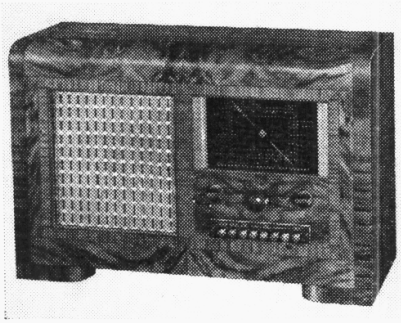
'TRADER' SERVICE SHEET 328

DECCA PT/ML

2-BAND AC SUPERHET



PRESS-BUTTON tuning for six stations is incorporated in the Decca PT/ML receiver, the buttons switching into circuit trimmers adjusted to the required wavelengths. There are two other buttons for wave-change switching, these taking the place of the usual rotary wave-change switch.

The receiver is a 4-valve (plus rectifier) AC 2-band superhet suitable for mains of 200-250 V, 50-60 C/S. Provision is made for both a gramophone pick-up and extension speaker.

CIRCUIT DESCRIPTION

Aerial input on MW via series condenser **C1** and coupling coil **L1** to single-tuned circuit **L3, C23** (manual), or on LW via **C1, L1** and **L3** to single tuned circuit **L2, C23** (manual). **C23** is connected to the top end of either **L2** (LW) via **S16** or **L3** (MW) via **S9** and **S2, S3, S4, S5**. On MW **L2** is short-circuited via **S6, S7, S8,** or on **LW C29** is connected across **L3,** via **S1** and **S2, S3, S4, S5** to form a MW break-through rejector circuit in series with **L2.**

With auto-tuning, **C23** is replaced by the appropriate trimmer via **S10, S11, S12** or **S13** (MW), or **S14** or **S15** (LW), according to which button is depressed.

First valve (**V1, Mazda metallised AC/TH1**) is a triode hexode operating as frequency changer with internal coupling. Triode oscillator grid coils **L4** (LW, via **S32**) and **L5** (MW, via **S25** and **S18, S19, S20, S21**) are tuned by **C24** (manual) or trimmers **C38-C45** via **S26, S27, S28** or **S29** (MW), or **S30** or **S31** (LW) according to the button depressed (auto). Parallel trimming by **C46, C47** (LW) and **C48** (MW); series tracking by **C49** (LW) and **C50** (MW). Reaction from anode via coil **L6** on both bands.

Second valve (**V2, Mullard metallised VP4B** or **Mazda AC/VP2**) is an RF pentode operating as intermediate frequency amplifier with tuned-primary tuned-secondary transformer couplings **C25, L7, L8, C26** and **C27, L9, L10, C28.**

Intermediate frequency 465 KC/S.

Diode second detector is part of separate double diode (**V3, Mullard metallised 2D4A**). Audio frequency component in rectified output is developed across load resistance **R10** and passed via IF stopper **R9,** AF coupling condenser **C13** and manual volume control **R13** to CG of pentode output valve (**V4, Mullard PenA4**). IF filtering by **R9, C11, C12.** Fixed tone correction by **C15,** and variable tone control by **C17, R17,** in anode circuit. Provision for connection of high impedance external speaker across primary of internal speaker input transformer **T1.** Provision for connection of gramophone pick-up across **R13.**

Second diode of **V3,** fed from tap on **L10** via **C14,** provides DC potential which is developed across load resistance **R12** and fed back through decoupling circuits as GB to FC and IF valve, giving automatic volume control.

Delay voltage is obtained from drop along resistances **R14, R15** in **V4** cathode lead to chassis.

HT current is supplied by IHC full-wave rectifying valve (**V5, Brimar R2** or **Mullard IW4/350**). Smoothing by speaker field **L13** and dry electrolytic condensers **C18, C19.** Mains circuit RF filtering by **C20. F1** performs the dual function of voltage adjustment and protection of mains input circuit in case of accidental short-circuit.

DISMANTLING THE SET

A detachable bottom is fitted to the cabinet and upon removal (four countersunk-head wood screws) gives access to all the trimmers.

Removing Chassis.—To remove the chassis from the cabinet, remove the three knobs (recessed grub screws) and the two bolts (with lock and claw washers) holding the chassis to the bottom of the cabinet. Then free the aerial lead from the cleat on the side of the cabinet (round-head wood screw) and remove the aerial, earth and pick-up socket strip from the cabinet (three round-head wood screws).

The chassis can now be withdrawn to the extent of the speaker leads, which is sufficient for normal purposes. *When replacing,* make sure that the chassis is correctly positioned in the cabinet as otherwise the push-buttons will jam on the escutcheon.

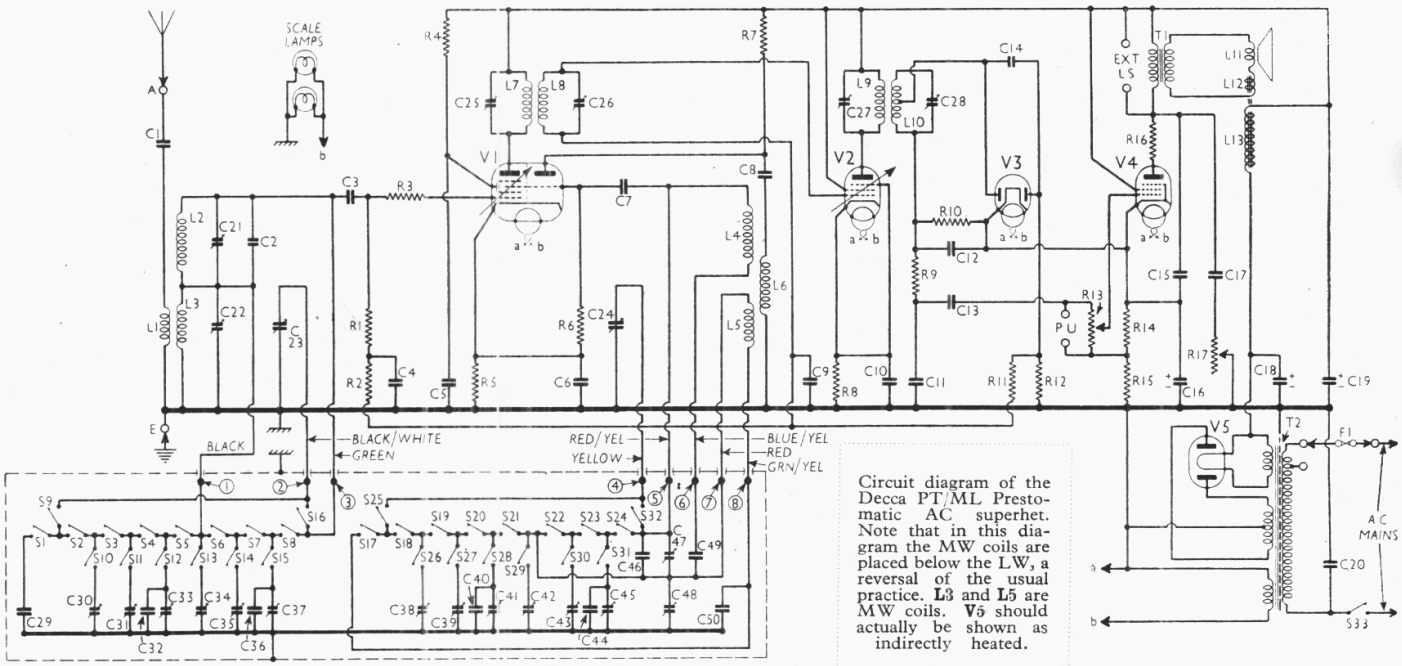
To free the chassis entirely unsolder the speaker leads and *when replacing,* connect them as follows, numbering the top row of tags from left to right :—1, blue; 2, black; 3, red.

Removing Auto-Unit.—Before access can be gained to the components beneath the chassis, it will be necessary to remove the auto-unit. To do this unsolder the yellow, green, red, black/white, red/yellow, green/yellow and blue/yellow leads connecting it to the main chassis, remove the four self-tapping screws holding it to the main chassis and unsolder the black lead from **C21.** *When replacing,* consult the circuit diagram and chassis illustration.

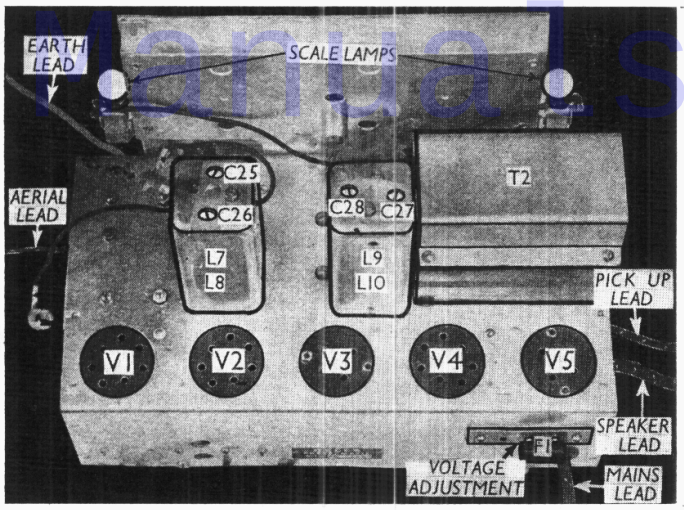
Removing Speaker.—If it is desired to remove the speaker from the cabinet, unsolder the leads and remove the nuts and lock washers from the four screws holding it to the sub-baffle. *When replacing,* see that the transformer is at the top and connect the leads as follows, numbering the top row of tags from left to right :—1, blue; 2, two black leads; 3, two red leads.

COMPONENTS AND VALUES

	RESISTANCES	Values (ohms)
R1	V1 hexode CG resistance ..	500,000
R2	V1 hexode CG decoupling ..	500,000
R3	V1 hexode CG stabiliser ..	40
R4	V1 SG HT feed	15,000
R5	V1 fixed GB resistance ..	200
R6	V1 osc. CG resistance ..	50,000
R7	V1 osc. anode HT feed ..	30,000
R8	V2 fixed GB resistance ..	200
R9	IF stopper	70,000
R10	V3 signal diode load	300,000
R11	AVC line decoupling	500,000
R12	V3 AVC diode load	500,000
R13	Manual volume control ..	500,000
R14	V4 GB and AVC delay	140
R15	voltage resistances	160
R16	V4 anode RF stopper ..	150
R17	Variable tone control	50,000



Circuit diagram of the Decca PT/ML Prestomatic AC superhet. Note that in this diagram the MW coils are placed below the LW, a reversal of the usual practice. **L3** and **L5** are MW coils. **V5** should actually be shown as indirectly heated.



Plan view of the chassis. **F1** is included in the mains voltage adjustment plug

	CONDENSERS	Values (μF)
C1	Aerial series condenser	0·0004
C2	Aerial LW fixed trimmer	0·00003
C3	V1 hexode CG condenser	0·0001
C4	V1 hexode CG decoupling	0·02
C5	V1 SG decoupling	0·1
C6	V1 cathode by-pass	0·1
C7	V1 osc. CG condenser	0·0001
C8	V1 osc. anode coupling	0·0002
C9	V2 CG decoupling	0·02
C10	V2 cathode by-pass	0·1
C11	IF by-pass condensers	0·0001
C12		0·0001
C13	AF coupling to V4	0·02
C14	Coupling to V3 AVC diode	0·000075
C15	Fixed tone corrector	0·006
C16*	V4 cathode by-pass	50·0
C17	Part of variable tone control	0·05
C18*	HT smoothing	8·0
C19*		8·0
C20	Mains RF by-pass	0·006
C21‡	Aerial circuit LW trimmer	—
C22‡	Aerial circuit MW trimmer	—
C23†	Aerial circuit manual tuning	—
C24†	Osc. circuit manual tuning	—
C25‡	1st IF trans. pri. tuning	—
C26‡	1st IF trans. sec. tuning	—
C27‡	2nd IF trans. pri. tuning	—
C28‡	2nd IF trans. sec. tuning	—
	AUTO-TUNING UNIT	
C29	LW coupling condenser	0·00125
C30‡	Aerial circuit automatic tuning trimmers	—
C31‡		—
C32		0·000175
C33‡		—
C34‡		—
C35‡		—
C36		—
C37‡		—
C38‡		—
C39‡		—
C40	Oscillator circuit automatic tuning trimmers	0·000175
C41‡		—
C42‡		—
C43‡		—
C44		—
C45‡		—
C46	Osc. circ. LW fixed trimmer	0·000175
C47‡	Osc. circuit LW trimmer	—
C48‡	Osc. circuit MW trimmer	—
C49	Osc. circuit LW tracker	0·00101
C50	Osc. circuit MW tracker	0·00054

* Electrolytic. † Variable. ‡ Pre-set.

	OTHER COMPONENTS	Approx. Values (ohms)
L1	Aerial coupling coil	14·0
L2	Aerial circuit LW tuning coil	13·0
L3	Aerial circuit MW tuning coil	2·75
L4	Osc. circuit LW tuning coil	3·5
L5	Osc. circuit MW tuning coil	1·75
L6	Oscillator reaction coil	5·25

	OTHER COMPONENTS (*Continued*)		Approx. Values (ohms)
L7	1st IF trans.	Pri.	6·0
L8		Sec.	6·0
L9	2nd IF trans.	Pri.	6·0
L10		Sec., total	6·0
L11	Speaker speech coil		1·8
L12	Hum neutralising coil		0·25
L13	Speaker field coil		1,000·0
T1	Speaker input trans.	Pri.	330·0
		Sec.	0·5
T2	Mains trans.	Pri., total	31·0
		Heater sec.	0·1
		Rect. heat. sec.	0·2
		HT sec., total	600·0
F1	Mains fuse		—
S1	Rejector circuit switch		—
S2-S8	Manual/auto change switches		—
S9, S16	Aerial circuit manual waveband switches		—
S10-S15	Aerial circuit auto trimmer selector switches		—
S17	Osc. MW coil shorting switch		—
S18-S24	Manual/auto change switches		—
S25, S32	Osc. circuit manual waveband switches		—
S26-S31	Osc. circuit auto trimmer selector switches		—
S33	Mains switch ganged R13		—

VALVE ANALYSIS

Valve voltages and currents given in the table (col. 3) are those measured in our receiver when it was operating on mains of 230 V, using the 240 V tapping on the mains transformer. The receiver was tuned to the lowest wavelength on the medium band and the volume control was at maximum, but there was no signal input.

Voltages were measured on the 400 V scale of a model 7 Universal Avometer, chassis being negative.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 AC/TH1	245	6·2	123	8·0
	Oscillator			
	90	4·6		
V2 VP4B	245	9·5	245	3·4
V3 2D4A	—	—	—	—
V4 PenA4	230	32·0	245	4·8
V5 R2	305†	—	—	—

† Each anode, AC.

GENERAL NOTES

Switches.—S1-S32 are all push-button switches contained in a 2-bank push-button unit with eight plungers. Each plunger controls four switches, two on the upper and two on the lower paxolin terminal strip. **S1-S8** and **S17-S24** are of the "series" type, incorporating "L" shaped moving contacts, while **S9-S16** and **S25-S32** are of the ordinary type, consisting of two straight contacts which are shorted when the plunger is depressed. Push-button switch units of this type were described in articles 8 and 9 of the series "Automatic Tuning" (April 30 and May 7, 1938).

Of the four switches controlled by each plunger, two are of the "L" type, and two of the ordinary type. Thus the left-hand plunger (in our view of the auto-unit), controls **S1, S9, S17** and **S25.** The second from the left controls **S2, S10, S18** and **S26,** and so on.

When all the buttons are *out,* **S1-S8** and **S17-S24** are *closed* and **S9-S16** and **S25-S32** are *open.*

When any button is depressed, only its four associated switches are affected; the two "L" types *open,* while the two ordinary types *close.*

Thus when the left-hand button is depressed, **S1** and **S17** *open,* and **S9** and **S25** *close.* All the other switches remain unaltered.

The tags of all the switches are shown in our view of the auto-unit. The tags of the "L" contacts have no external connection to them; in addition, two tags (second from the right, top and bottom bank) are blank, and do not form part of the circuit.

The functions of the various switches are given in the table "Other Components."

S33 is the QMB mains switch, in the main chassis, ganged with the volume control **R13.**

Coils.—L1, L3; L2 and **L4-L6** are in three unscreened units beneath the main chassis. The IF transformers **L7, L8** and **L9, L10** are in two screened units on the chassis deck, with their associated Tempa trimmers.

Scale Lamps.—These are two MES types, rated at 6·0 V, 0·3 A.

External Speaker.—Two sockets are provided on a panel at the rear of the cabinet for a high impedance (8,000 O) external speaker. The sockets are not isolated from the HT supply.

Fuse F1.—This is incorporated in the mains voltage adjustment plug. A length of 2A fuse wire should be used for replacement.

Condensers C16, C18, C19.—These are three dry electrolytics in a single carton beneath the chassis, having a common negative (black) lead. The yellow

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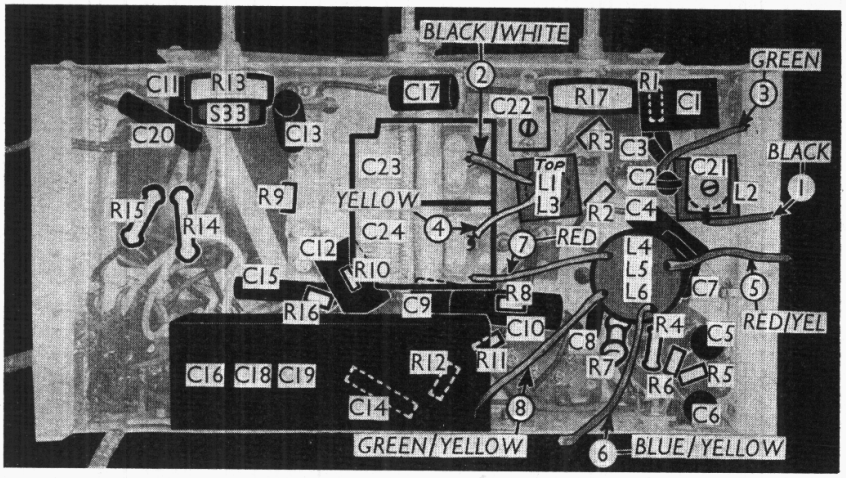


Under-chassis view, with the auto-unit removed. The interconnecting leads are colour-coded and numbered.

DECCA PT/ML—*Continued*

lead is the positive of **C16** (50 μF, 15 peak volts); the blue lead is the positive of **C18** (8μF, 525 peak volts) and the red lead the positive of **C19** (8μF, 450 peak volts).

Auto-Tuning Unit.—This is shown, with all the components included in it, at the bottom left-hand corner of the circuit diagram, and in a separate chassis illustration. All the interconnecting leads (of which there are eight) are indicated and colour-coded on the circuit diagram and on the under-chassis view. Their connection points on the auto-tuning unit are also indicated and numbered on the illustration of this unit. In addition, although there is no wire connecting them, the auto-unit and the main chassis are connected electrically by the bolts holding them together.

The auto-unit contains the switches **S1-S32** (see under switches), the fourteen Tempa trimmers, external parallel fixed trimmers across certain of the Tempa types (**C32, C36, C40, C44** and **C46,** the LW coupling condenser **C29** and the fixed trackers **C49** and **C50**).

Of the Tempa trimmers, **C47** and **C48** are LW and MW trimmers (the former having **C46** across it). The remaining twelve are for the six pre-set stations.

The circuit may seem a little confusing in that **C29** and **C46-C50** are shown in the auto-unit, but as they are actually in this part of the receiver it was thought best to place them similarly in the circuit diagram. By tracing this out, it will be seen that they are actually in their usual positions relative to the tuning coils and the gang condenser. Note, however, that the LW coils are *above* the MW coils, a reversal of the usual practice. Thus **L2** and **L4** are LW coils, and **L3** and **L5** MW coils.

CIRCUIT ALIGNMENT

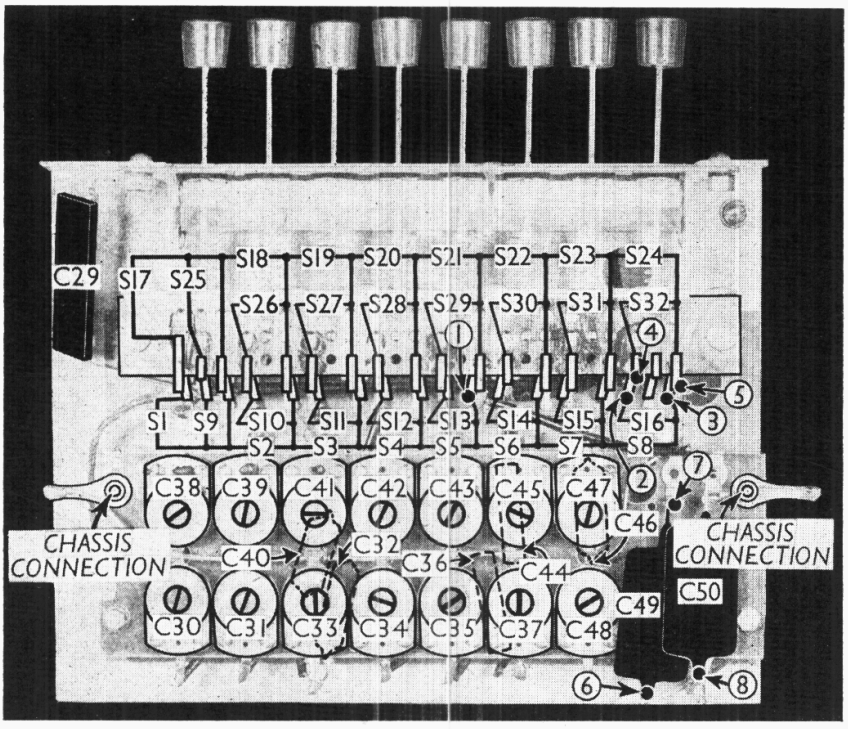
IF Stages.—According to the makers, the IF trimmers are adjusted at the factory for the correct response curve with an oscilloscope, and should not be touched unless they have been tampered with, or a new transformer has been fitted. The IF is 465 KC/S and alignment follows the usual practice.

RF and Oscillator Stages.—Set pointer so that it is vertical when gang is at maximum.

MW.—Press MW manual button, connect signal generator to **A** and **E** sockets and feed in a 200 m (1,500 KC/S) signal. Tune to 200 m on scale, and adjust **C22** (under main chassis) and **C48** (on auto unit) for maximum output.

LW.—Press LW manual button, feed in a 1,200 m (250 KC/S) signal, tune to 1,200 m on scale and adjust **C21** (under main chassis) and **C47** (on auto unit) for maximum output.

Adjustment of the trimmers for the pre-set stations is best carried out on the signals from the stations themselves.



The underside of the auto-tuning unit, showing all the switch tags, and the points to which the leads from the main chassis are connected.

MAINTENANCE PROBLEMS

Mains Supply Accidently Changed

A SERVICE call was made recently to examine a Pye G/DC receiver, which had suddenly developed an extremely loud hum and would not "light up." Tests made confirmed that the heater circuit, including the pilot lamp, was continuous, and, as it was known that the *positive* side of the mains were earthed in this particular house, it was presumed that a condenser had broken down somewhere in the receiver between the negative line and earth, thus starving the set of current.

The set was taken to the service department and connected up, when, to my surprise, it "lit up" and functioned perfectly. Now in our service department the mains have the *negative* side earthed, which seemed to confirm my suspicion. Accordingly all suspected condensers were tested, but a blank was drawn, and the decision was made to return the receiver and make further tests on the job.

This town is in process of being "changed over" gradually to AC, so I examined the supply meter, for fear the "change-over" had taken place. However the usual DC meter was there, and, quite naturally, no further notice was taken of this point, but, in the course of testing, it was found that the DC side of the test-meter would not respond to the current and, upon switching over to the AC range, a reading was obtained!

This demanded further investigation and it was found that the supply was fed from a "splitter" in the house next door, and the supply there had been changed. Evidently the feed from the "splitter" to the house next door had been overlooked.

At first I wondered why the set would not "light up" on AC, but a little thought soon revealed that the smoothing choke in the heater circuit would offer a tremendous impedance to AC, thus accounting for the "dead" pilot light.

The trouble was satisfactorily cleared by informing the electricity department who changed the meter and fitted the necessary rectifier to the receiver.—R. A. C.

Incorrect Decoupling Resistance

MOST of the weaker stations on a Pye T4 had become very distorted, and, as the trimming of this particular model is rather critical, it was decided to re-align all the circuits, in view of similar trouble having been experienced with other sets. This unfortunately had not the desired effect, although some improvement was noticed, so the AVC circuit was examined in case the delay voltage was excessive, but all was well in this direction.

It was noticed that when the voltage was being measured on the plate side of the oscillator anode decoupling resistance, distant signals came in normally. Investigation proved all components in the oscillator circuit to be in order, but the value of the oscillator decoupling resistance did not tally with the maker's figure. The correct value was fitted and the set became normal again.

Strangely enough, when new the set worked normally. Evidently when the emission of the valves dropped slightly, the heterodyne voltage of the oscillator valve was not maintained, due to the high value of the decoupling resistance which had been fitted in error.—R. A. COATES, WHITBY.

Dry Joint on Speech Coil

A FERRANTI "Nova" battery receiver gave bad quality intermittently. The QPP valve was changed without improvement, but an external speaker cured the trouble.

The primary and secondary windings of the original speaker transformer were checked and found in order. The speech coil was examined and the resistance was 2 O, but when the diaphragm was flexed the reading varied from 2 to 40 O. A further check revealed a dry joint at the junction of speech coil and braided cable. — HAROLD RICHARDS, PERRANWELL STATION.

Short in Screening Tubing

A G.E.C. AVC5 worked only with one valve screen cover off. When this was replaced the set ceased to work.

Inside the brass tube which screens the lead to the top cap the rubber-covered lead had perished, and shorted by pressure when the cover was fitted. Some large bore Systoflex slipped over the lead and down the tube cured the trouble.—H. P. LONGHURST, WANDSWORTH.

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