' 26533 0 | I' 77624 1 | C' 61240 0 | I' 70414 1 |
| 30,2440 | C' 04343 1 | C' 60442 0 | C' 02635 0 | I' 72441 0 | C' 01235 1 | C' 24037 0 | C' 15332 1 | I' 41401 1 |
| 30,2450 | C' 00001 0 | I' 65206 0 | C' 15330 0 | I' 77702 1 | C' 00005 1 | C' 00011 1 | C' 24015 0 | C' 01235 1 |
| 30,2460 | C' 24023 0 | C' 02635 0 | I' 77624 1 | C' 61303 0 | I' 66370 0 | C' 00022 1 | C' 00051 0 | C' 00006 1 |
| 30,2470 | I' 70573 1 | C' 03524 1 | I' 77741 0 | C' 00037 0 | I' 45445 0 | C' 70253 1 | I' 76100 1 | C' 60470 1 |
| 30,2500 | C' 00044 1 | I' 64373 1 | C' 02445 0 | C' 03502 0 | I' 77732 1 | C' 06621 1 | I' 71300 1 | C' 60501 0 |
| 30,2510 | C' 00041 1 | I' 60414 0 | C' 04343 1 | C' 60514 1 | I' 57101 0 | C' 00050 1 | C' 00047 1 | I' 41316 0 |
| 30,2520 | C' 21650 1 | I' 77742 0 | C' 00041 1 | I' 77770 1 | C' 00022 1 | I' 64373 1 | C' 03524 1 | C' 03502 0 |
| 30,2530 | I' 53761 1 | C' 00041 1 | C' 67212 1 | C' 65301 0 | I' 77300 1 | C' 60525 0 | C' 01235 1 | C' 34023 1 |
| 30,2540 | C' 61303 0 | I' 50545 0 | C' 02241 1 | I' 63471 0 | C' 00037 0 | I' 77605 1 | C' 02010 1 | C' 00041 1 |
| 30,2550 | I' 77770 1 | C' 00022 1 | I' 74373 0 | C' 03524 1 | C' 00041 1 | I' 77653 1 | C' 01301 1 | C' 05301 0 |
| 30,2560 | I' 77775 1 | C' 15332 1 | C' 06643 0 | I' 40100 1 | C' 60552 0 | C' 60566 1 | I' 50145 1 | C' 01277 1 |
| 30,2570 | C' 60607 0 | I' 53166 0 | C' 60607 0 | C' 16625 1 | C' 01275 0 | I' 40071 0 | C' 02625 1 | C' 60601 0 |
| 30,2600 | C' 02623 1 | I' 56345 0 | C' 01273 0 | C' 02625 1 | I' 77600 1 | C' 60607 0 | C' 02621 0 | I' 63545 0 |
| 30,2610 | C' 02623 1 | I' 50021 1 | C' 01267 0 | C' 60627 1 | I' 53166 0 | C' 60627 1 | C' 16631 1 | C' 02821 0 |
| 30,2620 | I' 44205 0 | C' 02623 1 | C' 01265 1 | I' 40071 0 | C' 02631 1 | C' 60627 1 | C' 02627 0 | I' 63545 0 |
| 30,2630 | C' 02627 0 | I' 63525 0 | C' 02621 0 | I' 77615 0 | I' 50021 1 | C' 01257 0 | C' 60641 1 | I' 77766 0 |
| 30,2640 | C' 02635 0 | I' 74575 0 | C' 02621 0 | C' 26621 0 | C' 02627 0 | I' 77762 1 | C' 26627 0 | C' 02635 0 |
| 30,2650 | I' 77762 1 | C' 02635 0 | I' 77624 1 | C' 61322 0 | C' 03672 1 | I' 77776 1 | 05301 0 | C' 04022 0 |
| 30,2660 | 41746 1 | 61747 1 | 00006 1 | 63126 1 | 31746 0 | 64712 1 | 55300 1 | 31750 1 |
| 30,2670 | 64716 0 | 55301 0 | 05301 0 | C' 04022 0 | 31300 0 | 55746 1 | 31301 1 | 55750 0 |
| 30,2700 | 06006 1 | I' 77624 1 | C' 27371 1 | I' 77624 1 | C' 61326 1 | I' 43014 0 | C' 02706 1 | C' 60361 0 |
| 30,2710 | C' 01676 1 | I' 43014 0 | C' 01751 0 | C' 60361 0 | C' 01476 0 | I' 77614 1 | C' 01635 0 | C' 60361 0 |
| 30,2720 | I' 77624 1 | C' 61322 0 | C' 27670 0 | C' 01235 1 | C' 35215 1 | C' 60655 1 | I' 77775 1 | C' 01701 0 |
| 30,2730 | C' 14001 0 | C' 03672 1 | C' 00007 0 | I' 45135 1 | C' 03674 1 | C' 55366 1 | I' 45006 0 | C' 61322 0 |
| 30,2740 | C' 00007 0 | I' 45135 1 | C' 03674 1 | C' 55341 1 | C' 01701 0 | I' 40014 0 | C' 02464 0 | C' 60750 0 |
| 30,2750 | I' 77651 0 | C' 01207 0 | C' 03531 0 | I' 47256 0 | C' 01235 1 | I' 40056 0 | C' 60652 0 | C' 01245 0 |
| 30,2760 | I' 43014 0 | C' 02466 1 | C' 00467 1 | I' 43345 1 | C' 21650 1 | C' 21652 0 | C' 27526 0 | C' 03531 0 |
| 30,2770 | I' 60246 1 | C' 00047 1 | I' 41316 0 | C' 03526 0 | I' 56070 0 | C' 00046 0 | C' 03673 0 | I' 53670 0 |



OCTAL LISTING FOR PARAGRAPH j 182, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, a" a DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED aIa (INTERPRETIVE OPERATOR WORDS) OR aCa (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 30,3000 | C' 03873 0 | C' 20001 1 | I' 77751 1 | C' 00155 0 | C' 37526 1 | C' 47047 1 | I' 87575 1 | C' 03502 0 |
| 30,3010 | C' 37516 1 | C' 75250 1 | I' 77624 1 | C' 50741 0 | I' 43014 0 | C' 01342 0 | C' 01047 0 | C' 01262 0 |
| 30,3020 | I' 77624 1 | C' 56741 0 | I' 51575 1 | C' 01257 0 | I' 53750 0 | C' 03873 0 | C' 20601 1 | C' 27502 0 |
| 30,3030 | C' 01265 1 | I' 53640 0 | C' 20801 1 | C' 03504 0 | I' 77776 1 | C' 33655 1 | C' 04555 0 | C' 20763 1 |
| 30,3040 | 04106 1 | 03048 0 | 03230 0 | 34710 0 | 05415 1 | 08112 0 | 06006 1 | I' 77624 1 |
| 30,3050 | C' 75462 0 | I' 77624 1 | C' 61273 0 | I' 17414 0 | C' OR44 1 | C' 60052 0 | 05301 0 | C' 04022 0 |
| 30,3060 | 06006 1 | I' 17214 0 | C' 02664 1 | C' 01101 0 | I' 17051 0 | C' 01207 0 | C' 37531 1 | C' 00760 0 |
| 30,3070 | I' 86370 0 | C' 00000 1 | C' 00051 0 | C' 0000d 1 | I' 77775 1 | C' 15332 1 | C' 06643 0 | I' 87300 0 |
| 30,3100 | C' 61076 1 | C' 02007 1 | C' 02621 0 | C' 02631 1 | C' 02641 0 | I' 43014 0 | C' 01663 0 | C' 04343 1 |
| 30,3110 | C' 61113 0 | I' 77014 1 | C' 01483 1 | I' 77624 1 | C' 61322 0 | I' 77024 1 | C' 26373 1 | I' 43175 0 |
| 30,3120 | C' 02152 0 | C' 04343 1 | C' 01124 1 | I' 77752 1 | I' 77650 1 | C' 00744 0 | 06006 1 | I' 46135 1 |
| 30,3130 | C' 02746 0 | C' 61160 1 | I' 77776 1 | 05301 0 | C' 04022 0 | 06006 1 | I' 77745 1 | C' 03070 0 |
| 30,3140 | C' 34041 0 | C' 27022 1 | I' 77775 1 | C' 00011 1 | C' 25207 0 | C' 01215 0 | C' 25235 1 | C' 01701 0 |
| 30,3150 | I' 43046 1 | C' 04343 1 | C' 01154 0 | I' 77702 1 | C' 36241 0 | C' 61240 0 | I' 77650 1 | C' 01103 1 |
| 30,3160 | I' 77624 1 | C' 01322 0 | C' 03870 0 | I' 17214 0 | C' 01603 0 | C' 01701 0 | I' 43014 0 | C' 04343 1 |
| 30,3170 | C' 61173 0 | C' 01463 1 | I' 77742 0 | C' 16152 0 | C' 03670 0 | I' 77624 1 | C' 26322 0 | I' 77624 1 |
| 30,3200 | C' 61336 0 | I' 77776 1 | 33658 1 | 04555 0 | C' 20624 0 | 03233 0 | 03210 1 | 03224 0 |
| 30,3210 | 06006 1 | I' 70740 0 | C' 02750 1 | C' 00001 0 | C' 24007 0 | C' 01701 0 | C' 00001 0 | I' 45135 1 |
| 30,3220 | C' 15330 0 | C' 55366 1 | C' 02026 1 | I' 77770 1 | 06006 1 | I' 77624 1 | C' 61354 1 | I' 77776 1 |
| 30,3230 | 06006 1 | I' 77650 1 | C' 03703 0 | 06006 1 | I' 77624 1 | C' 01354 1 | I' 77776 1 | 04106 1 |
| 30,3240 | I' 77201 1 | C' 00001 0 | C' 01207 0 | I' 50256 0 | C' 01235 1 | I' 57552 1 | I' 77006 1 | I' 44316 0 |
| 30,3250 | C' 21654 0 | I' 43125 0 | C' 02241 1 | C' 04343 1 | C' 61256 1 | I' 77712 0 | I' 56362 0 | C' 00045 0 |
| 30,3260 | I' 45316 1 | I' 44366 1 | I' 77605 1 | C' 00045 0 | C' 00041 1 | I' 77761 1 | C' 01235 1 | I' 53352 0 |
| 30,3270 | C' 01207 0 | C' 01701 0 | I' 77616 0 | I' 77350 1 | C' 03673 0 | C' 01573 1 | I' 53257 1 | C' 20610 1 |
| 30,3300 | C' 01607 1 | C' 01207 0 | I' 77616 0 | C' 00031 0 | I' 77131 1 | C' 00052 0 | C' 00002 0 | C' 00006 1 |
| 30,3310 | I' 77770 1 | C' 00022 1 | I' 73775 0 | C' 00031 0 | C' 77746 1 | C' 07524 0 | I' 61110 0 | C' 77771 0 |
| 30,3320 | C' 61312 0 | I' 77616 0 | I' 70740 0 | C' 02750 1 | C' 00001 0 | I' 77616 0 | I' 43014 0 | C' 01476 0 |
| 30,3330 | C' 01475 0 | I' 43014 0 | C' 01474 1 | C' 01412 1 | I' 43414 1 | C' 01073 1 | I' 77745 1 | C' 01110 0 |
| 30,3340 | C' 16362 1 | C' 01106 1 | I' 77742 0 | C' 02360 0 | I' 71016 0 | I' 77745 1 | C' 02362 1 | C' 15110 0 |
| 30,3350 | C' 02360 0 | I' 77752 1 | C' 01106 1 | I' 77616 0 | I' 40220 0 | C' 01214 1 | C' 00001 0 | I' 41575 0 |
| 30,3360 | C' 15332 1 | I' 41400 0 | I' 77731 1 | C' 00017 1 | C' 00072 1 | I' 66150 0 | C' 00016 0 | C' 00012 1 |
| 30,3370 | I' 77624 1 | C' 61606 0 | I' 77750 0 | C' 00010 0 | C' 06641 1 | I' 66110 1 | C' 00002 0 | C' 00010 0 |



OPTAL LISTING FOR PARAGRAPH J 163, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, #A DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #I# (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|--------------|
| 30,3400 | I' 46135 1 | C' 00013 0 | C' 61417 1 | I' 77625 0 | C' 21646 0 | C' 00013 0 | I' 46025 1 | C' 21644 1 |
| 30,3410 | C' 61413 0 | I' 77650 1 | C' 61370 1 | I' 52131 0 | C' 00013 0 | C' 00004 0 | C' 61370 1 | I' 46135 1 |
| 30,3420 | C' 00017 1 | C' 61436 1 | I' 77625 0 | C' 21646 0 | C' 00017 1 | I' 46025 1 | C' 21644 1 | C' 61432 0 |
| 30,3430 | I' 77650 1 | C' 61365 0 | I' 52131 0 | C' 00017 1 | C' 00004 0 | C' 61365 0 | I' 77624 1 | C' 56741 0 |
| 30,3440 | I' 77331 0 | C' 00017 1 | C' 00072 1 | C' 15332 1 | C' 00011 1 | I' 66370 0 | C' 00154 1 | C' 00051 0 |
| 30,3450 | C' 00006 1 | C' 66555 1 | I' 77700 0 | C' 61451 0 | I' 66150 0 | C' 00016 0 | C' 00012 1 | I' 77624 1 |
| 30,3460 | C' 61606 0 | I' 43750 1 | C' 00010 0 | C' 02641 0 | I' 66110 1 | C' 00002 0 | C' 00010 0 | I' 54140 0 |
| 30,3470 | C' 00012 1 | C' 00014 1 | I' 71244 0 | C' 61477 1 | C' 15332 1 | I' 77650 1 | C' 61500 0 | I' 77766 0 |
| 30,3500 | C' 06401 1 | C' 14001 0 | C' 00017 1 | I' 77630 1 | C' 61572 0 | I' 46135 1 | C' 00013 0 | C' 61550 0 |
| 30,3510 | I' 77625 0 | C' 21646 0 | C' 00013 0 | I' 46025 1 | C' 21644 1 | C' 61520 1 | I' 77650 1 | C' 61543 1 |
| 30,3520 | I' 77731 1 | C' 00013 0 | C' 00004 0 | I' 77624 1 | C' 61606 0 | I' 43750 1 | C' 00010 0 | C' 02641 0 |
| 30,3530 | I' 62071 0 | C' 00001 0 | C' 00002 0 | I' 70130 1 | C' 00010 0 | C' 00012 1 | I' 40060 0 | C' 00014 1 |
| 30,3540 | C' 61543 1 | I' 77650 1 | C' 61545 1 | I' 77745 1 | C' 15332 1 | C' 06401 1 | I' 77650 1 | C' 61505 0 |
| 30,3550 | I' 62150 1 | C' 00014 1 | C' 00006 1 | I' 67330 0 | C' 00014 1 | C' 00017 1 | I' 77625 0 | C' 21646 0 |
| 30,3560 | C' 00017 1 | I' 46025 1 | C' 21644 1 | C' 61566 0 | I' 77650 1 | C' 61454 0 | I' 52131 0 | C' 00017 1 |
| 30,3570 | C' 00004 0 | C' 61454 0 | I' 77624 1 | C' 56741 0 | I' 66370 0 | C' 00066 1 | C' 00051 0 | C' 00006 1 |
| 30,3600 | I' 77775 1 | C' 15332 1 | C' 06643 0 | I' 52100 1 | C' 61602 1 | C' 01214 1 | I' 40131 0 | C' 00007 0 |
| 30,3610 | C' 00377 1 | C' 61612 0 | I' 71140 1 | C' 00012 1 | C' 00016 0 | I' 41545 0 | C' 15332 1 | I' 56743 1 |
| 30,3620 | C' 02401 0 | C' 75376 1 | I' 41415 1 | I' 62000 0 | C' 61640 1 | C' 77771 0 | I' 67314 0 | C' 77771 0 |
| 30,3630 | C' 00007 0 | I' 70430 1 | C' 61636 0 | C' 00007 0 | I' 77650 1 | C' 61617 0 | I' 77745 1 | I' 77616 0 |
| 30,3640 | I' 77614 1 | C' 01631 1 | C' 61636 0 | C' 00064 0 | C' 00000 1 | C' 00002 0 | C' 00000 1 | C' 10306 0 |
| 30,3650 | C' 36750 0 | C' 00253 0 | C' 31436 1 | C' 10000 0 | C' 00000 1 | C' 01461 0 | C' 01531 1 | C' 04000 0 |
| 30,3660 | C' 00000 1 | C' 00707 1 | C' 03434 1 | I' 45020 1 | C' 03730 0 | C' 27022 1 | I' 66134 1 | C' 03746 1 |
| 30,3670 | C' 03745 1 | I' 77775 1 | C' 00001 0 | C' 03632 0 | C' 27570 0 | C' 00007 0 | C' 03640 0 | C' 03576 0 |
| 30,3700 | I' 67201 0 | C' 00001 0 | C' 15332 1 | I' 43125 0 | C' 21660 1 | C' 03705 0 | C' 61711 1 | I' 77745 1 |
| 30,3710 | C' 21662 0 | I' 45006 0 | C' 22000 1 | I' 52001 1 | C' 00001 0 | C' 03730 0 | I' 45175 0 | C' 03632 0 |
| 30,3720 | C' 77256 0 | I' 70372 0 | C' 21761 1 | I' 52315 1 | C' 03612 1 | C' 03713 1 | I' 52341 0 | C' 21761 1 |
| 30,3730 | I' 72561 0 | C' 03703 0 | C' 24015 0 | C' 03721 0 | I' 41456 0 | I' 74241 0 | C' 00015 0 | C' 00001 0 |
| 30,3740 | I' 51352 1 | C' 00015 0 | C' 14015 0 | C' 03727 0 | I' 56261 1 | C' 21605 1 | C' 03076 0 | I' 63316 0 |
| 30,3750 | C' 00015 0 | I' 77636 1 | I' 75421 1 | I' 76561 1 | I' 53455 0 | C' 00015 0 | C' 37713 0 | C' 03657 0 |
| 30,3760 | C' 01440 0 | C' 00000 1 | I' 45020 1 | C' 02321 0 | C' 55341 1 | I' 70414 1 | C' 01743 0 | C' 61770 0 |
| 30,3770 | C' 16152 0 | C' 23534 1 | I' 77624 1 | C' 26322 0 | I' 77650 1 | C' 02321 0 | C' 03776 1 | CKSM 72005 1 |



TOTAL LISTING FOR PARAGRAPH J 164, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A'S DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #1A (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 31,2000 | I' 77776 1 | 30036 1 | 50120 1 | 54011 0 | 30035 1 | 50120 1 | 54013 1 | 30120 1 |
| 31,2010 | 66211 0 | 40000 0 | 50120 1 | 54046 1 | 06006 1 | I' 77624 1 | C' 46000 0 | C' 34015 1 |
| 31,2020 | C' 73232 0 | 05447 0 | C' 00010 0 | 05261 1 | C' 00004 0 | C' 00012 1 | 34760 1 | 55056 1 |
| 31,2030 | 06006 1 | I' 43131 0 | C' 00302 0 | C' 00001 0 | C' 00666 1 | I' 66214 0 | C' 00665 1 | C' 00305 1 |
| 31,2040 | C' 00000 1 | I' 43131 0 | C' 00303 1 | C' 00000 1 | C' 03267 1 | I' 77414 0 | C' 04664 1 | 06006 1 |
| 31,2050 | I' 45014 0 | C' 01702 0 | C' 62060 0 | C' 76360 0 | I' 77624 1 | C' 31322 0 | I' 77650 1 | C' 62236 1 |
| 31,2060 | I' 77414 0 | C' 04665 0 | 33050 1 | 04555 0 | C' 20624 0 | 04106 1 | 02070 1 | 02062 1 |
| 31,2070 | 31751 0 | 00006 1 | 12074 1 | 62075 1 | 31752 0 | 74703 0 | 00006 1 | 12104 1 |
| 31,2100 | 06006 1 | I' 52014 0 | C' 01463 1 | C' 62167 0 | 06006 1 | I' 77614 1 | C' 01663 0 | I' 41535 1 |
| 31,2110 | C' 00736 0 | I' 41335 1 | C' 23055 0 | I' 66150 0 | C' 00155 0 | C' 00302 0 | I' 77624 1 | C' 30000 1 |
| 31,2120 | C' 02617 0 | I' 77776 1 | 31751 0 | 73052 1 | 55753 0 | 31752 0 | 00006 1 | 12144 0 |
| 31,2130 | 74706 0 | 00006 1 | 12137 1 | 06006 1 | I' 52014 0 | C' 00064 0 | C' 62142 1 | 06006 1 |
| 31,2140 | I' 77614 1 | C' 00264 1 | I' 77776 1 | 02156 1 | 31753 1 | 00006 1 | 12150 0 | 02156 1 |
| 31,2150 | 33047 1 | 04555 0 | C' 20624 0 | 04106 1 | 02156 1 | 02150 1 | 06006 1 | I' 77414 0 |
| 31,2160 | C' 04705 1 | C' 62265 1 | 33053 1 | 04555 0 | C' 20751 0 | 04106 1 | 02173 0 | 02170 0 |
| 31,2170 | 06006 1 | I' 77650 1 | C' 62224 1 | 06006 1 | I' 77634 0 | C' 45505 0 | C' 35225 1 | C' 62272 1 |
| 31,2200 | I' 53521 1 | C' 01736 1 | C' 27357 0 | C' 23056 0 | C' 03351 0 | I' 77776 1 | 05447 0 | C' 00124 0 |
| 31,2210 | 33063 1 | 54374 0 | 05301 0 | C' 00012 1 | 04555 0 | C' 56000 1 | 05301 0 | C' 04022 0 |
| 31,2220 | 06006 1 | I' 77614 1 | C' 03307 0 | C' 62226 0 | I' 77624 1 | C' 76360 0 | I' 43014 0 | C' 04464 0 |
| 31,2230 | C' 03067 0 | I' 77624 1 | C' 30002 0 | I' 43014 0 | C' 04664 1 | C' 03267 1 | I' 77776 1 | 00004 0 |
| 31,2240 | 31330 0 | 74747 0 | 55242 0 | 00006 1 | 51242 1 | 30001 0 | 53225 1 | 51242 1 |
| 31,2250 | 30005 1 | 57754 0 | 00003 1 | 33051 0 | 04555 0 | C' 20624 0 | 04106 1 | 02261 0 |
| 31,2260 | 02253 1 | 06006 1 | I' 77414 0 | C' 04465 1 | 02070 1 | I' 45014 0 | C' 02676 1 | C' 62272 1 |
| 31,2270 | I' 77650 1 | C' 62364 1 | I' 67220 0 | C' 01150 1 | C' 02752 0 | I' 67230 1 | C' 62307 1 | C' 02754 0 |
| 31,2300 | I' 45030 0 | C' 62305 0 | C' 63064 0 | I' 77850 1 | C' 62307 1 | I' 77624 1 | C' 61345 1 | I' 71214 0 |
| 31,2310 | C' 01711 1 | C' 62315 1 | C' 03001 0 | C' 34001 1 | C' 56544 1 | I' 77624 1 | C' 56343 0 | I' 43014 0 |
| 31,2320 | C' 01751 0 | C' 62323 1 | C' 01476 0 | I' 45014 0 | C' 01471 1 | C' 27113 1 | I' 77776 1 | 05301 0 |
| 31,2330 | C' 04022 0 | 06006 1 | I' 77624 1 | C' 62767 0 | I' 77214 0 | C' 00345 0 | C' 62341 0 | C' 02272 1 |
| 31,2340 | C' 03627 1 | I' 46135 1 | C' 02752 0 | C' 62353 0 | I' 77614 1 | C' 00462 1 | I' 45145 0 | C' 01225 0 |
| 31,2350 | C' 26373 1 | I' 77650 1 | C' 62355 0 | I' 77624 1 | C' 62527 0 | C' 03665 1 | I' 40251 0 | C' 03627 1 |
| 31,2360 | C' 00001 0 | C' 03657 0 | I' 77850 1 | C' 01150 1 | I' 41456 0 | I' 77775 1 | C' 00043 0 | C' 24037 0 |
| 31,2370 | C' 03635 1 | I' 54361 1 | C' 23030 0 | C' 20620 1 | I' 77655 1 | I' 77656 1 | C' 27643 0 | C' 03635 1 |



ODAL LISTING FOR PARAGRAPH J 165, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A'S DENOTES UNUSED FIXED MEMOR

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED AIA (INTERPRETIVE OPERATOR WORDS) OR ACA (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 31,2400 | I' 52342 0 | C' 02141 1 | I' 54381 1 | C' 23030 0 | C' 20618 1 | I' 53455 0 | C' 02617 0 | C' 03651 0 |
| 31,2410 | I' 72441 0 | C' 03643 0 | I' 77206 0 | C' 03643 0 | I' 57561 1 | I' 53372 1 | C' 03651 0 | I' 77656 0 |
| 31,2420 | C' 27502 0 | C' 15332 1 | C' 03510 0 | C' 17516 0 | C' 00001 0 | I' 57526 1 | I' 71206 0 | C' 15332 1 |
| 31,2430 | I' 77776 1 | 33041 1 | 54001 1 | 31754 0 | 00006 1 | 20001 1 | 54154 0 | 06006 0 |
| 31,2440 | I' 67206 1 | C' 01343 1 | I' 77621 1 | I' 43242 1 | I' 41215 1 | C' 23036 0 | C' 00041 1 | I' 52405 0 |
| 31,2450 | C' 07107 0 | I' 62414 1 | C' 04343 1 | C' 62454 0 | C' 17524 1 | C' 00037 0 | I' 47005 1 | C' 23045 0 |
| 31,2460 | C' 45562 1 | I' 77771 0 | C' 23042 0 | C' 03526 0 | I' 45014 0 | C' 02666 0 | C' 75250 1 | I' 77624 1 |
| 31,2470 | C' 56741 0 | I' 51575 1 | C' 01265 1 | I' 60414 0 | C' 04343 1 | C' 62476 0 | C' 27504 0 | C' 01257 0 |
| 31,2500 | I' 77646 0 | I' 60414 0 | C' 04343 1 | C' 62504 1 | C' 03502 0 | I' 77776 1 | 33046 0 | 04555 0 |
| 31,2510 | C' 20763 1 | 02506 0 | 02521 0 | 02047 0 | 34710 0 | 05415 1 | 05301 0 | C' 00012 1 |
| 31,2520 | I' 65112 0 | 06006 1 | I' 45014 0 | C' 00467 1 | C' 75462 0 | I' 77776 1 | 04106 1 | I' 40220 0 |
| 31,2530 | C' 03672 1 | C' 00001 0 | I' 65345 0 | C' 01714 1 | C' 01716 0 | I' 63325 0 | C' 15340 1 | C' 02617 0 |
| 31,2540 | I' 53435 0 | C' 03627 1 | C' 27621 1 | I' 53435 0 | C' 03621 1 | C' 27605 1 | C' 03621 1 | I' 53435 0 |
| 31,2550 | C' 03605 1 | C' 03613 0 | I' 50214 0 | C' 01703 1 | C' 62752 0 | C' 00001 0 | C' 36156 0 | C' 26437 0 |
| 31,2560 | I' 65215 1 | C' 01355 0 | C' 23032 1 | I' 41415 1 | C' 01355 0 | I' 64375 1 | C' 03627 1 | C' 03605 1 |
| 31,2570 | I' 63372 1 | C' 02617 0 | I' 76521 0 | C' 03605 1 | I' 77725 1 | C' 00003 1 | C' 14043 0 | C' 00005 1 |
| 31,2600 | I' 77624 1 | C' 62756 1 | I' 41257 1 | C' 20611 0 | C' 00155 0 | C' 14037 0 | C' 00001 0 | C' 14043 0 |
| 31,2610 | C' 00007 0 | I' 77624 1 | C' 62756 1 | I' 41257 1 | C' 20611 0 | C' 00155 0 | I' 41415 1 | C' 00037 0 |
| 31,2620 | I' 75425 0 | C' 23040 1 | I' 77725 1 | C' 00021 1 | C' 14043 0 | C' 00005 1 | I' 77624 1 | C' 62756 1 |
| 31,2630 | I' 65257 1 | C' 20622 0 | C' 00007 0 | I' 77624 1 | C' 62756 1 | I' 65257 1 | C' 20622 0 | C' 00021 1 |
| 31,2640 | C' 14043 0 | C' 00023 0 | I' 77624 1 | C' 62756 1 | I' 77657 0 | C' 20611 0 | C' 14035 1 | C' 00001 0 |
| 31,2650 | C' 14043 0 | C' 00003 1 | I' 77624 1 | C' 62756 1 | I' 41257 1 | C' 20601 1 | C' 00035 1 | I' 72405 0 |
| 31,2660 | C' 00007 0 | I' 77725 1 | C' 00003 1 | C' 14043 0 | C' 00001 0 | I' 77624 1 | C' 62756 1 | I' 41257 1 |
| 31,2670 | C' 20601 1 | C' 00035 1 | I' 72405 0 | C' 00005 1 | I' 43325 1 | C' 00025 0 | C' 00031 0 | I' 45325 1 |
| 31,2700 | C' 00027 1 | C' 00033 1 | I' 40206 1 | C' 00021 1 | I' 45345 1 | C' 00025 0 | C' 00031 0 | I' 43325 1 |
| 31,2710 | C' 00027 1 | C' 00033 1 | I' 41525 0 | C' 15332 1 | C' 24041 1 | C' 00035 1 | I' 53451 1 | C' 00005 1 |
| 31,2720 | I' 63241 0 | C' 00013 0 | C' 00021 1 | I' 53451 1 | C' 00005 1 | I' 41441 0 | C' 00013 0 | I' 50021 1 |
| 31,2730 | C' 00027 1 | C' 62746 0 | I' 77614 1 | C' 00304 0 | C' 62744 1 | I' 52175 0 | C' 00035 1 | C' 62746 0 |
| 31,2740 | I' 52014 0 | C' 00304 0 | C' 62735 1 | C' 62744 1 | I' 77775 1 | C' 00021 1 | I' 76505 0 | C' 03605 1 |
| 31,2750 | I' 77650 1 | C' 03672 1 | I' 41545 0 | C' 23034 1 | I' 52006 0 | C' 62565 0 | I' 70501 1 | C' 00047 1 |
| 31,2760 | C' 14045 0 | C' 00043 0 | I' 55301 0 | C' 00051 0 | C' 00045 0 | I' 43460 1 | C' 00050 1 | I' 77014 1 |
| 31,2770 | C' 04343 1 | C' 63001 0 | C' 77775 1 | I' 77614 1 | C' 01743 0 | C' 63005 1 | I' 52014 0 | C' 00265 0 |



TOTAL LISTING FOR PARAGRAPH / 166, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, S'S DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED SIA (INTERPRETIVE OPERATOR WORDS) OR SCs (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 31,3000 | C' 63007 0 | I' 43174 1 | C' 00000 1 | C' 01743 0 | C' 62776 0 | I' 77614 1 | C' 00065 1 | I' 44575 0 |
| 31,3010 | C' 01573 1 | I' 53257 1 | C' 57176 0 | C' 01807 1 | I' 77657 0 | C' 57176 0 | C' 27627 1 | C' 01601 1 |
| 31,3020 | I' 53702 1 | C' 57176 0 | I' 53655 1 | C' 01615 1 | C' 57176 0 | C' 03635 1 | I' 77616 0 | C' 26305 0 |
| 31,3030 | C' 05432 1 | C' 00302 0 | C' 24533 1 | C' 00065 1 | C' 01265 1 | C' 01604 1 | C' 00000 1 | C' 00000 1 |
| 31,3040 | C' 02000 0 | C' 00000 1 | C' 01505 0 | C' 14100 0 | C' 00012 1 | C' 27462 1 | C' 01461 0 | C' 01531 1 |
| 31,3050 | C' 01306 0 | C' 01307 1 | C' 00077 1 | C' 00202 1 | C' 00006 1 | C' 10461 0 | C' 21675 0 | C' 00000 1 |
| 31,3060 | C' 00000 1 | C' 15375 1 | C' 02004 1 | C' 62217 1 | I' 77735 0 | C' 02754 0 | I' 45230 1 | C' 63101 1 |
| 31,3070 | C' 21646 0 | I' 70152 0 | C' 00154 1 | I' 64743 0 | C' 23705 1 | C' 23623 1 | I' 55523 0 | C' 23541 0 |
| 31,3100 | C' 01104 0 | I' 77616 0 | I' 71220 1 | C' 03657 0 | C' 03413 1 | C' 34041 0 | C' 27022 1 | I' 67175 0 |
| 31,3110 | C' 00007 0 | C' 03746 1 | C' 27640 0 | C' 00001 0 | C' 03632 0 | C' 03540 0 | I' 53435 0 | C' 03640 0 |
| 31,3120 | C' 36817 1 | C' 72667 0 | I' 61375 1 | C' 03405 0 | C' 00001 0 | I' 66172 0 | C' 03745 1 | C' 03646 0 |
| 31,3130 | I' 77646 0 | C' 27654 0 | C' 03632 0 | I' 53315 0 | C' 03646 0 | C' 03640 0 | I' 77624 1 | C' 45312 0 |
| 31,3140 | I' 77624 1 | C' 45422 1 | I' 77624 1 | C' 46754 0 | C' 16366 0 | C' 00005 1 | I' 77624 1 | C' 45422 1 |
| 31,3150 | I' 77624 1 | C' 46754 0 | C' 36364 0 | C' 03657 0 | I' 71220 1 | C' 03657 0 | C' 03413 1 | C' 34041 0 |
| 31,3160 | C' 61663 0 | I' 63375 0 | C' 03632 0 | C' 03612 1 | I' 77624 1 | C' 45312 0 | I' 77624 1 | C' 45422 1 |
| 31,3170 | I' 77624 1 | C' 46754 0 | C' 16366 0 | C' 00005 1 | I' 77624 1 | C' 45422 1 | I' 77624 1 | C' 46754 0 |
| 31,3200 | C' 26364 1 | C' 03646 0 | C' 00001 0 | I' 45014 0 | C' 01072 0 | C' 10653 0 | I' 77646 0 | C' 17654 0 |
| 31,3210 | C' 03423 1 | I' 77615 0 | C' 03413 1 | C' 37656 0 | C' 03657 0 | 06006 1 | I' 77634 0 | C' 45505 0 |
| 31,3220 | C' 01046 1 | I' 77776 1 | 33535 1 | 04555 0 | C' 20465 1 | 05423 1 | 03230 0 | 03222 0 |
| 31,3230 | 06006 1 | I' 43175 0 | C' 02026 1 | C' 00462 1 | C' 14001 0 | C' 23534 1 | C' 14007 0 | C' 23534 1 |
| 31,3240 | I' 77614 1 | C' 01463 1 | I' 77624 1 | C' 61762 0 | I' 77745 1 | C' 01106 1 | C' 16353 0 | C' 01046 1 |
| 31,3250 | C' 34041 0 | C' 27022 1 | I' 77775 1 | C' 00017 1 | C' 02337 1 | C' 26152 0 | C' 00025 0 | C' 16345 1 |
| 31,3260 | C' 00015 0 | C' 36323 0 | C' 26322 0 | I' 76145 0 | C' 01106 1 | C' 02352 1 | C' 36335 1 | C' 63414 0 |
| 31,3270 | C' 01046 1 | I' 77776 1 | 33536 1 | 04555 0 | C' 20465 1 | 05423 1 | 03300 1 | 03272 0 |
| 31,3300 | 06006 1 | I' 75170 0 | C' 00005 1 | C' 00002 0 | I' 43134 0 | C' 02324 0 | C' 00462 1 | I' 66730 0 |
| 31,3310 | C' 02325 1 | C' 23534 1 | C' 16327 0 | C' 15340 1 | C' 02330 0 | I' 54170 0 | C' 63620 0 | C' 02324 0 |
| 31,3320 | I' 77624 1 | C' 63414 0 | C' 02321 0 | I' 45014 0 | C' 01463 1 | C' 26322 0 | I' 77754 1 | C' 02324 0 |
| 31,3330 | I' 44343 0 | C' 54240 0 | C' 01104 0 | I' 41446 1 | I' 51025 1 | C' 02330 0 | C' 63345 0 | I' 45545 1 |
| 31,3340 | C' 61447 1 | C' 02321 0 | C' 01046 1 | I' 77734 1 | C' 02333 0 | I' 67114 1 | C' 77775 1 | C' 02324 0 |
| 31,3350 | I' 45335 0 | C' 00050 1 | C' 02327 0 | I' 52030 0 | C' 63356 1 | C' 63315 0 | I' 70535 0 | C' 02334 1 |
| 31,3360 | I' 63144 0 | C' 00154 1 | C' 00001 0 | I' 77534 0 | C' 02751 0 | 33537 0 | 04555 0 | C' 20504 1 |
| 31,3370 | 05423 1 | 03376 0 | 03404 1 | 34715 0 | 05415 1 | 05112 0 | 33535 1 | 04555 0 |

OBJECT LISTING FOR PARAGRAPH J 187, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED AIA (INTERPRETIVE OPERATOR WORDS) OR AOA (CONSTANTS)

| | | | | | | | | |
|---------|-------------|------------|------------|------------|------------|------------|------------|------------|
| 31,3400 | C' 20485 1 | 05423 1 | 03404 1 | 03376 0 | 06006 1 | I' 66350 1 | C' 02325 1 | C' 00051 0 |
| 31,3410 | C' 00001 0 | I' 77500 1 | C' 63307 0 | 05423 1 | I' 66020 0 | C' 02321 0 | C' 02320 1 | I' 77601 0 |
| 31,3420 | C' 00001 0 | I' 65375 0 | C' 15324 0 | C' 02323 1 | I' 45125 0 | C' 15340 1 | C' 55341 1 | I' 53515 0 |
| 31,3430 | C' 02337 1 | I' 47206 0 | C' 00001 0 | I' 53572 1 | I' 47206 0 | C' 00001 0 | I' 53572 1 | I' 47315 0 |
| 31,3440 | C' 02337 1 | C' 02345 1 | I' 53572 1 | I' 70125 0 | C' 02335 0 | C' 02320 1 | I' 41223 1 | C' 00001 0 |
| 31,3450 | C' 23534 1 | I' 73406 1 | I' 76561 1 | C' 00023 0 | I' 71525 0 | I' 76561 1 | C' 00015 0 | I' 47255 0 |
| 31,3460 | I' 53572 1 | C' 02152 0 | I' 72441 0 | C' 00007 0 | C' 02734 0 | I' 73526 1 | C' 26732 0 | C' 00007 0 |
| 31,3470 | I' 56235 0 | C' 02152 0 | C' 00031 0 | I' 71244 0 | C' 63500 1 | C' 02732 0 | I' 77676 0 | C' 02732 0 |
| 31,3500 | I' 43175 0 | C' 02337 1 | C' 03466 0 | C' 26657 1 | C' 02345 1 | C' 02746 0 | I' 45160 1 | C' 00012 1 |
| 31,3510 | C' 24737 1 | I' 43014 0 | C' 04313 1 | C' 63523 0 | C' 04310 1 | C' 63523 0 | I' 43345 1 | C' 02323 1 |
| 31,3520 | C' 00037 0 | I' 77650 1 | C' 02321 0 | I' 52145 0 | C' 15332 1 | C' 02321 0 | C' 77763 0 | C' 77751 1 |
| 31,3530 | C' 77737 1 | C' 77725 1 | C' 77713 1 | C' 37716 0 | C' 33106 0 | C' 01442 1 | C' 01437 0 | C' 01306 0 |
| 31,3540 | C' 77406 0 | C' 56241 0 | C' 00043 0 | C' 24640 0 | C' 00046 0 | C' 25716 0 | C' 77741 0 | C' 85080 1 |
| 31,3550 | C' 00055 1 | C' 20266 1 | C' 77720 1 | C' 46646 1 | C' 77646 0 | C' 57652 1 | C' 00155 0 | C' 07202 0 |
| 31,3560 | C' 00466 0 | C' 07373 1 | C' 00050 1 | C' 36561 0 | C' 00070 0 | C' 04130 1 | C' 77662 0 | C' 64143 0 |
| 31,3570 | C' 77747 0 | C' 67215 0 | C' 00062 0 | C' 32207 0 | C' 00070 0 | C' 34343 1 | C' 77463 0 | C' 46314 0 |
| 31,3600 | C' 00004 0 | C' 21505 1 | C' 00271 0 | C' 32622 0 | C' 00101 1 | C' 07343 1 | C' 77574 1 | C' 70656 0 |
| 31,3610 | C' 00065 1 | C' 03052 0 | C' 77642 1 | C' 66360 1 | C' 00045 0 | C' 05267 1 | C' 77577 1 | C' 71734 1 |
| 31,3620 | C' 00130 0 | C' 27711 0 | C' 05120 1 | C' 14712 0 | C' 05076 0 | C' 06264 1 | C' 04453 1 | C' 23531 1 |
| 31,3630 | C' 03554 0 | C' 33074 1 | C' 03326 0 | C' 25112 1 | C' 03263 0 | C' 00252 1 | C' 03014 1 | C' 34505 0 |
| 31,3640 | C' 03007 0 | C' 22564 0 | C' 02740 0 | C' 04432 0 | C' 02531 1 | C' 04017 0 | C' 02066 0 | C' 23501 1 |
| 31,3650 | C' 01502 1 | C' 13664 1 | C' 01272 1 | C' 23036 0 | C' 00570 0 | C' 37365 0 | C' 00252 1 | C' 25253 1 |
| 31,3660 | C' 00000 1 | C' 30213 1 | C' 77703 0 | C' 52142 1 | C' 77254 1 | C' 76114 1 | C' 77173 1 | C' 64334 1 |
| 31,3670 | C' 76265 1 | C' 51114 1 | C' 76644 0 | C' 77223 1 | C' 75215 0 | C' 72762 1 | C' 74613 0 | C' 76225 0 |
| 31,3700 | C' 74571 1 | C' 67600 0 | C' 74174 0 | C' 54550 0 | C' 77777 0 | C' 75752 0 | C' 77777 0 | C' 75752 0 |
| 31,3710 | C' 77777 0 | C' 76200 1 | C' 77777 0 | C' 76736 1 | C' 77777 0 | C' 77051 0 | C' 77777 0 | C' 77556 1 |
| 31,3720 | C' 77777 0 | C' 77556 1 | C' 77777 0 | C' 76370 1 | C' 77777 0 | C' 77102 1 | C' 77777 0 | C' 76426 0 |
| 31,3730 | C' 77777 0 | C' 74660 1 | C' 00000 1 | C' 04773 0 | C' 00000 1 | C' 06577 1 | C' 00000 1 | C' 04773 0 |
| 31,3740 | C' 00000 1 | C' 02741 1 | C' 00000 1 | C' 03643 0 | C' 77777 0 | C' 77053 1 | C' 00000 1 | C' 02234 0 |
| 31,3750 | C' 00000 1 | C' 02347 0 | C' 00000 1 | C' 00151 1 | C' 00000 1 | C' 00740 1 | C' 00000 1 | C' 01217 1 |
| 31,3760 | C' 00000 1 | C' 01301 1 | C' 77777 0 | C' 75337 1 | C' 77777 0 | C' 75470 0 | C' 03766 0 | C' 03767 1 |
| 31,3770 | CKM 40224 1 | | | | | | | |



OCAL LISTING FOR PARAGRAPH J 170, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED A" (INTERPRETIVE OPERATOR WORDS) OR #C" (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 32,2000 | I' 85345 0 | C' 27112 0 | C' 02403 1 | I' 87546 1 | I' 73525 1 | C' 02403 1 | I' 74286 0 | C' 26450 1 |
| 32,2010 | C' 02405 1 | I' 77634 0 | C' 45505 0 | C' 26443 0 | C' 27112 0 | C' 02850 0 | I' 77618 0 | C' 00011 1 |
| 32,2020 | I' 45244 1 | C' 64067 1 | C' 16326 1 | I' 45000 0 | C' 64067 1 | C' 55050 1 | I' 45006 0 | C' 56573 0 |
| 32,2030 | I' 77624 1 | C' 64075 1 | I' 85525 0 | C' 00017 1 | I' 77615 0 | C' 00005 1 | C' 26350 0 | C' 03401 1 |
| 32,2040 | C' 15104 0 | C' 15332 1 | C' 15110 0 | C' 01205 1 | I' 71214 0 | C' 03711 0 | C' 64050 0 | C' 02325 1 |
| 32,2050 | I' 43225 0 | C' 00011 1 | I' 45014 0 | C' 00662 0 | C' 26373 1 | I' 63256 0 | C' 02327 0 | I' 50256 0 |
| 32,2060 | I' 65552 0 | I' 77621 1 | C' 02350 0 | C' 36356 1 | C' 27404 1 | I' 77624 1 | C' 46653 0 | I' 65345 0 |
| 32,2070 | C' 15330 0 | C' 15332 1 | I' 77606 1 | C' 34011 0 | C' 64036 0 | I' 77775 1 | C' 24251 1 | C' 14045 0 |
| 32,2100 | C' 00001 0 | I' 50025 0 | C' 24243 1 | C' 64130 1 | I' 65060 1 | C' 00050 1 | C' 00046 0 | I' 45324 0 |
| 32,2110 | C' 00050 1 | C' 24231 1 | I' 65040 0 | C' 64130 1 | C' 00050 1 | I' 50025 0 | C' 24241 0 | C' 64130 1 |
| 32,2120 | I' 65124 0 | C' 00050 1 | C' 00046 0 | I' 50025 0 | C' 24225 1 | C' 64130 1 | I' 77730 0 | C' 00050 1 |
| 32,2130 | I' 52110 0 | C' 00001 0 | C' 64135 1 | I' 77730 0 | C' 00050 1 | I' 44745 1 | C' 00001 0 | C' 24240 1 |
| 32,2140 | I' 42603 1 | C' 24224 0 | C' 24210 1 | I' 60125 1 | C' 00003 1 | C' 64133 1 | I' 55225 1 | I' 50000 1 |
| 32,2150 | C' 64167 0 | C' 64167 0 | I' 45325 1 | C' 00001 0 | C' 24251 1 | I' 71244 0 | C' 64164 0 | C' 24245 1 |
| 32,2160 | I' 77671 1 | C' 00001 0 | I' 43405 1 | C' 00005 1 | I' 52145 0 | C' 24247 0 | C' 64162 0 | I' 52145 0 |
| 32,2170 | C' 24173 1 | C' 64152 0 | C' 02755 1 | C' 01307 1 | C' 00013 0 | C' 22652 0 | C' 00005 1 | C' 01642 0 |
| 32,2200 | C' 00005 1 | C' 01642 0 | C' 77556 1 | C' 53522 1 | C' 00055 1 | C' 20266 1 | C' 00155 0 | C' 07202 0 |
| 32,2210 | C' 00000 1 | C' 00000 1 | C' 77730 0 | C' 71525 0 | C' 00000 1 | C' 00000 1 | C' 04445 0 | C' 10102 0 |
| 32,2220 | C' 03726 1 | C' 31201 0 | C' 01040 1 | C' 26313 1 | C' 00234 1 | C' 01660 0 | C' 25254 0 | C' 01014 0 |
| 32,2230 | C' 02222 1 | C' 15646 1 | C' 22223 1 | C' 16457 0 | C' 25254 0 | C' 01014 0 | C' 30304 0 | C' 23351 1 |
| 32,2240 | C' 03030 1 | C' 22335 1 | C' 20000 0 | C' 00000 1 | C' 00033 1 | C' 05763 0 | C' 00053 1 | C' 36200 0 |
| 32,2250 | C' 23637 1 | C' 27636 1 | C' 00012 1 | C' 00010 0 | C' 00006 1 | I' 77420 1 | C' 03762 1 | 30154 1 |
| 32,2260 | 05651 0 | 32271 1 | 04555 0 | C' 20624 0 | 14106 0 | 12261 1 | 06006 1 | I' 77650 1 |
| 32,2270 | C' 03762 1 | C' 01211 1 | I' 43020 1 | C' 03733 0 | C' 03666 1 | I' 67164 0 | C' 20000 0 | C' 02756 1 |
| 32,2300 | I' 45140 0 | C' 03734 1 | C' 25552 1 | C' 27710 1 | I' 77626 0 | C' 60121 0 | C' 00037 0 | C' 37724 1 |
| 32,2310 | C' 03733 0 | I' 77220 1 | C' 03762 1 | C' 03710 1 | I' 65256 0 | C' 00045 0 | C' 17767 1 | C' 03736 0 |
| 32,2320 | I' 77625 0 | C' 03413 1 | C' 26641 0 | C' 03656 1 | I' 50256 0 | I' 77752 1 | I' 44326 0 | C' 31655 0 |
| 32,2330 | C' 27771 0 | C' 03700 0 | I' 41451 1 | C' 03672 1 | I' 67441 1 | C' 03740 1 | I' 41515 0 | I' 63345 0 |
| 32,2340 | C' 31677 0 | I' 55441 0 | C' 03746 1 | I' 77772 0 | C' 27405 0 | C' 03656 1 | C' 02657 1 | I' 45246 0 |
| 32,2350 | C' 31723 0 | C' 26760 1 | C' 03710 1 | C' 36746 1 | C' 64272 1 | I' 53575 0 | C' 03656 1 | I' 53515 0 |
| 32,2360 | C' 03710 1 | I' 72441 0 | I' 65336 1 | C' 00045 0 | I' 51525 1 | I' 45006 0 | C' 64075 1 | I' 43215 0 |
| 32,2370 | C' 03724 0 | C' 03736 0 | C' 14003 1 | C' 00005 1 | I' 77756 0 | C' 17403 0 | I' 77746 1 | C' 03401 1 |

SYMBOL LISTING FOR PARAGRAPH J 171, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, 'A' DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #I# (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 32,2400 | I' 53575 0 | C' 03656 1 | I' 41406 0 | I' 53515 0 | C' 03710 1 | I' 47315 0 | I' 53435 0 | I' 53361 0 |
| 32,2410 | C' 03403 0 | I' 53361 0 | C' 03401 1 | I' 43014 0 | C' 00662 0 | C' 01063 0 | C' 16152 0 | I' 77624 1 |
| 32,2420 | C' 26322 0 | I' 77745 1 | C' 01104 0 | C' 17401 1 | C' 01106 1 | C' 37403 1 | C' 03762 1 | I' 71220 1 |
| 32,2430 | C' 03762 1 | C' 03413 1 | C' 34041 0 | C' 27022 1 | I' 67175 0 | C' 00001 0 | C' 03755 0 | C' 27640 0 |
| 32,2440 | C' 00007 0 | C' 17672 1 | C' 00015 0 | C' 03718 1 | I' 53135 0 | C' 03756 0 | C' 64452 0 | I' 52135 1 |
| 32,2450 | C' 31736 1 | C' 74772 0 | I' 53575 0 | C' 03640 0 | C' 17740 1 | C' 00045 0 | C' 27646 0 | C' 03672 1 |
| 32,2460 | I' 77656 1 | C' 03746 1 | I' 72441 0 | C' 03740 1 | C' 03757 1 | I' 45246 0 | C' 31752 0 | I' 71240 1 |
| 32,2470 | C' 64477 1 | C' 31655 0 | I' 41525 0 | C' 31677 0 | I' 41466 0 | I' 77650 1 | C' 64503 0 | I' 47375 0 |
| 32,2500 | C' 03740 1 | C' 03746 1 | I' 77606 1 | I' 41545 0 | I' 77244 0 | C' 64507 1 | I' 41476 1 | I' 77775 1 |
| 32,2510 | I' 53435 0 | C' 03740 1 | C' 03746 1 | I' 77650 1 | C' 03762 1 | I' 71220 1 | C' 03762 1 | C' 31705 1 |
| 32,2520 | C' 17730 0 | C' 03636 1 | C' 03664 0 | I' 77745 1 | C' 31715 0 | C' 17650 1 | C' 31703 1 | C' 37732 0 |
| 32,2530 | C' 65103 0 | I' 77624 1 | C' 11527 1 | I' 77745 1 | C' 02742 1 | C' 14033 1 | C' 02744 1 | C' 14035 1 |
| 32,2540 | C' 00041 1 | C' 14031 0 | C' 03775 1 | I' 77661 0 | C' 20206 1 | C' 03724 0 | I' 43276 0 | C' 03726 1 |
| 32,2550 | I' 45246 0 | C' 31760 1 | I' 50000 1 | C' 64555 0 | C' 64736 1 | I' 50145 1 | C' 03732 1 | C' 64563 0 |
| 32,2560 | I' 52135 1 | C' 31735 1 | C' 65053 1 | I' 53145 1 | C' 03730 0 | C' 64616 1 | I' 42545 0 | C' 00035 1 |
| 32,2570 | I' 52525 1 | C' 00033 1 | I' 41205 0 | C' 03754 1 | I' 57512 0 | I' 50015 0 | C' 31655 0 | C' 64602 1 |
| 32,2600 | I' 52166 1 | C' 64604 1 | I' 77745 1 | C' 31677 0 | I' 43205 1 | C' 03761 1 | C' 31657 1 | I' 60325 0 |
| 32,2610 | C' 00035 1 | C' 00047 1 | I' 77665 1 | I' 52057 1 | C' 20175 0 | C' 64624 0 | I' 60345 0 | C' 00031 0 |
| 32,2620 | C' 00047 1 | I' 53665 1 | C' 03664 0 | C' 20200 1 | I' 45206 1 | C' 31653 0 | I' 77676 0 | C' 03765 0 |
| 32,2630 | I' 71240 1 | C' 64642 0 | C' 03724 0 | I' 71240 1 | C' 64640 1 | C' 03765 0 | I' 77676 0 | C' 03765 0 |
| 32,2640 | I' 77745 1 | C' 03765 0 | I' 45246 0 | C' 31764 0 | I' 71240 1 | C' 64736 1 | I' 72405 0 | C' 00031 0 |
| 32,2650 | I' 77606 1 | I' 43345 1 | C' 03732 1 | C' 31675 1 | C' 03732 1 | I' 43175 0 | C' 03656 1 | C' 03466 0 |
| 32,2660 | C' 26657 1 | C' 03710 1 | I' 77765 0 | C' 03765 0 | C' 16746 0 | C' 31653 0 | I' 57565 0 | C' 03765 0 |
| 32,2670 | I' 71354 0 | C' 00154 1 | I' 67140 0 | C' 03734 1 | C' 02756 1 | C' 36760 0 | C' 25552 1 | I' 75345 1 |
| 32,2700 | C' 00037 0 | C' 03765 0 | I' 60325 0 | C' 03650 1 | C' 00047 1 | I' 53665 1 | C' 00001 0 | C' 20176 0 |
| 32,2710 | I' 50006 1 | C' 64716 0 | I' 65345 0 | C' 31715 0 | I' 77650 1 | C' 64720 0 | I' 65345 0 | C' 31707 0 |
| 32,2720 | I' 45271 1 | C' 00003 1 | C' 31657 1 | I' 71240 1 | C' 64730 1 | I' 77605 1 | C' 03650 1 | C' 00001 0 |
| 32,2730 | I' 41545 0 | C' 00001 0 | C' 37650 0 | C' 65065 1 | I' 77650 1 | C' 64531 1 | I' 45345 1 | C' 00031 0 |
| 32,2740 | C' 03664 0 | I' 51406 1 | I' 50025 0 | C' 31766 1 | C' 65037 0 | I' 53145 1 | C' 03730 0 | C' 64560 0 |
| 32,2750 | I' 53025 0 | C' 31705 1 | C' 65005 1 | I' 45345 1 | C' 03670 0 | C' 00031 0 | I' 55301 0 | C' 00050 1 |
| 32,2760 | C' 03666 1 | I' 41457 1 | C' 57600 0 | I' 40015 1 | C' 31653 0 | C' 64772 1 | I' 45246 0 | C' 31653 0 |
| 32,2770 | I' 77640 0 | C' 64775 0 | I' 57545 1 | C' 31715 0 | I' 77725 1 | I' 41345 0 | I' 77712 0 | C' 03666 1 |



OTAL LISTING FOR PARAGRAPH J 172, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, #''# DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #I# (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 32,3000 | I' 77615 0 | C' 03638 1 | C' 03638 1 | I' 77650 1 | C' 65024 1 | I' 63545 0 | C' 03664 0 | I' 70501 1 |
| 32,3010 | C' 00047 1 | I' 60325 0 | C' 00031 0 | C' 00050 1 | I' 55260 0 | C' 00047 1 | I' 77657 0 | C' 20600 0 |
| 32,3020 | C' 03638 1 | I' 77625 0 | C' 03664 0 | C' 03666 1 | I' 77745 1 | C' 00031 0 | C' 17670 0 | C' 03730 0 |
| 32,3030 | I' 77625 0 | C' 31675 1 | C' 37730 1 | C' 65136 0 | I' 52030 0 | C' 64523 1 | C' 65053 1 | I' 45345 1 |
| 32,3040 | C' 03726 1 | C' 03724 0 | I' 45246 0 | C' 31770 0 | I' 67240 0 | C' 65051 0 | C' 31737 0 | I' 77650 1 |
| 32,3050 | C' 65053 1 | I' 77745 1 | C' 31677 0 | I' 77650 1 | C' 03762 1 | I' 45020 1 | C' 03733 0 | C' 27371 1 |
| 32,3060 | I' 43175 0 | C' 03640 0 | C' 01473 0 | I' 77650 1 | C' 65111 0 | I' 45020 1 | C' 03733 0 | C' 27371 1 |
| 32,3070 | I' 77214 0 | C' 01673 1 | C' 03656 1 | C' 25535 0 | C' 03710 1 | C' 15543 1 | C' 03736 0 | C' 01517 0 |
| 32,3100 | I' 77615 0 | I' 77650 1 | C' 65117 0 | I' 45020 1 | C' 03733 0 | C' 27371 1 | I' 43175 0 | C' 03640 0 |
| 32,3110 | C' 01673 1 | C' 25535 0 | C' 03700 0 | C' 15543 1 | C' 03716 1 | C' 15517 0 | C' 03736 0 | C' 00041 1 |
| 32,3120 | I' 45014 0 | C' 00263 0 | C' 27066 1 | I' 77775 1 | C' 00001 0 | C' 03656 1 | I' 70125 0 | C' 00015 0 |
| 32,3130 | C' 03734 1 | C' 27736 0 | C' 00007 0 | C' 03710 1 | I' 77650 1 | C' 03733 0 | I' 77620 0 | C' 00041 1 |
| 32,3140 | I' 43001 1 | C' 00001 0 | C' 00272 0 | I' 60345 0 | C' 03636 1 | C' 00047 1 | I' 60325 0 | C' 03646 0 |
| 32,3150 | C' 00051 0 | C' 00013 0 | I' 56342 1 | I' 65260 0 | C' 00050 1 | C' 03726 1 | I' 77716 1 | I' 43342 0 |
| 32,3160 | C' 31653 0 | C' 03754 1 | I' 77605 1 | C' 00001 0 | C' 00035 1 | I' 53605 1 | C' 00001 0 | C' 20172 1 |
| 32,3170 | I' 45257 0 | C' 20172 1 | C' 31671 0 | I' 65234 1 | C' 45562 1 | C' 31653 0 | I' 57457 0 | C' 20601 1 |
| 32,3200 | I' 41215 1 | C' 00001 0 | C' 03646 0 | I' 47057 0 | C' 20172 1 | C' 45562 1 | I' 77725 1 | C' 33770 1 |
| 32,3210 | I' 70501 1 | C' 00050 1 | I' 56264 1 | C' 00050 1 | C' 00013 0 | I' 65257 1 | C' 57170 0 | C' 03652 0 |
| 32,3220 | I' 41406 0 | I' 77624 1 | C' 56633 1 | I' 41476 1 | I' 40476 0 | I' 41525 0 | C' 03654 0 | I' 45006 0 |
| 32,3230 | C' 56633 1 | I' 50125 1 | C' 03730 0 | C' 65236 0 | I' 77650 1 | C' 65250 0 | I' 77745 1 | C' 03632 0 |
| 32,3240 | I' 52054 1 | C' 65243 1 | C' 65344 1 | I' 50145 1 | C' 03757 1 | C' 65344 1 | I' 77650 1 | C' 65352 0 |
| 32,3250 | I' 47145 1 | C' 31671 0 | C' 45562 1 | I' 65276 1 | C' 31715 0 | I' 45257 0 | C' 20601 1 | C' 00001 0 |
| 32,3260 | I' 53605 1 | C' 00035 1 | C' 20172 1 | I' 76257 0 | C' 20172 1 | I' 65234 1 | C' 45562 1 | C' 03722 0 |
| 32,3270 | C' 00001 0 | I' 77751 1 | I' 53040 0 | C' 65300 1 | C' 65300 1 | I' 52061 1 | C' 20210 0 | C' 65311 1 |
| 32,3300 | I' 50145 1 | C' 03761 1 | C' 65322 1 | I' 77676 0 | C' 17761 1 | C' 31705 1 | C' 03730 0 | I' 77650 1 |
| 32,3310 | C' 65322 1 | I' 47166 0 | C' 45713 0 | I' 50125 1 | C' 03761 1 | C' 65330 1 | I' 45545 1 | C' 77760 0 |
| 32,3320 | I' 77676 0 | C' 00013 0 | I' 53145 1 | C' 03722 0 | C' 65344 1 | I' 52040 1 | C' 65344 1 | C' 65352 0 |
| 32,3330 | I' 53145 1 | C' 03722 0 | C' 65341 1 | I' 71240 1 | C' 65341 1 | I' 77626 0 | C' 77764 1 | I' 77650 1 |
| 32,3340 | C' 65352 0 | I' 57545 1 | I' 77626 0 | C' 77760 0 | I' 77745 1 | C' 00013 0 | C' 17722 0 | C' 00015 0 |
| 32,3350 | I' 52006 0 | C' 65357 0 | I' 77745 1 | C' 00017 1 | C' 17722 0 | C' 00015 0 | I' 41476 1 | I' 77624 1 |
| 32,3360 | C' 65500 1 | I' 53145 1 | C' 03632 0 | C' 65476 1 | I' 50025 0 | C' 03706 0 | C' 65371 1 | I' 77650 1 |
| 32,3370 | C' 65424 0 | I' 50145 1 | C' 03730 0 | C' 65376 0 | I' 77650 1 | C' 65437 1 | I' 53145 1 | C' 03722 0 |

OTAL LISTING FOR PARAGRAPH J 174, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED AIA (INTERPRETIVE OPERATOR WORDS) OR AC (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 33,2000 | 03425 1 | 03132 1 | 05243 1 | C' 00007 0 | 34714 1 | 55452 1 | 55843 0 | 32443 0 |
| 33,2010 | 55412 0 | 02302 1 | 34734 0 | 55844 1 | 32441 1 | 55074 1 | 06006 1 | I' 77824 1 |
| 33,2020 | C' 10617 0 | I' 57546 1 | I' 77752 1 | C' 10447 1 | C' 02403 1 | I' 72556 1 | C' 02445 0 | I' 77776 1 |
| 33,2030 | 04555 0 | C' 16516 1 | 02316 1 | 34714 1 | 55421 0 | 55450 0 | 55451 1 | 34375 1 |
| 33,2040 | 55655 1 | 32445 0 | 02356 0 | 34675 1 | 55713 1 | 06006 1 | I' 73545 1 | C' 02401 0 |
| 33,2050 | C' 02724 1 | C' 10734 0 | C' 02401 0 | I' 77746 1 | C' 02726 0 | I' 77676 0 | C' 02732 0 | I' 77776 1 |
| 33,2060 | 05253 0 | C' 00003 1 | 12064 0 | 13432 0 | 06006 1 | I' 77624 1 | C' 47244 0 | I' 77776 1 |
| 33,2070 | 04555 0 | C' 16602 1 | 34675 1 | 70077 0 | 00006 1 | 12077 1 | 25421 1 | 05447 0 |
| 33,2100 | C' 00056 1 | 02316 1 | 11421 0 | 02131 0 | 04555 0 | C' 17012 1 | 02316 1 | 00006 1 |
| 33,2110 | 31657 1 | 05231 1 | C' 02116 0 | C' 60065 1 | 32121 1 | 05070 0 | 32121 1 | 05074 1 |
| 33,2120 | 05213 1 | C' 60453 0 | 34714 1 | 55050 1 | 31514 0 | 55051 0 | 51423 0 | 55430 0 |
| 33,2130 | 02427 1 | 51421 1 | 02133 1 | 02417 1 | 34374 0 | 55412 0 | 34712 1 | 55547 1 |
| 33,2140 | 34714 1 | 51422 1 | 54037 1 | 55502 0 | 55506 1 | 02321 0 | 00004 0 | 34711 1 |
| 33,2150 | 05130 0 | C' 02153 1 | 05112 0 | 00006 1 | 27412 0 | 31412 1 | 00006 1 | 62163 1 |
| 33,2160 | 34701 0 | 05130 0 | C' 02153 1 | 34675 1 | 05042 1 | C' 02170 0 | C' 60065 1 | 05213 1 |
| 33,2170 | 51421 1 | 02172 1 | 02417 1 | 31412 1 | 00006 1 | 62177 1 | 05112 0 | 34715 0 |
| 33,2200 | 55547 1 | 02321 0 | 00006 1 | 41503 1 | 21507 0 | 06006 1 | I' 45345 1 | C' 02511 0 |
| 33,2210 | C' 02505 0 | I' 45044 0 | C' 60214 0 | C' 60276 1 | I' 56325 0 | C' 02507 1 | I' 57212 1 | C' 27111 0 |
| 33,2220 | I' 77634 0 | C' 45541 0 | C' 01051 1 | I' 77776 1 | 11421 0 | 02302 1 | 02427 1 | 32447 1 |
| 33,2230 | 55412 0 | 51423 0 | 41427 0 | 55452 1 | 31675 1 | 00006 1 | 12244 0 | 44706 0 |
| 33,2240 | 27651 0 | 34706 1 | 27647 1 | 12250 0 | 44706 0 | 27651 0 | 34706 1 | 27653 1 |
| 33,2250 | 02417 1 | 34714 1 | 55404 1 | 55405 0 | 34672 0 | 55450 0 | 55451 1 | 30032 0 |
| 33,2260 | 55413 1 | 02453 1 | 31512 0 | 55051 0 | 34714 1 | 55050 1 | 02427 1 | 05447 0 |
| 33,2270 | C' 00007 0 | 44714 0 | 05246 1 | 04555 0 | C' 16063 0 | 05423 1 | I' 43215 0 | C' 15340 1 |
| 33,2300 | C' 27117 0 | I' 77616 0 | 00006 1 | 23425 0 | 34714 1 | 55155 0 | 55156 0 | 55157 1 |
| 33,2310 | 04555 0 | C' 16602 1 | 04555 0 | C' 17516 0 | 03103 0 | 01425 0 | 00006 1 | 23425 0 |
| 33,2320 | 02312 0 | 00006 1 | 23425 0 | 02331 1 | 00003 1 | 30067 0 | 00006 1 | 62335 0 |
| 33,2330 | 05057 0 | 00004 0 | 51422 1 | 40037 1 | 55655 1 | 00004 0 | 51422 1 | 30037 0 |
| 33,2340 | 61655 0 | 00006 1 | 12324 1 | 51422 1 | 30037 0 | 51547 0 | 55502 0 | 04526 1 |
| 33,2350 | 51547 0 | 55503 1 | 51547 0 | 23504 1 | 00003 1 | 01425 0 | 54001 1 | 12361 0 |
| 33,2360 | 55655 1 | 34714 1 | 50001 0 | 54000 0 | 24001 0 | 11655 1 | 12360 1 | 00002 0 |
| 33,2370 | I' 47020 0 | C' 00051 0 | C' 45505 0 | C' 02441 1 | I' 51025 1 | C' 02443 0 | C' 66401 1 | I' 77624 1 |

ODD LISTING FOR PARAGRAPH J 175, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A'S DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED I'S (INTERPRETIVE OPERATOR WORDS) OR A'S (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 33,2400 | C' 86276 1 | I' 74261 1 | C' 20212 1 | C' 02405 1 | I' 53321 1 | C' 02672 0 | C' 02650 0 | C' 16650 0 |
| 33,2410 | C' 02441 1 | C' 02443 0 | I' 47170 1 | C' 02647 0 | C' 45650 0 | I' 77650 1 | C' 00051 0 | 00006 1 |
| 33,2420 | 23426 0 | 06006 1 | I' 77624 1 | C' 66370 0 | I' 77776 1 | 02316 1 | 01426 0 | 00008 1 |
| 33,2430 | 23425 0 | 31423 0 | 55052 0 | 32442 1 | 04555 0 | C' 20624 0 | 02267 0 | 01425 0 |
| 33,2440 | 12431 1 | C' 14400 0 | C' 01542 0 | C' 01602 1 | C' 02757 0 | C' 01713 0 | C' 01671 0 | C' 07623 1 |
| 33,2450 | C' 26552 1 | 04555 0 | C' 70127 1 | 05291 1 | C' 00075 0 | C' 00004 0 | 00004 0 | 30025 0 |
| 33,2460 | 55645 0 | 34714 1 | 54037 1 | 54040 1 | 54041 0 | 00003 1 | 33130 0 | 55655 1 |
| 33,2470 | 33131 1 | 02356 0 | 06006 1 | I' 77735 0 | C' 27112 0 | C' 26477 1 | C' 27123 1 | C' 26455 1 |
| 33,2500 | C' 27112 0 | C' 01472 1 | C' 01163 1 | I' 77776 1 | 11643 0 | 02507 1 | 02523 1 | 06006 1 |
| 33,2510 | I' 77624 1 | C' 64000 0 | I' 77776 1 | 31412 1 | 55646 0 | 05243 1 | C' 00002 0 | 04555 0 |
| 33,2520 | C' 17075 0 | 03376 0 | 55412 0 | 05301 0 | C' 00135 0 | 11450 0 | 02417 1 | 03401 1 |
| 33,2530 | 02532 1 | 05112 0 | 00006 1 | 22154 1 | 00004 0 | 40025 1 | 61645 1 | 00006 1 |
| 33,2540 | 02542 0 | 64674 0 | 61644 0 | 00006 1 | 62550 0 | 05130 0 | C' 02575 1 | 00154 1 |
| 33,2550 | 34710 0 | 02545 1 | C' 00031 0 | 32552 1 | 54154 0 | 50154 1 | 31460 1 | 50154 1 |
| 33,2560 | 55577 1 | 10154 0 | 12554 0 | 00002 0 | 32552 1 | 54154 0 | 50154 1 | 31577 0 |
| 33,2570 | 50154 1 | 55460 0 | 10154 0 | 12565 1 | 00002 0 | 30025 0 | 55645 0 | 31540 1 |
| 33,2600 | 55631 0 | 05301 0 | C' 00115 1 | 31631 1 | 55540 0 | 10000 0 | 30000 1 | 55541 1 |
| 33,2610 | 40000 0 | 55540 0 | 34714 1 | 56037 0 | 55162 1 | 34714 1 | 56040 0 | 55164 1 |
| 33,2620 | 34714 1 | 56041 1 | 55166 0 | 34374 0 | 04114 1 | C' 00005 1 | 34675 1 | 05042 1 |
| 33,2630 | C' 02633 0 | C' 66065 1 | 05213 1 | 02553 0 | 05301 0 | C' 00215 1 | 12640 0 | 02564 1 |
| 33,2640 | 11643 0 | 02643 1 | 02646 1 | 03401 1 | 04555 0 | C' 15262 0 | 06006 1 | I' 77745 1 |
| 33,2650 | C' 27121 0 | C' 24051 0 | C' 01163 1 | I' 76505 0 | C' 02672 0 | I' 57545 1 | C' 00160 0 | C' 16533 0 |
| 33,2660 | C' 00162 1 | C' 02537 1 | I' 76001 1 | C' 00001 0 | C' 00010 0 | I' 57535 0 | C' 02644 0 | I' 77640 0 |
| 33,2670 | C' 67203 1 | I' 50135 0 | C' 02542 0 | C' 66706 0 | I' 72174 0 | C' 00014 1 | C' 02454 0 | I' 62143 0 |
| 33,2700 | C' 02243 0 | C' 77775 1 | C' 12555 1 | I' 66104 1 | C' 66677 1 | C' 02454 0 | I' 77770 1 | C' 00010 0 |
| 33,2710 | I' 41343 0 | C' 02543 1 | C' 27675 0 | I' 43661 1 | C' 21212 0 | C' 02511 0 | C' 06511 1 | I' 40725 0 |
| 33,2720 | C' 27677 1 | C' 02531 1 | I' 77732 1 | I' 45425 0 | C' 71206 0 | C' 06573 0 | I' 77100 0 | C' 66710 1 |
| 33,2730 | C' 00004 0 | I' 56743 1 | C' 75314 0 | C' 75230 1 | C' 12463 0 | I' 77104 1 | C' 66731 1 | C' 00010 0 |
| 33,2740 | I' 66140 1 | C' 02455 1 | C' 02455 1 | I' 56743 1 | C' 02460 1 | C' 75206 1 | I' 77613 0 | C' 75266 1 |
| 33,2750 | C' 12511 1 | I' 42743 1 | C' 75304 1 | C' 75220 0 | C' 12473 1 | I' 42673 0 | C' 75206 1 | C' 75256 1 |
| 33,2760 | C' 12521 1 | I' 40743 0 | C' 27702 1 | C' 75206 1 | I' 42772 0 | C' 75246 0 | C' 12531 0 | I' 76104 0 |
| 33,2770 | C' 66740 1 | C' 00010 0 | I' 64743 0 | C' 02533 0 | C' 02531 1 | I' 55523 0 | C' 02541 0 | I' 76521 0 |



OCTAL LISTING FOR PARAGRAPH J 176, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #I# (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 33,3000 | C' 02001 1 | I' 77745 1 | C' 00155 0 | C' 06541 1 | I' 77745 1 | C' 00160 0 | C' 06531 0 | I' 77745 1 |
| 33,3010 | C' 00162 1 | C' 06533 1 | I' 77700 0 | C' 68772 0 | I' 76174 1 | C' 00006 1 | C' 00002 0 | I' 57343 1 |
| 33,3020 | C' 02513 1 | C' 27705 0 | I' 77722 0 | I' 73406 1 | I' 56072 1 | C' 00046 0 | C' 10021 0 | I' 77745 1 |
| 33,3030 | I' 77746 1 | C' 10027 0 | I' 77704 1 | C' 67017 0 | I' 77776 1 | 34753 1 | 54003 0 | 01400 1 |
| 33,3040 | 11412 0 | 02522 0 | 11450 0 | 13045 1 | 03047 1 | 30032 0 | 55414 0 | 08006 1 |
| 33,3050 | I' 45345 0 | C' 02503 0 | C' 02507 1 | I' 55525 0 | C' 02511 0 | I' 74276 1 | C' 27705 0 | I' 74521 1 |
| 33,3060 | C' 02672 0 | C' 02760 1 | I' 77776 1 | 05301 0 | C' 00005 1 | 32444 1 | 04555 0 | C' 17125 1 |
| 33,3070 | 02316 1 | 11450 0 | 02262 0 | 06006 1 | I' 77624 1 | C' 64000 0 | I' 77776 1 | 02122 1 |
| 33,3100 | 05537 0 | C' 01600 0 | 03105 0 | 05537 0 | C' 01601 1 | 05301 0 | C' 00005 1 | 02267 0 |
| 33,3110 | C' 02222 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 00001 0 |
| 33,3120 | C' 00004 0 | C' 00002 0 | C' 00220 1 | C' 77776 1 | C' 35730 0 | C' 00035 1 | C' 10317 0 | C' 17550 1 |
| 33,3130 | C' 00115 1 | C' 01453 1 | 34712 1 | 55643 0 | 33424 0 | 55074 1 | 34703 1 | 55412 0 |
| 33,3140 | 34731 0 | 55644 1 | 34712 1 | 55632 0 | 55657 0 | 34714 1 | 55656 1 | 00006 1 |
| 33,3150 | 31634 1 | 53636 1 | 00006 1 | 31634 1 | 53640 0 | 34375 1 | 55655 1 | 32446 0 |
| 33,3160 | 02356 0 | 03163 0 | 02030 0 | 00006 1 | 23425 0 | 44675 0 | 55705 0 | 06006 1 |
| 33,3170 | I' 41545 0 | C' 02636 0 | I' 77756 0 | C' 02676 1 | C' 18702 0 | I' 77746 1 | C' 02704 0 | I' 77676 0 |
| 33,3200 | C' 02674 0 | I' 77776 1 | 01425 0 | I' 44743 1 | C' 02543 1 | C' 02505 0 | I' 42675 0 | C' 27713 1 |
| 33,3210 | C' 02505 0 | C' 06505 1 | I' 77613 0 | C' 02507 1 | C' 06507 0 | I' 42675 0 | C' 27715 1 | C' 02505 0 |
| 33,3220 | I' 41475 1 | C' 15330 0 | I' 67300 0 | C' 67203 1 | C' 02647 0 | I' 71254 1 | C' 67237 0 | C' 02471 1 |
| 33,3230 | I' 45425 0 | C' 61306 0 | I' 77621 1 | C' 02473 0 | C' 02473 0 | I' 77650 1 | C' 67261 0 | I' 43345 1 |
| 33,3240 | C' 02467 0 | C' 02475 0 | C' 16467 0 | C' 02475 0 | I' 44275 1 | C' 27717 0 | C' 02473 0 | C' 16473 0 |
| 33,3250 | C' 02501 1 | I' 44275 1 | C' 27717 0 | C' 02471 1 | I' 57325 1 | C' 02503 0 | C' 27721 0 | I' 45421 1 |
| 33,3260 | C' 75306 0 | I' 77776 1 | 11412 0 | 02522 0 | 03401 1 | 11304 0 | 12523 0 | 06006 1 |
| 33,3270 | I' 77775 1 | C' 02650 0 | C' 16461 0 | C' 02443 0 | C' 02457 0 | I' 77776 1 | 05301 0 | C' 00275 1 |
| 33,3300 | 06006 1 | I' 64375 1 | C' 02467 0 | C' 02672 0 | I' 53372 1 | C' 02461 0 | C' 16650 0 | C' 02457 0 |
| 33,3310 | C' 02443 0 | I' 77776 1 | 02417 1 | 31646 1 | 55631 0 | 05301 0 | C' 00155 0 | 06006 1 |
| 33,3320 | I' 77775 1 | C' 27112 0 | C' 02467 0 | I' 77776 1 | 11632 0 | 03374 1 | 05301 0 | C' 00255 0 |
| 33,3330 | 06006 1 | I' 77745 1 | C' 02634 1 | I' 53025 0 | C' 02640 1 | C' 67371 0 | C' 00001 0 | I' 43335 0 |
| 33,3340 | C' 27120 1 | C' 02633 0 | C' 16633 0 | C' 02634 1 | C' 16636 0 | C' 00001 0 | C' 02654 1 | I' 77776 1 |
| 33,3350 | 03163 0 | 05301 0 | C' 00335 1 | 00006 1 | 31636 0 | 53640 0 | 34704 0 | 55412 0 |
| 33,3360 | 05301 0 | C' 00075 0 | 33423 1 | 04555 0 | C' 17125 1 | 04555 0 | C' 17516 0 | 03103 0 |
| 33,3370 | 02453 1 | I' 77776 1 | 34712 1 | 55632 0 | 11631 0 | 55646 0 | 34334 1 | 55412 0 |



OCAL LISTING FOR PARAGRAPH J 177, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A'S DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED *ai* (INTERPRETIVE OPERATOR WORDS) OR *ac* (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|-------------|------------|------------|------------|
| 33,3400 | 02523 1 | 00004 0 | 44714 0 | 00006 1 | 06030 1 | 74706 0 | 10000 0 | 13416 0 |
| 33,3410 | 34706 1 | 70101 0 | 10000 0 | 13416 0 | 00003 1 | 00002 0 | 37657 1 | 05103 0 |
| 33,3420 | 00004 0 | 04574 0 | C' 70002 1 | C' 02647 0 | C' 06200 0 | 05301 0 | C' 00154 1 | 05243 1 |
| 33,3430 | C' 00003 1 | 02037 1 | 04555 0 | C' 16063 0 | 34712 1 | 22007 0 | 23427 1 | 55047 1 |
| 33,3440 | 00006 1 | 51427 1 | 31433 1 | 53046 0 | 33467 1 | 04555 0 | C' 20577 0 | 33455 0 |
| 33,3450 | 04555 0 | C' 20624 0 | 03610 0 | 03456 0 | 03444 0 | C' 01451 0 | 53046 0 | 51427 1 |
| 33,3460 | 53433 0 | 11427 0 | 13466 1 | 34711 1 | 54001 1 | 13436 1 | 03530 1 | C' 01236 1 |
| 33,3470 | 06006 1 | I' 77170 1 | C' 00002 0 | C' 00014 1 | I' 40331 1 | C' 00052 0 | C' 00006 1 | C' 00001 0 |
| 33,3500 | I' 60533 1 | C' 02436 1 | C' 00001 0 | I' 77756 0 | C' 10023 1 | I' 77745 1 | C' 00001 0 | I' 41546 0 |
| 33,3510 | I' 47133 0 | C' 02435 1 | C' 45510 1 | C' 00003 1 | I' 41356 1 | C' 00001 0 | I' 77752 1 | C' 10027 0 |
| 33,3520 | I' 71545 0 | C' 00003 1 | I' 72405 0 | I' 78076 1 | C' 00000 1 | C' 10025 1 | I' 43504 1 | C' 67500 0 |
| 33,3530 | 34712 1 | 54735 1 | 34714 1 | 03625 0 | 06006 1 | I' 77624 1 | C' 67471 1 | I' 64375 1 |
| 33,3540 | C' 00007 0 | C' 02672 0 | I' 77772 0 | C' 26736 1 | C' 00015 0 | I' 76521 0 | C' 02672 0 | C' 02744 1 |
| 33,3550 | I' 77624 1 | C' 67722 1 | C' 02414 1 | I' 77776 1 | 04555 0 | C' 16063 0 | 34711 1 | 54735 1 |
| 33,3560 | 36211 0 | 03625 0 | 06006 1 | I' 77624 1 | C' 67722 1 | C' 24015 0 | C' 02414 1 | C' 34007 1 |
| 33,3570 | C' 47334 0 | I' 77624 1 | C' 47140 1 | I' 77776 1 | 33621 1 | 04555 0 | C' 20624 0 | 03610 0 |
| 33,3600 | 13602 1 | 13574 0 | 06006 1 | I' 53375 0 | C' 02760 1 | C' 02650 0 | C' 02650 0 | I' 77776 1 |
| 33,3610 | 04555 0 | C' 16063 0 | 05447 0 | C' 00032 0 | 05243 1 | C' 00002 0 | 05301 0 | C' 00004 0 |
| 33,3620 | 05112 0 | C' 01535 0 | 05537 0 | C' 01602 1 | 03610 0 | 00006 1 | 23424 1 | 55431 1 |
| 33,3630 | 06006 1 | I' 77624 1 | C' 67471 1 | I' 76740 0 | C' 02431 0 | C' 00007 0 | C' 36766 0 | C' 46053 0 |
| 33,3640 | I' 77776 1 | 31773 0 | 55161 1 | 31775 0 | 55160 0 | 34714 1 | 55303 1 | 34712 1 |
| 33,3650 | 04555 0 | C' 16002 1 | 04555 0 | C' 17512 1 | 03622 1 | 30075 0 | 74707 1 | 10000 0 |
| 33,3660 | 03610 0 | 51330 0 | 30052 0 | 00006 1 | 13666 0 | 01424 1 | 34714 1 | 57330 0 |
| 33,3670 | 10000 0 | 50000 1 | 54000 0 | 13645 1 | C' 30341 1 | C' 22444 0 | C' 57223 0 | C' 66451 1 |
| 33,3700 | C' 05427 0 | C' 12577 1 | C' 77567 0 | C' 44202 1 | C' 24276 1 | C' 14066 1 | C' 23073 1 | C' 11773 1 |
| 33,3710 | C' 00055 1 | C' 20267 0 | C' 03146 1 | C' 14632 0 | C' 00121 0 | C' 35341 1 | C' 01767 0 | C' 31666 0 |
| 33,3720 | C' 00004 0 | C' 35223 1 | I' 77620 0 | C' 02424 1 | I' 76740 0 | C' 01330 0 | C' 00003 1 | C' 34767 0 |
| 33,3730 | C' 46000 0 | I' 77624 1 | C' 47572 1 | I' 77850 1 | C' 02424 1 | I' 77776 1 | 06006 1 | I' 47145 1 |
| 33,3740 | C' 02636 0 | C' 45543 1 | I' 77776 1 | 56154 1 | 55045 0 | 04555 0 | C' 20607 1 | 33771 0 |
| 33,3750 | 04555 0 | C' 20624 0 | 13754 0 | 13755 1 | 13747 1 | 06006 1 | I' 47135 0 | C' 01046 1 |
| 33,3760 | C' 45510 1 | C' 02634 1 | I' 77776 1 | 34714 1 | 55632 0 | 05301 0 | C' 00004 0 | 04574 0 |
| 33,3770 | C' 21176 1 | C' 01435 1 | C' 03772 0 | C' 03773 1 | CKM 71456 0 | " | " | " |



OCTAL LISTING FOR PARAGRAPH J 200, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, #''# DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #I# (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 34,2000 | C' 03431 1 | C' 02428 0 | 34744 1 | 54003 0 | 00006 1 | 32273 0 | 52757 0 | 44714 0 |
| 34,2010 | 22007 0 | 55265 0 | 52763 1 | 00006 1 | 32275 0 | 53337 0 | 00006 1 | 30025 0 |
| 34,2020 | 53266 0 | 34714 1 | 22007 0 | 52025 1 | 53337 0 | 52757 0 | 00004 0 | 00006 1 |
| 34,2030 | 31710 0 | 53271 0 | 31706 1 | 57267 0 | 00006 1 | 31337 1 | 21271 0 | 27267 1 |
| 34,2040 | 05301 0 | C' 05023 0 | C' 22000 1 | 00004 0 | 00006 1 | 31270 0 | 53707 1 | 31271 1 |
| 34,2050 | 57710 0 | 32000 0 | 54003 0 | 04633 0 | C' 76625 1 | 05301 0 | C' 05023 0 | C' 22000 1 |
| 34,2060 | 34731 0 | 05140 1 | C' 02314 0 | C' 70066 0 | 05243 1 | C' 00013 0 | 04555 0 | C' 20807 1 |
| 34,2070 | 05261 1 | C' 40514 0 | C' 00073 0 | 32901 1 | 54003 0 | 32276 0 | 55426 1 | 22007 0 |
| 34,2100 | 30032 0 | 53760 0 | 22007 0 | 30033 1 | 53762 1 | 22007 0 | 30034 0 | 53764 1 |
| 34,2110 | 06006 1 | I' 74575 0 | C' 02760 1 | C' 02760 1 | I' 64375 1 | C' 02467 0 | C' 02672 0 | I' 53372 1 |
| 34,2120 | C' 02850 0 | C' 16650 0 | C' 01337 1 | I' 52131 0 | C' 00052 0 | C' 66424 0 | C' 66373 0 | 06006 1 |
| 34,2130 | I' 77731 1 | C' 03747 0 | C' 00000 1 | I' 65345 0 | C' 01273 0 | C' 01264 0 | I' 55525 0 | C' 02403 1 |
| 34,2140 | C' 15104 0 | C' 15332 1 | I' 45014 0 | C' 00862 0 | C' 26373 1 | C' 35232 1 | C' 77256 0 | I' 77656 1 |
| 34,2150 | C' 25752 0 | C' 01232 0 | I' 74235 0 | C' 01714 1 | C' 30300 1 | I' 77712 0 | C' 25240 0 | C' 01752 0 |
| 34,2160 | I' 53435 0 | C' 01714 1 | I' 47206 0 | C' 01752 0 | I' 65256 0 | C' 02634 1 | I' 74346 0 | I' 77626 0 |
| 34,2170 | C' 62041 0 | C' 02634 1 | I' 74356 1 | I' 53485 0 | C' 01736 1 | C' 01736 1 | I' 53435 0 | C' 01752 0 |
| 34,2200 | I' 77676 0 | C' 01744 1 | I' 45345 1 | C' 15330 0 | C' 02634 1 | I' 65215 1 | C' 02401 0 | C' 03301 0 |
| 34,2210 | I' 45565 0 | C' 74476 1 | I' 77414 0 | C' 01482 0 | 05301 0 | C' 04023 1 | 00006 1 | 32302 1 |
| 34,2220 | 53223 1 | 37665 0 | 55074 1 | 34752 0 | 54003 0 | 00004 0 | 44714 0 | 55063 1 |
| 34,2230 | 40025 1 | 64735 1 | 10000 0 | 12236 0 | 12236 0 | 34714 1 | 64712 1 | 05140 1 |
| 34,2240 | C' 02647 0 | C' 76066 0 | 05261 1 | C' 00003 1 | C' 00025 0 | 04574 0 | C' 77141 0 | 00004 0 |
| 34,2250 | 10763 1 | 05112 0 | 11265 0 | 12257 1 | 12257 1 | 12257 1 | 12013 0 | 41336 1 |
| 34,2260 | 00006 1 | 62267 0 | 10024 0 | 12021 1 | 00006 1 | 31266 1 | 12024 1 | 00006 1 |
| 34,2270 | 32275 0 | 12025 0 | C' 77766 0 | C' 00011 1 | C' 77764 1 | C' 00013 0 | C' 02451 0 | C' 71704 1 |
| 34,2300 | C' 41735 0 | C' 02303 0 | C' 70066 0 | 06006 1 | I' 77624 1 | C' 70436 1 | I' 77776 1 | 32511 0 |
| 34,2310 | 04555 0 | C' 20621 0 | 04555 0 | C' 77132 1 | 34701 0 | 05042 1 | C' 02326 1 | C' 70066 0 |
| 34,2320 | 41501 0 | 74710 1 | 27501 0 | 04633 0 | C' 42404 1 | 05213 1 | 30024 1 | 00006 1 |
| 34,2330 | 82332 1 | 12424 0 | 30102 1 | 74105 0 | 00006 1 | 12337 0 | 02420 0 | 41702 1 |
| 34,2340 | 60025 0 | 00006 1 | 62504 1 | 54154 0 | 55707 1 | 61703 1 | 00006 1 | 62351 1 |
| 34,2350 | 12416 1 | 31661 1 | 54001 1 | 32510 1 | 07164 0 | 34714 1 | 54163 1 | 06006 1 |
| 34,2360 | I' 54201 0 | C' 00001 0 | C' 20206 1 | I' 77606 1 | I' 77650 1 | C' 76103 1 | C' 14021 1 | C' 00747 0 |
| 34,2370 | I' 41405 0 | C' 00001 0 | I' 72405 0 | C' 00751 1 | I' 41325 0 | C' 00743 1 | C' 00003 1 | I' 72415 1 |



ODAL LISTING FOR PARAGRAPH J 201, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A'S DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #I# (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 34,2400 | I' 77628 0 | C' 63755 0 | I' 72405 0 | C' 00743 1 | I' 41325 0 | C' 00751 1 | C' 00003 1 | I' 72425 1 |
| 34,2410 | I' 77628 0 | C' 77754 1 | I' 77751 1 | C' 00021 1 | C' 03077 1 | I' 77776 1 | 04555 0 | C' 42404 1 |
| 34,2420 | 34113 0 | 04555 0 | C' 01732 0 | 02326 1 | 44705 0 | 00006 1 | 03012 1 | 05301 0 |
| 34,2430 | C' 00004 0 | 34714 1 | 55476 1 | 55477 0 | 55500 1 | 05112 0 | I' 51575 1 | C' 01177 1 |
| 34,2440 | C' 27723 1 | C' 01171 1 | I' 45246 0 | C' 05311 1 | C' 27735 0 | C' 01171 1 | I' 50256 0 | C' 01177 1 |
| 34,2450 | I' 77752 1 | C' 03737 1 | I' 77616 0 | 31716 0 | 00006 1 | 20154 0 | 50120 1 | 54000 0 |
| 34,2460 | 31717 1 | 00006 1 | 20155 1 | 50120 1 | 54002 1 | 31720 0 | 00006 1 | 20156 1 |
| 34,2470 | 50120 1 | 54004 1 | 16030 0 | 30154 1 | 00006 1 | 71701 1 | 00006 1 | 66030 1 |
| 34,2500 | 00006 1 | 33561 0 | 52155 1 | 06030 1 | 06006 1 | I' 52001 1 | C' 00001 0 | C' 76161 0 |
| 34,2510 | C' 01673 1 | C' 01476 0 | 37663 0 | 55056 1 | 05103 0 | 37714 1 | 55734 1 | 06006 1 |
| 34,2520 | I' 77634 0 | C' 45505 0 | C' 01152 0 | I' 77624 1 | C' 56741 0 | I' 77624 1 | C' 56404 1 | I' 77776 1 |
| 34,2530 | 31734 0 | 00006 1 | 12535 1 | 00006 1 | 62554 1 | 36211 0 | 05475 1 | C' 01734 0 |
| 34,2540 | C' 01224 1 | 37714 1 | 55734 1 | 00003 1 | 06006 1 | I' 45014 0 | C' 04667 1 | C' 56741 0 |
| 34,2550 | I' 52131 0 | C' 01243 0 | C' 01224 1 | C' 70577 0 | 06006 1 | I' 77624 1 | C' 56741 0 | I' 77624 1 |
| 34,2560 | C' 56404 1 | I' 77614 1 | C' 04746 0 | C' 70527 0 | I' 77634 0 | C' 45505 0 | I' 45225 0 | C' 14647 1 |
| 34,2570 | C' 01152 0 | I' 45040 1 | C' 70527 0 | C' 56415 1 | I' 77745 1 | C' 01225 0 | C' 01152 0 | I' 77624 1 |
| 34,2600 | C' 56343 0 | I' 45014 0 | C' 00707 1 | C' 71034 0 | C' 27113 1 | I' 77624 1 | C' 56741 0 | I' 77624 1 |
| 34,2610 | C' 56343 0 | I' 77614 1 | C' 01674 0 | I' 43014 0 | C' 02756 1 | C' 70617 0 | C' 01476 0 | I' 77624 1 |
| 34,2620 | C' 27113 1 | I' 77624 1 | C' 56526 0 | I' 77624 1 | C' 71123 1 | I' 45014 0 | C' 02464 0 | C' 71132 1 |
| 34,2630 | I' 43014 0 | C' 01671 0 | C' 02716 0 | C' 70643 1 | I' 77745 1 | C' 02001 1 | C' 34001 1 | C' 56544 1 |
| 34,2640 | I' 77745 1 | C' 15332 1 | C' 01126 0 | I' 77614 1 | C' 02476 0 | I' 52375 1 | C' 01215 0 | C' 01207 0 |
| 34,2650 | C' 03531 0 | I' 43056 0 | C' 04707 0 | C' 71045 0 | C' 01273 0 | I' 45014 0 | C' 02744 1 | C' 70671 0 |
| 34,2660 | C' 47110 1 | C' 25235 1 | C' 01273 0 | I' 40035 0 | C' 01235 1 | C' 70666 0 | I' 40056 0 | C' 70555 0 |
| 34,2670 | C' 01245 0 | I' 77624 1 | C' 47047 1 | I' 77214 0 | C' 00707 1 | C' 70701 0 | C' 03502 0 | I' 77676 0 |
| 34,2700 | C' 03502 0 | I' 77624 1 | C' 56741 0 | I' 77614 1 | C' 00706 0 | C' 71076 0 | I' 43345 1 | C' 31220 0 |
| 34,2710 | C' 31222 1 | C' 27526 0 | C' 03531 0 | I' 60246 1 | C' 00047 1 | I' 41316 0 | C' 03526 0 | I' 45070 1 |
| 34,2720 | C' 00046 0 | C' 56526 0 | I' 56070 0 | C' 00047 1 | C' 00047 1 | I' 72257 1 | C' 20577 0 | C' 00155 0 |
| 34,2730 | C' 03526 0 | I' 54335 0 | C' 02400 1 | C' 20632 1 | I' 47171 0 | C' 03526 0 | C' 45562 1 | C' 03526 0 |
| 34,2740 | I' 76214 1 | C' 04747 1 | C' 70751 0 | C' 03005 1 | I' 72244 0 | C' 70751 0 | C' 03005 1 | I' 77646 0 |
| 34,2750 | C' 03526 0 | I' 45014 0 | C' 02666 0 | C' 75250 1 | I' 77624 1 | C' 56741 0 | I' 45014 0 | C' 02744 1 |
| 34,2760 | C' 71006 1 | C' 56526 0 | I' 51575 1 | C' 01265 1 | I' 77657 0 | C' 57176 0 | C' 27504 0 | C' 01257 0 |
| 34,2770 | I' 53646 0 | C' 57176 0 | C' 03502 0 | I' 77735 0 | C' 02003 0 | I' 45261 0 | C' 20613 1 | C' 03502 0 |

OCTAL LISTING FOR PARAGRAPH J 202, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #1 (INTERPRETIVE OPERATOR WORDS) OR #C (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 34,3000 | I' 67240 0 | C' 71141 0 | C' 02004 1 | I' 50025 0 | C' 03504 0 | C' 71141 0 | I' 77624 1 | C' 75462 0 |
| 34,3010 | I' 43014 0 | C' 04707 0 | C' 71103 0 | C' 02744 1 | C' 71111 0 | I' 77624 1 | C' 56526 0 | I' 45014 0 |
| 34,3020 | C' 00707 1 | C' 71117 0 | C' 71132 1 | I' 77624 1 | C' 58741 0 | I' 52375 1 | C' 01215 0 | C' 01207 0 |
| 34,3030 | C' 03531 0 | I' 77614 1 | C' 02624 0 | C' 70651 1 | I' 45014 0 | C' 01674 0 | C' 27113 1 | I' 77624 1 |
| 34,3040 | C' 56741 0 | I' 77624 1 | C' 56343 0 | I' 77650 1 | C' 70613 1 | C' 27502 0 | C' 15332 1 | C' 03510 0 |
| 34,3050 | C' 27516 0 | C' 03531 0 | I' 71256 0 | C' 01257 0 | I' 60414 0 | C' 04303 0 | C' 71057 0 | I' 43025 1 |
| 34,3060 | C' 00045 0 | C' 02464 0 | C' 03524 1 | I' 77214 0 | C' 00747 0 | C' 71071 1 | C' 03502 0 | I' 77676 0 |
| 34,3070 | C' 03502 0 | I' 77624 1 | C' 58741 0 | I' 52145 0 | C' 03003 1 | C' 70711 1 | I' 43335 0 | C' 01357 1 |
| 34,3100 | C' 31222 1 | I' 77650 1 | C' 70711 1 | I' 62150 1 | C' 01125 0 | C' 00001 0 | I' 52130 1 | C' 01125 0 |
| 34,3110 | C' 70523 1 | I' 62150 1 | C' 01126 0 | C' 00001 0 | I' 52130 1 | C' 01126 0 | C' 70555 0 | I' 77624 1 |
| 34,3120 | C' 71123 1 | I' 77650 1 | C' 71023 0 | I' 53775 1 | C' 01573 1 | C' 57167 0 | I' 77655 1 | C' 01607 0 |
| 34,3130 | C' 01207 0 | I' 77616 0 | I' 53775 1 | C' 01645 1 | C' 57167 0 | I' 77655 1 | C' 01661 1 | C' 01215 0 |
| 34,3140 | I' 77616 0 | I' 77776 1 | 30105 0 | 74703 0 | 00006 1 | 13150 1 | 34711 1 | 03151 1 |
| 34,3150 | 34712 1 | 55505 1 | 34714 1 | 55300 1 | 05301 0 | C' 04022 0 | 37664 1 | 05027 1 |
| 34,3160 | C' 03172 0 | C' 70067 1 | 06006 1 | C' 00155 0 | I' 53135 0 | C' 01301 1 | C' 71163 0 | I' 52040 1 |
| 34,3170 | C' 71006 1 | C' 71201 1 | 33223 1 | 04555 0 | C' 20635 0 | 04550 0 | 44712 0 | 55300 1 |
| 34,3200 | 05112 0 | I' 77614 1 | C' 04707 0 | C' 70523 1 | I' 77776 1 | 00004 0 | 33224 0 | 54006 0 |
| 34,3210 | 37716 0 | 55725 1 | 55734 1 | 00003 1 | 06006 1 | I' 77650 1 | C' 70555 0 | C' 00052 0 |
| 34,3220 | C' 36307 0 | C' 00052 0 | C' 36307 0 | C' 01461 0 | C' 70067 1 | I' 40220 0 | C' 03704 1 | C' 00001 0 |
| 34,3230 | I' 77634 0 | C' 45505 0 | C' 36316 0 | C' 71461 1 | I' 77751 1 | C' 01156 1 | C' 03373 0 | I' 77776 1 |
| 34,3240 | 03265 0 | 34371 0 | 00006 1 | 06031 0 | 77707 1 | 00006 1 | 13250 1 | 03254 1 |
| 34,3250 | 40075 1 | 74675 0 | 10000 0 | 03320 0 | 34714 1 | 54154 0 | 06006 1 | I' 77650 1 |
| 34,3260 | C' 03704 1 | 40101 0 | 74707 1 | 00006 1 | 13452 0 | 04555 0 | C' 57750 1 | 34711 1 |
| 34,3270 | 55611 1 | 51611 0 | 30032 0 | 00006 1 | 51611 0 | 21155 0 | 54154 0 | 06006 1 |
| 34,3300 | I' 45246 0 | C' 31550 0 | I' 77444 0 | C' 71307 0 | 11611 1 | 03270 1 | 03241 0 | I' 77776 1 |
| 34,3310 | 40075 1 | 74675 0 | 10000 0 | 03452 1 | 34710 0 | 00006 1 | 05011 1 | 03254 1 |
| 34,3320 | 06006 1 | I' 77601 0 | C' 00001 0 | I' 52375 1 | C' 03204 1 | C' 03715 1 | I' 57456 1 | I' 74235 0 |
| 34,3330 | C' 03707 1 | C' 31551 1 | I' 77606 1 | I' 60345 0 | C' 02316 1 | C' 00047 1 | I' 77606 1 | I' 60345 0 |
| 34,3340 | C' 00045 0 | C' 00051 0 | I' 70460 1 | C' 00050 1 | I' 74271 0 | I' 77730 0 | C' 03705 0 | I' 76521 0 |
| 34,3350 | C' 01736 1 | C' 00025 0 | I' 77761 1 | C' 31553 0 | C' 03212 0 | I' 77624 1 | C' 47432 1 | I' 45001 1 |
| 34,3360 | C' 00001 0 | C' 47675 0 | I' 77750 0 | C' 03705 0 | I' 53775 1 | C' 03204 1 | C' 20160 1 | C' 00017 1 |
| 34,3370 | I' 77624 1 | C' 47432 1 | I' 45175 0 | C' 00025 0 | C' 47577 1 | I' 77721 0 | C' 31557 1 | I' 77761 1 |



TOTAL LISTING FOR PARAGRAPH J 203, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, 'A' DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED 'I' (INTERPRETIVE OPERATOR WORDS) OR 'C' (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|--------------|
| 34,3400 | C' 15270 0 | I' 53750 0 | C' 03705 0 | C' 20183 1 | I' 77776 1 | 00004 0 | 34714 1 | 55647 1 |
| 34,3410 | 55651 0 | 55653 1 | 31772 1 | 55646 0 | 31773 0 | 55650 1 | 31774 1 | 55652 0 |
| 34,3420 | 00006 1 | 30155 0 | 53526 0 | 00006 1 | 30160 0 | 53530 1 | 00006 1 | 30162 1 |
| 34,3430 | 53532 0 | 00006 1 | 50120 1 | 30017 1 | 53576 0 | 00006 1 | 50120 1 | 30021 1 |
| 34,3440 | 53600 1 | 00006 1 | 50120 1 | 30023 0 | 53602 0 | 44712 0 | 55332 0 | 00003 1 |
| 34,3450 | 34714 1 | 03254 1 | 06006 1 | I' 77751 1 | C' 03373 0 | C' 01156 1 | I' 52135 1 | C' 31601 1 |
| 34,3460 | C' 03704 1 | I' 71220 1 | C' 03705 0 | C' 02316 1 | C' 34041 0 | C' 27045 0 | I' 77775 1 | C' 00001 0 |
| 34,3470 | C' 27707 1 | C' 00007 0 | C' 03715 1 | I' 77745 1 | C' 02316 1 | C' 34041 0 | C' 27057 0 | I' 77775 1 |
| 34,3500 | C' 00007 0 | C' 27204 1 | C' 00001 0 | I' 53451 1 | C' 03707 1 | C' 03707 1 | I' 76521 0 | C' 01736 1 |
| 34,3510 | C' 17357 0 | C' 00045 0 | C' 02316 1 | I' 77775 1 | C' 15330 0 | C' 37351 1 | C' 56126 1 | C' 01334 1 |
| 34,3520 | I' 77775 1 | C' 31542 0 | C' 37351 1 | C' 56126 1 | C' 03723 1 | I' 77614 1 | C' 02745 0 | C' 71533 1 |
| 34,3530 | C' 01156 1 | I' 77650 1 | C' 03705 0 | I' 77775 1 | C' 15330 0 | C' 03351 0 | I' 52151 0 | C' 01334 1 |
| 34,3540 | C' 71530 1 | C' 15066 0 | C' 17626 0 | C' 00000 1 | C' 00000 1 | C' 11132 1 | C' 27477 0 | C' 01616 1 |
| 34,3550 | C' 37651 1 | C' 16721 1 | C' 31463 1 | C' 06315 0 | C' 20000 0 | C' 00000 1 | C' 20000 0 | C' 00000 1 |
| 34,3560 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 17676 0 | C' 20113 0 |
| 34,3570 | C' 75766 1 | C' 45544 0 | C' 00000 1 | C' 00000 1 | C' 02011 0 | C' 32233 1 | C' 17676 0 | C' 20113 0 |
| 34,3600 | C' 00001 0 | 04555 0 | C' 17573 0 | 36214 0 | 55131 1 | 34712 1 | 55132 1 | 33650 1 |
| 34,3610 | 04555 0 | C' 20624 0 | 05423 1 | 03615 0 | 03607 0 | 41132 1 | 64712 1 | 00006 1 |
| 34,3620 | 13645 1 | 05447 0 | C' 00120 1 | 06006 1 | I' 43234 0 | C' 45505 0 | C' 07137 0 | C' 36316 0 |
| 34,3630 | C' 71461 1 | I' 77776 1 | 33651 0 | 04555 0 | C' 20624 0 | 05423 1 | 03640 0 | 03623 0 |
| 34,3640 | 05447 0 | C' 00124 0 | 04555 0 | C' 56000 1 | 15423 0 | 05435 0 | C' 00120 1 | 03623 0 |
| 34,3650 | C' 01006 0 | C' 01422 1 | C' 20000 0 | C' 00000 1 | C' 10000 0 | C' 00000 1 | C' 04000 0 | C' 00000 1 |
| 34,3660 | C' 02000 0 | C' 00000 1 | C' 00020 0 | C' 00000 1 | C' 00004 0 | C' 00000 1 | C' 00002 0 | C' 00000 1 |
| 34,3670 | C' 00000 1 | C' 04000 0 | C' 00000 1 | C' 00010 0 | C' 00000 1 | C' 00001 0 | C' 00000 1 | C' 00000 1 |
| 34,3700 | C' 77777 0 | C' 77557 0 | C' 77777 0 | C' 77760 0 | C' 00000 1 | C' 00012 1 | C' 54631 1 | C' 63145 1 |
| 34,3710 | C' 21463 0 | C' 06315 0 | C' 77777 0 | C' 77771 0 | C' 37777 1 | C' 37777 1 | C' 77777 0 | C' 77766 0 |
| 34,3720 | C' 77777 0 | C' 77767 1 | C' 00000 1 | C' 35610 0 | C' 36703 0 | C' 03743 1 | C' 33041 1 | C' 37714 1 |
| 34,3730 | C' 00003 1 | C' 13241 1 | C' 20000 0 | C' 00000 1 | C' 00605 1 | C' 00612 1 | C' 00613 0 | C' 40214 1 |
| 34,3740 | C' 45266 1 | C' 73645 1 | C' 56536 1 | C' 70467 0 | C' 71205 0 | C' 16525 1 | C' 12525 0 | C' 22525 0 |
| 34,3750 | C' 12525 0 | C' 17775 1 | C' 06676 0 | C' 00000 1 | C' 00062 0 | C' 00020 0 | C' 14223 1 | C' 00000 1 |
| 34,3760 | C' 05174 0 | C' 00002 0 | C' 21727 0 | C' 00000 1 | C' 01654 1 | C' 00000 1 | C' 00764 1 | C' 00040 0 |
| 34,3770 | C' 30447 0 | C' 00000 1 | C' 00010 0 | C' 00000 1 | C' 00322 1 | C' 03775 1 | C' 03776 1 | CksM 77620 0 |



OCTAL LISTING FOR PARAGRAPH J 204, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "I" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED IIA (INTERPRETIVE OPERATOR WORDS) OR ICA (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 35,2008 | 03728 1 | 02003 0 | 03741 0 | 03748 1 | 33125 1 | 03114 0 | 03073 0 | 06006 1 |
| 35,2010 | I' 71214 0 | C' 01270 0 | C' 03663 1 | C' 17413 1 | C' 03744 0 | I' 43054 1 | C' 72020 0 | C' 01070 1 |
| 35,2020 | I' 77624 1 | C' 10716 0 | I' 43145 0 | C' 15332 1 | C' 03461 1 | I' 43014 0 | C' 01310 1 | C' 72031 0 |
| 35,2030 | C' 03661 0 | C' 02364 1 | I' 43345 1 | C' 03663 1 | C' 02364 1 | C' 34041 0 | C' 45354 1 | I' 77624 1 |
| 35,2040 | C' 72212 0 | I' 77454 1 | C' 72053 1 | 05537 0 | C' 00611 1 | 34743 0 | 04555 0 | C' 20624 0 |
| 35,2050 | 04106 1 | 02003 0 | 02043 1 | I' 43014 0 | C' 03601 0 | C' 72032 0 | C' 01310 1 | C' 72063 0 |
| 35,2060 | I' 77776 1 | 03073 0 | 02066 0 | I' 77776 1 | 33125 1 | 03114 0 | 06006 1 | I' 71201 1 |
| 35,2070 | C' 00001 0 | C' 03746 1 | C' 14047 1 | C' 03754 1 | I' 71406 0 | C' 16734 0 | I' 77756 0 | C' 26732 0 |
| 35,2100 | C' 03554 0 | I' 77657 0 | C' 57176 0 | C' 26657 1 | C' 03562 0 | I' 43057 1 | C' 57176 0 | C' 03466 0 |
| 35,2110 | C' 36746 1 | C' 24737 1 | I' 77746 1 | C' 03663 1 | C' 03503 1 | I' 77616 0 | C' 00037 0 | C' 37656 0 |
| 35,2120 | C' 72534 0 | I' 51575 1 | C' 03646 0 | C' 26635 0 | C' 03640 0 | I' 51451 0 | C' 03620 0 | C' 26637 1 |
| 35,2130 | C' 03540 0 | I' 45115 0 | C' 03612 1 | C' 45312 0 | I' 77624 1 | C' 45422 1 | C' 16641 0 | C' 03663 1 |
| 35,2140 | C' 03413 1 | I' 77776 1 | 33127 0 | 03114 0 | 06006 1 | I' 77624 1 | C' 72742 0 | I' 77624 1 |
| 35,2150 | C' 73005 0 | I' 77650 1 | C' 72022 1 | 03726 1 | 00006 1 | 31422 1 | 02162 0 | 03741 0 |
| 35,2160 | 00006 1 | 31424 1 | 53764 1 | 03746 1 | 06006 1 | I' 77624 1 | C' 10716 0 | I' 77634 0 |
| 35,2170 | C' 45505 0 | C' 03665 1 | I' 77615 0 | C' 02364 1 | C' 03413 1 | C' 03503 1 | C' 34041 0 | C' 45354 1 |
| 35,2200 | I' 77624 1 | C' 72522 1 | I' 77624 1 | C' 72534 0 | I' 77624 1 | C' 72742 0 | I' 77624 1 | C' 73005 0 |
| 35,2210 | I' 77650 1 | C' 72167 1 | I' 66220 1 | C' 01340 1 | C' 03665 1 | C' 40000 0 | I' 40345 1 | C' 33136 0 |
| 35,2220 | C' 00001 0 | C' 27454 1 | C' 03540 0 | C' 27576 0 | C' 03546 0 | C' 27570 0 | C' 03554 0 | C' 27620 0 |
| 35,2230 | C' 03562 0 | C' 03612 1 | I' 77624 1 | C' 72522 1 | I' 63235 0 | C' 03540 0 | I' 53515 0 | C' 03540 0 |
| 35,2240 | I' 46315 1 | I' 51352 1 | C' 02625 1 | I' 63256 0 | I' 63241 0 | C' 00001 0 | I' 75241 1 | C' 02625 1 |
| 35,2250 | I' 65552 0 | I' 50315 0 | C' 02625 1 | C' 03540 0 | I' 71244 0 | C' 72260 0 | C' 15340 1 | I' 41425 1 |
| 35,2260 | I' 71214 0 | C' 03741 0 | C' 72507 0 | C' 03452 1 | C' 14033 1 | I' 77625 0 | C' 03744 0 | C' 03452 1 |
| 35,2270 | I' 45246 0 | C' 33142 0 | I' 77640 0 | C' 72517 1 | I' 70535 0 | C' 03665 1 | I' 72030 1 | C' 01340 1 |
| 35,2300 | C' 00154 1 | I' 77330 1 | C' 03664 0 | C' 03554 0 | I' 65256 0 | C' 00045 0 | I' 53515 0 | C' 03540 0 |
| 35,2310 | I' 77725 1 | I' 41525 0 | C' 00045 0 | I' 77621 1 | C' 00015 0 | C' 14037 0 | C' 15330 0 | I' 41425 1 |
| 35,2320 | C' 03744 0 | I' 50165 0 | C' 00037 0 | C' 01340 1 | I' 71545 0 | I' 56205 0 | C' 00017 1 | C' 00015 0 |
| 35,2330 | I' 77676 0 | C' 00035 1 | I' 44246 1 | C' 15330 0 | I' 77240 1 | C' 01340 1 | C' 02617 0 | I' 53435 0 |
| 35,2340 | C' 00007 0 | I' 41241 0 | C' 03546 0 | C' 00015 0 | I' 47315 0 | C' 00001 0 | C' 03562 0 | I' 53435 0 |
| 35,2350 | C' 00001 0 | I' 41241 0 | C' 03562 0 | C' 00017 1 | I' 77621 1 | I' 63301 0 | C' 00047 1 | C' 00007 0 |
| 35,2360 | I' 50235 0 | C' 00001 0 | C' 02617 0 | I' 50315 0 | C' 00001 0 | C' 00007 0 | I' 65552 0 | I' 77765 0 |
| 35,2370 | I' 43225 0 | C' 15330 0 | C' 03744 0 | I' 65525 0 | C' 00035 1 | I' 75221 1 | C' 15330 0 | C' 00037 0 |



OPAL LISTING FOR PARAGRAPH J 205, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A'A DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #I# (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 35,2400 | I' 77615 0 | I' 56205 0 | C' 33134 1 | I' 77605 1 | I' 41257 1 | C' 20176 0 | I' 51406 1 | I' 50025 0 |
| 35,2410 | C' 03454 1 | C' 72415 1 | I' 75345 1 | C' 03454 1 | I' 77606 1 | I' 51135 1 | C' 03665 1 | C' 72425 1 |
| 35,2420 | I' 71331 0 | C' 03665 1 | C' 37777 1 | I' 77650 1 | C' 72463 0 | I' 41345 0 | C' 03452 1 | C' 00033 1 |
| 35,2430 | I' 71244 0 | C' 72441 0 | C' 03454 1 | I' 77605 1 | C' 33140 1 | C' 17454 1 | I' 70446 0 | I' 52076 1 |
| 35,2440 | C' 72451 1 | I' 51545 1 | C' 03452 1 | I' 51525 1 | C' 00033 1 | I' 77625 0 | I' 71240 1 | C' 72454 1 |
| 35,2450 | I' 77846 0 | I' 52165 1 | C' 03450 0 | C' 72463 0 | I' 57545 1 | C' 03450 0 | I' 70406 1 | C' 03450 0 |
| 35,2460 | I' 77615 0 | I' 77650 1 | C' 72464 1 | C' 03450 0 | I' 77615 0 | C' 02364 1 | C' 02364 1 | I' 83375 0 |
| 35,2470 | C' 03570 0 | C' 03576 0 | I' 77624 1 | C' 72702 1 | I' 77624 1 | C' 45376 1 | I' 83375 0 | C' 03612 1 |
| 35,2500 | C' 03620 0 | I' 77624 1 | C' 72702 1 | I' 77624 1 | C' 45406 1 | I' 77650 1 | C' 72232 1 | I' 43345 1 |
| 35,2510 | C' 03663 1 | C' 02364 1 | C' 17663 1 | I' 77614 1 | C' 01310 1 | C' 72517 1 | C' 03744 0 | I' 52145 0 |
| 35,2520 | C' 15332 1 | C' 01340 1 | I' 52375 1 | C' 03554 0 | C' 03540 0 | I' 41456 0 | C' 26625 1 | C' 03540 0 |
| 35,2530 | I' 53435 0 | C' 03546 0 | C' 02617 0 | I' 77616 0 | I' 77220 1 | C' 02370 1 | C' 03662 0 | I' 65315 0 |
| 35,2540 | C' 03554 0 | C' 03503 1 | I' 65325 0 | C' 03656 1 | C' 15332 1 | I' 45006 0 | C' 72706 0 | C' 27415 1 |
| 35,2550 | C' 00007 0 | C' 27640 0 | C' 03415 1 | I' 63256 0 | C' 03540 0 | I' 41456 0 | I' 50235 0 | C' 00001 0 |
| 35,2560 | C' 02617 0 | I' 77715 1 | I' 72441 0 | C' 00001 0 | I' 75326 1 | I' 43244 1 | C' 72570 0 | C' 15340 1 |
| 35,2570 | C' 16633 0 | C' 03656 1 | I' 77625 0 | C' 03503 1 | C' 03423 1 | I' 40335 0 | C' 33144 0 | C' 00001 0 |
| 35,2600 | I' 63325 0 | C' 33147 0 | C' 03540 0 | C' 27570 0 | C' 03546 0 | C' 37576 1 | C' 22000 1 | I' 77624 1 |
| 35,2610 | C' 72667 0 | I' 64375 1 | C' 03646 0 | C' 00001 0 | I' 77772 0 | C' 37405 1 | C' 02370 1 | I' 45020 1 |
| 35,2620 | C' 01340 1 | C' 72667 0 | I' 61375 1 | C' 03405 0 | C' 00001 0 | I' 77772 0 | C' 03646 0 | I' 63255 0 |
| 35,2630 | C' 03546 0 | C' 03540 0 | I' 65325 0 | C' 03413 1 | C' 03656 1 | I' 41525 0 | C' 15340 1 | I' 77624 1 |
| 35,2640 | C' 72706 0 | I' 77775 1 | C' 00001 0 | C' 03415 1 | I' 41575 0 | C' 02625 1 | I' 57435 1 | C' 02617 0 |
| 35,2650 | I' 41456 0 | I' 76435 1 | C' 02625 1 | I' 77715 1 | I' 64315 1 | C' 03646 0 | C' 00001 0 | I' 77772 0 |
| 35,2660 | C' 36611 1 | C' 01340 1 | I' 40220 0 | C' 01340 1 | C' 00001 0 | I' 77650 1 | C' 72844 1 | I' 57575 1 |
| 35,2670 | C' 02617 0 | C' 24007 0 | C' 03540 0 | I' 57456 1 | C' 00015 0 | I' 76435 1 | C' 02617 0 | C' 00001 0 |
| 35,2700 | I' 43401 0 | C' 00023 0 | I' 65325 0 | C' 15332 1 | C' 02364 1 | I' 41406 0 | I' 45020 1 | C' 02367 1 |
| 35,2710 | C' 27371 1 | I' 71214 0 | C' 01673 1 | I' 43054 1 | C' 72716 1 | C' 01473 0 | I' 45545 1 | C' 63736 0 |
| 35,2720 | I' 73014 0 | C' 00063 1 | C' 03746 1 | I' 43014 0 | C' 04303 0 | C' 72727 0 | C' 00263 0 | C' 25517 0 |
| 35,2730 | I' 77657 0 | C' 57176 0 | C' 25535 0 | I' 77657 0 | C' 57176 0 | C' 35543 0 | C' 27066 1 | I' 52175 0 |
| 35,2740 | C' 00001 0 | C' 02367 1 | I' 43020 1 | C' 02370 1 | C' 01311 0 | C' 72751 1 | I' 52014 0 | C' 00470 1 |
| 35,2750 | C' 72775 1 | I' 77414 0 | C' 03274 0 | 33131 1 | 04555 0 | C' 20824 0 | 04106 1 | 02764 0 |
| 35,2760 | 06006 1 | I' 77414 0 | C' 03074 1 | 02753 1 | 06006 1 | I' 45014 0 | C' 03354 0 | C' 72771 0 |
| 35,2770 | C' 72617 1 | I' 77214 0 | C' 01267 0 | C' 03646 0 | C' 03646 0 | I' 77624 1 | C' 72662 0 | I' 77776 1 |



OUTPUT LISTING FOR PARAGRAPH J 208, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A'S DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED I/A (INTERPRETIVE OPERATOR WORDS) OR C/A (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 35,3000 | 33130 0 | 03114 0 | 06008 1 | I' 77650 1 | C' 02310 1 | I' 71220 1 | C' 02310 1 | C' 33145 1 |
| 35,3010 | C' 03628 0 | I' 11214 0 | C' 01351 1 | C' 73033 0 | C' 33145 1 | I' 77615 0 | C' 33145 1 | C' 03628 0 |
| 35,3020 | I' 11414 0 | C' 01142 1 | C' 13033 0 | 03100 0 | 03010 0 | 03034 0 | 00000 1 | I' 41575 0 |
| 35,3030 | C' 0M40 0 | I' 11024 1 | C' 10860 0 | I' 77776 1 | 03504 0 | 31110 0 | 55100 0 | 34734 0 |
| 35,3040 | 04555 0 | C' 01132 0 | 33132 1 | 04555 0 | C' 20824 0 | 03050 1 | 03053 1 | 03063 1 |
| 35,3050 | 30005 1 | 54000 0 | 04106 1 | 40076 1 | 74705 0 | 00000 1 | 13050 0 | 05301 0 |
| 36,3060 | C' 04024 0 | 03435 0 | C' 00047 1 | 30005 1 | 54000 0 | 05301 0 | C' 04024 0 | 06008 1 |
| 35,3070 | I' 52014 0 | C' 00070 0 | C' 02366 0 | 00000 1 | 23340 1 | 3311 1 | 04555 0 | C' 20763 1 |
| 35,3100 | 14100 0 | 01340 1 | 13075 1 | 34712 1 | 05415 1 | 16112 1 | 37713 0 | 71011 1 |
| 36,3110 | 00008 1 | 13113 0 | 24002 0 | 00002 0 | 00008 1 | 23787 0 | 55105 0 | 31765 1 |
| 35,3120 | 04555 0 | C' 20024 0 | 14100 0 | 01767 0 | 13111 1 | C' 01445 0 | C' 01401 0 | C' 01472 1 |
| 35,3130 | C' 01413 0 | C' 01521 0 | C' 04055 0 | C' 14441 0 | C' 37325 1 | C' 00001 0 | C' 20650 0 | C' 12525 0 |
| 35,3140 | C' 12525 0 | C' 00004 0 | C' 21505 1 | C' 00002 0 | C' 71111 0 | C' 61337 1 | C' 01252 0 | C' 25253 1 |
| 35,3150 | 34752 8 | 05042 1 | C' 03204 1 | C' 72064 0 | 34734 0 | 04555 0 | C' 01132 0 | 31044 0 |
| 36,3100 | 14611 1 | 00000 1 | 13154 0 | 30105 0 | 14101 1 | 00008 1 | 13111 1 | 33310 0 |
| 35,3110 | 03112 0 | 33311 1 | 04555 0 | C' 20465 1 | 05514 1 | 05514 1 | 13163 1 | 06008 1 |
| 35,3200 | I' 11024 1 | C' 13420 0 | I' 77650 1 | C' 13201 0 | 06006 1 | I' 77624 1 | C' 73312 0 | I' 52375 1 |
| 35,3210 | C' 00001 0 | C' 02321 0 | I' 51406 1 | C' 02321 0 | I' 17301 0 | C' 00041 1 | I' 77762 1 | I' 53457 1 |
| 35,3220 | C' 20201 0 | I' 52315 1 | C' 00007 0 | C' 02335 0 | I' 17641 1 | I' 77752 1 | C' 38323 0 | C' 47432 1 |
| 35,3230 | I' 77624 1 | C' 02000 0 | I' 53575 0 | C' 02321 0 | I' 77715 1 | C' 15330 0 | I' 11214 0 | C' 04713 0 |
| 35,3240 | C' 13242 1 | C' 00015 0 | I' 77624 1 | C' 41001 0 | I' 41505 1 | C' 01738 1 | I' 12431 1 | C' 00001 0 |
| 35,3250 | I' 53445 1 | C' 00001 0 | I' 47315 0 | C' 02327 0 | C' 02335 0 | I' 41256 0 | C' 02321 0 | I' 63241 0 |
| 35,3260 | C' 00015 0 | I' 50312 1 | C' 00007 0 | I' 72565 1 | C' 00015 0 | I' 77728 1 | C' 1325 1 | C' 02327 0 |
| 35,3210 | I' 51041 0 | C' 00001 0 | C' 13211 1 | I' 44345 0 | C' 02325 1 | C' 15340 1 | C' 02325 1 | I' 77776 1 |
| 35,3300 | 34708 1 | 11044 1 | 00000 1 | 15423 0 | 41044 1 | 14611 1 | 27044 1 | 13177 1 |
| 35,3310 | C' 04060 0 | C' 04005 0 | I' 41020 0 | C' 00112 0 | C' 45505 0 | C' 34041 0 | C' 27036 1 | I' 77775 1 |
| 35,3320 | C' 00011 1 | C' 1225 0 | C' 00025 0 | C' 10241 1 | C' 00015 0 | C' 02272 1 | C' 34041 0 | C' 27022 1 |
| 35,3330 | I' 77775 1 | C' 00011 1 | C' 1255 1 | C' 00025 0 | C' 02263 1 | I' 41014 1 | C' 03111 0 | C' 73413 0 |
| 35,3340 | C' 45505 0 | C' 34041 0 | C' 27371 1 | I' 43115 0 | C' 02255 1 | C' 00203 0 | C' 25535 0 | C' 02263 1 |
| 35,3350 | C' 15543 1 | C' 02212 1 | I' 43014 0 | C' 04343 1 | C' 13356 0 | C' 00003 1 | I' 77014 1 | C' 01473 0 |
| 35,3360 | C' 35517 1 | C' 27066 1 | I' 77775 1 | C' 00001 0 | C' 28327 0 | C' 00001 0 | C' 38335 1 | C' 27371 1 |
| 35,3370 | I' 11214 0 | C' 01413 0 | C' 00015 0 | C' 00041 1 | I' 43175 0 | C' 02225 0 | C' 00203 0 | C' 25535 0 |

TOTAL LISTING FOR PARAGRAPH J 21

ALL VALID WORDS ARE BASIC INSTRUCTIONS

| | | | |
|---------|------------|------------|------------|
| 35,3400 | C' 02241 1 | C' 15543 | |
| 35,3410 | C' 27066 1 | I' 77650 | |
| 35,3420 | C' 01205 1 | I' 77624 1 | |
| 35,3430 | C' 73335 0 | 03726 1 | |
| 35,3440 | I' 45014 0 | C' 00670 0 | |
| 35,3450 | C' 73452 0 | C' 00001 0 | |
| 35,3460 | C' 00670 0 | C' 00076 0 | |
| 35,3470 | I' 46135 1 | C' 03747 0 | |
| 35,3500 | C' 36321 1 | C' 74104 1 | |
| 35,3510 | C' 20763 1 | 04106 1 | |
| 35,3520 | 23766 1 | 55765 0 | |
| 35,3530 | 64705 1 | 00006 1 | |
| 35,3540 | 34743 0 | 03517 1 | 04 |
| 35,3550 | 04555 0 | C' 20763 1 | 04 |
| 35,3560 | 04006 1 | I' 52014 0 | C' 036 |
| 35,3570 | 34714 1 | 55145 1 | 0001 |
| 35,3600 | C' 40036 0 | C' 05024 1 | C' 13000 |
| 35,3610 | 06006 1 | I' 77624 1 | C' 63102 |
| 35,3620 | 03636 1 | 05447 0 | C' 00027 |
| 35,3630 | I' 77776 1 | 03655 1 | 03665 1 |
| 35,3640 | 05435 0 | C' 00027 1 | 05435 0 |
| 35,3650 | 01664 1 | 13642 0 | 05301 0 |
| 35,3660 | 04555 0 | C' 20624 0 | 14106 0 |
| 35,3670 | 04555 0 | C' 20624 0 | 04106 1 |
| 35,3700 | 13710 0 | 06006 1 | I' 41575 0 |
| 35,3710 | 00006 1 | 43721 1 | 53626 0 |
| 35,3720 | C' 00000 1 | C' 35100 0 | C' 01441 1 |
| 35,3730 | 05447 0 | C' 00050 1 | 34753 1 |
| 35,3740 | 01770 0 | 00006 1 | 23770 0 |
| 35,3750 | 05435 0 | C' 00031 0 | 05435 0 |
| 35,3760 | C' 23740 0 | C' 00306 1 | C' 06614 1 |
| 35,3770 | C' 05001 0 | C' 00003 1 | C' 27040 0 |

TOTAL LISTING FOR PARAGRAPH J 210, 20'35 OCT. 28, 1968

ALL VALID WORDS ARE BASIC INSTRUCTIONS EACH WORD, A" DENOTES UNUSED FIXED MEMORY

| | | | |
|---------|------------|---------|------------------------------------|
| 36,2000 | C' 00004 0 | C' 3156 | OPERATOR WORDS) OR ACs (CONSTANTS) |
| 36,2010 | C' 12137 1 | C' 0603 | |
| 36,2020 | C' 00000 1 | C' 3076 | I' 50025 0 |
| 36,2030 | C' 03663 1 | C' 3404 | C' 74424 0 |
| 36,2040 | I' 27045 0 | I' 776 | I' 71240 1 |
| 36,2050 | I' 43021 0 | C' 000 | I' 71240 1 |
| 36,2060 | I' 63435 0 | C' 03 | I' 85241 0 |
| 36,2070 | C' 00001 0 | I' 65 | C' 03612 1 |
| 36,2100 | C' 01160 1 | C' 01 | C' 74476 1 |
| 36,2110 | C' 03646 0 | I' 7 | C' 36100 0 |
| 36,2120 | C' 34011 0 | C' 01 | I' 86170 1 |
| 36,2130 | I' 43156 1 | C' 01 | C' 03205 0 |
| 36,2140 | C' 24047 1 | C' 01 | C' 03771 0 |
| 36,2150 | C' 36746 1 | C' 01 | C' 03646 0 |
| 36,2160 | C' 16732 0 | C' 01 | C' 60030 1 |
| 36,2170 | I' 43145 0 | C' 01 | C' 33762 1 |
| 36,2200 | C' 34013 1 | C' 01 | I' 45465 1 |
| 36,2210 | C' 02734 0 | C' 01 | C' 33766 0 |
| 36,2220 | C' 15340 1 | C' 01 | I' 2054 1 |
| 36,2230 | I' 77745 1 | C' 01 | C' 3700 0 |
| 36,2240 | I' 77650 1 | C' 01 | 4627 1 |
| 36,2250 | C' 03632 0 | C' 01 | 0000 1 |
| 36,2260 | C' 03663 1 | C' 01 | C' 74610 0 |
| 36,2270 | I' 77715 1 | C' 01 | C' 36746 1 |
| 36,2300 | C' 03640 0 | C' 01 | C' 40051 1 |
| 36,2310 | C' 03746 1 | C' 01 | C' 37726 0 |
| 36,2320 | C' 57176 0 | C' 01 | C' 26415 0 |
| 36,2330 | I' 71214 0 | C' 01 | C' 17636 1 |
| 36,2340 | C' 02321 0 | C' 01 | C' 40051 1 |
| 36,2350 | C' 00356 1 | C' 01 | C' 47021 1 |
| 36,2360 | I' 45214 1 | C' 01 | C' 01352 1 |
| 36,2370 | I' 70501 1 | C' 01 | C' 03656 1 |
| 36,2380 | | C' 01 | C' 31754 0 |
| 36,2390 | | C' 01 | C' 74747 0 |
| 36,2400 | | C' 01 | C' 52052 1 |
| 36,2410 | | C' 01 | C' 36152 1 |
| 36,2420 | | C' 01 | C' 52040 1 |
| 36,2430 | | C' 01 | C' 43345 1 |
| 36,2440 | | C' 01 | C' 74772 0 |
| 36,2450 | | C' 01 | C' 03730 0 |
| 36,2460 | | C' 01 | C' 65301 0 |
| 36,2470 | | C' 01 | C' 00047 1 |
| 36,2480 | | C' 01 | C' 77650 1 |
| 36,2490 | | C' 01 | C' 74732 1 |
| 36,2500 | | C' 01 | C' 74603 1 |
| 36,2510 | | C' 01 | C' 17666 1 |
| 36,2520 | | C' 01 | C' 77624 1 |
| 36,2530 | | C' 01 | C' 71240 1 |
| 36,2540 | | C' 01 | C' 74764 1 |
| 36,2550 | | C' 01 | C' 78027 0 |
| 36,2560 | | C' 01 | C' 37761 0 |
| 36,2570 | | C' 01 | C' 64515 1 |
| 36,2580 | | C' 01 | C' 45020 1 |
| 36,2590 | | C' 01 | C' 03763 0 |



TOTAL LISTING FOR PARAGRAPH J 212, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" A DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED A" A (INTERPRETIVE OPERATOR WORDS) OR A" C (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 36,3000 | C' 64311 0 | I' 77776 1 | 33244 0 | 03215 1 | 34710 0 | 03211 0 | 13013 1 | 12502 0 |
| 36,3010 | 33245 1 | 03231 1 | 12502 0 | 33246 1 | 03205 0 | 12502 0 | 33247 0 | 03231 1 |
| 36,3020 | 12502 0 | 06006 1 | I' 77650 1 | C' 03763 0 | I' 77624 1 | C' 74776 1 | I' 77776 1 | 34716 0 |
| 36,3030 | 55131 1 | 34712 1 | 55132 1 | 33243 1 | 03231 1 | 13033 0 | 06006 1 | I' 67201 0 |
| 36,3040 | C' 00001 0 | C' 01133 1 | I' 53025 0 | C' 31667 1 | C' 75053 0 | I' 60335 1 | C' 00111 0 | C' 00047 1 |
| 36,3050 | I' 52125 0 | C' 31725 0 | C' 75064 1 | I' 43145 0 | C' 31731 0 | C' 00700 0 | C' 75060 0 | I' 77752 1 |
| 36,3060 | I' 77752 1 | I' 65301 0 | C' 00047 1 | C' 31727 1 | I' 56325 0 | C' 03706 0 | I' 77776 1 | 07171 1 |
| 36,3070 | C' 00001 0 | C' 00001 0 | C' 05070 0 | C' 17527 1 | C' 36700 0 | C' 47114 0 | C' 70670 1 | 06006 1 |
| 36,3100 | I' 67206 1 | C' 03076 0 | I' 56205 0 | I' 41257 1 | C' 20165 1 | C' 31733 1 | I' 77621 1 | C' 03716 1 |
| 36,3110 | C' 03413 1 | I' 77776 1 | 33242 0 | 03231 1 | 13112 1 | 34714 1 | 55125 1 | 55126 1 |
| 36,3120 | 06006 1 | I' 77624 1 | C' 65055 1 | I' 53575 0 | C' 03656 1 | I' 74315 0 | C' 03740 1 | C' 31740 0 |
| 36,3130 | I' 74315 0 | C' 03746 1 | C' 31742 1 | I' 50255 0 | I' 50015 0 | C' 31744 1 | C' 75163 1 | I' 50375 0 |
| 36,3140 | C' 03746 1 | C' 03656 1 | I' 71240 1 | C' 75147 1 | C' 31746 0 | I' 52006 0 | C' 75151 0 | I' 41545 0 |
| 36,3150 | C' 31750 1 | I' 77756 0 | C' 16732 0 | I' 43146 0 | C' 03666 1 | C' 26734 0 | C' 03640 0 | C' 26657 1 |
| 36,3160 | C' 03700 0 | C' 36746 1 | C' 24737 1 | I' 43014 0 | C' 01267 0 | C' 03665 1 | I' 77214 0 | C' 01071 0 |
| 36,3170 | I' 77626 0 | C' 60362 0 | C' 00037 0 | I' 77615 0 | C' 03716 1 | C' 27656 1 | C' 03700 0 | I' 77651 0 |
| 36,3200 | C' 03672 1 | C' 37646 1 | C' 73005 0 | I' 77650 1 | C' 75163 1 | 00006 1 | 23762 0 | 03215 1 |
| 36,3210 | 34712 1 | 05415 1 | 15112 1 | 01762 0 | 13240 0 | 00006 1 | 23733 1 | 04555 0 |
| 36,3220 | C' 20763 1 | 14106 0 | 13225 0 | 13227 1 | 01733 1 | 51733 1 | 10004 1 | 51733 1 |
| 36,3230 | 10003 0 | 00006 1 | 23762 0 | 04555 0 | C' 20624 0 | 14106 0 | 13240 0 | 01762 0 |
| 36,3240 | 51762 0 | 10001 1 | C' 01441 1 | C' 01006 0 | C' 01475 0 | C' 01447 1 | C' 01474 1 | C' 01521 0 |
| 36,3250 | I' 77620 0 | C' 02317 0 | I' 66370 0 | C' 00066 1 | C' 00051 0 | C' 00022 1 | I' 66374 1 | C' 00022 1 |
| 36,3260 | C' 00052 0 | C' 00006 1 | I' 63775 1 | C' 03502 0 | C' 02467 0 | C' 12745 1 | I' 77775 1 | C' 03510 0 |
| 36,3270 | I' 52717 1 | C' 02555 0 | C' 75032 1 | C' 12745 1 | I' 77775 1 | C' 03516 0 | I' 52717 1 | C' 02643 1 |
| 36,3300 | C' 75032 1 | C' 12745 1 | I' 77700 0 | C' 75304 1 | I' 43104 0 | C' 75262 0 | C' 02706 1 | C' 75313 1 |
| 36,3310 | I' 77775 1 | C' 15332 1 | C' 02737 0 | I' 77201 1 | C' 00001 0 | C' 02723 0 | I' 47036 1 | C' 45562 1 |
| 36,3320 | I' 47515 0 | C' 02731 0 | I' 76234 0 | C' 45562 1 | I' 47515 0 | C' 02737 0 | I' 76234 0 | C' 45562 1 |
| 36,3330 | I' 77171 0 | C' 03526 0 | C' 00000 1 | C' 01257 0 | I' 40151 0 | C' 03526 0 | C' 75337 1 | C' 01262 0 |
| 36,3340 | I' 77654 0 | C' 75350 0 | I' 40112 1 | C' 75350 0 | C' 01262 0 | I' 52114 1 | C' 00001 0 | C' 75342 0 |
| 36,3350 | I' 61551 1 | C' 01257 0 | I' 75405 1 | C' 01262 0 | I' 76257 0 | C' 57576 1 | C' 01257 0 | I' 63101 1 |
| 36,3360 | C' 00050 1 | C' 77775 1 | I' 77134 1 | C' 02215 0 | C' 00242 0 | I' 40265 1 | C' 15322 0 | C' 00001 0 |
| 36,3370 | C' 03456 0 | I' 60351 0 | C' 01257 0 | C' 00047 1 | I' 65345 0 | C' 00155 0 | C' 03524 1 | I' 77701 1 |

OCAL LISTING FOR PARAGRAPH J 213, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, S'S DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED A1 (INTERPRETIVE OPERATOR WORDS) OR A2 (CONSTANTS)

| | | | | | | | | |
|---------|--------------|------------|------------|------------|------------|------------|------------|------------|
| 36,3400 | C' 00051 0 | I' 70460 1 | C' 00050 1 | I' 41471 0 | I' 77650 1 | C' 77676 0 | I' 77731 1 | C' 00052 0 |
| 36,3410 | C' 00066 1 | I' 60775 1 | C' 02723 0 | C' 75134 0 | I' 77206 0 | C' 02731 0 | I' 53303 1 | C' 75112 1 |
| 36,3420 | I' 77206 0 | C' 02737 0 | I' 53303 1 | C' 75070 1 | I' 61006 0 | C' 75411 1 | I' 45575 1 | C' 74303 1 |
| 36,3430 | I' 45575 1 | C' 74311 1 | I' 45575 1 | C' 74317 1 | I' 77214 0 | C' 02706 1 | C' 75441 1 | C' 15332 1 |
| 36,3440 | C' 03474 0 | I' 66374 1 | C' 00022 1 | C' 00052 0 | C' 00006 1 | I' 77773 1 | C' 74275 1 | I' 53761 1 |
| 36,3450 | C' 00001 0 | C' 20201 0 | C' 11301 0 | I' 77304 0 | C' 75445 0 | C' 01265 1 | I' 77732 1 | C' 01265 1 |
| 36,3460 | I' 77650 1 | C' 02317 0 | I' 45020 1 | C' 02317 0 | C' 27371 1 | I' 74375 0 | C' 03460 0 | C' 03456 0 |
| 36,3470 | C' 26643 1 | C' 03466 0 | I' 77761 1 | C' 03456 0 | C' 26651 1 | C' 03474 0 | I' 77761 1 | C' 03456 0 |
| 36,3500 | C' 02657 1 | I' 77776 1 | 33763 0 | 55252 1 | 55253 0 | 34714 1 | 55254 1 | 55255 0 |
| 36,3510 | 05301 0 | C' 04022 0 | 05435 0 | C' 00236 0 | 31253 1 | 55252 1 | 31255 1 | 55254 1 |
| 36,3520 | 06006 1 | I' 73150 1 | C' 01252 0 | C' 01254 0 | I' 70731 0 | C' 00051 0 | C' 00006 1 | C' 75054 1 |
| 36,3530 | I' 60276 1 | C' 00052 0 | I' 65161 1 | C' 02643 1 | C' 00051 0 | I' 57144 1 | C' 00047 1 | C' 02215 0 |
| 36,3540 | I' 65057 0 | C' 57576 1 | C' 00051 0 | I' 77653 1 | C' 02467 0 | C' 02665 0 | I' 57543 1 | C' 75054 1 |
| 36,3550 | I' 74301 0 | C' 00052 0 | C' 02651 1 | I' 71124 0 | C' 00051 0 | C' 00047 1 | I' 53674 1 | C' 02215 0 |
| 36,3560 | C' 57576 1 | I' 52724 1 | C' 00051 0 | C' 02555 0 | C' 02673 1 | I' 77614 1 | C' 02746 0 | C' 75607 1 |
| 36,3570 | I' 57543 1 | C' 75054 1 | I' 74301 0 | C' 00052 0 | C' 02657 1 | I' 71124 0 | C' 00051 0 | C' 00047 1 |
| 36,3600 | I' 53674 1 | C' 02215 0 | C' 57576 1 | I' 52724 1 | C' 00051 0 | C' 02643 1 | C' 02701 0 | I' 77624 1 |
| 36,3610 | C' 56741 0 | I' 77776 1 | 31252 0 | 63764 1 | 55253 0 | 31254 0 | 67715 0 | 55255 0 |
| 36,3620 | 06006 1 | I' 66350 1 | C' 01252 0 | C' 00051 0 | C' 00006 1 | I' 77775 1 | C' 02665 0 | C' 06467 1 |
| 36,3630 | I' 77775 1 | C' 02673 1 | C' 06555 1 | I' 77214 0 | C' 02746 0 | C' 75645 1 | C' 02701 0 | C' 06643 0 |
| 36,3640 | I' 52100 1 | C' 75643 1 | C' 75653 0 | I' 77634 0 | C' 75510 1 | I' 43335 0 | C' 01256 1 | C' 35766 0 |
| 36,3650 | I' 52030 0 | C' 75653 0 | C' 75640 1 | I' 77624 1 | C' 56741 0 | I' 53375 0 | C' 01701 0 | C' 01273 0 |
| 36,3660 | C' 03450 0 | I' 47014 1 | C' 00707 1 | C' 75753 1 | C' 26745 0 | I' 77004 0 | C' 57343 1 | C' 00000 1 |
| 36,3670 | I' 77014 1 | C' 04343 1 | C' 75674 0 | C' 00002 0 | I' 53775 1 | C' 01257 0 | C' 57205 1 | I' 40055 0 |
| 36,3700 | C' 01521 0 | C' 75713 0 | C' 25521 0 | C' 01265 1 | I' 53257 1 | C' 57202 0 | C' 01527 0 | I' 77600 1 |
| 36,3710 | C' 75717 1 | C' 35527 1 | C' 75726 0 | I' 53375 0 | C' 01535 0 | C' 01257 0 | C' 01535 0 | I' 53375 0 |
| 36,3720 | C' 01543 1 | C' 01265 1 | C' 01543 1 | I' 45134 0 | C' 02150 1 | C' 23344 0 | I' 77624 1 | C' 56741 0 |
| 36,3730 | I' 47014 1 | C' 00707 1 | C' 75756 1 | C' 26724 1 | I' 77624 1 | C' 20203 1 | I' 77624 1 | C' 56741 0 |
| 36,3740 | I' 77214 0 | C' 02746 0 | C' 75745 0 | C' 03450 0 | C' 01701 0 | I' 66150 0 | C' 02317 0 | C' 00052 0 |
| 36,3750 | I' 77776 1 | 04574 0 | C' 27406 0 | I' 52034 1 | C' 26700 1 | C' 75665 0 | I' 45034 1 | C' 26651 1 |
| 36,3760 | C' 20237 0 | I' 77650 1 | C' 75736 1 | C' 00066 1 | C' 77771 0 | C' 00014 1 | C' 03766 0 | C' 03767 1 |
| 36,3770 | CKSM 40555 0 | | | | | | | |



TOTAL LISTING FOR PARAGRAPH / 214, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A'S DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED I'S (INTERPRETIVE OPERATOR WORDS) OR A'S (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 37,2000 | C' 01231 0 | 34712 1 | 55132 1 | 34711 1 | 04555 0 | C' 20761 0 | 04106 1 | 02011 0 |
| 37,2010 | 02003 0 | 32102 0 | 04555 0 | C' 20624 0 | 04106 1 | 02017 0 | 02011 0 | 06006 1 |
| 37,2020 | I' 77745 1 | C' 01046 1 | C' 02316 1 | I' 45335 0 | C' 01133 1 | C' 36100 0 | I' 71230 0 | C' 76042 0 |
| 37,2030 | C' 02316 1 | C' 34041 0 | C' 27036 1 | I' 46135 1 | C' 00050 1 | C' 76050 0 | I' 43175 0 | C' 00001 0 |
| 37,2040 | C' 01423 0 | C' 76053 0 | I' 77745 1 | C' 02316 1 | C' 34041 0 | C' 27022 1 | I' 77650 1 | C' 76033 0 |
| 37,2050 | I' 43175 0 | C' 00001 0 | C' 01663 0 | C' 16152 0 | C' 00015 0 | I' 45014 0 | C' 00662 0 | C' 26322 0 |
| 37,2060 | I' 77776 1 | 32101 0 | 04555 0 | C' 20624 0 | 04106 1 | 04106 1 | 06006 1 | I' 43345 1 |
| 37,2070 | C' 02316 1 | C' 36076 0 | C' 01046 1 | I' 77634 0 | C' 76011 0 | C' 00003 1 | C' 25140 0 | C' 00001 0 |
| 37,2100 | C' 00000 1 | C' 01453 1 | C' 01442 1 | I' 57546 1 | C' 14017 1 | I' 77756 0 | C' 14013 0 | C' 16332 1 |
| 37,2110 | C' 00015 0 | I' 41335 1 | C' 03310 0 | C' 03301 0 | I' 45261 0 | C' 20217 1 | C' 15330 0 | I' 45215 0 |
| 37,2120 | C' 02634 1 | C' 02401 0 | I' 77634 0 | C' 70473 0 | I' 71406 0 | I' 77606 1 | I' 72405 0 | C' 00017 1 |
| 37,2130 | C' 14027 1 | I' 77676 0 | C' 00023 0 | I' 72405 0 | C' 00013 0 | C' 14033 1 | I' 41556 1 | C' 00031 0 |
| 37,2140 | I' 72405 0 | C' 00017 1 | C' 14021 1 | I' 77676 0 | I' 72405 0 | C' 00013 0 | C' 24025 0 | C' 00013 0 |
| 37,2150 | I' 77656 1 | C' 26714 1 | C' 00021 1 | I' 77656 1 | C' 26722 1 | C' 00027 1 | I' 77656 1 | C' 36730 0 |
| 37,2160 | C' 47140 1 | I' 41575 0 | C' 02760 1 | I' 45006 0 | C' 47432 1 | I' 47175 1 | C' 00003 1 | C' 45547 0 |
| 37,2170 | C' 27317 1 | C' 15332 1 | C' 24001 0 | C' 00767 1 | I' 47034 0 | C' 45547 0 | C' 70453 1 | C' 14013 0 |
| 37,2200 | C' 00741 0 | I' 72405 0 | C' 00001 0 | I' 60415 1 | C' 00005 1 | I' 77650 1 | C' 70366 0 | 04555 0 |
| 37,2210 | C' 17573 0 | 34714 1 | 55126 1 | 55125 1 | 05435 0 | C' 00120 1 | 05447 0 | C' 00026 0 |
| 37,2220 | 05435 0 | C' 00031 0 | 05435 0 | C' 00027 1 | 05435 0 | C' 00010 0 | 05261 1 | C' 00004 0 |
| 37,2230 | C' 05022 1 | C' 26000 0 | 06006 1 | I' 77634 0 | C' 45505 0 | C' 35225 1 | C' 56343 0 | I' 43014 0 |
| 37,2240 | C' 02756 1 | C' 76243 0 | C' 01476 0 | I' 43014 0 | C' 00707 1 | C' 76247 1 | C' 01674 0 | I' 77624 1 |
| 37,2250 | C' 27113 1 | I' 77624 1 | C' 56741 0 | I' 77624 1 | C' 56343 0 | I' 43014 0 | C' 00747 0 | C' 76261 0 |
| 37,2260 | C' 01674 0 | I' 77624 1 | C' 27113 1 | I' 77776 1 | 37663 0 | 05042 1 | C' 02512 0 | C' 70067 1 |
| 37,2270 | 05261 1 | C' 00072 1 | C' 00111 0 | 34761 0 | 05103 0 | 34706 1 | 70075 1 | 00006 1 |
| 37,2300 | 15112 1 | 34676 1 | 70077 0 | 00006 1 | 15112 1 | 34714 1 | 55775 1 | 05435 0 |
| 37,2310 | C' 00126 1 | 04555 0 | C' 76536 0 | 05447 0 | C' 00126 1 | 34751 0 | 54003 0 | 05435 0 |
| 37,2320 | C' 00024 1 | 06006 1 | I' 77624 1 | C' 30002 0 | I' 77776 1 | 04555 0 | C' 16070 1 | 34712 1 |
| 37,2330 | 55332 0 | 05112 0 | C' 00203 0 | I' 43020 1 | C' 03667 0 | C' 03347 1 | C' 03667 0 | I' 46135 1 |
| 37,2340 | C' 02745 0 | C' 60213 1 | I' 50025 0 | C' 21646 0 | C' 60173 1 | I' 70152 0 | C' 00154 1 | I' 70601 1 |
| 37,2350 | C' 00001 0 | C' 23705 1 | I' 64723 0 | C' 23623 1 | C' 23541 0 | I' 77666 1 | C' 36104 1 | C' 03667 0 |
| 37,2360 | I' 77420 1 | C' 02317 0 | 34753 1 | 54003 0 | 36211 0 | 71044 1 | 10000 0 | 02437 0 |
| 37,2370 | 34711 1 | 27044 1 | 05435 0 | C' 00116 1 | 32442 1 | 04555 0 | C' 20504 1 | 04106 1 |



ODAL LISTING FOR PARAGRAPH J 215, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A'S DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED A's (INTERPRETIVE OPERATOR WORDS) OR A's (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 37,2400 | 02424 1 | 02424 1 | 34716 0 | 05415 1 | 05112 0 | 32441 1 | 04555 0 | C' 20504 1 |
| 37,2410 | 04106 1 | 02416 0 | 02372 0 | 34716 0 | 05415 1 | 05112 0 | 32444 1 | 54001 1 |
| 37,2420 | 31732 0 | 00006 1 | 20001 1 | 55342 1 | 05447 0 | C' 00116 1 | 34751 0 | 54003 0 |
| 37,2430 | 34761 0 | 05027 1 | C' 05423 1 | C' 04062 1 | 06006 1 | I' 77650 1 | C' 02317 0 | 05604 0 |
| 37,2440 | C' 01211 1 | C' 01527 0 | C' 16600 0 | C' 14600 1 | C' 61740 0 | 05435 0 | C' 00037 0 | 37716 0 |
| 37,2450 | 55725 1 | 55734 1 | 30075 0 | 74702 1 | 00006 1 | 12510 0 | 32535 0 | 04555 0 |
| 37,2460 | C' 20465 1 | 02527 0 | 02464 0 | 02456 1 | 32534 1 | 04555 0 | C' 20470 0 | 02527 0 |
| 37,2470 | 12516 0 | 36211 0 | 05475 1 | C' 01725 0 | C' 01734 0 | 00006 1 | 30025 0 | 53726 1 |
| 37,2500 | 30033 1 | 55727 0 | 30034 0 | 55731 1 | 30032 0 | 55733 0 | 00003 1 | 02484 0 |
| 37,2510 | 32443 0 | 04555 0 | C' 20470 0 | 02527 0 | 12516 0 | 12510 0 | 31725 0 | 64712 1 |
| 37,2520 | 00006 1 | 12527 1 | 36211 0 | 05475 1 | C' 01725 0 | C' 01734 0 | 00003 1 | 04555 0 |
| 37,2530 | C' 20464 0 | 05447 0 | C' 00037 0 | 05423 1 | C' 15200 1 | C' 01536 0 | 34752 0 | 56003 1 |
| 37,2540 | 55771 0 | 04604 1 | 55770 1 | 11775 1 | 02575 1 | 02547 0 | 02576 1 | 06006 1 |
| 37,2550 | I' 77624 1 | C' 71225 1 | I' 77776 1 | 50154 1 | 02555 0 | 02574 0 | 05447 0 | C' 00124 0 |
| 37,2560 | 44712 0 | 55775 1 | 05435 0 | C' 00077 1 | 04555 0 | C' 56000 1 | 05447 0 | C' 00077 1 |
| 37,2570 | 05301 0 | C' 00111 0 | 34714 1 | 02575 1 | 36214 0 | 55775 1 | 31770 0 | 22000 1 |
| 37,2600 | 31771 1 | 56003 1 | 22000 1 | 04577 0 | 34766 1 | 05027 1 | C' 03636 1 | C' 14063 1 |
| 37,2610 | 02625 1 | 37667 1 | 05042 1 | C' 03141 0 | C' 76067 1 | 34735 1 | 05140 1 | C' 02647 0 |
| 37,2620 | C' 76066 0 | 44711 0 | 04114 1 | C' 00005 1 | 15213 0 | 00006 1 | 22070 0 | 03157 1 |
| 37,2630 | 34712 1 | 55230 0 | 40075 1 | 74712 0 | 26075 1 | 34672 0 | 70076 1 | 54076 1 |
| 37,2640 | 40103 1 | 74705 0 | 26103 1 | 34714 1 | 55425 1 | 55426 1 | 00070 0 | 03157 1 |
| 37,2650 | 34715 0 | 54001 1 | 40000 0 | 52763 1 | 34712 1 | 55230 0 | 34711 1 | 55227 0 |
| 37,2660 | 40102 0 | 74711 0 | 10000 0 | 02736 1 | 41246 1 | 55065 1 | 00006 1 | 31662 1 |
| 37,2670 | 53670 0 | 31663 0 | 57671 0 | 00006 1 | 31665 0 | 53673 0 | 31666 0 | 57674 0 |
| 37,2700 | 30102 1 | 74677 1 | 00006 1 | 12721 0 | 32771 1 | 05140 1 | C' 02772 1 | C' 76066 0 |
| 37,2710 | 31162 0 | 57533 0 | 55536 1 | 31164 0 | 57534 1 | 55537 0 | 31166 1 | 57535 0 |
| 37,2720 | 55540 0 | 34715 0 | 55725 1 | 33136 0 | 05140 1 | C' 03227 0 | C' 32066 0 | 46214 1 |
| 37,2730 | 04114 1 | C' 00001 0 | 34362 1 | 54001 1 | 40000 0 | 52763 1 | 40075 1 | 74712 0 |
| 37,2740 | 10000 0 | 02761 0 | 34735 1 | 05140 1 | C' 02647 0 | C' 76066 0 | 34675 1 | 05042 1 |
| 37,2750 | C' 03007 0 | C' 76067 1 | 44710 1 | 04114 1 | C' 00005 1 | 34702 0 | 00006 1 | 05011 1 |
| 37,2760 | 15213 0 | 00006 1 | 32766 1 | 53223 1 | 12746 1 | C' 03070 0 | C' 76067 1 | 55227 0 |
| 37,2770 | 05156 0 | C' 00062 0 | 34711 1 | 54070 1 | 50000 1 | 30037 0 | 50070 0 | 57533 0 |



TOTAL LISTING FOR PARAGRAPH J 216, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, #A DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #I (INTERPRETIVE OPERATOR WORDS) OR #C (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 37,3000 | 50070 0 | 55536 1 | 10070 1 | 12773 1 | 11227 0 | 12767 1 | 05213 1 | 34711 1 |
| 37,3010 | 00004 0 | 54070 1 | 60000 1 | 50000 1 | 11162 1 | 03017 1 | 03025 0 | 63135 0 |
| 37,3020 | 00006 1 | 63025 0 | 05537 0 | C' 00205 0 | 03046 0 | 10070 1 | 13011 0 | 05301 0 |
| 37,3030 | C' 16035 0 | C' 20000 0 | C' 03036 1 | C' 76067 1 | 04555 0 | C' 15262 0 | 06006 1 | I' 51575 1 |
| 37,3040 | C' 01163 1 | I' 77405 0 | C' 37354 1 | 00006 1 | 30155 0 | 21426 1 | 05301 0 | C' 10035 0 |
| 37,3050 | 06006 1 | I' 77624 1 | C' 77323 0 | I' 77776 1 | 05301 0 | C' 10035 0 | 34113 0 | 05475 1 |
| 37,3060 | C' 01231 0 | C' 01170 0 | 00003 1 | 05301 0 | C' 10035 0 | 00006 1 | 31223 0 | 52006 0 |
| 37,3070 | 31205 1 | 55074 1 | 05435 0 | C' 00036 1 | 05261 1 | C' 00005 1 | C' 05022 1 | C' 20000 0 |
| 37,3100 | 06006 1 | I' 77624 1 | C' 27472 0 | I' 77776 1 | 34714 1 | 55125 1 | 55126 1 | 04555 0 |
| 37,3110 | C' 17112 0 | 44702 1 | 55734 1 | 00006 1 | 03011 1 | 05447 0 | C' 00147 0 | 05447 0 |
| 37,3120 | C' 00162 1 | 34704 0 | 70074 0 | 00006 1 | 13130 1 | 05261 1 | C' 00111 0 | C' 00132 1 |
| 37,3130 | 04574 0 | C' 10123 0 | 05301 0 | C' 00035 1 | 15112 1 | C' 63401 1 | C' 00170 1 | C' 00372 1 |
| 37,3140 | C' 00044 1 | 34720 0 | 05475 1 | C' 01231 0 | C' 01170 0 | 00003 1 | 06006 1 | I' 45175 0 |
| 37,3150 | C' 01171 1 | C' 77256 0 | C' 25207 0 | C' 01256 1 | C' 01215 0 | I' 77776 1 | 15112 1 | 00006 1 |
| 37,3160 | 30025 0 | 53246 1 | 44714 0 | 55224 0 | 55225 1 | 55226 1 | 34714 1 | 55166 0 |
| 37,3170 | 55164 1 | 55163 0 | 55165 0 | 55167 1 | 55230 0 | 00006 1 | 40040 1 | 53225 1 |
| 37,3200 | 52040 1 | 55162 1 | 23164 0 | 40041 0 | 57226 0 | 56041 1 | 55166 0 | 00002 0 |
| 37,3210 | 10763 1 | 13213 0 | 15213 0 | 37665 0 | 55074 1 | 11230 0 | 12647 1 | 33255 0 |
| 37,3220 | 54002 1 | 11166 0 | 00002 0 | 13226 0 | 00002 0 | 00002 0 | 22007 0 | 11164 1 |
| 37,3230 | 13233 1 | 13242 1 | 13233 1 | 22041 1 | 11226 1 | 41226 1 | 13206 1 | 13235 1 |
| 37,3240 | 23166 1 | 00002 0 | 11224 0 | 41224 0 | 13247 1 | 13243 0 | 13175 0 | 55162 1 |
| 37,3250 | 41225 1 | 55164 1 | 44714 0 | 52040 1 | 13203 1 | C' 02650 0 | I' 41456 0 | C' 01760 1 |
| 37,3260 | I' 67340 1 | C' 03746 1 | C' 00047 1 | I' 77240 1 | C' 77312 1 | I' 41441 0 | C' 01714 1 | I' 44316 0 |
| 37,3270 | C' 37364 1 | I' 56325 0 | C' 37366 0 | C' 00043 0 | C' 00041 1 | I' 41205 0 | C' 37370 1 | I' 65361 0 |
| 37,3300 | C' 01760 1 | I' 41205 0 | C' 37372 0 | C' 00041 1 | I' 53361 0 | C' 01714 1 | I' 77626 0 | C' 76521 0 |
| 37,3310 | I' 41455 0 | C' 01760 1 | I' 60345 0 | C' 00043 0 | C' 00050 1 | I' 53663 1 | C' 37356 0 | C' 56623 0 |
| 37,3320 | I' 45561 1 | C' 76527 0 | I' 77616 0 | I' 74375 0 | C' 01163 1 | C' 37354 1 | I' 76505 0 | C' 01736 1 |
| 37,3330 | C' 03433 0 | I' 41562 0 | I' 41455 0 | C' 01207 0 | I' 74255 0 | C' 01177 1 | C' 37362 1 | I' 44055 1 |
| 37,3340 | C' 01171 1 | C' 00037 0 | C' 35232 1 | C' 77256 0 | I' 53255 0 | I' 77655 1 | C' 01177 1 | C' 35240 1 |
| 37,3350 | C' 00037 0 | C' 03215 1 | C' 27057 0 | C' 02312 0 | C' 32537 1 | C' 61377 0 | C' 55754 1 | C' 77644 1 |
| 37,3360 | C' 65556 1 | C' 00000 1 | C' 31000 0 | C' 01463 1 | C' 06315 0 | C' 00001 0 | C' 65000 1 | C' 02047 0 |
| 37,3370 | C' 36332 0 | C' 00152 1 | C' 14511 1 | 06006 1 | I' 77201 1 | C' 00001 0 | C' 01177 1 | I' 63361 0 |



CODAL LISTING FOR PARAGRAPH J 220, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, #A DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #A (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 40,2000 | 34712 1 | 57012 0 | 54115 0 | 11042 1 | 02006 0 | 02013 1 | 42057 0 | 60154 1 |
| 40,2010 | 00006 1 | 12013 0 | 04410 0 | 56154 1 | 54117 1 | 50000 1 | 02017 0 | 03335 1 |
| 40,2020 | 02076 1 | 02076 1 | 02076 1 | 02076 1 | 02076 1 | 02076 1 | 02076 1 | 02062 1 |
| 40,2030 | 02062 1 | 03335 1 | 03335 1 | 03335 1 | 03335 1 | 03335 1 | 03335 1 | 02074 0 |
| 40,2040 | 02255 1 | 03504 0 | 03335 1 | 03335 1 | 03335 1 | 03335 1 | 03335 1 | 03335 1 |
| 40,2050 | 03382 0 | 02310 1 | 02275 0 | 02060 0 | 03335 1 | 02370 1 | 02271 1 | #C# 00022 1 |
| 40,2060 | 04574 0 | #C# 02002 1 | 10777 1 | 02067 1 | 02067 1 | 05112 0 | 05112 0 | 36214 0 |
| 40,2070 | 71000 1 | 10000 0 | 02076 1 | 03335 1 | 34714 1 | 54117 1 | 10777 1 | 02103 1 |
| 40,2100 | 02103 1 | 02102 0 | 05112 0 | 02225 0 | 11015 0 | 34714 1 | 55015 0 | 02110 0 |
| 40,2110 | 50117 0 | 34072 0 | 74362 0 | 54124 1 | 30777 0 | 54143 0 | 03225 1 | 36214 0 |
| 40,2120 | 71000 1 | 10000 0 | 02133 1 | 50137 1 | 57001 1 | 54022 0 | 40022 0 | 40022 0 |
| 40,2130 | 56022 1 | 60117 0 | 02150 1 | 50137 1 | 57001 1 | 54154 0 | 34714 1 | 54155 1 |
| 40,2140 | 34377 0 | 07256 1 | 56155 0 | 60117 0 | 54155 1 | 02150 1 | 26154 0 | 02166 1 |
| 40,2150 | 50137 1 | 55001 0 | 40777 1 | 50137 1 | 02216 0 | 00006 1 | 12160 0 | 02213 0 |
| 40,2160 | 36214 0 | 71000 1 | 10000 0 | 02166 1 | 40777 1 | 02214 1 | 44712 0 | 60137 1 |
| 40,2170 | 00006 1 | 62164 0 | 07052 1 | #C# 02223 0 | 36214 0 | 71000 1 | 50000 1 | 02177 1 |
| 40,2200 | 02204 0 | 00006 1 | 40156 1 | 52156 1 | 56156 0 | 50137 1 | 55004 0 | 56155 0 |
| 40,2210 | 50137 1 | 55001 0 | 02164 0 | 10777 1 | 54777 1 | 05112 0 | #C# 00022 1 | #C# 00020 0 |
| 40,2220 | #C# 00012 1 | #C# 00005 1 | #C# 00000 1 | #C# 05174 0 | #C# 13261 0 | 50777 0 | 32231 0 | 54137 0 |
| 40,2230 | 00002 0 | #C# 00004 0 | #C# 00004 0 | #C# 00004 0 | #C# 00004 0 | #C# 00004 0 | #C# 00003 1 | #C# 00003 1 |
| 40,2240 | #C# 00003 1 | #C# 00003 1 | #C# 00003 1 | #C# 00002 0 | #C# 00002 0 | #C# 00002 0 | #C# 00002 0 | #C# 00002 0 |
| 40,2250 | 05640 0 | #C# 00001 0 | #C# 00001 0 | #C# 00000 1 | #C# 00000 1 | 34714 1 | 55001 0 | 34374 0 |
| 40,2260 | 54777 1 | 02502 1 | 34712 1 | 55000 1 | 34714 1 | 55013 0 | 34233 1 | 54136 1 |
| 40,2270 | 05112 0 | 34714 1 | 55002 0 | 34375 1 | 02260 1 | 02347 0 | 02334 1 | 34711 1 |
| 40,2300 | 50137 1 | 64704 0 | 27000 1 | 11015 0 | 34714 1 | 55015 0 | 02307 1 | 05112 0 |
| 40,2310 | 02347 0 | 02314 0 | 34712 1 | 02300 0 | 22002 0 | 02225 0 | 50137 1 | 32342 0 |
| 40,2320 | 54123 0 | 64712 1 | 54122 1 | 34714 1 | 54124 1 | 56123 1 | 03307 0 | 34700 1 |
| 40,2330 | 54124 1 | 56122 0 | 03307 0 | 00001 0 | 22002 0 | 02225 0 | 50137 1 | 32342 0 |
| 40,2340 | 54122 1 | 64712 1 | 54123 0 | 02323 1 | #C# 00005 1 | #C# 00003 1 | #C# 00000 1 | 22002 0 |
| 40,2350 | 36214 0 | 71000 1 | 10000 0 | 05112 0 | 44333 1 | 02363 0 | 44334 0 | 02363 0 |
| 40,2360 | 44335 1 | 02363 0 | 05112 0 | 60777 0 | 00006 1 | 12367 0 | 00002 0 | 00001 0 |
| 40,2370 | 10777 1 | 64712 1 | 02374 0 | 64712 1 | 50000 1 | 32231 0 | 54137 0 | 11015 0 |



TOTAL LISTING FOR PARAGRAPH J 221, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED aIa (INTERPRETIVE OPERATOR WORDS) OR aCa (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 40,2400 | 02406 1 | 02403 1 | 02403 1 | 30137 1 | 02430 1 | 02423 0 | 10137 0 | 54137 0 |
| 40,2410 | 02430 1 | 32500 0 | 27013 0 | 30137 1 | 54125 0 | 00008 1 | 27001 0 | 04555 0 |
| 40,2420 | C' 02337 1 | 30125 1 | 54137 0 | 02428 0 | 25015 1 | 05112 0 | 22002 0 | 02441 1 |
| 40,2430 | 07715 0 | 10000 0 | 00002 0 | 05640 0 | 05112 0 | 00002 0 | 54777 1 | 22002 0 |
| 40,2440 | 02225 0 | 34714 1 | 50137 1 | 55001 0 | 50137 1 | 55004 0 | 54124 1 | 50137 1 |
| 40,2450 | 44704 1 | 71000 1 | 72501 0 | 55000 1 | 50137 1 | 32471 1 | 54143 0 | 03225 1 |
| 40,2460 | 50137 1 | 32474 1 | 54777 1 | 02502 1 | 44711 0 | 20777 1 | 02502 1 | 50137 1 |
| 40,2470 | 34331 1 | 54777 1 | 00001 0 | C' 00016 0 | C' 00005 1 | C' 00004 0 | C' 00015 0 | C' 00011 1 |
| 40,2500 | C' 00003 1 | C' 77774 0 | 30777 0 | 54021 0 | 42515 0 | 00004 0 | 50021 1 | 57023 1 |
| 40,2510 | 00006 1 | 02513 1 | 25016 1 | 00003 1 | 00002 0 | C' 04000 0 | 34714 1 | 54156 1 |
| 40,2520 | 02555 0 | 02523 1 | 02550 0 | 02500 0 | 10154 0 | 56154 1 | 02531 1 | 02540 1 |
| 40,2530 | 07716 0 | 02602 1 | 54154 0 | 02530 0 | 34674 0 | 26154 0 | 34711 1 | 02517 0 |
| 40,2540 | 56154 1 | 02602 1 | 10000 0 | 02532 1 | 05640 0 | 04712 1 | 40000 0 | 02532 1 |
| 40,2550 | 00008 1 | 50156 0 | 32577 0 | 52124 1 | 00002 0 | 10154 0 | 00002 0 | 00002 0 |
| 40,2560 | 12561 0 | 44874 1 | 70154 0 | 54154 0 | 50002 0 | 00001 0 | 00006 1 | 50156 0 |
| 40,2570 | 32577 0 | 52155 1 | 07256 1 | 52124 1 | 20155 1 | 02606 0 | C' 05605 1 | C' 03656 1 |
| 40,2600 | C' 16314 0 | C' 31463 1 | C' 16040 1 | 52124 1 | 52155 1 | 04431 0 | 04574 0 | C' 02563 0 |
| 40,2610 | 52124 1 | 52155 1 | 04431 0 | 02615 1 | 02627 0 | 56156 0 | 56155 0 | 54154 0 |
| 40,2620 | 02606 0 | 02627 0 | 02606 0 | 02627 0 | 36211 0 | 03056 1 | 02606 0 | 56002 0 |
| 40,2630 | 54162 0 | 02653 0 | 07226 0 | 07052 1 | C' 00123 1 | 00162 1 | 02437 0 | 02314 0 |
| 40,2640 | 30154 1 | 03211 0 | 46214 1 | 50117 0 | 04333 0 | 54777 1 | 02653 0 | 30155 0 |
| 40,2650 | 03211 0 | 04574 0 | C' 02505 0 | 50002 0 | 54144 1 | 50140 1 | 02656 0 | 02673 1 |
| 40,2660 | 50117 0 | 30150 0 | 74372 1 | 04327 0 | 00006 1 | 50000 1 | 30001 0 | 52155 1 |
| 40,2670 | 34714 1 | 54156 1 | 00144 0 | 30145 1 | 02664 1 | 50140 1 | 02676 1 | 02701 0 |
| 40,2700 | 03323 0 | 00006 1 | 50145 1 | 30001 0 | 52155 1 | 34333 0 | 54777 1 | 34714 1 |
| 40,2710 | 54156 1 | 07226 0 | 03176 1 | 00136 0 | 07052 1 | C' 02757 0 | 10155 1 | 34700 1 |
| 40,2720 | 02722 1 | 44700 0 | 60155 0 | 03070 0 | 04420 0 | 04420 0 | 03077 1 | 04420 0 |
| 40,2730 | 10154 0 | 02735 1 | 02735 1 | 40000 0 | 54154 0 | 10162 0 | 02753 1 | 02747 1 |
| 40,2740 | 10154 0 | 05640 0 | 02751 0 | 02744 1 | 56154 1 | 74672 1 | 54154 0 | 04574 0 |
| 40,2750 | C' 03150 0 | 44872 1 | 02746 0 | 40154 0 | 74672 1 | 40000 0 | 02746 0 | C' 26161 0 |
| 40,2760 | C' 30707 1 | C' 21616 0 | C' 07071 0 | C' 71527 1 | 07052 1 | C' 00123 1 | 56156 0 | 56155 0 |
| 40,2770 | 56154 1 | 00006 1 | 12774 0 | 04161 0 | 03066 1 | 03077 1 | 02747 1 | 07052 1 |



TOTAL LISTING FOR PARAGRAPH J 222, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A'S DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #1A (INTERPRETIVE OPERATOR WORDS) OR #Ca (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 40,3000 | C' 00123 1 | 02774 1 | 10154 0 | 03007 0 | 03007 0 | 04161 0 | 04161 0 | 32763 1 |
| 40,3010 | 20154 0 | 07052 1 | C' 02761 0 | 34877 0 | 60155 0 | 03070 0 | 02725 0 | 07052 1 |
| 40,3020 | C' 00123 1 | 56156 0 | 60000 1 | 54156 1 | 34714 1 | 60155 0 | 03070 0 | 63077 1 |
| 40,3030 | 50140 1 | 03031 0 | 03042 1 | 30117 0 | 60145 1 | 54002 1 | 56155 0 | 50002 0 |
| 40,3040 | 54001 1 | 02747 1 | 34714 1 | 03034 0 | 07052 1 | C' 00123 1 | 36211 0 | 03056 1 |
| 40,3050 | 03021 1 | 07052 1 | C' 00123 1 | 34711 1 | 03056 1 | 03021 1 | 56002 0 | 54124 1 |
| 40,3060 | 56002 0 | 54123 0 | 04420 0 | 10123 0 | 03061 0 | 00124 0 | 56155 0 | 60000 1 |
| 40,3070 | 54155 1 | 60002 0 | 60154 1 | 54154 0 | 00002 0 | 54162 0 | 00002 0 | 10162 0 |
| 40,3100 | 04161 0 | 00002 0 | 04161 0 | 56002 0 | 54144 1 | 10154 0 | 03116 1 | 03116 1 |
| 40,3110 | 04712 1 | 54154 0 | 02334 1 | 40155 1 | 54155 1 | 00144 0 | 02314 0 | 00144 0 |
| 40,3120 | 00006 1 | 33164 1 | 20155 1 | 00006 1 | 13130 1 | 00006 1 | 34672 0 | 52155 1 |
| 40,3130 | 00002 0 | 56002 0 | 54115 0 | 03103 0 | 03120 1 | 34710 0 | 54137 0 | 34377 0 |
| 40,3140 | 07256 1 | 50154 1 | 34072 0 | 74362 0 | 54124 1 | 34714 1 | 56156 0 | 56155 0 |
| 40,3150 | 54154 0 | 56777 0 | 54143 0 | 10000 0 | 54777 1 | 03225 1 | 10137 0 | 03136 0 |
| 40,3160 | 44374 1 | 54777 1 | 00115 1 | C' 00000 1 | C' 02476 0 | 56002 0 | 54115 0 | 03103 0 |
| 40,3170 | 03135 0 | 56002 0 | 54115 0 | 03103 0 | 34712 1 | 03136 0 | 56002 0 | 54115 0 |
| 40,3200 | 34714 1 | 54124 1 | 36214 0 | 03307 0 | 34710 0 | 03307 0 | 03103 0 | 34334 1 |
| 40,3210 | 03136 0 | 00006 1 | 73221 1 | 22154 1 | 34714 1 | 54155 1 | 56002 0 | 54115 0 |
| 40,3220 | 03174 0 | C' 00244 0 | 03211 0 | 04574 0 | C' 62346 1 | 56002 0 | 54114 1 | 34362 1 |
| 40,3230 | 70143 0 | 54021 0 | 56021 1 | 54141 1 | 34712 1 | 70143 0 | 10000 0 | 03241 0 |
| 40,3240 | 03251 1 | 56124 0 | 04354 1 | 54124 1 | 34675 1 | 70143 0 | 10000 0 | 34711 1 |
| 40,3250 | 04712 1 | 54143 0 | 00004 0 | 50141 0 | 11023 0 | 03257 1 | 05640 0 | 64712 1 |
| 40,3260 | 54142 1 | 50143 1 | 73303 0 | 00006 1 | 60124 0 | 00006 1 | 13301 1 | 50143 1 |
| 40,3270 | 43303 0 | 70142 1 | 60124 0 | 40000 0 | 50141 0 | 57023 1 | 00006 1 | 63301 0 |
| 40,3300 | 25016 1 | 00003 1 | 00114 0 | C' 00037 0 | C' 01740 0 | C' 02000 0 | C' 03740 1 | 54141 1 |
| 40,3310 | 34711 1 | 54143 0 | 56002 0 | 54114 1 | 03252 1 | 03225 1 | 33320 0 | 04577 0 |
| 40,3320 | C' 63401 1 | 44374 1 | 54777 1 | 43342 0 | 60136 0 | 00006 1 | 13337 1 | 43341 0 |
| 40,3330 | 60136 0 | 00006 1 | 13334 1 | 03335 1 | 04220 0 | 04400 1 | 05112 0 | 05622 1 |
| 40,3340 | C' 01501 1 | C' 04140 0 | 04216 0 | 34712 1 | 55014 1 | 04220 0 | 04473 0 | 04447 1 |
| 40,3350 | 03450 0 | 44712 0 | 03344 1 | 34714 1 | 55013 0 | 44374 1 | 54777 1 | 03343 0 |
| 40,3360 | 44714 0 | 03344 1 | 44710 1 | 00006 1 | 03011 1 | 10115 0 | 34675 1 | 71021 1 |
| 40,3370 | 10000 0 | 03400 0 | 04473 0 | 11042 1 | 03376 0 | 05112 0 | 04574 0 | C' 21176 1 |



SYMBOL LISTING FOR PARAGRAPH J 224, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A'S DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED A/A (INTERPRETIVE OPERATOR WORDS) OR A/C (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 41,2000 | 03534 0 | 02771 1 | 34714 1 | 55015 0 | 34233 1 | 54136 1 | 11013 0 | 02035 0 |
| 41,2010 | 02035 0 | 02012 0 | 32033 0 | 01013 1 | 00006 1 | 12027 1 | 36214 0 | 71000 1 |
| 41,2020 | 10000 0 | 02023 1 | 02027 0 | 10777 1 | 02350 0 | 02350 0 | 02027 0 | 41013 0 |
| 41,2030 | 55013 0 | 04447 1 | 01013 1 | C' 03421 0 | C' 00034 0 | 34714 1 | 55000 1 | 44374 1 |
| 41,2040 | 54777 1 | 41001 0 | 55041 1 | 02034 1 | 00006 1 | 02133 1 | 00006 1 | 32114 1 |
| 41,2050 | 52006 0 | 50140 1 | 02052 1 | 02055 0 | 02221 1 | 10146 0 | 02131 0 | 02350 0 |
| 41,2060 | 02064 1 | 25017 0 | 04325 1 | 02120 0 | 34674 0 | 55015 0 | 44233 0 | 00136 0 |
| 41,2070 | 00006 1 | 12073 0 | 02116 0 | 02306 0 | 11000 1 | 04161 0 | 44374 1 | 54777 1 |
| 41,2100 | 11042 1 | 02104 0 | 02105 1 | 02104 0 | 04443 0 | 57005 0 | 04317 0 | 00006 1 |
| 41,2110 | 32114 1 | 52006 0 | 02133 1 | C' 02062 1 | C' 04101 0 | C' 77772 0 | 30156 0 | 04317 0 |
| 41,2120 | 44715 1 | 01001 1 | 00006 1 | 12133 0 | 34335 0 | 54777 1 | 31017 0 | 03353 1 |
| 41,2130 | 02133 1 | 04712 1 | 04317 0 | 42145 1 | 01001 1 | 10000 0 | 04712 1 | 02141 1 |
| 41,2140 | 02146 0 | 54154 0 | 04473 0 | 04574 0 | C' 06000 1 | C' 00050 1 | 51001 1 | 32151 0 |
| 41,2150 | 04577 0 | C' 02350 0 | C' 02304 1 | C' 02372 0 | C' 02377 0 | C' 02357 1 | C' 02352 1 | C' 02520 1 |
| 41,2160 | C' 00675 0 | C' 02350 0 | C' 02350 0 | C' 01323 1 | C' 03220 1 | C' 03220 1 | C' 03220 1 | C' 03220 1 |
| 41,2170 | C' 03220 1 | C' 03220 1 | C' 03220 1 | C' 02350 0 | C' 02350 0 | C' 02350 0 | C' 02726 0 | C' 02737 0 |
| 41,2200 | C' 02754 0 | C' 02677 0 | C' 02612 0 | C' 02350 0 | C' 03343 0 | C' 02350 0 | C' 02350 0 | C' 03456 0 |
| 41,2210 | C' 03502 0 | C' 01360 0 | C' 01343 1 | C' 01351 1 | C' 03603 1 | C' 12347 1 | C' 03420 1 | C' 02350 0 |
| 41,2220 | C' 02350 0 | 10146 0 | 02226 0 | 02350 0 | 02226 0 | 02226 0 | 46211 1 | 01001 1 |
| 41,2230 | 00006 1 | 02233 1 | 02133 1 | 34711 1 | 54117 1 | 02260 1 | 54145 0 | 50117 0 |
| 41,2240 | 30150 0 | 54122 1 | 03027 1 | 02201 0 | 02246 0 | 24122 0 | 30122 0 | 74372 1 |
| 41,2250 | 04327 0 | 50000 1 | 30000 1 | 50145 1 | 56000 1 | 10117 1 | 02234 0 | 02133 1 |
| 41,2260 | 00125 1 | 50000 1 | 12263 0 | 00002 0 | 00002 0 | 00002 0 | 00002 0 | 12300 1 |
| 41,2270 | 12300 1 | 00002 0 | 12300 1 | 00002 0 | 00002 0 | 12300 1 | 00002 0 | 00002 0 |
| 41,2300 | 50002 0 | 00001 0 | 34333 0 | 12307 0 | 34334 1 | 12307 0 | 34335 0 | 54777 1 |
| 41,2310 | 40002 1 | 55013 0 | 04555 0 | C' 00437 1 | 04443 0 | 00136 0 | 55002 0 | 56002 0 |
| 41,2320 | 54117 1 | 00006 1 | 32114 1 | 52006 0 | 10146 0 | 04712 1 | 12331 0 | 12332 0 |
| 41,2330 | 12332 0 | 04317 0 | 34375 1 | 54777 1 | 31002 1 | 12344 1 | 55001 0 | 56002 0 |
| 41,2340 | 54117 1 | 34374 0 | 54777 1 | 31001 1 | 04574 0 | C' 01222 1 | 00117 0 | 04161 0 |
| 41,2350 | 04574 0 | C' 01323 1 | 44711 0 | 02423 0 | 50145 1 | 40002 1 | 56132 1 | 44712 0 |
| 41,2360 | 02423 0 | 50145 1 | 40001 1 | 56131 1 | 02442 1 | 02465 1 | 50145 1 | 40000 0 |
| 41,2370 | 56130 0 | 02404 0 | 44712 0 | 02436 1 | 50145 1 | 40001 1 | 02370 1 | 44711 0 |



TOTAL LISTING FOR PARAGRAPH J 225, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A'S DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED A'S (INTERPRETIVE OPERATOR WORDS) OR A'S (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 41,2400 | 02436 1 | 50145 1 | 40002 1 | 02370 1 | 44711 0 | 61001 1 | 10000 0 | 02412 1 |
| 41,2410 | 00136 0 | 02412 1 | 54122 1 | 50000 1 | 34333 0 | 54777 1 | 50122 0 | 40130 1 |
| 41,2420 | 03353 1 | 56122 0 | 02406 1 | 54123 0 | 22002 0 | 02512 0 | 04345 1 | 76214 1 |
| 41,2430 | 60123 1 | 10000 0 | 00001 0 | 05640 0 | 02350 0 | 00001 0 | 54123 0 | 22002 0 |
| 41,2440 | 02442 1 | 02425 0 | 00006 1 | 22156 0 | 02512 0 | 74675 0 | 10000 0 | 02350 0 |
| 41,2450 | 00156 0 | 22002 0 | 02512 0 | 74675 0 | 10000 0 | 04161 0 | 00001 0 | 22002 0 |
| 41,2460 | 02512 0 | 10000 0 | 00001 0 | 00001 0 | 02350 0 | 22002 0 | 30146 1 | 64712 1 |
| 41,2470 | 00006 1 | 12503 1 | 50140 1 | 02473 0 | 02476 0 | 00001 0 | 03021 1 | 02261 0 |
| 41,2500 | 00001 0 | 24145 1 | 00001 0 | 00006 1 | 51017 0 | 00000 1 | 40000 0 | 12370 0 |
| 41,2510 | C' 00147 0 | C' 00146 1 | 50140 1 | 32507 1 | 50000 1 | 30000 1 | 74364 0 | 00002 0 |
| 41,2520 | 02512 0 | 04345 1 | 76214 1 | 54117 1 | 54122 1 | 60145 1 | 50000 1 | 40000 0 |
| 41,2530 | 50122 0 | 57003 0 | 10122 1 | 02524 0 | 34714 1 | 54155 1 | 54156 1 | 50117 0 |
| 41,2540 | 34333 0 | 54777 1 | 50117 0 | 41003 1 | 54154 0 | 03042 1 | 54123 0 | 00006 1 |
| 41,2550 | 32542 1 | 52006 0 | 50140 1 | 02553 0 | 02557 1 | 03027 1 | 02572 0 | 03021 1 |
| 41,2560 | 02572 0 | C' 02120 0 | C' 64101 0 | 04555 0 | C' 61131 0 | 10117 1 | 02570 1 | 00136 0 |
| 41,2570 | 54117 1 | 02534 1 | 50000 1 | 32575 1 | 04577 0 | C' 61321 0 | C' 62563 0 | C' 60516 0 |
| 41,2600 | C' 60603 1 | C' 60614 1 | C' 60621 1 | C' 60524 1 | C' 60623 0 | C' 65143 1 | C' 65216 1 | C' 60621 1 |
| 41,2610 | C' 60610 0 | C' 60636 1 | 44711 0 | 02423 0 | 02457 0 | 33001 0 | 02336 0 | 02302 1 |
| 41,2620 | 33002 0 | 02336 0 | 02304 1 | 33003 1 | 02336 0 | 02306 0 | 46211 1 | 03004 0 |
| 41,2630 | 00006 1 | 32114 1 | 52006 0 | 34714 1 | 03070 0 | 50145 1 | 54000 0 | 34712 1 |
| 41,2640 | 03070 0 | 50145 1 | 54001 1 | 34711 1 | 03070 0 | 50145 1 | 54002 1 | 44716 1 |
| 41,2650 | 61002 1 | 00006 1 | 12654 0 | 02771 1 | 31003 0 | 04320 1 | 31005 0 | 00004 0 |
| 41,2660 | 00006 1 | 12670 0 | 50145 1 | 40000 0 | 71004 0 | 50145 1 | 26000 0 | 02675 1 |
| 41,2670 | 41004 0 | 50145 1 | 70000 0 | 50145 1 | 54000 0 | 00003 1 | 02771 1 | 44712 0 |
| 41,2700 | 02423 0 | 02457 0 | 33001 0 | 02336 0 | 02302 1 | 33002 0 | 02336 0 | 02304 1 |
| 41,2710 | 44715 1 | 03004 0 | 00006 1 | 32114 1 | 52006 0 | 34714 1 | 03070 0 | 50145 1 |
| 41,2720 | 54000 0 | 34712 1 | 03070 0 | 50145 1 | 54001 1 | 02771 1 | 02302 1 | 00006 1 |
| 41,2730 | 32114 1 | 52006 0 | 34714 1 | 03070 0 | 50145 1 | 54000 0 | 02771 1 | 44712 0 |
| 41,2740 | 02423 0 | 34674 0 | 55015 0 | 02304 1 | 00006 1 | 32114 1 | 52006 0 | 34712 1 |
| 41,2750 | 03070 0 | 50145 1 | 54001 1 | 02771 1 | 44711 0 | 02423 0 | 34674 0 | 55015 0 |
| 41,2760 | 02306 0 | 00006 1 | 32114 1 | 52006 0 | 34711 1 | 03070 0 | 50145 1 | 54002 1 |
| 41,2770 | 02771 1 | 34714 1 | 55000 1 | 44714 0 | 55014 1 | 44374 1 | 54777 1 | 04574 0 |



OCTAL LISTING FOR PARAGRAPH J 226, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A'S DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED a1s (INTERPRETIVE OPERATOR WORDS) OR aCs (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 41,3000 | C' 61450 1 | C' 00025 0 | C' 00026 0 | C' 00027 1 | 54117 1 | 41000 1 | 54021 0 | 40021 0 |
| 41,3010 | 40021 0 | 10000 0 | 13014 0 | 00002 0 | 60117 0 | 00000 1 | 13020 1 | 04101 0 |
| 41,3020 | 00002 0 | 56002 0 | 54114 1 | 34363 0 | 70147 1 | 04336 0 | 00114 0 | 56002 0 |
| 41,3030 | 54114 1 | 50117 0 | 33061 0 | 54001 1 | 50117 0 | 34362 1 | 70153 1 | 50001 0 |
| 41,3040 | 00000 1 | 00114 0 | 56002 0 | 54114 1 | 50140 1 | 03045 0 | 03064 0 | 50117 0 |
| 41,3050 | 33061 0 | 54001 1 | 50117 0 | 34362 1 | 70147 1 | 50001 0 | 00000 1 | 60000 1 |
| 41,3060 | 00114 0 | 03020 0 | 04336 0 | 04345 1 | 34362 1 | 70147 1 | 00000 1 | 00114 0 |
| 41,3070 | 54117 1 | 56002 0 | 54115 0 | 34714 1 | 54162 0 | 50117 0 | 57006 0 | 54155 1 |
| 41,3100 | 50117 0 | 57003 0 | 54154 0 | 50140 1 | 03104 1 | 03132 1 | 50117 0 | 30150 0 |
| 41,3110 | 74372 1 | 04317 0 | 00006 1 | 60117 0 | 54145 0 | 11000 1 | 03165 0 | 02451 0 |
| 41,3120 | 03027 1 | 02201 0 | 03150 0 | 24145 1 | 30145 1 | 20117 1 | 34714 1 | 50117 0 |
| 41,3130 | 53777 0 | 03150 0 | 04325 1 | 11000 1 | 03165 0 | 02451 0 | 03021 1 | 02261 0 |
| 41,3140 | 03144 0 | 34714 1 | 54117 1 | 03123 1 | 30146 1 | 04712 1 | 00006 1 | 13154 0 |
| 41,3150 | 56154 1 | 00115 1 | C' 02126 0 | C' 64101 0 | 44716 1 | 01017 0 | 00006 1 | 12771 0 |
| 41,3160 | 30154 1 | 00006 1 | 51017 0 | 01000 0 | 02771 1 | 03042 1 | 54123 0 | 00006 1 |
| 41,3170 | 33153 0 | 52006 0 | 50140 1 | 03173 1 | 03177 0 | 03027 1 | 03200 0 | 03021 1 |
| 41,3200 | 50000 1 | 33203 0 | 04577 0 | C' 62347 0 | C' 60774 0 | C' 60714 0 | C' 60764 1 | C' 61017 0 |
| 41,3210 | C' 61044 0 | C' 61002 1 | C' 61017 0 | C' 65365 1 | C' 61323 1 | C' 61051 1 | C' 60777 0 | C' 61323 1 |
| 41,3220 | 43227 1 | 71017 1 | 54155 1 | 40136 1 | 64233 1 | 10000 0 | 03235 0 | C' 60000 1 |
| 41,3230 | 03235 0 | 34675 1 | 26155 1 | 34714 1 | 55022 1 | 36043 0 | 71001 0 | 04345 1 |
| 41,3240 | 54022 0 | 40022 0 | 56022 1 | 61002 1 | 54154 0 | 34714 1 | 55012 1 | 11042 1 |
| 41,3250 | 03252 1 | 04516 1 | 00004 0 | 11020 0 | 03261 1 | 34712 1 | 05140 1 | C' 03265 0 |
| 41,3260 | C' 62101 0 | 52155 1 | 53021 1 | 00003 1 | 00136 0 | 04414 1 | 11021 1 | 03273 1 |
| 41,3270 | 03273 1 | 03304 0 | 03304 0 | 33310 0 | 05140 1 | C' 03265 0 | C' 62101 0 | 34371 0 |
| 41,3300 | 05027 1 | C' 03311 1 | C' 62101 0 | 05213 1 | 34714 1 | 55020 0 | 55021 1 | 05213 1 |
| 41,3310 | C' 00144 0 | 11021 1 | 03316 0 | 03316 0 | 05112 0 | 05112 0 | 11012 1 | 03341 1 |
| 41,3320 | 36043 0 | 71020 0 | 02316 1 | 34160 1 | 71020 0 | 63337 0 | 54023 1 | 30023 0 |
| 41,3330 | 55001 0 | 33340 0 | 54136 1 | 43227 1 | 71021 1 | 54156 1 | 02046 1 | C' 75377 0 |
| 41,3340 | C' 04140 0 | 04410 0 | 05112 0 | 34333 0 | 54777 1 | 31047 0 | 54001 1 | 31017 0 |
| 41,3350 | 04610 1 | 03353 1 | 05112 0 | 54022 0 | 56002 0 | 54115 0 | 34675 1 | 26777 1 |
| 41,3360 | 34710 0 | 54137 0 | 40022 0 | 40022 0 | 40022 0 | 40000 0 | 74716 1 | 50000 1 |
| 41,3370 | 34072 0 | 74362 0 | 54124 1 | 56777 0 | 54143 0 | 10000 0 | 54777 1 | 04574 0 |



GENERAL LISTING FOR PARAGRAPH J 230, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #I# (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 42,2000 | 34752 0 | 54003 0 | 34876 1 | 05103 0 | 32061 1 | 04555 0 | C' 20465 1 | 05423 1 |
| 42,2010 | 02012 0 | 02004 1 | 31466 1 | 74707 1 | 10000 0 | 12054 0 | 05447 0 | C' 00212 0 |
| 42,2020 | 04555 0 | C' 40146 0 | 32060 0 | 04555 0 | C' 20465 1 | 05423 1 | 02030 0 | 02022 0 |
| 42,2030 | 31466 1 | 74371 1 | 00006 1 | 12046 0 | 40000 0 | 74371 1 | 00006 1 | 12046 0 |
| 42,2040 | 00004 0 | 04633 0 | C' 13207 0 | 00003 1 | 04555 0 | C' 40277 1 | 32057 1 | 04555 0 |
| 42,2050 | C' 20465 1 | 05423 1 | 05423 1 | 02046 1 | 05435 0 | C' 00212 0 | 02020 1 | C' 01460 1 |
| 42,2060 | C' 01457 0 | C' 01056 0 | 52152 0 | 51002 1 | 32133 1 | 54146 0 | 51002 1 | 32277 1 |
| 42,2070 | 54147 1 | 41002 0 | 64726 0 | 00006 1 | 62100 1 | 34712 1 | 54140 0 | 02116 0 |
| 42,2100 | 34711 1 | 54140 0 | 51002 1 | 32777 1 | 54153 1 | 34747 1 | 70146 0 | 54002 1 |
| 42,2110 | 50000 1 | 32563 0 | 54150 1 | 00006 1 | 50002 0 | 32565 0 | 52152 0 | 52006 0 |
| 42,2120 | 52124 1 | 00006 1 | 50000 1 | 32514 0 | 52124 1 | 52006 0 | 52124 1 | 00006 1 |
| 42,2130 | 50000 1 | 32444 1 | 12124 0 | C' 00000 1 | C' 40000 0 | C' 40000 0 | C' 40000 0 | C' 00000 1 |
| 42,2140 | C' 01045 1 | C' 01131 0 | C' 01003 0 | C' 01363 0 | C' 00375 0 | C' 77776 1 | C' 00000 1 | C' 01051 1 |
| 42,2150 | C' 00000 1 | C' 00000 1 | C' 77777 0 | C' 01051 1 | C' 01333 0 | C' 01155 1 | C' 01155 1 | C' 00032 0 |
| 42,2160 | C' 00037 0 | C' 01155 1 | C' 00000 1 | C' 01051 1 | C' 01045 1 | C' 01045 1 | C' 01362 1 | C' 00000 1 |
| 42,2170 | C' 01045 1 | C' 01045 1 | C' 01045 1 | C' 02345 1 | C' 03412 0 | C' 01045 1 | C' 03660 1 | C' 00024 1 |
| 42,2200 | C' 03662 0 | C' 01516 1 | C' 02640 1 | C' 64000 0 | C' 02003 0 | C' 24006 1 | C' 24011 1 | C' 64014 0 |
| 42,2210 | C' 64017 0 | C' 02022 0 | C' 22025 0 | C' 22030 1 | C' 24033 1 | C' 64036 0 | C' 22041 1 | C' 00044 1 |
| 42,2220 | C' 24047 1 | C' 24052 0 | C' 24055 1 | C' 22060 1 | C' 20083 0 | C' 24066 1 | C' 24071 1 | C' 24074 1 |
| 42,2230 | C' 24077 1 | C' 24102 1 | C' 64105 1 | C' 24110 1 | C' 24113 1 | C' 24116 1 | C' 24121 0 | C' 24124 0 |
| 42,2240 | C' 24127 0 | C' 04132 0 | C' 04135 1 | C' 24140 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 |
| 42,2250 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 64170 0 | C' 24173 1 | C' 00000 1 | C' 24201 1 | C' 24204 1 |
| 42,2260 | C' 24207 1 | C' 24212 0 | C' 02215 0 | C' 24220 1 | C' 24223 1 | C' 24226 1 | C' 02231 0 | C' 02234 0 |
| 42,2270 | C' 04237 0 | C' 02242 1 | C' 04245 0 | C' 04250 1 | C' 04253 1 | C' 04256 1 | C' 24261 1 | C' 00000 1 |
| 42,2300 | C' 04040 1 | C' 04140 0 | C' 04102 0 | C' 00000 1 | C' 00504 0 | C' 02000 0 | C' 04000 0 | C' 04000 0 |
| 42,2310 | C' 04000 0 | C' 00000 1 | C' 00000 1 | C' 02000 0 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 24400 0 |
| 42,2320 | C' 04102 0 | C' 04102 0 | C' 04102 0 | C' 04102 0 | C' 04140 0 | C' 04102 0 | C' 00000 1 | C' 24400 0 |
| 42,2330 | C' 04140 0 | C' 04000 0 | C' 00140 1 | C' 00000 1 | C' 20102 0 | C' 04140 0 | C' 24400 0 | C' 24400 0 |
| 42,2340 | C' 24400 0 | C' 24400 0 | C' 24400 0 | C' 24400 0 | C' 24400 0 | C' 24400 0 | C' 24400 0 | C' 24500 1 |
| 42,2350 | C' 00542 1 | C' 24410 1 | C' 20204 0 | C' 00410 1 | C' 10000 0 | C' 00000 1 | C' 00306 1 | C' 00614 1 |
| 42,2360 | C' 00510 0 | C' 00417 0 | C' 00204 1 | C' 00004 0 | C' 10507 1 | C' 10507 1 | C' 10200 1 | C' 00444 0 |
| 42,2370 | C' 00010 0 | C' 24510 0 | C' 24512 1 | C' 10440 0 | C' 00204 1 | C' 20451 0 | C' 00457 1 | C' 36460 0 |

OCTAL LISTING FOR PARAGRAPH J 231, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, #A DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #A (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 42,2400 | C' 00000 1 | C' 37044 0 | C' 10217 1 | C' 34444 1 | C' 35004 0 | C' 00000 1 | C' 00000 1 | C' 00404 1 |
| 42,2410 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 22440 1 |
| 42,2420 | C' 24512 1 | C' 00000 1 | C' 24512 1 | C' 24512 1 | C' 24512 1 | C' 22451 1 | C' 00102 1 | C' 00000 1 |
| 42,2430 | C' 16143 0 | C' 10507 1 | C' 00102 1 | C' 00102 1 | C' 06143 1 | C' 00102 1 | C' 04102 0 | C' 04102 0 |
| 42,2440 | C' 00000 1 | C' 00000 1 | C' 01162 0 | C' 00006 1 | C' 03240 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 |
| 42,2450 | C' 00000 1 | C' 10707 0 | C' 03435 0 | C' 13070 1 | C' 34345 1 | C' 00205 1 | C' 21616 0 | C' 26113 0 |
| 42,2460 | C' 31713 0 | C' 00070 0 | C' 20460 1 | C' 01065 0 | C' 06740 1 | C' 11414 0 | C' 31463 1 | C' 07475 0 |
| 42,2470 | C' 16051 1 | C' 00001 0 | C' 03434 1 | C' 00002 0 | C' 22245 1 | C' 00014 1 | C' 35607 0 | C' 07606 0 |
| 42,2500 | C' 06300 1 | C' 16631 1 | C' 11307 0 | C' 12000 1 | C' 00000 1 | C' 27176 1 | C' 14235 0 | C' 16102 0 |
| 42,2510 | C' 14000 1 | C' 07475 0 | C' 16051 1 | C' 05174 0 | C' 13261 0 | C' 00000 1 | C' 00000 1 | C' 00000 1 |
| 42,2520 | C' 00000 1 | C' 00714 0 | C' 31463 1 | C' 13412 1 | C' 07534 1 | C' 05605 1 | C' 03656 1 | C' 00001 0 |
| 42,2530 | C' 16170 0 | C' 00441 0 | C' 34306 0 | C' 07176 0 | C' 21603 1 | C' 15340 1 | C' 15340 1 | C' 01031 1 |
| 42,2540 | C' 21032 0 | C' 34631 1 | C' 23146 0 | C' 14340 0 | C' 24145 1 | C' 02363 0 | C' 03721 0 | C' 20373 1 |
| 42,2550 | C' 02122 1 | C' 00424 0 | C' 30446 1 | C' 00631 0 | C' 23146 0 | C' 00260 0 | C' 06213 1 | C' 11036 1 |
| 42,2560 | C' 06144 0 | C' 01031 1 | C' 21032 0 | C' 03660 1 | C' 03653 1 | C' 03425 1 | C' 01045 1 | C' 01046 1 |
| 42,2570 | C' 00000 1 | C' 02363 0 | C' 02365 0 | C' 03653 1 | C' 01103 1 | C' 01105 1 | C' 01107 0 | C' 02351 1 |
| 42,2600 | C' 02353 0 | C' 02343 1 | C' 01125 0 | C' 03660 1 | C' 03625 0 | C' 03066 1 | C' 03067 0 | C' 00000 1 |
| 42,2610 | C' 03074 1 | C' 03073 0 | C' 00000 1 | C' 03025 0 | C' 03026 0 | C' 00000 1 | C' 03501 0 | C' 03503 1 |
| 42,2620 | C' 03505 1 | C' 02355 0 | C' 02353 0 | C' 02343 1 | C' 02320 1 | C' 02322 0 | C' 00000 1 | C' 02632 1 |
| 42,2630 | C' 00000 1 | C' 00000 1 | C' 02320 1 | C' 02322 0 | C' 02324 0 | C' 02320 1 | C' 02322 0 | C' 02324 0 |
| 42,2640 | C' 03645 0 | C' 03743 1 | C' 03753 0 | C' 03633 1 | C' 03631 0 | C' 00000 1 | C' 02610 1 | C' 00000 1 |
| 42,2650 | C' 00000 1 | C' 02640 1 | C' 02634 1 | C' 02636 0 | C' 02610 1 | C' 02612 0 | C' 02614 0 | C' 03721 0 |
| 42,2660 | C' 03766 0 | C' 03770 1 | C' 03400 0 | C' 03402 1 | C' 03326 0 | C' 03722 0 | C' 03736 0 | C' 03734 1 |
| 42,2670 | C' 03713 1 | C' 03724 0 | C' 03726 1 | C' 03637 0 | C' 03722 0 | C' 03713 1 | C' 00013 0 | C' 00013 0 |
| 42,2700 | C' 00013 0 | C' 03315 0 | C' 03675 0 | C' 03715 1 | C' 03713 1 | C' 01103 1 | C' 01105 1 | C' 03315 0 |
| 42,2710 | C' 03722 0 | C' 03677 1 | C' 03315 0 | C' 03174 0 | C' 03766 0 | C' 00735 0 | C' 02751 0 | C' 02752 0 |
| 42,2720 | C' 00735 0 | C' 02751 0 | C' 02752 0 | C' 02616 1 | C' 03753 0 | C' 01132 0 | C' 00000 1 | C' 00000 1 |
| 42,2730 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 |
| 42,2740 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 |
| 42,2750 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 03660 1 | C' 03653 1 | C' 03425 1 | C' 03404 1 | C' 03406 0 |
| 42,2760 | C' 03410 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 03674 1 | C' 03676 0 | C' 03700 0 | C' 03537 0 |
| 42,2770 | C' 03541 1 | C' 03543 0 | C' 03664 0 | C' 03666 1 | C' 03670 0 | C' 03404 1 | C' 03406 0 | C' 03410 1 |



TOTAL LISTING FOR PARAGRAPH J 232, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED a/a (INTERPRETIVE OPERATOR WORDS) OR a/c (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 42,3000 | C' 03730 0 | C' 03732 1 | C' 00000 1 | C' 02765 1 | C' 02767 0 | C' 02771 1 | C' 01103 1 | C' 02357 1 |
| 42,3010 | C' 02361 1 | C' 02320 1 | C' 02322 0 | C' 02324 0 | C' 00036 1 | C' 00035 1 | C' 00000 1 | C' 02773 0 |
| 42,3020 | C' 02775 0 | C' 00000 1 | C' 02757 0 | C' 02761 0 | C' 02763 1 | C' 03730 0 | C' 03732 1 | C' 00000 1 |
| 42,3030 | C' 03722 0 | C' 03723 1 | C' 03724 0 | C' 01333 0 | C' 01334 1 | C' 01335 0 | C' 01045 1 | C' 01046 1 |
| 42,3040 | C' 01047 0 | C' 01050 0 | C' 01051 1 | C' 01052 1 | C' 02320 1 | C' 02322 0 | C' 02324 0 | C' 16351 1 |
| 42,3050 | C' 00142 0 | C' 16347 0 | C' 16512 0 | C' 22347 1 | C' 24454 1 | C' 00000 1 | C' 00653 1 | C' 00143 1 |
| 42,3060 | C' 06347 1 | C' 22347 1 | C' 00512 1 | C' 00012 1 | C' 24344 1 | C' 24344 1 | C' 24503 1 | C' 00512 1 |
| 42,3070 | C' 00007 0 | C' 16347 0 | C' 16347 0 | C' 24503 1 | C' 06512 1 | C' 16512 0 | C' 22507 0 | C' 16505 0 |
| 42,3100 | C' 20410 0 | C' 16352 1 | C' 24507 0 | C' 24512 1 | C' 24252 1 | C' 00000 1 | C' 00000 1 | C' 06352 0 |
| 42,3110 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 00000 1 | C' 24511 1 |
| 42,3120 | C' 16347 0 | C' 00000 1 | C' 16347 0 | C' 16347 0 | C' 16347 0 | C' 24512 1 | C' 00302 0 | C' 02041 0 |
| 42,3130 | C' 10347 0 | C' 24344 1 | C' 00302 0 | C' 00302 0 | C' 16347 0 | C' 00302 0 | C' 04102 0 | C' 04102 0 |
| 42,3140 | C' 06143 1 | C' 06043 0 | C' 06252 1 | 04555 0 | C' 00653 1 | 07226 0 | 03332 0 | 07052 1 |
| 42,3150 | C' 03204 1 | 34335 0 | 54777 1 | 04555 0 | C' 61131 0 | 03350 1 | 33206 0 | 56154 1 |
| 42,3160 | 55007 0 | 33207 1 | 50155 0 | 04431 0 | 34334 1 | 54777 1 | 04555 0 | C' 61131 0 |
| 42,3170 | 00006 1 | 33213 1 | 52155 1 | 31007 1 | 04431 0 | 34333 0 | 54777 1 | 04555 0 |
| 42,3200 | C' 61131 0 | 00136 0 | C' 25660 0 | C' 31742 1 | C' 01727 1 | C' 01217 1 | C' 00011 1 | C' 32445 0 |
| 42,3210 | C' 02104 0 | C' 10422 1 | C' 05174 0 | C' 13261 0 | C' 00000 1 | C' 00062 0 | 04555 0 | C' 60653 1 |
| 42,3220 | 07226 0 | 10154 0 | 03224 0 | 03255 0 | 63312 1 | 10000 0 | 03241 0 | 03255 0 |
| 42,3230 | 03255 0 | 10155 1 | 03234 1 | 03255 0 | 63313 0 | 10000 0 | 03241 0 | 03255 0 |
| 42,3240 | 03255 0 | 10154 0 | 33315 0 | 03252 1 | 43315 1 | 54154 0 | 43316 1 | 54155 1 |
| 42,3250 | 33314 1 | 03333 1 | 54154 0 | 33316 0 | 03247 0 | 03317 1 | 33310 0 | 07256 1 |
| 42,3260 | 46214 1 | 26777 1 | 04555 0 | C' 61171 1 | 34714 1 | 54124 1 | 44711 0 | 50117 0 |
| 42,3270 | 64333 0 | 54143 0 | 04555 0 | C' 61225 0 | 03350 1 | 56155 0 | 00006 1 | 73311 0 |
| 42,3300 | 52155 1 | 50117 0 | 34333 0 | 54777 1 | 04555 0 | C' 61171 1 | 04574 0 | C' 62565 0 |
| 42,3310 | C' 23147 1 | C' 23346 1 | C' 77753 0 | C' 41126 1 | C' 03256 0 | C' 00025 0 | C' 37016 1 | 10155 1 |
| 42,3320 | 13327 0 | 13327 0 | 13323 1 | 00006 1 | 43215 0 | 20155 1 | 13332 1 | 00006 1 |
| 42,3330 | 33215 1 | 13325 1 | 56002 0 | 54144 1 | 07052 1 | C' 03202 1 | 00006 1 | 30155 0 |
| 42,3340 | 53010 0 | 04420 0 | 04420 0 | 34714 1 | 56156 0 | 56155 0 | 56154 1 | 00144 0 |
| 42,3350 | 56002 0 | 54144 1 | 31010 1 | 00006 1 | 74710 1 | 00006 1 | 74676 0 | 22155 0 |
| 42,3360 | 31007 1 | 54154 0 | 07052 1 | C' 03210 1 | 00144 0 | 03506 1 | 07052 1 | C' 03447 0 |
| 42,3370 | 03456 0 | 34714 1 | 54156 1 | 33451 1 | 54154 0 | 33452 1 | 56155 0 | 07256 1 |



TOTAL LISTING FOR PARAGRAPH J 234, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, #A DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED #A (INTERPRETIVE OPERATOR WORDS) OR #C# (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 43,2000 | 50154 1 | 02002 1 | 02124 1 | 02150 1 | 02240 0 | 02412 1 | 03203 0 | 03206 0 |
| 43,2010 | 02516 1 | 03100 0 | 02536 0 | 12527 1 | 02275 0 | 02275 0 | 03153 0 | 02275 0 |
| 43,2020 | 02576 1 | 02326 1 | 02637 1 | 02573 1 | 02502 1 | 02276 0 | 02303 0 | 02311 0 |
| 43,2030 | 02314 0 | 02321 0 | 02472 1 | 02367 1 | 02032 0 | 03175 1 | 02505 0 | 02037 1 |
| 43,2040 | 03722 0 | 03724 0 | 03726 1 | 03730 0 | 02706 1 | 02712 1 | 03013 0 | 03016 0 |
| 43,2050 | 02400 1 | 03004 0 | 02700 1 | 02703 1 | 02546 1 | 02553 0 | 02120 0 | 02565 0 |
| 43,2060 | 02632 1 | 03021 1 | 03025 0 | 02732 0 | 03140 1 | 02751 0 | 02360 0 | 02742 1 |
| 43,2070 | 03124 0 | 02120 0 | 13146 0 | 02275 0 | 02120 0 | 02275 0 | 11044 1 | 02120 0 |
| 43,2100 | 30100 0 | 72123 1 | 10000 0 | 02120 0 | 34112 1 | 55044 1 | 30002 0 | 54155 1 |
| 43,2110 | 44711 0 | 04170 0 | 02113 0 | 00155 0 | 04400 1 | 05423 1 | 34714 1 | 02105 1 |
| 43,2120 | 04400 1 | 04574 0 | C' 21176 1 | C' 24100 0 | 02136 1 | 02127 1 | 02120 0 | 02271 1 |
| 43,2130 | 04555 0 | C' 16516 1 | 04555 0 | C' 17516 0 | 02135 1 | 02121 1 | 44112 0 | 61002 1 |
| 43,2140 | 00006 1 | 12470 1 | 24002 0 | 02147 1 | 00006 1 | 12470 1 | 02120 0 | C' 77670 0 |
| 43,2150 | 02136 1 | 02153 1 | 02175 0 | 02271 1 | 02076 1 | 32173 0 | 04555 0 | C' 20465 1 |
| 43,2160 | 05423 1 | 12162 1 | 32174 1 | 04555 0 | C' 20746 0 | 04555 0 | C' 16602 1 | 04555 0 |
| 43,2170 | C' 17516 0 | 05423 1 | 05423 1 | C' 06226 1 | C' 12200 0 | 31323 1 | 02272 1 | 02076 1 |
| 43,2200 | 34751 0 | 54003 0 | 11314 1 | 02210 0 | 02205 1 | 04400 1 | 05537 0 | C' 00115 1 |
| 43,2210 | 11303 1 | 02217 1 | 02217 1 | 02217 1 | 05537 0 | C' 00117 0 | 05423 1 | 32237 0 |
| 43,2220 | 04555 0 | C' 20465 1 | 05423 1 | 02224 1 | 31773 0 | 55161 1 | 31775 0 | 55160 0 |
| 43,2230 | 32174 1 | 04555 0 | C' 20746 0 | 34712 1 | 55303 1 | 05423 1 | 05423 1 | C' 06134 1 |
| 43,2240 | 02271 1 | 02076 1 | 32267 0 | 04555 0 | C' 20465 1 | 05423 1 | 02247 1 | 32270 0 |
| 43,2250 | 04555 0 | C' 20746 0 | 04555 0 | C' 17012 1 | 04555 0 | C' 17516 0 | 05423 1 | 32266 1 |
| 43,2260 | 04555 0 | C' 17125 1 | 04555 0 | C' 17516 0 | 05423 1 | 05423 1 | C' 02757 0 | C' 06335 1 |
| 43,2270 | C' 12400 0 | 31322 0 | 00006 1 | 16711 1 | 02120 0 | 04447 1 | 34215 0 | 00006 1 |
| 43,2300 | 01007 1 | 04574 0 | C' 62001 1 | 00006 1 | 30033 1 | 53334 0 | 30034 0 | 55335 1 |
| 43,2310 | 02121 1 | 05447 0 | C' 00006 1 | 02121 1 | 05435 0 | C' 00006 1 | 05435 0 | C' 00220 1 |
| 43,2320 | 02121 1 | 05435 0 | C' 00006 1 | 05447 0 | C' 00220 1 | 02121 1 | 02076 1 | 32357 1 |
| 43,2330 | 04555 0 | C' 20465 1 | 05423 1 | 05423 1 | 42356 1 | 60154 1 | 00006 1 | 12341 1 |
| 43,2340 | 05423 1 | 00004 0 | 34714 1 | 54156 1 | 54001 1 | 52025 1 | 52155 1 | 53052 0 |
| 43,2350 | 20155 1 | 07226 0 | 52155 1 | 20025 1 | 00003 1 | 05423 1 | C' 00027 1 | C' 06230 0 |
| 43,2360 | 02715 0 | 02721 1 | 34675 1 | 05042 1 | C' 02002 1 | C' 66065 1 | 02121 1 | 05253 0 |
| 43,2370 | C' 00002 0 | 02120 0 | 00004 0 | 34763 1 | 05042 1 | C' 02000 0 | C' 66065 1 | 02121 1 |

CODAL LISTING FOR PARAGRAPH J 235, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A'S DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED *is* (INTERPRETIVE OPERATOR WORDS) OR *ac* (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 43,2400 | 05253 0 | C' 00002 0 | 02120 0 | 34763 1 | 05042 1 | C' 03736 0 | C' 66065 1 | 05301 0 |
| 43,2410 | C' 00174 0 | 02121 1 | 02715 0 | 32471 1 | 00006 1 | 02012 0 | 10000 0 | 12120 1 |
| 43,2420 | 02457 0 | 02076 1 | 44726 1 | 00006 1 | 03012 1 | 32173 0 | 04555 0 | C' 20465 1 |
| 43,2430 | 12444 0 | 02432 0 | 34752 0 | 54003 0 | 04555 0 | C' 42427 0 | 04555 0 | C' 42446 1 |
| 43,2440 | 34711 1 | 05140 1 | C' 02447 1 | C' 66106 0 | 02457 0 | 15423 0 | 02121 1 | 00006 1 |
| 43,2450 | 31156 1 | 53477 0 | 31157 0 | 55500 1 | 04633 0 | C' 42462 1 | 05213 1 | 34706 1 |
| 43,2460 | 70101 0 | 10000 0 | 00002 0 | 34706 1 | 00006 1 | 02030 0 | 10000 0 | 16706 1 |
| 43,2470 | 00002 0 | C' 00030 1 | 02715 0 | 02076 1 | 00004 0 | 34677 0 | 05042 1 | C' 03565 1 |
| 43,2500 | C' 64104 0 | 05112 0 | 05447 0 | C' 00020 0 | 02121 1 | 40102 0 | 74105 0 | 00006 1 |
| 43,2510 | 62120 0 | 34371 0 | 05027 1 | C' 03446 1 | C' 40106 1 | 02121 1 | 40102 0 | 74105 0 |
| 43,2520 | 00006 1 | 62523 1 | 02120 0 | 34752 0 | 54003 0 | 04574 0 | C' 65521 1 | 02715 0 |
| 43,2530 | 02076 1 | 34676 1 | 05042 1 | C' 02330 0 | C' 56102 1 | 05112 0 | 40102 0 | 74105 0 |
| 43,2540 | 00006 1 | 62543 1 | 02120 0 | 02076 1 | 04555 0 | C' 64000 0 | 02076 1 | 34756 1 |
| 43,2550 | 05103 0 | 04574 0 | C' 46332 1 | 02076 1 | 00004 0 | 40105 1 | 74707 1 | 26105 1 |
| 43,2560 | 34754 0 | 05027 1 | C' 03150 0 | C' 72064 0 | 05112 0 | 02076 1 | 00004 0 | 44707 1 |
| 43,2570 | 70105 1 | 54105 1 | 02560 0 | 05447 0 | C' 00025 0 | 02600 0 | 05435 0 | C' 00025 0 |
| 43,2600 | 02076 1 | 30074 1 | 74704 1 | 00006 1 | 12627 1 | 30075 0 | 74706 0 | 00006 1 |
| 43,2610 | 12627 1 | 30075 0 | 74702 1 | 00006 1 | 12622 1 | 34763 1 | 05027 1 | C' 02447 1 |
| 43,2620 | C' 76067 1 | 05112 0 | 34763 1 | 05027 1 | C' 02445 0 | C' 76067 1 | 05112 0 | 05537 0 |
| 43,2630 | C' 00406 0 | 05423 1 | 34753 1 | 56003 1 | 37716 0 | 55725 1 | 02121 1 | 34704 0 |
| 43,2640 | 70074 0 | 00006 1 | 12121 0 | 05447 0 | C' 00010 0 | 34706 1 | 70075 1 | 00006 1 |
| 43,2650 | 12121 0 | 05447 0 | C' 00031 0 | 05447 0 | C' 00027 1 | 05447 0 | C' 00007 0 | 34752 0 |
| 43,2660 | 54003 0 | 00004 0 | 04555 0 | C' 45245 0 | 37716 0 | 55303 1 | 06006 1 | I' 77624 1 |
| 43,2670 | C' 27371 1 | I' 77776 1 | 05261 1 | C' 00002 0 | C' 00001 0 | 00004 0 | 04574 0 | C' 12641 1 |
| 43,2700 | 05447 0 | C' 00026 0 | 12121 0 | 05435 0 | C' 00026 0 | 12121 0 | 32711 1 | 54335 0 |
| 43,2710 | 02121 1 | C' 03543 0 | 05435 0 | C' 00125 1 | 02121 1 | 31011 0 | 00006 1 | 16711 1 |
| 43,2720 | 12120 1 | 00006 1 | 32731 0 | 53313 0 | 44105 0 | 70102 0 | 54102 0 | 00002 0 |
| 43,2730 | C' 03143 1 | C' 12106 0 | 02715 0 | 02076 1 | 00004 0 | 34676 1 | 05042 1 | C' 03601 0 |
| 43,2740 | C' 70064 1 | 15112 1 | 00004 0 | 44712 0 | 70101 0 | 54101 0 | 05447 0 | C' 00066 1 |
| 43,2750 | 02121 1 | 02715 0 | 02076 1 | 34712 1 | 55376 0 | 34714 1 | 55362 0 | 33243 1 |
| 43,2760 | 55361 0 | 03520 0 | 23372 0 | 23373 1 | 33242 0 | 54156 1 | 32777 1 | 04555 0 |
| 43,2770 | C' 20465 1 | 02774 1 | 03631 0 | 02764 0 | 33243 1 | 55371 1 | 05423 1 | C' 01201 0 |

COAL LISTING FOR PARAGRAPH J 236, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, A'S DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED *is* (INTERPRETIVE OPERATOR WORDS) OR *cs* (CONSTANTS)

| | | | | | | | | |
|---------|------------|------------|------------|------------|------------|------------|------------|------------|
| 43,3000 | 31378 1 | 00008 1 | 13334 1 | 03520 0 | 02715 0 | 02078 1 | 34754 0 | 05042 1 |
| 43,3010 | C' 03215 1 | C' 62064 1 | 05112 0 | 05435 0 | C' 00120 1 | 02121 1 | 05447 0 | C' 00120 1 |
| 43,3020 | 02121 1 | 06006 1 | I' 77414 0 | C' 04466 1 | 02121 1 | 06006 1 | I' 77414 0 | C' 04666 0 |
| 43,3030 | 05520 0 | 02121 1 | 34676 1 | 05042 1 | C' 03037 0 | C' 66103 0 | 05112 0 | 06006 1 |
| 43,3040 | I' 77624 1 | C' 27371 1 | I' 43014 0 | C' 04064 1 | C' 04303 0 | C' 67050 0 | I' 77614 1 | C' 04284 0 |
| 43,3050 | I' 77776 1 | 33076 0 | 05475 1 | C' 01554 1 | C' 01626 1 | 00003 1 | 06006 1 | I' 77624 1 |
| 43,3060 | C' 26862 1 | I' 45154 0 | C' 02150 1 | C' 20237 0 | I' 77624 1 | C' 20263 1 | I' 77776 1 | 33077 1 |
| 43,3070 | 50120 1 | 54052 1 | 04574 0 | C' 27406 0 | I' 77634 0 | C' 21176 1 | C' 00051 0 | C' 67074 0 |
| 43,3100 | 34676 1 | 05042 1 | C' 03105 0 | C' 66103 0 | 05112 0 | 06006 1 | I' 77624 1 | C' 27371 1 |
| 43,3110 | I' 43014 0 | C' 04063 0 | C' 04304 1 | C' 67116 0 | I' 77614 1 | C' 04283 1 | I' 77776 1 | 33076 0 |
| 43,3120 | 05475 1 | C' 01626 1 | C' 01554 1 | 13055 0 | 34700 1 | 70105 1 | 00006 1 | 12120 1 |
| 43,3130 | 05447 0 | C' 00213 1 | 05253 0 | C' 00027 1 | 02120 0 | 05301 0 | C' 00112 0 | 02075 1 |
| 43,3140 | 02076 1 | 34756 1 | 05042 1 | C' 02746 0 | C' 10104 0 | 15112 1 | 05435 0 | C' 00221 0 |
| 43,3150 | 34714 1 | 04574 0 | C' 10010 1 | 05253 0 | C' 00026 0 | 02120 0 | 33174 0 | 54003 0 |
| 43,3160 | 44756 0 | 71751 1 | 55751 1 | 31330 0 | 54021 0 | 30021 1 | 30021 1 | 74756 0 |
| 43,3170 | 40000 0 | 64754 0 | 27751 1 | 02121 1 | C' 02751 0 | 02076 1 | 34754 0 | 05042 1 |
| 43,3200 | C' 03574 1 | C' 60105 0 | 05112 0 | 05435 0 | C' 00177 0 | 12121 0 | 05447 0 | C' 00177 0 |
| 43,3210 | 12121 0 | 00006 1 | 33227 0 | 00004 0 | 53313 0 | 34672 0 | 54030 0 | 40102 0 |
| 43,3220 | 74105 0 | 26102 0 | 04633 0 | C' 42616 0 | 00003 1 | 02121 1 | C' 02765 1 | C' 48106 1 |
| 43,3230 | C' 00061 0 | C' 01373 1 | C' 01461 0 | C' 01773 0 | C' 00060 1 | C' 60017 1 | C' 17777 0 | C' 25252 0 |
| 43,3240 | C' 52400 1 | C' 76777 1 | C' 01371 0 | C' 03334 0 | 31360 0 | 00006 1 | 13255 1 | 00006 1 |
| 43,3250 | 31376 1 | 51377 0 | 52001 1 | 34714 1 | 55360 1 | 00004 0 | 30002 0 | 55357 0 |
| 43,3260 | 55363 1 | 25365 0 | 05541 1 | C' 01102 0 | 11362 0 | 34714 1 | 55362 0 | 03334 0 |
| 43,3270 | 01357 1 | 10000 0 | 13244 1 | 13244 1 | 10000 0 | 13244 1 | 00002 0 | 00006 1 |
| 43,3300 | 23371 0 | 03330 1 | 11362 0 | 03310 0 | 03301 0 | 03310 0 | 25366 0 | 01371 0 |
| 43,3310 | 65630 1 | 00006 1 | 63314 1 | 03265 0 | 25366 0 | 64716 0 | 50000 1 | 03320 0 |
| 43,3320 | 01371 0 | 01371 0 | 01371 0 | 03335 1 | 03516 0 | 01371 0 | 01371 0 | 01371 0 |
| 43,3330 | 00006 1 | 23361 1 | 04574 0 | C' 03231 1 | 03277 0 | 34712 1 | 55372 1 | 34714 1 |
| 43,3340 | 54003 0 | 33232 1 | 55377 1 | 34747 1 | 55373 0 | 03365 1 | 34744 1 | 55377 1 |
| 43,3350 | 34747 1 | 55373 0 | 03365 1 | 34744 1 | 55377 1 | 33233 0 | 55373 0 | 03365 1 |
| 43,3360 | 55372 1 | 33230 0 | 55377 1 | 33231 1 | 55373 0 | 00004 0 | 30003 1 | 55374 1 |
| 43,3370 | 00006 1 | 51377 0 | 30001 0 | 53376 0 | 31377 0 | 55360 1 | 54001 1 | 24001 0 |

| OCCUPIED LOCATIONS | PAGE | OCCUPIED LOCATIONS | PAGE | OCCUPIED LOCATIONS | PAGE | OCCUPIED LOCATIONS | PAGE |
|--------------------|-----------|--------------------|-----------|--------------------|--------------|--------------------|--------------|
| 4000 TO | 4044 127 | 5355 TO | 5362 1379 | 6672 TO | 6715 1100 | 00,2500 TO | 00,2537 1135 |
| 4045 TO | 4071 128 | 5363 TO | 5366 1381 | 6716 TO | 6751 1101 | 00,2540 TO | 00,2567 1136 |
| 4072 TO | 4105 129 | 5367 TO | 5375 1383 | 6752 TO | 6753 1102 | 00,2570 TO | 00,2607 1137 |
| 4106 TO | 4111 190 | 5376 TO | 5403 1385 | 6754 TO | 7030 1103 | 00,2610 TO | 00,2624 1138 |
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| 4633 TO | 4665 1075 | 6064 TO | 6112 1080 | 7624 TO | 7656 1121 | 00,3455 TO | 00,3515 1156 |
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| 07,2707 | TO 07,2745 | 1393 | 10,2564 | TO 10,2615 | 1436 | 11,3450 | TO 11,3527 | 1317 | 13,2350 | TO 13,2372 | 1207 |
| 07,2746 | TO 07,3011 | 1394 | 10,2616 | TO 10,2656 | 1437 | 11,3530 | TO 11,3605 | 1318 | 13,2373 | TO 13,2430 | 1208 |
| 07,3012 | TO 07,3035 | 1395 | 10,2657 | TO 10,2722 | 1438 | 11,3606 | TO 11,3607 | 1319 | 13,2431 | TO 13,2462 | 1209 |
| 07,3036 | TO 07,3074 | 1396 | 10,2723 | TO 10,2762 | 1439 | 11,3610 | TO 11,3666 | 1320 | 13,2463 | TO 13,2522 | 1210 |
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| 07,3464 | TO 07,3511 | 1407 | 10,3551 | TO 10,3621 | 1450 | 12,2510 | TO 12,2542 | 1255 | 13,3167 | TO 13,3233 | 1291 |
| 07,3512 | TO 07,3515 | 1408 | 10,3622 | TO 10,3656 | 1451 | 12,2543 | TO 12,2616 | 1256 | 13,3234 | TO 13,3313 | 1292 |
| 07,3516 | TO 07,3542 | 1409 | 10,3657 | TO 10,3670 | 1452 | 12,2617 | TO 12,2657 | 1257 | 13,3314 | TO 13,3375 | 1293 |
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| 07,3572 | TO 07,3608 | 1411 | 10,3702 | TO 10,3703 | 26 | 12,2737 | TO 12,2771 | 1260 | 13,3452 | TO 13,3471 | 1295 |
| 07,3607 | TO 07,3612 | 1412 | 11,2000 | TO 11,2035 | 479 | 12,2772 | TO 12,3043 | 1263 | 13,3472 | TO 13,3527 | 1296 |
| 07,3613 | TO 07,3635 | 1417 | 11,2036 | TO 11,2115 | 480 | 12,3044 | TO 12,3121 | 1264 | 13,3530 | TO 13,3572 | 1297 |
| 07,3636 | TO 07,3710 | 1418 | 11,2116 | TO 11,2161 | 481 | 12,3122 | TO 12,3174 | 1265 | 13,3573 | TO 13,3620 | 1298 |
| 07,3711 | TO 07,3716 | 1419 | 11,2162 | TO 11,2233 | 482 | 12,3175 | TO 12,3214 | 1266 | 13,3621 | TO 13,3676 | 1299 |
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| 10,2203 | TO 10,2222 | 228 | 11,2428 | TO 11,2506 | 1305 | 12,3552 | TO 12,3632 | 1272 | 14,2002 | TO 14,2052 | 699 |
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| 14,2812 | TO 14,2853 | 717 | 15,3258 | TO 15,3331 | 1052 | 16,3424 | TO 16,3463 | 954 | 17,3550 | TO 17,3568 | 1029 |
| 14,2854 | TO 14,2857 | 721 | 15,3332 | TO 15,3376 | 1053 | 16,3464 | TO 16,3535 | 955 | 17,3569 | TO 17,3623 | 1030 |
| 14,2858 | TO 14,3133 | 722 | 15,3377 | TO 15,3444 | 1054 | 16,3536 | TO 16,3605 | 956 | 17,3624 | TO 17,3643 | 1031 |
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| 14,3213 | TO 14,3285 | 724 | 15,3522 | TO 15,3543 | 1056 | 16,3656 | TO 16,3716 | 958 | 17,3714 | TO 17,3763 | 1033 |
| 14,3286 | TO 14,3321 | 725 | 15,3544 | TO 15,3610 | 1057 | 16,3717 | TO 16,3724 | 959 | 17,3764 | TO 17,3785 | 27 |
| 14,3322 | TO 14,3343 | 726 | 15,3611 | TO 15,3661 | 1058 | 16,3725 | TO 16,3740 | 960 | 20,2000 | TO 20,2006 | 877 |
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| 14,3405 | TO 14,3466 | 1357 | 15,3716 | TO 15,3741 | 1060 | 17,2000 | TO 17,2011 | 877 | 20,2040 | TO 20,2045 | 885 |
| 14,3467 | TO 14,3542 | 1358 | 15,3742 | TO 15,3764 | 1061 | 17,2012 | TO 17,2015 | 883 | 20,2046 | TO 20,2106 | 886 |
| 14,3543 | TO 14,3624 | 1359 | 15,3765 | TO 15,3773 | 1062 | 17,2016 | TO 17,2027 | 884 | 20,2107 | TO 20,2146 | 887 |
| 14,3625 | TO 14,3706 | 1360 | 15,3774 | TO 15,3775 | 27 | 17,2030 | TO 17,2043 | 899 | 20,2147 | TO 20,2220 | 888 |
| 14,3707 | TO 14,3743 | 1361 | 16,2000 | TO 16,2027 | 866 | 17,2044 | TO 17,2114 | 900 | 20,2221 | TO 20,2274 | 889 |
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| 15,2157 | TO 15,2200 | 705 | 16,2257 | TO 16,2277 | 879 | 17,2405 | TO 17,2455 | 967 | 20,2516 | TO 20,2557 | 927 |
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| 15,2236 | TO 15,2251 | 717 | 16,2404 | TO 16,2437 | 882 | 17,2577 | TO 17,2645 | 1010 | 20,2632 | TO 20,2675 | 930 |
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