"TRADER" SERVICE SHEET

1344

ALBA 3312

A.M./F.M. Table Radio Receiver

FIVE Mullard A.C./D.C. valves, in addition to the mains rectifier, are employed in the Alba 3312 receiver, an A.M./F.M. superhet covering 88-100Mc/s and M.W. and L.W. bands of 190-550m and 1,000-2,000m. It employs an internal F.M. aerial and an internal ferrite rod A.M. aerial.

Release date and original price: September 1957; £21 4*s* 6*d*. *P.T. extra.*

CIRCUIT DESCRIPTION

A.M. aerial input is coupled via isolating capacitor **C18** to aerial tuning circuits **L10, C21, C22** (M.W.) and **L11, C19, C22** (L.W.). **L10** and **L11** are mounted at opposite ends of a ferrite rod and form the internal aerial.

V2 (UCH81) is employed as a frequency changer on A.M. Section **a** operates as a tuned grid oscillator with injector grid coupling to the heptode mixer section **b**. Oscillator grid coil **L12** is tuned by **C29, C30** (M.W.) and by **C29, C30, C31** (L.W.), with series tracking by **C32** in conjunction with the adjustable inductance of **L12** on both bands.

Second A.M. valve **V3 (UF89)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings **C35, L16, L17, C36; C42, L21, L22, C43.**

A.M. Intermediate frequency 470kc/s

Diode A.M. detector is part of a triple-diode-triode valve **V4 (UABC80).** Audio frequency component in its rectified output is developed across **R21** and fed via **S10,** tone control **R24, C50,** volume control **R25, C51, R26** to the control grid of **V4d** which operates as A.F. amplifier. D.C. potential developed across **R21** is filtered by **R20, C25** and fed back to the control grids of **V2** and **V3,** giving automatic gain control.

Provision is made for the connection of a gramophone pick-up across the tone control **R24, C49** via **C48, R23** and **C47.** Output of **V4d** is resistance-capacitance coupled to control grid of pentode output valve **V5 (UL84).** Tone correction by **C56** and the negative feed-back circuit **R29, C52, R28.**

H.T. current is supplied by half-wave rectifier valve **V6 (UY85).** Smoothing by **C54, R32, C53.** Residual hum neutralizing by passing H.T. current through section **a** of the output transformer **T1.**

Operation on F.M.

300Ω balanced input to the grid-cathode circuit of the R.F. amplifier valve **V1 (UCC85).** Output of **V1a** is developed across tuned anode circuit **L4, C9** and fed via **C10, C11** to the control grid of **V1b** which operates as oscillator/mixer valve.

Tuned oscillator grid circuit comprises **L5, C10, C11, C12.** Reaction coupling from oscillator anode via **C14, L6.** To prevent oscillator voltage passing into the aerial and R.F. circuits, a bridge neutralizing circuit is formed by **C10, C11, C13,** and the grid/cathode capacitance of **V1b.** **V1a** anode is thus at zero oscillator potential.

V2b and **V3** operate as an F.M. intermediate frequency amplifier, with tuned transformers **C15, L7, L8, C16; C34, L14, L15** and discriminator transformer **C39, L18, L19, C40, L20** to diode sections **a** and **b** of **V4** which operate in a ratio detector discriminator circuit.

F.M. Intermediate frequency 10.7Mc/s

A.F. output of ratio detector is developed across **C41** and fed via the de-emphasis circuit comprising **R18** and tone control capacitance and **S9** to the control grid circuit of **V4d** after which it follows the same path as has already been described for A.M. operation.

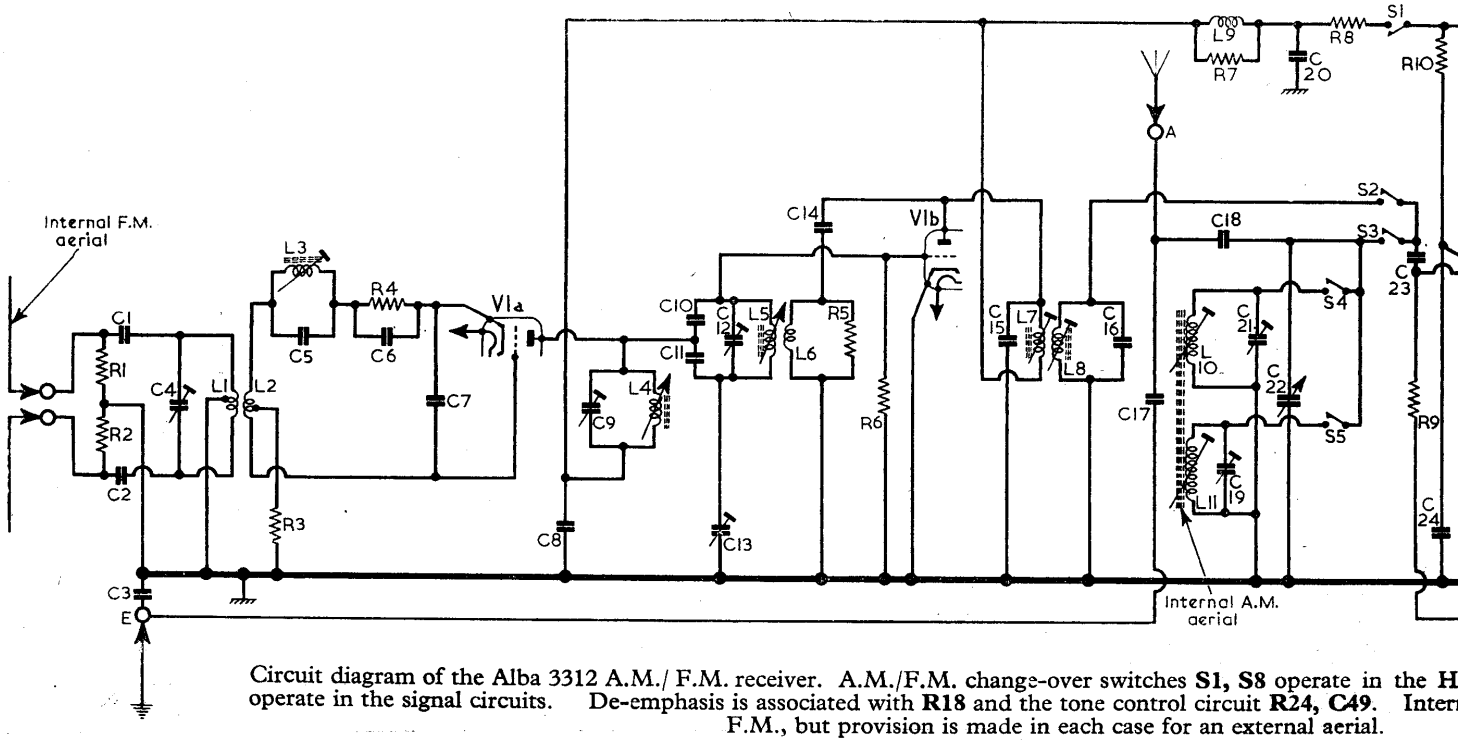
CIRCUIT ALIGNMENT

Equipment Required.—A.M./F.M. signal generator, 30 per cent modulated for A.M. (for F.M. alignment the 88.1Mc/s signal is deviated by ±25kc/s), an output meter; a valve-voltmeter or 20,000 Ω/V meter; and an insulated trimming tool for core adjustments.

As the tuning scale remains fixed to the cabinet when the chassis is removed for alignment purposes, the scale backing plate is marked with small holes which indicate alignment points. The corresponding frequency to each point is shown in the sketch in col. 4 overleaf.

Check that with the gang at maximum capacitance the cursor coincides with the points at the low-frequency end of the scale backing plate.

L10 (A1) and **L11** (A2) are ferrite rod tuned and should be adjusted for maximum output by sliding the formers along the ferrite rod and securing them to the rod with an adhesive after alignment to prevent them from moving.



Circuit diagram of the Alba 3312 A.M./ F.M. receiver. A.M./F.M. change-over switches **S1, S8** operate in the H
operate in the signal circuits. De-emphasis is associated with **R18** and the tone control circuit **R24, C49.** Inter
F.M., but provision is made in each case for an external aerial.

A.M. Alignment

1.—Connect output meter across external speaker sockets.

2.—Switch receiver to M.W. and turn tuning gang and volume control to maximum, and the tone control fully anti-clockwise (without operating switch). Short-circuit oscillator section of gang **C29** (A1). Connect signal generator to **C22** on gang (A1) and via a 0.1μF capacitor to chassis. Feed in a 470kc/s signal, modulated 30 per cent at 400 c/s and adjust **L16** (E4), **L17** (B2), **L21** (E4) and **L22** (C2) for maximum output. Repeat adjustments until no improvement can be obtained.

3.—Tune receiver to 500m and connect signal generator via dummy aerial to the A.M. aerial socket and chassis. Feed in a 600kc/s signal and adjust **L12** (B1) and **L10** (A1) for maximum output.

4.—Tune receiver to 200m, feed in a 1,500kc/s signal and adjust **C30** (B1) and **C21** (B1) for maximum output.

5.—Repeat operations 3 and 4 for optimum calibration.

6.—Switch receiver to L.W. and tune to 1,950m. Feed in a 154kc/s signal and adjust **L11** (A2) for max. output.

7.—Tune receiver to 1,200m, feed in a

(*Continued col. 1 overleaf*)

The appearance of the Alba **3312**.

Resistors

R1	1MΩ	G5
R2	1MΩ	G5
R3	120Ω	G4
R4	220Ω	G3
R5	2·2kΩ	G3
R6	1MΩ	G3
R7	4·7kΩ	G4
R8	470Ω	F4
R9	1MΩ	F4
R10	16kΩ	F4
R11	220Ω	F4
R12	47kΩ	F4
R13	8·2kΩ	E4
R14	27kΩ	F3
R15	470Ω	E4
R16	22kΩ	E4
R17	470Ω	E4
R18	12kΩ	E5
R19	100kΩ	E5
R20	1MΩ	E5
R21	330kΩ	E5
R22	27kΩ	D4
R23	56kΩ	E5
R24	500kΩ	D3
R25	500kΩ	E3
R26	10MΩ	D4
R27	220kΩ	D5
R28	1MΩ	D5
R29	1·2MΩ	D4
R30	10kΩ	D5
R31	180Ω	D5
R32	700Ω	E4
R33	285Ω	C2
R34	155Ω	C2
R35	170Ω	C2
R36	70Ω	C2
R37	24Ω	B1
R38	24Ω	B1

Capacitors

C1	0·001μF	G5
C2	0·001μF	G5
C3	0·002μF	F5
C4	30pF	A2
C5	47pF	G3
C6	0·001μF	G4
C7	8·2pF	G3
C8	570pF	G3
C9	30pF	G3
C10	39pF	G3
C11	39pF	G3
C12	30pF	G3
C13	30pF	G4
C14	18pF	G3
C15	12pF	G3
C16	15pF	A1
C17	47pF	F5
C18	8·2pF	F5
C19	65pF	B1
C20	0·0022μF	G4
C21	65pF	B2
C22	—	A1
C23	100pF	F4
C24	0·005μF	F4
C25	0·1μF	E4
C26	0·05μF	F4
C27	100pF	F4
C28	665pF	F3
C29	—	A1
C30	65pF	B1
C31	600pF	F3
C32	4,700pF	E3
C33	0·005μF	E4
C34	12pF	B2
C35	100pF	B2
C36	100pF	B2
C37	0·01μF	E4
C38	0·02μF	E4
C39	12pF	C2
C40	47pF	C2
C41	330pF	E5
C42	100pF	C2
C43	100pF	C2
C44	100pF	D4
C45	0·005μF	E5
C46	5μF	E5
C47	0·002μF	E5
C48	0·02μF	E5
C49	500pF	E3
C50	0·02μF	E3
C51	0·1μF	E3
C52	0·01μF	D5
C53	100μF	B2
C54	100μF	B2
C55	100μF	D5
C56	0·002μF	D4
C57	0·002μF	G1
C58	0·005μF	D5
C59	0·005μF	D5
C60	0·02μF	C1

Coils*

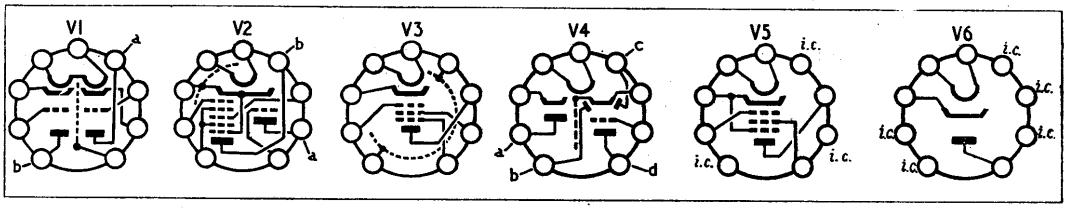
L1	—	G4
L2	—	G4
L3	—	G4
L4	—	A1
L5	—	A1
L6	—	A1
L7	0·8	A1
L8	0·9	A1
L9	4·2	G4
L10	1·2	A1
L11	5·0	A2
L12	4·0	F4
L13	2·0	F4
L14	—	B2
L15	—	B2
L16	9·0	B2
L17	9·0	B2
L18	—	C2
L19	—	C2
L20	—	C2
L21	9·0	C2
L22	9·0	C2
L23	2·7	—
L24	—	G3

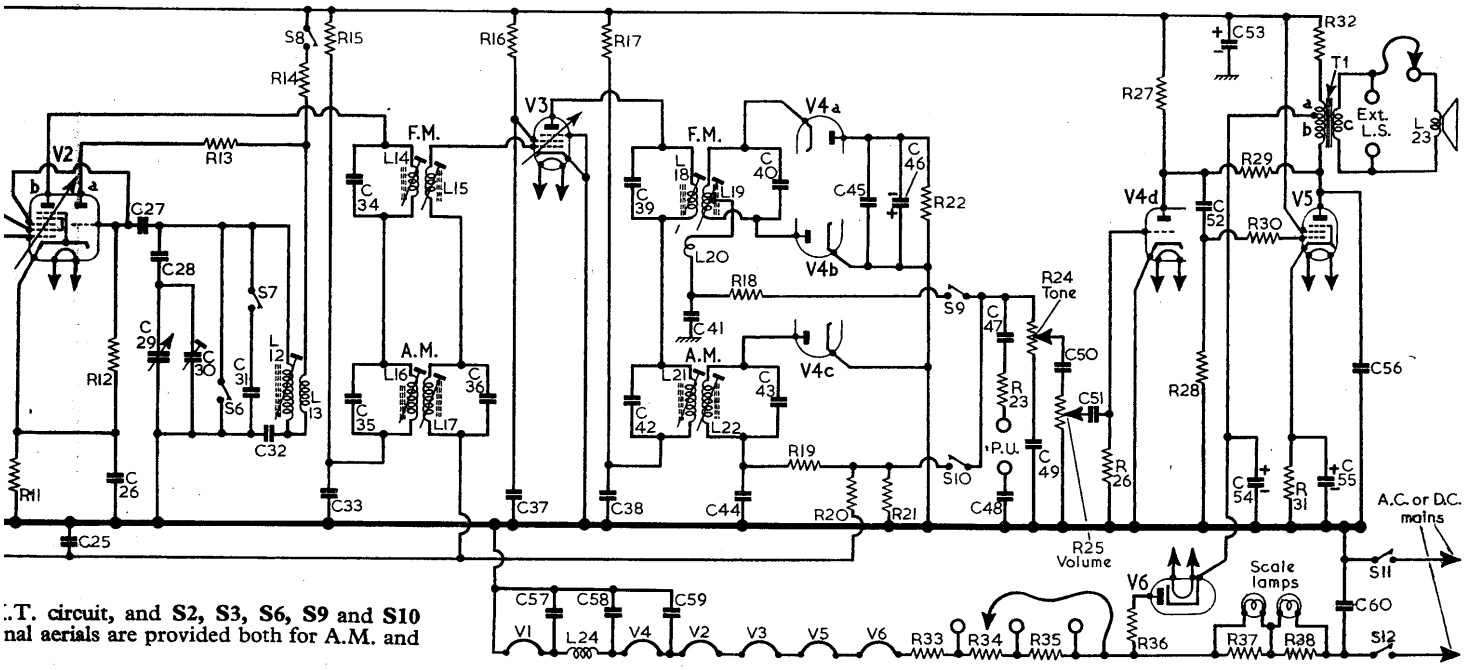
Miscellaneous*

T1	a	85·0	C1
	b	305·0	
	c	—	
S1—S10		—	F4
S11, S12		—	D3

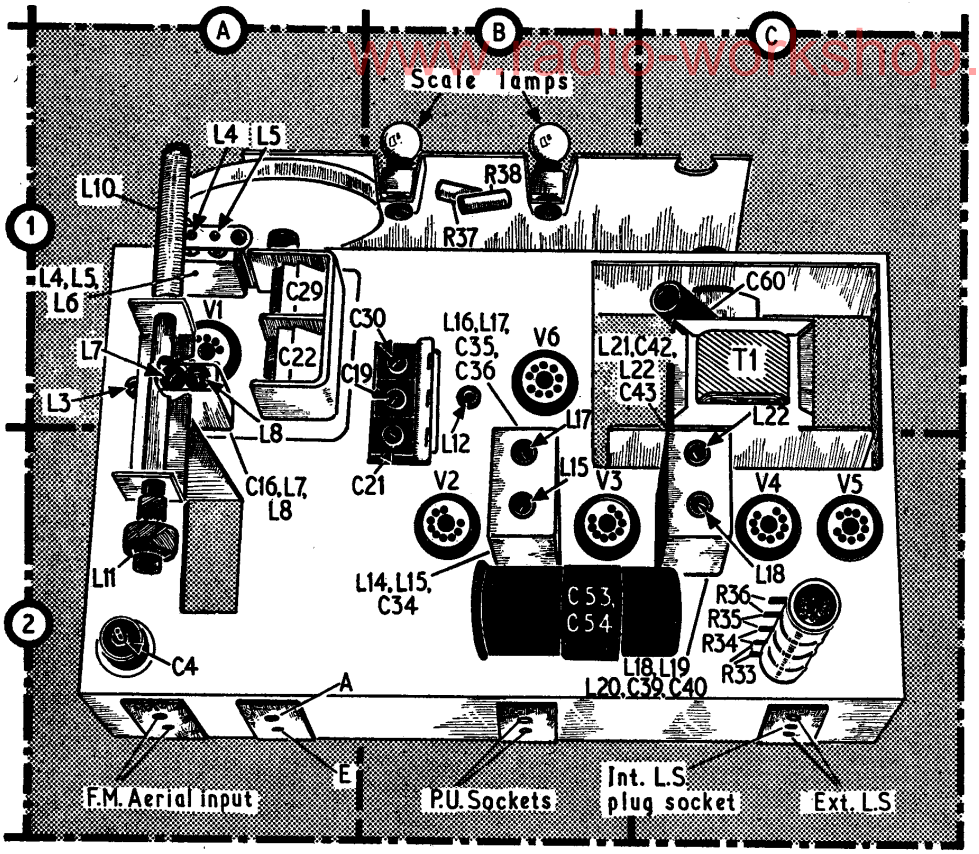
*Approx. D.C. values in ohms.

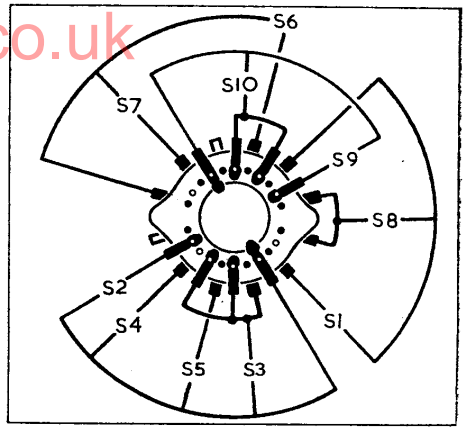
Valve base diagrams for six valves used in the receiver, drawn as seen from the free ends of the pins.





...T. circuit, and **S2, S3, S6, S9** and **S10** ...nal aerials are provided both for A.M. and





Above: Diagram of the waveband switch unit. *Left*: Plan view of the chassis.

SWITCH TABLE

Switch	F.M.	M.W.	L.W.
S1 ..	C	—	—
S2 ..	C	—	—
S3 ..	—	C	C
S4 ..	—	C	—
S5 ..	—	—	C
S6 ..	C	—	—
S7 ..	—	—	C
S8 ..	—	C	C
S9 ..	C	—	—
S10 ..	—	C	C

Circuit Alignment—*continued*

250 kc/s signal and adjust **C19** (B1) for maximum output.

F.M. Alignment

1.—Switch receiver to F.M. and turn gang to maximum. Connect D.C. valve-voltmeter or 20,000Ω/V meter across **C46** (E5) with the meter positive lead connected to chassis. Connect signal generator output to the control grid (pin 2) of **V2b**, and feed in an unmodulated 10.7 Mc/s signal. Adjust **L18** (C2), **L15** (B2) and **L14** (E4) for maximum output. Note meter reading.

2.—Connect valve-voltmeter across **C41** (E5) and adjust **L19** (E4) for exactly half the output obtained at the end of operation 1.

3.—Reconnect valve-voltmeter across **C46** (E5). Couple signal generator output via a tight loop of wire round **V1** envelope and feed in an unmodulated 10.7 Mc/s signal. Adjust **L7** (A1) and **L8** (A1) for maximum output.

4.—Check I.F. bandwidth by swinging signal generator frequency each side of 10.7 Mc/s until output falls by 3 dB. The bandwidth covered by this means should not be less than 200 kc/s.

5.—Connect signal generator to F.M. aerial socket, feed in a 10.7 Mc/s signal and adjust **L3** (A1) for minimum output.

6.—Connect A.C. valve-voltmeter to junction of **C10** (G3) and **C11** (G3) with the negative lead connected to chassis via a 0.1μF isolating capacitor. Set the cores of **L4** (A1) and **L5** (A1) to minimum (i.e., fully in). Fully screw in **C13** (G4), set **C9** and **C12** to their mid-positions, then unscrew **C13** until a second dip in the valve-voltmeter reading is obtained.

7.—Reconnect valve-voltmeter across **C46** (E5). Tune receiver to 88.1 Mc/s calibration mark. (First hole at low-frequency end of backing plate.) Connect signal generator to F.M. aerial socket. Feed in a 88.1 Mc/s signal deviated by ± 25 kc/s. Adjust **C12** (G3) and **C9** (G3) for maximum output.

8.—Disconnect signal generator. Set cursor to mid-scale position and re-adjust **C9** for maximum background noise level.

9.—Seal all trimmers with wax on completion of alignment.

Finally, **C4** (A2) should be adjusted for maximum output at the customer's house, using his aerial, while receiving a transmission.

GENERAL NOTES

Switches.—S1-S10 are the waveband switches fitted in one rotary unit beneath the chassis. This unit is indicated in our underside view of the chassis (F4), and the individual switches are identified in the diagram above where the unit is drawn as seen when viewed in the direction of the arrow in the underchassis illustration.

The associated table shows the switch positions for the three control settings, starting from the fully anti-clockwise position of the control knob. A dash signifies that the switch is open, **C** that it is closed.

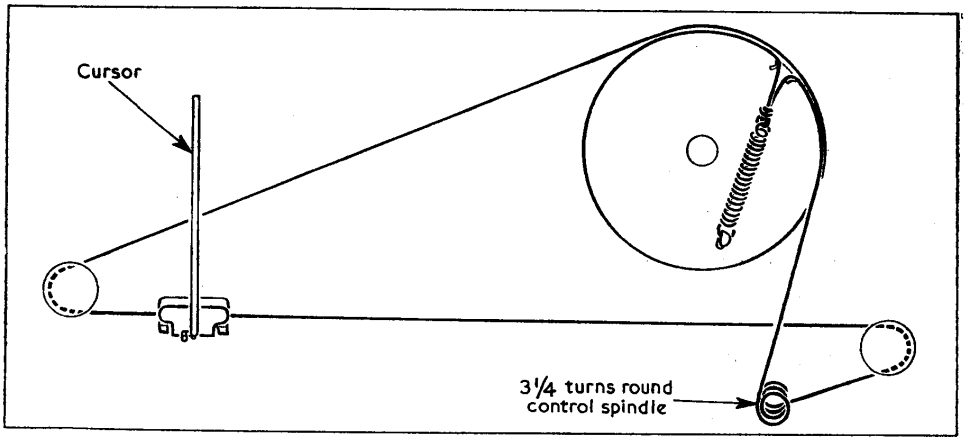
Scale Lamps.—These are two 6.3V, 0.115A lamps with clear, spherical bulbs and M.E.S. caps.

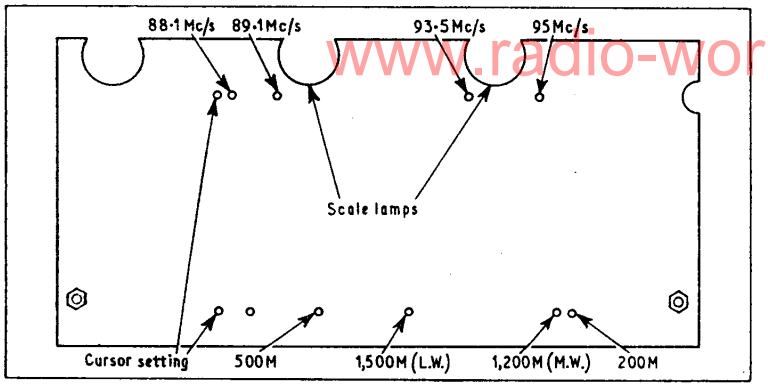
Drive Cord Replacement.—A little more than a yard of nylon braided glass yarn is required for a new drive cord. This should be fitted as shown in the sketch seen below, in which it is drawn as seen when viewed from the front of the chassis with the gang at maximum capacitance.

Remove the scale back-plate by unscrewing the two nuts. Tie both ends of the length of yarn together at the tension spring so as to form a loop of yarn which measures thirty-six and a half inches from end to end, not including the fastening knots. Hook the other end of the tension spring to the anchor tag on the drive drum.

Now lead one cord over the left-hand edge

The drive cord system, drawn as seen from the front of the chassis.





Sketch of the tuning scale backing plate, showing the frequencies and wavelengths associated with the holes that form the calibration marks.

of the gap in the drum rim and round the drum in an anti-clockwise direction for about one and one quarter turns. Begin the second turn behind the first. Lead the cord to the left and over the pulley provided, then back along the front of the chassis and over the right-hand pulley. Next, wind about three and one quarter turns in a clockwise direction around the brass control spindle, front turn last. Then hook the remainder of the cord over the right-hand edge of the drive drum gap.

Slip the cursor on the horizontal run by passing the cord under the three tags provided behind it. With the gang at maximum, the cursor should cover the pair of small holes at the left-hand end of the group provided in the backing plate for alignment purposes. These are shown in our sketch of the backing plate in cols. 4 and 5 above.

MODIFICATIONS

Earlier versions of this receiver may contain the following variation in component values:—**R10** may be 15kΩ, **R11** may be 200Ω, **R23** may be 100kΩ, **C20** may be 0.002μF, **C38** may be 0.01μF, **R37** and **R38** shunting the scale lamps may be a single 85Ω resistor shunting both scale lamps. **C21** may be across **C22**. A 0.1μF H.T. R.F. bypass capacitor may be connected between the H.T. positive line and chassis.

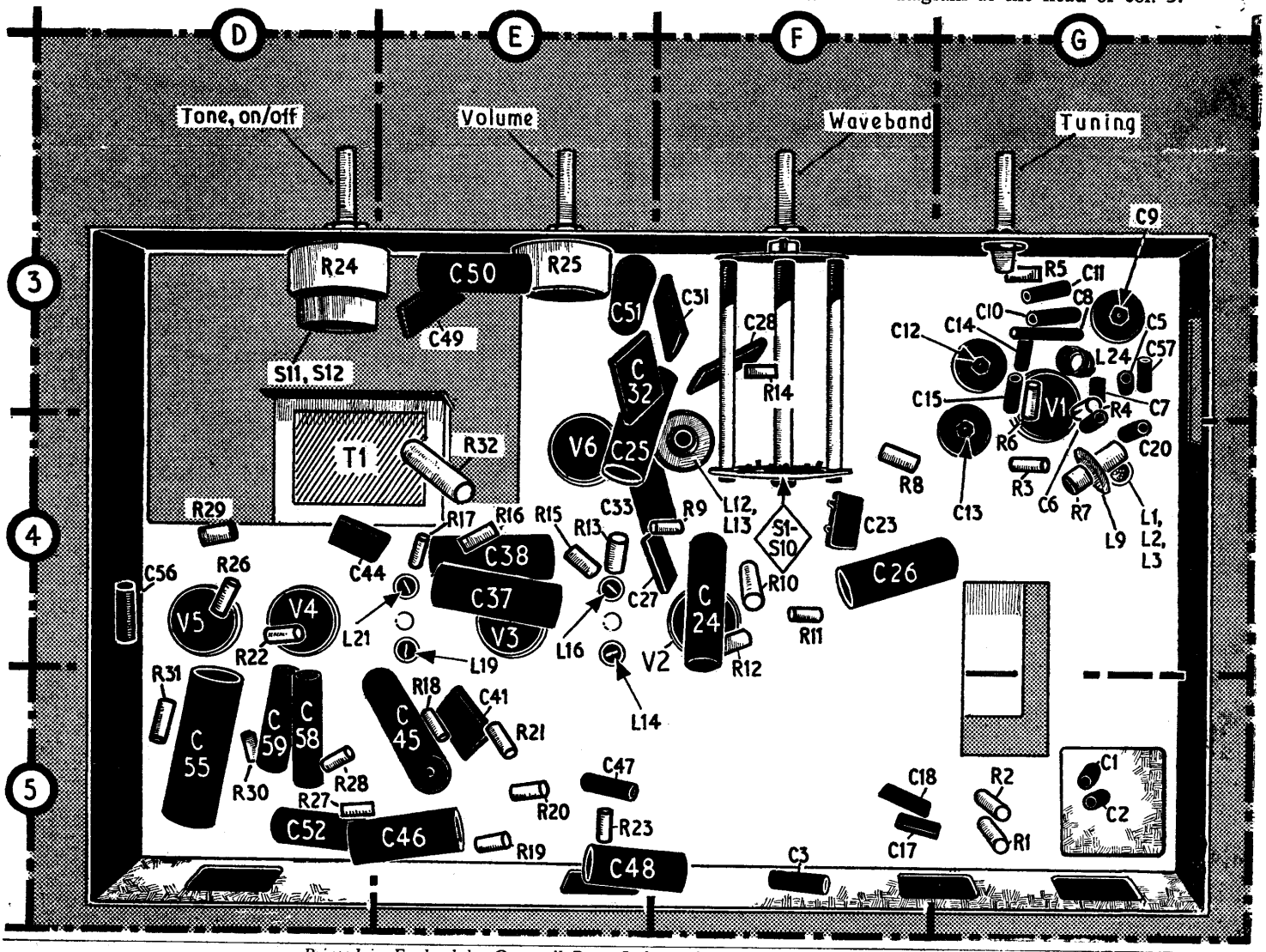
VALVE ANALYSIS

Valve voltages given in the table below are those measured on our sample receiver when it was operating from A.C. mains of 230V, with the voltage adjustment set to the appropriate tapping. The gang was turned to maximum, and the received was switched to F.M. and M.W. as indicated. There was no signal input. A high-resistance meter was used, and chassis was the negative connection in every case.

Valve		Anode (V)	Screen (V)	Cath. (V)
V1a UCC85	*	—	—	—
	†	140	—	2·0
V1b UCC85	*	—	—	—
	†	160	—	—
V2a UCH81	*	60	—	7·5
	†	—	—	—
V2b UCH81	*	210	130	7·5
	†	200	130	2·5
V3 UF89	*	220	115	—
	†	190	100	—
V4 UABC80	*	78	—	—
	†	76	—	—
V5 UL84	*	215	210	15
	†	210	200	13
V6 UY85	*	230[1]	—	240·0
	†	230[1]	—	235·0

**Measured with receiver switched to A.M.*
†Measured with receiver switched to F.M.
[1]A.C. reading.

Underside view of the chassis. The **S1-S10** switch unit is shown in detail in the diagram at the head of col. 3.



Printed in England by Cornwall Press Ltd., Paris Garden, London, S.E.1.