"TRADER" SERVICE SHEET

1117

ROBERTS MR

A.C. Mains Transportable

FITTED with self-contained frame aerials for M.W. and L.W. reception, the Roberts MR is a transportable table superhet designed to operate from A.C. mains only of 200-250 V, 50 c/s. The waveband ranges are 192-570m and 1,200-2,100m.

Release date and original price: August 1953, £15 2s, purchase tax extra.

CIRCUIT DESCRIPTION

Tuned frame aerial input by **L1, C28** (M.W.) and **L1, L2, C28** (L.W.) to triode heptode valve **(V1, Mullard ECH81),** which operates as frequency changer with internal coupling, the oscillator grid being externally connected to an injector grid in the heptode section.

Oscillator grid coil **L3** is tuned by **C29** for both M.W. and L.W. operation. Parallel trimming by **C30** (M.W.) and **C8, C31** (L.W.); series tracking on both bands by **C7.** Reaction coupling from oscillator anode by **L4.**

Second valve **(V2, Mullard EBF80)** is a double diode pentode valve, its pentode section operating as intermediate frequency amplifier with tuned transformer couplings **C2, L5, L6, C3** and **C12, L7, L8, C13.**

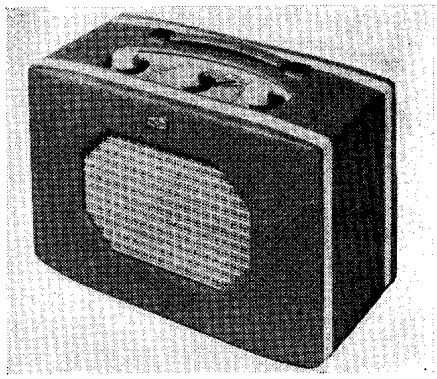
Intermediate frequency 470kc/s.

One diode section of **V2** operates as signal detector, the A.F. component in its rectified output being developed across the volume control **R10,** which operates as diode load, and passed via **C18** to the grid of **V3a** (triode section of **V3, Mullard ECL80**). I.F. filtering by **C15, R9** and **C16.**

Second diode of **V2** is fed via **C11** from **V2** pentode anode and the resulting D.C. potential is developed across load resistor **R7** and fed back as bias to **V1** and **V2** giving automatic gain control.

Resistance-capacitance coupling by **R12, C19** and **R13** between **V3a** and pentode output valve, section **b** of **V3.** Grid bias for **V3b** is developed across cathode resistors **R14, R15,** but as **V3a** requires only a proportion of this bias, its grid circuit is returned to the junction of **R14, R15** instead of to chassis. Tone correction in **V3b** anode circuit by **C21.** Noise suppressor switch **S6** shunts a second capacitor, **C20,** across **T1** primary

(Continued col. 1 overleaf)



Appearance of the Roberts MR

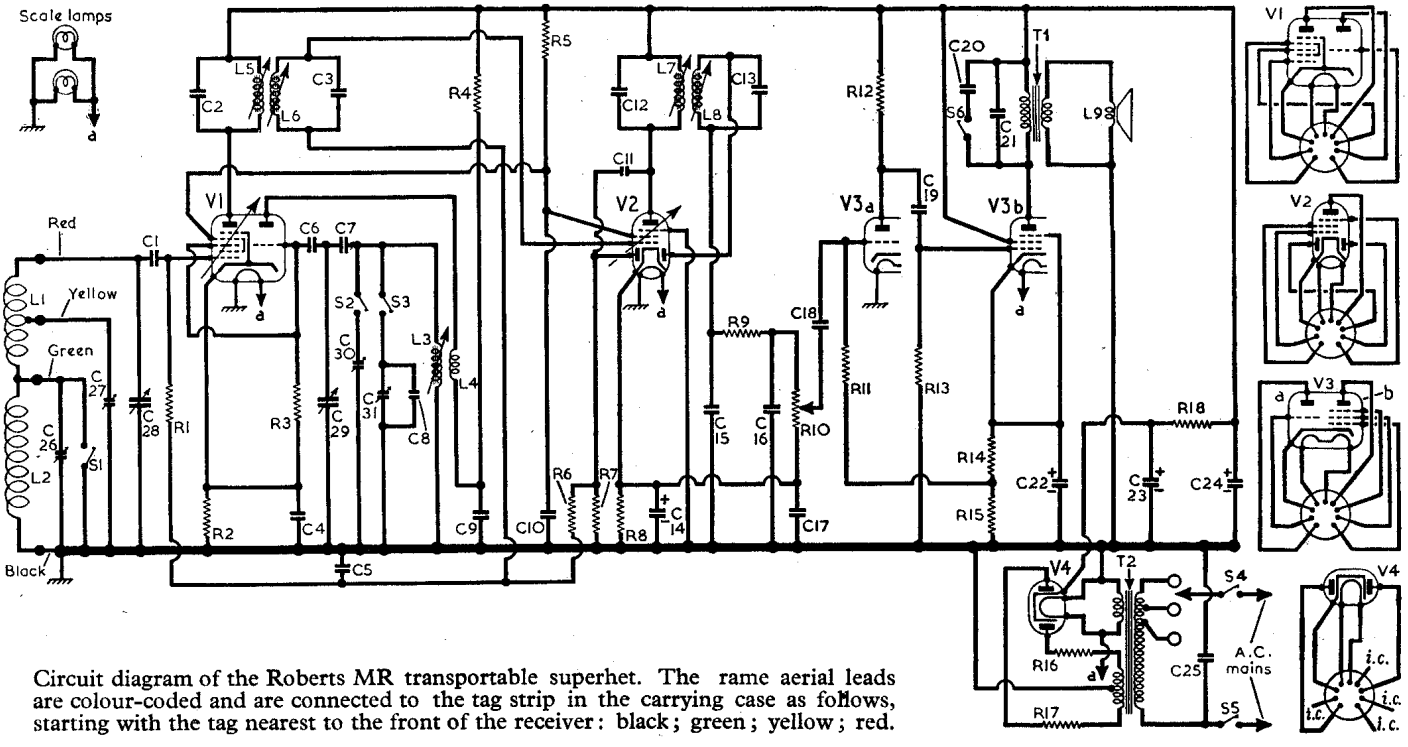
COMPONENTS AND VALUES

	RESISTORS	Values	Locations
R1	V1 C.G.	220kΩ	E3
R2	V1 G.B.	220Ω	E3
R3	V1 osc. C.G. ...	47kΩ	D3
R4	Osc. anode feed ...	33kΩ	D4
R5	S.G. H.T. feed ...	22kΩ	D4
R6	A.G.C. decoup. ...	1MΩ	E4
R7	A.G.C. diode load	1MΩ	F4
R8	V2 G.B.	470Ω	E4
R9	I.F. filter ...	100kΩ	G3
R10	Volume control ...	1MΩ	F3
R11	V3a C.G.	2·2MΩ	G3
R12	V3a anode load ...	220kΩ	G3
R13	V3b C.G.	560kΩ	G3
R14	V3 G.B.	180Ω	G3
R15	V3 G.B.	180Ω	G3
R16	V4 surge limiters	120Ω	E4
R17	V4 surge limiters	120Ω	E4
R18*	H.T. smoothing ...	1,950Ω	F4

* Two 3·9kΩ resistors in parallel.

	CAPACITORS	Values	Locations
C1	V1 C.G.	100pF	D3
C2	1st I.F. trans.	100pF	B2
C3	tuning	100pF	B2
C4	V1 cath. by-pass...	0·1μF	D4
C5	A.G.C. decoupling	0·1μF	E3
C6	V1 osc. C.G. ...	100pF	E3
C7	Osc. tracker ...	620pF	D3
C8	L.W. osc. trimmer	547pF	E3
C9	Osc. anode decoup.	0·1μF	D3
C10	S.G. decoupling ...	0·1μF	D4
C11	A.G.C. coupling ...	50pF	F4
C12	2nd I.F. trans.	100pF	A1
C13	tuning	100pF	A1
C14*	V2 cath. by-pass...	20μF	E3
C15	I.F. by-passes ...	100pF	G3
C16	I.F. by-passes ...	100pF	G3
C17	V2 cath. by-pass ...	0·1μF	E3
C18	A.F. couplings ...	0·005μF	G3
C19	A.F. couplings ...	0·005μF	G3
C20	Noise suppressor ...	0·01μF	A2
C21	Tone corrector ...	0·002μF	A2
C22*	V3 cath. by-pass ...	250μF	B2
C23*	H.T. smoothing ...	32μF	F4
C24*	H.T. smoothing ...	32μF	F4
C25	Mains R.F. filter...	0·005μF	D3
C26‡	L.W. aerial trim.. .	40pF	B1
C27‡	M.W. aerial trim....	40pF	B1
C28†	Aerial tuning ...	528pF	B1
C29†	Oscillator tuning ...	528pF	B1
C30‡	M.W. osc. trim. ...	40pF	C1
C31‡	L.W. osc. trim. ...	40pF	C1

* Electrolytic. †Variable. ‡ Pre-set.



Circuit diagram of the Roberts MR transportable superhet. The rame aerial leads are colour-coded and are connected to the tag strip in the carrying case as follows, starting with the tag nearest to the front of the receiver: black; green; yellow; red.

	OTHER COMPONENTS		Approx. Values (ohms)	Locations
L1	M.W. frame, total		5·0	—
L2	L.W. frame aerial		29·0	—
L3	Osc. tuning coil ...		5·4	D3
L4	Osc. reaction coil		1·5	D3
L5	1st I.F. trans.	Pri.	9·7	B2
L6		Sec.	9·7	B2
L7	2nd I.F. trans.	Pri.	9·7	A1
L8		Sec.	9·7	A1
L9	Speech coil ...		3·5	—
T1	O.P. trans.	Pri.	460·0	A2
		Sec.	0·4	
T2	Mains trans.	Pri, total	113·0	C2
		H.T. sec., total	700·0	
		Htr. sec.	0·2	
S1-S5	W'band and on/off switches ...		—	D3
S6	Noise suppressor sw.		—	—

Circuit Description—*continued*

winding, and in cutting the top response of the receiver effectively reduces the amplitude of short-duration pulse interference. The manufacturers stress that this switch is not intended for use as a tone control.

H.T. current is supplied by I.H.C. full-wave rectifying valve **(V4, Mullard EZ80).** Smoothing by **R18** and electrolytic capacitors **C23, C24.** Resistors **R16, R17** protect **V4** from current surges. A single heater winding on the mains transformer **T2** feeds the heater of **V4** as well as the scale lamps and remaining valves. Mains R.F. filtering by **C25.**

GENERAL NOTES

Switches.—**S1-S5** are the waveband and on/off switches, ganged together in a single rotary unit beneath the chassis. The unit is indicated in our underside view of the chassis and shown in detail in col. 2 where it is drawn as seen from the rear of an inverted chassis.

S6 is the noise supressor switch and is mounted on the back cover of the carrying case.

Frame Aerials.—These are contained in two slots in the outside surface of the carrying case. The windings in the slots are covered by means of two white plastic bands, which can be easily removed. The band round the front of the carrying case covers the L.W. frame aerial winding **L2,** while that at the rear covers the M.W. frame aerial winding **L1.**

Scale Lamps.—Two Osram 6.3V, 0.115A lamps, with small clear spherical bulbs and M.E.S. bases, are used to illuminate the tuning scale, and their holders are secured by a single milled-edge nut to the top of the carrying case.

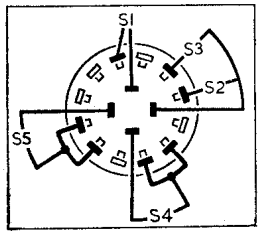


Diagram of the waveband/on/off switches. The switch positions are Off, M.W., L.W., from the anti-clockwise setting of the control knob.

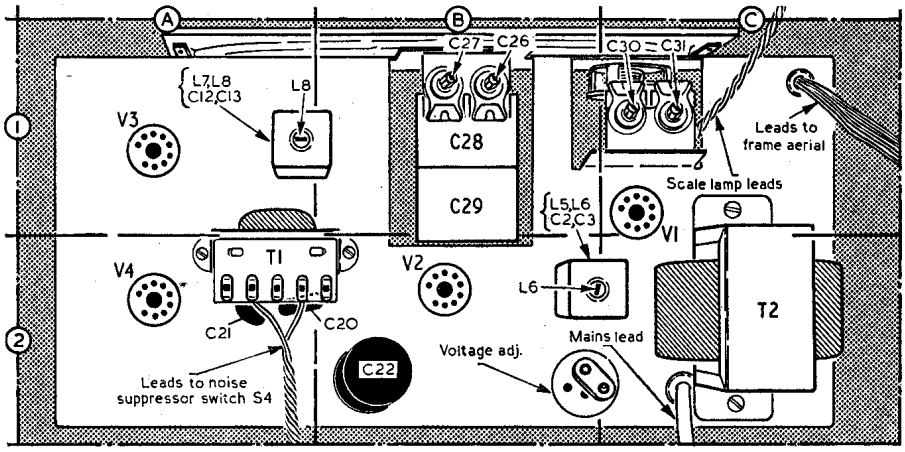
CIRCUIT ALIGNMENT

I.F. Stages.—Remove chassis from carrying case. Connect output of signal generator to junction of **C1, C28,** and to chassis. Switch receiver to M.W., turn gang to minimum and volume control to maximum. Feed in a 470kc/s (638.3m) signal and adjust the cores of **L8** (location reference A1), **L7** (F3), **L6** (B2) and **L5** (E4) for maximum output, reducing the input as the circuits come into line to avoid A.G.C. action. Repeat these adjustments until no further improvement results.

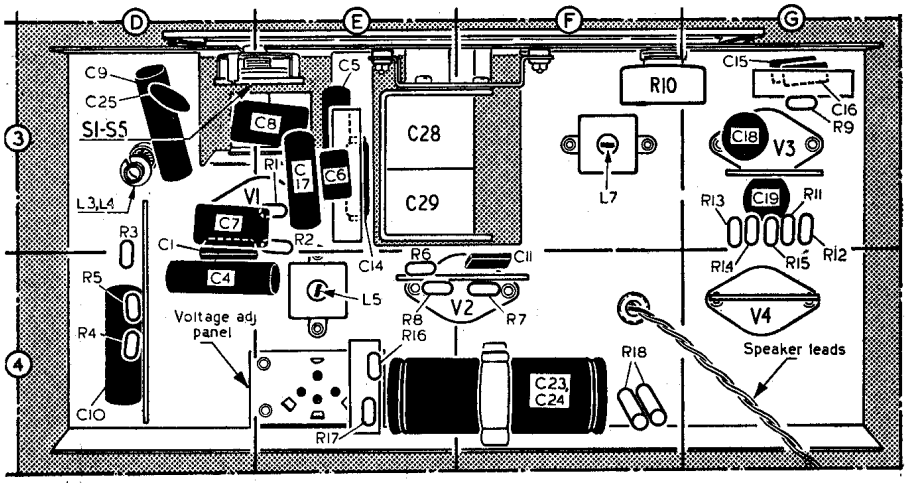
R.F. and Oscillator Stages.—These adjustments may be carried out with the chassis in its carrying case. Check that with the gang at maximum capacitance the cursor coincides with the high wavelength ends of the tuning scales. Disconnect signal generator leads from the chassis and lay them close to the frame aerials in the receiver.

M.W.—Switch receiver to M.W., and tune to 510m. Feed in a 510m (588.1kc/s) signal and adjust the core of **L3** (accessible through chassis deck, immediately above **T2**) for maximum output. Feeding in the same frequency, adjust the inductance of the M.W. frame aerial **L1** for maximum output. This last operation may be performed by removing the white plastic band from the rear edge of the carrying case, and varying the spacing of the M.W. frame aerial turns thus revealed. Tune receiver to 210m, feed in a 210m (1,429kc/s) signal and adjust **C30** (C1) and **C27** (B1) for maximum output.

L.W.—Switch receiver to L.W., tune to the "Luxembourg" calibration mark on tuning scale, feed in a 1,288m (233kc/s) signal and adjust **C31** (C1) and **C26** (B1) for maximum output.



Plan view of chassis. The core of **L3** is accessible through a hole, not shown in this drawing, in the chassis deck immediately above the mains transformer **T2.**



Underside view of chassis, showing the direction in which the waveband switch diagram, shown in detail in col. 2 above, is viewed.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those derived from the manufacturers' information, and were measured with the receiver switched to M.W. and the gang turned to maximum capacitance.

Voltages were measured with a Model 7 Avometer, chassis being the negative connection in each case.

Valve	Anode		Screen		Cath.
	V	mA	V	mA	V
V1 ECH81	157 (Osc)	1·3 (ator)	63	2·9	1·5
	61	2·6			
V2 EBF80	157	3·0	63	1·1	1·8
V3 ECL80 :					
(a)	50	0·7	—	—	5·6
(b)	150	12·8	157	2·5	5·6
V4 EZ80	195*	—	—	—	210·0

*Each anode, A.C.

Printed in England by Cornwall Press Ltd., Paris Garden, London, S.E.1.