"TRADER" SERVICE SHEET

1123

ROBERTS CR & BR

A.C./A.D. and A.D. Superhet Portables

EASE of chassis removal is a feature of the Roberts CR, a two-band, four-valve portable superhet, designed to operate from all-dry batteries or from A.C. mains of 200-250 V, 50 c/s. The waveband ranges are 192-570m and 1,200-2,100m.

The Roberts BR, also covered in this *Service Sheet*, is a battery-only version of Model CR, the differences being covered in the circuit diagram below and under "General Notes" overleaf, but the *Service Sheet* was prepared from a model CR.

Release dates and original prices: CR, August 1953, £16 os 6d; BR, September 1953, £12 17s. Purchase tax and batteries extra.

CIRCUIT DESCRIPTION

Tuned frame aerial input by **L1**, **C24** (M.W.) and **L1, L2, C24** (L.W.) to hexode valve **(V1, Mullard DK92)**, which operates as frequency changer with electron coupling.

Oscillator grid coil **L3** is tuned by **C25** for both M.W. and L.W. operation. Parallel trimming by **C26** (M.W.) and **C7, C27** (L.W.); series tracking on both bands by **C6.** Reaction coupling from oscillator anode by **L4.**

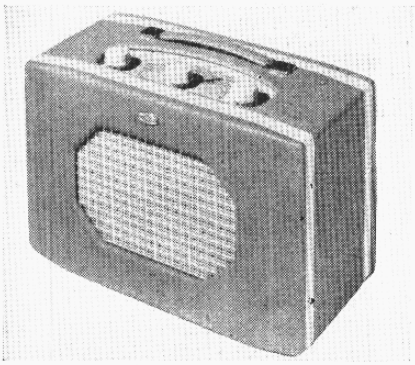
Second valve **(V2, Mullard DF91)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings **C3, L5, L6, C4** and **C10, L7, L8, C11.**

Intermediate frequency 470 kc/s.

Diode signal detector is part of diode pentode valve **(V3, Mullard DAF91).** Audio frequency component of rectified output is developed across volume control **R6** and passed via **C13** to control grid of pentode section. I.F. filtering by **C12** and **C17.**

D.C. potential developed across **R6** is fed back as bias to **V1** and **V2** giving automatic gain control.

(*Continued col. 1 overleaf*)



Appearance of the Roberts CR and BR portables. The white plastic bands round the case cover the frame aerials.

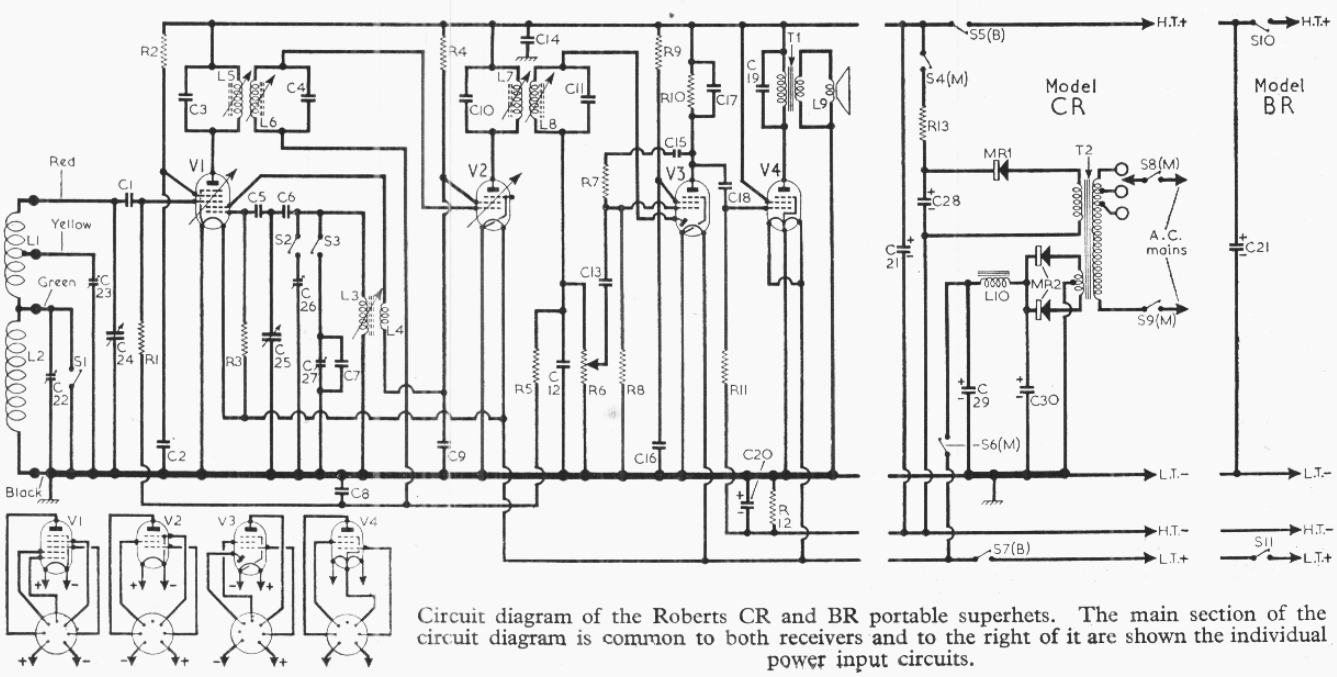
COMPONENTS AND VALUES

	CAPACITORS	Values	Locations
C1	V1 C.G.	100pF	E3
C2	V1 S.G. decoupling	0·05μF	E3
C3	1st I.F. trans. tuning	100pF	C2
C4		100pF	C2
C5	V1 osc. C.G. ...	100pF	E3
C6	Oscillator tracker...	620pF	E3
C7	L.W. osc. trim. ...	547pF	C1
C8	A.G.C. decoupling	0·05μF	E3
C9	H.T. decoupling ...	0·05μF	D3
C10	2nd I.F. trans. tuning	100pF	A1
C11		100pF	A1
C12	I.F. by-pass ...	100pF	F4
C13	A.F. coupling ...	0·005μF	G3
C14	H.T. decoupling ...	0·1μF	F3
C15	Neg. feed-back ...	50pF	G3
C16	V3 S.G. decoupling	0·05μF	G4
C17	I.F. by-pass ...	100pF	G3
C18	A.F. coupling ...	0·005μF	G3
C19	Tone corrector ...	0·002μF	A2
C20*	G.B. decoupling ...	20μF	G4
C21*	H.T. smoothing ...	32μF	F4
C22‡	L.W. aerial trim....	40pF	B1
C23‡	M.W. aerial trim....	40pF	B1
C24†	Aerial tuning ...	528pF	B1
C25†	Oscillator tuning ...	528pF	B1
C26‡	M.W oscillator trim.	40pF	C1
C27‡	L.W. oscillator trim.	40pF	C1
C28*	H.T. reservoir ...	24μF	F4
C29*	L.T. smoothing ...	2,500μF	B2
C30*		2,500μF	B2

* Electrolytic. † Variable. ‡ Pre-set.

	RESISTORS	Values	Locations
R1	V1 C.G.	2·2MΩ	E3
R2	V1 S.G. feed ...	180kΩ	D3
R3	V1 osc. C.G. ...	27kΩ	E3
R4	H.T. decoupling ...	27kΩ	F4
R5	A.G.C. decoupling	4·7MΩ	E4
R6	Volume control ...	1MΩ	G3
R7	Neg. feed-back ...	10MΩ	G3
R8	V3 C.G.	4·7MΩ	G3
R9	V3 S.G. feed ...	4·7MΩ	G3
R10	V3 pentode load ...	560kΩ	G3
R11	V4 C.G.	2·2MΩ	G3
R12	V4 G.B.	390Ω	G4
R13	H.T. smoothing ...	1·8kΩ	F4

(*The table of Other Components is overleaf*)



Circuit diagram of the Roberts CR and BR portable superhets. The main section of the circuit diagram is common to both receivers and to the right of it are shown the individual power input circuits.

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	C2
L6	1st I.F. trans. Sec.	9·7	C2
L7	2nd I.F. trans. Pri.	9·7	A1
L8	2nd I.F. trans. Sec.	9·7	A1
L9	Speech coil ...	3·5	—
L10	L.T. smoothing choke	4·0	D4
T1	O.P. trans. Pri.	460·0	A2
	O.P. trans. Sec.	0·4	
T2	Mains trans. Pri., total	324·0	
	Mains trans. HT. sec. ...	194·0	C2
	Mains trans. L.T. sec., total	0·8	
S1-S3	Waveband switches	—	E3
S4(M)-S9(M)	Mains/batt./off sw.	—	E3
S10, S11	Battery switches ...	—	—
MR1	SenTerCel RMO ...	—	F4
MR2	SenTerCel V35-1-1W	—	E4

Circuit Description—*continued.*

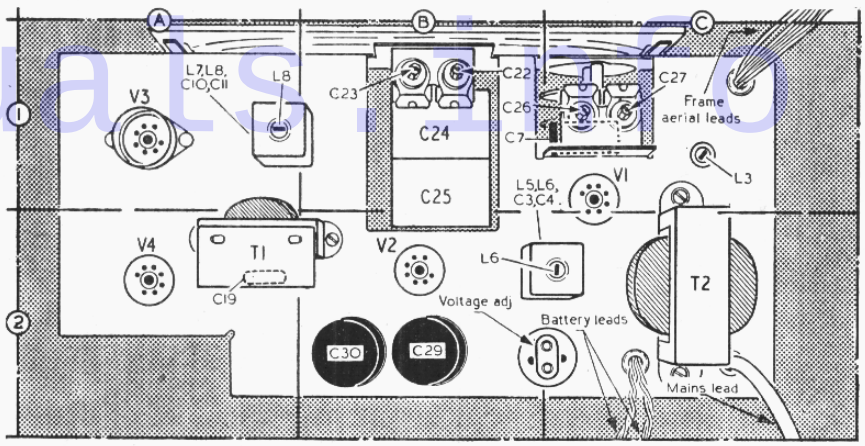
Resistance-capacitance coupling between **V3** pentode anode and pentode output valve **(V4, Mullard DL94).** Tone correction in anode circuit by **C19.** Grid bias is developed across **R12** in the H.T. negative lead to chassis.

In the mains/battery model H.T. current on mains operation is supplied by half-wave metal rectifier **(MR1, SenTerCel RMO).** Smoothing by **R13** and electrolytic capacitors **C21, C28.** L.T. current is supplied by full-wave rectifier **(MR2, SenTerCel V35-1-1W)** and smoothed by choke **L10** and electrolytic capacitors **C29, C30.** For mains operation, switches **S4 (M), S6 (M), S8 (M)** and **S9 (M)** close, as indicated by the suffix **(M).** For battery operation **S5(B)** and **S7(B)** close.

GENERAL NOTES

Switches.—**S1-S3** are the waveband switches and **S4 (M)-S9 (M)** are the mains/battery changeover switches in model CR, in two rotary units beneath the chassis. These are indicated in our under chassis illustration and shown in detail in column 2, where they are drawn as seen from the rear of an inverted chassis.

Switches **S1** and **S2** close for M.W. operation, and **S3** for L.W. operation. Switches with the suffix **(M)** close for mains operation and those with the suffix **(B)** close for battery operation. From the fully anti-clockwise setting of the control knob, the switch positions are L.W. (batt.); M.W. (batt.); off; M.W. (mains); L.W. (mains).



Plan view of the CR chassis. C29, C30, T2 are omitted in model BR.

Batteries.—Those recommended by the makers are: L.T. Ever Ready AD1, rated at 1.5 V; H.T. Ever Ready B107, rated at 90 V. A standard 3-pin plug is provided for the H.T. battery, and a standard 2-pin plug for the L.T.

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

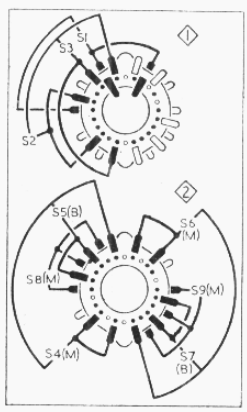


Diagram of the waveband switch unit (above) and mains/battery/off switch unit (below) drawn as seen from the rear of an inverted chassis.

Dismantling.—This simply involves the removal of four fixing screws from the sides of the chassis and the disconnection of the speaker and frame aerial leads from their appropriate tags. The frame aerial leads should be reconnected as follows, starting with the tag nearest to the front of the receiver; black; green; yellow; red.

Model BR.—This is similar to Model CR, but is for operation from all-dry batteries only. Apart from the absence of the mains power supply components and the connection of the negative side of **C21,** the only other difference between this and Model CR is that the waveband/off switch is a single-unit 3-position control. In the circuit diagram overleaf two power input circuits are shown, one for the CR and one for the BR, the main section of the diagram being common to both.

CIRCUIT ALIGNMENT

I.F. Stages.—Remove chassis from carrying case. Connect output of signal generator to junction of **C1, C24,** and to chassis. Switch receiver to M.W., turn gang to minimum and volume control to maximum. Feed in a 470 kc/s (638.3m) signal and adjust the cores of **L8** (location reference A1), **L7** (F3), **L6** (C2) 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 (588.1 kc/s) signal and adjust the core of **L3** (C1) 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 (1,429 kc/s) signal and adjust **C26** (C1) and **C23** (B1) for maximum output.

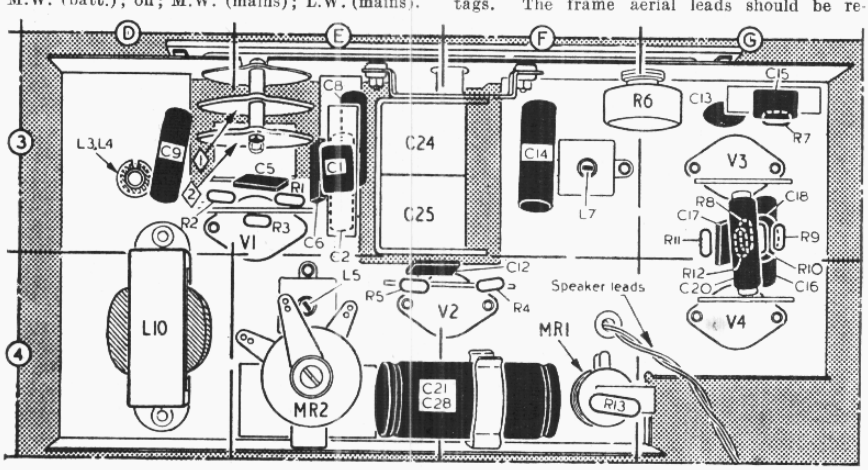
L.W.—Switch receiver to L.W., tune to the "Luxembourg" calibration mark on tuning scale, feed in a 1,288m (233 kc/s) signal and adjust **C27** (C1) and **C22** (B1) for maximum output.

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 on a Model 7 Avometer chassis being the negative connection in each case.

Valve		Anode V	Anode mA	Screen V	Screen mA
V1	DK92	85	0·44	44	0·1
		Oscillator 28	2·1		
V2	DF91	85	1·4	28	0·22
V3	DAF91	11	0·1	4	0·016
V4	DL94	81	6·5	85	1·5



Underside view of chassis. Apart from the omission of certain components, the layout of model BR is similar.

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