

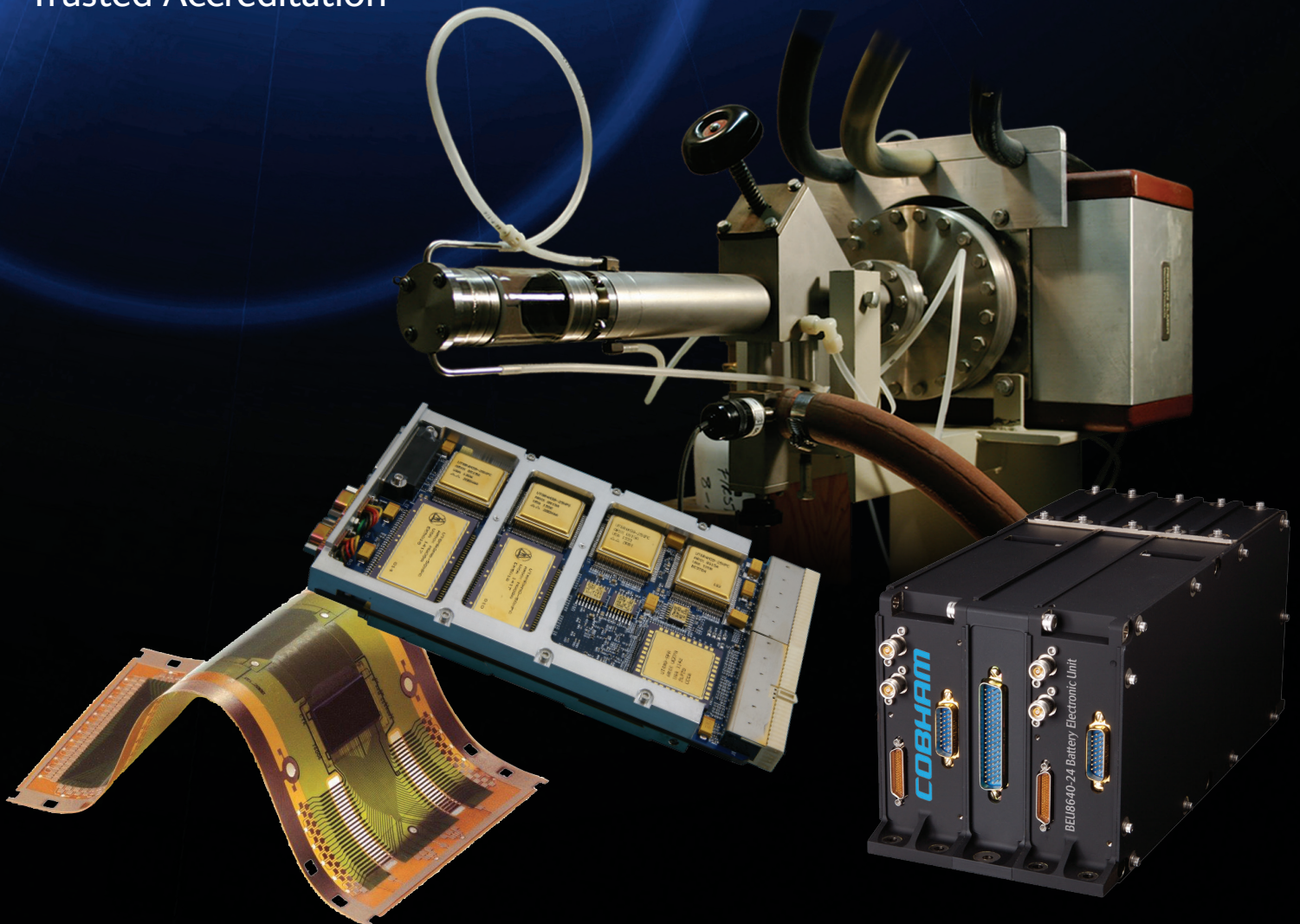
# Electronic Manufacturing Services (EMS)

Cobham Semiconductor Solutions

**COBHAM**

Brochure  
February 2017

Circuit Card Assembly  
Radiation Testing  
Custom Hybrid, MCM and Module  
System Development Engineering  
Trusted Accreditation





# Cobham Circuit Card Assembly (CCA)

Cobham Semiconductor Solutions (formerly Aeroflex) Circuit Card Assembly offers a full turnkey electronic manufacturing operation, including assemblies, modules, and systems complete with testing and coating capabilities, in a domestic facility.

We support both consigned and turn-key procurement of customer Bills of Materials, qualify components where necessary, and Build-to-Spec all volumes of boards.

Cobham recently completed their Ceramic Column Grid Array (CGA) package qualification with the assistance of Six Sigma Services.

Our Automated Circuit Card Assembly line debuted in Fall 2014 – please see video at [www.cobham.com/EMS](http://www.cobham.com/EMS).

## Manufacturing Leadership

- Assembly processes for both ANSI-J-STD-001 including latest Space Addendum and NASA 8739
- ISO 9001:2008 certified with AS9100:2004 Rev C value-added compliance
- ESD Certified to ANSI-ESD S20.20 for assemblies and Integrated Circuits
- Environmental and quality control systems. Colorado "Gold" award winner
- Full ITAR compliance



MyData MY100-4



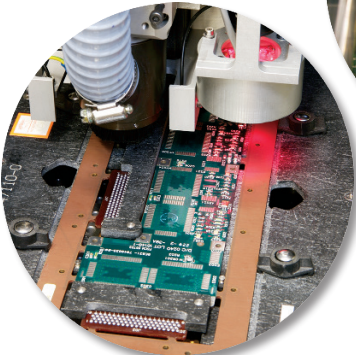
CCA Automated Line



# Cobham Circuit Card Assembly (CCA)

## Manufacturing Support Processes

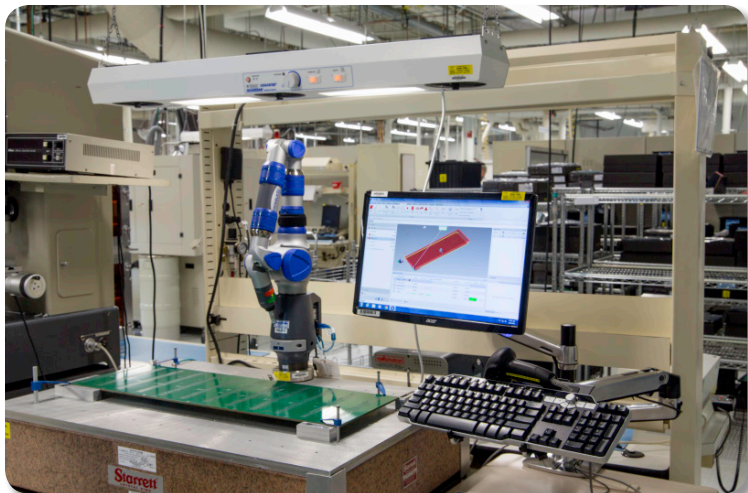
- Turnkey or consigned manufacturing
  - Counterfeit Parts Control Program
  - Obsolescence and EOL parts management
  - Parts management to customer provided requirements (AVL, PAPL, PAMPL)
  - Component traceability by Lot Date Code or customer provided tracking process
- Incoming XRF screening for all Military and Space programs (pure tin and speciality metal detection)
- Component lead forming, part programming and post-delivery component level test screening as part of the assembly services



Board Router



Flying Probe



FARO

## Manufacturing Expertise

- Automated surface mount and Plated through-hole assembly
- Qualified Ceramic Column Grid Array (CGA) assembly
- Automated Optical Inspection (AOI), Solder Paste Integrity measurements (SPI) and Coordinate Measuring (CMM) for critical dimension measurements.
- 2D 360 degree rotational Real Time Xray
- Burn-in capabilities at assembly, module and box level
- Flying Probe
- System Level Board testing capable
- Shock, Vibration and Temperature
- Conformal Coating to Mil-I-46058 standards



My Data



PARMI



# Radiation Testing Qualification Services

## MIL-STD Radiation Effects Test Services

- Total Ionizing Dose (TID) RLAT (50 to 300 rads/sec)
  - MIL-STD-883 Test Methods 1019, Cond. A
- TID ELDRS (10 to 100 mrads/sec)
  - MIL-STD-883 Test Methods 1019, Cond. D, ESA/SCC22900
- Prompt Dose / Flash X-Ray Tests
  - MIL-STD-883 Test Methods 1020 and 1021
- Neutron Displacement Damage Tests
- Heavy Ion SEE Tests (SEL, SET, SEGR, SEU, SEB, SEFI)
- Proton SEE and Displacement Damage Tests
- Cryogenic Focal Plane Array testing (25 K)

## Device Preparation for Single Event Effects Testing

Preparation for Single Event Effects (SEE) Testing can be quite demanding. Cobham RAD can significantly lessen these demands by using Cobham RAD proprietary processes and techniques that simplify this task.

Backside thinning to 35µm allows for SEE Testing at TAMU or Berkeley without repackaging of ICs.

### Finished Package Backside Thinning

- Package backside thinning to 35µm ±5µm
- Custom PC board design in preparation for SEE Testing
- Custom DUT Socket Solutions for SEE Testing of multiple interchangeable ICs for at-speed testing on a test board

### Die Thinning

- Die thinning is available as required to any thickness (±5µm)

### Die Extraction / Repackaging

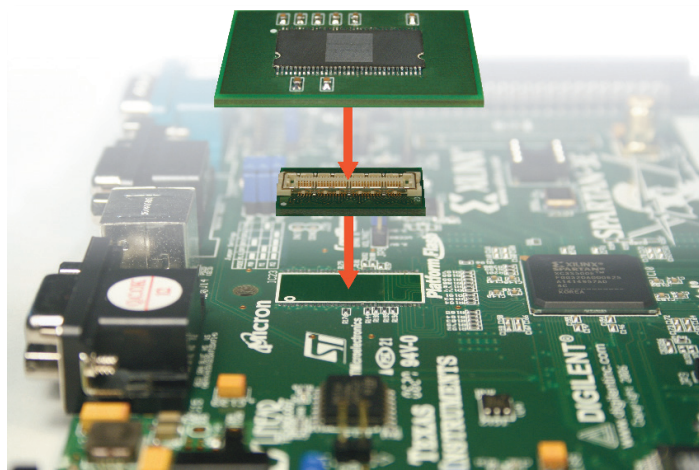
- When package backside thinning is not a solution, we routinely perform die extraction and repackaging in preparation for SEE Testing
- Custom PC board design for SEE Testing is available

## Quick-Turn Prototype IC Assembly

Cobham RAD offers the following services: Quick-Turn Prototype IC Assembly in ceramic, etched out plastic, COB and flip chip.

### Quick-Turn Prototype IC Assembly Capabilities

- Dicing, Die Visual and Die Attach
  - Wafer Dicing (up to 12inch wafers)
  - Visual Inspection (50-500X)
  - Conductive and non-conductive epoxy die attach
  - Silver Glass and Eutectic die attach
  - Flip Chip
- Wirebond, Encapsulation and Marking
  - Gold and Aluminum Wirebond (to 35µm pitch)
  - Epoxy, Solder, and Glass Frit Lid Seal
  - Dam and Fill (Plastic Encapsulation)
    - Plastic Equivalent Devices
    - COB Glob Top
  - Package Ink Marking or Laser Marking
- Package Options
  - Multi-chip / Stacked Modules, Chip-On-Board (COB), and Custom Substrates
  - Ceramic Packages Including: BGA, PGA, J-Lead, Flat Pack, QFP, Sidebrazed, CERDIP and others
  - Etched Cavity Plastic Packages Including: J-Lead, QFP, SOIC, TSSOP, QFN /MLF and others

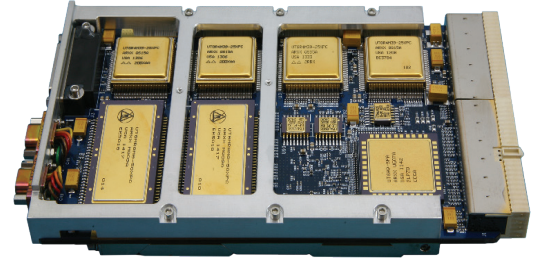


# Single Board Computers (SBC) and Packaging

## Gen 6 LEON 3FT SBC [cobham.com/HiRel](http://cobham.com/HiRel)

GEN 6 LEON 3FT 3U cPCI SBC is a flight ready TRL-8 board for LEO, GEO and Planetary Missions. Flexible Architecture, enabled for use of LEON 3FTs Microprocessors, including the UT699, UT699E, UT700. It supports up to 95 Dhrystone MIPS performance with a 132MHz System Clock. On board memory supported is 64MB of SRAM Memory and 32MB of NV Memory, along with two cPCI bus I/F connectors (Hypertronics) and two SpW connectors. IPC-6012 Class 3A compliance.

With our Electronic Manufacturing Service (EMS) experience on the LEAP and ALExIS boards, and various flight board builds, Cobham can serve your needs with an off-the-shelf Single Board Computer (SBC) option specifically designed for Command and Control Applications.



### Gen 6 LEON 3FT SBC [cobham.com/HiRel](http://cobham.com/HiRel)

	LEON	Main Clock (MHz)	AMBA Clock (MHz)	Memory Access (MHz)/ wait states (W-S)	Estimated DMIPS	SpW Ck (MHz)	Typical Power Consumption (W)	Maximum Power (W)
DS4350272-x00	UT699E	33	33	33 / 0 W-S	44.2	33	3.0	5.1
DS4350272-x01	UT699E	66	66	66 / 3 W-S	70.4	132	3.5	6.6
DS4350272-x02	UT700	33	33	33 / 0 W-S	44.2	33	3.0	5.1
DS4350272-x03	UT700	66	66	66 / 3 W-S	70.4	132	3.5	6.6
DS4350272-x04	UT700	132	66	66 / 3 W-S	94.9	132	4.2	7.3
DS4350272-x05	UT699	49.5	49.5	49.5 / 3 W-S	50.9	99	5.5	8.5

Conditions: cPCI active/Memory Access [Typ = no Access | Max = 50%  
All other IP Functions Disabled via Clock gating register.

GEN VI Single Board Computer EM, FM Designations

Several models of the GEN VI SBCs can be manufactured based on usage purpose, delivery schedule, mass, and cost. The following types of assemblies are identified:

- Flight Modules (FM): Designated by a -3xx in the part number, the FMs are used in spacecraft final production. These units meet full specifications.
- Engineering Model (EM): Designated by a -1xx in the part number, the EMs are flight-like units used in the flight design checkout, software development and qualification, upper assembly unit checkout and initial flight unit integration (pre-environmental). EMs meet full design specifications less the Flight Parts and board level environmental tests/screening.

## Packaging

Cobham Semiconductor Solutions has developed the capability of Custom Packaging along with the commercially available plastic packaging

### Package Technology Overview

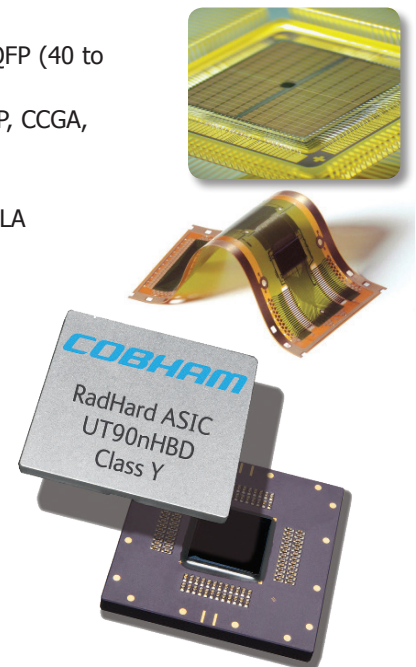
- Commercial Plastic Packages: BGA and fpBGA (81 to 484 pin), QFN (12 to 64 pin), PQFP (40 to 208 pin), in pitches ranging from 1.27 to 0.4mm
- HiRel Packages: Hermetic ceramic package technology, from 12 to 377 user I/O; CQFP, CCGA, LGA, PGA, DFP
- QML-V certification per MIL-PRF-38535
- Class Y facility certification per MIL-PRF-38535; first Class Y certification awarded by DLA
- QML qualified chip cap attach and solder column attach processes

### Plug & Sense<sup>SM</sup> Packaging Examples

- Flip-Chip on Flex, Organic, or Ceramic assembly
- Stacked Sensor to ASIC design
- 4,096 Channel Bio-Sensor with 2 ASICs
- Two 512 Channel Flip-Chip ASICs plus Flip-Chip Bio Sensor

### Advanced Package Technology

- Stacked Die assembly
- MRAM magnetic shielding assembly
- Advanced Flip-Chip assembly (Class Y)
- Decoupling Capacitor attach to package (Class Y)
- Heat Sink attach (Class Y)
- Seam Seal and Laser Mark



# Electronic Manufacturing Services (EMS)

Cobham Semiconductor Solutions

## Cobham Custom Hybrid, MCM and Module Services

Cobham, a supplier of standard products and custom microelectronic solutions offers Space and Military qualified assembly and test services meeting the requirements of MIL-PRF-38534 Class H & K.

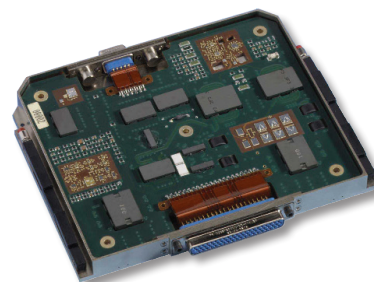
Our MCM packaging technology enables our customers to realize the optimum Size, Weight and Power (SWaP) of their products by applying flip-chip, chip and wire, Chip-on-Board (COB), Surface Mount Technology (SMT) and Planar Magnetics. In many cases, more than one of these technologies are combined in a single module.

From DC to 40 GHz, Cobham can provide microelectronic packaging and test solutions for high speed digital, precision analog and RF/Microwave devices used in military, space and critical industrial applications.

### Cobham Offers

- One stop solution for your microelectronic assembly, evaluation, test and screening requirements
- MIL-PRF-38534 compliant (Class H & K), ISO-9001 and AS9100 certified
- Customer furnished tooling - Cobham is experienced in integrating customer originated designs into a smooth, seamless high quality process
- Full turnkey and "design to spec" services for hybrid, SMT assemblies and boxes
- Vertically integrated die to box facility, Class 1,000, Class 10,000 and Class 100,000 manufacturing space
- High-reliability Chip-On-Board design and manufacturing services

- RF/microwave manufacturing services for high volume phased array antennas
- Value-added services such as radiation testing and characterization, classified testing and COTS/commercial upscreening
- Cobham HiRel products, such as FPGAs and ASICs, are available for vertical integration



### Production Capabilities

- State-of-the-Art gold ball bonding:
  - 0.8 mil to 2.0 mil automatic gold ball bonding
  - Typical IC bond pad dimensions: 65µm; 50µm on special request
  - Typical IC bond pad pitch: 80µm; 75µm on special request
  - Standard operating procedure: Security Bump on Stitch
  - Specialized stand-off stitch allows inter-chip, high-speed ball bonding versus slower wedge bond processes
  - Large Area – 16" x 13" bondable area

*The most important thing we build is trust.*

# COBHAM

[www.cobham.com](http://www.cobham.com)

#### WEB SITES

EMS  
HiRel  
RAD

[www.cobham.com/EMS](http://www.cobham.com/EMS)  
[www.cobham.com/HiRel](http://www.cobham.com/HiRel)  
[www.cobham.com/rad](http://www.cobham.com/rad)

#### TELEPHONE

1-800-645-8862