

- **FREQUENCY RANGE 500 KHz TO 30 MHz**
- **CONTINUOUS TUNING WITH ELECTRONIC BANDSWITCHING**
- **OUTSTANDING STABILITY AND TUNING ACCURACY**
- **SOLID CAST ALUMINIUM CONSTRUCTION**



Although designed more than ten years ago, when it represented such a revolutionary advance in radio reception, the Racal RA.17 Receiver continues to provide the outstanding performance which has made it justly famous.

Approved and used by the Armed Services and by major communications and broadcasting authorities in nearly every country in the world, over 15,000 models of the RA.17 and its derivatives have now been produced. Development has continued unceasingly to improve this receiver still further and the design has been advanced to include modern technical refinements and to meet the needs of the latest reception techniques. The latest version, the RA.17L Receiver, is now the standard model.

A revolutionary frequency-changing circuit eliminates switches and complex wiring in the r.f. circuits, providing dependable electronic bandswitching from 1 to 30 MHz. The superlative setting accuracy, stability and sensitivity may be judged from examination of the specification included in this leaflet. To obtain full advantage from the advanced electrical design, the highest quality engineering and workmanship have been employed at all stages of development and manufacture. All components have been selected for dependable performance in all climates and are types approved for use by the Armed Forces.

The North American version of this receiver, the RA.17C-12, is built to American standards. Plugs, sockets, valves, panel engravings, screw threads and a number of components are all of American design.

The RA.17 Receiver acquires increased usefulness with the addition of the specially designed adaptors and converters shown on the final page of this leaflet. These units add versatility without affecting the superb performance of the receiver in any way.

RACAL

Publication No.
307-1

A proportion of the components including crystals, loudspeaker, meter and transformers are of North American manufacture. Wherever possible other components are directly interchangeable with equivalents available in the North American market. Details of suitable replacement components can be supplied.

TECHNICAL SPECIFICATION

Frequency Range	1 to 30 MHz, range extends to 0.5 MHz with slight degradation of performance.	A.G.C. Time Constants	Short: Charge: 25 milliseconds Discharge: 200 milliseconds Long: Charge: 200 milliseconds Discharge: 1 second
Stability	After warm-up, drift in output frequency less than 50 Hz per hour under conditions of constant supply voltage and ambient temperature.	A.F. Response	With 13 kHz bandwidth, response remains within ± 4 dB from 250 Hz to 6000 Hz.
Input Impedance	75 ohms unbalanced.	A.F. Output	1. 50 mW from a switched 2½ in. loudspeaker on the front panel (1 W, North American version). 2. Two headphone sockets in parallel on front panel. 3. Three independent outputs of 3 mW at 600 ohms at rear of chassis. 4. One output of 10 mW at 600 ohms. Pre-set level is independent of the a.f. gain control setting. 5. One output of 50 mW (1 W North American version) at 3 ohms.
Tuning	Effective scale length of approximately 145 feet, i.e. about 8 in. of scale length corresponds to 100 kHz. Frequency increments remain substantially constant over the entire band.		<i>Note:</i> Two headphone sockets are connected across the loudspeaker on the British version and across one of the 600 ohms, 3 mW outlets on the North American version of the receiver.
Calibration	A 100 kHz signal derived from a 1 MHz crystal oscillator, having an accuracy of 5 parts in 10 ⁶ provides check points at 100 kHz intervals.	Distortion	Not greater than 5% at 50 mW output.
Aerial Input	(a) Wideband. (b) Double-tuned in six bands: (i) 0.5 to 1.0 MHz. (iv) 4 to 8 MHz. (ii) 1 to 2 MHz. (v) 8 to 16 MHz. (iii) 2 to 4 MHz. (vi) 16 to 30 MHz.	Hum Level	With A.F. GAIN control at maximum, the hum level is never less than 40 dB below rated output 50 mW or 1W respectively.
Sensitivity	A1 reception, bandwidth 3 kHz: 1 µV for 18 dB signal/noise ratio. A2 reception, 30% modulated, bandwidth 3 kHz: 3 µV for 18 dB signal/noise ratio.	Noise Limiter	A series noise limiter circuit can be switched into operation to provide limiting at modulation levels exceeding 30%.
Cross Modulation	For levels of wanted signal between 3 µV and 1 mV, an interfering signal 10 kHz off-tune and modulated 30%, must be at a level greater than 50 dB above that of the wanted signal to produce a cross modulation of 3%. The ratio of wanted to unwanted signal is improved at the rate of 3 dB/1% up to 10% off-tune.	Meter Indication	Alternative switching for indication of signal carrier level or a.f. output level. Additional 'S' Meter indication on North American version.
Intermodulation	Better than 100 dB down for interfering signals at least 10% removed from the wanted signal.	Controls	Megahertz Tuning Kiloherz Tuning Aerial Band Switch Aerial Tuning Aerial Attenuator Tuning Lock I.F. Gain I.F. Bandwidth System Switch A.G.C. Time Constant B.F.O. on/off B.F.O. Note A.F. Volume Line Output Level Limiter on/off Loudspeaker on/off Power on/off Meter Switch
Blocking	With similar conditions to those for cross modulation, the unwanted signal level must be 60 dB above that of the wanted signal to reduce the audio output by 3 dB.	External Connections	Power Input Aerial Input 2 to 3 MHz I.F. Input (for RA.137 L.F. Converter) 1 MHz Oscillator Output 100 kHz I.F. Output VFO2 Output (for diversity coupling) A.G.C. Line A.F. Outputs
Selectivity	Six alternative bandwidths are obtained by means of a selector switch. Filter details (nominal) are: -6 dB -66 dB 1. 13 kHz 35 kHz 2. 6.5 kHz 22 kHz 3. 3.0 kHz 15 kHz 4. 1.2 kHz 8 kHz 5. 0.30 kHz Less than 2 kHz 6. 0.10 kHz Less than 1.5 kHz Detected Output 28 kHz 20 kHz 15 kHz 8 kHz Less than 2 kHz Less than 1.5 kHz Bandwidths 5 and 6 are obtained with crystal-lattice filters; differences in centre frequencies of these bandwidth settings do not exceed 50 Hz.	Power Supply	100-125 and 200-250V, 45-65 Hz a.c. Power consumption 120VA approximately.
I.F. Output	100 kHz at 75 ohms impedance. Level approximately 0.2V with a.g.c. in operation. Two outlets in parallel are provided.	Dimensions	For rack mounting: Height: 10½ in. (26.7 cm). Width: 19 in. (48.3 cm). Depth: 20½ in. (51 cm), (with fitted dust cover). Fitted cabinet: Height: 12 in. (30.5 cm). Width: 20½ in. (52 cm). Depth: 21½ in. (55.6 cm). Weight: Rack mounted 67 lb. (30.5 kg.) In cabinet 97 lb. (44 kg.)
Image and Spurious Responses	With wideband or tuned input, external image signals are at least -80 dB, other spurious responses -60 dB. Internally generated spurious responses are not greater than 5 dB above receiver noise (3 kHz bandwidth and no antenna connected).	Construction	Cast chassis with ½ in. aluminium front panel, finished to highest durability and climatic specification.
Noise Factor	Less than 7 dB throughout the entire frequency range.	Notes	(i) 2nd V.F.O. output lead is normally coupled to the oscillator cathode. For panoramic reception with the RA.66, this is moved to the oscillator anode. (ii) For panoramic reception, alterations are made in the a.g.c. circuits. These cause minor changes in performance.
B.F.O. Range	±8 kHz.		
B.F.O. Stability	With constant ambient temperature and supply voltage, after warm-up time of 1 to 2 hours, drift does not exceed 50 Hz. For input level variations of 10 µV to 1 mV, b.f.o. drift is negligible.		
Automatic Gain Control	A.G.C. is applied to the r.f. and the first 100 kHz i.f. stages only. An increase in signal level of 50 dB above 1 µV improves the signal/noise ratio by 18 dB. An increase in signal level of 100 dB above 1 µV increases the a.f. output by less than 7 dB.		

CONVERTERS AND ADAPTORS

Low Frequency Converter Type RA.137

The RA.137 extends the lower frequency limit of the RA.17 to 10 kHz. The converter input circuit can be switched for either wideband or double-tuned operation. The output is fed to the 2-3 MHz section of the RA.17 where the same highly accurate film scale is used for tuning indication.

Single Sideband Adaptor Type RA.63

This adaptor, which operates from a 100 kHz i.f. output of the RA.17 Receiver, enables s.s.b. signals in the upper or lower sideband to be received. Vernier tuning of the local oscillator is provided for distortion-free reception. The unit can be used for suppressed or pilot carrier s.s.b. and for s.s.b. reception of d.s.b. signals over a pass-band from 500 to 3,000 Hz.

Independent Sideband Adaptors Type RA.98 and RA.121

These adaptors are designed to simplify reception of independent sideband signals. The RA.98 includes a motor-driven automatic tuning device to maintain correct alignment even during long periods of fading. With the RA.121, after accurate tuning has been effected using a cathode ray tube, a locking device holds the local oscillator exactly to the incoming pilot carrier. The passband of both adaptors is 300 to 6,000 Hz.

Diversity Switching Unit Type MA.168

This switching unit operates from the 100 kHz i.f. outputs of two RA.17 Receivers operating in diversity. The unit electronically selects the better signal which is passed either to a built-in detector and b.f.o. in the case of a.m., m.c.w. and c.w. signals, or to external adaptors in the case of f.s.k. or s.s.b. signals. The unit is fully transistorized.

SPECIAL RECEIVERS

Panoramic Receiver Type RA.81

Using the RA.66 Panoramic Adaptor, the RA.17 Receiver will provide panoramic reception of bandwidths up to 1 MHz. A first-class visual display of radio transmissions throughout the h.f. spectrum is obtained making the receiver ideal for search, monitoring or bandwatching activities. Simple modifications to the RA.17L Receiver are necessary, altering the a.g.c. characteristics; the performance of the receiver is otherwise unchanged.

Panoramic Recording Receiver Type RA.166A

The RA.166A is a further development of the Panoramic Receiver Type RA.81. In addition to providing visual panoramic presentation, a permanent record of the spectrum scanned is marked on a chart recorder.

Radio Teleprinter Receiving Terminals Type RA.103 and RA.129

The RA.103 Dual Diversity and RA.129 Single Channel terminals employ the RA.70 Frequency Converter and PV.78 F.S.K. Converter to exploit the high stability and setting accuracy of the RA.17 for accurate radio teleprinter reception. Tuning is extremely simple and channel changing is a matter of a few seconds. These versatile terminals are ideal for aviation, meteorological and similar services.

ANCILLARY UNITS

I.F. Converter Unit Type RA.73

This small crystal-controlled frequency converter unit enables auxiliary equipment with a 400-500 kHz input to be used with the RA.17 Receiver. A crystal-controlled oscillator is employed to convert the 100 kHz output of the RA.17 to the required frequency.

Receiver Protection Unit Type MA.107

This unit is designed for insertion in the aerial input circuit of the RA.17 Receiver to afford complete protection against excess voltage due to nearby transmitters.

Decade Frequency Generator Type MA.1350A

This synthesizer phase-locks the second v.f.o. of the RA.17 Receiver, providing exceptionally stable and accurate frequency selection in discrete steps of 100 Hz, using four decade controls. In addition, an interpolation oscillator enables the receiver to be continuously tuned over a range of 100 Hz, 1 kHz or 10 kHz. The MA.1350A incorporates a reference frequency generator with a stability of ± 2 parts in 10^9 per day.

The RACAL policy is one of continuous improvement, and consequently the equipment may vary in detail from the description and specification in this publication.

The logo consists of the word "RACAL" in a bold, sans-serif font. Each letter is contained within a separate rectangular box, and the boxes are arranged in a slightly staggered, overlapping fashion.

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Telephone: BRACKNELL 3244 · Cables/Grams: RACAL BRACKNELL · TELEX 84166

JC/N967/DL

Printed in England