

COMROD ACS-001

VHF/UHF Antenna Control System



Application:

The ACS-001 system is an active antenna combiner, and an antenna selector switch. It is primary designed to reduce the number of antennas in an installation, and allows the simultaneous use of several radios to one transmit antenna or to individual directional antennas. A receive distribution amplifier is included to allow simultaneous reception on all receivers.

The system was originally designed to be used on stealth ships, and controlled the following antennas:

- 4 hull-integrated directional 118-430MHz antennas that can be routed to individual transmitters.
- 1 low signature omni directional 118-430MHz antenna that can be used by all transmitters simultaneously.
- 1 telescopic whip 30-90MHz antenna, to be used by a dedicated Lo-VHF transceiver. Up/down also controlled from ACS-001
- 1 active receiving antenna, 30-430MHz

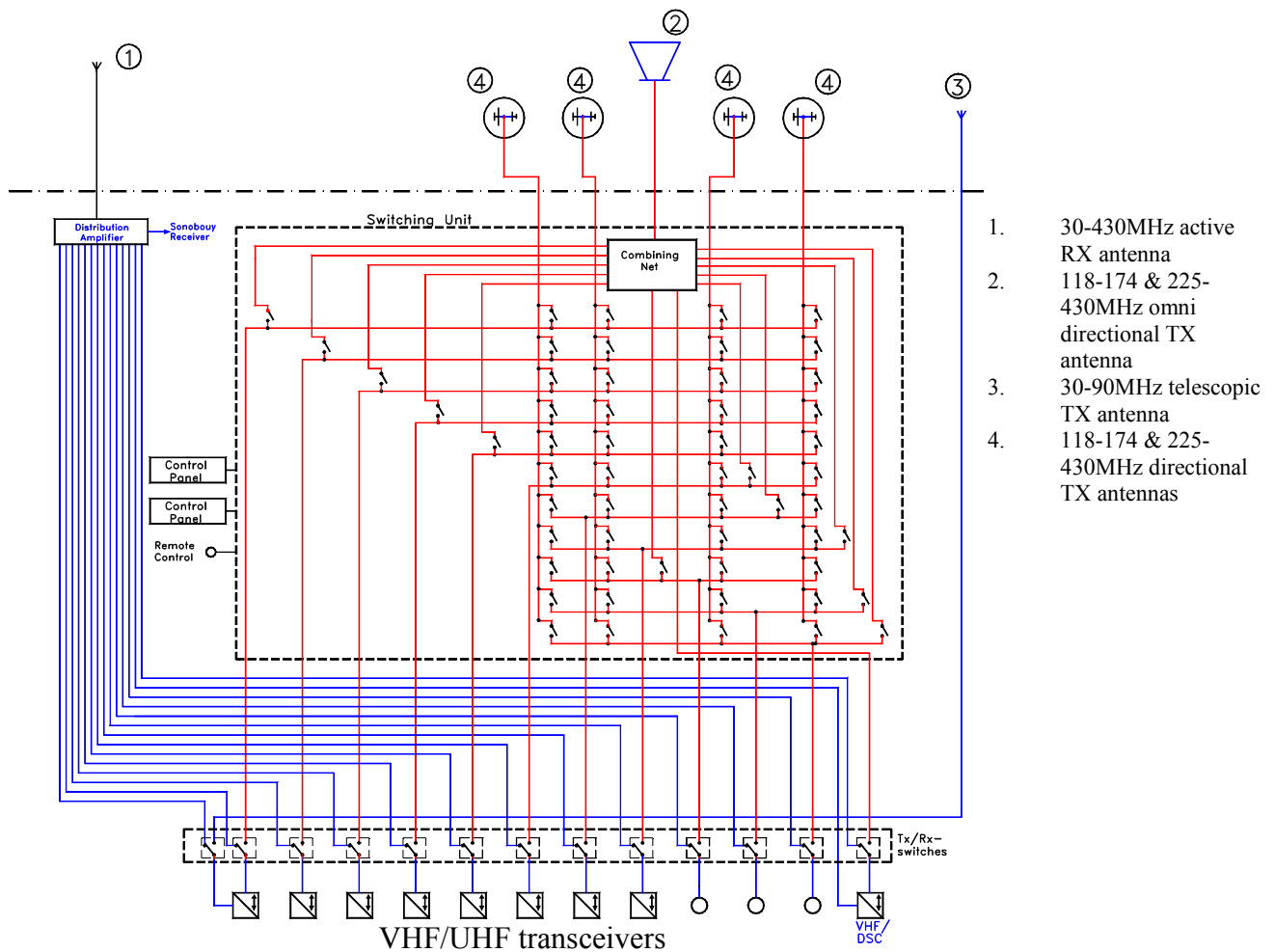
The system is transparent for up to 4 simultaneous transmissions on the omni directional 118-430MHz antenna.

The system is controlled using a TFT touch panel or with a Windows PC application.

Electrical specifications:

Number of transceivers	12, VHF-UHF 1, Lo-VHF
Number of additional receivers	11
Frequency range, V/UHF Lo-VHF	118-174MHz & 225-430MHz 30-90MHz
Maximum transmitter power	25W *12, VHF/UHF 50W, Lo-VHF
Maximum output power to common antenna	400W PEP
TX/RX switching	RF VOX, switch time <100µs
TX Intermodulation, Signals in same band	Two tone: 25W*2: >45dB Three tone: 25W *3 >40dB
Isolation	TXa to TXb: >40dB TXa to RXb: >60dB
Frequency response	Flat within ±3dB through combiner, when 4 or less simultaneous transmitters Less than 2dB loss from transmitter to sectional antenna

Functional diagram



Features

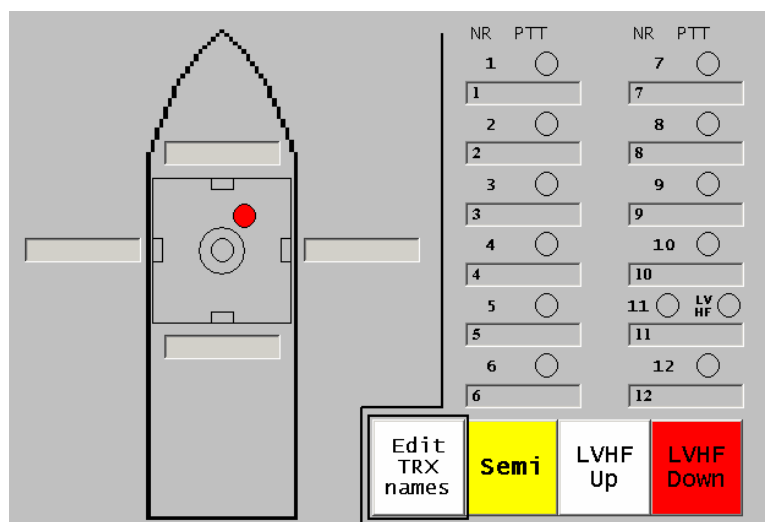
- Any of the 11 VHF/UHF transceivers can be routed to any sectional antenna
- GMDSS maritime VHF always routed to omni directional antenna. Output for DSC receiver
- Switching time is even fast enough for AIS use
- In case of mains power loss, some functionality is retained using 24V emergency power
 1. Transceiver 11(VHF/UHF) and 13 is connected directly to omni antenna, transceiver 13 (GMDSS/DSC) have highest priority
 2. Lo-VHF is connected to its transceiver as in normal operation
 3. Receiving antenna is distributed as usual.
- Computer control through MPI – RS485 bus
- Uses an internal PLC, software that can be upgraded with new memory chips
- Can be expanded for 16 directional antennas within same rack

The system can be designed for many different combinations of frequencies / transceivers / antennas etc.

TFT touch control panel layout

Here transceivers are connected to the desired antenna by first touching the transceiver button, and then touch the required antenna button on the “ship”

Actual solution will be tailored to the intended application.

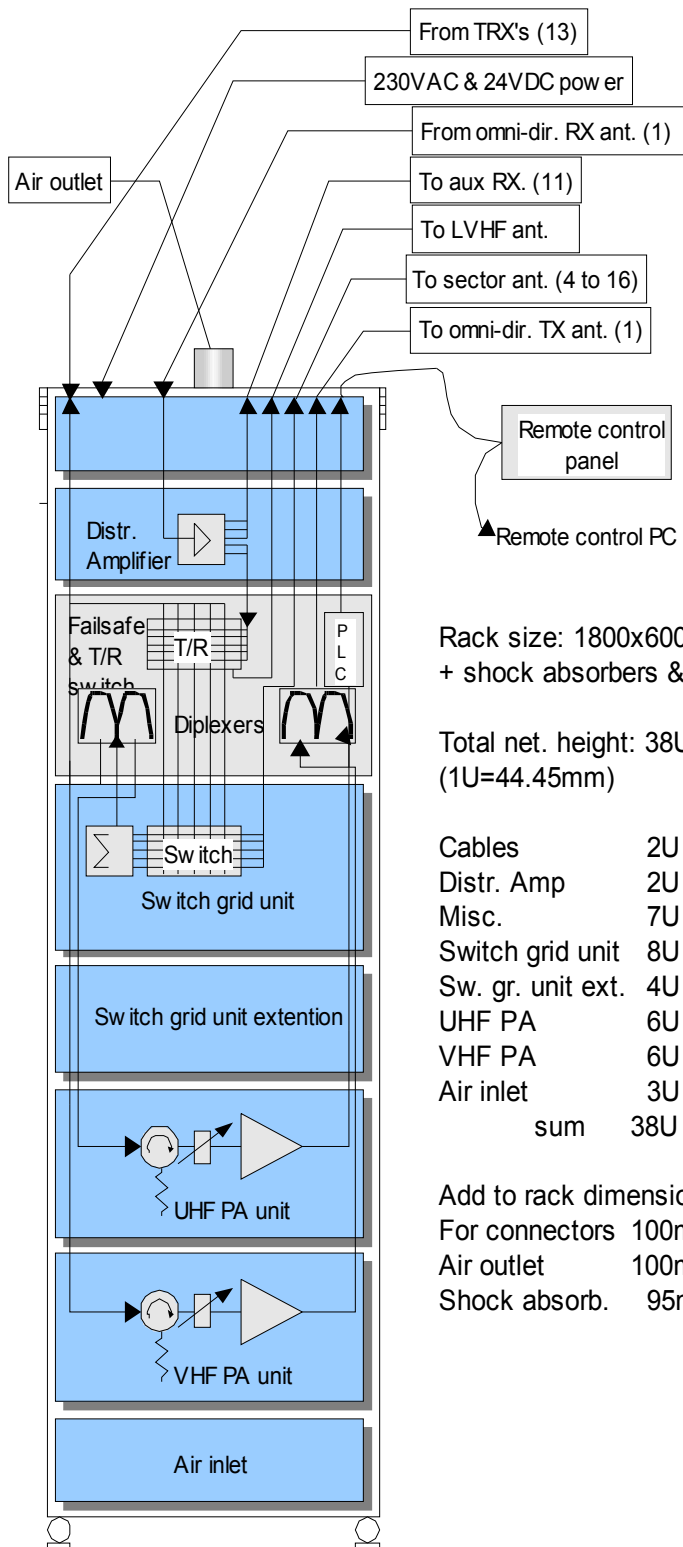


RF power

The system is transparent with up to 4 transceivers of 25W each, with more than 4 simultaneous transmitters the output power is as follows:

N	Attenuation[dB]	Pout(rms) [W]	Pout(pep) [W]
1	0,0	25	25
2	0,0	50	100
3	0,0	75	225
4	0,0	100	400
5	-1,9	80	400
6	-3,5	67	400
7	-4,9	57	400
8	-6,0	50	400
9	-7,0	44	400
10	-8,0	40	400
11	-8,8	36	400
12	-9,5	33	400

Mechanical layout



Rack size: 1800x600x600mm
+ shock absorbers & air outlet

Total net. height: 38U=1.67m
(1U=44.45mm)

Cables	2U
Distr. Amp	2U
Misc.	7U
Switch grid unit	8U (cables at back)
Sw. gr. unit ext.	4U (opt. 4 .. 16)
UHF PA	6U
VHF PA	6U
Air inlet	3U
sum	38U

Add to rack dimensions:

For connectors	100mm (top of rack)
Air outlet	100mm (top of rack)
Shock absorb.	95mm (bottom/back)