Eddystone Radio Limited

Member of Marconi Communication Systems Limited

(PROVISIONAL)

Ships Main and Reserve Receiver

1837/1

FEATURES

- High Stability Operation
- Digital Readout to 100Hz
- Continuous Tune
- Muting Relay
- ± 10kHz Fine Tune Facility
- No Preselector Required
- Tuned Bandpass Input
- Front End Protection
- AM/CW/SSB
- Wide Frequency Range 100kHz-30MHz
- Five Bandwidths for Optimum Performance

Description

1837 Series is the designation for a family of HF/MF communications receivers intended for maritime and high stability applications in the frequency band 100kHz to 30MHz. The parent receiver (Model 1837/1) is designed primarily as a maritime equipment and provides reception facilities for CW, MCW, and AM signals, together with upper and lower sideband reception of A3A, A3H and A3J signals, in accordance with the requirements of the British MPT Specification 1201 and CEPT draft recommendations for a Maritime Main Receiver. Operation is from any standard 40-60Hz supply or from a 12/24 volt DC supply using an external invertor unit.

The receiver has a 483mm (19 inch) panel to suit standard racking and is also available complete with cabinet for use in bench-mounted installations; it can also be equipped with shock mounts for mobile use. Other accessories include a cabinet loudspeaker unit in matching style.

A highly advanced circuit design is employed using the latest digital techniques and components. Double conversion applies on all ranges except in the 840 - 1600kHz band where single conversion is used. On the HF ranges the 1st IF frequency is variable by means of the "Fine Tune" control over a range of ± 10kHz relative to the frequency selected by the main tuning control. The frequency to which the receiver is tuned is shown by a 6 - digit electronic display on the front panel. When set to the 'tune' condition, the receiver is operated in the 'search' mode as a normal medium stability receiver. The received frequency is shown on the digital display. On pressing the "Lock" button, an error-correcting circuit is brought into use and the receiver changes to the high stability mode. The receiver is now locked to the reception frequency at the instant the "Lock button is pressed and the tune frequency is shown on the digital display. The digital display will flash at a 100 millisecond repetition rate to indicate that the received frequency is close to the limits of the error correcting circuits. The receiver will continue to function but with medium stability until reset.

Selectivity is adjustable to suit signal mode and the normal diode detector is replaced by a product detector when receiving CW and SSB. The associated beat oscillator generates pre-tuned carrier insertion frequencies for CW/LSB reception, adjustment being possible by use of the B.F.O. control. For USB reception the carrier insertion frequency is derived from the high stability master oscillator at 100kHz. The 100kHz IF output is available for connection to ancillary equipment.

Separate AGC systems are employed for the RF and IF stages with provision for manual control of IF gain when required. The IF AGC line is brought out for interconnection when operating receivers in dual diversity and is also used to operate the integral carrier-level meter; the RF AGC line is permanently connected. Audio outputs are available for loudspeaker, headset and lines; the line output being fed from an independent low-level amplifier with adjustable pre-set gain control. A monitor speaker is fitted and all external connections except the headset socket are located at the rear. An aerial muting relay and input attenuator are also incorporated.

Specification

Frequency Coverage:
100kHz to 30MHz in nine ranges with fine-tune facility on Ranges 1 - 5.

Range 1	18.0MHz	-	30.0MHz
Range 2	10.0MHz	-	19.0MHz
Range 3	5.5MHz	-	10.0MHz
Range 4	2.9MHz	-	5.5MHz
Range 5	1.6MHz	-	2.9MHz
Range 6	840kHz	-	1600kHz
Range 7	400kHz	-	850kHz
Range 8	200kHz	-	400kHz
Range 9	100kHz	-	210kHz

Intermediate Frequencies
1st IF: Tunable 1340 - 1360KHz to provide fine-tune facility on Ranges 1 - 5; 1350kHz on Ranges 7 - 9. Not in use on Range 6.
2nd IF: 100kHz. BFO/Carrier Insertion ± 3kHz swing for 'CW' and LSB reception. Fixed 100kHz at 'USB'.

Aerial Input Impedance
75Ω nominal (unbalanced) for frequencies 4MHz to 30MHz. 10Ω in series with 250pFd for frequencies 1.605MHz to 4MHz: 10Ω in series with 220, 390, 560pFd for frequencies below 1.605MHz.

Reception Modes
A1 telegraphy, A2, A2H, A3, A3A, A3H and A3J telephony with upper sideband selectable in SSB mode. Separate filters are used for single and double sideband working.

Environmental
The receiver conforms to the climatic and shock/vibration requirements of British MPT 1201 and 1204, and CEPT draft recommendations.
Operating temperature rating:
−15°C to +55°C (+40°C, 95% relative humidity).

Muting
Internal reed relay controlled from associated transmitter interrupts aerial feeder and grounds input circuit during transmission.

Scale Resolution
Display indicates to 100Hz.

Power Supply
100/130 or 200/260V (40-60Hz) single phase AC. Consumption approximately 50VA. 12-24V DC with separate invertor.

Mounting Styles
Rack-mounting, bench-mounting and bench-mounting with resilient mounts. Plinth loudspeaker unit available to order.

Dimensions and Weight
Rack-mounting (with dust covers)

Width	483mm (19 ins)
Height:	159mm (6.25 ins)
Intrusion into rack:	334mm (13.125 ins)
Weight (approx)	16.783kg (37 lbs)

Bench-mounting (with cabinet)

Width:	502mm (19.75 ins)
Height (with feet):	191mm (7.5 ins)
Depth (overall):	376mm (14.8 ins)
Weight (approx):	21.8kg (48 lbs)

Our equipment is designed generally to meet "British Defence Specification 133 Class L2"

Controls

Front Panel
Range switch. Main tune knob. Fine tune knob. Frequency lock button. Peak R.F. knob. Filter select knob. Audio gain/IF gain concentric knobs. BFO Pitch knob. RF gain −20dB push buttons. BFO/AM/SSB buttons. AGC/Manual & Long/Short time constant push buttons.

Back Panel
Meter zero preset. Line level preset.

Facilities

Front Panel
Carrier level meter. Phone socket. Oven light.

Back Panel
Aerial input. IF output. Ancillaries connector. Mains input socket. Fuses.

Typical Performance

Sensitivity
(75Ω input all ranges)
15dB S/N ratio, 3kHz B/W: AM 30% mod. =3μV; CW=1μV.

IF Selectivity
Four selectable bandwidths using switched L/C filter plus separate SSB filter.

Position	−6dB	−60dB
400Hz	400Hz	2.4kHz
1.3kHz	1.3kHz	4.5kHz
SSB*	2.4kHz at −3dB	3.9kHz
3kHz	3kHz	12kHz
8kHz	8kHz	18kHz

*Asymmetrical response, meeting requirements of MPT1201 and CEPT draft recommendations.

Image Rejection

100kHz	-	525kHz	80dB
525kHz	-	18MHz	70dB
18MHz	-	30MHz	50dB

IF Rejection

100kHz	-	1750kHz	60dB
1.5MHz	-	2.9MHz	60dB
2.9MHz	-	30MHz	85dB

Note: Any given image or 1st IF breakthrough occurring on Ranges 1 - 5 may be eliminated by off-setting the 1st IF and retuning.

Frequency Stability
Figures quoted after 30 minute warm-up period.

'Tune' mode - 1 part in 10^4/°C (typically 5 parts in 10^5/°C)
'Lock' mode - not greater than 20Hz (Typically 5Hz) drift in any period of 15 minutes for 7°C increase in ambient temperature.

Cross Modulation
With a wanted signal 60dBμV producing standard output, unwanted output will be at least 30dB below this level with an interfering signal 20kHz off-tune and of level 90dBμV.

Intermodulation
1. The level of third order intermodulation products given by two signals of equal strength lying at carrier +1kHz and carrier +1.6kHz will be at least 30dB below the level of either signal.

2. With a wanted signal 30dBμV producing standard output, two unwanted signals adjusted to produce a third order intermodulation product at the wanted frequency, must each be of a level greater than 90dBμV to produce standard output when neither signal is closer than 30kHz to the wanted frequency.

Blocking
With a wanted signal 60dBμV, output will be affected by less than 3dB with an interfering carrier 20kHz off-tune of level 100dBμV.

AGC Characteristics
Output is maintained within 3dB for 90dB increase in signal from threshold reference level (taken at 8MHz)

AGC Time Constant

Position	Charge	Discharge
Short	30mS	0.5 sec
Long	200mS	6.5 sec

Audio Output
Ext. speaker (3Ω) : 500mW at 5% distortion (1.5W max)
Line (600Ω) : 10mW (adjustable)
Headset : Low/medium Z

Audio Response
Within 3dB over the range 200Hz to 8kHz. Overall response is dependent on IF selectivity

IF Output (100kHz)
3μV at aerial produces an IF output of at least 20mV across 75Ω.

Radiation
Less than 400pW (typically 20pW)

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