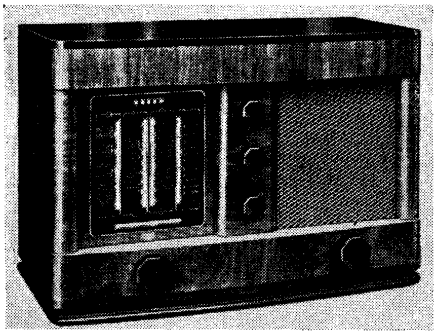
"TRADER" SERVICE SHEET
1143

ALBA 3011

A.C. Table Superhet with Band-spread Tuning



Appearance of the Alba 3011.

EMPLOYING an R.F. stage of amplification and a band-spread tuning control for use on its lower wavelength S.W. band, the Alba 3011 is a 5-valve (plus rectifier), 4-band, table superhet, designed to operate from A.C. mains of 105-115 V, 126-136 V, 200-220 V and 225-245 V, 50 c/s. The waveband ranges covered are 11-32 m, 30-110 m, 190-570 m and 1,000-2,000 m.

Release date and original price: April 1952, £27 16s 6d. Purchase tax extra.

CIRCUIT DESCRIPTION

Aerial input via coupling coils **L1** (S.W.1), **L2** (S.W.2), **L3** (M.W.) and **L4** (L.W.) to single-tuned circuits **L5, C39** (S.W.1), **L6, C39** (S.W.2), **L7, C39** (M.W.) and **L8, C39** (L.W.) which precede variable-mu R.F. pentode valve **(V1, Mullard EF41)** operating as R.F. amplifier.

R.F. transformer coupling by **L9, L13** (S.W.1), **L10, L14** (S.W.2), **L11, L15** (M.W.), and **L12, L16** (L.W.), tuned by **C44,** to triode hexode frequency changing valve **(V2, Mullard ECH42).**

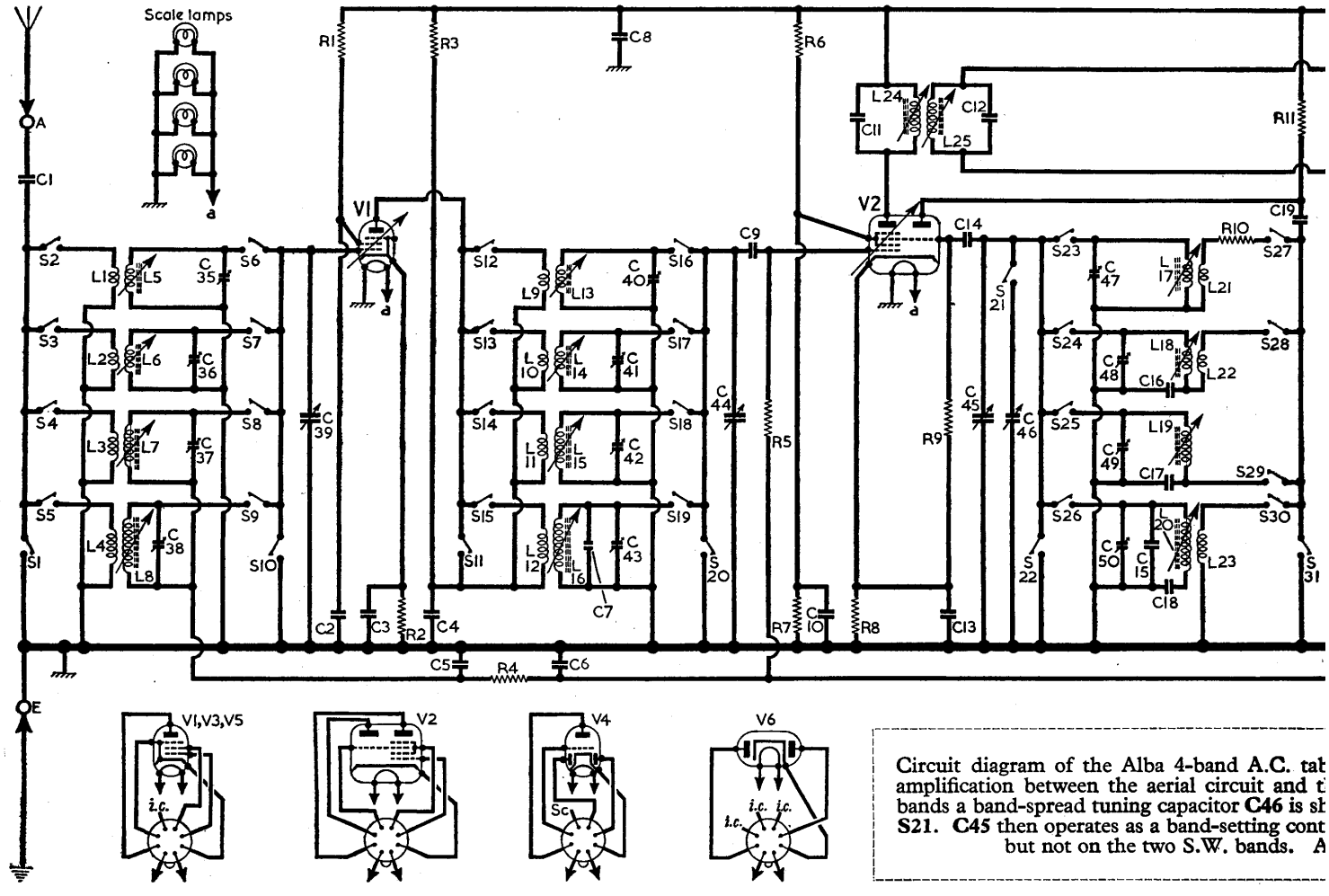
Oscillator grid coils **L17, L18, L19** and **L20** are tuned by **C45.** For S.W.1 operation **S21** closes and band-spread tuning capacitor **C46** is brought into operation; **C45** then acts as the band setter. Parallel trimming by **C47** (S.W.1), **C48** (S.W.2), **C49** (M.W.) and **C15, C50** (L.W.); series tracking by **C16** (S.W.2), **C17** (M.W.) and **C18** (L.W.). Reaction coupling from anode by coupling coils **L21** (S.W.1), **L22** (S.W.2) and **L23** (L.W.), and across the common impedance of tracker **C17** (M.W.). Additional reaction coupling on S.W.2 across **C16.**

Second valve **(V3, Mullard EF41)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings **C11, L24, L25, C12** and **C22, L26, L27, C23.**

Intermediate frequency 470 kc/s.

Diode signal detector is part of double diode triode valve **(V4, Mullard EBC41).** Audio frequency component in its rectified output is developed across load resistor **R15,** and passed via **C27** and volume control **R16** to grid of triode section. I.F. filtering by **C24, R14, C25.**

Second diode of **V4** is fed from **V3** anode via **C28** and the resulting D.C. potential developed across load resistor **R19** is fed back as bias to **V1, V2** and **V3** giving automatic gain control. The A.G.C. bias applied to **V1,** however, only controls that valve for M.W. and L.W.



Circuit diagram of the Alba 4-band A.C. tab
amplification between the aerial circuit and t
bands a band-spread tuning capacitor **C46** is sh
S21. C45 then operates as a band-setting cont
but not on the two S.W. bands. A

operation, its grid circuit being returned directly to chassis, via the tuning coils, on S.W.1 and S.W.2.

Provision is made for the connection of a gramophone pick-up across **R16** via **S33** which closes in the gram position of the waveband control **S32** opens, and **S1, S10, S11, S20, S22** and **S31** close in this position to prevent radio break-through.

Resistance-capacitance coupling by **R17, C29** and **R21** between **V4** and pentode output valve **(V5, Mullard EL41).** Fixed tone correction in anode circuit by **C31.** Three-position tone control by **C30, R22** and switches **S34, S35.** Provision is made for the connection of a low impedance external speaker across **T1** secondary winding. Muting of the internal speaker is accomplished by means of a plug and socket arrangement on the Ext. L.S. socket panel at the rear of the chassis.

H.T. current is supplied by I.H.C. full-wave rectifying valve **(V6, Mullard EZ40).** Smoothing by **R24,** choke **L29** and electrolytic capacitors **C32, C33** and **C34.** The heaters of all the valves, including **V6,** are fed from the single heater winding **a** on the mains transformer **T2.**

GENERAL NOTES

Switches.—S1-S33 are the waveband and radio/gram change-over switches, ganged in three rotary units beneath the chassis. These units are indicated in the under-chassis illustration and shown in detail overleaf, where they are drawn as seen from the rear of an inverted chassis. The associated switch table shows the switch operations for the five control settings, starting with the control in the fully anti-clockwise position. A dash indicates open, and **C,** closed.

S34, S35 are the tone control switches and comprise a single rotary unit which is mounted on a bracket on the front of

(*Continued col. 1 overleaf*)

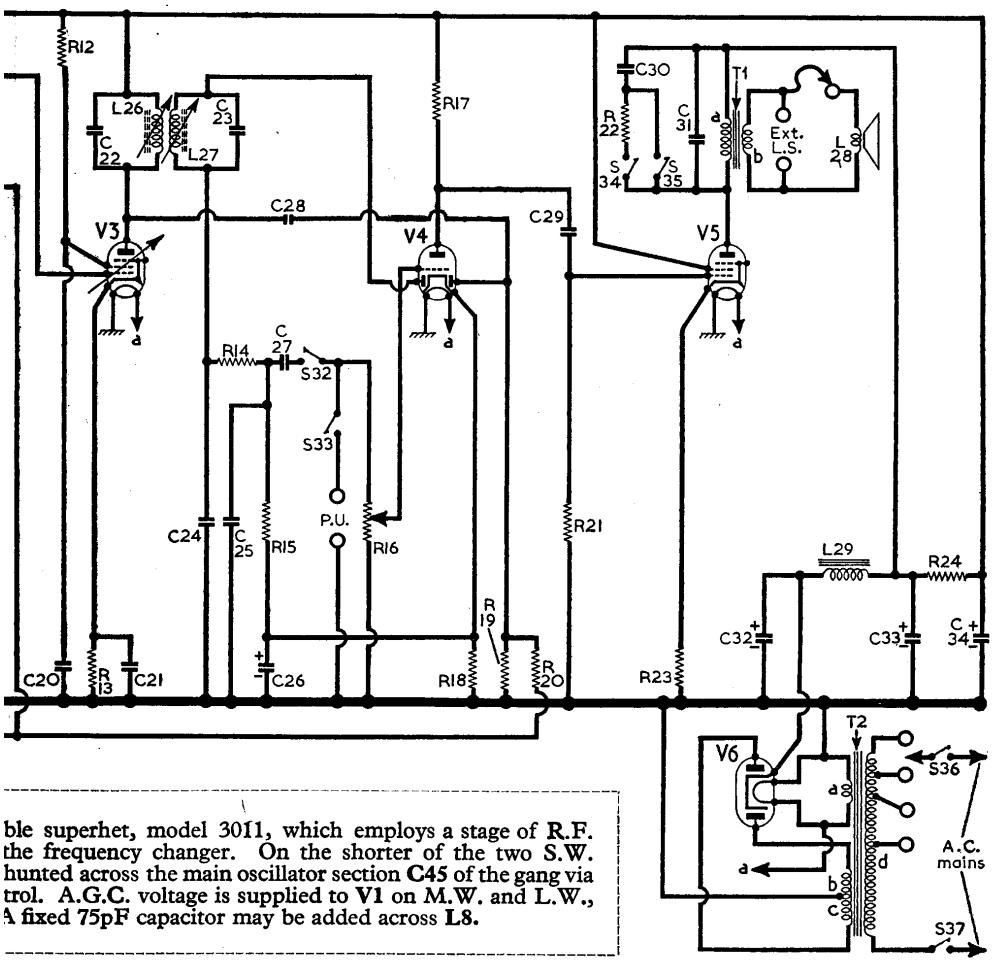
COMPONENTS AND VALUES

	RESISTORS	Values	Locations
R1	V1 S.G. H.T. feed	90kΩ	F5
R2	V1 G.B.	300Ω	F5
R3	V1 anode decoup....	10kΩ	F5
R4	A.G.C. decoup. ...	1MΩ	F5
R5	V2 C.G.	1MΩ	F6
R6	V2 S.G. H.T. pot.	22kΩ	F6
R7	divider	33kΩ	F6
R8	V2 G.B.	220Ω	F6
R9	V2 osc. C.G. ...	47kΩ	G6
R10	Osc. stabilizer ...	25Ω	G6
R11	V2 osc. anode feed	27kΩ	F6
R12	V3 S.G. feed ...	90kΩ	F6
R13	V3 G.B.	300Ω	F6
R14	I.F. stopper ...	47kΩ	C3
R15	Signal diode load	470kΩ	C3
R16	Volume control ...	250kΩ	—
R17	V4 anode load ...	47kΩ	D6
R18	V4 G.B.	2·2kΩ	D6
R19	A.G.C. diode load	1MΩ	E6
R20	A.G.C. decoupling	1MΩ	E6
R21	V5 C.G.	820kΩ	D5
R22	Part tone control ...	10kΩ	—
R23	V5 G.B.	200Ω	D5
R24	H.T. smoothing ...	2·2kΩ	E5

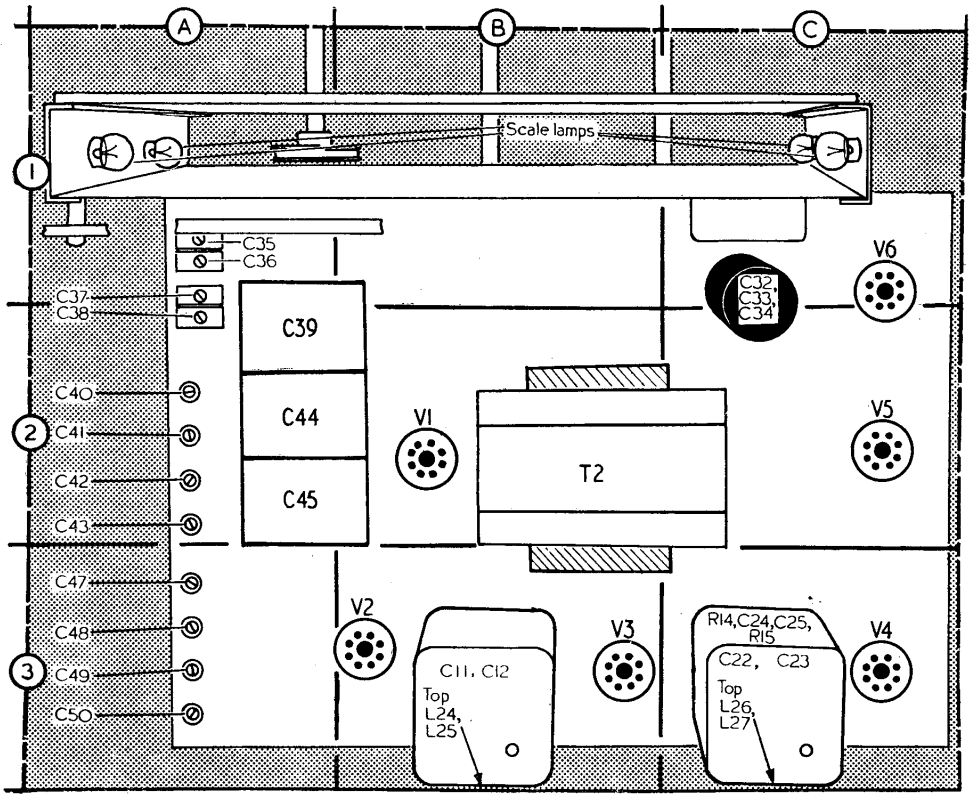
	CAPACITORS	Values	Locations
C1	Aerial coupling ...	200pF	G4
C2	V1 S.G. decoupling	0·1μF	F5
C3	V1 cath. by-pass...	0·01μF	F5
C4	V1 anode decoup...	0·1μF	G5
C5	A.G.C. decoupling	0·05μF	E5
C6		0·05μF	E5
C7	L.W. R.F. trimmer	70pF	G5
C8	H.T. decoupling ...	0·25μF	F6
C9	V2 C.G.	100pF	F5
C10	V2 S.G. decoupling	0·1μF	F6
C11	1st I.F. trans. tuning	100pF	B3
C12		100pF	B3
C13	V2 cath. by-pass...	0·1μF	G6
C14	V2 osc. C.G. ...	100pF	G6
C15	L.W. osc. trimmer	140pF	G6
C16	S.W.2 osc. tracker	2,750pF	G6
C17	M.W. osc. tracker...	600pF	F6
C18	L.W. osc. tracker...	270pF	G6
C19	Osc. anode coup....	100pF	G6
C20	V3 S.G. decoupling	0·1μF	F6
C21	V3 cath. by-pass ...	0·1μF	F6
C22	2nd I.F. trans. tuning	100pF	C3
C23		100pF	C3
C24	I.F. by-passes ...	100pF	C3
C25		100pF	C3
C26*	V4 cath. by-pass ...	25μF	D6
C27	A.F. coupling ...	0·005μF	E6
C28	A.G.C. coupling ...	12pF	E6
C29	A.F. coupling ...	0·005μF	D6
C30	Parts tone control	0·05μF	—
C31		0·005μF	—
C32*	H.T. smoothing ...	16μF	C1
C33*		32μF	C1
C34*		32μF	C1
C35‡	S.W.1 aerial trim	25pF	A1
C36‡	S.W.2 aerial trim...	25pF	A1
C37‡	M.W. aerial trim...	60pF	A1
C38‡	L.W. aerial trim ...	60pF	A1
C39†	Aerial tuning ...	528pF§	A2
C40‡	S.W.1 R.F. trim ...	30pF	A2
C41‡	S.W.2 R.F. trim....	30pF	A2
C42‡	M.W. R.F. trim ...	30pF	A2
C43‡	L.W. R.F. trim. ...	30pF	A2
C44†	R.F. tuning ...	528pF§	A2
C45†	Oscillator tuning ...	528pF§	A2
C46†	Band-spread tuning	30pF	F4
C47‡	S.W.1 osc. trim. ...	30pF	A3
C48‡	S.W.2 osc. trim....	30pF	A3
C49‡	M.W. osc. trim. ...	30pF	A3
C50‡	L.W. osc. trim. ...	30pF	A3

* Electrolytic. † Variable. ‡ Pre-set.
§ "Swing" value, min. to max.

	OTHER COMPONENTS	Approx. Values (Ohms)	Locations
L1	Aerial coupling coils	—	G4
L2		0·5	G4
L3		1·5	G4
L4		45·0	G4
L5	Aerial tuning coils	—	G4
L6		—	G4
L7		3·0	G4
L8		23·0	G4
L9	R.F. coupling coils	—	G5
L10		—	G5
L11		0·5	G5
L12		43·0	G5
L13	R.F. tuning coils ...	—	G5
L14		—	G5
L15		3·0	G5
L16		23·0	G5
L17	Oscillator tuning coils	—	G6
L18		—	G6
L19		3·0	G6
L20		7·0	G6
L21	Oscillator reaction coils	—	G6
L22		—	G6
L23		3·5	G6
L24	1st I.F. trans. Pri.	6·0	B3
L25	1st I.F. trans. Sec.	8·5	B3
L26	2nd I.F. trans. Pri.	6·0	C3
L27	2nd I.F. trans. Sec.	8·5	C3
L28	Speech coil ...	2·5	—
L29	Smoothing choke...	68·0	E4
T1	O.P. trans. a ...	480·0	
	O.P. trans. b ...	—	—
T2	Mains trans. a ...	—	
	Mains trans. b ...	160·0	
	Mains trans. c	170·0	B2
	Mains trans. d, total	30·0	
S1-S33	Waveband switches	—	G4
S34, S35	Tone switches ...	—	—
S36, S37	Mains sw., gd' R16	—	—



ble superhet, model 3011, which employs a stage of R.F. the frequency changer. On the shorter of the two S.W. hunted across the main oscillator section **C45** of the gang via trol. A.G.C. voltage is supplied to **V1** on M.W. and L.W., A fixed 75pF capacitor may be added across **L8.**



Plan view of the chassis showing all the R.F. and oscillator trimmers on the left.

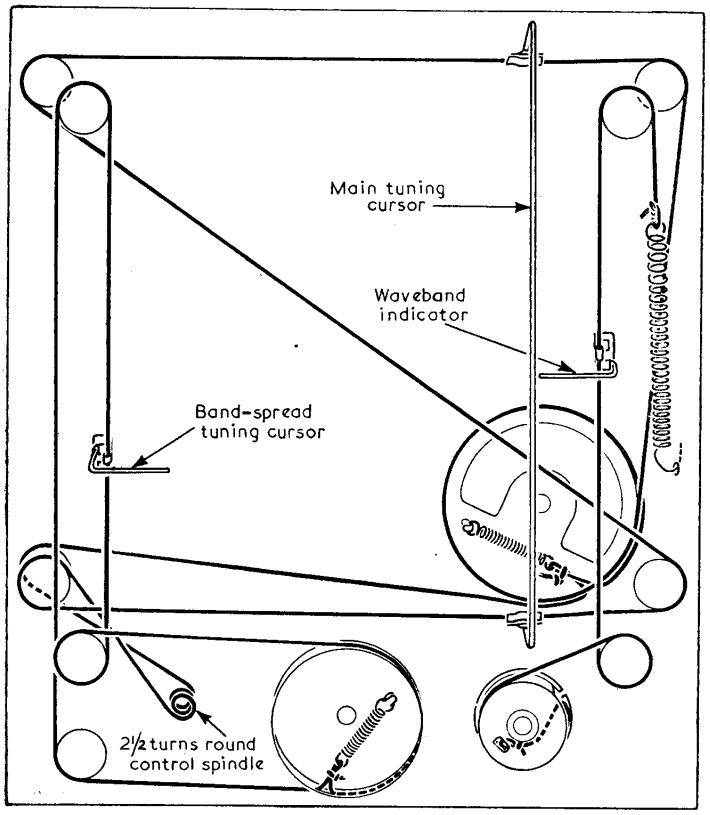
General Notes—*continued*

the cabinet. The switch unit has three settings which, starting from the fully anti-clockwise position, are as follows: brilliant, **S34, S35** open; medium, **S34** closed, **S35** open; mellow, **S34** open, **S35** closed.

S36, S37 are the Q.M.B. mains switches ganged with the volume control **R16.**

Scale Lamps.—These are four 6.3 V, 0.115 A lamps, with small clear spherical bulbs and M.E.S. bases.

Band-spread Tuning Control.—Owing to the extremely critical nature of the tuning on S.W.1, a small band-spread tuning capacitor **C46** is shunted across the main oscillator tuning capacitor **C45** via **S21** and provides a means of fine tuning.



Sketch showing the main tuning drive, the band-spread tuning drive and the waveband indicator drive systems as viewed from the front of the chassis with the tuning scale and the scale backing cover removed. In this sketch, the assembly is drawn as seen when the chassis is standing on its base; when the chassis is in the cabinet it stands on its side, and the band-spread cursor is then at the bottom.

The band-spread tuner has a separate tuning scale at the foot of the main tuning scales which is calibrated from 0 to 100. The calibration of the main S.W.1 tuning scale is correct with the band-spread control set to zero, and is modified by it in the following way when the band-spread control is set to 100.

At 11 m on the main scale, 2 metres are added by turning the band-spread tuning control from 0 to 100; at 13 m on the main scale, 1.3 metres are added by the band-spread control; at 19 m, 1 metre is added; at 25 m, 0.7 metre is added; at 30 m, 0.6 metre is added. This constitutes a band-spreading device.

Switch Table

Switches	Gram	L.W.	M.W.	S.W.2	S.W.1
S1 ...	C	—	—	—	—
S2 ...	—	—	—	—	C
S3 ...	—	—	—	C	—
S4 ...	—	—	C	—	—
S5 ...	—	C	—	—	—
S6 ...	—	—	—	—	C
S7 ...	—	—	—	C	—
S8 ...	—	—	C	—	—
S9 ...	—	C	—	—	—
S10 ...	C	—	—	—	—
S11 ...	C	—	—	—	—
S12 ...	—	—	—	—	C
S13 ...	—	—	—	C	—
S14 ...	—	—	C	—	—
S15 ...	—	C	—	—	—
S16 ...	—	—	—	—	C
S17 ...	—	—	—	C	—
S18 ...	—	—	C	—	—
S19 ...	—	C	—	—	—
S20 ...	C	—	—	—	—
S21 ...	—	—	—	—	C
S22 ...	C	—	—	—	—
S23 ...	—	—	—	—	C
S24 ...	—	—	—	C	—
S25 ...	—	—	C	—	—
S26 ...	—	C	—	—	—
S27 ...	—	—	—	—	C
S28 ...	—	—	—	C	—
S29 ...	—	—	C	—	—
S30 ...	—	C	—	—	—
S31 ...	C	—	—	—	—
S32 ...	—	C	C	C	C
S33 ...	C	—	—	—	—

Drive Cord Replacements.—The following instructions cover the replacement of the main tuning drive, the band-spread cursor drive and the waveband indicator drive. In order to make the various pulleys easily accessible, the tuning scale and the scale backing cover should be removed (total of eight self-tapping screws).

Main Tuning Drive.—About 6 ft. of nylon-braided glass yarn is required for a new drive cord, which should be run as shown in our sketch of the drive cord systems (adjoining), starting with the gang at maximum capacitance and running the cord off clockwise round the drum.

Band-spread Tuning Drive.—About 3 ft of nylon-braided glass yarn is required for a new drive cord, which should be run as indicated in the drive cord sketch. The band-spread control should be set to maximum capacitance, and the cord run off clockwise from the drive drum, pulling against the end-stop.

Waveband Indicator Drive.—About 18 inches of nylon-braided glass yarn is required for a new drive cord, which should be fitted as follows. First remove the indicator drive drum from its spindle, and tie one end of the cord to the lug on its rear face. Replace the drum on its

spindle with the gap at about 2 o'clock, then lead the cord out through the gap in its rim, and run the cord clockwise round the drum and the pulleys as indicated in the drive sketch, finally tying the cord to the spring. The free end of the spring should be anchored to the hole below the lower scale lamp.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those derived from the manufacturers' information. These were measured on a receiver while it was operating from A.C. mains of 230 V, the voltage adjustment being set to the 225-245 V tapping. The receiver was tuned to the highest wavelength end of M.W., but there was no signal input.

Voltages were measured with a Model 7 Avometer, using the 10 V and 400 V ranges. The voltage measured across **C33** was about 285 V. Chassis was the negative connection in every case.

Valve	Anode		Screen		Cath.
	V	mA	V	mA	V
V1 EF41	195	4·5	70	1·5	1·7
V2 ECH42	200	2·0	70	2·4	1.7
	Oscillator				
	95	3·0			
V3 EF41	200	5·0	70	1·5	2·0
V4 EBC41	125	0·8	—	—	1·7
V5 EL41	270	27·0	200	5·5	6·5
V6 EZ40	270*	—	—	—	290·0†

* A.C. reading, each anode. † Cathode current 54 mA.

CIRCUIT ALIGNMENT

Remove chassis from cabinet and position it on the bench with the R.F. and oscillator core adjustments facing upwards.

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 "live" 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 **L27** (location reference C3), **L26** (C3), **L25** (B3) and **L24** (B3) for maximum output. Repeat these adjustments until no further improvement results.

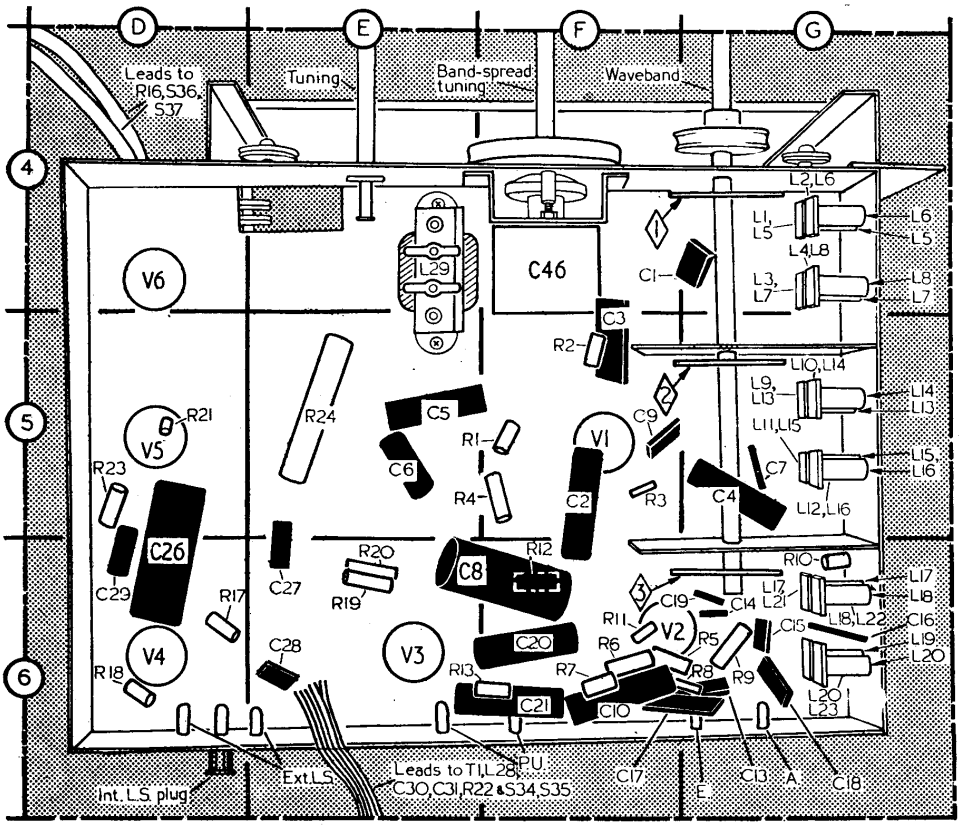
R.F. and Oscillator Stages.—Check that with gang at maximum capacitance the cursor coincides with the highest wavelength ends of the tuning scales. Transfer signal generator leads, via a dummy aerial, to **A** and **E** sockets.

S.W.1.—Switch receiver to S.W.1 and turn the band-spread tuning capacitor **C46** to minimum capacitance. Tune receiver to 30 m, feed in a 30 m (10 Mc/s) signal and adjust the cores of **L17** (G6), **L13** (G5) and **L5** (G4) for maximum output. Tune receiver to 11.1 m, feed in a 11.1 m (27 Mc/s) signal and adjust **C47** (A3), **C40** (A2) and **C35** (A1) for maximum output. Repeat these adjustments until no further improvement results.

S.W.2.—Switch receiver to S.W.2, tune receiver to 100 m, feed in a 100 m (3 Mc/s) signal and adjust the cores of **L18** (G6), **L14** (G5) and **L6** (G4) for maximum output. Tune receiver to 33.34 m, feed in a 33.34 m (9 Mc/s) signal and adjust **C48** (A3), **C41** (A2) and **C36** (A1) 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 **L19** (G6), **L15** (G5) and **L7** (G4) for maximum output. Tune receiver to 200 m, feed in a 200 m (1,500 kc/s) signal and adjust **C49** (A3), **C42** (A2) and **C37** (A1) for maximum output. Repeat these adjustments until no further improvement results.

L.W.—Switch receiver to L.W., tune to 1,949 m, feed in a 1,949 m (154 kc/s) signal and adjust the cores of **L20** (G6), **L16** (G5) and **L8** (G4) for maximum output. Tune receiver to 1,000 m, feed in a 1,000 m (300 kc/s) signal and adjust **C50** (A3), **C43** (A2) and **C38** (A1) for maximum output. Repeat these adjustments until no further improvement results.



Underside view of the chassis, showing all the R.F. and oscillator core adjustments along the right-hand edge. The volume control and the tone control switches are mounted separately in the front of the cabinet.

Waveband Switch Diagram

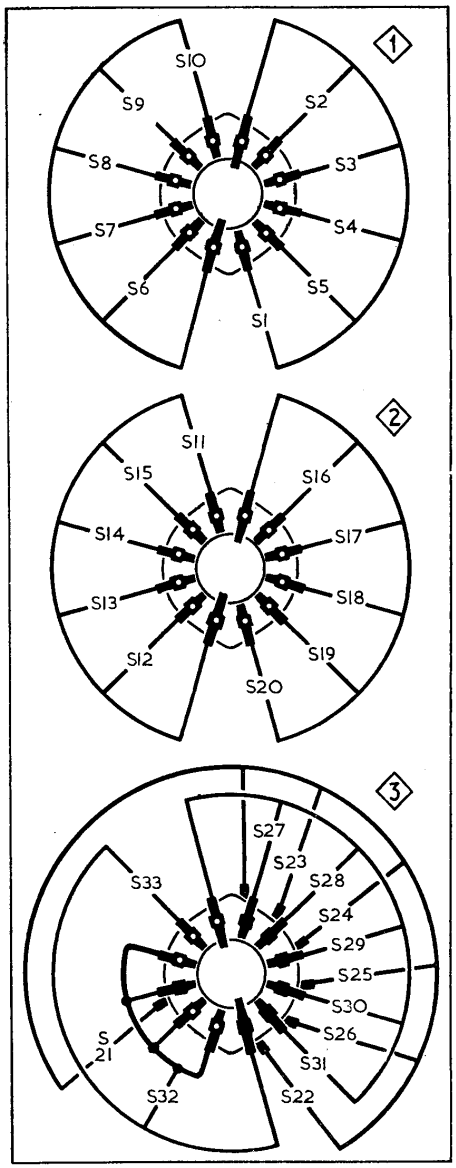


Diagram of the waveband switch units, drawn as seen from the rear of an inverted chassis. The associated switch table appears in column 3.

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