

R-3050 VLF/LF/MF/HF Receiver

(U.S. Military Nomenclature R-2437/U)



The Cubic R-3050 was designed to provide a superior receiving system at a reasonable price.

FEATURES:

- Modular construction
- Automatic fault indication
- Fast field repair
- 5 kHz-30 MHz range
- LSB/USB/ISB/AM/CW/FM modes
- 100 memory channels
- Indefinite memory storage
- Multi-function keypad
- Multi-function display
- Various data bus options

MODULAR CONSTRUCTION

The R-3050 features independently shielded modules to protect the circuits from electromagnetic interference. This approach also provides for ease of field maintenance, where individual modules can be replaced in less than one minute.

AUTOMATIC FAULT DETECTION

If a detected fault should occur in a module, the R-3050 user is immediately advised via the "FAULT" indication on the front panel display. Field repair requires only checking the fault indicator LED on top of each module to see which is activated, removing the indicated module and plugging in a replacement. No special tools or alignment are required.

USER SELECTABLE FEATURES

The operator uses the front panel keypad to select various receiver functions, such as Frequency, Mode, Bandwidth, Meter Display, Tuning Rate and Scanning Parameters. The control knob will vary frequency, adjust BFO & IF shift ± 9.99 kHz, set RF gain from 0.0 to -110 dB and vary scan and sweep rates from 30 ms to 1000 ms per step. Once channel set data has been entered, it can be stored indefinitely in any one of 100 channels through a non-volatile RAM.

DATA BUS OPTION

The R-3050 can be configured with a variety of data bus options, providing the user with an impressive selection of remote interface parameters at no extra cost. Bus specifications currently available include RS-232, RS-485, IEEE-488, and MIL-STD-188. Additional user-specified interfaces also are available at a nominal charge.

INDEPENDENT SIDEBAND

In the Independent Sideband position (ISB/L), the R-3050 will receive both upper and lower sideband signals on the same carrier frequency, using two separate detectors and sideband filters. Each sideband has separate audio outputs with individual volume controls. A 600 ohm balance output port is located on the receiver panel for interfacing with external audio devices.

R-3050 TECHNICAL SPECIFICATIONS

FREQUENCY

Range: 5 kHz - 30 MHz

Resolution: 10 Hz

Stability (Internal Standard):

- 1 ppm over temperature range:
- .01 ppm per week aging

Tuning Modes:

- 1. manual, optical shaft encoder
- 2. keypad
- 3. remote control

Display: 7 digit LED

Power Interrupt: stores memory channel data indefinitely in non-volatile RAM

MODES:

LSB, USB ISB, AM, CW, FM

RF SECTION:

Input: 50 ohms, N connector

VSWR: less than 3:1

Sensitivity: for 10 db SINAD (above 1600 kHz)

AM (6 kHz BW): -107 dBm
90% modulation

CW (300 Hz BW): -124 dBm

ISB/SSB (2.7 kHz BW): -113 dBm

Protection: up to 50 volts RMS from 50 ohm source without damage; automatic reset

Preselection: automatically selected filter, 10 frequency bands, 8 one-half octave bands between 1.6-30 MHz, 2 bands from 5 kHz to 1.6 MHz

Gain Control:

Type: automatic and manual

AGC Range: 110 dB minimum

AGC Threshold: -107 dBm

Audio reference level at -70 dBm

Fast attack, selectable hold, fast release

Hold time (locally or remotely selectable):

Zero: 30 ms nominal

Short: 50 ms nominal

Medium: 250 ms nominal

Long: 3 seconds nominal

Off: manual gain control only

Release Time: 50 ms nominal

Manual Gain Control: 0 to -110 dB gain reduction

IF SECTION:

First IF: 40.455 MHz

Second IF: 455 kHz

First IF Bandwidth:

10 kHz at -6 dB

Second IF Bandwidths (Selectable):

.3 kHz @ -6dB

1 kHz

2 kHz

2.7 kHz

6 kHz

6 positions. Other bandwidths available upon request

INTERFERENCE IMMUNITY:

IF Rejection: 100 dB minimum

Image Rejection: 90 dB minimum

Cross Modulation: unmodulated wanted signal of -67 dBm together with a modulated (30% at 1 kHz) unwanted signal of -20 dBm spaced 100 kHz apart will produce less than 10% cross modulation of unwanted signal

Blocking: attenuation of wanted RF signal at -67 dBm and caused by an unmodulated signal of +10 dBm spaced 200 kHz away, will be less than 3 dB

Oscillator Re-radiation: -107 dBm maximum from antenna connector into 50 ohms.

Spurious Responses: -120 dBm equivalent or less for -50 dBm input signals

Generated Spurious: -115 dBm input equivalent or less, 2 to 30 MHz

Intermodulation Distortion: third order intermodulation products resulting from two input signals at -20 dBm each are less than -100dBm

INPUT/OUTPUT:

Outputs:

First IF (Wideband): 40.455 MHz with 1 MHz minimum bandwidth, 50 ohms at approximately 10 dB gain from input (BNC female)

Second IF/ISB: 455 kHz at selected bandwidth and nominal -10 dBm level, 0 ± 3 dB over range (2 BNC females)

Synthesizer Reference: 0 dBm, 50 ohm output for receiver daisy chain operation, 1 MHz (BNC female)

Audio: LSB, USB, ISB, FM, AM, CW: 0 ± 3 dBm over dynamic range

Frequency: 0.5 V/kHz AC coupled (4 V p-p maximum) 600 ohms balanced pair contacts on AUDIO connector

Headphones: 0 to 12 V p-p 15 ohm source impedance

FM Video: (always present): 1 V per kHz (positive sense, DC coupled) 93 ohm unbalanced contacts on AUDIO connector

Signal Strength: digital format on bus (8 bit) (on bus connector), analog format on AUDIO connector

Inputs:

Synthesizer Reference: 1 MHz, 0 dBm, 50 ohms (BNC female)

Antenna: N female

GENERAL DATA:

Power Requirements: 50 watts, 95-135 VAC or 190-270 VAC (internally selectable), 47-420 Hz

Dimensions: 19"W x 5.22"H x 19.16"D (including rear protective handles)

Weight: 35 lbs.

ENVIRONMENTAL DATA:

Temperature Range: -20 to +60°C

Relative Humidity: Per MIL-STD-810D (method 507.2)

Vibration: Sinusoidal: per MIL-STD-167-1 Random: per MIL-STD-810D (method 514.3)

Shock: per MIL-STD-810D; MIL-S-901C Level A

FEATURES:

Standard:

- 100 memory channels
- Preselector
- BFO ± 9.99 kHz (10 Hz steps)
- Built-in fault detection
- Multi-function detection
- LSB, USB, ISB, AM, CW and FM modes
- 0.3, 1, 2, 2.7, 6 kHz BW
- Multi-function LED meter
- Signal strength
- Audio level
- Frequency shift display
- FM video output
- 10, 100 or 1000 Hz tuning steps
- IF shift tuning ± 9.99 kHz (10 Hz steps)
- RF input over voltage protection up to 50 V RMS from 50 ohm source
- Interface for remote antenna switch

Optional:

- IEEE-488 data bus
- RS-232 data bus
- MIL-STD-188 data bus
- RS-485 data bus
- Special data bus
- Customer-specified bandwidths (up to 6 bandwidths available)
- 10 MHz Synth. Ref.

