

HF COMMUNICATIONS RECEIVER

RA6217



FEATURES

- Continuous coverage from 980 kHz to 30 MHz
- AM, SSB, CW, MCW, and FM reception
- Exceptional sensitivity and stability
- All solid-state
- Drift-cancelling electronic bandswitching
- Can be used with synthesizer

DESCRIPTION

In the RA6217 receiver, Racal has once more successfully applied the Wadley drift-cancelling frequency selection system exemplified in its world-famous predecessor, the Racal RA17. The introduction of solid-state circuitry has even further improved the performance of the system, which features continuous tuning using electronic band selection to eliminate switches and remove complex wiring. These features have resulted in a high-grade, solid-state HF communications receiver, covering a frequency range from 1 to 30 MHz, developed to meet the most exacting performance requirements. The range is selected in discrete 1 MHz bands, with a 20 kHz overlap beyond each end of the scale.

The receiver is suitable for operation in the AM, SSB (upper or lower sideband), CW, MCW and FM modes. Switched selection of five IF bandwidths is available. All IF filters are designed on an interchangeable basis.

The excellent frequency stability of this receiver and the high accuracy of setting obtainable with the easily read in-line digital frequency display insures trouble-free operation even under the most difficult reception conditions. Calibration and zeroing of the frequency scale is rapidly accomplished by use of a built-in calibrator circuit and precise fine adjustment control.

The RA6217 is designed for a low power consumption. Interchangeable power supply units are available for use from AC line supplies or low voltage DC sources. A nickel cadmium battery pack is available which, with an AC charger unit, enables the receiver to be operated independently of line supplies.

The receiver, designed to meet the stringent environmental requirements of the Armed Forces, is strongly constructed using the highest quality components. Modular construction is used throughout, with plug-in connections to ensure the maximum accessibility and the minimum possible repair time.

RACAL

COMMUNICATIONS, INC.

MAY 1975

(see other side)

SPECIFICATIONS Courtesy of <http://BlackRadios.terry.org>

Frequency Range:

980 kHz to 30 MHz

Modes of Reception:

AM, SSB, CW, MCW, FM

Sensitivity (3 kHz bandwidth):

CW, SSB: 0.5 microvolts for 15 dB signal-to-noise ratio
MCW, AM (30% mod): 1.5 microvolts for 15 dB signal-to-noise ratio
FM (13 kHz bandwidth): 1 microvolt input for 20 dB quieting. 10 kHz peak-to-peak deviation for 10mW AF output

Noise Figure:

Less than 11 dB throughout

Input Impedance:

50-75 ohms (nominal)

RF Input Attenuator:

0 to 40 dB nominal in 10 dB steps

Oscillator Radiation at Antenna Terminal:

Less than 5 microvolts in 75 ohms

Tuning:

Continuous tuning with digital presentation of MHz and kHz and interpolation scale down to 200 Hz

Frequency Setting Accuracy:

Within 500 Hz

Calibration:

Internal calibrator unit provides marker signals at 100 kHz intervals

Stability:

Long Term: ± 50 Hz per 8 hour period at constant ambient temperature
Short Term: ± 5 Hz at constant ambient temperature
Variation with Temperature: Typically less than 50 Hz per $^{\circ}\text{C}$

Selectivity:

13, 6.0, 3.0, 1.0 kHz and 200 Hz (nominal at 3 dB points)

Shape Factor (6-60 dB):

1:4 or better (1:10 for 200 Hz bandwidth)

IF Outputs:

2-3 MHz broad-band spectrum for panoramic display

1.6 MHz, 100 mV nominal in 75 ohms (after IF selectivity)

455 kHz, 200 mV nominal in 50 ohms (100 kHz to customer order)

Automatic Gain Control:

Range: Input variation of 80 dB causes no more than 3 dB change in output

Time Constants (nominal):

Short: charge, 16 milliseconds;

discharge, 30 milliseconds

Medium: charge, 50 milliseconds;

discharge, 200 milliseconds

Long: charge, 80 milliseconds;

discharge, 4 seconds

BFO Range:

Continuously variable, ± 3.5 kHz from switched setting at IF + 6, IF + 3, 0, IF - 3 and IF - 6 kHz
Fixed crystal-controlled points at IF + 1.5 and - 1.5 kHz

Spurious Response to External Signals:

Better than 60 dB down for signals less than 10% off tune

Better than 80 dB down for signals more than 10% off tune

Internally Generated Spurious Signals:

Below noise when measured in a 3 kHz bandwidth, except at 1.0 MHz where response can be 5 dB above receiver noise

Image Rejection:

80 dB or better

Out-of-Band Intermodulation Distortion Products:

With the preselector tuned to the wanted frequency, the level of two equal unwanted signals more than 10% removed from the wanted frequency must be at least 80 dB above a 0.5 microvolt reference to produce a signal equivalent to the reference level

In-Band Intermodulation Distortion Products:

40 dB or more below two desired 3 millivolt input signals within the receiver passband, extended to 300 millivolts with use of the antenna attenuator

Cross Modulation:

For wanted signal levels up to 0.5 millivolts and with appropriate use of the antenna attenuator, a 30% modulated interfering signal 1.33% removed must normally have a level 46 dB above the wanted signal to produce cross modulation of 3%. The ratio improves at a rate of approximately 2 dB for each percent up to 10% off tune

Meter Indication:

RF tuning indicator; AF level to line

AF Output:

10 milliwatts (600 ohms) to headphone jack and rear terminals
Independent 1.0 milliwatt (600 ohms) output to line at rear terminals

AF Response (Overall):

To correspond with IF bandwidth in use and maintained to within 3 dB down to 300 Hz

AF Distortion (Overall):

Typically less than 2%

Controls:

MHz tuning, kHz tuning, RF range, RF tuning, RF attenuator, RF/IF gain, System switch, IF bandwidth, Detector mode switch, Calibrate/fine tune, Tuning lock, BFO tune, AF gain, Dimmer (pre-set), Meter switch, AF line level (pre-set), VFO internal/external switch

Power Supplies:

(Optional plug-in Units)

MA 6302: 100-125 and 200-250v, 48-420 Hz, 10VA (approx.)

MA 6301: 11-30v DC (positive or negative grounded)

MA 6300: Combined AC power supply/battery charger for use with MA6704 Ni-Cad battery pack

Environmental Conditions:

Operating: 0°C to $+55^{\circ}\text{C}$

Storage: -40°C to $+70^{\circ}\text{C}$

Dimensions:

3 1/2" high x 19" wide x 17" deep

Weight:

25 pounds (approx.)

Specifications subject to change without notice.

ALTERNATIVE MODELS

The success of the RACAL RA6217 in so many fields of HF reception has resulted in the development of a number of alternative models.

RA6217A This is the version of the RA6217 receiver described and specified in this publication.

RA6217B This version offers the maximum versatility in tuning methods. Frequency setting is available with synthesizer operation or continuously variable manual control. MHz selection is derived from switched crystal oscillators, the use of which also enhances the noise performance in the presence of strong signals. The unit has switch contacts for the RA6397 Antenna Filter Unit and can act as master to the RA6217F slave receiver.

RA6217D This receiver is designed primarily for remote-controlled operation. MHz selection uses switched crystal oscillators. All frequency setting is by synthesizer which can also actuate an RA6397 Antenna Filter Unit. The RA6217D may be used as master with the RA6217F.

RA6217E This version has a selector switch coupled to the MHz setting (for the RA6397 Antenna Filter Unit) and an additional 1.6 MHz IF output of 75 kHz bandwidth to make it particularly suitable for panoramic reception.

RA6217F Designed for use as a slave receiver, this unit contains no local oscillators. These are replaced by buffer amplifiers which are fed from the master receiver.

RA6217G The operation of this version (primarily for SSB communication) has been simplified by combining mode and bandwidth selection. The five available modes are AM (8 kHz), USB (3 kHz), LSB (3 kHz), and CW (1000 Hz and 200 Hz).

RA6217Q This receiver, which is suitable for pre-detection recording, has a wide-band IF output with a bandwidth of 100 kHz centered on 70 kHz. No detectors or AF circuits are provided.

RACAL

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