

# **TECHNICAL SPECIFICATION**

## **CDR-3280 LF-HF HALF-RACK RECEIVER**



**The CDR-3280 LF-HF Receiver is a high performance computer-controlled 10 kHz to 30 MHz DSP Receiver**

### **FEATURES**

- 10 kHz to 30 MHz Tuning Range
- 1 Hz Tuning Resolution
- 3 ms Typical Synthesizer Tuning Speed
- Low Synthesizer Phase Noise
- 51 Standard Bandwidths
- 3 1/2" Half-rack size
- ISB, LSB, USB, CW, AM, FM and FSK Detection Modes
- Rugged construction using surface mount technology
- Quadrature Digital IF output (I & Q)
- Third Order Intercept Point of +30 dBm typical
- Continuous self-test, BITE and BIT
- Easy-to-read vacuum fluorescent display
- User-friendly menu-driven control

# CDR-3280 LF-HF DSP RECEIVER SPECIFICATION

## FREQUENCY

Tuning Range: 10 kHz to 30 MHz  
Tuning resolution: 1 Hz  
Synthesizer Tuning Speed (from receipt of last command byte until within 1 kHz of the final frequency): all modulation modes  
Df<100 kHz <1.0 msec, typical  
Df<1 MHz <1.5 msec, typical  
Df<10 MHz <2.0 msec, typical  
Receiver Tuning Time: 10 ms max.  
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 (TCXO): 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 <6 kHz  
ISB - 2.8 kHz bandwidth per sideband

## SCAN AND SWEEP

Channels: 250 programmable channels  
Scan: up to 250 channels  
Sweep: f1 to f2 at selected steps. Up to 125 frequency bands programmable  
Sweep and Scan Rate: 1 to 100 per second  
Adjustable Threshold: -112 to 0 dBm in 0.5 dB increments

## RF SECTION

Input Impedance: 50 ohms  
Input VSWR: less than 3:1  
Sensitivity for 10 dB SINAD (above 1.6 MHz):  
AM (6 kHz BW): -105 dBm, 50% modulation  
CW (500 Hz BW): -122 dBm  
SSB (3 kHz BW): -113 dBm  
FM (16 kHz BW): -98 dBm input, 5 kHz deviation, 400 Hz modulation: 20 dB SINAD  
Noise Figure: 15 dB

RF Protection: 50 dB reflective attenuation. Activates at signal levels between +10 dBm and +20 dBm. Protects from input signals of levels up to 10 watts  
RF Filters: eight sub-octave bandpass preselector filters used from 1.6 to 30 MHz. Frequencies below 1.6 MHz are selected by two low pass filters. Filter selection is automatic with tuned frequency selection  
AGC (fast attack selectable decay):  
Attack time (SSB and CW modes):  
Fast: <2 msec for 50 dB change (sweep and scan only)  
Normal: <10 msec for 50 dB change  
Decay Times: selectable 20 ms to 4 seconds nominal for 50 dB change  
Dynamic Range: output level held within 1 dB over a 110 dB range  
Threshold: set to -112 dBm  
Dump: bus controllable, time <2 ms  
AM or FM: average detection with 50 ms response time for 50 dB change  
MGC: bus controllable over 127.5 dB gain reduction in 0.5 dB nominal steps

## IF SECTION

First IF: 40.456 MHz  
Second IF: 456 kHz  
Third IF: 24 kHz  
Fourth IF (DSP): 51 standard bandwidths from 100 Hz to 16 kHz, bus selectable  
Shape Factor: 3 dB to 60 dB (better than 2:1, 400 Hz and above)  
Inband Ripple: 1 dB maximum

## INTERFERENCE IMMUNITY

IF Rejection: 100 dB  
Image Rejection: 100 dB  
Cross Modulation: unmodulated desired signal of -60 dBm together with a modulated (30% AM at 1 kHz) undesired signal of -10 dBm, spaced 100 kHz apart, will produce less than 10% cross modulation of the desired signal  
Blocking: attenuation of a desired RF signal of -60 dBm caused by an unmodulated signal of +10 dBm spaced 100 kHz away is less than 3 dB

Synthesizer Phase Noise: -110 dBc/Hz @ 1 kHz spacing, nominal  
Oscillator Reradiation (up to 1 GHz): -110 dBm  
Spurious Responses: -120 dBm equivalent or less for -50 dBm input signals  
Generated Spurious (above 0.14 MHz): two at no more than -110 dBm. All others less than -120 dBm  
Intermodulation Distortion:  
Third Order Intercept Point: +30 dBm (typical)  
Second Order Intercept Point (typical):  
1.6 MHz <f<30 MHz: +60 dBm  
0.1 MHz <f<1.6 MHz: +45 dBm

## OUTPUTS

WBIF: 456 kHz, 20 kHz min. BW  
NBIF: 455 kHz with BW equal to selected receiver BW. Level -10 dBm  $\pm$ 3 dB over AGC dynamic range  
Third IF: Digital I&Q, 24 ks/s  
Video: demodulated FM, 2V peak-to-peak into 75 ohm (deviation equal to 30% of selected bandwidth)  
Audio Line Output:  
AM, CW, LSB, USB: 0 dBm  $\pm$ 3 dB  
ISB (simultaneous LSB and USB outputs): 0 dBm  $\pm$ 3 dB  
FM: 0.5 V/kHz AC coupled (4V peak-to-peak maximum) 600 ohms balanced pair, short circuit protected, less than 3% distortion at rated output  
Headphones: 0 to 5V, peak-to-peak, 8 ohm load impedance to front panel phone jack. Short circuit protected  
Speaker: 0 to 10V peak-to-peak, 8 ohm load impedance to rear panel for external speaker

## REMOTE CONTROL

RS232, RS422 and IEEE488 available.  
All receiver operational parameters are remotely controllable

## BITE

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

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## RELIABILITY

MTBF: 9,000 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

Ref Output: BNC

Antenna Input: BNC

WBIF Output: BNC

NBIF Output: 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

## 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

## DESIGN AND CONSTRUCTION

MIL-STD-2036, Paragraph 5.1.4 as a guideline. Workmanship:

MIL-HBK-454, Requirement 9 as a guideline

## DIMENSIONS AND WEIGHT

Size: Half 19-inch rack,

8.45 inches (21.5 cm) wide

3.5 inches (8.9 cm) high

22.25 inches (56.5 cm) deep

Weight: 16 lbs (7.25 kg)

## FINISH

Front Panel and Chassis Cover:

FED-STD-595, chip 26307, semi-gloss grey enamel

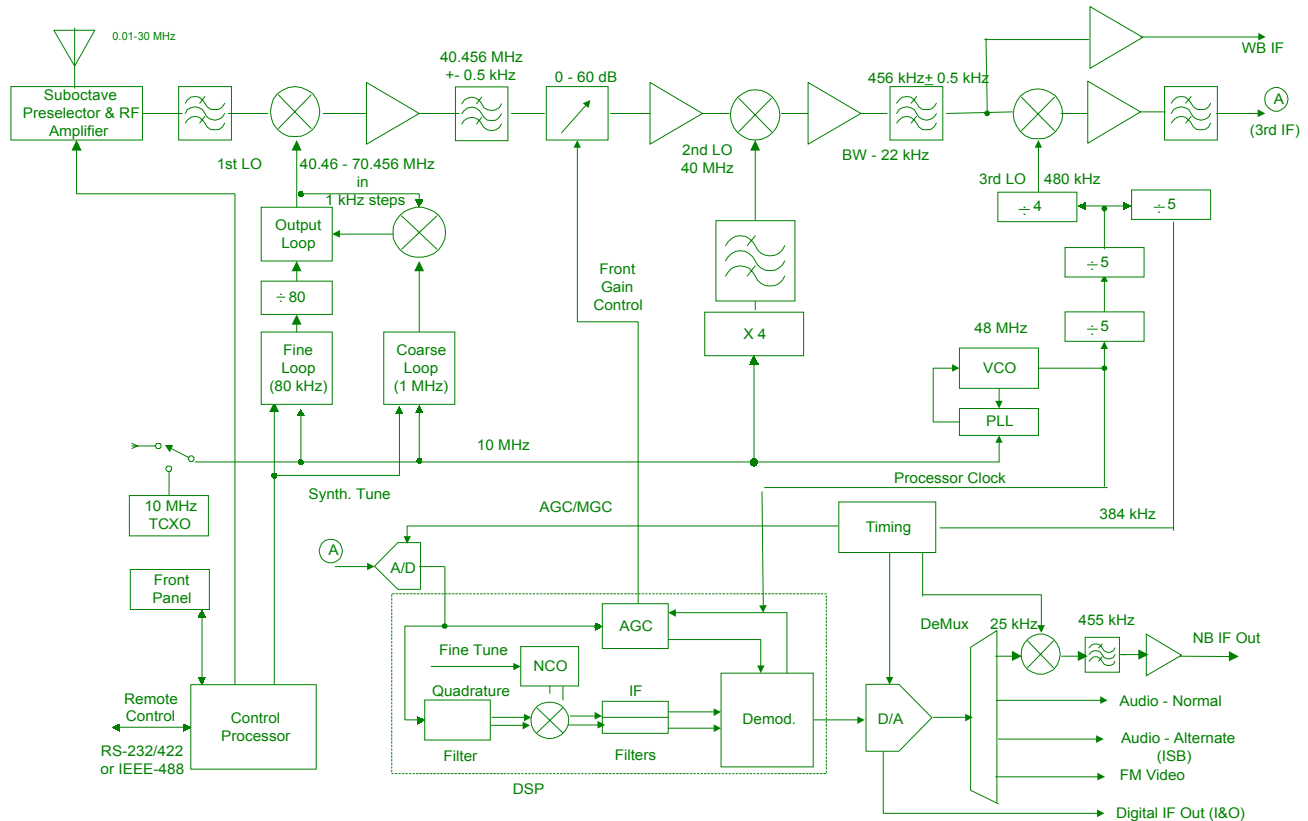
Chassis: corrosion protected following guidelines established in

MIL-HBK-454, Requirement 15

Handles and Silkscreen Markings:

matte black

# CDR-3280 LF-HF DSP RECEIVER SPECIFICATION



This LF through HF 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 three intermediate frequencies (IF's) are 40.456 MHz, 456 kHz and 24 kHz. Having the first IF above the entire tuning range assures spurious-free reception. At the third IF, the signal is converted to digital form. A digital signal processor chip then provides fine tuning, IF filtering to the selected bandwidth, and AM, FM or product detection according to the operating mode. Fifty-one bandwidths are offered from 100 Hz to 16 kHz. The demodulated signals are converted back to analog form for output to a speaker, headphones or balanced lines.

## Ordering Information

Model Number	Part Number	Description
CDR-3280	260001-13	LF/HF Digital Receiver, one-half rack, 10 kHz - 30 MHz
CHAS-KIT-01	2600-1000-1	Full Rack chassis Kit, without rack slides
RKSLD-KIT-02	222-026/087	Rack Slides Kit (2RU)
VIRTCONT-01	2800-3001-1	HF Virtual Control Software (order with unit)
MNT-KIT-01	2600-1009-1	Dual Rack-mount Kit, Side-by-side

Specifications subject to change without prior notice

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