

R-3500

VHF-UHF Receiver

(U.S. Military Nomenclature R-2412/U)



A range of VHF-UHF Receivers for the surveillance and communications user.

FEATURES

- Extended frequency coverage
- 100 memory channels per receiver
- Preselector module standard
- Noise riding threshold
- Automatic frequency control
- Bridge timer
- Built-in fault detection
- Modular construction
- Various data bus options
- <30 min. MTTR
- Two antenna inputs per receiver

The R-3500 series of VHF/UHF receivers bring a new standard of performance to the industry. These receivers offer a range of features previously unavailable, or available only at extra cost, from other suppliers.

EXTENDED FREQUENCY COVERAGE

With frequency coverage from 20 MHz to 1.2 GHz the R-3500 receiver family offers full function capability without compromising size, weight or performance.

INTERNAL PRESELECTOR MODULE

Included as a standard module, the pre-selector module provides a high degree of front end selectivity by using eight half-octave bandpass filters to cover the frequency range.

NOISE RIDING THRESHOLD

A Noise Riding Threshold (NRT) is provided on AM and FM modes. NRT measures the ratio of signal to the background noise level. An output is provided when the operator-selected threshold for a particular scan event or spot frequency is exceeded.

BRIDGE TIMER

This feature delays continuation of sweep or scan function for a programmable period of time from 0-9 seconds, allowing the receiver to hold a frequency after the carrier has dropped.

AUTOMATIC FREQUENCY CONTROL

An Automatic Frequency Control (AFC) circuit can be enabled to ensure the receiver

tracks an acquired signal while it remains above the programmed threshold level. The carrier is automatically centered in the passband of the selected IF filter. Upon loss of signal the receiver will remain tuned to that frequency until another frequency is entered or another signal is acquired within the passband. The AFC facility is available in AM and FM modes.

SELECTABLE EXTERNAL FREQUENCY STANDARDS

External frequency standards of 1 MHz, 5 MHz or 10 MHz are easily selectable via a toggle switch located on the reference module.

MODULAR CONSTRUCTION

The R-3500 series receivers, like all Cubic receivers, are built using a modular design concept which employs independently shielded diecast modules. This approach, while providing excellent EMI characteristics, also allows ease of field maintenance. Modules can be replaced in less than one minute.

R-3500 VHF/UHF RECEIVER TECHNICAL SPECIFICATIONS

FREQUENCY

Range: 20 MHz - 1200 MHz

Resolution:

100 Hz in AM and FM modes
10 Hz in SSB mode

Synthesizer:

Lock Time: 5 ms typical

Stability (internal standard): Internal reference oscillator 10 MHz with stability of ± 1 PPM over the specified temperature range.

MODES

Selectable: FM, AM, LSB, USB

RF SECTION

RF Input (Antenna): 50 ohms, two TNC females per each receiver either keypad or remotely selectable

RF Input VSWR: Less than 3:1

RF Protection: Will withstand application of RF power up to 10 watts without damage. Automatic reset.

RF Noise Figure:

12 dB maximum below 1000 MHz
15 dB maximum 1000-1200 MHz

RF Sensitivity (measured at the audio output below 1000 MHz):

AM (6 kHz BW -108 dBm input) 10 dB ((S+N)/N)
FM (50 kHz BW/-95 dBm input) 18 dB ((S+N)/N)

IF Bandwidth (at 3 dB and 60 dB):

Bandwidth	Shape Factor
3 kHz	2.5:1 (LSB/USB only)
6 kHz	2.5:1 (AM/FM only)
15 kHz	2.5:1 (AM/FM only)
50 kHz	2.5:1 (AM/FM only)
200 kHz	4:1 (AM/FM only)
1 MHz	4:1 (AM/FM only)

Others available upon request.

Preselector Filters:

Band	Frequency Range (MHz)
1	20 to 33
2	33 to 56
3	56 to 93
4	93 to 156
5	156 to 260
6	260 to 430
7	430 to 720
8	720 to 1200

AGC RF DERIVED IN SELECTED BANDWIDTH

LSB/USB:

Fast Attack: 7.5 ms nominal

Decay Time:

Fast 0.2 seconds
Slow 2.0 seconds
Off

AM: Average type

INTERFERENCE IMMUNITY

IF Rejection: 100 dB minimum

Image Rejection: 90 dB minimum

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

Cross Modulation: Unmodulated wanted signal of -73 dBm together with a modulated (30% at 1 kHz) unwanted signal of -20 dBm spaced 10 MHz apart will produce less than 10% cross modulation of wanted signal.

Inherent Local Oscillator Re-radiation: -87 dBm, up to 3 GHz from receiver antenna connector into 50 ohms.

Second Order Intermodulation Distortion: Second order input intercept point of +35 dBm valid with test tones up to -25 dBm.

Third Order Intermodulation Distortion: Third order input intercept point of +10 dBm minimum.

Valid with test tones up to -20 dBm with 10 MHz signal spacing.

Blocking: Attenuation of a wanted RF signal of -67 dBm caused by an unmodulated unwanted signal of -7 dBm spaced 10 MHz away, will be less than 3 dB (15 kHz BW).

LO Phase Noise: 100 dBc/Hz at 100 kHz

OUTPUT SIGNALS

IF Output:

Wide Band IF: 21.4 MHz, 4 MHz BW
Narrow Band IF: 21.4 MHz output at selected bandwidth.

Line Audio: AM, LSB, USB: 0 ± 3 dBm over AGC dynamic range, FM: 0 ± 3 dBm for deviation equal to $\pm 1/3$ of selected bandwidth, 600 ohms balanced pair on audio connector. Less than 5% distortion at rated output. Short circuit protected.

Headphones or Speaker: Dual, 0 to 12 V p-p, 8 ohm source impedance to front and rear panel phone jacks. Front jack with ring contact to adjacent receiver, both jacks with tip contact to own receiver. Short circuit protected.

FM Video: 4 V p-p max with sensitivity (Volts/kHz) selected to match selected bandwidth. Positive sense, DC coupled 93 ohm single ended output. Uses two pins on audio connector.

Audio Signal Strength: Analog format using two pins on audio connector (0 to 5 VDC)

INPUT SIGNALS:

Synthesizer Reference: 1, 5 or 10 MHz selectable, 0 dBm, 50 ohms: (one connector per assembly)

RF Input (Antenna): 50 ohms, two TNC females per each receiver either keypad or remotely selectable

REMOTE CONTROL:

All front panel functions can be controlled via one of the following bus interfaces:

IEEE-488
RS-232
RS-422

Interfaces may be exchanged in the field by replacing one module and one connector plate.

PHYSICAL CHARACTERISTICS:

Size: Standard 19-inch rack mount
5.25 inches (13.34 cm) height
23 inches (58.42 cm) deep

Weight: Weight of the dual receiver in rack chassis is 50 lbs.

ENVIRONMENTAL DATA:

Temperature Range: -0 to +50°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-810C

EMI/EMC: Per MIL-STD-461B Class A1A

Power Requirements: 100 Watts maximum per receiver, 90-150 or 180-260 VAC 47-460 Hz

The R-2412/U receiver configuration is controlled. Please consult the factory for options available with the R-3500.

