Supplement to The Wireless & Electrical Trader, April 3, 1948

"TRADER" SERVICE SHEET

855

REGENTONE U22

THREE-BAND A.C./D.C. SUPERHET

SHORT (16-50 m), medium (195-550 m) and long (800-2,000 m) wavebands are covered by the Regentone U22 4-valve (plus rectifier) superhet designed to operate from A.C. or D.C. mains of 100-120 and 200-250 V, 50-100 c/s. Provision is made for the connection of a gramophone pick-up.

Modifications which have been introduced during production are explained under "General Notes," and instructions are given for the replacement of the tuning drive cord.

Release date and original price: October, 1946, £15 15s, increased December, 1946, to £16 5s, increased June, 1947, to £17 17s. Purchase tax is not included in these prices.

CIRCUIT DESCRIPTION

Aerial input, via series capacitor **C1,** is developed across **C3, L1, C4** in series, which form a potential divider, shunted by **R1.** On S.W., where the impedance of **C3** and **C4** is negligible, signal is developed across **L1** and passed to single-tuned circuit **L2, C38.**

On M.W. and L.W., where the impedance of **L1** is negligible, **C3** and **C4** form a capacitative potential divider to provide bottom coupling from **C4** to single-tuned circuits **L3, C38** (M.W.) and **L4, C38** (L.W.).

First valve **(V1, Brimar 6K8G)** is a triode hexode operating as frequency changer with electron coupling. Triode oscillator grid coils **L5** (S.W.), **L6** (M.W.) and **L7** (L.W.) are tuned by **C39.** Parallel trimming by **C40** (S.W.), **C9, C41** (M.W.) and **C10, C42** (L.W.); series tracking by **C11** (S.W.), **C12** (M.W.) and **C13** (L.W.). Inductive reaction coupling from anode, via **C14,** on S.W., and from the common impedance of the trackers on M.W. and L.W.

Second valve **(V2, Brimar 6K7G)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings **C5, L9, L10, C6** and **C18, L11, L12, C19,** in which the tuning capacitors are fixed and alignment adjustments are carried out by varying the positions of the iron-dust cores.

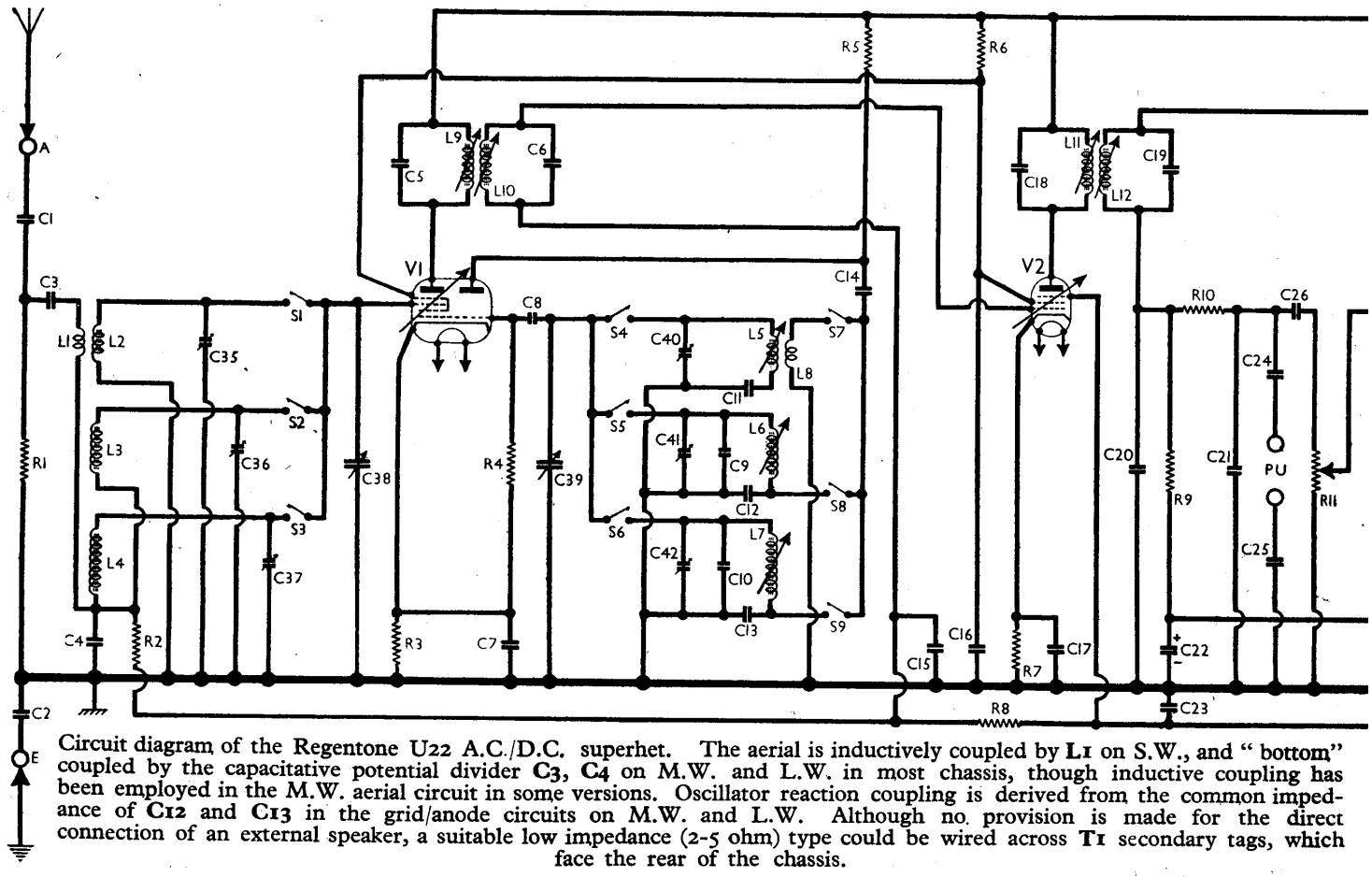
Intermediate frequency 465 kc/s.

Diode second detector is part of double diode triode valve **(V3, Brimar 6Q7G).** Audio frequency component in rectified output is developed across load resistor **R9** and passed via **R10, C26** and manual volume control **R11** to control grid of triode section, which operates as A.F. amplifier. I.F. filtering by **C20, R10, C21.** Sockets are provided for the connection of a gramophone pick-up, via isolating capacitors **C24, C25,** across **R11.**

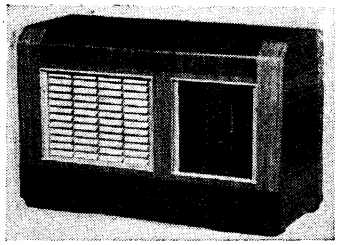
Second diode of **V3,** fed from **L12,** via **C27,** provides D.C. potential which is developed across **R15** and fed back through decoupling circuits as G.B. to F.C. (except on S.W.) and I.F. valves, giving automatic volume control Delay voltage, together with G.B. for triode section, is obtained from the drop across **R12** in **V3** cathode lead to chassis.

Resistance-capacitance coupling by **R13, C28, R16** between **V3** triode and pentode output valve **(V4, Brimar 25A6G).** Variable tone control in anode circuit by **C30, R18.**

When the receiver is operated from A.C. mains, H.T. current is supplied by I.H.C. half-wave rectifying valve **(V5, Brimar 25Z4G)** which, with D.C. mains,



Circuit diagram of the Regentone U22 A.C./D.C. superhet. The aerial is inductively coupled by L1 on S.W., and "bottom" coupled by the capacitative potential divider C3, C4 on M.W. and L.W. in most chassis, though inductive coupling has been employed in the M.W. aerial circuit in some versions. Oscillator reaction coupling is derived from the common impedance of C12 and C13 in the grid/anode circuits on M.W. and L.W. Although no provision is made for the direct connection of an external speaker, a suitable low impedance (2-5 ohm) type could be wired across T1 secondary tags, which face the rear of the chassis.



The appearance of the Regentone U22 3-band A.C./D.C. table superhet receiver.

behaves as a low resistance. Smoothing by resistors **R19, R20** and electrolytic capacitors **C31, C32** and **C33.**

Valve heaters, together with scale lamps and adjustable ballast resistor **R23,** are connected in series across mains input. Mains R.F. filtering by **C34,** and earth isolation by **C2.**

Three tappings are provided on the heater ballast resistor **R23** to permit operation on mains of 110-120 V, or 200-230/231-250 V.

VALVE ANALYSIS

Valve voltages and current given in the table (col. 5) are those measured in our receiver when it was operating on A.C. mains of 224 V, using the 210-230 V tapping on the heater ballast resistor.

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 Universal Avometer, chassis being the negative connection.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 6K8G	212	1·7	87	6·5
	Oscillator			
	81	3·5		
V2 6K7G	212	6·2	87	1·4
V3 6Q7G	63	0·32	—	—
V4 25A6G	220	45·0	212	7·7
V5 25Z4G†	—	—	—	—

† Cathode to chassis, 242 V, D.C.

COMPONENTS AND VALUES

	RESISTORS	Values (ohms)	Locations
R1	Aerial shunt ...	15,000	L6
R2	V1 hex. C.G. decoup.	270,000	K5
R3	V1 fixed G.B. ...	330	L6
R4	V1 osc. C.G. ...	47,000	K4
R5	Osc. H.T. feed ...	33,000	K5
R6	S.G.'s H.T. feed ...	15,000	I5
R7	V2 fixed G.B. ...	330	J6
R8	V2 C.G. decoup. ...	270,000	J5
R9	Signal diode load...	470,000	I4
R10	I.F. stopper ...	100,000	I3
R11	Volume control ...	250,000	G3
R12	V3 G.B., A.V.C. delay	5,100	I4
R13	V3 triode load ...	270,000	H5
R14	A.V.C. decoupling	270,000	I5
R15	A.V.C. diode load...	470,000	H4
R16	V4 C.G. resistor ...	270,000	H5
R17	V4 G.B. resistor ...	620	I5
R18	Tone control ...	50,000	E3

(*Continued next column*)

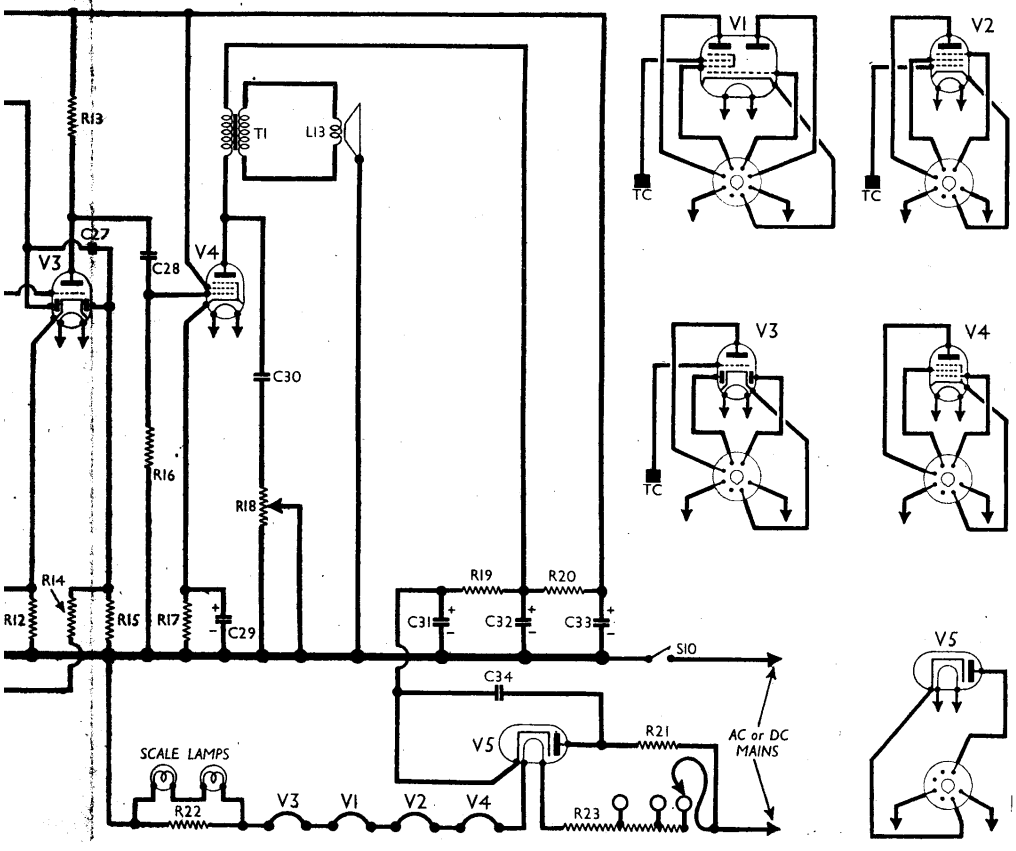
	RESISTORS (*continued*)	Values (ohms)	Locations
R19	H.T. smoothing resistors ...	100	E5
R20		820	F5
R21	V5 surge limiter ...	47	G5
R22	Scale lamps shunt*	280	D2
R23	Heater ballast ...	521	D2

* Consists of 50Ω and 230Ω in series.

	CAPACITORS	Values (μF)	Locations
C1	Aerial series ...	0·0005	L6
C2	Earth isolator ...	0·1	J6
C3	Aerial coupling ...	0·0005	L5
C4		0·0027	J4
C5	1st I.F. transformer	0·0001	B2
C6	tuning	0·0001	B2
C7	V1 cath. by-pass ...	0·1	L6
C8	V1 osc. C.G. ...	0·00005	K4
C9	M.W. fixed trim. ...	0·00003	J4
C10	L.W. fixed trim. ...	0·00005	J5
C11	Osc. S.W. tracker...	0·005	J3
C12	Osc. M.W. tracker	0·0005	J4
C13	Osc. L.W. tracker...	0·00015	J4
C14	Osc. anode coup. ...	0·0001	K3
C15	V2 C.G. decoup. ...	0·1	K5
C16	S.G.'s decoupling...	0·1	I4
C17	V2 cath. by-pass ...	0·1	J6
C18	2nd I.F. transformer	0·0001	B1
C19	tuning	0·0001	B1
C20	I.F. by-passes ...	0·0001	I5
C21		0·0002	H3
C22*	V3 cath. by-pass ...	25·0	G4
C23	A.V.C. decoupling	0·1	J5
C24	P.U. isolators ...	0·01	H6
C25		0·01	I6
C26	A.F. coupling ...	0·01	H3
C27	A.V.C. coupling ...	0·00005	I4
C28	A.F. coupling ...	0·01	H5
C29*	V4 cath. by-pass ...	25·0	F4
C30	Tone control ...	0·05	F4
C31*	H.T. smoothing capacitors ...	16·0	D1
C32*		16·0	D1
C33*		16·0	D1
C34	Mains R.F. by-pass	0·1	G5
C35‡	Aerial S.W. trim....	—	K4
C36‡	Aerial M.W. trim....	—	K4
C37‡	Aerial L.W. trim....	—	K5
C38†	Aerial tuning ...	—	A2
C39†	Oscillator tuning ...	—	A1
C40‡	Osc. S.W. trim. ...	—	K4
C41‡	Osc. M.W. trim. ...	—	K4
C42‡	Osc. L.W. trim. ...	—	K5

* Electrolytic. † Variable. ‡ Pre-set.

	OTHER COMPONENTS	Approx. Values (ohms)	Locations
L1	Aerial S.W. coup....	10·0	L4
L2	Aerial tuning coils	Very low	L4
L3		3·5	L4
L4		22·0	L5
L5	Oscillator tuning coils	Very low	J4
L6		3·6	J4
L7		10·2	J5
L8	Osc. S.W. reaction	10·0	J4
L9	1st I.F. trans. Pri.	7·0	B2
L10	Sec.	7·0	B2
L11	2nd I.F. trans. Pri.	7·0	B1
L12	Sec.	7·0	B1
L13	Speech coil ...	2·0	—
T1	Output trans. Pri.	270·0	D2
	Sec.	0·1	D2
S1-S9	Waveband switches	—	L3
S10	Mains SW, g'd R11	—	G3



DISMANTLING THE SET

Removing Chassis.—Remove the four control knobs (recessed grub screws) from the front of the cabinet;

from the underside of the cabinet remove the three hexagon head self-threading screws (with washers) securing the chassis to the base of the cabinet, and slide out the chassis to the extent of the

speaker leads, which is sufficient for most purposes.

To free the chassis entirely, unsolder the two red leads from their tags on the speaker, and the black earthing lead from a soldering tag on the speaker frame.

Removing Speaker.—Remove the chassis as previously described, and then remove the four 4BA nuts (with washers) securing the speaker to the sub-baffle.

When replacing, the connecting panel should be at the top, and the black earthing lead must be soldered to a tag beneath the lower left-hand fixing nut.

GENERAL NOTES

Switches.—S1-S9 are the waveband switches, ganged in a single rotary unit beneath the chassis. The position of the unit is indicated in our under-chassis view, and it is shown in detail in the diagram in col. 2, where it is drawn as seen when viewed from the rear of an inverted chassis.

The table (col. 2) gives the switch positions for the three control settings, starting from the fully anti-clockwise position of the knob. A dash indicates open, and **C**, closed.

S10 is the Q.M.B. mains switch, ganged with the manual volume control **R11.**

Coils.—All the R.F. and oscillator coils are in six unscreened tubular units mounted in two rows beneath the chassis, together with their associated trimmers and trackers and the waveband switch.

Scale Lamps.—These are two Osram lamps rated at 6.5 V 0.3 A, having M.E.S. bases and small, clear, spherical bulbs.

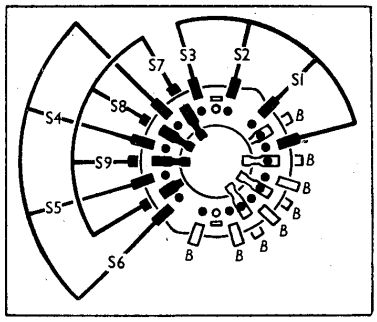
Capacitors C31, C32.—These are two dry electrolytics in a single tubular metal container mounted on the chassis deck, beneath which the two connecting tags emerge. The red tag is the positive of **C31** (16 μF), and the plain tag is that of **C32** (16 μF). The container is the common negative connection, and the unit is rated at 450 V D.C. working.

Capacitor C33.—This is a single 16 μF dry electrolytic in a tubular metal container mounted vertically on the chassis deck. The positive tag projects through a hole in the chassis deck, and our sample was a T.C.C. "Micropack," rated at 350 V peak working, type CE19L.

Chassis Divergencies.—A number of versions of this receiver have been produced, all differing to some extent from the sample on which this *Service Sheet* was prepared. Transformer coupling may be employed in the M.W. aerial circuit; the A.V.C. feed to **C27** may be taken from **V2** anode, and the L.W. oscillator coil **L7** may be short-circuited to earth on M.W. by extra contacts on an alternative type of waveband switch.

In some versions, two 3.5 V 0.15 A scale lamps connected in parallel are used, and the 230 Ω vitreous wire-wound resistor which constitutes part of **R22** in our chassis is then omitted. Also, **C2** may be 0.01 μF, **C9** and **C10** may be omitted, **C12** may be 0.00035 μF, and **C14** may be 0.00005 μF. In addition, **R1** may be 47,000 Ω, and **R19** may be 1,000 Ω.

Switch Diagram and Table



Switch	S.W.	M.W.	L.W.
S1	C	—	—
S2	—	C	—
S3	—	—	C
S4	C	—	—
S5	—	C	—
S6	—	—	C
S7	C	—	—
S8	—	C	—
S9	—	—	C

Diagram of the waveband switch unit **S1-S9** as seen from the rear of an inverted chassis. Below it is the associated switch table.

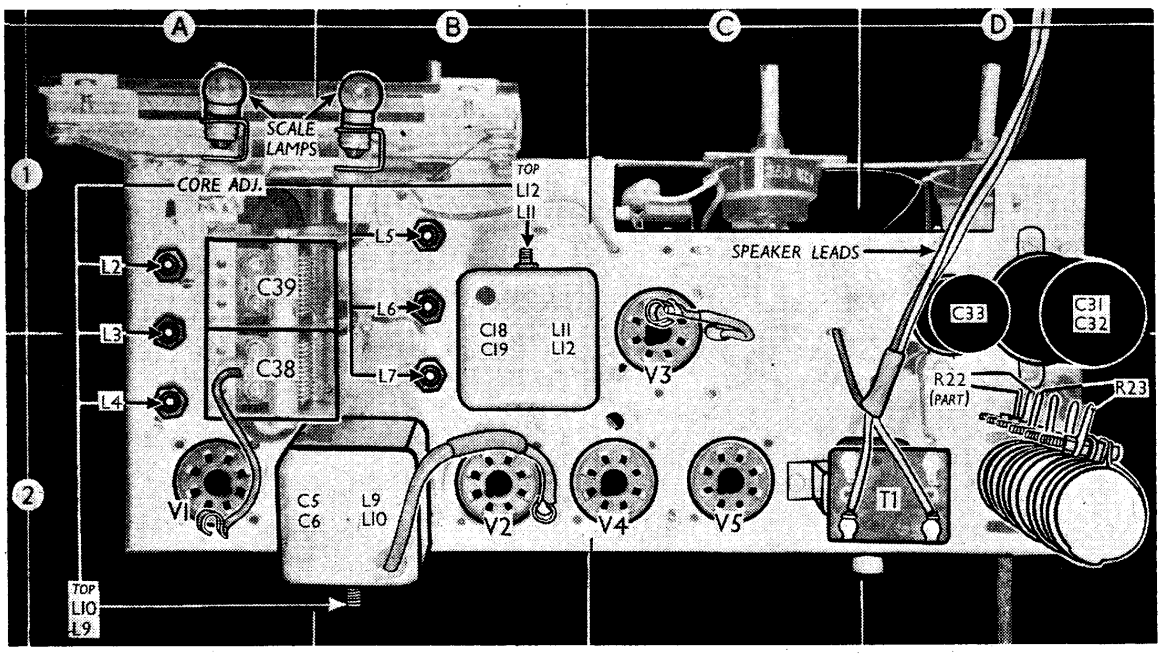
CIRCUIT ALIGNMENT

I.F. Stages.—Switch set to M.W., turn gang to minimum capacitance and volume control to maximum, and connect signal generator, via an 0.1 μF isolating capacitor in each lead, to control grid (top cap) of **V1** and chassis. Feed in a 465 kc/s (645.16 m) signal, and adjust the cores of **L9, L10, L11** and **L12** (location references B2, B1) for maximum output. Repeat this operation.

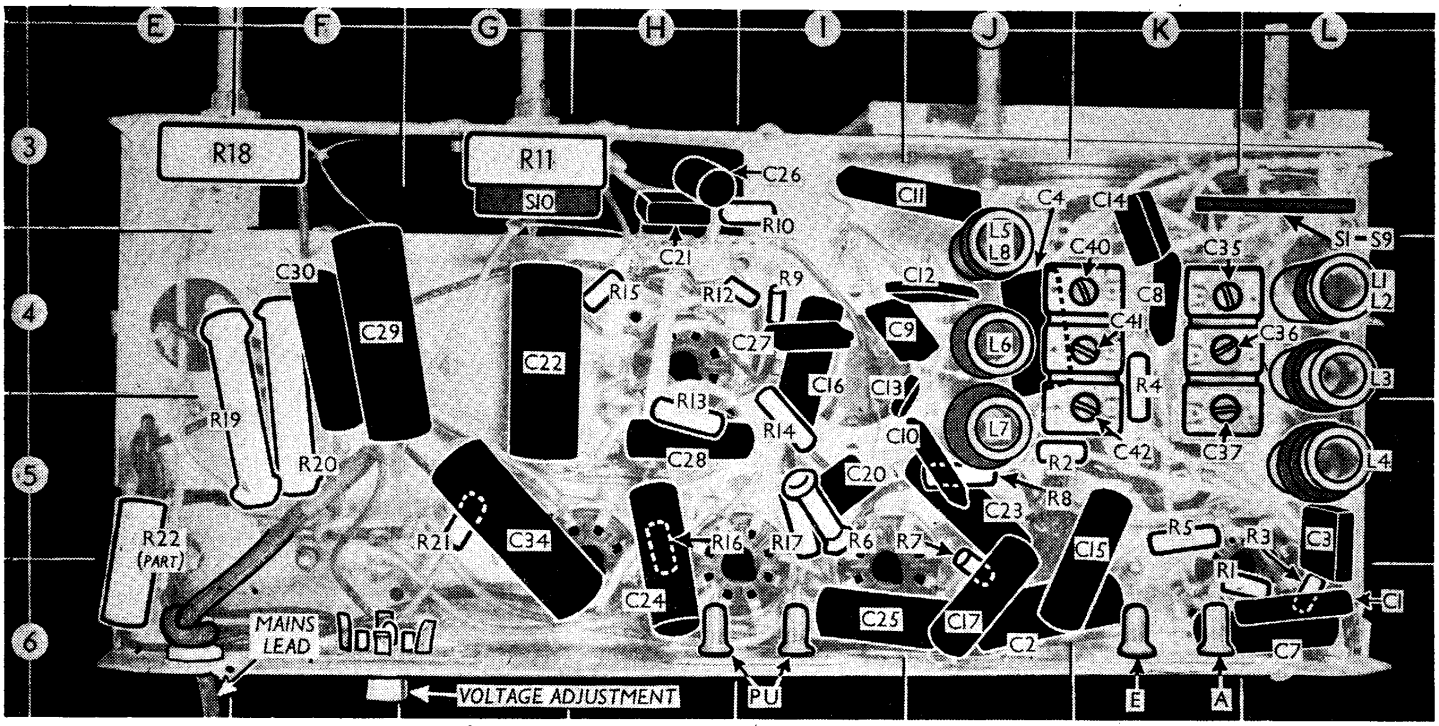
R.F. and Oscillator Stages.—With the gang at maximum capacitance the cursor should be horizontal and coincident with the highest wavelength calibration lines on the S.W. and M.W. scales. It may be adjusted in position by moving it up or down the drive cord. Transfer "live" signal generator lead to **A** socket, via a suitable dummy aerial.

S.W.—Switch set to S.W., tune to 20 m on scale, feed in a 20 m (15 Mc/s) signal, and adjust **C40** (K4) and **C35** (K4) for maximum output. Tune to 50 m on scale, feed in a 50 m (6 Mc/s) signal, and adjust the cores of **L5** (B1) and **L2** (A1) for maximum output. Repeat these operations until optimum results are obtained.

M.W.—Switch set to M.W., tune to 250 m on scale, feed in a 250 m (1,200 kc/s) signal, and adjust **C41** (K4) and **C36** (K4) for maximum output. Tune to 500 m on scale, feed in a 500 m (600 kc/s) signal,



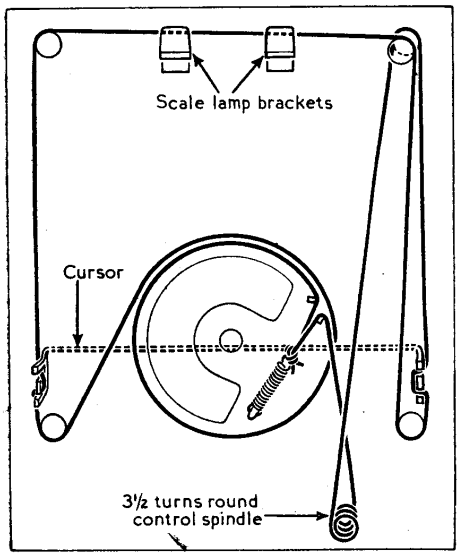
Plan view of the chassis. The R.F. and oscillator coil core adjustments, and those for the I.F. transformers, are indicated, as also are the secondary tags of **T1**, to which a suitable external speaker may be connected. If 3.5 V, 0.15 A scale lamps are used they will be wired in parallel and shunted by the section of **R22** (location **D2**) seen in this picture.



Under-chassis view. All the R.F. and oscillator trimmers are grouped, with their associated coils, close to the waveband switch unit at the top right-hand corner. Part of the scale lamps shunt resistor is seen, the remainder being on the heater ballast resistor former on the chassis deck. A number of versions of this receiver have been produced, and the main differences are explained under "Chassis Divergencies" in col. 2. The tappings on the heater ballast resistor are wired to the voltage adjustment panel on the rear edge of the chassis.

and adjust the cores of **L6** (B1) and **L3** (A1) for maximum output. Repeat these operations until optimum results are obtained.

L.W.—Switch set to L.W., tune to 1,000 m on scale, feed in a 1,000 m (300 kc/s) signal, and adjust **C42** (K5) and **C37** (K5) for maximum output. Tune to 2,000 m on scale, feed in a 2,000 m (150 kc/s) signal, and adjust the cores of **L7** (B2) and **L4** (A2) for maximum output. Repeat these operations until optimum results are obtained.



Sketch showing the course of the tuning drive cord as seen when viewing the chassis from the rear with the gang at minimum capacitance.

DRIVE CORD REPLACEMENT

Access to the drive cord system is obtained from the rear of the scale backing plate, and with the cord in position it appears as shown in the sketch (col. 4) when viewed from the rear of the chassis with the gang at minimum capacitance. A piece of stiff wire, hook-shaped at one end, will be of considerable assistance in fitting a new cord.

The length of the cord, which is of normal fishing line, is 51½ inches overall when tied in a loop. (When the loop is stretched between two pins they should therefore be 25¾ in apart.) Having tied both ends of the cord to the spring with a non-slip knot, the loop end should be passed through the hole in the drive drum flange and the spring hooked to the anchor provided on the drum.

The cord should be fitted as indicated in our sketch, and the cursor may be loosely clamped to it, prior to setting it exactly, as described under "Circuit Alignment."

TECHNICAL INFORMATION ON LOAN

IT appears that certain dealers and service engineers are still not aware of the conditions under which we are prepared to loan information on receivers for which no *Trader Service Sheet* is available. The rules of this service are therefore given once more, below.

A charge of 1s is made for each manual loaned, to cover the cost of search, stationery and outward postage.

Applications for loan must be accompanied by the necessary fee, **and must include the following undertaking each time an application is made:** "We promise to return undamaged any information loaned within three working days of receipt." **In no circumstances may loan material be collected by hand.**

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