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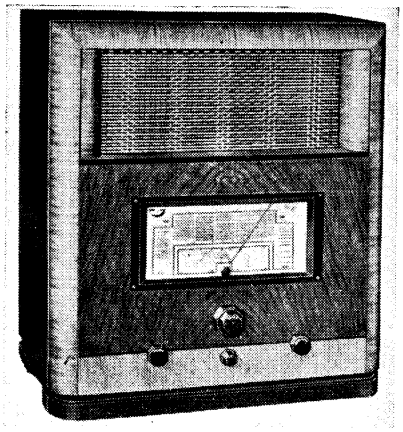
"TRADER" SERVICE SHEET

605

REVISED ISSUE OF SERVICE SHEET No. 262

MARCONIPHONE 559

575, 576, 557, 567, AND HMV 499, 490, 494, 495



The Marconiphone 559 receiver.

AN RF amplifier is incorporated in the Marconiphone 559 5-valve (plus rectifier) AC 3-band superhet, while another feature is the inclusion of a cathode-ray tuning indicator. The receiver covers a short-wave range of 16.5-52 m, and is suitable for mains of 195-255 V, 50-100 C/S.

Sockets are provided for the connection of gramophone pick-up, which may be permanently connected, tags are provided for the connection of an external speaker, and the speaker field acts as a smoothing choke in the negative side of the HT circuit.

An almost identical chassis is fitted in the 575 radiogram and the 576 automatic radiogram, but these models are for 50-60 C/S.

The chassis in the 557 receiver and 567 radiogram are also very similar, but do not include the cathode-ray tuning indicator, the difference being explained under "General Notes."

Equivalent HMV models are: 499 table, similar to Marconiphone 559; 490 autoradiogram, similar to Marconiphone 576; 494 table, similar to Marconiphone 557; and 495 radiogram, similar to Marconiphone 567.

This *Service Sheet* was prepared on a 559 model.

Release dates and original prices:

Marconiphone 559, *September*, 1937, £15 4s. 6d.; 575, *July*, 1937, £28 7s.; 576, *July*, 1937, £34 13s.; 557, *March*, 1937, £12 12s.; 567, *March*, 1937, £23 2s.

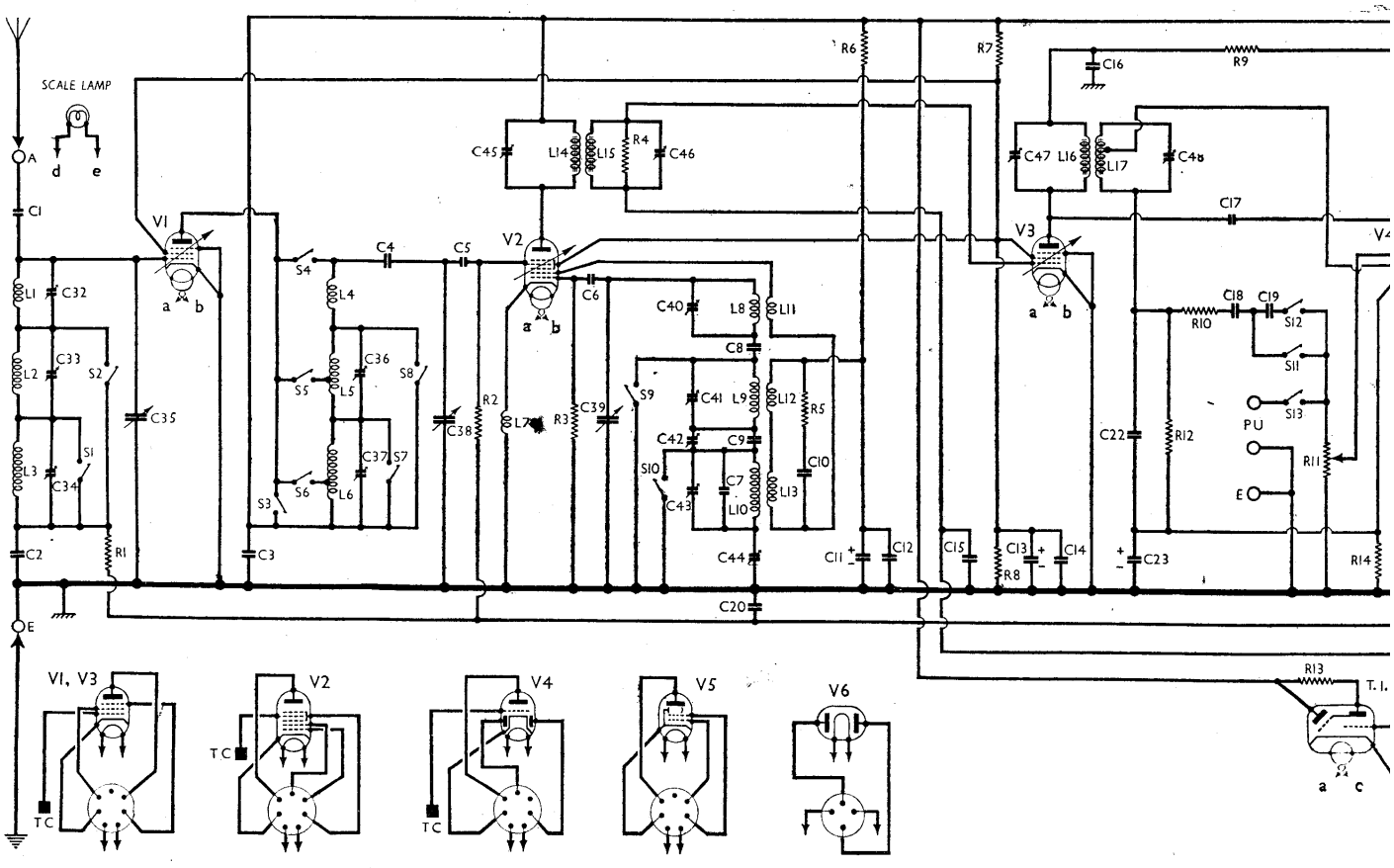
HMV 499, *September*, 1937, £15 4s. 6d.; 490, *July*, 1937, £34 13s.; 494, *March*, 1937, £12 12s.; 495, *March*, 1937, £23 2s.

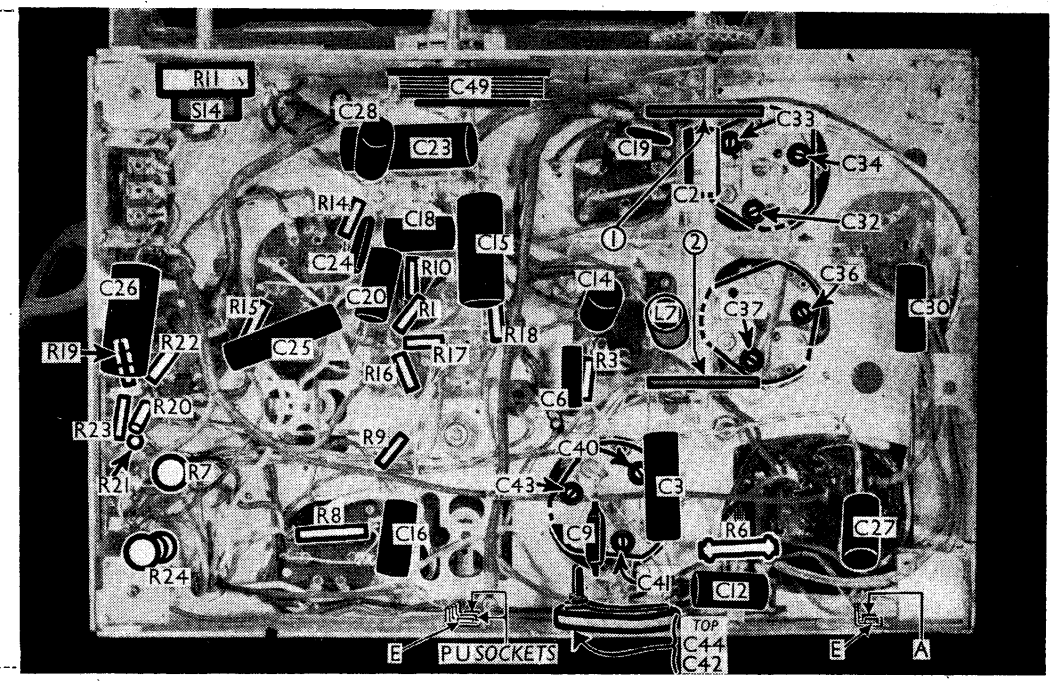
It should be noted that the above prices may in some cases have been subsequently increased.

CIRCUIT DESCRIPTION

Aerial input via series condenser **C1** to single-tuned circuits **L1** (SW), plus **L2** (MW), plus **L3** (LW), tuned by **C35,** which precede variable-mu RF pentode signal-frequency amplifying valve **(V1, Marconi W42).**

Tuned anode coupling by coils **L4** (SW),





Under-chassis view. The two waveband switch units are indicated by arrows and numbers in circles. They are shown in detail in the diagrams in col. 2 overleaf, where they are drawn as seen when viewed in the directions of the arrow in this view. It should be noted that they point in opposite directions.

plus **L5** (MW), plus **L6** (LW), tuned by **C38,** between **V1** and second valve **(V2, Marconi X42),** a heptode operating as frequency changer with electron coupling. Oscillator grid coils **L8** (SW), plus **L9** (MW), plus **L10** (LW), are tuned by **C39;** parallel trimming by **C40** (SW), **C41** (MW) and **C7, C43** (LW); series tracking by **C8** (fixed) (SW), **C9, C42** (MW) and **C44** (LW). Anode reaction by coils **L11** (SW), **L12** (MW) and **L13** (LW).

Third valve **(V3, Marconi W42)** is a variable-mu RF pentode operating as intermediate frequency amplifier with tuned-primary, tuned-secondary iron-dust cored transformer couplings **C45, L14, L15, C46** and **C47, L16, L17, C48.**

Intermediate frequency 465 KC/S.

Diode second detector is part of double-diode triode valve **(V4, Marconi DH42).** Audio frequency component in rectified output is developed across load resistance **R12** and passed via IF stopper **R10,** and, on MW and LW, AF coupling condenser **C18,** switch **S11** and manual volume control **R11** to CG of triode section, which operates as AF amplifier. On SW, **S11** opens, and AF coupling is via **C18, C19** and **S12** to **R11.**

IF filtering by **C22, R10** in diode circuit and **C24** in **V4** triode anode circuit. Provision for connection of gramophone pick-up via **S13** across **R11.**

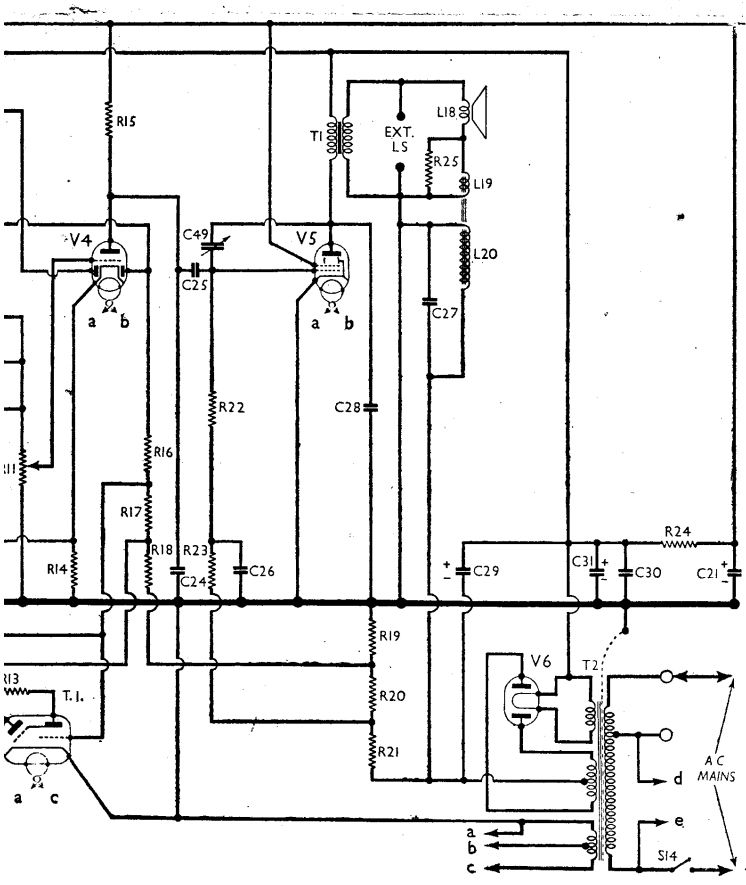
Second diode of **V4,** fed via **C17** from **V3** anode, provides DC potentials which are developed across load resistances **R16, R17, R18** and fed back through decoupling circuits as GB to RF, FC and IF valves, giving automatic volume control. Cathode ray tuning indicator **(T.I., Marconi Y63)** is controlled by AVC line potential to **V1** and **V2.**

Resistance-capacity coupling by **R15, C25** and **R22** between **V4** triode and pentode or beam tetrode output valve **(V5, Marconi N42** or **KT42).**

Fixed tone correction by **C28** in anode circuit. Variable tone control by variable condenser **C49,** which provides capacitative coupling between anode and control grid. Provision by soldering tags for connection of low impedance external speaker across secondary of output transformer **T1.**

HT current is supplied by full-wave rectifying valve **(V6, Marconi U12/14).** Smoothing by speaker field **L20,** which is shunted by **C27,** in negative HT lead, and resistance **R24** in positive lead, and elec-

(*Continued in col. 1 overleaf*)



Circuit diagram of the Marconiphone 559. The speaker field **L20** operates as a smoothing choke, and is in the negative side of the circuit. It is shunted by **C27.** AF coupling is modified for SW reception by the inclusion of a small condenser **C19** in series with the normal condenser **C18.** Several other Marconiphone and HMV models employ the same circuit, while in further models it is the same except for the exclusion of the cathode ray tuning indicator.

COMPONENTS AND VALUES

	RESISTANCES	Values (ohms)
R1	V1 CG decoupling ...	75,000
R2	V2 pent. CG decoupling...	500,000
R3	V2 osc. CG resistance ...	50,000
R4	1st IF trans. damping ...	750,000
R5	Part of V2 oscillator anode circuit stabiliser ...	100
R6	V2 osc. anode HT feed ...	23,000
R7	V1, V2, V3 SG's HT potential divider	23,000
R8		35,000
R9	V3 anode HT feed ...	10,000
R10	IF stopper	100,000
R11	Manual volume control...	2,000,000
R12	V4 signal diode load ...	500,000
R13	T.I. anode HT feed ...	1,000,000
R14	V4 GB resistance ...	750
R15	V4 triode anode load ...	50,000
R16	V4 AVC diode load resistances	500,000
R17		500,000
R18		500,000
R19	AVC delay and GB potential divider	1,000
R20		7,500
R21		50,000
R22	V5 CG resistance ...	150,000
R23	V5 CG decoupling ...	100,000
R24	HT smoothing resistance	1,000
R25	Hum neut. coil shunt ...	0·4

	OTHER COMPONENTS	Approx. Values (ohms)
L1	Aerial SW tuning coil ...	0·1
L2	Aerial MW tuning coil ...	6·0
L3	Aerial LW tuning coil ...	14·0
L4	V1 anode SW tuning coil	0·1
L5	V1 anode MW tuning coil	5·5
L6	V1 anode LW tuning coil	14·0
L7	V2 cathode stabiliser ...	0·1
L8	Osc. SW tuning coil ...	0·1
L9	Osc. MW tuning coil ...	5·5
L10	Osc. LW tuning coil ...	4·2
L11	Osc. SW reaction coil ...	1·0
L12	Osc. MW reaction coil ...	2·0
L13	Osc. LW reaction coil ...	3·0
L14	1st IF trans. Pri. ...	5·0
L15	1st IF trans. Sec. ...	5·0
L16	2nd IF trans. Pri. ...	5·0
L17	2nd IF trans. Sec., total	5·0
L18	Speaker speech coil ...	4·0
L19	Hum neutralising coil ...	0·8
L20	Speaker field coil ...	1,600·0
T1	Output trans. Pri. ...	400·0
	Output trans. Sec. ...	0·6
T2	Mains trans. Pri., total ...	30·0
	Mains trans. Heater sec., total	0·4
	Mains trans. Rect. heat. sec....	0·1
	Mains trans. HT sec., total ...	630·0
S1-S12	Waveband switches ...	—
S13	Gram. pick-up switch ...	—
S14	Mains switch, ganged R11	—

	CONDENSERS	Values (μF)
C1	Series aerial condenser	0·0000075
C2	V1 CG decoupling ...	0·05
C3	HT circuit RF by-pass ...	0·1
C4	HT blocking condenser	0·1
C5	V1 to V2 RF coupling ...	0·000035
C6	V2 osc. CG condenser ...	0·00005
C7	Osc. circuit LW fixed trimmer	0·000023
C8	Osc. circuit SW tracker...	0·0035
C9	Osc. circuit MW fixed tracker	0·00035
C10	Part of V1 oscillator anode circuit stabiliser	0·00015
C11*	V2 osc. anode decoupling	4·0
C12	V2 osc. anode RF bypass	0·005
C13*	V1, V2, V3 SG's decoupling	4·0
C14		0·1
C15	V3 CG decoupling ...	0·23
C16	V3 anode decoupling ...	0·05
C17	Coupling to V4 AVC diode	0·000075
C18	MW and LW AF coupling to V4 triode ...	0·01
C19	SW AF coupling to V4 triode	0·001
C20	AVC line decoupling ...	0·05
C21*	HT smoothing condenser	4·0
C22	IF by-pass	0·0001
C23*	V4 cathode by-pass ...	25·0
C24	IF by-pass	0·00035
C25	V4 triode to V5 AF coupling	0·05
C26	V5 CG decoupling ...	0·03
C27	Speaker field shunt ...	0·05
C28	Fixed tone corrector ...	0·0023
C29*	HT smoothing	8·0
C30	HT circuit RF by-pass ...	0·015
C31*	HT smoothing	4·0
C32‡	Aerial circ. SW trimmer	—
C33‡	Aerial circ. MW trimmer	—
C34‡	Aerial circ. LW trimmer	—
C35†	Aerial circuit tuning ...	—
C36‡	V1 anode MW trimmer...	—
C37‡	V1 anode LW trimmer...	—
C38†	V1 anode circuit tuning	—
C39†	**Oscillator circuit tuning**	—
C40‡	Osc. circuit SW trimmer	—
C41‡	Osc. circuit MW trimmer	—
C42‡	Osc. circuit MW tracker	—
C43‡	Osc. circuit LW trimmer	—
C44‡	Osc. circuit LW tracker	—
C45‡	1st IF trans. pri. tuning	—
C46‡	1st IF trans. sec. tuning	—
C47‡	2nd IF trans. pri. tuning	—
C48‡	2nd IF trans. sec. tuning	—
C49†	Variable tone control ...	—

* Electrolytic. † Variable. ‡ Pre-set.

Circuit Description—(*continued*)

trolytic condensers **C21, C29** and **C31,** while **C2, C30** operate as RF by-passes. HT supply to **V3** and **V5** anodes is smoothed only by **L20** and the associated condensers, but all screen feeds and **V1, V2** and **V4** triode receive additional smoothing from **R24, C21.**

Fixed DC potentials for GB to all control grids except **V4,** and for AVC delay, are obtained from a potential divider comprising resistances **R19, R20, R21,** the total voltage drop being that across the speaker field, with which it is connected in parallel.

The scale lamp is of the high voltage type, rated at 230 V, and is connected across 195-223 V section of the primary of the mains transformer **T2.** The connections are indicated in our diagram at **c, d.** There are also special connections, marked **a, c** in our diagram, for the tuning indicator heater, as this is rated at 6.3 V, while the remaining valves are rated at 4 V and are connected to **a** and **b** on the heater secondary.

DISMANTLING THE SET

A detachable bottom is fitted to the cabinet and upon removal (three round-head wood screws) gives access to most of the components beneath the chassis.

Removing Chassis.—Remove the knobs from the spindles of the wave-change switch and volume control (recessed self-tapping screws), those from the tone control and slow-motion tuning (recessed grub screws), and the large tuning knob (pull off);

remove the four bolts (with washers and spring washers) holding the chassis to the bottom of the cabinet and free the speaker leads from the cleat holding them to the sub-baffle.

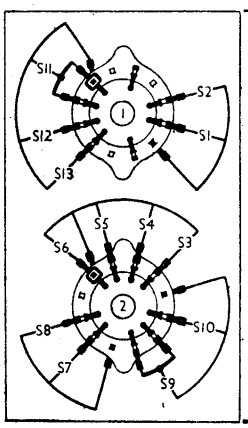
The chassis can now be withdrawn to the extent of the speaker leads, which is sufficient for normal purposes.

To free the chassis entirely, unsolder the speaker leads.

When replacing, connect them as follows: 2, yellow; 6, black and black lead to speaker; 7, yellow/black.

Removing Speaker.—If it is desired to remove the speaker from the cabinet, remove the four screws (with lock washers) holding it to the sub-baffle.

When replacing see that tags 6, 7 and 8 are at the top.



Diagrams of the waveband switch units, viewed from the directions of their respective arrows in our underchassis view, where they face opposite directions.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on mains of 232 V, using the 224-255 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.

If, as in our case, **V2** should become unstable when measurements are being made of its screen current, it can be stabilised by connecting a non-inductive condenser of about 0.1 μF from the grid (top cap) to chassis.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 W42	228	5·2	70	1·3
V2 X42	228	2·2	70	2·1
	Oscillator			
	135	3·7		
V3 W42	186	5·0	70	1·3
V4 DH42	127	1·8	—	—
V5 N42*	237	30·0	228	4·5
V6 U12/14	338†	—	—	—

* May be KT42. † Each anode, AC.

GENERAL NOTES

Switches.—S1-S12 are the waveband switches, and **S13** the pick-up switch, ganged in two rotary units beneath the chassis. These are indicated in our underchassis view, and shown in detail in the diagrams below.

The table below gives the switch positions for the four control settings,

Switch Table

Switch	LW	MW	SW	Gram
S1	—	C	—	—
S2	—	—	C	—
S3	—	—	—	C
S4	—	—	C	—
S5	—	C	—	—
S6	C	—	—	—
S7	—	C	—	—
S8	—	—	C	—
S9	—	—	C	C
S10	—	C	—	—
S11	C	C	—	—
S12	—	—	C	—
S13	—	—	—	C

starting from fully anti-clockwise. A dash indicates open, and **C** closed.

S14 is the QMB mains switch, ganged with the volume control **R11.**

Coils.—L1-L3; L4-L6; L8-L13, and the IF transformers **L14, L15** and **L16, L17** are in five screened units on the chassis deck. Most of these contain additional components as indicated in our plan chassis view. **L7** is a small coil on a tubular former beneath the chassis.

Scale Lamp.—This is a special high voltage Osram tubular type, with a small double-pole bayonet cap base. It is rated at 230 V, 15 W, and is connected across the 195-223 V section of the primary of **T2.**

External Speakers.—These should be low-resistance (5 O) types, and in the case of the Models 559 and 557, they should be connected across tags 2 and 3 on the internal speaker terminal strip : that is, across the secondary of **T1.**

In the case of the radiogram models 567, 571 and 576, two sockets are provided for a 5 O external speaker. Across these sockets is connected a 50 O resistance. A switch is fitted, which connects into circuit either the internal or external speakers separately, or both together.

The resistance loads **T1** secondary in the event of the internal speaker being switched "off" inadvertently while no external speaker is connected, as otherwise **V5** might be damaged.

Condensers C11, C13, C21, C29, C31.—These are five dry electrolytics in a single metal-cased unit on the chassis deck. The case is isolated, and the connections are made via colour coded leads emerging from a hole in the chassis deck.

The red lead is the positive of **C29** (8 μF) and the brown the negative. The black lead is the common negative of all the other condensers in the unit. The yellow lead to **R6** is the positive of **C11** (4 μF), the yellow lead to **R15** is the positive of **C21** (4 μF), the yellow lead to **R24** the positive of **C31** (4 μF), and the green lead the positive of **C13** (4 μF). The unit is a Dubilier type 3221.

Trimmers.—Note that the majority of these are reached from the underside of the chassis, the trimmers being inside the bases of the respective coil units. The IF trimmers are reached through holes in the sides of their cans.

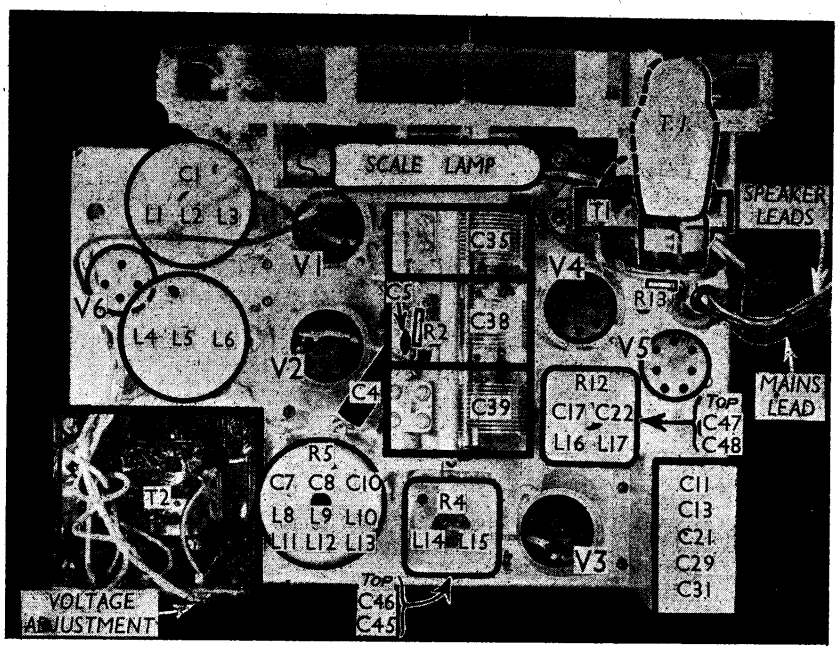
Trackers.—The two variable trackers can be adjusted through holes in the rear chassis member.

Resistance R25.—The hum neutralising coil shunt is a short length of resistance wire, with insulating sleeving, connected between tags 3 and 4 on the internal speaker terminal panel.

Chassis Divergencies.—The various models alluded to in this sheet have minor divergencies.

In the first place, models 557 (table) and 567 (radiogram) have no tuning indicator. The circuit is the same as that which we give, except that the Y63 indicator and its connections, together with **R13,** are removed. The mains transformer is also slightly different in that the extra winding between **b** and **c** on the heater secondary, to give 6.3 V, is not included.

Next, the tone control circuit may be different. Broadly speaking, the 559, 575 and 576 have the variable condenser tone control shown by us, but the 557 and 567 mostly have an older type of tone control. Also, some of the 559, 575 and 576 models may have the old control, while some of the 557 and 567 models may have the later type.



Plan view of the chassis. The multiple condenser block is seen on the right. The IF adjustments are approximately indicated, but all other adjustments are seen in the under-chassis view. The only difference in the 557 and 567 is the omission of the tuning indicator with its feed resistance **R13.**

In chassis having the earlier type **C49** is missing. Instead, there is a three-position rotary switch, with two common tags joined to the anode side of **T1** primary, and two other tags joined to one side respectively of each of two fixed condensers, 0.01 μF and 0.023 μF. The other sides of each of these condensers are joined together and to the HT side of **T1** primary.

In the first position of the switch, neither condenser is in circuit, in the second position, the smaller condenser is in parellel with **T1** primary, and in the third position, both condensers are in parallel with it.

All radiogram models have a 7,500 O resistance connected across the pick-up winding. The external speaker connections are explained earlier under "External Speaker." In early models an N42 output pentode is used in place of the KT42 tetrode.

CIRCUIT ALIGNMENT

IF Stages.—Switch set to LW, turn gang to maximum and volume control to maximum. Connect signal generator to control grid (top cap) of **V2,** via a 0.1 μF condenser, leaving existing top cap connection in place, and to chassis. Feed in a 465 KC/S (645.16 m) signal and adjust **C45, C46, C47** and **C48** in that order, for maximum output. Re-check these adjustments.

RF and Oscillator Stages: SW.—Connect signal generator to **A** and **E** sockets and switch set to SW. Feed in an 18 m (16.7 MC/S) signal, tune it in, and adjust **C40** and **C32** for maximum output, rocking the gang slightly for optimum results.

Feed in a 50 m (6 MC/S) signal, tune it in. Then adjust the inductance of **L1** if necessary. A loop of wire will be found running across the coil former and this loop must be bent up or down until maximum output is obtained. Identify the loop by first removing the coil can; then replace the can and move the loop by a strip of insulating material with a suitable nick in it. This adjustment will not normally be necessary.

Return to 18 m and readjust **C32** very carefully, while rocking the gang.

MW.—Switch set to MW, turn gang to minimum, and feed in a 195 m (1,540 KC/S) signal. Adjust **C41** for maximum output. Feed in a 225 m (1,330 KC/S) signal, tune it in, and adjust **C33** and **C36** for maximum output. Feed in a 530 m (565 KC/S) signal, tune it in, and adjust **C42** for maximum output, rocking the gang for optimum results. Return to 195 m, and check setting of **C41.**

LW.—Switch set to LW, turn gang to minimum, and feed in a 725 m (413 KC/S) signal. Adjust **C43** for maximum output. Feed in an 800 m (375 KC/S) signal, tune it in, and adjust **C34** and **C37** for maximum output. Feed in a 1,900 m (158 KC/S) signal, tune it in, and adjust **C44** for maximum output, rocking the gang for optimum results. Check setting of **C43** at 725 m.

Finally, return to MW and go through whole of MW and LW alignment again. Set the scale pointer to give best possible calibration compromise.

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