

Section 1

INTRODUCTION

General

Book 1

This handbook provides the detailed commissioning notes and comprehensive operating instructions required for Radio Receiver type 40A (British Home Office design) manufactured by Eddystone Radio Limited.

It is important to note that Book 2, which is a separate publication, provides the overall technical information and service data. It is therefore essential to refer to Book 2 whenever detailed modification data or maintenance instruction is required.

Guarantee

All 40A Series receivers are suitable for continuous use under normal operating conditions and should require very little routine maintenance over long periods of operation. With the exception of the semi-conductor devices, all components are guaranteed by the Manufacturer for a period of one year from the date of purchase. The semi-conductor devices are covered by a separate guarantee.

Servicing

Spares for user servicing can be supplied and advice will be freely given when required. Any enquiries relating to service matters should be directed to the "Sales and Service Department", Eddystone Radio Limited, at our usual address. Please quote the equipment Model number and Serial number in all communications. Should major servicing become necessary the unit can, by prior arrangement, be returned to the Manufacturer for attention; care should be taken to ensure that the unit is well protected against possible damage during transit.

General Description

Radio Receiver type 40A, is a portable Radio Frequency Interference (RFI) measuring set, designed to meet the special requirements of the British Post Office and, in general, the special requirements of the specification set down in CISPR (16). The equipment is primarily intended for use by personnel engaged in the investigation of RFI in the frequency range 130kHz to 32MHz. The receiver is also ideally suited to many industrial uses, including acceptance testing on a wide range of electrical appliances.

Measurements can be taken of the voltage or field strength of CW signals, or impulsive noise with pulse repetition frequencies as low as 1Hz. Integral ferrite loop aerials or the "whip" aerial supplied, are utilized for interference tracing. Separate correction and conversion tables are supplied with calibrated aerials specifically intended for field strength measurements or radiated noise measurements, or to facilitate the assessment of conducted noise using a suitable artificial mains network.

The equipment is extremely simple to operate and long term accuracy of a high order is assured by standardising the overall system gain against an internal impulse calibrator, prior to taking each reading. Power is derived from a self-contained battery supply (type LP3627) utilizing six International Type D dry cells ("U2" or equivalent) for field operation.

Alternatively, a standard AC source in the range 105-125/190-270V 40-60Hz can be used via the mains power supply module (type LP3618) supplied.

The receiver takes the form of a conventional single superhet with an intermediate frequency of 1.75MHz. As such it has an input impedance of 50Ω and is fed via the front panel "RF INPUT 50Ω " socket and the 10dB and 1dB step attenuators. When either 'LOOP' or 'WHIP' aerials are selected, they are switched (internally) to this input via an additional impedance converting aerial amplifier. For gain standardisation (Calibration) the fixed level output of the internal broadband impulse generator is also switched to this input, though in this case by-passing the attenuators. The output meter is fed from the amplified output of the quasi-peak rectifier. A high impedance DC output direct from the detector is provided on the rear ancillary connector. Other facilities include AGC and a +20dB gain setting, both which operate on the IF amplifier. The AGC line is brought out to the rear ancillary connector to enable the connection of additional AGC time constant capacitors. A buffered pre-detector output from the IF amplifier is brought out to the rear panel BNC connector. The receiver can also be operated from an external DC supply via an input on the rear ancillary connector. This input is diode protected to prevent accidental polarity reversal of the supply from causing damage - however the internal power supply must be disconnected when an external power supply is used. (See Commissioning Notes).

The extendable whip aerial is supplied in the cabinet lid and must be fitted to the UHF - type input socket located beneath the protection cover on the RH side of the cabinet (See Commissioning Notes), when 'WHIP' is selected.

For audio monitoring an envelope detector is provided with an audio amplifier supplying an internal monitor speaker and the 'PHONES' jack socket on the front panel. When a plug is inserted in this socket, the internal loudspeaker is automatically muted.

TECHNICAL DATA SUMMARY

Input impedance	:	$50\Omega \pm 10\%$ at the tuned frequency with 10dB or more attenuation being used.
Measurement range	:	(equivalent sinewave p. d. input) 0dB μ V to 100dB μ V with use of 'IF +20dB' facility. An extra ± 5 dB range at any point is obtainable using the meter, but with a slight reduction in accuracy (0.5dB).
Detector output	:	$\geq +150$ mV D.C. at 'SET CAL' reading on meter (output across 10M Ω load). Output is proportional to quasi-peak rectifier output voltage.
IF Output	:	≥ 50 mV p. to p. emf with a sinewave input giving 'SET CAL' on meter.
IF Frequency	:	1.75MHz.
External power supply input	:	+8.0 to +10.5V DC for optimum operation (n.b. this input is diode protected against accidental reversal of polarity).
Weight	:	= 10kg total package (approx).
Dimensions	:	WIDTH : 385mm including handle. HEIGHT : 161mm including feet. DEPTH : 358mm including feet.
Bandwidth	:	9kHz \pm 1kHz.
Bandwidth at 60dB	:	36kHz maximum.
Electrical charge time constant of rectifier circuit	:	approx 1mS.
Electrical discharge time constant of rectifier circuit	:	approx 160mS.
Mechanical time constant of critically damped meter (to 35% of steady deflection)	:	approx 160mS.
IF and image rejection (150kHz - 30MHz)	:	better than 40dB.
Spurious response rejection	:	better than 40dB.
Accuracy of sinewave voltage measurement	:	Within ± 2 dB (at 'SET CAL' mark on meter).

Screening : With the receiver in a RF field 80dB μ V/M in frequency range 130kHz - 32MHz, the indication on the meter shall not exceed 'SET CAL' after calibration.

Internal noise : Does not exceed -5dB point on meter after calibration.

Pulse response ('CISPR' selected). : Between 150kHz and 30MHz after calibration.

n.b. When 'LONG' is selected the variation in response at low prfs is widened by a few dB.

PRF (Hz)	Relative equivalent level of pulse for 'SET CAL' on meter (dB).
1000	-4.5 ± 1.0
100 (ref)	0 (ZERO)
20	$+6.5 \pm 1.0$
10	$+10 \pm 1.5$
2	$+20.5 \pm 2.0$
1	$+22.5 \pm 2.0$
Isolated pulse	$+23.5 \pm 2.0 / -3.0$

Frequency calibration : Within $\pm 2\%$.

Audio Output : At least 100mW into an 8 Ω load at the front panel phone jack.

Environmental : Equipment meets DEF 135 for category III equipment. Operating temperature - range -5°C to +55°C RH not exceeding 30% and 0°C to 40°C, RH not less than 95% at +40°C.