RA 3711 RA 3712

MODULAR HF RECEIVERS

KEY FEATURES

- Frequency range 0.5-40MHz
- High RF performance
- Modular construction
- Wide range of optional modules
- Automatic scanning of channels and frequency
- Serial ASCII or IEEE 488 control
- Controller of slave receivers
- Simple to operate
- Comprehensive BITE

DESCRIPTION

These high performance HF receivers cover the extended frequency range 0.5-40MHz.

Using a highly modular design, the same frame and modules can be configured to assemble receivers to meet a variety of different applications.

They are part of the successful RA3700 Series and comprise single and dual variants. A range of optional modules can be added to enhance the receiver facilities.

The RA3711 is a Single receiver, whilst the RA3712 is a Dual version.

Each receiver includes, as standard, a serial ASCII remote control interface with a built-in multi-addressing capability of up to 100 receivers. Alternatively, an IEEE 488 interface may be fitted. Slave receivers may be controlled in a number of ways: by computer, by using the RA3700 receiver control unit; or by the RA3711 and RA3712 receivers, which have built-in controller facilities. All front panel operating functions except power on/off switching can be controlled remotely.

Single function buttons control the most commonly used operations and four keys control the receivers' many special facilities by means of a menu system.

Comprehensive built-in test equipment (BITE), locates faults to module level and may be controlled remotely as well as locally from the front panel.

The frequency synthesizer is patented in the UK (2026268) and the US (4204174).

RACAL COMMUNICATIONS

Frequency Range
0.15MHz to 40MHz in 1Hz or 10Hz steps.

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

Mode of operation

CW	ISB	A3
MCW	AGN	R3A
AM	A3A	H3E
FM	A3J	J3E
USB/LSB	R3A, H3A, J2A, R3E, H3E, J3E	
ISB	R7B, B8E, B9E, (R1F1)	
FSK	F1B	
(A1)		

Tuning
Tunable ±0.9MHz in 1Hz 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 (0.1 to 5.0Hz).
b) Frequency sweep between any two frequencies with selected step size. All modes and bandwidths available and one step time selectable (over the range from 1MHz to 999.9MHz).
In either mode scanning may be halted on detection of a signal above a threshold set on 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 10⁷.
b) **SMLE second oscillator***
Temperature stability ±2 x 10⁻⁸ per °C.
Ageing:
±3 x 10⁷ per day after 3 months continuous operation.
c) **9420 second oscillator***
Temperature stability ±5 x 10⁻⁹ per °C.
Ageing:
±5 x 10⁷ per day after 3 months continuous operation.
* full details in Racal Data Publications 6015-2 and 6017.

Warm up
±5 x 10⁻⁸ within 10 minutes of switch on.

External standard
An external standard input at the rear of the unit is provided for 5MHz operation of the receiver.
AM: A signal of ±10dBm (1μV) into a 2.7kHz bandwidth, an unwanted signal 20kHz removed must be greater than 90dB (10mW) above the wanted signal to give a mute output equal to that of the wanted signal. At 30kHz removed the figure must be greater than 100dB (100kW).

Out of band intermodulation products
RF amplifier on
With two -13dBm (100mV) signals separated and removed from the wanted signal by 25kHz, the third order intermodulation products will be not less than 60dB (94dB) below either of the interfering signals. Third order intermod point of +12dBm (0.9V).
RF amplifier off
Third order intercept point typically not less than +20dBm (2V).

In band intermodulation products
Two in-band signals of -33dBm (5mV) with 600Hz spacing produce third order intermodulation products not greater than -100dB (10μV) below the wanted signal (2.1kHz bandwidth).

Blocking
With a wanted signal of -33dBm (5mV) with, an unwanted signal, more than 30kHz removed must be greater than +10dBm (+15dBm) to reduce the wanted signal by not more than 3dB (with RF amplifier off).

Cross modulation
With a wanted signal of ±10dBm (1μV) and an unwanted signal 30% modulated at 400Hz modulated, more than 20kHz removed, must be greater than +10dm (+10dBm) to produce an equivalent 30% modulation of the wanted signal by the output produced by the wanted signal.

External spurious responses
Spurious response rejection not less than 80dB (90dB).

Internal spurious responses
Image and IF rejection not less than 90dB (90dB).

Internal spurious responses
Typically not less than 80dB (90dB), but no internal spurious response gives an output more than 3dB greater than the equivalent noise level in a 2.7kHz bandwidth. None give an output greater than that produced by an equivalent -13dBm (0.5μV) signal.

Audio output
a) input impedance 50 ohms nominal.
b) The receiver will withstand, without damage, an input signal of ±10dBm (7V) up to 30MHz decreasing to ±10dBm (7V) at 40MHz.

Sensitivity
The following typical benchmarks are (standard):
CW: 2.5mV
LSB: 2.5mV
Symmetrical: 3.5mV
J3E: 2.7kHz
Other filters are available as options. A total of 6 filters may be fitted. Using a 2.7kHz filter and a receiver the receiver. The optional IF filter Module allows a further 6 filters to be fitted.

AF outputs
a) 300mW into the internal loudspeaker. Adjustable using the front panel volume control. May be switched off from the front panel.
b) Rear panel connection for external loudspeaker. Level adjustable using the front panel volume control. Maximum 1W into 2.5 ohms or 100mW into 15 ohms.
c) Two independent 600 ohm outputs giving front panel volume control. Maximum output 220mW into 16 ohms or 1mW into 600 ohms.

AF harmonics
Better than 5% (2.5kHz filter).

AF Noise
Centre frequency 1.4MHz
Bandwidth determined by IF filter selected.
Level +10Bm into 50 ohms.
Optional module provides 100Hz (F output.)

IF Wide
Centre frequency 1.4MHz
±60 bandwidth not less than 12kHz.

Metering
The front panel bargraph meter may be switched to meter either RF signal level or IF output level.

Remote control
One of the following interfaces is fitted—
a) IEEE 488 interface complying with IEEE-488 and IEC625 recommendation V32 and V24 Standard.
RS423-A, Compatible with V28 IRD/JG23-2 interface Data rate may be preset in the range from 50 to 9600 baud.
b) RS422-A interface with ANSI/IEEE Standard 422-1978.

Power supply
100-120, 200-240V 45-65Hz.
Operates to full specification over the range −15% to +30% relative to a nominal setting. Automatic mains range selection is not necessary from the front panel.
Power consumption approximately 60W for the basic RA3711 receiver. Power consumption approximately 90W for the RA3712 receiver.

Environmental
The full environmental Specification is given in Racal Document 8320 Issue 1.0 available on request. The equipment is suitable for operation in the following environment.
Operating temperature −10°C to +55°C.
Storage temperature −40°C to +70°C.
Relative humidity 95% at +40°C.

Dimensions
Height 133mm (5.25in).
Width 483mm (19in).
Depth 493mm (19.4in) behind front panel.

Weight
Approximately 14kg (31 lb) for the basic RA3711 receiver.
Approximately 17kg (37 lb) for the RA3712 receiver.

Radiated interference
The RA3711 may be fitted with up to 5 crystal-optioned modules. One plug-in optional module handling six additional filter (RA3711) receiver, one for AGC processing (audio processing) module.

Note: Figures in ( ) are typical values.