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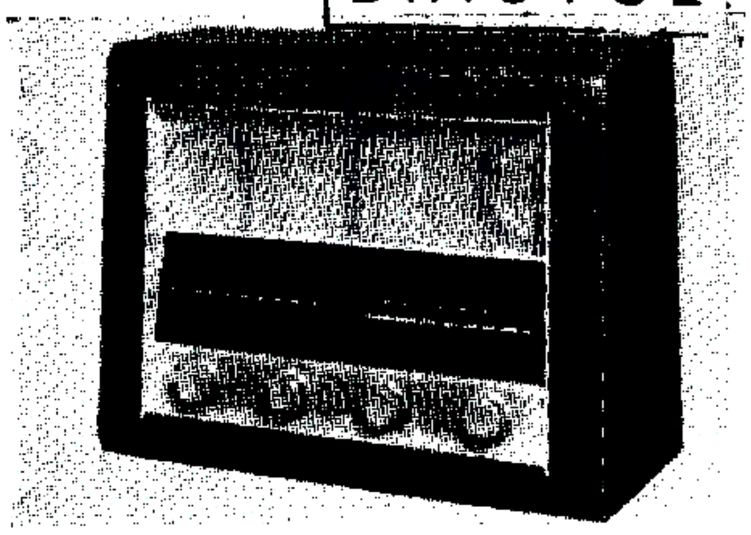
BUSH DAC34

A.C./D.C. Transportable Superhet



THE Bush DAC34 is a 3-band 4-valve (plus rectifier) transportable table receiver, designed to operate from A.C. or D.C. mains of 200-250 V, 40-100 c/s in the case of A.C. The total mains consumption is approximately 35 watts. The waveband ranges are 16-50 m, 182-560 m and 833-2,068 m.

Release date and original price: August, 1953, *£20 0s 3d. Purchase tax extra.*

CIRCUIT DESCRIPTION

Aerial input via coupling coils **L2, L3, L4** to single-tuned circuits **L5, C39** (S.W.) **L6, C39** (M.W.) and **L7, C39** (L.W.), which precede triode hexode valve **(V1, Mullard UCH42)** operating as frequency changer. Reception from an internal frame aerial **L1** is provided on M.W. and L.W., the winding being connected in series with the chassis end of the two tuning coils.

Oscillator grid coils **L8, L9** and **L10** are tuned by **C40.** Parallel triming by **C41** (S.W.), **C42** (M.W.) and **C43** (L.W.); series tracking by

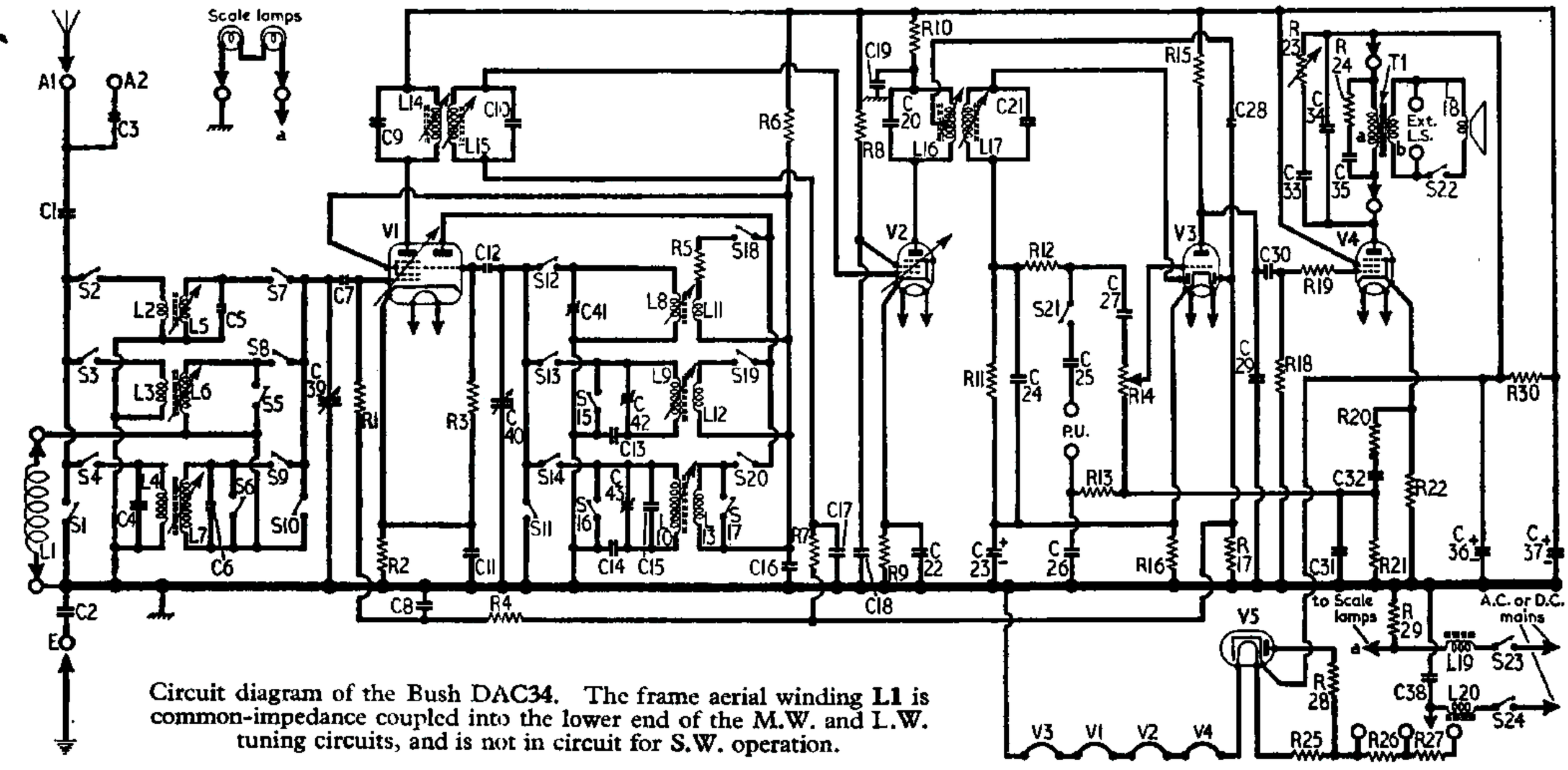
(*Continued col.* 1 *overleaf*)

CAPACITORS		Values	Locations
C1	Aerial and earth isolators	0·005μF	H4
C2		0·01μF	H4
C3	Aerial series	50pF	H4
C4	L.W. aerial shunt	800pF	G4
C5	S.W. aerial trim.	20pF	H4
C6	L.W. aerial trim.	60pF	G4
C7	V1 C.G.	50pF	G4
C8	A.G.C. decoupling	0·1μF	G4
C9	1st I.F. trans. tuning	110pF	B2
C10		110pF	B2
C11	V1 cath. by-pass	0·05μF	G3
C12	V1 osc. C.G.	45pF	G4
C13	M.W. osc. tracker	556pF	G3
C14	L.W. osc. tracker	390pF	G3
C15	L.W. osc. trim.	180pF	G3
C16	H.T. decoupling	0·05μF	G4
C17	A.G.C. decoupling	0·05μF	G4
C18	V2 S.G. decoupling	0·05μF	G4
C19	H.T. decoupling	0·05μF	F4
C20	2nd I.F. trans. tuning	110pF	C2
C21		110pF	C2
C22	Cathode by-passes	0·05μF	F4
C23*		50μF	F2
C24	I.F. by-pass	100pF	F4
C25	P.U. isolators	0·005μF	H4
C26		0·1μF	F3
C27	A.F. coupling	0·01μF	F3
C28	A.G.C. coupling	50pF	F4
C29	Tone corrector	0·002μF	—
C30	A.F. coupling	0·01μF	F4
C31	Neg. feed-back	0·1μF	E4
C32		0·05μF	E4
C33	Part tone control	0·05μF	E3
C34	Tone correctors	0·001μF	E4
C35		0·01μF	—
C36*	H.T. Smoothing	32μF	C1
C37*		16μF	C1
C38	Mains R.F. filter	0·01μF	D2
C39†	Aerial tuning	528pF	A2
C40†	Oscillator tuning	528pF	A1
C41‡	S.W. osc. trim.	40pF	H3
C42‡	M.W. osc. trim.	40pF	H3
C43‡	L.W. osc. trim.	40pF	G4

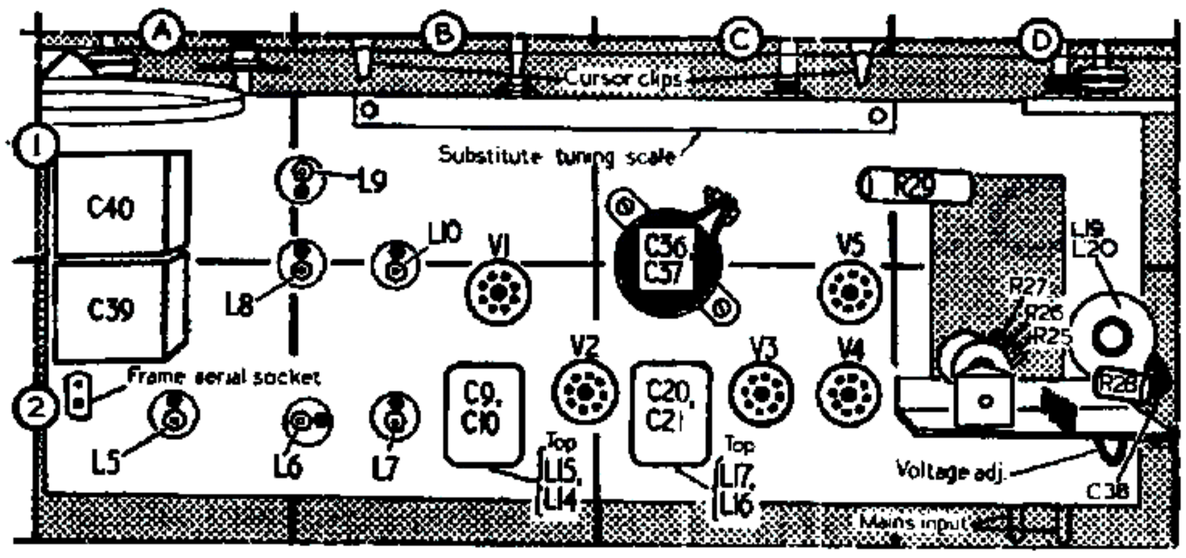
* Electrolytic. † Variable. ‡ Pre-set.

RESISTORS		Values	Locations
R1	V1 C.G.	470kΩ	G4
R2	V1 G.B.	220Ω	G4
R3	V1 osc. C.G.	47kΩ	G4
R4	A.G.C. decoupling	1MΩ	F4
R5	Osc. stabilizer	47Ω	H4
R6	H.T. feed	15kΩ	G4
R7	A.G.C. decoupling	2·2MΩ	F4
R8	V2 S.G. feed	47kΩ	F4
R9	V2 G.B.	330Ω	F4
R10	V2 anode decoup.	10kΩ	F4
R11	Signal diode load	330kΩ	F4
R12	I.F. filter	100kΩ	F3
R13	Neg. feed-back	47kΩ	F3
R14	Volume control	2·2MΩ	F3
R15	V3 anode load	150kΩ	F4
R16	V3 G.B.	5·6kΩ	F4
R17	A.G.C. diode load	1MΩ	F4
R18	V4 C.G.	470kΩ	F4
R19	V4 C.G. stopper	47kΩ	F4
R20	Neg. feed-back	1kΩ	E4
R21		10kΩ	E4
R22		220Ω	E4
R23	Tone control	50kΩ	E3
R24	Tone corrector	10kΩ	—
R25	Heater ballast	950Ω	D2
R26		150Ω	D2
R27		150Ω	D2
R28	V5 surge limiter	250Ω	D2
R29	Scale lamp shunt	250Ω	D1
R30	H.T. smoothing	10kΩ	E4

OTHER COMPONENTS		Approx Values (ohms)	Locations
L1	Frame aerial	0·5	—
L2	Aerial coupling coils	—	H4
L3		0·6	G4
L4		32·0	G4
L5	Aerial tuning coils	—	H4
L6		4·0	G4
L7		16·0	G4
L8	Oscillator tuning coils	—	G3
L9		3·2	G3
L10		4·0	G3
L11	Oscillator reaction coils	—	G3
L12		0·6	G3
L13		1·5	G4
L14	1st I.F. trans. Pri.	12·5	B2
L15	1st I.F. trans. Sec.	12·5	B2
L16	2nd I.F. trans. Pri.	12·5	C2
L17	2nd I.F. trans. Sec.	12·5	C2
L18	Speech coil	2·5	—
L19	Mains R.F. filters	3·0	D2
L20		3·0	D2
T1	O.P. trans. a	500·0	
	O.P. trans. b	0·5	—
S1–S21	Waveband/gram. switches		H4
S22	Speaker switch		—
S23, S24	Mains sw., g'd R14		F3



Circuit diagram of the Bush DAC34. The frame aerial winding **L1** is common-impedance coupled into the lower end of the M.W. and L.W. tuning circuits, and is not in circuit for S.W. operation.



Plan view of the chassis showing the substitute tuning scale referred to in "Circuit Alignment" below.

Circuit Description—*continued*

C13 (M.W.) and **C14** (L.W.). Reaction coupling from anode by **L11, L12** and **L13.**

Second valve **(V2, Mullard UF41)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings **C9, L14, L15, C10** and **C20, L16, L17, C21.**

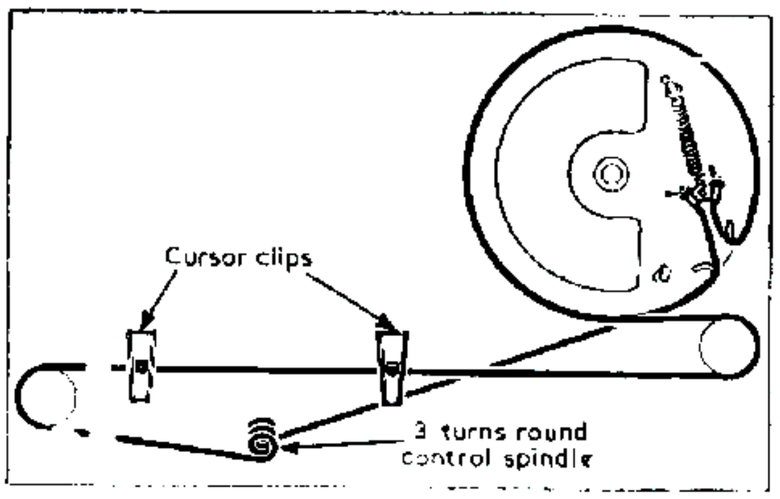
Intermediate frequency 470 kc/s.

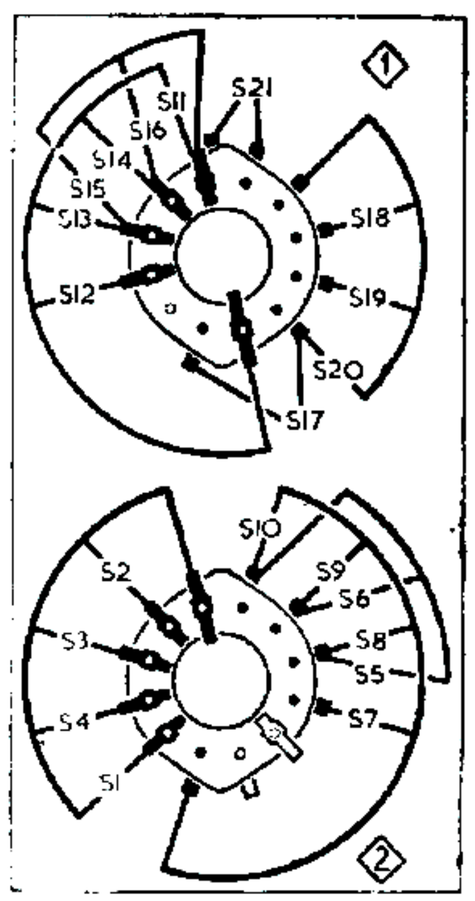
Diode signal detector is part of double diode triode valve **(V3, Mullard UBC41).** Audio frequency component in its rectified output is developed across load resistor **R11,** and passed via **C27** and volume control **R14** to grid of triode section. I.F. filtering by **C24, R12** and the capacitance of the screened leads.

Second diode of **V3** is fed from **V2** anode via **C28,** and the resulting D.C. potential developed across load resistor **R17** is fed back as bias to **V1** and **V2,** giving automatic gain control.

Resistance-capacitance coupling by **R15, C30** and **R18** between **V3** and pentode output valve **(V4, Mullard UL41).** Tone correction in anode circuit by **C34, R24** and **C35.** Variable tone control by **R23** and **C33.** Negative feed-back tone correction between **V4** cathode circuit and **V3** grid circuit via **R22, R20, C32, R21, C31** and **R13.**

H.T. current is supplied by I.H.C. half-wave rectifying valve **(V5, Mullard UY41).** H.T. smoothing by **R30** and electrolytic capacitors **C36, C37.** Valve heaters, together with ballast resistors **R25, R26, R27** and scale lamps, are connected in series across the mains input. Mains R.F. filtering by **C38** and chokes **L19, L20.**





Above: Sketch of the tuning drive cord system as seen from the front of the chassis.

Left: Diagrams of the waveband switch units, drawn as seen in the direction indicated by the arrows in the under-chassis illustration.

CIRCUIT ALIGNMENT

I.F. Stages.—Switch receiver to medium waves and tune it to 300 m. Connect output of signal generator, via an 0.1 μF capacitor in each lead, to control grid (pin 6) of **V2** and chassis, feed in a 470 kc/s (638.3 m) signal and adjust the cores of **L17** (location reference C2) and **L16** (C2) for maximum output. Transfer signal generator leads to control grid (pin 6) of **V1** and chassis, and, feeding in a 470 kc/s signal adjust the cores of **L15** (B2) and **L14** (B2) for maximum output. Repeat these adjustments until no further improvement results.

R.F. and Oscillator Stages.—In order that the receiver may be aligned with the chassis in its cabinet, three holes are provided in the cabinet base to give access to **C41, C42** and **C43.** If, however, the chassis is removed from its cabinet for alignment, the frame aerial should be disconnected and a shorting link placed across the frame aerial sockets. As the tuning scale is fixed to the cabinet, reference should be made in this case to the substitute tuning scale fixed along the front of the chassis deck. A temporary cursor, such as a paper clip, should be fixed to the tuning drive, and, with the gang at maximum, aligned with the datum line on the substitute tuning scale.

L.W.—Switch receiver to L.W. and connect signal generator output leads to **A** and **E** sockets. Tune receiver to 2,000 m, feed in a 2,000 m (150 kc/s) signal and adjust the cores of **L10** (B2) and **L7** (B2) for maximum output. Tune receiver to 1,000 m, feed in a 1,000 m (300 kc/s) signal and adjust **C43** (G4) for maximum output. Repeat these adjustments until no further improvement results.

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** (B1) and **L6** (B2) for maximum output. Tune receiver to 200 m, feed in a 200 m (1,500 kc/s) signal and adjust **C42** (H3) for maximum output. Repeat these adjustments until no further improvement results.

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** (B2) and **L5** (A2) for maximum output. Tune receiver to 25 m, feed in a 25 m (12 Mc/s) signal and adjust **C41** (H4) for maximum output. Repeat these adjustments until no further improvement results.

L.W. Check.—If alignment has been carried out with the chassis out of its cabinet, the cores of **L7** and **L10** should be re-adjusted for maximum output at 2,000 m (150 kc/s) after the chassis has been replaced in its cabinet and the frame aerial re-connected.

GENERAL NOTES

Switches.—**S1-S21** are the waveband and radio/gram change-over switches, ganged in two rotary units beneath the chassis. These units are indicated in our underside illustration of the chassis and shown in detail in the switch diagram in column 1, where they are drawn as seen in the direction of the indicating arrows in the chassis view. In the associated switch table, a dash indicates open, and **c,** closed.

S22 is the internal speaker muting switch and is mounted, together with the external speaker sockets, in the top rear corner of the cabinet.

Switches	S.W.	M.W.	L.W.	Gram.
S1	—	—	—	c
S2	c	—	—	
S3	—	c	—	—
S4	—	—	c	—
S5	c	—	—	—
S6	c	c	—	—
S7	c	—	—	—
S8	—	c	—	—
S9	—	—	c	—
S10	—	—	—	c
S11	—	—	—	c
S12	c	—	—	—
S13	—	c	—	—
S14	—	—	c	—
S15	c	—	—	—
S16	c	c	—	—
S17	c	c	—	—
S18	c	—	—	—
S19	—	c	—	—
S20	—	—	c	—
S21	—	—	—	c

Scale Lamps.—These are 3.5 V, 0.15 A lamps with large clear spherical bulbs and M.E.S. bases.

Drive Cord Replacemnt.—About 4ft 6in of nylon braided glass yarn is required for a new drive cord which should be run as shown in the sketch of the drive cord system, starting with the gang at maximum capacitance and running the cord off clockwise round the drum.

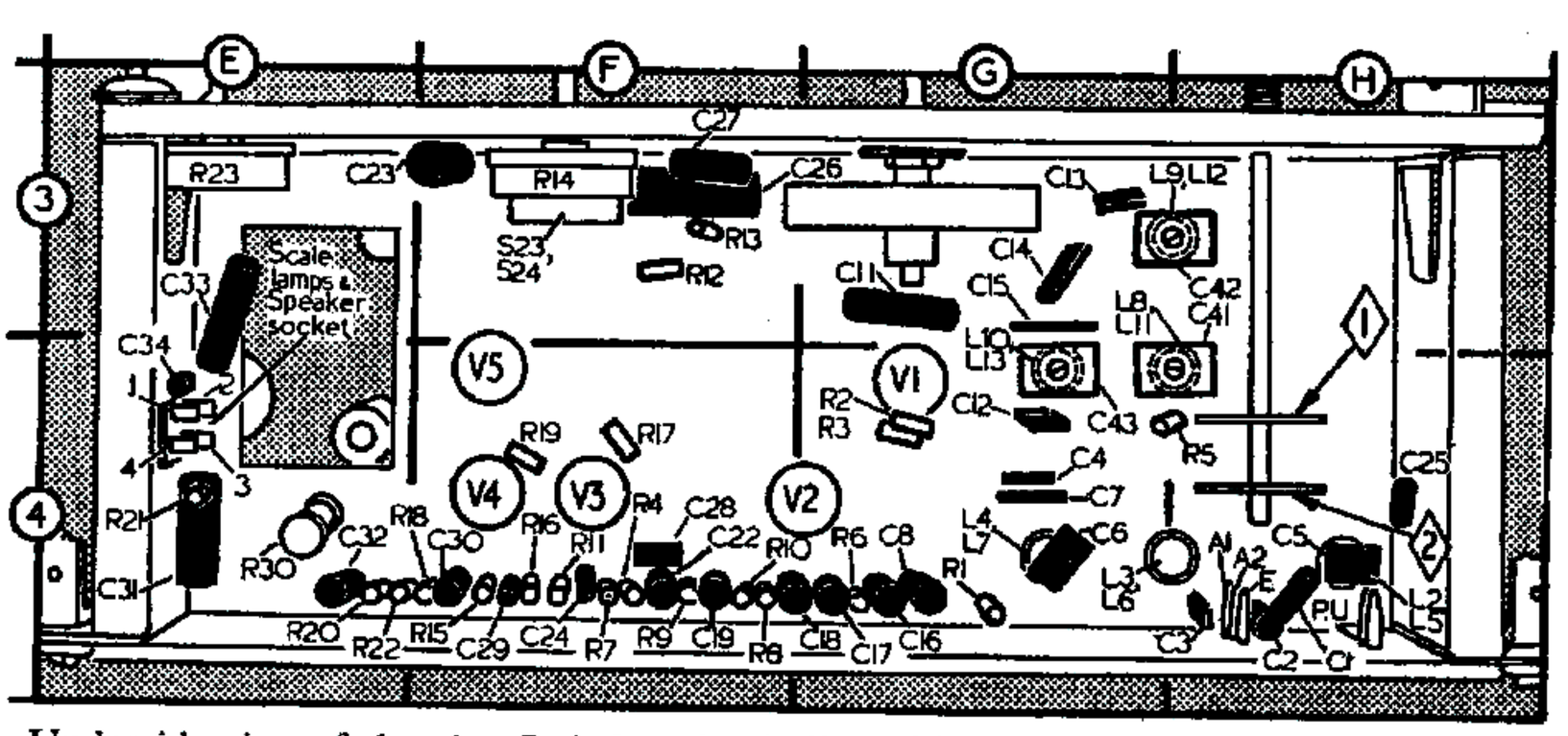
VALVE ANALYSIS

Valve voltages and currents given in the table below are those derived from the manufacturer's information. They were measured on a receiver which was operated from A.C. mains of 230 V and tuned to the highest wavelength end of M.W. There was no signal input.

Voltages were measured on the 10 V and 1,000 V ranges of a Model 7 Avometer, chassis being the negative connection in every case.

Valve	Anode V	Anode mA	Screen V	Screen mA	Cath. V
V1 UCH42...	100	2·4	48	1·2	1·0
	Oscillator				
	48	1·2			
V2 UF41 ...	68	2·8	50	1·2	1·2
V3 UBC41 ...	48	0·16	—	—	0·6
V4 UL41 ...	212	25·0	96	3·2	6·4
V5 UY41 ...	211*	—	—	—	226·0†

* A.C. reading. † Cathode current 37 mA.



Underside view of chassis. Switch units, indicated here, are shown in detail in col. 1.

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