"TRADER" SERVICE SHEET

1761

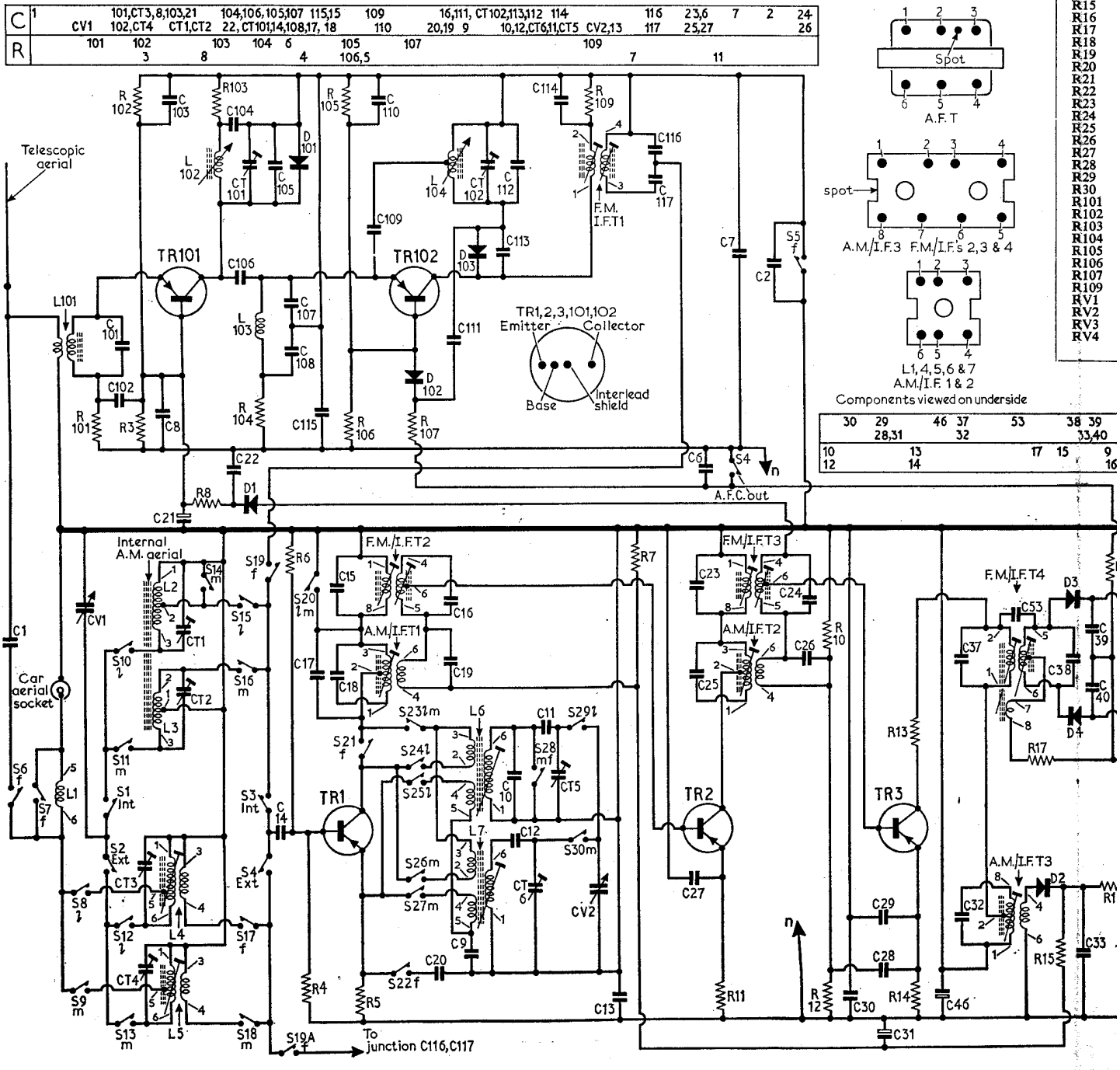
PERDIO PR40 "Knight

A.M./F.M. Portable Radio Receiver
Covering Long, Medium & F.M. Wavebands

PERDIO PR40 ("Knightsbridge FM" series) is a nine transistor, eight diode a.m./f.m. portable radio receiver which covers the long, medium and f.m. wavebands. It is fitted with a tone control, record socket and external aerial socket, and features a logging scale in addition to the normal tuning scale for each waveband.

Normal reception is by means of internal ferrite rod and telescopic aerials. When operating on an external aerial, an "internal/external" aerial switch permits the ferrite rod aerial windings to be replaced by screened aerial tuned circuits to increase immunity from ignition interference and obviate the ferrite rod directional properties.

The receiver is housed in a moulded plastics case and is powered by a 9V dry

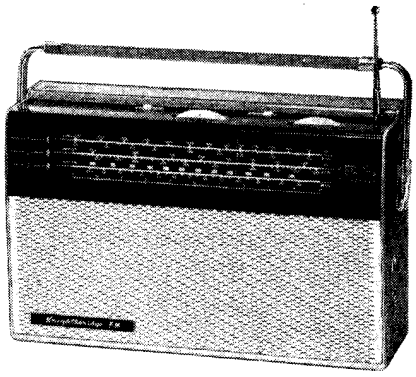


Resistor

R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
R13
R14
R15
R16
R17
R18
R19
R20
R21
R22
R23
R24
R25
R26
R27
R28
R29
R30
R101
R102
R103
R104
R105
R106
R107
R109
RV1
RV2
RV3
RV4

PERDIO PR40 **1761**

...htsbridge FM" Series



Appearance of the Perdio PR40.

Resistors		
R3	8·2kΩ	A1
R4	6·8kΩ	E2
R5	1kΩ	E2
R6	33kΩ	E2
R7	56kΩ	E2
R8	1kΩ	D2
R9	220kΩ	D2
R10	18kΩ	D2
R11	680Ω	E2
R12	47kΩ	E2
R13	220Ω	E3
R14	470Ω	E3
R15	8·2kΩ	E3
R16	330Ω	E3
R17	47Ω	D3
R18	2·2kΩ	D2
R19	1kΩ	D2
R20	6·8kΩ	D2
R21	6·8kΩ	D2
R22	47kΩ	D3
R23	39kΩ	E3
R24	68Ω	E3
R25	2·7kΩ	E3
R26	22kΩ	E3
R27	180Ω	F3
R28	270Ω	F3
R29	2·7kΩ	F3
R30	120kΩ	F3
R101	680Ω	G4
R102	33kΩ	G4
R103	180Ω	G4
R104	1kΩ	G4
R105	8·2kΩ	G4
R106	3·3kΩ	G4
R107	390kΩ	G4
R109	150Ω	G4
RV1	20kΩ	D2
RV2	10kΩ	D3
RV3	1·5kΩ	D2
RV4	200Ω	F3

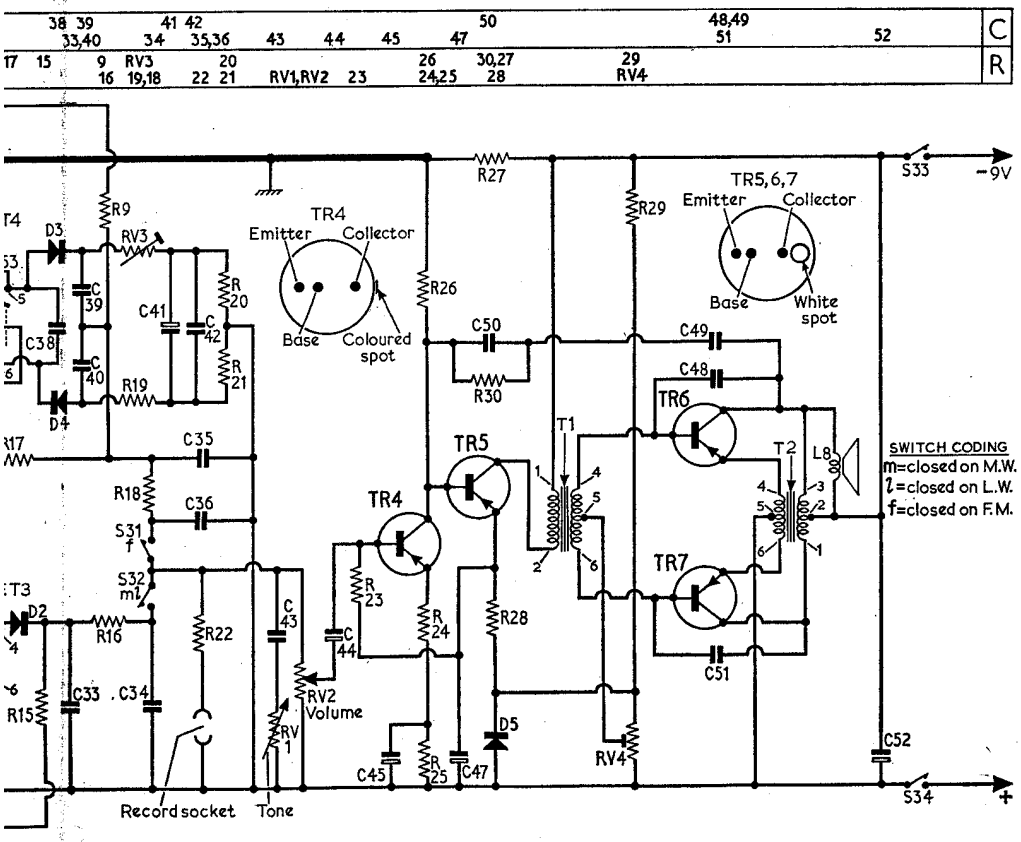
Capacitors		
C1	3,300pF	A1
C2	0·1μF	B1
C6	0·1μF	A1
C7	0·1μF	A1
C8	0·1μF	A1
C9	0·22μF	B1
C10	30pF	B1
C11	145pF	B1
C12	330pF	B1
C13	0·1μF	E2
C14	0·01μF	F2
C15	165pF	E2
C16	165pF	E2
C17	2,200pF	E2
C18	250pF	E2
C19	2,200pF	E2
C20	0·1μF	F2
C21	12·5μF	E2
C22	1,200pF	D2
C23	165pF	D2
C24	165pF	D2
C25	250pF	E3
C26	2,200pF	E3
C27	0·1μF	E2
C28	0·047μF	E2
C29	0·022μF	E3
C30	0·1μF	D3
C31	12·5μF	D2
C32	250pF	E3
C33	0·03μF	E3
C34	0·02μF	E3
C35	330pF	D3
C36	4,700pF	D2
C37	165pF	D3
C38	56pF	D3
C39	330pF	D3
C40	330pF	D2
C41	12·5μF	D2
C42	1,200pF	D2
C43	0·15μF	E3
C44	2μF	E3
C45	12·5μF	E3
C46	320μF	F2
C47	125μF	F3
C48	4,700pF	F2
C49	0·047μF	F2
C50	56pF	F3
C51	4,700pF	F3
C52	320μF	F2
C53	2·2pF	D3
C101	25pF	G4
C102	1,200pF	G4
C103	1,200pF	G4
C104	1,200pF	G4
C105	5·6pF	G4
C106	6·8pF	G4
C107	4·7pF	G4
C108	280pF	G4
C109	10pF	G4
C110	1,200pF	G4
C111	18pF	G4
C112	10pF	G4
C113	68pF	G4
C114	1,200pF	G4
C115	0·1μF	G4
C116	220pF	G4
C117	1,200pF	G4
CT1	40pF	C1
CT2	40pF	C1
CT3	40pF	C1
CT4	40pF	C1
CT5	40pF	B1
CT6	40pF	B1
CT101	6pF	A1
CT102	6pF	B1
CV1	326pF	A1
CV2	326pF	A1

Coils and Transformers*		
L1	11·7	C1
L2	15·4	C1
L3	—	B1
L4 1-6	27·0	C1
L5 1-6	4·2	C1
L6 1-6	8·0	B1
L7 1-6	3·3	B1
L8	15·0	—
L101	—	G4
L102	—	G4
L103	—	G4
L104	—	G4
AM/IFT1 pri.	6·7	E2
AM/IFT1 sec.	—	E2
AM/IFT2 pri.	6·7	E3
AM/IFT2 sec.	—	E3
AM/IFT3 pri.	5·5	E3
AM/IFT3 sec.	—	E3
FM/IFT1	—	G4
FM/IFT2	—	E2
FM/IFT3	—	D3
FM/IFT4	—	D3
T1 pri.	204·0	F3
T1 sec.	190·0	F3
T2 pri.	3·2	F3
T2 sec.	2·2	F3

Diodes		
D1	OA79	D2
D2	OA91	E3
D3	OA70	D2
D4	OA70	D2
D5	AA129	F3
D101	OA91	G4
D102	BA110	G4
D103	OA91	G4

* *Approximate d.c. resistance in ohms.*

Circuit diagram of the Perdio PR40 "Knightsbridge FM" Series.



battery. Audio output power is 1W and a low level high impedance output, which is independent of the volume control, is available for feeding a tape recorder.

Waveband ranges are 780m-2,000m (l.w.), 185-570m (m.w.) and 87.5-108Mc/s (f.m.).

TRANSISTOR ANALYSIS

Transistor voltages quoted in the table below were taken from information supplied by the manufacturers. They were measured on a 20,000Ω/V testmeter with the receiver switched to f.m. with no signal input. The volume control was set at minimum.

CIRCUIT NOTES

The self-oscillating mixer **TR1** is fed from the ferrite rod aerial, **L2** and **L3**, or from an external aerial via separate screened input coils **L4** and **L5**. A separate oscillator tuned circuit is employed for each waveband; **L6** (l.w.) and **L7** (m.w.).

Three single-tuned i.f. transformers **AM/IFT1, 2** and **3** couple the two earthed emitter i.f. amplifiers, **TR2** and **TR3**, and the detector diode **D2.** The first i.f. amplifier **TR2** is a.g.c. controlled by bias derived from the detector output.

Demodulated audio signals are fed via the volume control **RV2** to the first a.f. amplifier **TR4** which is directly coupled to the second a.f. amplifier **TR5.** Output from **TR5** drives the output transistors **TR6** and **TR7** in push-pull. The circuit is stabilised against falling battery voltage and temperature changes.

Operation on F.M.

Signals from the aerial system are coupled via a wide band transformer **L101** to **TR101** which operates as an r.f. amplifier. Output from **TR101** is fed to the self-oscillating mixer **TR102,** oscillator signals being generated by the tuned circuit associated with **L104.** Three double tuned i.f. transformers **FM/IFT1-3** couple the i.f. amplifier to the ratio detectors comprising **FM/IFT4** and diodes **D3** and **D4.**

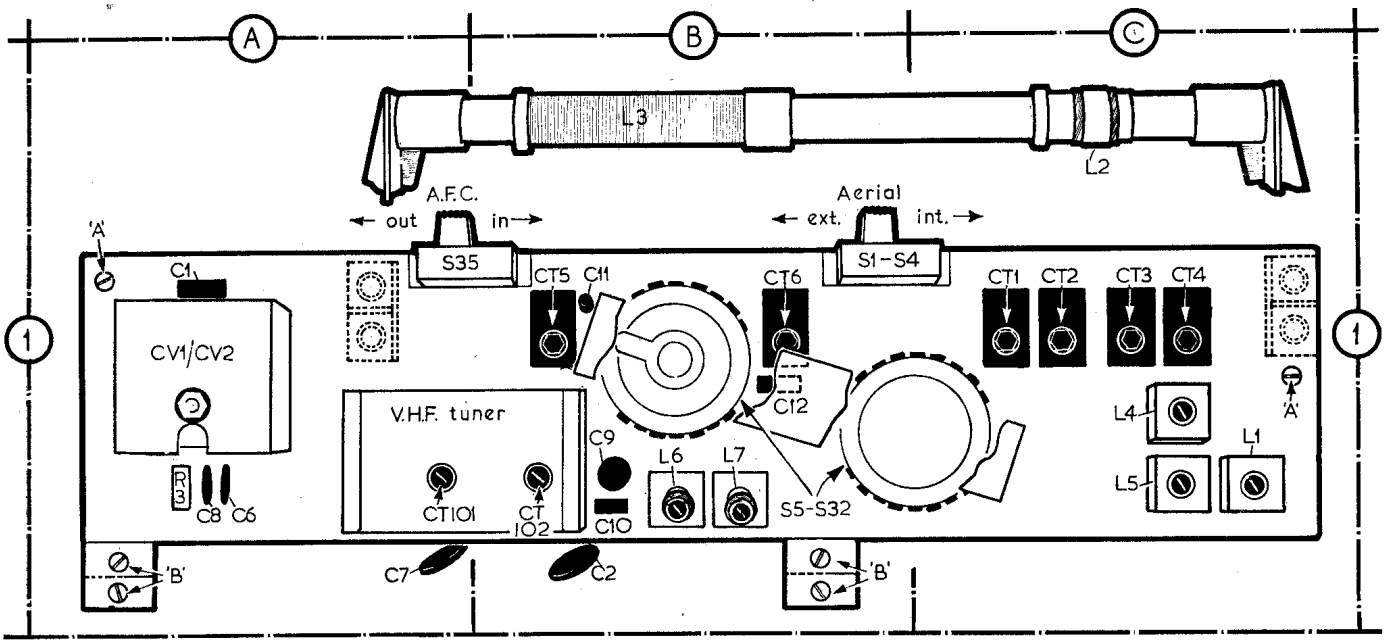
Output from the ratio detector is fed to the

(*Continued overleaf col.* 1)

Transistor Table

Transistor		Emitter (V)	Base (V)	Collector (V)
TR1	AF116	1·0	1·2	7·0
TR2	AF116	0·68	0·84	7·0
TR3	AF116	1·1	1·4	6·5
TR4	OC71	0·73	0·8	1·1
TR5	OC81D	0·95	1·1	8·4
TR6	OC81	—	0·13	9·0
TR7	OC81	—	0·13	9·0
TR101	AF102	1·0	1·32	6·75*
TR102	AF115	1·75†	2·0	6·75‡

* *Measured at the junction* **L102, R103, C104.**
† *Measured at the junction* **L103, R104, C108.**
‡ *Measured at the junction* **R109, FM/1FT1**



The r.f. panel sub-assembly, component side view, as it appears when the receiver back cover is removed. The ferrite rod aerial **L2, L3** *is part of the assembly and is normally mounted in position on the panel indicated by the dotted outline.*

Circuit Notes—*continued*

audio channel as for a.m. A reference d.c. voltage from the ratio detector is fed back to the oscillator stage for automatic frequency control.

CIRCUIT ALIGNMENT

Equipment Required.—A signal generator covering the ranges 150kc/s-1,620kc/s, 10Mc/s-11Mc/s, and 87Mc/s-110Mc/s capable of being modulated with a.m. and f.m.; a wobbulator, if the signal generator is not provided with "sweeping" circuits; an oscilloscope; an audio output meter with an impedance to match 15Ω; a dummy car aerial made up as shown in the diagram in col. 3 and an r.f. coupling coil.

During alignment the volume control should be set at maximum and the tone control for minimum treble cut. The input level from the signal generator should be regulated so that the receiver output is approximately 50mW, to prevent a.g.c. action.

A.M. Circuits

1.—Switch receiver to m.w. and turn the tuning gang to the fully meshed position. Check that the cursor coincides with the zero mark on the logging scale. Connect the signal generator between chassis and the i.f. input tag on the i.f. panel after removing the input lead from the r.f. panel i.e. between chassis and the switch side of **C14.** Connect the audio output meter across the loudspeaker tags.

2.—Feed in a 468kc/s 30 per cent modulated a.m. signal and adjust the cores of **AM/IFT1, 2** and **3** for maximum output.

3.—Connect the signal generator to the r.f. coupling coil and loosely couple the coil to the receiver by placing it adjacent to, and coaxial with, the ferrite rod aerial. Switch receiver to l.w. and the aerial switch to "Int." Tune receiver to 165kc/s.

4.—Feed in a 165kc/s 30 per cent modulated signal and adjust **L6** and **L2** for maximum output.

5.—Connect the signal generator to the external aerial socket via the dummy car aerial and set the aerial switch to "Ext". Adjust the core of **L4** for maximum output.

6.—Re-connect the signal generator to the r.f. coupling coil and set the aerial switch to "Int". Tune receiver to 370kc/s and feed in a 370kc/s signal. Adjust **CT5** and **CT1** for maximum output.

7.—Switch to "Ext" and transfer the signal generator via the dummy aerial to the external aerial socket. Adjust **CT3** for maximum output.

8.—Repeat operations 3-7 until there is no further improvement, always finishing with the adjustment at 370kc/s.

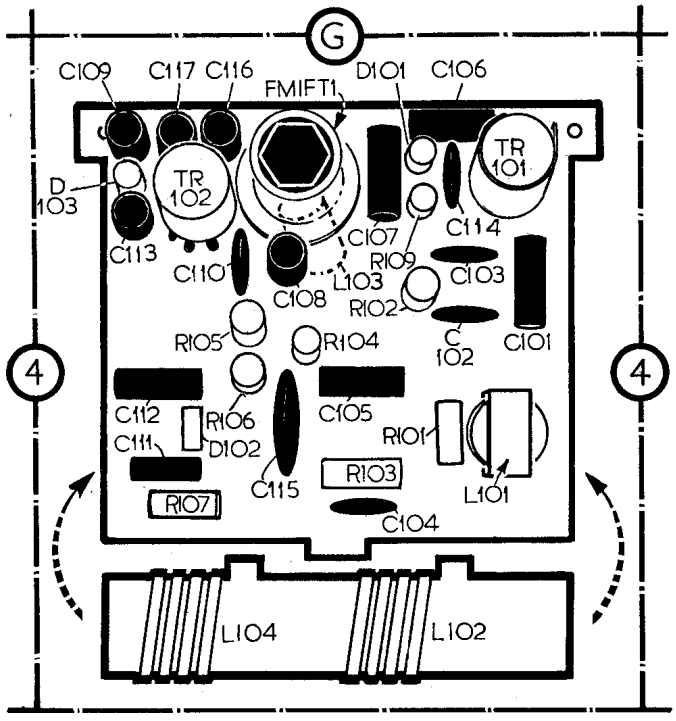
9.—Switch receiver to m.w. and the aerial switch to "Int". Couple the signal generator via the r.f. coupling coil. Tune receiver to 600kc/s and feed in a 600kc/s signal. Adjust **L7** and **L3** for maximum output.

10.—Switch to "Ext" and transfer the signal generator via the dummy aerial to the external aerial socket. Adjust **L5** for maximum output.

11.—Switch to "Int" and re-connect the signal generator to the r.f. coupling coil. Tune receiver to 1,300kc/s and feed in a 1,300kc/s signal. Adjust **CT6** and **CT2** for maximum output.

12.—Connect the signal generator as in operation 10 and adjust **CT4** for maximum output.

13.—Repeat operations 9-12 until there is no



Component side view of the f.m. tuner panel sub-assembly. **L102, L104** *is attached to the foil side in the position indicated by arrows.* **L103** *is also on the foil side immediately below* **FM/IFT1.**

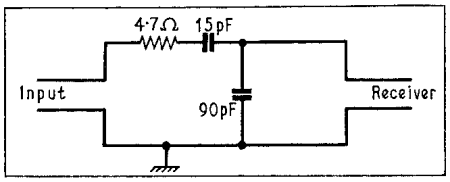


Diagram of the aerial matching pad. If the car aerial lead capacitance varies considerably from a nominal value of 90pF, the 90pF capacitor in the pad should be replaced accordingly.

further improvement, always finishing with the adjustment at 1,300kc/s.

F.M. Circuits

1.—Switch receiver to f.m. and connect the sweep generator between chassis and the i.f. input tag on the i.f. panel after removing the input lead from the r.f. panel. Connect the oscilloscope between chassis and the junction **R18, C36.**
2.—Feed in a sweep signal centred on 10.7 Mc/s and adjust the cores of **FM/IFT2, 3** and **4** for maximum output and response which conforms in shape to the curve shown in fig. 1.
3.—Increase the input signal level by approximately 20dB, reducing the oscilloscope sensitivity accordingly. Switch a 30 per cent modulated a.m. signal on to the swept signal and adjust **RV3** for minimum a.m. output at the centre point of the response.
4.—With the tuning gang fully open, adjust the pulley assembly on the side of the f.m. tuner until the return spring just starts to move back i.e. until there is no slack in the f.m. drive cord. Switch the a.f.c. to "Out". Connect the f.m. signal generator to the external aerial socket.
5.—Tune receiver to 88Mc/s and feed in an 88Mc/s f.m. signal. Adjust **CT102** for maximum output.
6.—Tune receiver to 95Mc/s and feed in a 95Mc/s signal. Adjust **CT101** and both cores of **FM/IFT1** for maximum output.
7.—Repeat operations 5 and 6 until there is no further improvement.
8.—Feed in a sweep frequency signal at the aerial socket and readjust both cores of **AM/IFT1** for a response which conforms to the curve given in fig. 2.

GENERAL NOTES

Dismantling.—To expose the component sides of the printed circuit panels and provide access to all alignment adjustments, remove the case back by taking out two fixing screws.

The chassis comprises two sub-assemblies, an r.f. panel and an i.f./a.f. panel. To remove the chassis complete, disconnect both battery plugs, unplug the two speaker leads and the speaker frame lead from the i.f./a.f. panel, and the aerial lead from the r.f. panel. Pull out the last section of the telescopic aerial.

Remove four screws "A" in the corners of the i.f./a.f. panel and two screws "A" in the r.f. panel. Lift the whole assembly towards the top of the case and withdraw from the bottom, taking care not to damage the volume control knob. Finally unplug the external aerial leads.

To separate the i.f./a.f. panel from the r.f. panel, unplug 13 coloured flying leads from the i.f./a.f. panel, unsolder one end of **C2** and remove four screws "**B**".

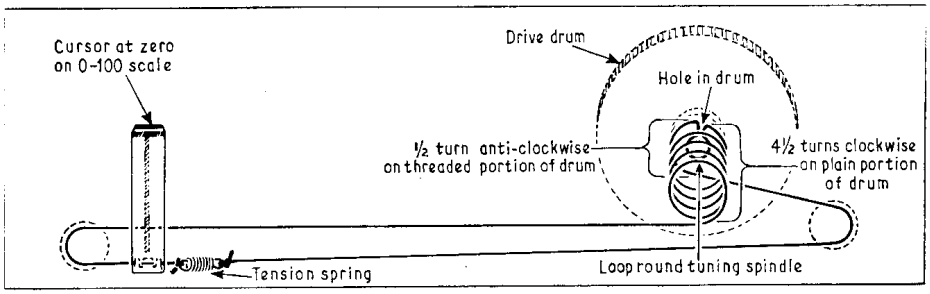
Drive Cord Replacement.—To fit a new drive cord, a length of 38in of cord is required. Remove the tuning scale by taking out four fixing screws, then pull off the tuning control knob. Form a tight loop in the replacement cord, push the loop through the slot in the drive drum and locate it around the centre boss. This operation may be facilitated by moistening the cord slightly.

Replace the tuning knob and proceed to route the cord as shown in the drive assembly diagram noting the relative positions of the tuning gang, scale cursor and tension spring.

The f.m. tuner drive cord is best fitted with the tuning gang in the fully open position. Fit the cord over the pulley assembly, wind one turn round the drive spindle in an anti-clockwise direction then pass through the slot so that the eyelet engages firmly.

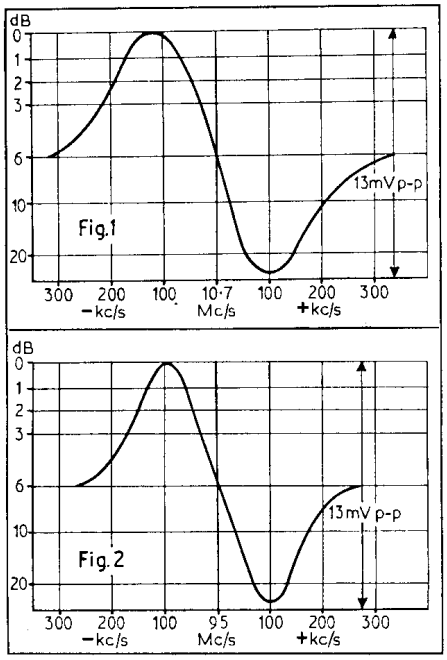
Output Bias Adjustment.—The output bias adjustment potentiometer **RV4** should be set so that with no signal applied and the volume at minimum, the quiescent output stage current should be 8.5mA. Remove the link on the i.f. panel, connected between tag 2 of **T2** and battery negative, and insert a 0-10 milliameter in its place. Adjust **RV4** for a meter reading of 8.5mA. Remove the meter and replace the link.

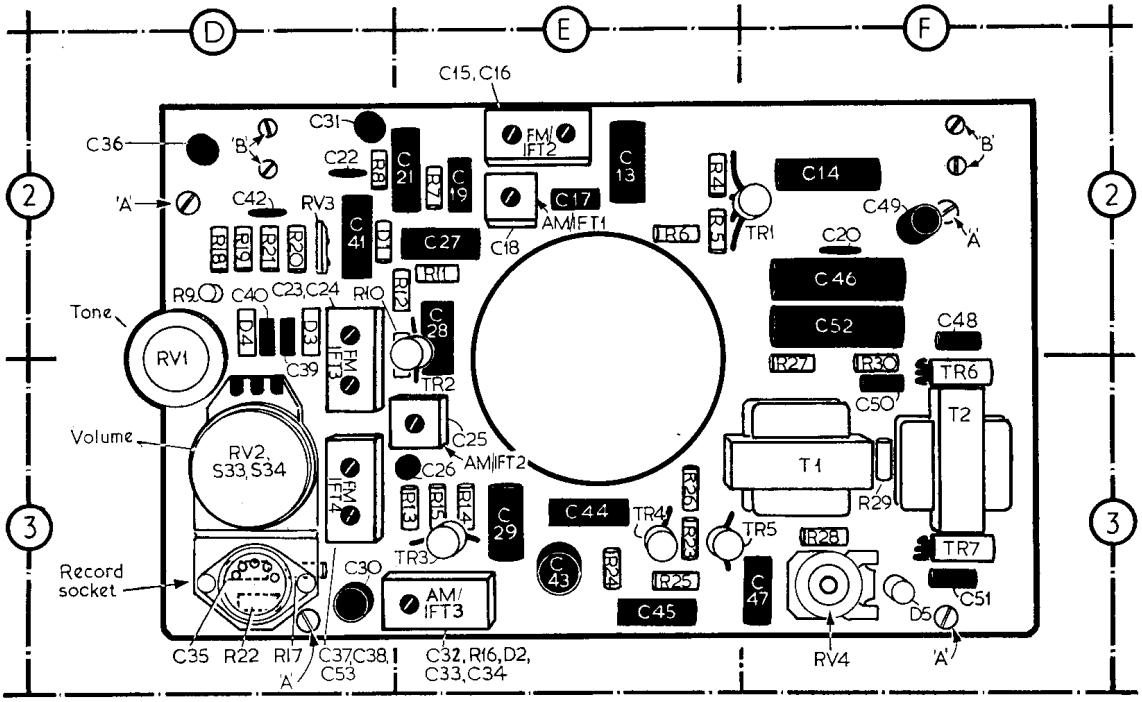
Batteries.—Ever Ready AD28, 1289 or U2 depending on the type of connectors fitted, or any equivalent.



Drive Cord assembly shown with the tuning gang fully meshed. When replacing the cord, note relative positions of the drive drum, cursor and tension spring (see "General Notes").

I.F. Response Curves





Component side illustration of the i.f./a.f. panel sub-assembly. The four screws marked "A" secure the panel to the cabinet and the four screws "B" secure the panel to the r.f panel sub-assembly.

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