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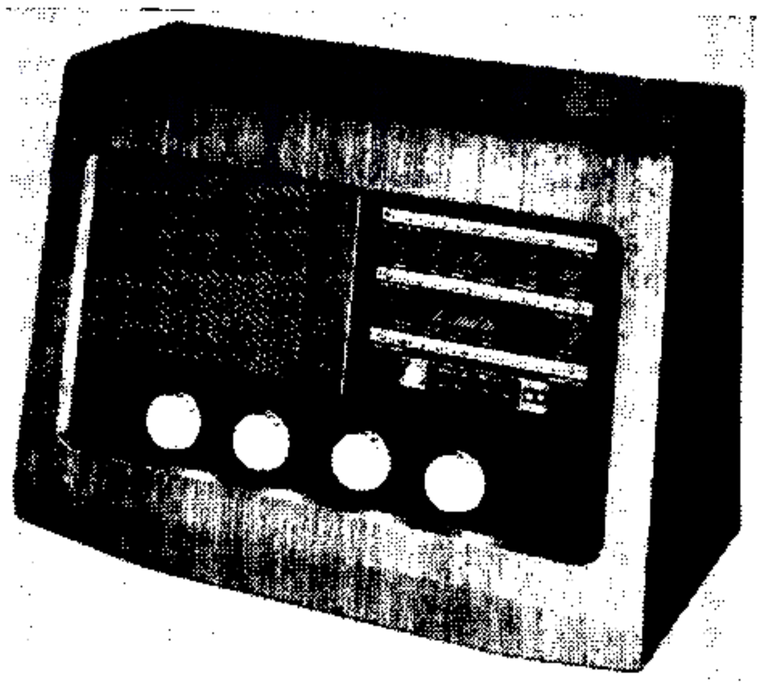
ACE A.C. RECEIVERS

Covering A51, and "Minigram" and "Mayfair" Autoradiograms

FIVE Ace receivers are covered in this *Service Sheet*, which was prepared from an A51 table receiver. The other models are the "Mayfair" MRG535 (single speed) and MRGS535 (3-speed) autoradiograms; and the "Minigram" RGA535 (single speed) and RGAS535 (3-speed) autoradiograms.

An identical chassis is employed in all five models. It is a 4-valve (plus rectifier) 3-band superhet designed to operate from A.C. mains only of 190-250 V.

Release date (approximate, all ARG models, November 1951) and original prices: A51, March 1951, £19 2s 6d; MRG535, £55 3s 1d; MRGS535, £58 16s 8d; RGA535, £42 13s 1d; RGAS535, £46 6s 7d. Purchase tax extra.



The appearance of the Ace A51.

CIRCUIT DESCRIPTION

Aerial input is inductively coupled on S.W. by **L2**, and capacitatively "bottom" coupled on M.W. and L.W. by **C4** to single tuned circuits **L3, C35** (S.W.), **L4, C35** (M.W.) and **L5, C35** (L.W.) which precede triode hexode valve **(V1, Brimar 6K8GT)**, operating as frequency changer

(*Continued col. 1 overleaf*)

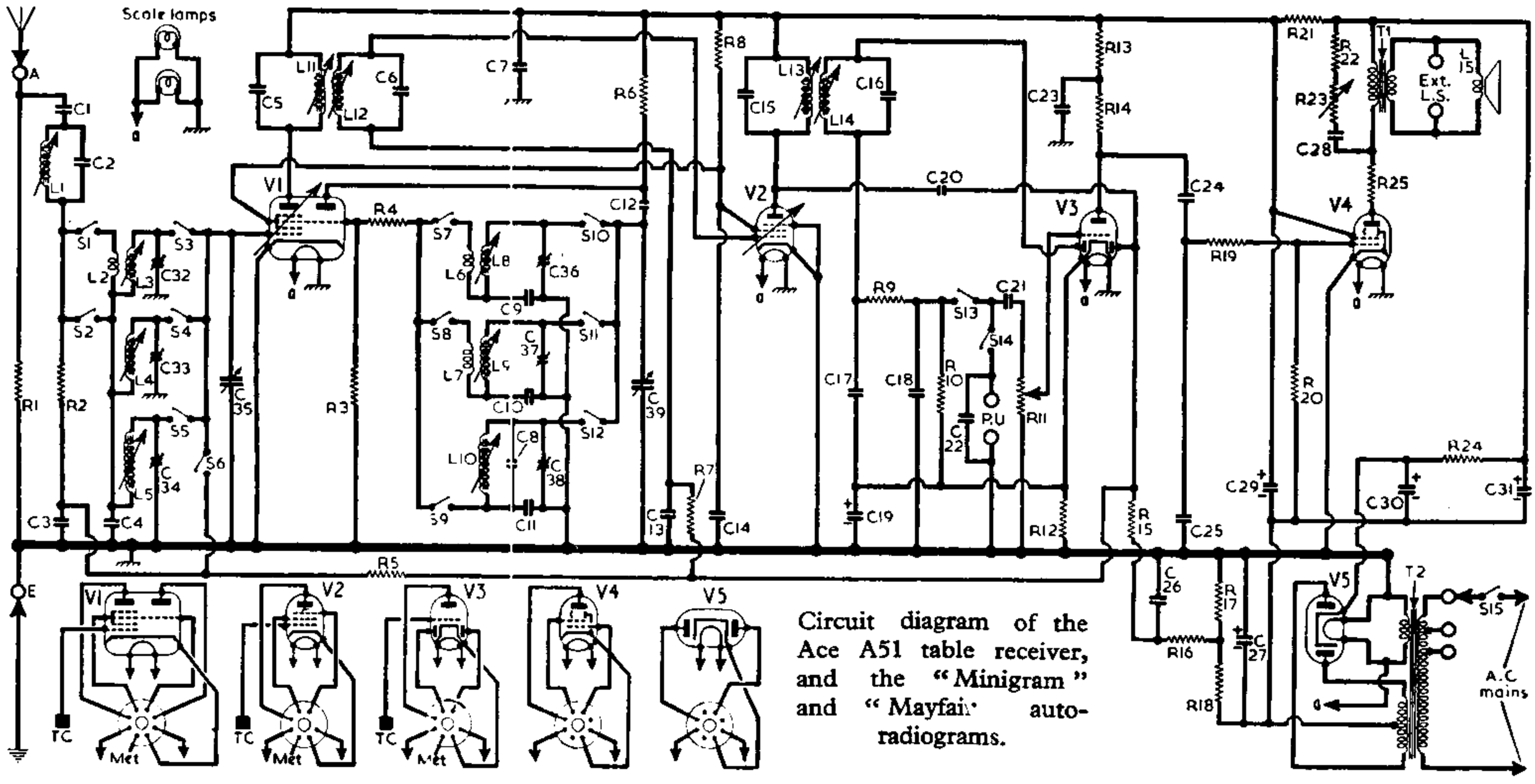
COMPONENTS AND VALUES

	CAPACITORS	Values	Locations
C1	Aerial coupling ...	500pF	G4
C2§	I.F. filter tune ...	820pF	G4
C3	A.G.C. decoupling	0·01μF	F4
C4	Aerial coupling ...	0·0033μF	G3
C5	1st I.F. trans.	100pF	A2
C6	tuning	100pF	A2
C7	H.T. by-pass ...	0·01μF	F4
C8	L.W. osc. trim. ...	25pF	F3
C9§	S.W. osc. tracker ...	0·0022μF	F3
C10	M.W. osc. tracker...	380pF	F3
C11	L.W. osc. tracker...	150pF	F3
C12	Osc. anode coup. ...	50pF	G3
C13	A.G.C. decoupling	0·01μF	G4
C14	S.G. decoupling ...	0·01μF	F4
C15	2nd I.F. trans.	100pF	B2
C16	tuning	100pF	B2
C17	I.F. by-passes ...	120pF	F4
C18		120pF	F3
C19*	V3 cath. by-pass ...	25μF	E4
C20	A.G.C. coupling ...	23pF	F4
C21	A.F. coupling ...	0·05μF	F3
C22	P.U. tone corrector	250pF	F4
C23	V3 anode decoup....	0·1μF	E4
C24	A.F. coupling ...	0·01μF	F4
C25	I.F. by pass ...	250pF	E4
C26	A.G.C. decoupling	0·01μF	F4
C27*	G.B. by-pass ...	25μF	E3
C28	Part tone control...	0·05μF	E3
C29*	H.T. smoothing ...	16μF	C1
C30*		8μF	C1
C31*		16μF	C1
C32‡	S.W. aerial trim. ...		G3
C33‡	M.W. aerial trim....	—	G3
C34‡	L.W. aerial trim. ...		G3
C35†	Aerial tuning ...		B1
C36‡	S.W. osc. trim. ...	—	F3
C37‡	M.W. osc. trim. ...	—	F3
C38‡	L.W. osc. trim. ...	—	F3
C39†	Oscillator tuning ...	—	B1

	RESISTORS	Values	Locations
R1	Aerial shunts ...	2·2kΩ	G4
R2		10kΩ	F4
R3	V1 osc. C.G. ...	47kΩ	G4
R4	V1 osc. stopper ...	120Ω	G3
R5	A.G.C. decoupling	1MΩ	F4
R6	Osc. anode feed ...	22kΩ	G4
R7	A.G.C. decoupling	1MΩ	F4
R8	S.G. H.T. feed ...	15kΩ	F4
R9	I.F. stopper ...	47kΩ	F4
R10	Diode load ...	470kΩ	F4
R11	Volume control ...	1MΩ	E3
R12	V3 G.B.	2·4kΩ	F4
R13	V3 H.T. decoupling	68kΩ	E4
R14	V3 anode load ...	220kΩ	F4
R15	A.G.C. diode load...	1MΩ	F4
R16	A.G.C. decoupling	1MΩ	D3
R17	G.B. resistors ...	47Ω	D3
R18		150Ω	D3
R19	V4 C.G.	68kΩ	E4
R20		470kΩ	E4
R21	H.T. smoothing ...	1·5kΩ	D3
R22	Part tone control...	680Ω	E3
R23	Tone control ...	50kΩ	D3
R24	H.T. smoothing ...	500Ω	D3
R25	V4 anode stopper...	47Ω	E4

	OTHER COMPONENTS	Approx. Values (ohms)	Locations
L1	I.F. rejector ...	1·8	G4
L2	S.W. aerial coup....	—	G3
L3		—	G3
L4	Aerial tuning coils	1·7	G3
L5		40·0	G3
L6	Osc. reaction coils	0·4	F3
L7		1·0	F3
L8	Oscillator tuning	—	F3
L9		5·5	F3
L10	coils	17·5	F3
L11	1st I.F. trans. Pri.	8·0	A2
L12	Sec.	8·0	A2
L13	2nd I.F. trans. Pri.	5·5	B2
L14	Sec.	5·5	B2
L15	Speech coil ...	2·5	—
T1	O.P. trans. Pri. ...	400·0	E3
	Sec. ...	0·5	E3
T2	Pri., total	34·0	
	H.T. sec., total ...	450·0	C2
	Heater sec. ...	0·2	
S1-S14	Waveband switches	—	G3
S15	Mains sw., g'd R11	—	E3

* Electrolytic. † Variable. ‡ Pre-set. § Two in parallel.



Circuit diagram of the Ace A51 table receiver, and the "Minigram" and "Mayfair" autoradiograms.

Circuit Description—*continued*

with internal coupling. I.F. rejection by **L1, C2.**

Oscillator anode coils **L8** (S.W.), **L9** (M.W.) and **L10** (L.W.) are tuned by **C39.** Parallel trimming by **C36** (S.W), **C37** (M.W.) and **C8, C38** (L.W.); series tracking by **C9** (S.W.) **C10** (M.W.) and **C11** (L.W.).

Second valve **(V2, Brimar 6K7GT)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings **C5, L11, L12, C6** and **C15, L13, L14, C16.** **Intermediate frequency 472 kc/s.**

Diode signal detector is part of double-diode triode valve **(V3, Brimar 6Q7GT).** Audio-frequency component in rectified output is developed across load resistor **R10** and passed via **C21** and volume control **R11** to control grid of triode section, which operates as A.F. amplifier. I.F. filtering by **C17, R9, C18** and **C25.**

Second diode of **V3** is fed from **V2** anode via **C20,** and the resulting D.C. potential developed across its load resistor **R15** is fed back as bias to **V1** and **V2,** giving automatic gain control. Provision is made for the connection of a gramophone pick-up across **R11** via **S14,** which closes in the gram position of the waveband switch control. **S6** closes and **S13** opens on gram to prevent radio break-through.

Resistance-capacitance coupling via **R14, C24** and **R20** between **V3** triode anode and beam tetrode output valve **(V4, Brimar 6V6GT).** Variable tone control in anode circuit by **R22, R23** and **C28.** Provision is made for the connection of a low-impedance external speaker across **T1** secondary. Bias for **V4** is obtained from the voltage dropped across **R17** and **R18** in the H.T. negative lead to chassis.

H.T. current is supplied by I.H.C. full-wave rectifying valve **(V5, Brimar 6X5GT).** Smoothing by **R21, R24** and electrolytic capacitors **C29, C30, C31.**

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating from A.C. mains of 230 V. The receiver was tuned to the highest wavelength end of M.W., but there was no signal input.

Voltage readings were measured with an Avo Electronic Test Meter which has a very high internal impedance, and allowance should be made for the extra current drawn by meters of lower impedance. Chassis was the negative connection.

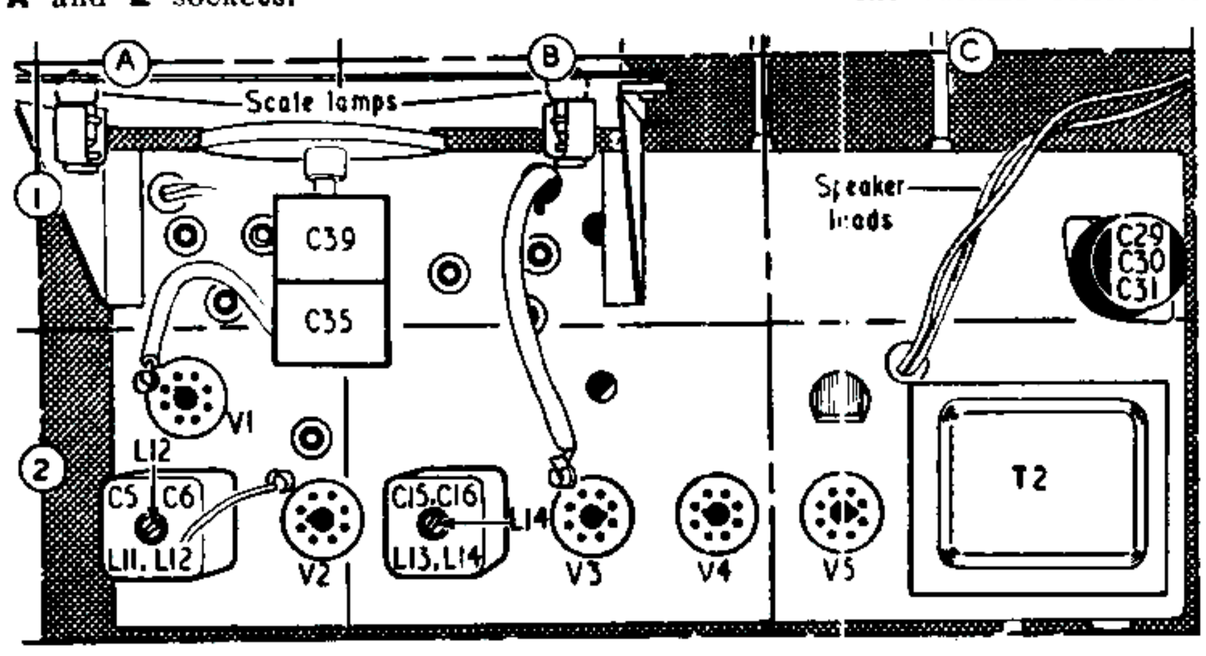
Valve	Anode		Screen		Cath.
	V	mA	V	mA	V
V1 6K8GT	230 / Oscillator / 115	2·0 / 4·5	130	5·8	—
V2 6K7GT	230	9·0	130	2·0	—
V3 6Q7GT	70	0·45	—	—	1·0
V4 6V6GT	260	38·0	230	2·0	—
V5 6X5GT	280†	—	—	—	310·0

† A.C. reading.

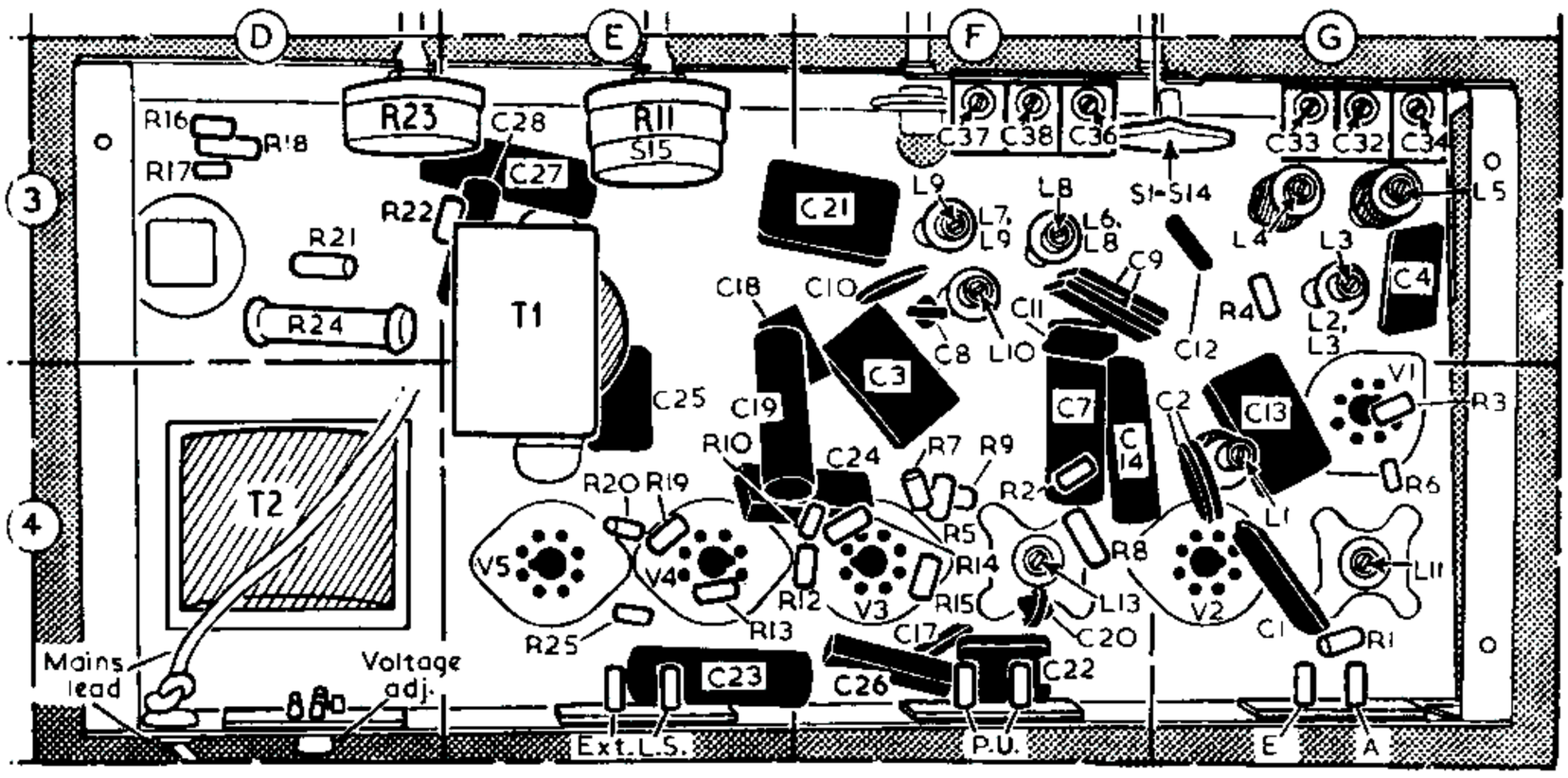
CIRCUIT ALIGNMENT

I.F. Stages.—Switch receiver to M.W. and turn gang to maximum capacitance. Connect output of signal generator, via an 0.1 μF capacitor in the "live" lead, to control grid (top cap) of **V1** and chassis. Feed in a 472 kc/s (635.6 m) signal and adjust the cores of **L14, L13, L12** and **L11** (location references B2, F4, A2, G4) for maximum output. Repeat these adjustments.

R.F. and Oscillator Stages.—Transfer signal generator leads, via a suitable dummy aerial, to **A** and **E** sockets.



Plan view of chassis, showing two of the I.F. core adjustments. The remaining I.F. adjustments, together with all the R.F. and oscillator cores and trimmers, are shown in the underside view of the chassis.

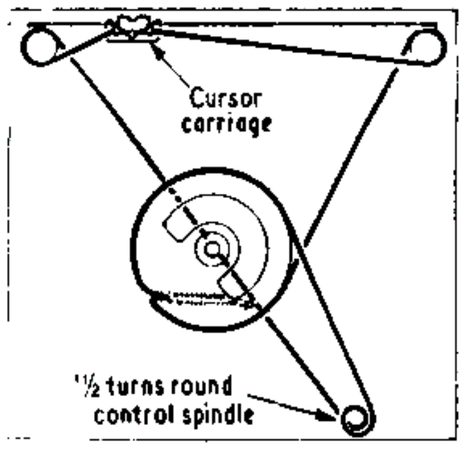


Underside view of the chassis, showing all the R.F. and oscillator adjustments.

L.W.—Switch receiver to L.W., tune to 2,000 m, feed in a 2,000 m (150 kc/s) signal and adjust the cores of **L10** (F3) and **L5** (G3) for maximum output. Tune receiver to 1,000 m, feed in a 1,000 m (300 kc/s) signal and adjust **C38** (F3) and **C34** (G3) for maximum output. Repeat these adjustments.

M.W.—Switch receiver to M.W., tune to 500 m, feed in a 500 m (600 kc/s) signal and adjust the cores of **L9** (F3) and **L4** (G3) for maximum output. Tune receiver to 200 m, feed in a 200 m (1,500 kc/s) signal and adjust **C37** (F3) and **C33** (G3) for maximum output. Repeat these adjustments.

S.W.—Switch receiver to S.W., tune to 50 m, feed in a 50 m (6 Mc/s) signal and adjust the cores of **L8** (F3) and **L3** (G3) for maximum output. Tune receiver to 20 m, feed in a 20 m (15 Mc/s) signal and adjust **C36** (F3) and **C32** (G3) for maximum output. Repeat these adjustments.



Sketch of the drive cord system, drawn as seen from the rear of the chassis.

GENERAL NOTES

Switches.—**S1-S12** are the waveband switches, and **S13, S14** are the radio/gram change-over switches ganged in a single rotary unit beneath the chassis. This is indicated in our underside view of the chassis and shown in detail in the diagram in col. 3, where it is drawn as seen from the rear of an inverted chassis.

The table below it gives the switch positions for the four control settings, starting from the fully anti-clockwise position of the control knob. A dash indicates open, and **C,** closed.

S15 is the Q.M.B. mains switch, ganged with the volume control **R11.**

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

External speaker.—Two sockets are provided at the rear of the chassis for the connection of a low impedance (3-4Ω) external speaker.

Chassis Divergencies.—**C25** is shown in the maker's diagram as being connected between V3 triode anode and chassis, whereas in our chassis it was connected as shown in our diagram, so it may be connected either way. Similarly, we give the value of **C19** and that of **C27** as 25 μF, as they were in our chassis. In other chassis they may be 50 μF each. Our H.T. smoothing electrolytic was as shown in our table, but it is shown in the makers' diagram as being 25 μF+25 μF for **C29** and **C31,** and a separate 8 μF reservoir for **C30.**

Drive Cord Replacement.—About 50 inches of high grade flax fishing line, plaited and waxed, is required for a new tuning drive cord, which should be run as shown in the accompanying sketch, which is drawn as seen from the rear of the chassis, neglecting obstructions, when the gang is at maximum capacitance.

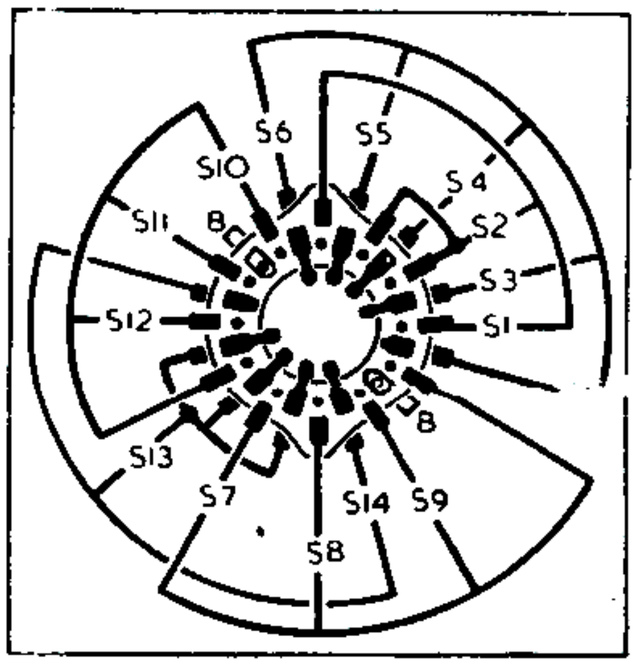


Diagram of the waveband switch unit, drawn as seen from the rear of an inverted chassis. Below is the associated switch table.

Switches	S.W.	M.W.	L.W.	Gram.
S1	C	—	—	—
S2	—	C	C	—
S3	C	—	—	—
S4	—	C	—	—
S5	—	—	C	—
S6	—	—	—	C
S7	C	—	—	—
S8	—	C	—	—
S9	—	—	C	—
S10	C	—	—	—
S11	—	C	—	—
S12	—	—	C	—
S13	C	C	C	—
S14	—	—	—	C

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