

"TRADER" SERVICE SHEET  
1722

# Marconiphone 4308

A.M./F.M. Radiogram

**C**OVERING the medium, long and f.m. wavebands and incorporating a Garrard four-speed Autoslim record changer, Marconiphone 4308 is a mains operated radiogram with an audio output of 2.5W.

It employs five valves plus rectifier, and is fitted with an internal ferrite rod aerial for a.m. reception and an internal dipole for f.m. External sockets provide facilities for the connection of an a.m. aerial and earth external f.m. aerial and an external loudspeaker.

Waveband ranges are 187-556m (m.w.), 1,135-1,970m (l.w.) and 88-101Mc/s (f.m.); power consumption is 50W (radio), 65W (gram).

### VALVE ANALYSIS

Valve voltages given in the table (col. 3) are those derived from the manufacturer's information. They were measured with a 20,000Ω/V meter, chassis being the negative connection in every case. The receiver was operating from a.c. mains of

230V with the mains adjustment set at the 230-250V tapping.

### CIRCUIT DESCRIPTION Operation On A.M.

Aerial coils **L8** and **L9** are mounted on a ferrite rod to form an internal aerial. For m.w. reception, **S2** is closed to short-circuit **L9**, and **L8** is tuned by **C23** and **C24**. For l.w. reception, **L8** and **L9** are connected in series and **S3** is closed to connect the additional tuning capacitor **C26** across the coils.

Signals from an external aerial are coupled via **R3**, **C22** and **L21** to the ferrite rod.

Triode-heptode valve **V2** operates as frequency changer, the output of oscillator section a being coupled via **C35** to the injector grid of mixer section b. **V2a** grid resistor **R16** is connected to chassis by a.m. switch **S10**. Oscillator grid coil **L10** is tuned by **C36** and **C37** on M.W. and, in addition by **C38** and **C39** on l.w. Reaction

coupling from **V2a** anode via **C33** and **L11**.

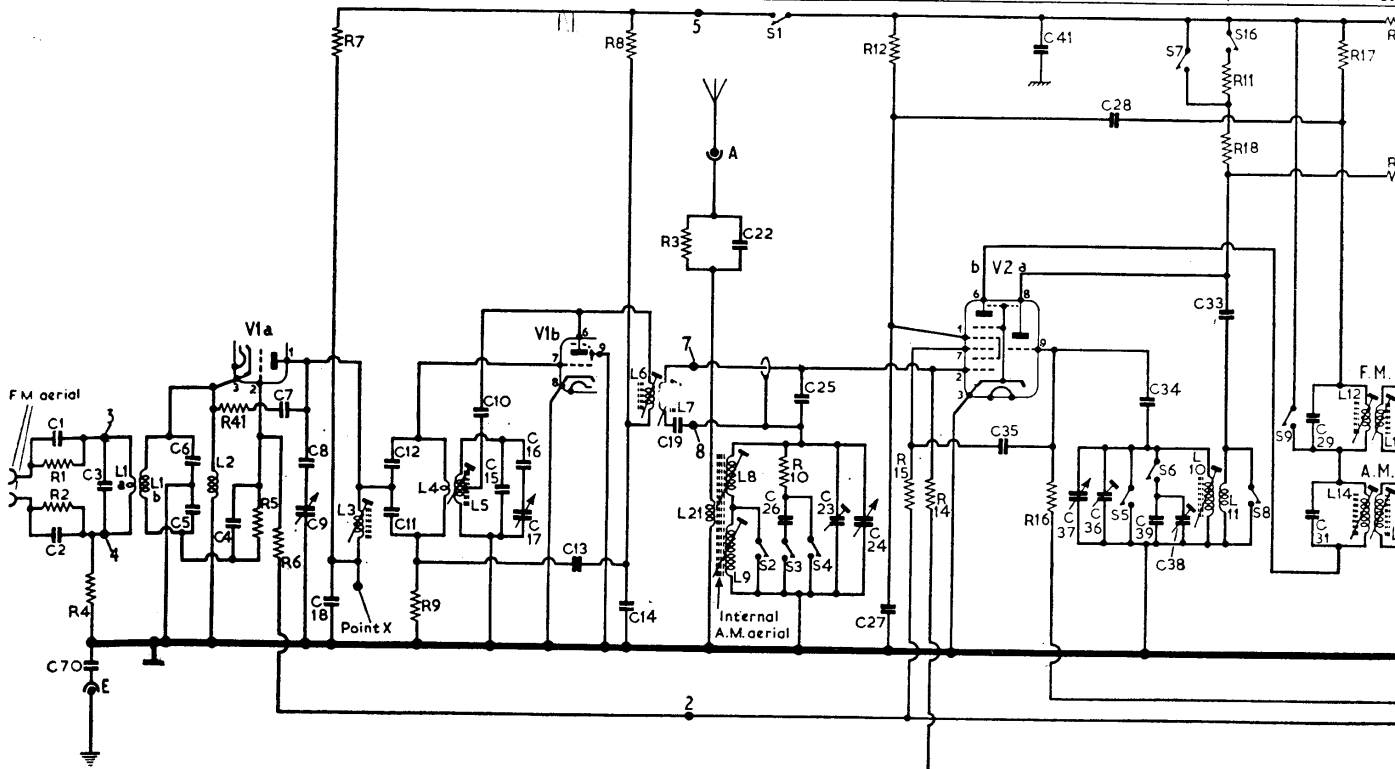
Variable-mu valve **V3** operates as intermediate frequency amplifier with tuned  
(Continued in col. 5)

### Valve Table

Valve	Anode (V)	Screen (V)	Cathode (V)
V1 UCC85	±	—	—
V2a UCH81	±97	—	—
	42	—	—
V2b UCH81	187	74	—
	146	75	—
V3 UF89	182	72	—
	173	65	—
V4d UABC80	±	—	—
	90	—	—
	85	—	—
V5 UL84	190	190	14.1
	180	178	12.8
V6 UY85	±	—	247.0
	±	—	242.0

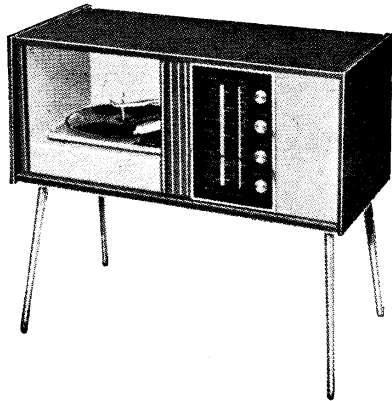
±No reading quoted.  
\*Receiver switched to a.m.  
†Receiver switched to f.m.

C	1,2	70,3	5,6,4	7	8,9	18	11,12	10,15	16,17	13	14	19	22	26,25	23	24	27	35	41,65	37	36,28,66,34,39,38	33	20	29,31	21
R	1,2	4	41	5	6	7	9	8	3	10	12	15	14	16	11,18	17	20								



Circuit diagram of Marconiphone 4308. On a.m., **V2** operates as a frequency changer with triode oscillator and heptode mixer. On f.m., the heptode section **V2b** operates as an i.f. amplifier, and the triode section operates as an audio preamplifier





**Circuit Description—continued**  
a.m. transformer couplings C31, L14, L15, C32, and C43, L16, L17, C44, to a.m. diode detector V4c. The primary winding, L12, of the second f.m. intermediate frequency transformer is short-circuited by S9.

**A.M. intermediate frequency 470Kc/s.**  
The audio frequency component in the rectified output of V4c is passed via i.f. filter circuit R28, C52, and a.m. switch S13, to R32, which operates as a combined diode load and volume control. The d.c. component of the rectified signal developed across R32 is fed back as a.g.c.

bias to V2b and V3 via decoupling circuit R27, C72.

V4d operates as an a.f. amplifier, its output being resistance-capacitance coupled by R29, C57 and R34 to the control grid of pentode output valve V5. Tone correction by C56, and tone control by R35, C58 in the anode circuit of V5.

H.t. current is supplied by half-wave rectifying valve V6. Smoothing by C62, R37, C61, section a of output transformer T1, R36 and C60.

(Continued overleaf col. 1)

Resistors		
R1	1.8MΩ	E6
R2	1.8MΩ	E6
R3	1.8MΩ	A2
R4	68Ω	E6
R5	680kΩ	E4
R6	1.5MΩ	E4
R7	2.2kΩ	E4
R8	6.8kΩ	E4
R9	680kΩ	E5
R10	100Ω	D2
R11	22kΩ	D3
R12	22kΩ	C2
R13	2.2MΩ	D3
R14	1MΩ	D2
R15	68kΩ	C3
R16	47kΩ	C3
R17	2.7kΩ	C2
R18	15kΩ	C2
R19	220kΩ	C3
R20	470kΩ	C2
R21	47kΩ	C2
R22	3.3kΩ	C2
R23	2.7MΩ	C3
R24	220Ω	B3
R25	100kΩ	B3
R26	4.7MΩ	C3
R27	1MΩ	C3
R28	100kΩ	C3
R29	120kΩ	B3
R30	10MΩ	B3
R31	27kΩ	B3
R32	1MΩ	D2
R33	270Ω	B2
R34	680kΩ	B3
R35	1MΩ	D3

Capacitors		
C1	470pF	E6
C2	470pF	E6
C3	47pF	E4
C4	220pF	E4
C5	15pF	E4
C6	47pF	E4
C7	7pF	E4
C8	47pF	E4
C9	15pF	D2
C10	18.5pF	E5
C11	5pF	E5
C12	5pF	E5
C13	12pF	E5
C14	88pF	E5
C15	11.5pF	E5
C16	50pF	E5
C17	15pF	C2
C18	1,500pF	E4
C19	40pF	E5
C20	1,000pF	E4
C21	1,000pF	E5
C22	100pF	B2
C23	40pF	D2
C24	31pF	C2
C25	30pF	D2
C26	96pF	D3
C27	3,900pF	C2
C28	5,000pF	C2
C29	12pF	C2
C30	12pF	C2
C31	220pF	C3
C32	220pF	C3
C33	220pF	B2
C34	56pF	D2
C35	220pF	C2
C36	40pF	C3
C37	136pF	D2

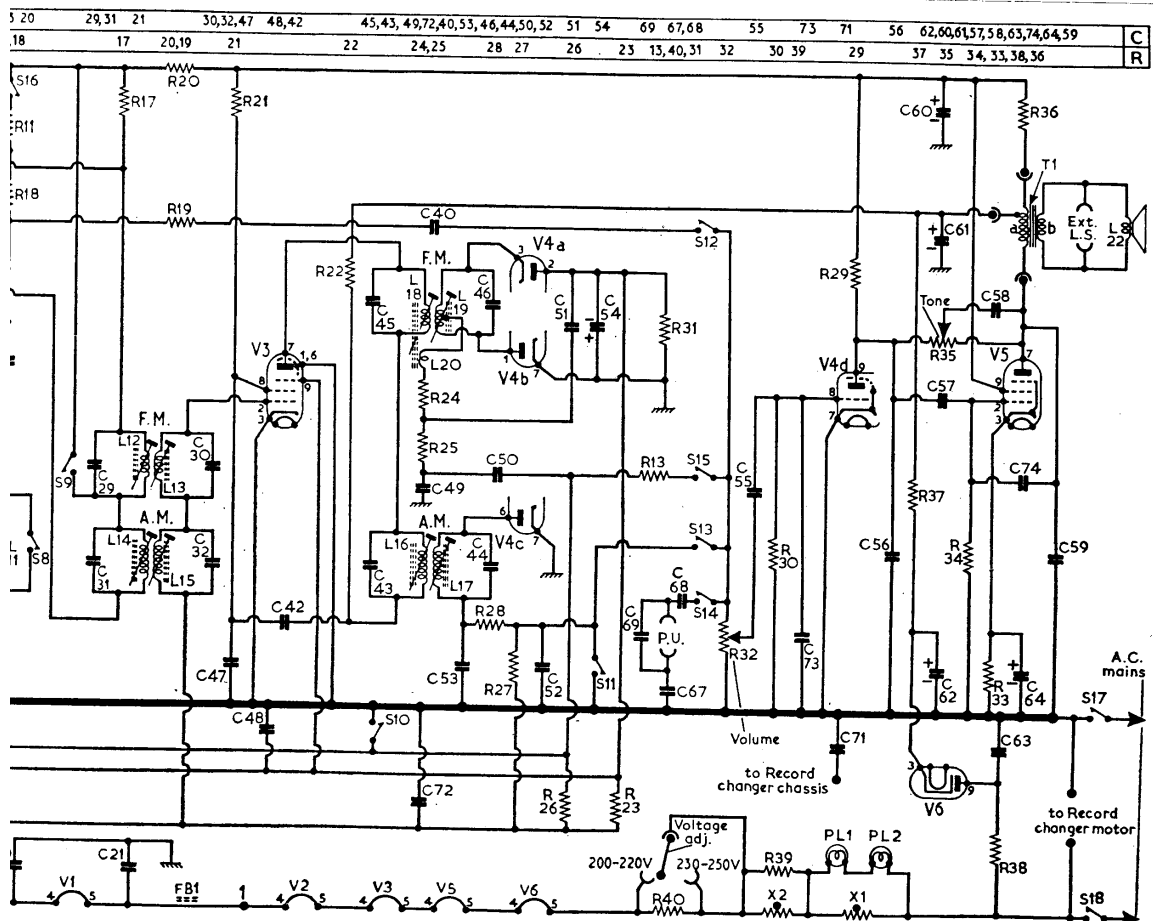
C38	30pF	D2
C39	265pF	D2
C40	5,000pF	C3
C41	5,000pF	C2
C42	0.01μF	B2
C43	220pF	B3
C44	220pF	B3
C45	15pF	B3
C46	56pF	B3
C47	6,000pF	C3
C48	5,000pF	C3
C49	500pF	B3
C50	0.02μF	C3
C51	300pF	B2
C52	100pF	C3
C53	100pF	B2
C54	4μF	B3
C55	0.02μF	C3
C56	220pF	B3
C57	3,900pF	B3
C58	500pF	B3
C59	1,000pF	B2
C60	32μF	B2
C61	40μF	B2
C62	40μF	B2
C63	0.02μF	B3
C64	10μF	C2
C65	5,000pF	C2
C66	1,000pF	E6
C67	0.02μF	+
C68	0.01μF	+
C69	1,000pF	+
C70	0.02μF	B2
C71	0.02μF	+
C72	0.04μF	C3
C73	100pF	B3
C74	7pF	B2

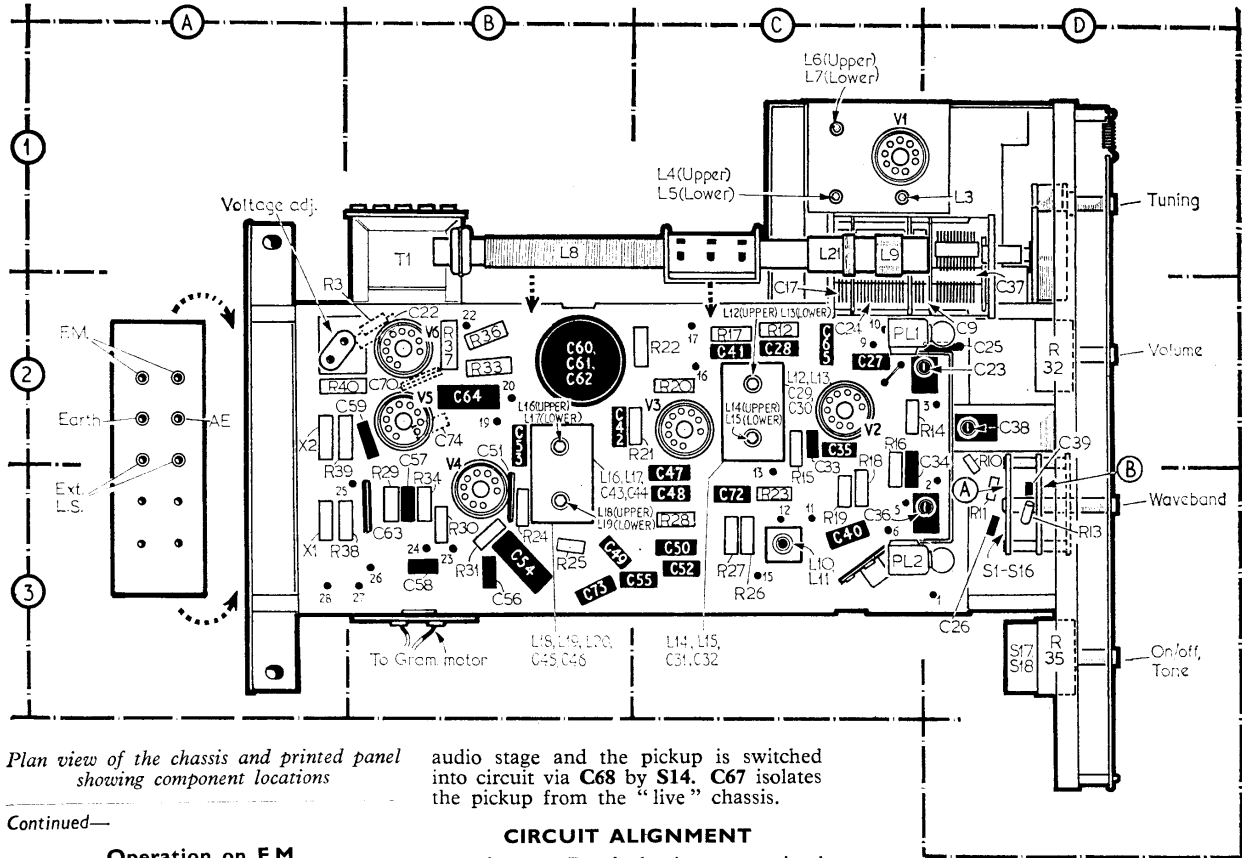
Coils*	
L1a	—
L1b	—
L2	—
L3	—
L4	—
L5	—
L6	1:0
L7	1:0
L8	—
L9	6:0
L10	3:0
L11	—
L12	—
L13	—
L14	6:5
L15	6:5
L16	6:5
L17	6:5
L18	—
L19	—
L20	—
L21	1:25
L22	—

Transformers*	
T1	400-0

Miscellaneous		
X1	V1010	A3
X2	V1010	A2
FB1	—	E4
FB2	—	E4
S1—S16	—	D3
S17, S18	—	D3
PL1	12V0-1A	C2
PL2	12V0-1A	C3

\*Approximate d.c. resistance in ohms.  
†Located on underside of record changer.





Plan view of the chassis and printed panel showing component locations

Continued—

**Operation on F.M.**

Balanced aerial input is coupled via L1a, L1b to a conventional f.m. tuner employing an earthed-grid r.f. amplifier V1a and self-oscillating mixer V1b. The r.f. and oscillator circuits are capacitance tuned by C9 and C17.

V2b and V3 form a two-valve f.m. intermediate frequency amplifier which is connected by tuned transformers L6, L7, C19, C25; C29, L12, L13, C30; and discriminator transformer C45, L18, L19, L20, C46, to diode sections a and b of V4, which operate in a ratio detector circuit.

**F.M. intermediate frequency 10.7 Mc/s**  
The audio frequency output from the ratio detector is developed across C49 and fed via C50 and R16 to the grid of V2a, which for f.m. operation functions as an a.f. amplifier. The output of V2a is developed across the anode load comprising R11, R18, and is coupled via R19, C40, and f.m. switch S12 to volume control R32. C33 operates as an r.f. bypass, a.m. oscillator reaction coil L11 being short-circuited by S8.

V2b and V3 are grid current biased by connecting R27 to chassis via f.m. switch S11. The negative voltage developed across stabilizing capacitor C54 is fed back as a.g.c. bias to the grid of V1a, the injector grid of V2b, and the suppressor grid of V3. A fraction of this voltage is also fed to the control grids of V2b and V3.

**Operation on Gram**

S12, S13 and S15 are open disconnecting the ratio detector outputs from the

audio stage and the pickup is switched into circuit via C68 by S14. C67 isolates the pickup from the "live" chassis.

**CIRCUIT ALIGNMENT**

**Equipment Required.**—An a.m. signal generator, modulated 30 per cent at 400c/s; an f.m. signal generator, deviated by  $\pm 25$ kc/s; an output meter; a 0.1 $\mu$ F capacitor and a 400pF capacitor; and two trimming tools, a hexagonal type and a non-metallic screwdriver type.

The chassis should be connected to the mains via an isolating transformer. Where this is not available ensure that the chassis is connected to the neutral side of the mains. No earth connection, either direct or through earthed equipment, should be made to the receiver. Connect the signal generator to the receiver via an isolating capacitor in its live output lead.

To facilitate accurate tuning of the receiver to the alignment frequencies, calibration markers are provided along the top edge of the scale backing plate. Reading from left to right these indicate the following positions: 1,500kc/s (m.w.), 220kc/s (l.w.), 92Mc/s (f.m.), 600kc/s (m.w.) and "set cursor." Adjust the signal generator to maintain an output of 100mW during alignment.

**A.M. Alignment**

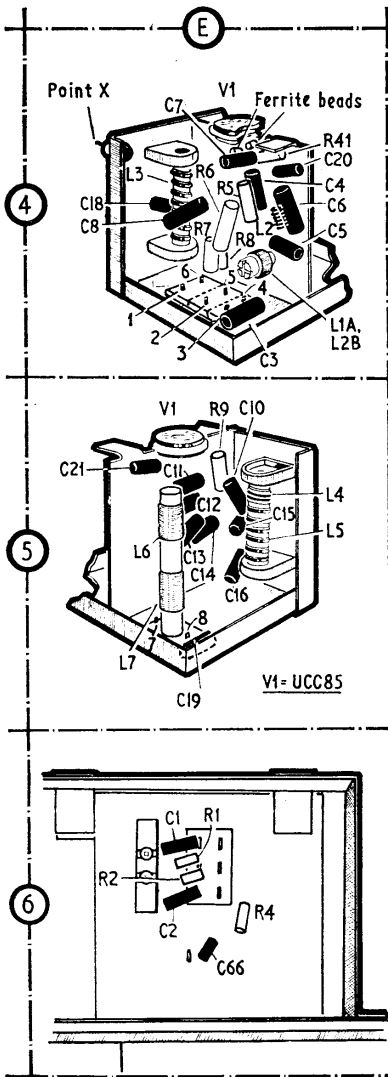
- 1.—Connect the output meter across the speaker. Connect the a.m. signal generator between chassis and the control grid of V2b (tags 7 and 8, located below C27, in C2) via the 0.1 $\mu$ F capacitor in its live output lead. Switch the receiver to m.w. Turn the tuning gang to minimum capacitance and the volume control to its maximum clockwise position.
- 2.—Feed in a modulated 470kc/s signal and adjust the cores of L17, L16 (location reference B2) and L15, L14 (location reference C2) for maximum output.
- 3.—With the tuning gang at maximum capacitance check that the cursor coincides with the extreme right-hand (set cursor) calibration marker.
- 4.—Loosely couple the signal generator to

the ferrite rod aerial via a loop of insulated wire. Tune the receiver to the calibration dot at 600kc/s. Feed in a 600kc/s signal and adjust the core of L10 (C3) for maximum output. Then slide the adjusting ring adjacent to L8 along the ferrite rod for maximum output.

- 5.—Tune the receiver to the calibration marker at 1,500kc/s. Feed in a 1,500kc/s signal and adjust C36 (C3) and C23 (D2) for maximum output.
- 6.—Switch the receiver to l.w. and tune to the calibration marker at 220kc/s. Feed in a 220kc/s signal, adjust C38 and slide the former of L9 (C1) along the ferrite rod for maximum output.

**F.M. Alignment**

- 1.—Connect the output meter across the speaker and the f.m. signal generator to V2b control grid (located below C27 in C2) via the 400pF capacitor in its live output lead. Switch the receiver to f.m. and allow it to warm up for at least ten minutes. Set the volume control 90 deg. back from its fully clockwise position and set the tone control to the maximum treble position.
- 2.—Feed in a 10.7Mc/s signal, deviated by  $\pm 25$ kc/s and adjust the cores of L18, L19 (location reference B3), and L13, L12 (location reference C2) for maximum output. Remove the f.m. signal generator.
- 3.—Connect the a.m. signal generator to tags 7 and 8. Feed in a modulated 10.7Mc/s signal and adjust the core of L19 (B3) for *minimum* output. Disconnect the a.m. generator.
- 4.—Reconnect the f.m. signal generator to tags 7 and 8 and check that the level of f.m. output has been retained. If maximum a.m. rejection does not coincide with maximum f.m. output, L19 should be adjusted for maximum a.m. rejection at the expense



Top and underside views of the f.m. tuner

- 5.—Unscrew the core of L7 (location reference C1) so that it protrudes from the former by approximately  $\frac{1}{16}$  in. Transfer the f.m. signal generator to test point X on the tuner unit (location reference E4). Feed in a 10.7Mc/s signal and adjust the cores of L6 and L7 (location reference C1) for maximum output.
- 6.—Rotate the tuning gang to set the cursor at the 92Mc/s calibration marker. Connect the signal generator to the f.m. aerial sockets and feed in a 92Mc/s signal. Tune in this signal by adjusting L5 (C1). If two peaks can be obtained, the one with the core nearer L4 at the top end of the former is correct.
- 7.—Adjust L3 (D1) for maximum audio output with the core towards the bottom end of the coil former. Check the calibration over the range.

**DISMANTLING**

**Record Changer Removal.**—To remove the record changer unit, first remove the wooden channelling from the underside of the cabinet (2 screws).

Take out one screw and slide out the removable cover in the bottom of the cabinet.

Disconnect the pick-up leads from the tag strip on the right-hand side of the main chassis, and the motor mains leads from the connecting block on the receiver compartment floor.

Ensure that both transit screws are screwed right down and then with access from the cabinet underside, pivot the clips on the transit screws to enable them to pass through the motor board and lift the changer unit clear.

**Chassis Removal.**—To remove the chassis from the cabinet, first pull off the control knobs. This can be done by using a length of stout cord wound around behind the knob and used as a "puller." To avoid the risk of breaking the nylon coupling spindle it is essential to pull in a forward direction only.

Remove the cabinet back cover (four screws) and disconnect the f.m. aerial plug from the socket on the main chassis.

Disconnect the receiver mains supply leads from the terminal block on the receiver compartment floor, and unplug the pick-up leads from the tag strip on the chassis. (When replacing the pick-up leads, note the inner of the screened lead is connected to the tag nearest to the edge of the printed board.)

Unsolder the speaker leads from the output transformer terminals.

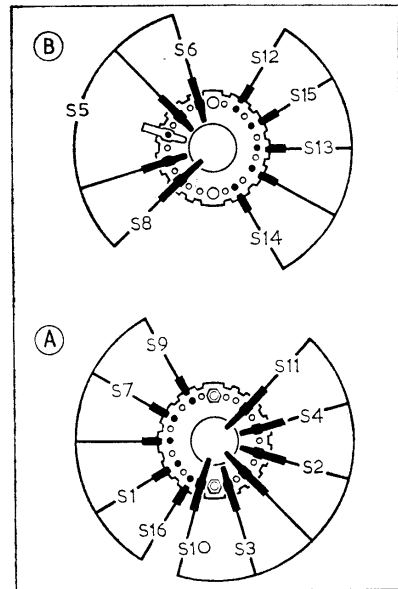
Remove two bolts securing the rear of the chassis to the vertical cabinet batten, pull the chassis clear of locating studs at the front and withdraw from the cabinet. (When refitting the chassis ensure that the lugs are located correctly in corresponding holes in the front of the chassis before inserting the rear chassis fixing screws.)

Note: Care should be taken to avoid scraping the scale backing paint with the control spindles.

**GENERAL NOTES**

**Switches.**—S1-S16 are the waveband and a.m./f.m. change-over switches ganged in a single rotary unit and shown in our illustration of the chassis in location reference D3. A detailed diagram of the unit is shown in column 6, where the contacts are drawn as seen when viewed from the rear if an upright chassis (see illustration). The table (col. 6) shows the switch operations for the four control settings, starting from the fully anti-clockwise position of the control knob. A dash indicates open, and C closed.

**Drive Cord Replacement.**—Approximately 72in of nylon braided glass yarn is required for a new drive cord. Turn the tuning gang to minimum capacitance (fully open) and thread the cord as shown in the illustration of the completed assembly below. Begin at the rear of the drive drum, winding  $2\frac{1}{2}$  turns

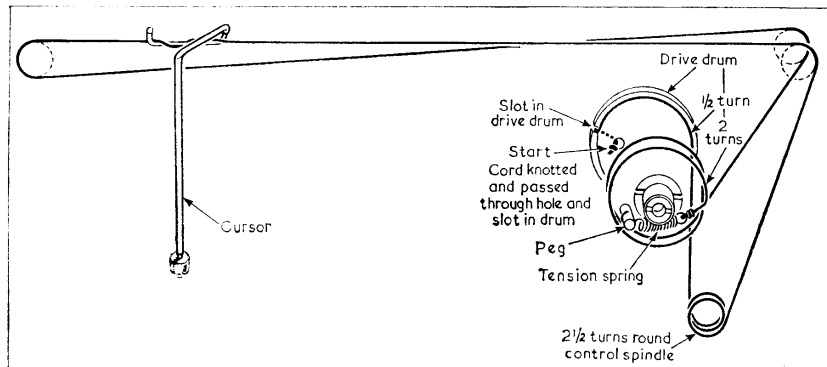


**Switch Table**

Switch	Gram	L.W.	M.W.	F.M.
1 .. ..	—	—	—	C
2 .. ..	—	—	—	C
3 .. ..	C	C	—	—
4 .. ..	—	—	—	C
5 .. ..	—	—	—	C
6 .. ..	C	—	—	—
7 .. ..	—	—	C	C
8 .. ..	—	—	C	—
9 .. ..	—	—	—	C
10 .. ..	C	C	—	—
11 .. ..	—	—	—	C
12 .. ..	—	—	—	C
13 .. ..	—	C	—	—
14 .. ..	C	—	C	—
15 .. ..	—	C	—	C
16 .. ..	—	—	—	C

in an anti-clockwise direction on the tuning spindle and finish with 2 turns clockwise on the front of the drive drum anchoring the tension spring to the peg provided. Attach the cursor so that it lines up with the extreme right-hand calibration marker with the tuning gang fully meshed.

**Record Changer.**—The record changer fitted is the Garrard four-speed Autoslim incorporating a turnover monaural cartridge type GC2 with sapphire styli GC2-3 (78) and GC2-1 (LP).



Drive cord assembly, drawn with the tuning gang at minimum