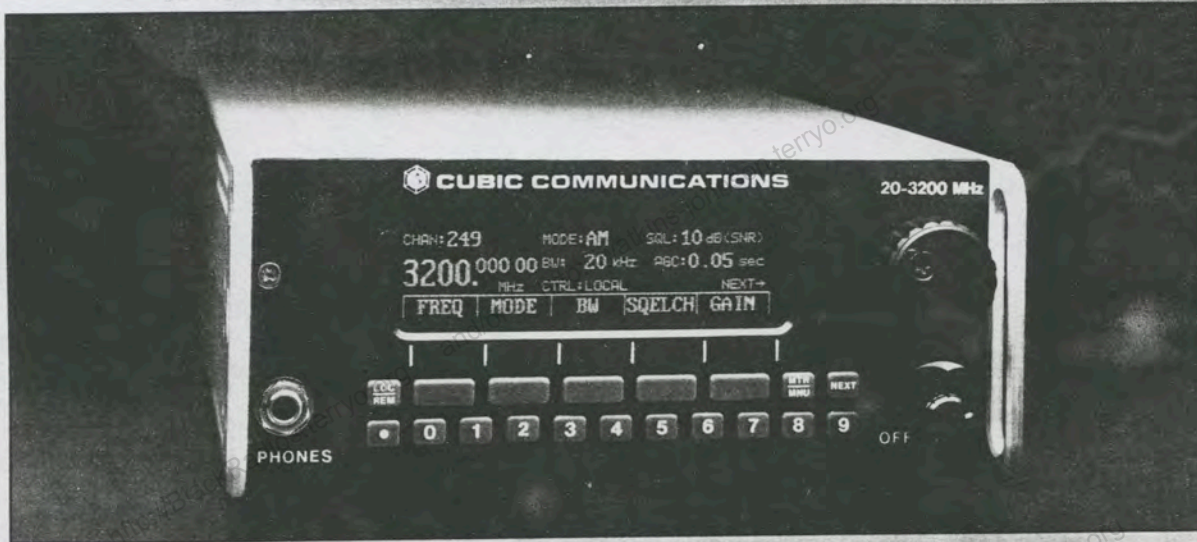


# VHF/UHF DSP Half Rack Receiver CDR-3570



The VHF/UHF Receiver is a high performance computer-controlled  
20 to 3200 MHz DSP receiver

## FEATURES

- 17 Synthesized Digital IF filters
- 10 Hz Tuning resolution
- Wide tuning range: 20 - 3200 MHz
- High dynamic range:  
IP3 +14 dBm typical  
NF 12 dB nominal
- Low LO phase noise
- Quadrature Digital IF output (I & Q)
- Easy to read vacuum fluorescent display
- 11 Preselection Filters
- Sweep and scan functions up to 100 channels per second
- Continuous self test, BITE and BIT
- Half Rack- 3 1/2" height
- Rugged construction using surface mount technology
- High MTBF: >9,000 hrs
- User friendly menu driven control



**CUBIC COMMUNICATIONS**

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# CDR-3570 VHF/UHF RECEIVER SPECIFICATIONS

## FREQUENCY

Frequency Range: 20 to 3200 MHz  
Tuning Step Resolution: 10 Hz to 10 MHz

Synthesizer Tuning Speed (from receipt of the last command byte until within 1 kHz of the final frequency): AM, FM, LSB, USB  
 $\Delta f < 100$  kHz 1.0 msec, typical  
 $\Delta f < 50$  MHz 1.5 msec, typical  
 $\Delta f < 500$  MHz 2.0 msec, typical  
20 to 100 MHz 1.8 msec, max  
100 to 600 MHz, 2.0 msec, max  
(Switching across 600, 1200, 1800 & 2400 MHz: 4.0 ms, max.)

Receiver Tuning Time: 10 ms maximum

Command Processing: 2 ms

Synthesizer Tuning Time: 2 ms

IF Settling Time: 4 ms

AGC Attack Time (fast) 2 ms applicable in all modes with IF bandwidth 2 kHz or greater

Tuning Accuracy:

Internal Standard (OCXO):

0.1 ppm of tuned frequency

External Standard: Equal to accuracy of external standard in ppm

Internal/External Frequency

Standard: 10 MHz

## DETECTION MODES

AM, FM - All bandwidths

USB, LSB, CW - bandwidths <15 kHz

## SCAN AND SWEEP

Channels: 250 programmable channels

Scan: Up to 250 channels

Sweep: f1 and f2 at selected steps. Up to 125 sweep bands

Sweep and Scan Rate: 1 to 100 per second.

Adjustable Threshold: 1 dB increments

## RF SECTION

Input Impedance: 50 ohms, nominal

Input VSWR: 2.0:1 typical, 3.05:1 maximum at the tuned frequency

Sensitivity:

AM (6 kHz BW): for frequencies <1200 MHz: -106dBm, >1200 MHz: -103 dBm.

Input signal modulated 50% by a 1 kHz tone will produce a minimum output S+N/N ratio of 10 dB

FM (50 kHz BW): -102 dBm.

Input signal modulated at a 1 kHz rate with a peak deviation equal to 30% of the selected bandwidth will produce a minimum output S+N/N ratio of 17 dB

SSB (3 kHz BW): -111 dBm.

Input signal will produce a minimum output S+N/N ratio of 10 dB

Noise Figure: 12 dB typical, 15 dB above 2.1 GHz

RF Input Protection: 50 dB

reflective attenuation. Activates at signal levels between +15 dBm and +30 dBm. Protects from input signals up to 10 watts

RF Filters: An 11-band preselector set consisting of the following bands:

Band	Frequency (MHz)
1	20-93
2	93-156
3	156-260
4	260-430
5	430-720
6	720-1200
7	1200-1600
8	1600-2000
9	2000-2400
10	2400-2800
11	2800-3200

Automatic Gain Control (AGC):

LSB, USB (Fast attack selectable decay):

Attack Time: <10 ms for 50dB change

Decay Time: Selectable 20 ms to 4 sec nominal for 50 dB change

AM, FM: Average Attack and decay times 50 ms nominal for 50 dB change

Sweep and Scan: Attack Time <2 ms (6 kHz or greater BW)

AGC Dynamic Range: Output level held to  $\pm 1$  dB over a 100 dB range

AGC Threshold: -110 dBm nominal

AGC Dump: Bus controllable, time <2 ms

Manual Gain Control (MGC)

Dynamic Range: 110 dB in 1.0 dB steps

Automatic Frequency Control (AFC):

Tracking Range: 10 times IF bandwidth

Acquisition Range:  $\pm 50\%$  of IF bandwidth

Squelch:

Operates on selected carrier to noise ratios of 6 dB to 30 dB

## IF SECTION

First IF: 1621.4 MHz (for RF of 20-1200 MHz); 421.4 MHz (for RF of 1201-3200 MHz)

Second IF: 21.4 MHz

Third IF: 0.6 MHz

Fourth IF (DSP): 17 Standard Bandwidth: 240, 180, 150, 100, 60, 50, 35, 30, 25, 20, 15, 10, 6, 5, 3, 2, and 1 kHz

Shape Factor: Better than 1.5:1, 6 dB - 80 dB

In-band Ripple: 1 dB maximum

## INTERFERENCE IMMUNITY

IF Rejection: 90 dB minimum

Image Rejection: <1200 MHz, 80 dB; >1200 MHz, 70 dB

Blocking: Attenuation of a wanted RF signal of -60 dBm and caused by an unmodulated unwanted signal of -10 dBm, spaced 20 MHz away, is less than 3 dB

Reciprocal Mixing: With an input at a rated sensitivity level in 50 kHz bandwidth, an out-of-band signal 500 kHz removed and 70 dB higher in level will not degrade the (S+N/N) of the desired signal by more than 3 dB

Oscillator Reradiation: -100 dBm

Generated Spurious: Less than -110 dBm equivalent input level



# CDR-3570 VHF/UHF RECEIVER SPECIFICATIONS

## Intermodulation:

2nd Order Intercept: 93 -  
3200 MHz: +60 dBm min;  
20 - 93 MHz: +45 dBm, min.  
3rd Order Intercept: +14 dBm  
minimum (two equal -20 dBm  
tones with greater than 10  
MHz spacing)

Inband: -50 dBc (two equal  
tones separated by 1 kHz or  
more, input level up to  
-20 dBm).

## LO Phase Noise:

Frequency Offset	Phase Noise (dBc/Hz)
1 kHz	-78
10 kHz	-91
100 kHz	-105

## ANALOG-TO-DIGITAL CONVERTER:

A/D Bits: 14  
A/D Sampling Rate: 2 Ms/s  
A/D Dynamic Range 80 dB

## OUTPUTS

WBIF: Centered at 21.4 MHz,  
Bandwidth 15 MHz, 20 dB gain  
nominal

NBIF: Centered at 21.4 MHz,  
bandwidth 0.5 MHz nominal,  
gain = 30 dB up to -10 dBm  
nominal output level

Digital I&Q: TTL (0 to +5V,  
12.5 MHz)

## Audio Line Output:

AM, LSB, USB:  $0 \pm 3$  dBm  
over AGC dynamic range,  
THD < 2%

FM:  $0 \pm 3$  dBm for deviation  
equal to  $\pm 1/3$  of selected  
bandwidth, THD < 3%

Audio Frequency Response:  
20 Hz to 15 kHz within 3 dB  
600 Ohms balanced pair, short  
circuit protected

Video: 600 mV peak-to-peak into  
75 ohms (deviation equivalent  
to 30% of selected bandwidth in  
FM or 50% modulation in AM)

Video Frequency Response:  
DC to 1/2 the IF bandwidth,  
-10 dB

FM De-emphasis: Flat, 75  $\mu$ s (60-  
240 kHz BW) or 750  $\mu$ s (60-  
50 kHz BW)

Ultimate (S+N)/N, FM: 50 dB  
minimum in a 50 kHz  
bandwidth,  $f_m = 1$  kHz,  
deviation = 15 kHz

## REMOTE CONTROL

IEEE-488, RS-232 and RS-422  
available. All receiver operational  
parameters are remotely control-  
lable.

## BITE

Probability of Detection is 90%.  
Entire receive chain is tested. In  
addition, fault detectors continu-  
ously monitor voltage levels and  
phase lock.

## RELIABILITY

MTBF: 11,000 hours. Calculated  
based on "Naval Sheltered" (NS)  
as defined in MIL-HDBK-217F.

## MAINTAINABILITY

Mean-Time-to-Repair (MTTR) of  
not more than 30 minutes at the  
module replacement level.

## POWER REQUIREMENTS

90 - 260 VAC, 47-440 Hz,  
50 watts

## CONTROLS & CONNECTORS

### Front Panel:

Full alphanumeric display with  
full function keypad for entry  
of all parameters  
Control knob for selection of all  
parameters  
Volume ON/OFF knob  
1/4 inch phone jack for headset

### Rear Panel:

Power Connector: IEC320  
Ref Input: BNC  
Antenna: TNC  
WBIF Out: BNC  
NBIF Out: BNC  
Digital Data: 15 pin Sub D  
Audio: 15 pin Sub D

### Bus Control:

RS-232/RS-422: 25 pin Sub D  
IEEE-488: Stacking 24 pin

## DIMENSIONS AND WEIGHT

Size: Half 19-inch rack  
8.45 inches (21.45 cm) wide  
3.5 inches (8.9 cm) high  
22.25 inches (56.47 cm) deep  
Weight: 16 lbs (7.25 kg)

## ENVIRONMENTAL DATA

Operating High Temperature:  
MIL-STD-810E, Method 501.3,  
Procedure II, Table 501.3-I  
Ambient air conditions,  
Maximum test temperature  
50°C, One cycle

Operating Low Temperature:  
MIL-STD-810E, Method 502.3,  
Procedure II, Temperature 0°C

Storage High Temperature:  
MIL-STD-810E, Method 501.3,  
Procedure I, 85°C, One cycle

Storage Low Temperature:  
MIL-STD-810E, Method 502.3,  
Procedure I, Temperature -40°C  
for 12 hours

Humidity: MIL-STD-810E,  
Method 507.3, Procedure I-  
Natural, Table 507.3-I, Five  
cycles total

Shock: MIL-STD-810E, Method  
516.4, Procedure VI

Vibration: MIL-STD-810E,  
Method 514.4 Procedure I,  
Category 9, Figure 514.4-15

## EMI/EMC

Equipment designed to intent of  
the applicable requirements of  
MIL-STD 461/462 as a guide.

## DESIGN AND CONSTRUCTION

Workmanship: MIL-E-16400  
Paragraph 3.17 as a guideline

## FINISH

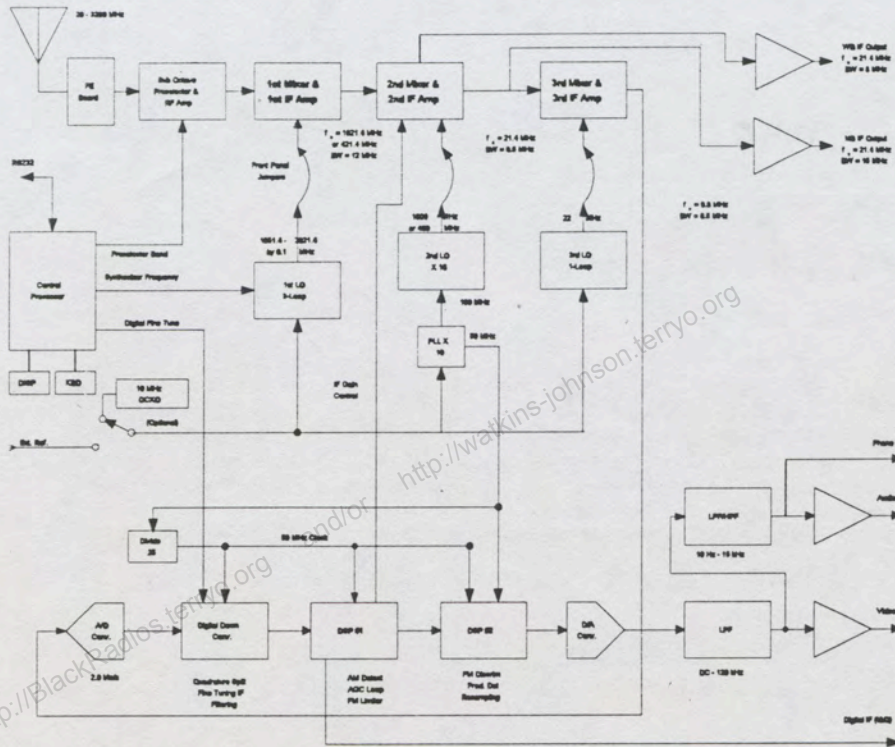
Front Panel and Chassis Cover:  
FED-STD-595 chip 26307,  
semi-gloss grey enamel

Chassis: Corrosion protected fol-  
lowing guidelines established in  
Paragraph 3.4 of MIL-E-16400

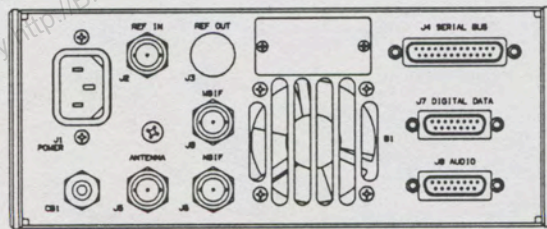
Handles and Silkscreen Markings:  
Matte black



# CDR-3570 VHF/UHF RECEIVER SPECIFICATIONS



The 20 - 3200 MHz CDR-3570 receiver is a triple-conversion superheterodyne design in which the final IF filtering and demodulation are accomplished with digital signal processing (DSP) for superior accuracy and flexibility. The first IF is at 1621.4 MHz for the tuning range 20 - 1200 MHz, and 421.4 MHz for the tuning range 1200 - 3200 MHz. The second IF is 21.4 MHz and the third is at 0.6 MHz. At the third IF, the signal is converted to digital form at a sample rate of 2Ms/s. Digital signal processor chips then provide fine tuning, IF filtering to the selected bandwidth, and AM, FM or product detection according to the operating mode. Seventeen bandwidths are offered from 1 kHz to 240 kHz with video output up to 120 kHz. The demodulated signals are converted back to analog form for output to headphones or balanced lines.



REAR PANEL

Specifications subject to change without prior notice

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