RA3701 RA3702 RA3703 RA3704

TECHNICAL SPECIFICATION

Frequency range
15kHz to 30MHz in 1Hz or 10Hz steps.

Tuning
By numeric keypad or single spinwheel tuning knob with selectable tune rate.

Modes of operation

CW	A1A
MCW	A2A
AM	A3E
FM	F3E
USB/LSB	R2A, H2A, J2A, R3E, H3E, J3E

Options:

ISB	B7E, B8E, B9E (RA3701, RA3703)
FSK	F1B

BFO
Tunable +/–9.99kHz in 10Hz steps using the main tuning knob or by keypad entry.

Channel Store
100 frequencies in non-volatile EEROM memory with associated mode, bandwidth, AGC and BFO settings. Bulk erasure of the memory is possible from the front panel or remotely.

Scan modes
(a) Channel scan between designated channels with selected dwell time on each channel (0.1s to 9.99s).
(b) Frequency sweep between any two frequencies with selected step size (from 0.1kHz to 999.9kHz) and sweep rate (from 10Hz/s to 999.99kHz/s).

In either mode scanning may be halted on detection of a signal above a threshold set at the front panel with the IF gain control.

Frequency stability
One of the following optional frequency standards may be fitted:–
(a) **TCXO**
Accuracy ± 1.5 in 10^6
(b) **9442 ovened oscillator***
Temperature stability ± 3 in 10^9 per °C.
Ageing
± 3 in 10^9 per day after 3 months continuous operation.
(c) **9420 ovened oscillator***
Temperature stability ± 6 in 10^{10} per °C.
Ageing
± 5 in 10^{10} per day after 3 months continuous operation.

**Full details in Racal Dana Publications 825-2 and 827-2.*

Sensitivity
For the frequency range 0.5 – 30MHz:
SSB/CW: A signal of –113dBm (1μV emf) in a 2.7kHz bandwidth gives an S+N/N of 16dB [19dB] with the RF amplifier on and 10dB [13dB] with the RF amplifier off.
AM: A signal of –103dBm (3μV emf) 70% modulated at 1kHz, in a 6kHz bandwidth, gives an S+N/N of 16dB [19dB] with the RF amplifier on and 10dB [13dB] with the RF amplifier off.

Selectivity
The following bandwidths are standard:

USB	2.7kHz
LSB	2.7kHz
Symmetrical	300Hz
	1kHz
	2.7kHz
	6kHz
	12kHz

Other filters are available as options. A total of 5 filters (giving 7 bandwidths) are fitted in the basic receiver. The optional IF Filter Module allows a further 7 filters to be added.

Reciprocal mixing
With a wanted signal of –113dBm (1μV emf) in a 2.7kHz bandwidth, an unwanted signal 20kHz removed must be greater than 96dB [102dB] above the wanted signal to give a noise level equal to the output produced by the wanted signal.
At 80kHz removed the difference in level must be greater than 106dB [115dB].

Out of band intermodulation products
RF amplifier on:
With two –13dBm (100mV emf) signals separated and removed from the wanted signal by 25kHz, the third order intermodulation products will be not less than 70dB [76dB] below either of the interfering signals. Third order intercept point not less than +22dBm [+25dBm].
RF amplifier off:
Third order intercept point typically not less than +32dBm.

In band intermodulation products
Two in band signals of –13dBm (100mV emf) with 600Hz spacing produce third order intermodulation products not greater than –50dB [–55dB] at the IF output and line output.

Blocking
With a wanted signal of –53dBm (1mV emf), an unwanted signal more than 20kHz removed must be greater than +7dBm [+13dBm] to reduce the output by 3dB.

Cross modulation
With a wanted signal of –53dBm (1mV emf) in a 2.7kHz bandwidth, an unwanted signal 30% modulated, more than 20kHz removed must be greater than +1dBm [+7dBm] to produce an output 20dB below the output produced by the wanted signal.

External spurious responses
Spurious response rejection not less than 80dB [90dB].

Image and IF rejection
Image and IF rejection not less than 90dB [100dB].

Internal spurious responses
Typically fewer than 5 internal spurious responses give an output more than 3dB above the receiver noise level in a 2.7kHz bandwidth. None give an output more than 6dB above the receiver noise level in a 2.7kHz bandwidth.

Antenna input
(a) Input impedance 50 ohms nominal.
(b) The receiver will withstand, without damage, input signals of up to 50V emf continuously.
(c) Re-radiation from antenna input:
0–30MHz: Not greater than –87dBm (10μV pd).
30–100MHz: Not greater than –67dBm [–87dBm].

AGC
An increase in input of 120dB above –107dBm (2μV emf) produces an output change of less than 2dB.
Short, medium and long decay times may be selected from the front panel. When the mode is changed the receiver automatically selects the last time constant used in that mode.

IF gain control
The IF gain control may be used to set:
(a) Receiver gain
(b) AGC threshold
(c) Squelch threshold
The control range is 120dB.

Note
Figures in [ ] are typical values.

AF outputs
(a) 200mW into the internal loudspeaker (RA3701, RA3702).
Adjustable using the front panel volume control. May be switched off from the front panel.
(b) Rear panel connection for external loudspeaker (RA3701, RA3702). Level adjustable using the front panel volume control. Maximum output 1W into 8 ohms or 200mW into 16 ohms.
(c) Front panel headphone output.
Adjustable using front panel volume control. Maximum output 200mW into 16 ohms or 1mW into 600 ohms. Plugging in headphones disables the internal loudspeaker.
(d) Rear panel line output –20dBm to +10dBm into 600 ohms balanced. Level adjustable by means of a preset control mounted on top of the receiver.

IF outputs
(a) **Narrow**
Centre frequency 1.4MHz.
Bandwidth determined by IF filter selected.
Level –7dBm into 50 ohms.
(Optional modules provide 100kHz or 455kHz IF outputs).
(b) **Wide**
Centre frequency 1.4MHz.
–3dB bandwidth not less than 12kHz.

Metering
The front panel bar-graph meter may be switched to meter either RF signal level or AF line level (RA3701, RA3702).

Remote Control
One of the following interfaces is fitted:-
(a) Serial ASCII complying with CCITT recommendation V10 and EIA Standard RS423-A. Compatible with V28/RS232-C. Data rate may be preset in the range 50 baud to 9600 baud.
(b) IEEE 488 complying with ANSI/IEEE Std 488-1978.

Power supply
100, 120, 220, 240V. 45-65Hz.
Operates to full specification over the range –15% to +10% relative to taps. Withstands a mains surge of $\pm 50\%$ for up to 1 second without damage. Power consumption approximately 60W for the basic RA3701 and RA3703 receivers. Power consumption approximately 90W for the RA3702 and RA3704 receivers.

Environmental
The full Environmental Specification is given in Racal Document ES20 (Issue 5.1) available on request. The equipment is suitable for operation in fixed or transportable installations.

Operating temperature	–10°C to +55°C.
Storage temperature	–40°C to +70°C.
Relative humidity	95% at 40°C.

Dimensions
Height 133mm (5.25 in)
Width 483mm (19 in)
Depth 450mm (17.7 in) behind front panel

Weight
Approximately 14 kg (31 lb) for the basic RA3701 and RA3703 receivers.
Approximately 20 kg (44 lb) for the RA3702 and RA3704 receivers.

Optional modules
The RA3701 and RA3703 may be fitted with up to 5 plug-in optional modules. One plug-in optional module may be fitted to the RA3702 and RA3704. Please consult Racal for details of optional modules.

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