"TRADER" SERVICE SHEET

1261

ALBA 3211 Se

Covering One A.M./F.M. Table Receiver and Four A.M./

EMPLOYING a tuning indicator and an internal F.M. aerial, the **Alba 3211** is a 4-band A.M./F.M. table receiver designed to operate from A.C. mains of 190-260V, 50 c/s. The band ranges are: A.M., 16.5—58m, 90—570m, 1,200—2,000m; F.M., 87.9—95.7 Mc/s.

Models 6221, 6231, 6241 and 6251 are autoradiogram versions of the 3211 employing an identical chassis. Model 6241 has no tuning indicator.

Release dates and original prices: 3211, *June* 1955, £25 0*s* 4*d*; 6221, *June* 1955, £56 17*s* 2*d*; 6231, *August* 1955, £49 5*s* 7*d*; 6241, *April* 1956, £44 14*s* 6*d*; 6251, *April* 1956, £52 6*s* 3*d*. *Purchase tax extra.*

CIRCUIT DESCRIPTION

A.M. aerial input is coupled via **L10, L11, L12** to aerial tuning circuits, **L13, C21** (S.W.), **L14, C21** (M.W.) and **L15, C21** (L.W.). Section **b** of **V2 (Mullard ECH81)** operates as A.M. mixer, and section **a** as oscillator.

Oscillator grid coils **L16** (S.W.), **L17** (M.W.) and **L18** (L.W.) are tuned by **C27**. Reaction coupling from oscillator anode across the common impedance of trackers **C32, C33, C34**. Addition coupling on S.W. by **L19** and on L.W. by **L20**. Oscillator stabilization by **R10, R11**. Output of **V2a** is coupled externally to mixer section **V2b**.

V3 (Mullard EF85) is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings **L21, L22** and **L28, L29**.

A.M. intermediate frequency 470 kc/s.

Diode section **c** of **V4 (Mullard EABC80)** functions as A.M. signal detector, and the audio frequency component in its rectified output is developed across **R19, R20**. A proportion of **V4c** A.F. output, that developed across **R20**, is passed via **C54, R27** and **C55** to triode section **d** of **V4**, which operates as A.F. amplifier.

D.C. potential developed across **R19, R20**, is fed to **T.I. (Mullard EM80)**, and that developed across **R20** is fed as A.G.C. bias to **V2b** and **V3**.

Provision is made for the connection of a pickup across the volume control circuit via **S28**, which closes in the gram position of the band control. **S8, S16, S18** and **S25** close in this position, and **S26, S27** open to prevent radio break-through.

Resistance-capacitance coupling by **R30, C58** and **R31** between **V4d** and pentode output valve **(V5, Mullard EL84)**. Negative feed-back tone control by **C60, R31** from **V5** anode to control grid circuit. Tone correction by negative feedback via **R33, R34, R35, C61** between winding **b** on output transformer **T1** and **V4d** grid circuit.

H.T. current is supplied by full-wave I.H.C. rectifying valve **V6 (Mullard EZ80)**. Smoothing by choke **L32, R36** and electrolyte capacitors **C62, C63, C64.**

Operation on F.M.

300Ω balanced F.M. aerial input via coupling transformer **L1, L2** to earthed grid R.F. amplifier, section **a** of **V1 (Mullard ECC85)**. Internal electrode capacitances of **V1a** are neutralized by returning its grid to chassis via **R1** and a section of **L2**.

Section **b** of **V1** operates as oscillator/mixer valve with tuned oscillator grid circuit **L5, C7, C8, C9**. Reaction coupling from anode via **C11, L6**. Oscillator radiation is kept to a minimum by means of a bridge neutralizing circuit, formed by **C7, C8, C10** and the inter-electrode capacitances of **V1b**, which prevents oscillator voltages passing back into the aerial circuit. F.M. tuning is by means of the ganged cores of **L4** and **L5** which are cam-driven from the A.M. tuning gang.

V2b and **V3** form the two-valve F.M. intermediate frequency amplifier, which is coupled by tuned transformers **L8, L9; L23, L24**; and discriminator transformer **L25, L26, L27**, to diode sections **a** and **b** of **V4** connected in a ratio detector circuit. Inter-electrode capacitance of **V3** is neutralized by returning anode decoupling capacitor **C42** to chassis via **C41.**

F.M. Intermediate frequency 10.7 Mc/s.

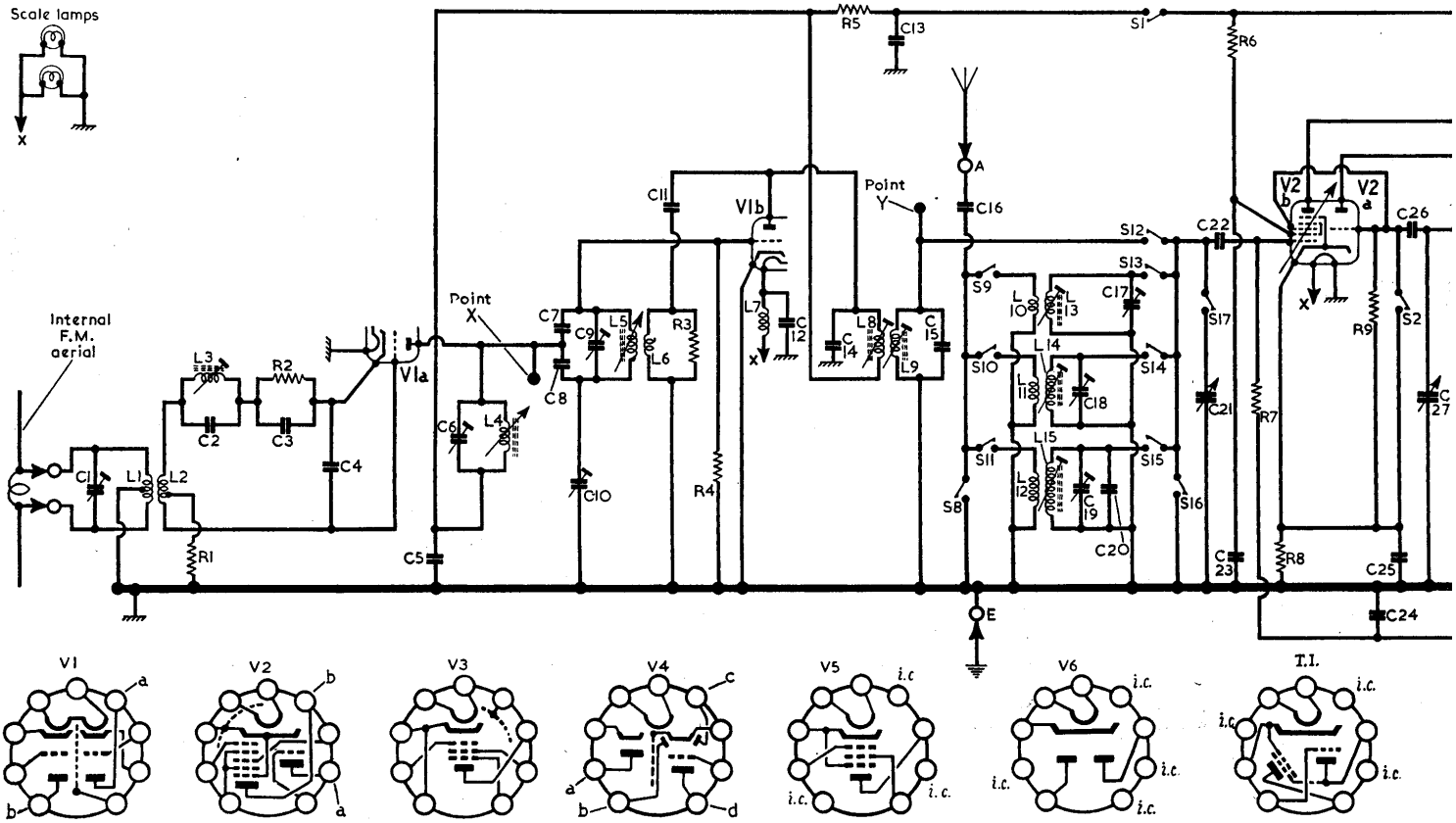
The A.F. output of the ratio detector is developed across A.F. load **C46** and passed via deemphasis circuit **R18, C47** to the volume control circuit. Limiting is by means of the fly-wheel effect of D.C. reservoir capacitor **C51.** D.C. potential developed across D.C. load **R24** is fed to **T.1.** via **R23.**

VALVE ANALYSIS

Valve voltages given in the table below are those derived from the manufacturers' information. They were measured, except where otherwise indicated, with the receiver switched to M.W. and tuned to the high wavelength end of the band. Readings were taken with a Model 7 Avometer, chassis being the negative connection in every case.

Valve		Anode (V)	Screen (V)	Cath. (V)
V1 ECC85	a	165*	—	2·4*
	b	165*	—	—
V2 ECH81	a	150	—	2·0
	b	250	75	2·0
V3 EF85 ...		130	95	2·0
V4 EABC80	a-c	—	—	—
	d	50	—	—
V5 EL84		230	255	7·7
V6 EZ80		295†	—	305·0‡
T.I. EM80		80§	—	—

*Receiver switched to F.M. †A.C. reading each anode. ‡Cathode current 60 mA. §Target 255V.



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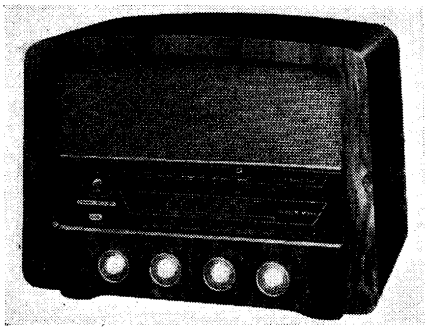
/F.M. Auto-radiograms



Appearance of the Alba 3211.

CIRCUIT ALIGNMENT

Apparatus Required.—An accurately calibrated F.M. signal generator for alignment adjustments at 10.7 Mc/s and 85—100 Mc/s; an A.M. signal generator covering 150 kc/s—18 Mc/s; a 1in diameter coupling loop consisting of ten turns of insulated wire; a 0-100mW output meter; a valve voltmeter for adjusting oscillator neutralizing circuit; a 0-50μA microammeter; a 200kΩ resistor.

The 10.7 Mc/s signal is required for F.M. I.F. alignment and is used unmodulated only, so that a 10.7 Mc/s signal from the A.M. signal generator will serve equally well.

As the tuning scale is fixed to the cabinet, the receiver should be aligned with its chassis in the cabinet and with the cabinet base cover and back cover removed to give access to the adjustments.

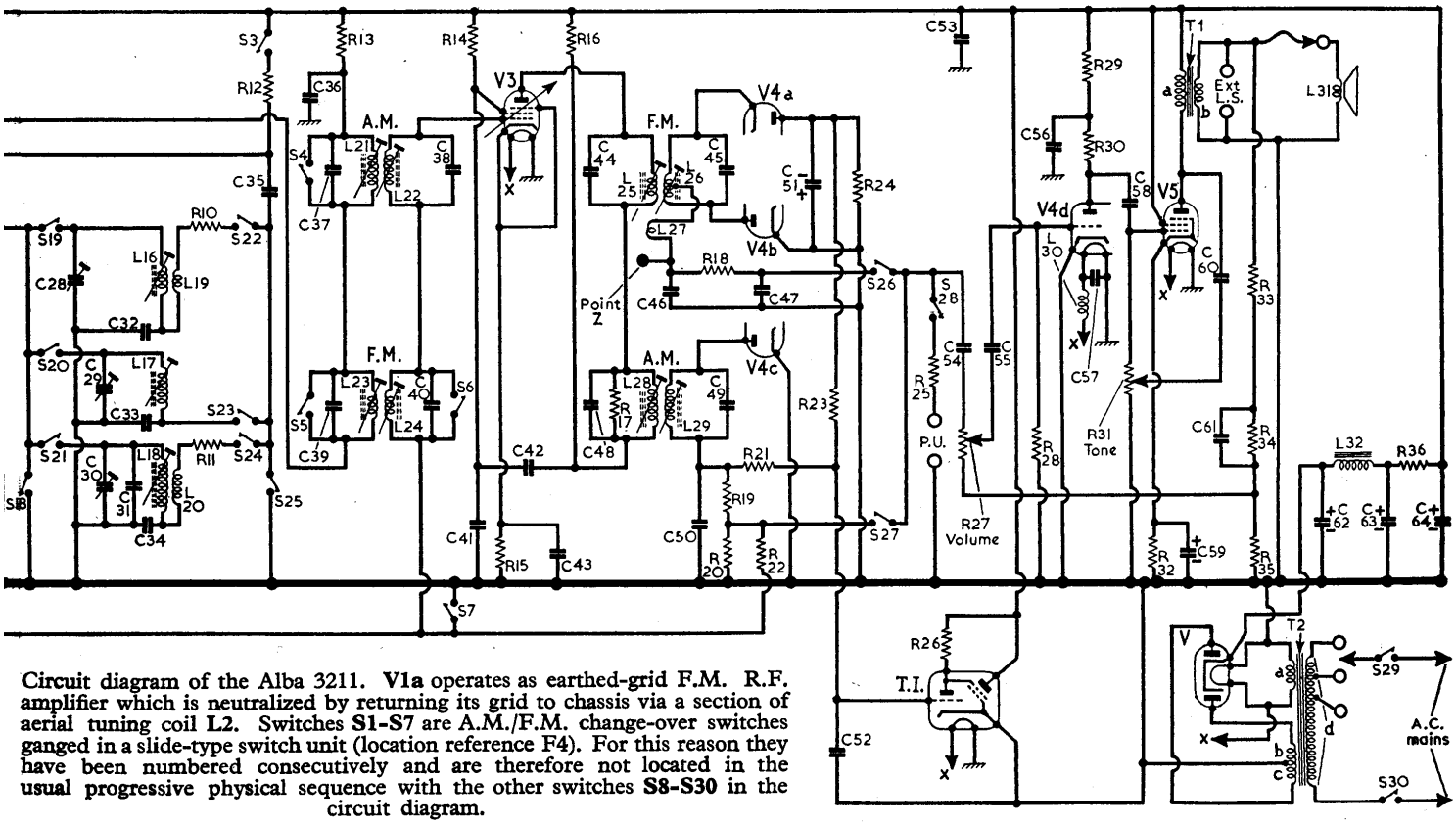
(*Continued col. 1 overleaf*)

COMPONENT VALUES AND LOCATIONS

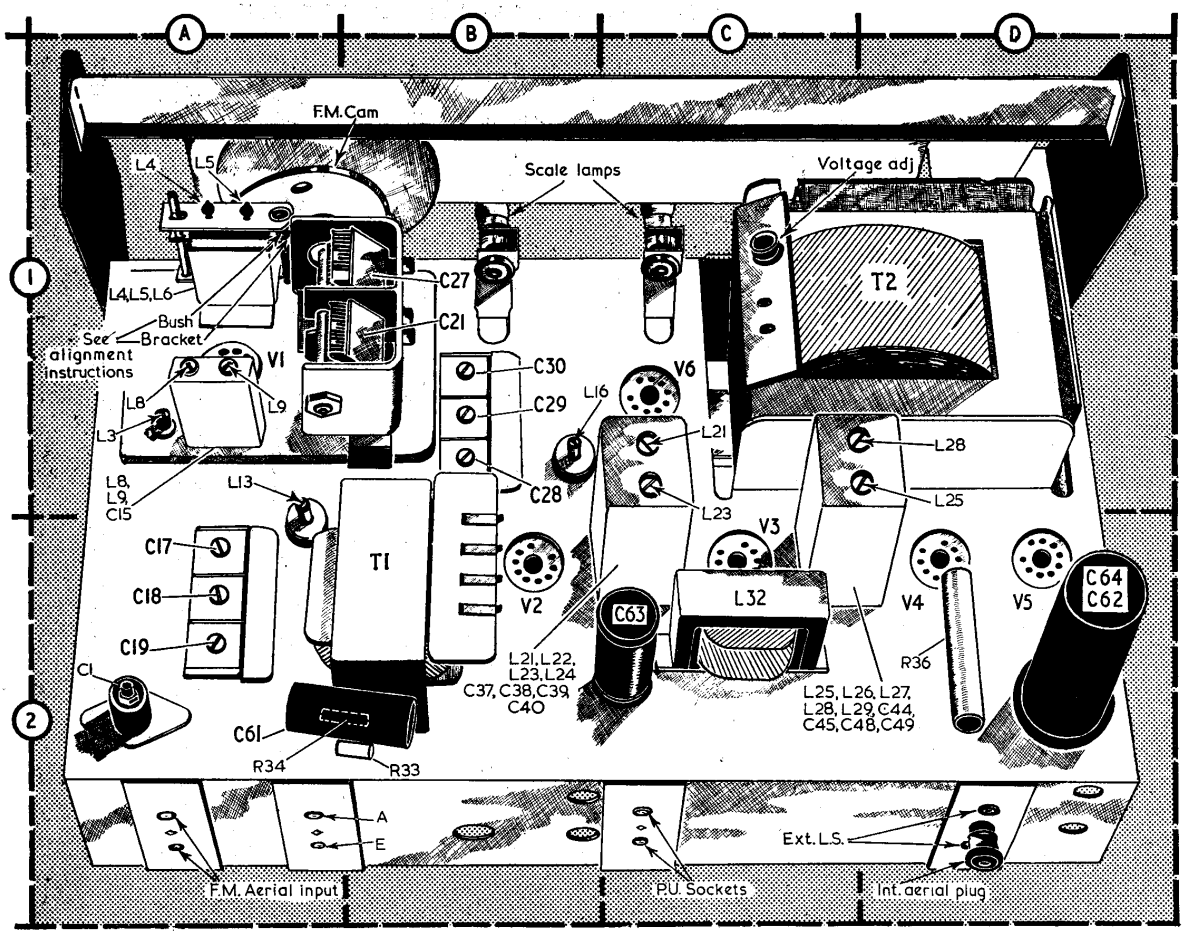
Capacitors		
C1	30pF	A2
C2	47pF	H3
C3	0·001μF	H3
C4	8·2pF	H3
C5	570pF	H3
C6	3(pF	H3
C7	39pF	H3
C8	39pF	H3
C9	30pF	H3
C10	30pF	H3
C11	18pF	H3
C12	2,200pF	H3
C13	2,200pF	H3
C14	12pF	H3
C15	15pF	A1
C16	200pF	G4
C17	—	A2
C18	—	A2
C19	—	A2
C20	100pF	H4
C21	—	B1
C22	100pF	G3
C23	0·002μF	G4
C24	0·1μF	F4
C25	0·05μF	G4
C26	100pF	G3
C27	—	B1
C28	—	B1
C29	—	B1
C30	—	B1
C31	190pF	G3
C32	5,343pF	F3
C33	600pF	F3
C34	270pF	F3
C35	100pF	G4
C36	0·005μF	G4
C37	100pF	C2
C38	100pF	C2
C39	27pF	C2
C40	27pF	C2
C41	3,900pF	F4
C42	0·05μF	F4
C43	0·1μF	F4
C44	10pF	D2
C45	50pF	D2
C46	330pF	F4
C47	2,500pF	E4
C48	100pF	D2
C49	100pF	D2
C50	100pF	E4
C51	5μF	E3
C52	0·005μF	E3
C53	0·25μF	G4
C54	0·02μF	F4
C55	0·02μF	E4
C56	0·1μF	E4
C57	0·001μF	E4
C58	0·01μF	E4
C59	25μF	E4
C60*	200pF	F3
C61	0·1μF	A2
C62	32μF	D2
C63	8μF	C2
C64	32μF	D2
Resistors		
R1	120Ω	H3
R2	220Ω	H3
R3	2·2kΩ	H3
R4	1MΩ	H3
R5	4·7kΩ	H3
R6	47kΩ	F4
R7	1MΩ	G4
R8	220Ω	G4
R9	47kΩ	G4
R10	220Ω	G3
R11	10kΩ	G3
R12	27kΩ	F4
R13	1·5kΩ	F4
R14	56kΩ	F4
R15	150Ω	F4
R16	10kΩ	F4
R17	68kΩ	F4
R18	12kΩ	E4
R19	220kΩ	E4
R20	220kΩ	E4
R21	2·2MΩ	E3
R22	1MΩ	F4
R23	2·2MΩ	E3
R24	56kΩ	E4
R25	100kΩ	F4
R26	470kΩ	E3
R27	500kΩ	E3
R28	10MΩ	E4
R29	220kΩ	E4
R30	220kΩ	E4
R31	500kΩ	F3
R32	150Ω	E4
R33	1·5kΩ	B2
R34	10kΩ	A2
R35	100Ω	E3
R36	600Ω	D2
Coils†		
L1	—	H3
L2	—	H3
L3	—	H3
L4	—	A1
L5	—	A1
L6	—	A1
L7	—	H3
L8	—	A1
L9	—	A1
L10	—	G4
L11	1·2	G4
L12	48·0	G4
L13	—	G4
L14	3·0	G4
L15	22·5	G4
L16	—	G3
L17	3·3	G3
L18	7·5	G3
L19	—	G3
L20	3·4	G3
L21	12·0	C2
L22	15·0	C2
L23	0·3	C2
L24	0·3	C2
L25	1·2	D2
L26	—	D2
L27	—	D2
L28	12·0	D2
L29	12·0	D2
L30	—	E4
L31	2·5	—
L32	70·0	C2
Transformers†		
T1 a	530·0	B2
T1 b	0·3	B2
T2 a	—	D1
T2 b	225·0	D1
T2 c	225·0	D1
T2 d	25·0	D1

* Two 100pF capacitors in parallel.

† Approximate D.C. resistance in ohms.



Circuit diagram of the Alba 3211. **V1a** operates as earthed-grid F.M. R.F. amplifier which is neutralized by returning its grid to chassis via a section of aerial tuning coil **L2**. Switches **S1-S7** are A.M./F.M. change-over switches ganged in a slide-type switch unit (location reference F4). For this reason they have been numbered consecutively and are therefore not located in the usual progressive physical sequence with the other switches **S8-S30** in the circuit diagram.



Plan illustration of chassis indicating a number of alignment adjustments. The bush and bracket in location A1 are referred to in the circuit alignment. The bush is a brass collar at the top of a spring-loaded guide rod on the side of the F.M. tuner. The bracket forms the upper guide through which the guide rod passes. A piece of 18 gauge wire between bush and bracket can be used to set the position of the tuner at maximum setting of the A.M. gang.

Circuit Alignment *(Continued)*

A.M. I.F. Stages

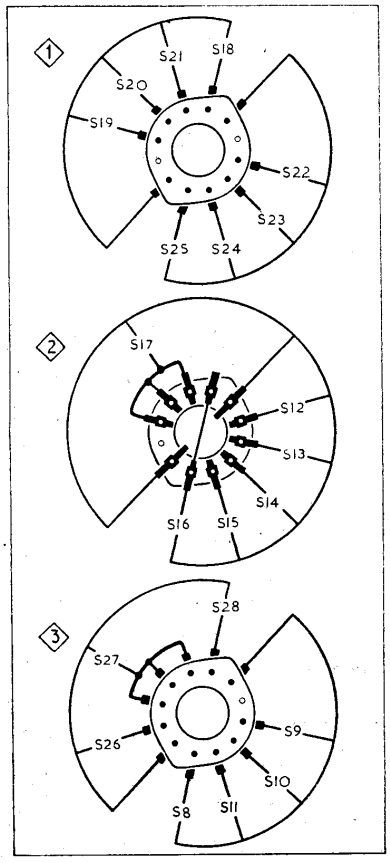
1.—Switch receiver to M.W. and turn gang to maximum. Turn volume control to maximum and connect a shorting link across **C27** (location reference B1).
2.—Connect output of A.M. signal generator across **C21** (B1). Connect sound output meter to Ext. L.S. sockets (D2).
3.—Feed in a 470 kc/s signal and adjust the cores of **L29** (F4), **L28** (D1), **L22** (F4) and **L21** (C1) for maximum output.
4.—Repeat operation 3 until no further improvement results.

A.M. R.F. and Oscillator Stages

5.—Remove shorting link from **C27**. Transfer signal generator leads, via standard dummy aerial, to **A** and **E** sockets.
6.—Tune receiver to 500m, feed in a 600 kc/s signal and adjust the cores of **L17** (G3) and **L14** (H4) for maximum output.
7.—Tune receiver to 200m, feed in a 1,500 kc/s signal and adjust **C29** (B1) and **C18** (A2) for maximum output. Repeat these adjustments and operation 6 until no further improvement results.
8.—Switch receiver to L.W. and tune it to 1,950m. Feed in a 154 kc/s signal and adjust the cores of **L18** (G3) and **L15** (H4) for maximum output.
9.—Tune receiver to 1,200m, feed in a 250 kc/s signal and adjust **C30** (B1) and **C19** (A2) for maximum output. Repeat these adjustments and operation 8 until no further improvement results.
10.—Switch receiver to S.W. and tune it to 50m. Feed in a 6 Mc/s signal and adjust the cores of **L16** (B1) and **L13** (A1) for maximum output.
11.—Tune receiver to 17m, feed in a 17.65 Mc/s signal and adjust **C28** (B1) and **C17** (A2) for maximum output. Repeat these adjustments and operation 10 until no further improvement results.

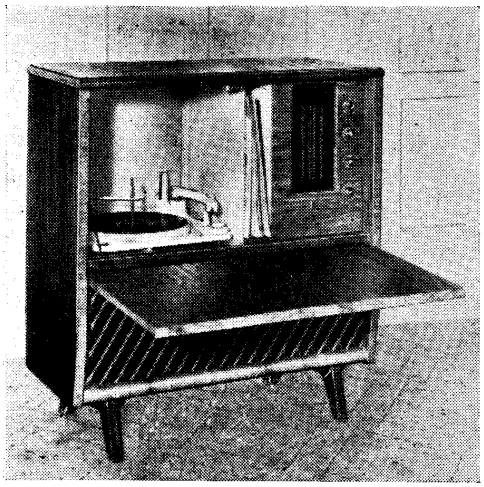
F.M. Alignment

12.—Switch receiver to F.M. Turn gang to maximum. Set **C6** and **C9** (H3) to their mid-positions.



Diagrams of the band/gram switches as viewed from rear of inverted chassis.

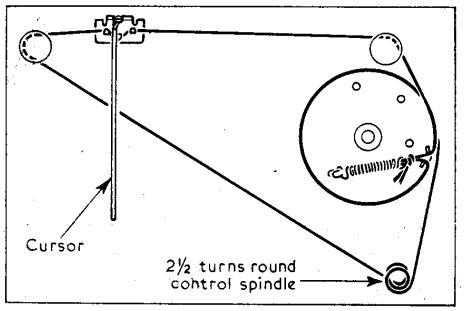
13.—Connect valve voltmeter between chassis and point X (H3). Adjust **C10** (H3) for minimum reading on meter, using the lesser capacitance peak if two are present. Disconnect valve voltmeter.
14.—Connect output of F.M. signal generator between chassis and point Y (H3). Connect microammeter in series with the 200kΩ resistor across **C51** (E3) taking the positive meter connection to chassis.
15.—Feed in an unmodulated 10.7 Mc/s signal and adjust the cores of **L25** (D1), **L24** (F4) and **L23** (C1) for maximum output on microammeter, noting the meter reading.
16.—Transfer negative meter lead to point Z (F4) and adjust the core of **L26** (F4) for half the reading obtained in operation 15.
17.—Repeat the adjustments to **L25** and **L26** in operations 15 and 16.
18.—Reconnect negative meter lead to **C51**. Transfer signal generator leads to coupling loop and slide loop over **V1**.
19.—Feeding in an unmodulated 10.7 Mc/s signal, adjust the cores of **L8** (A1) and **L9** (A1) for maximum output.
20.—Check that the response at 10.6 Mc/s and 10.8 Mc/s is not less than 3db (1.4:1) down on the response at 10.7 Mc/s.
21.—Transfer signal generator leads, less coupling loop, to F.M. aerial socket. Feeding in a 10.7 Mc/s signal, adjust the core of **L3** (A1) for minimum output. Disconnect microammeter.
22.—Check that with the gang at maximum capacitance a gap of 0.048in wide exists between the bush and bracket indicated in A1 (18 s.w.g.. wire has a diameter of 0.048in and may be used as a feeler). To adjust the gap, the grub screw securing the F.M. cam (B1) should be slackened and the cam rotated on the gang spindle.
23.—Tune receiver to calibration mark at 87.9 Mc/s, feed in an 87.9 Mc/s signal, deviated by ± 25 kc/s and adjust **C9** (H3) and **C6** (H3) for maximum output.
24.—Feed in a 95 Mc/s signal and tune it in on receiver. Check calibration. Adjustment can be made if necessary by moving **C7** and **C8** so that they are closer together or further apart.
25.—Adjust **C1** (A2) for optimum gain using aerial on which receiver is to operate.



Appearance of the Alba 6241.

GENERAL NOTES

Switches.—**S1-S7** are the A.M./F.M. switches, ganged in a single slide-type unit under the chassis. This unit is indicated in the main under-chassis illustration, where the switch contacts are identified. Switches **S1, S2, S4** and **S7** close for F.M. operation, and switches **S3 S5, S6** close for A.M. operation.



Sketch of the drive cord system as viewed from the front of an upright chassis with the gang at minimum capacitance.

S8-S28 are the band/gram switches ganged in three rotary units beneath the chassis. These units are indicated in the under-chassis illustration where numbered arrows show the direction in which they are viewed in the diagrams of the units in column 2. The associated switch table gives the switch operations in the five control settings, starting with the control turned fully anti-clockwise. A dash indicates opened, and **C**, closed.

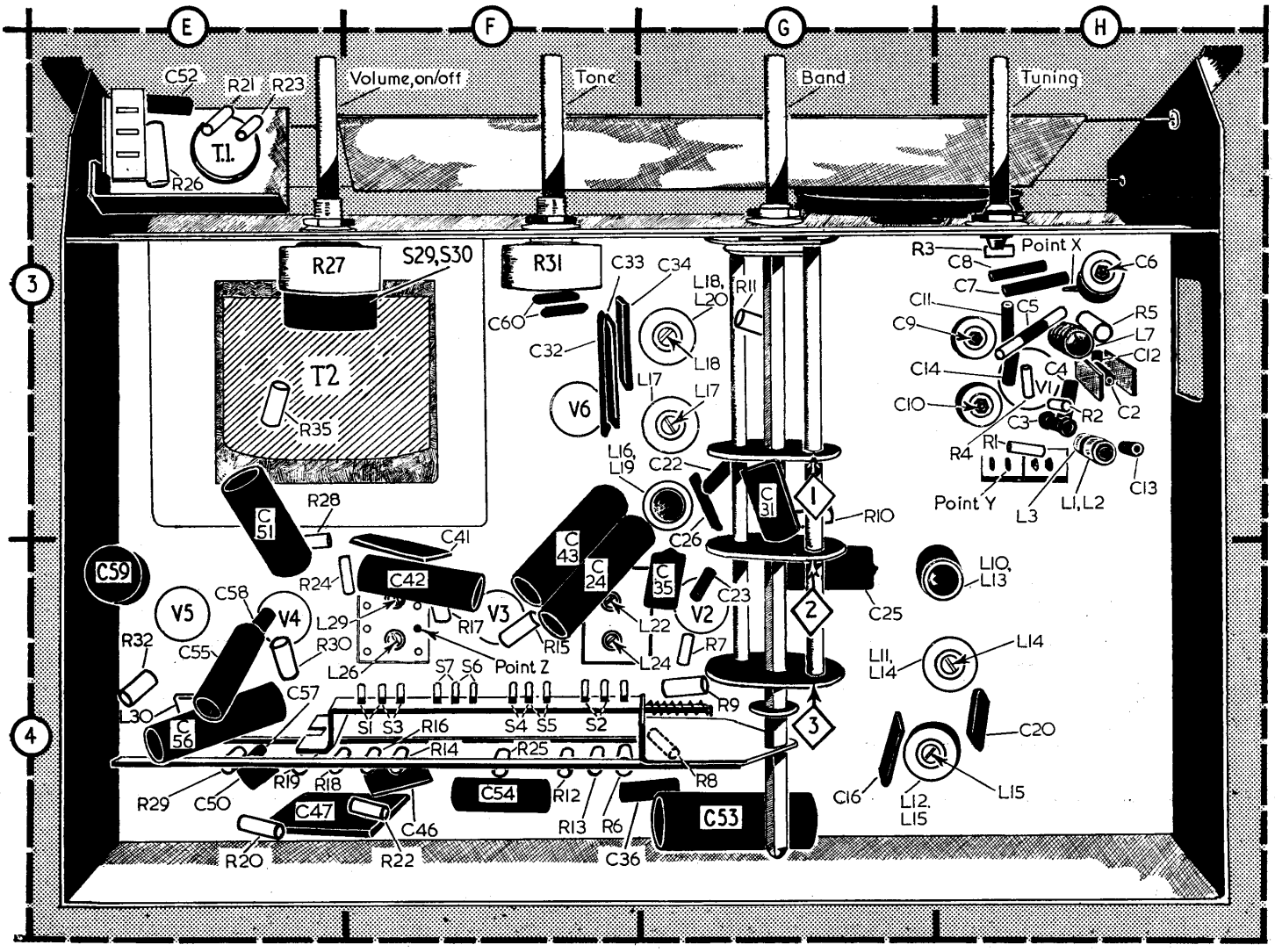
Scale Lamps.—These are 6.5V, 0.115A lamps with small, clear spherical bulbs and M.E.S. bases.

Drive Cord Replacement.—About 46in of nylon-braided glass yarn is required for a new drive cord. It should be run as shown in the sketch in col. 5, starting with the gang at minimum capacitance.

F.M. Aerial.—For F.M. reception, a dipole with a 300Ω balanced feeder is recommended by the manufacturers. If, however, an 80Ω co-axial feeder is used it should be connected between either of the F.M. aerial sockets and the A.M. **E** socket.

Switch Table

Switches	Gram	L.W.	M.W.	S.W.	F.M.
S8	C	—	—	—	—
S9	—	—	—	C	—
S10	—	—	C	—	—
S11	—	C	—	—	—
S12	—	—	—	—	C
S13	—	—	—	C	—
S14	—	—	C	—	—
S15	—	C	—	—	—
S16	C	—	—	—	—
S17	—	C	C	C	—
S18	C	—	—	—	—
S19	—	—	—	C	—
S20	—	—	C	—	—
S21	—	C	—	—	—
S22	—	—	—	C	—
S23	—	—	C	—	—
S24	—	C	—	—	—
S25	C	—	—	—	—
S26	—	—	—	—	C
S27	—	C	C	C	—
S28	C	—	—	—	—



Underside illustration of chassis. The band/gram switch units in G3, G4 are shown in detail in column 2 on the left.

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