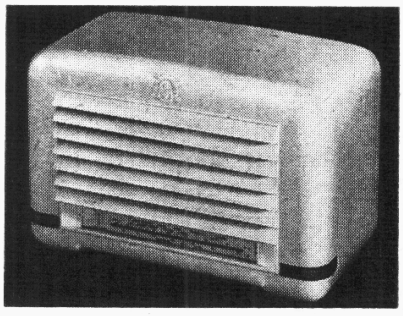
Supplement to The Wireless & Electrical Trader, December 27, 1947

'TRADER" SERVICE SHEET

843

RAYMOND "MINIT"

T.R.F. Midget A.C./D.C. Receiver



A SIMPLE tuned radio-frequency circuit is employed in the Raymond "Minit," a small table model of midget construction designed to operate from A.C. or D.C. mains of 200-250v, 40-100 c/s.

It is fitted with an attached aerial and "line" cord, and covers the M.W. (200-550 m) and L.W. (800-2,000 m) bands. Volume and tuning controls are horizontally inset in the corners of the cabinet, with milled edges for thumb manipulation.

Release date and original price: August, 1947. £10 10s., plus purchase tax.

CIRCUIT DESCRIPTION

Input from attached aerial, via isolating capacitor **C1** and coupling coil **L1,** to single-tuned circuits **L2, C13** (M.W.) and **L3, C13** (L.W.) which precede a variable-mu pentode valve **(V1, Brimar 12K7GT)** operating as R.F. amplifier. Gain control by variable cathode resistor **R1,** which adjusts the applied G.B. and simultaneously shunts the aerial coupling coil.

Tuned-secondary R.F. transformer coupling by **L4, L5, C15** (M.W.) and **L4, L6, C15** (L.W.) to pentode detector valve **(V2, Brimar 12K7GT)** operating with grid leak bias developed across **C3, R2.** R.F. filtering in detector anode circuit by **C5.**

Resistance-capacitance coupling by **R4, C6** and **R5** between **V2** and beam tetrode output valve **(V3, Brimar 35L6GT).**

When the receiver is operated from A.C. mains, H.T. current is supplied by half-wave rectifying valve **(V4, Brimar 35Z4GT)** which, with D.C. mains, behaves as a low resistance. Smoothing by resistor **R7** and electrolytic capacitors **C10, C11,** but the H.T. supply for the anodes of **V1** and **V3** is obtained direct from the rectifier cathode. Mains R.F. filtering by **C9.**

COMPONENTS AND VALUES

	RESISTORS	Values (ohms)	Location
R1	Volume control ...	10,000	D1
R2	V2 C.G. resistor ...	6,200,000	B2
R3	V2 S.G. feed ...	2,000,000	H4
R4	V2 anode load ...	500,000	I3
R5	V3 C.G. resistor ...	1,000,000	H4
R6	V3 G.B.	180	H4
R7	H.T. smoothing ...	5,000	I3
R8	Heater ballast resistors	145	I4
R9†		550	J4

† Line cord.

	CAPACITORS	Values (μF)	Location
C1	Aerial isolator ...	0·01	D2
C2	V1 cathode by-pass	0·01	E4
C3	V2 C.G. capacitor	0·01	B2
C4	V2 S.G. decoup. ...	0·05	H4
C5	R.F. by-pass ...	0·0002	H4
C6	A.F. coupling ...	0·01	H4
C7	Tone corrector ...	0·03	B2
C8*	V3 cath. by-pass ...	2·0	A1
C9	Mains R.F. by-pass	0·05	I4
C10*	H.T. smoothing capacitor ...	24·0	A1
C11*		16·0	A1
C12‡	Aerial M.W. trim.	—	C2
C13†	Aeri l tuning ...	0·0004	C1
C14‡	Det. M.W. trim. ...	—	C2
C15†	Det. tuning ...	0·0004	C1

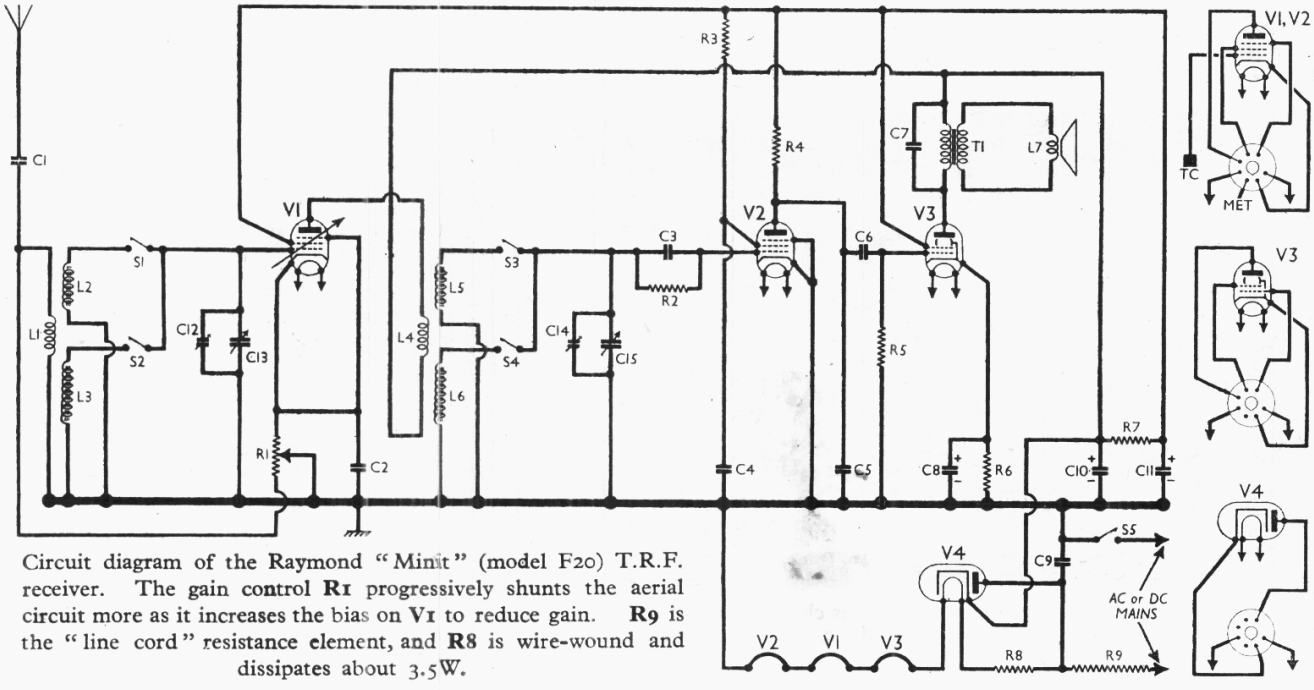
* Electrolytic. † Variable. ‡ Pre-set.

	OTHER COMPONENTS	Approx. Values (ohms)	Location
L1	Aerial coupling ...	25·0	C2
L2	Aerial tuning coils	2·7	C2
L3		30·0	C2
L4	R.F. coupling ...	45·0	H3
L5	Detector tuning coils	2·7	H3
L6		30·0	H3
L7	Speech coil ...	2·5	B1
T1	Output trans. Pri. ...	160·0	B1
	Sec. ...	0·4	B1
S1-S4	W/band switches...	—	F4
S5	Mains switch, ganged R1 ...	—	D1

VALVE ANALYSIS

Valve voltages and currents in the table (overleaf) are those measured in our receiver when it was operating on A.C. mains of 232 V. The receiver was tuned to the lowest wavelength on the M.W. band, and the volume control was at maximum, but there was no signal input.

Voltages were measured on the 400 V scale of a model 7 Avometer, chassis being the negative connection, but in the case of



Circuit diagram of the Raymond "Minit" (model F20) T.R.F. receiver. The gain control **R1** progressively shunts the aerial circuit more as it increases the bias on **V1** to reduce gain. **R9** is the "line cord" resistance element, and **R8** is wire-wound and dissipates about 3.5W.

V2 screen, due to the high value of the feed resistor, a negligible reading was obtained and therefore the current only is quoted.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 12K7GT	100	9·4	75	2·5
V2 12K7GT	12	0·13	*	0·03
V3 35L6GT	96	24·0	75	2·5
V4 35Z4GT†	—	—	—	—

* Negligible reading.
† Cathode to chassis 100 V, D.C.

DISMANTLING THE SET

Removing Chassis.—Viewing the receiver from the rear, remove the single control knob (recessed grub screw) and the back cover (two cheese-head screws with washers);

remove the right-hand valve from its holder;

rotate the volume control wheel until its grub screw is visible from the rear, slacken the screw with a long, narrow-bladed screwdriver, and withdraw its spindle, which projects above the chassis;

remove the three countersunk chassis retaining screws from the underside of the cabinet, and slide out the chassis and speaker as a single unit.

When replacing, first place the volume control wheel in its slot in the cabinet, gear wheel side facing the bottom, then slide the chassis into the cabinet. Insert the tapered end of the control spindle into its chassis bearing, locating the wheel on the spindle, and press the spindle downward against its stop.

Rotate the wheel until the grub screw is visible, ensure that the base of the wheel is pressed upward against the chassis bearing (which locates the wheel centrally in the cabinet slot), and tighten the screw.

GENERAL NOTES

Switches.—S1-S4 are the waveband switches, ganged in a small rotary unit at the rear of the chassis, as indicated in our under-chassis view. The unit is shown in detail in the diagram below, where it is viewed from the front of an inverted chassis. In the M.W. (clockwise) position of the control knob, **S1** and **S3** close, while on L.W. **S2, S4** close.

Capacitors C8, C10, C11.—These in our chassis were contained in a Dubilier "Drilitic" tubular metal unit, Type CT, rated at 250 V D.C. working. The red tag was the positive of **C10** (24 μF), the yellow tag the positive of **C11** (16 μF), and the plain tag the positive of **C8** (2 μF). The can formed the common negative connection.

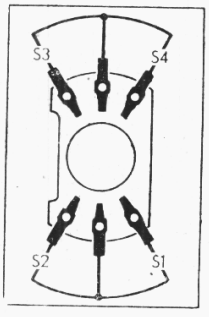
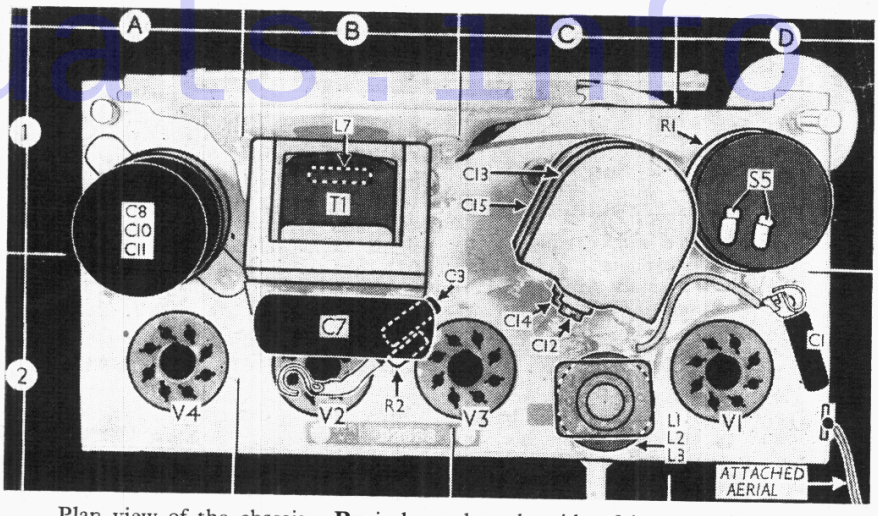


Diagram of the waveband switch unit, viewed from the front of an inverted chassis.



Plan view of the chassis. **R1** is located at the side of its control spindle.

V2.—This valve may be a 12K7, as it was in our chassis, or a 12J7, and either type is suitable as a replacement.

Drive Cord Replacement.—Two feet of twine is sufficient for the drive cord, whose course is shown in our under-chassis view, where the system is seen in the minimum gang position. A special double tag is used to clamp the ends and to hook on to the spring, but it is not essential.

The cursor is a flexible stamping which can be slipped on to the cord after fitting. The scale is a glass strip which is a friction fit in end clamps, and can be released with an upward movement.

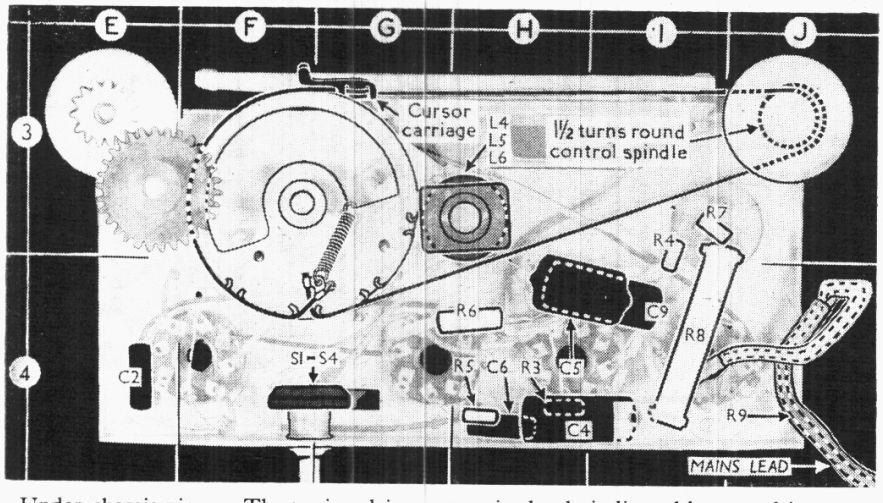
Service Note.—At some tuning positions signals are choked when the volume control is turned to maximum, but matters can be rectified by backing off the control a degree or two. This effect can be avoided altogether by inserting a 50 Ω ¼ W minimum bias resistor in **V1** cathode lead, but this should only be done in areas of high field strength. In other areas, sensitivity will be seriously affected, especially at the high-wavelength end of the scales.

CIRCUIT ALIGNMENT

R.F. and Detector Stages.—With the gang at minimum capacitance the left-hand edge of the cursor should coincide with the left-hand edge of the scale. Disconnect attached aerial and connect signal generator leads to **A** tag and, via an 0.1 μF isolating capacitor, to chassis.

M.W.—Switch set to M.W. (clockwise position when viewed from rear of chassis). Tune to 200 m on scale, turn volume control until the receiver is just below the reaction point, and feed in a 200 m (1,500 kc/s) signal. Adjust **C14** (location reference C2) for maximum output. Feed in a 230.8 m (1,300 kc/s) signal, tune it in, and adjust **C12** (C2) for maximum output. Tune to 500 m on scale, feed in a 500 m (600 kc/s) signal, and check that the point of maximum signal is obtained within ⅛ in from the calibration mark.

L.W.—No adjustments are provided for this band, but sensitivity and calibration should be checked at several points.



Under-chassis view. The tuning drive system is clearly indicated here, and instructions for replacing the cord are given in col. 3.

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