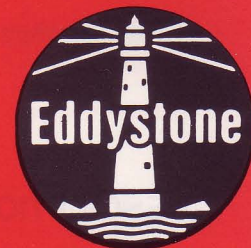


Eddystone Radio Limited

Member of Marconi Communication Systems Limited



HF/LF Receiver

Model 1650 Series

FEATURES

Meets requirements of British MPT Specification 1201 and CEPT Specification for a Maritime Main Receiver.

Modes AM, CW and USB with different versions providing reception of FSK and LSB.

Operation from any standard 40Hz – 60Hz mains supply or 24V DC negative ground. Automatic switching to 24V DC in the absence of mains supply. 12V DC operation using external inverter unit.

Tuned frequency to within 3Hz controlled by high stability synthesiser with single knob tuning.

RF circuits motor tuned automatically to correct frequency provides optimum freedom from cross modulation, intermodulation and blocking in the presence of high level interfering signals.

Frequency displayed to 5Hz on an eight digit display.

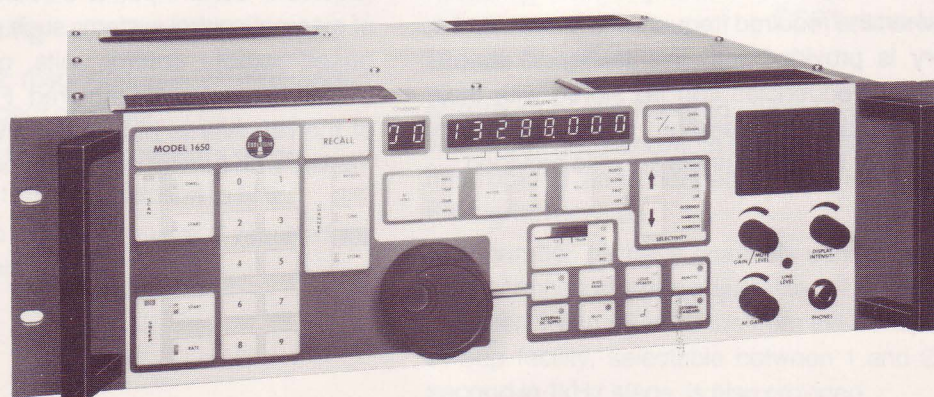
Keyboard provided for direct entry of known frequencies.

A maximum of one hundred channels can be stored with mode settings and can be interrogated and changed without interruption of signal received.

Any number of channels can be automatically scanned at a rate adjustable from the front panel.

Serial inputs and outputs at TTL level enable various forms of automatic and remote control.

Emergency battery back up provided to prevent loss of stored information in the event of a power failure.



DESCRIPTION

The 1650 series of receivers is intended for maritime and high stability applications in the frequency range 10kHz to 30MHz.

The parent receiver (1650/1) is designed primarily as a maritime equipment and provides reception facilities for CW, MCW, and AM signals, together with upper sideband signals in accordance with the requirements of the British MPT Specification 1201 and CEPT specification for a Maritime Main Receiver. Operation is from any standard 40Hz-60Hz mains supply or 24V DC negative ground. Automatic switching to 24V DC in the absence of mains supply. 12V DC operation using external inverter 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.

A highly advanced circuit design is employed using double conversion on all ranges. A first IF frequency at 46MHz ensures adequate image and IF breakthrough performance, and a second IF of 1.4MHz provides for specific customer bandwidths where requirements differ from the standard fitting. The frequency to which the receiver is tuned is controlled by a high stability synthesizer tunable within 3Hz, with the frequency shown by an eight digit electronic display. Frequency selection is by means of a single tuning knob giving the operator the feel of a conventional receiver for search facilities. A keyboard is also provided for direct entry when the required frequency is known, and a memory is provided with this facility so that a number of frequencies can be stored with their required modes of operation. Scan and sweep facilities over these channels are also provided.

Bandpass input tuned circuit can be provided as an option on all frequencies above 150kHz with a single low pass filter for operation from 10kHz to 150kHz. These RF circuits are gang tuned by a motor which is automatically tuned to the correct frequency, from information derived from the synthesizer control. This arrangement provides for optimum freedom from cross modulation, blocking, and intermodulation under traffic conditions when high-level interfering signals are present.

Selectivity is adjustable to suit signal mode, and a choice of AM or product detector is available. The associated insertion oscillator for the product detector is derived from the master oscillator for optimum stability on both SSB reception (fixed injection) and CW reception (variable injection from front panel control).

A version of the receiver (1650/3) is available providing reception of independent sideband (ISB) signals in addition to all the features of the standard receiver. This equipment allows the operator to select and store different AGC time constants on each sideband for optimum flexibility of operation.

Output is provided at the intermediate frequency of 1.4MHz for connection to ancillary equipment. Audio outputs are available for loudspeaker, headphones 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 provision for connection to an external speaker provided. Aerial muting relay and input attenuator are also incorporated.

The receiver is provided with serial inputs and outputs, at TTL level, to enable various forms of automatic and remote control operation. A range of 'Remote Interface Adaptors' connect the receivers' serial input, and output to various types of external control systems such as microcomputer-based remote control units, or custom control units, via Modems if required. Full remote control of the receiver is provided complete with remote 'fast search tuning' and error checking.

SPECIFICATION

(Not to be interpreted as a test specification)

Frequency Coverage

10kHz to 30MHz

Bandpass input tuned circuits 150kHz to 30MHz with low pass filter from 10kHz to 150kHz is available as an optional extra.

Intermediate Frequencies

46.205MHz 1st IF

1.4MHz 2nd IF

Aerial Impedance

50 Ω /75 Ω . nominal (unbalanced).

Reception Modes

1650/1 AM, CW, USB

1650/2 AM, CW, USB, LSB

1650/3 AM, CW, USB, LSB, ISB

Full provision for reception of FSK can also be provided as an option.

Reception Bandwidths

Very Narrow* : 400Hz

Narrow : 1kHz

Intermediate : 3kHz

Wide : 8kHz

SSB : 2.4kHz

Very Wide : 14kHz

Alternative bandwidths can be provided for specific customer requirements up to a maximum 14kHz.

*Very narrow filter not fitted on 1650/1.

Stability and Tuning

Tunable with 3Hz resolution with all frequencies derived from standard oscillator.

Stability within 10Hz over temperature range.

Display: Eight digit L.E.D. resolution to 5Hz.

Can be locked to external master if required for higher order of stability.

BFO

100Hz steps over ± 3.9 kHz derived from master oscillator.

Muting

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

IF and AF desensitising is also provided.

Power Supply

100V/130V and 200V/260V (40Hz-60Hz) single phase AC. Consumption approximately 50VA.

Operation from 24V DC negative ground automatically selected in the absence of AC mains supply. Operation from 12V DC using external inverter unit.

Mounting Styles

Rack mounting:

Including handles and cabling at rear

Height 133mm (5.25 inches)

178mm (7.00 inches) for 1650/3

Depth 528mm (20.80 inches)

Width 483mm (19.00 inches)

Weight Approximately 19Kg (42 lbs)

Bench mounting:

Including feet

Height 164mm (6.50 inches)

208mm (8.25 inches) for 1650/3

Depth 528mm (20.80 inches)

543mm (21.40 inches) for 1650/3

Width 502mm (19.75 inches)

Weight Approximately 23Kg (51 lbs)

Optional shock mounts for mobile use under arduous conditions.

Environmental

Operational temperature : -15°C to $+55^{\circ}\text{C}$

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

Relative humidity : 95% at $+40^{\circ}\text{C}$

Bump and vibration : Meets requirements of MPT 1204 and CEPT requirements

Stored Channels

Maximum of one hundred channels can be stored with mode and bandwidth setting. Channels can be interrogated and changed without interruption of the signal received.

Any number of these channels can be automatically scanned at a rate adjustable in 1 second steps between 1 and 99 seconds from the front panel. A sweep facility, selectable between 1 and 29kHz/second in 1kHz steps, is also provided.

Emergency battery back up is provided to prevent loss of information in the event of a power failure.

TYPICAL PERFORMANCE

(Not to be interpreted as a test specification)

Sensitivity12dB S/N on SSB for $1\mu\text{V}$ input with 2.4kHz bandwidth in RF wideband mode above 160kHz.**Selectivity**

	-6dB	-60dB
Very Narrow	400Hz	2kHz
Narrow	1 kHz	3.5kHz
Intermediate	3kHz	6kHz
Wide	8kHz	12kHz
SSB	2.4kHz	3.8kHz
Very Wide	14kHz	40kHz

Image Rejection

90dB.

IF Rejection

90dB.

Frequency StabilityBetter than $\pm 3\text{Hz}$ 0°C to 55°C .

Facility for locking to external master can be provided.

Cross ModulationWith a wanted signal $60\text{dB}\mu\text{V}$ producing standard output, an unwanted signal at level $100\text{dB}\mu\text{V}$ at 20kHz off-tune modulated 30% at 1kHz will produce an output of at least 30dB below standard output.**Intermodulation (In-Band)**

The level of third order intermodulation products produced by two signals in-band will be at least 40dB below the level of either signal.

Intermodulation (Out-of-Band)With a wanted signal $30\text{dB}\mu\text{V}$ 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 $95\text{dB}\mu\text{V}$ to produce standard output when neither signal is closer than 30kHz to the wanted frequency.**Blocking**With a wanted signal $60\text{dB}\mu\text{V}$, output will be affected by less than 3dB with an interfering signal 20kHz off-tune at level $110\text{dB}\mu\text{V}$.**AGC Characteristics**Output is maintained within 3dB for 90dB increase in signal from threshold reference level (nominally $1\mu\text{V}$).

Time constants switched to suit reception of AM, CW, SSB.

Audio Output

Line (600Ω)	: 10mW Pre-Set
Loudspeaker	: 1W maximum
Headphones	: 10mW maximum
	Low/Medium impedance

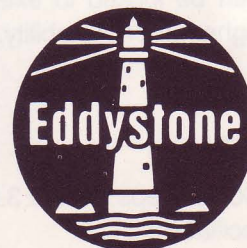
IF Output (1.4MHz)20mV output into 50Ω .**Radiation**Less than $10\mu\text{V}$ in 50Ω over 0-120MHz.

As we are always seeking to improve our products, the information in this document gives only general indications of product capacity, performance and suitability, none of which shall form part of any contract. The information contained herein is subject to confirmation at the time of ordering.

Eddystone Radio Limited

Member of Marconi Communication Systems Limited
 Alvechurch Road, Birmingham B31 3PP, England
 Telephone: 021-475 2231
 Cables: Eddystone Birmingham Telex: 337081

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