NUMBER 128 **'TRADER' SERVICE SHEETS**

PHILIPS 575A

ALL-WAVE A.C. SUPERHET

OF the all-wave type, the Philips 575A 5-valve (plus rectifier) A.C. superhet includes a short wave band of 16-50 metres, and is suitable for mains of 100-260 V.

CIRCUIT DESCRIPTION

Aerial input via coupling coils **L2** (S.W.), **L4** (M.W.) and **L6** (L.W.) to tuned circuits comprising **C44** and coils **L3** (S.W.), **L5** (M.W.), and **L7** (L.W.). All coils are independently switched. I.F. filter circuit **L1, C40** prevents interference. Condenser **C1** and resistance **R1** are shunted across aerial-earth circuit on M.W. and L.W. in order to ensure constant sensitivity.

First valve (**V1, Mullard metallised VP4B**) is an H.F. pentode operating as signal frequency amplifier with tuned-secondary transformer couplings to octode frequency changer (**V2, Mullard metallised FC4**). Primaries **L8** (S.W.), **L10** (M.W.), **L12** (L.W.); secondaries **L9** (S.W.), **L11** (M.W.), **L13** (L.W.) tuned by **C48.** Oscillator grid coils **L14** (S.W.), **L16** (M.W.), **L18** (L.W.), tuned by **C49**; tracking by **C16, C53** (M.W.) and **C17, C54** (L.W.); anode reaction coils **L15** (S.W.), **L17** (M.W.), **L19** (L.W.).

Moving-iron meter visual tuning indicator **T.I.** in common H.T. feed circuit to **V1** and **V2** pentode anodes.

Single variable-mu H.F. pentode I.F. amplifier (**V3, Mullard metallised VP4B**) operating with fixed G.B. and tuned-primary tuned-secondary transformer couplings **L20, L21** and **L22, L23.** The first transformer is so arranged that the coupling between its primary and secondary windings can be varied in order to provide variable selectivity over a band-width of 10-20 KC/S.

Intermediate frequency 115 KC/S.

Diode second detector forms part of double diode triode valve (**V4, Mullard metallised TDD4**). Audio-frequency component in rectified output is developed across manual volume control **R27** and passed via coupling condenser **C26** and I.F. stopper **R29** to grid of triode section which operates as L.F. amplifier. Resistance **R26** and condenser **C24** are for tone compensation in the upper register while **C27, R31** and **C28** preserve the bass response. Provision for connection of gramophone pick-up across volume control. I.F. filtering in **V4** triode anode circuit by tuned filter **L24, C59** and by-pass condensers **C30** and **C60.**

Second diode of **V4,** fed from **V3** anode via **C31,** provides D.C. potential which is developed across **R34, R35** and fed back through decoupling circuits as G.B. to H.F. and F.C. valves, giving automatic volume control.

Inter-station noise suppression is obtained by biasing **V4** signal diode negative with respect to cathode by means of the voltage drops along cathode resistances **R32** (**V4**) and **R10** (**V1** and **V4**). Control is effected by variable resistance **R14** which, in conjunction with H.T. potential divider **R15, R16, R17, R18,** applies neutralising positive potential to diode anode. Since the fixed G.B. applied to **V1** by reason of the drop along **R10** is somewhat high, a neutralising positive potential is provided by potentiometer **R4, R8.**

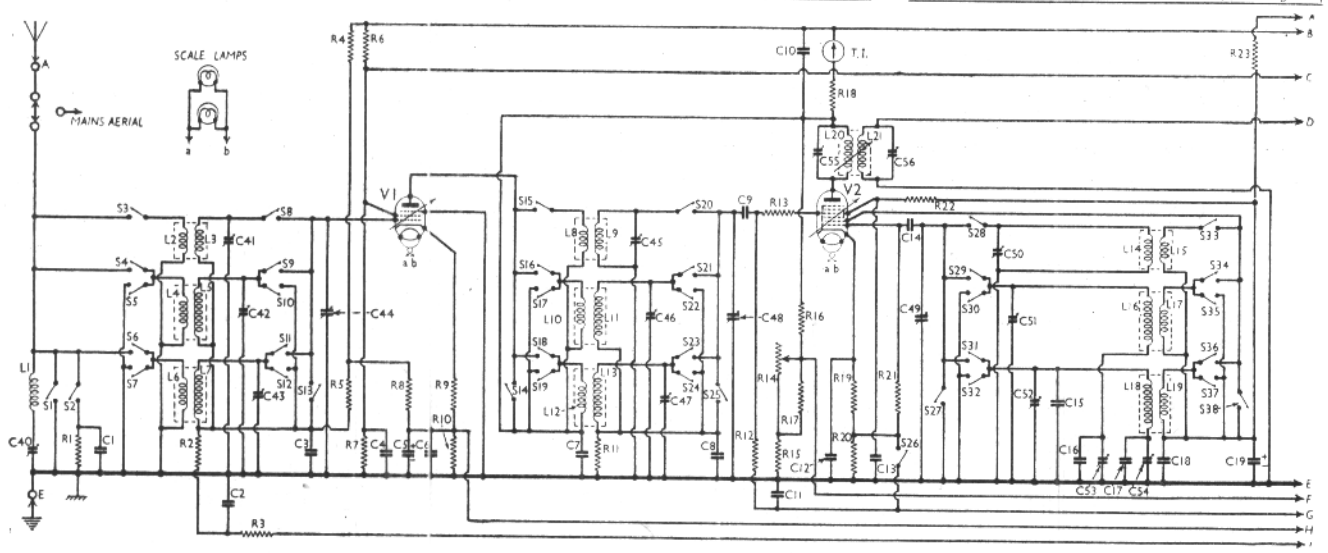
Resistance-capacity coupling by **R33, C32** and **R36** between **V4** triode section and output triode (**V5, Mullard AC044**). Provision for connection of high-impedance external speaker across primary of **T.1.** Switch **S45** breaks internal speaker speech coil circuit.

H.T. current is supplied by full-wave rectifying valve (**V6, Philips 1561**). Smoothing by iron-cored choke **L26** and electrolytic condensers **C35, C36.** Mains aerial connection by condenser **C37.**

COMPONENTS AND VALUES

	Resistances	Values (ohms)
R1	Aerial-earth shunt (M.W. and L.W.)	32,000
R2	V1 C.G. decoupling	10,000
R3	V1 A.V.G. line decoupling	2,000,000
R4	Parts of noise suppression circuit	400,000
R5		5,000,000
R6	V1 and V3 S.G.'s H.T. potential divider	6,250
R7		40,000
R8	Part of noise suppression circuit	32,000
R9	V1 fixed G.B. resistances	64
R10		1,600
R11	V2 pentode C.G. decoupling	10,000
R12	V2 pentode C.G. resistance	200,000
R13	V2 pentode C.G. circuit stabiliser	40
R14	Parts of noise suppression circuit	500,000
R15		5,000
R16		160,000
R17		2,500
R18	V1 and V2 anodes decoupling	8,000
R19	V2 fixed G.B. resistances	250
R20		250
R21	V2 osc. C.G. resistance	50,000
R22	V2 S.G.'s H.T. feed	10,000
R23	V2 S.G.'s and osc. anode H.T. feed	40,000
R24	V3 anode decoupling	5,000
R25	V3 fixed G.B. resistance	320
R26	Treble compensation resistance	500,000
R27	Manual volume control	500,000
R28	Part of noise suppression circuit	320,000
R29	V4 triode C.G. I.F. stopper	500,000
R30	V4 triode C.G. resistance	250,000
R31	Part of bass comp. circuit	1,600,000
R32	V4 triode cathode resistance	3,200
R33	V4 triode anode load	200,000
R34	V4 A.V.C. diode load	640,000
R35		640,000
R36	V5 C.G. resistance	640,000
R37	V5 C.G. I.F. stopper	1,000
R38	V5 G.B. resistance	615

	Condensers	Values (μF)
C1	Aerial-earth shunt	0·00008
C2	V1 A.V.C. line decoupling	0·05
C3	V1 C.G. decoupling	0·05
C4	V1 S.G. by-pass	0·1
C5*	V1 cathode by-passes	25·0
C6		0·05
C7	V1 anode decoupling	0·1
C8	V2 pentode C.G. decoupling	0·05
C9	V2 pentode C.G. condenser	0·00002
C10	V2 pentode anode decoupling	0·1
C11	V2 pent. A.V.C. line decoupling	0·05
C12	V2 cathode by-pass	0·05
C13	V2 S.G.'s by-pass	0·1
C14	V2 osc. C.G. condenser	0·0001
C15	Oscillator L.W. trimmer	0·00001
C16	Oscillator M.W. tracker	0·00157
C17	Oscillator L.W. tracker	0·00045
C18	V2 oscillator anode decoupling	0·1
C19*		32·0
C20	V3 anode decoupling	0·1
C21	V3 S.G. by-pass	0·1
C22	V3 cathode by-pass	0·05
C23	Gramophone pick-up coupling	0·05
C24	Treble compensation condenser	0·0002
C25	I.F. by-pass	0·00016
C26	L.F. coupling to V4 triode	0·05
C27	Bass compensation condensers	0·2
C28		0·005

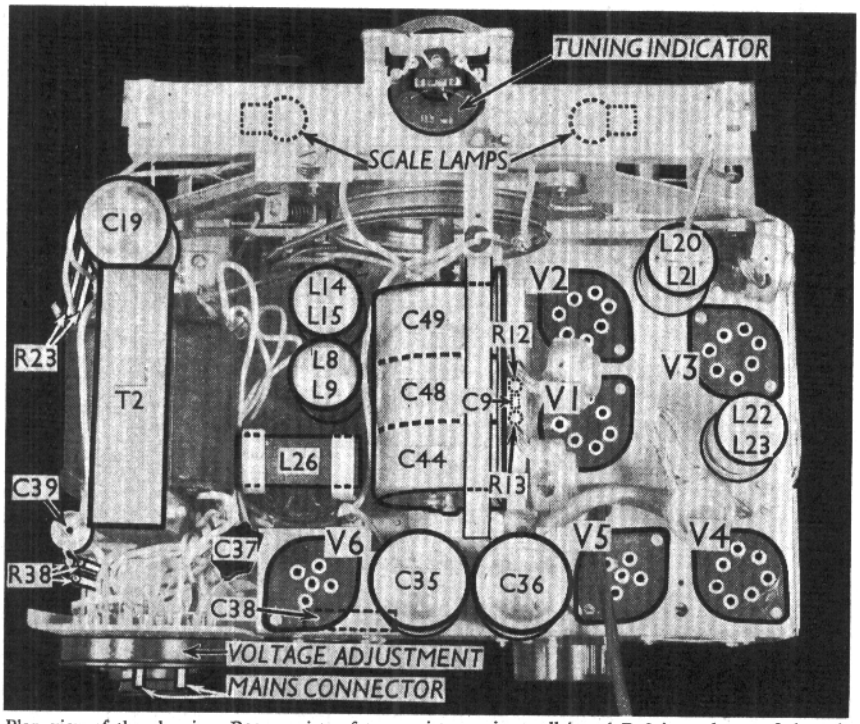


Above, and on the opposite page, is the circuit diagram of the Philips 575A. The lettered arrows to the right of the above section, and to the left of that opposite are merely to assist the reader in tracing out the circuit. They do not indicate breaks or joins in the actual chassis wiring. Note that all the coils are separately switched, and those which are tuned each have separate trimmers.

	Condensers (continued)	Values (μF)
C29*	V4 cathode by-pass	25·0
C30	V4 anode I.F. by-pass	0·0001
C31	Coupling to V4 A.V.C. diode	0·00005
C32	V4 to V5 L.F. coupling	0·01
C33	T1 primary shunt	0·0005
C34	T1 secondary shunt	3·0
C35*	H.T. Smoothing	32·0
C36*	H.T. Smoothing	32·0
C37	Mains aerial coupling	0·0005
C38	V6 anode H.F. by-pass	0·01
C39*	V5 G.B. resistance by-pass	16·0
C40‡	Aerial I.F. filter tuning	0·000145
C41‡	Aerial circuit trimmer (S.W.)	0·000027
C42‡	Aerial circuit trimmer (M.W.)	0·000027
C43‡	Aerial circuit trimmer (L.W.)	0·000027
C44†	Aerial circuit tuning	0·000465
C45‡	H.F. trans. trimmer (S.W.)	0·000027
C46‡	H.F. trans. trimmer (M.W.)	0·000027
C47‡	H.F. trans. trimmer (L.W.)	0·000027
C48†	H.F. trans. tuning	0·000465
C49†	Oscillator tuning	0·000465
C50‡	Oscillator trimmer (S.W.)	0·000027
C51‡	Oscillator trimmer (M.W.)	0·000027
C52‡	Oscillator trimmer (L.W.)	0·000027
C53‡	Oscillator M.W. tracker	0·00029
C54‡	Oscillator L.W. tracker	0·000145
C55‡	1st I.F. trans. pri. tuning	0·000145
C56‡	1st I.F. trans. sec. tuning	0·000145
C57‡	2nd I.F. trans. pri. tuning	0·000145
C58‡	2nd I.F. trans. sec. tuning	0·000145
C59‡	V4 anode I.F. filter tuning	0·000145
C60	V4 anode I.F. by-pass	0·00016

* Electrolytic. † Variable. ‡ Pre-set.

	Other Components	Approx. Values (ohms)
L1	Aerial I.F. filter coil	135·0
L2	Aerial coupling coil (S.W.)	3·0
L3	Aerial tuning coil (S.W.)	Very low
L4	Aerial coupling coil (M.W.)	27·0
L5	Aerial tuning coil (M.W.)	3·8
L6	Aerial coupling coil (L.W.)	125·0
L7	Aerial tuning coil (L.W.)	50·0
L8	H.F. trans. primary (S.W.)	1·4
L9	H.F. trans. secondary (S.W.)	Very low
L10	H.F. trans. primary (M.W.)	3·5
L11	H.F. trans. secondary (M.W.)	2·2
L12	H.F. trans. primary (L.W.)	4·4
L13	H.F. trans. secondary (L.W.)	4·8
L14	Oscillator tuning coil (S.W.)	Very low
L15	Oscillator reaction coil (S.W.)	Very low
L16	Oscillator tuning coil (M.W.)	4·0
L17	Oscillator reaction coil (M.W.)	3·2
L18	Oscillator tuning coil (L.W.)	32·0
L19	Oscillator reaction coil (L.W.)	3·4
L20, L21	1st I.F. trans. Pri.	140·0
	1st I.F. trans. Sec.	140·0
L22, L23	2nd I.F. trans. Pri.	140·0
	2nd I.F. trans. Sec.	140·0
L24	V4 anode I.F. filter coil	135·0



Plan view of the chassis. R23 consists of two resistances in parallel, and R38 is made up of three in parallel. The tuning indicator is of the moving iron type. Each coil unit only contains two coils.

	Other Components (continued)	Approx. Values (ohms)
L25	Speaker speech coil	4·8
L26	H.T. smoothing choke	290·0
T1	Speaker input trans. Pri.	250·0
	Speaker input trans. Sec.	0·7
T2	Mains trans. Pri. total	30·0
	Mains trans. Heater sec.	0·05
	Mains trans. Rect. fil. sec.	0·1
	Mains trans. H.T. sec. total	250·0
T.I.	Tuning indicator meter	2,000·0
S1-S42	Ganged switches	—
S43, S44	Mains switches, ganged R27	—
S45	Internal speaker switch	—

DISMANTLING THE SET

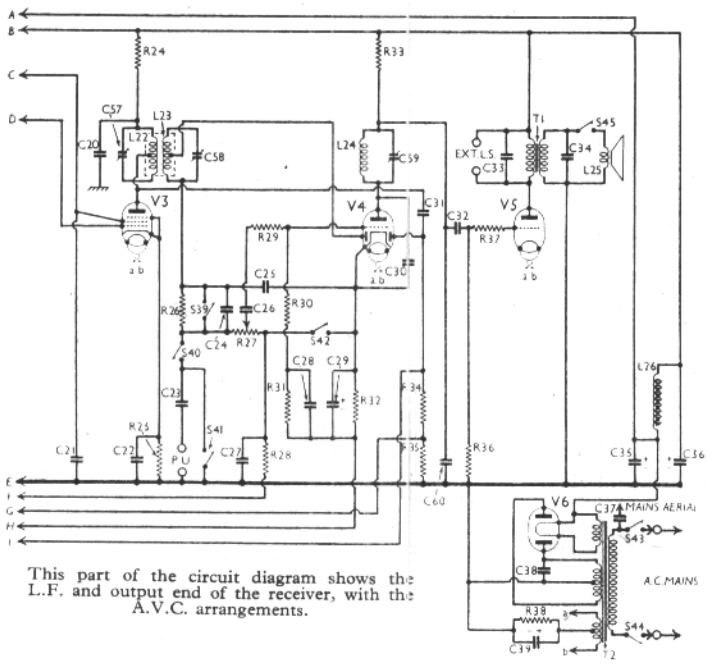
A detachable bottom is fitted to the cabinet and upon removal (eight round-head wood screws, six with washers) gives access to most of the under-chassis components, after the screen has been removed by taking out the two small self-tapping screws holding it to the back of the chassis, and sliding it out of position.

Removing Chassis.—Remove the five control knobs (recessed grub screws) and the four bolts (with washers) holding the chassis to the bottom of the cabinet. Free the switch indicator control rod from the coupling (grub screw), remove the tuning indicator (two screws) and unsolder the earthing lead to the speaker. The chassis can now be withdrawn, taking care that the stud on the pointer drive belt is freed from the pointer carriage. There is sufficient slack on the speaker leads to allow of normal repairs being carried out, but if it is desired to operate the chassis, the speaker earthing lead will have to be extended and provision made for connecting the mains.

When replacing, take care that the drive belt stud engages in the slot on the clip on the pointer carriage.

To free the chassis entirely, unsolder the leads to the speaker transformer primary.

Removing Speaker.—Unsolder the leads to the speaker transformer and the speaker switch and slacken the three clamps (nuts, lock nuts and washers). *When replacing*, see that the terminal strip is on the right.



This part of the circuit diagram shows the L.F. and output end of the receiver, with the A.V.C. arrangements.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on mains of 230 V, using the 220 V tapping on the mains transformer. The volume and sensitivity controls were at maximum and the set was tuned to the lowest wavelength on the medium band but there was no signal input.

Voltages were measured on the 1,200 V scale of an Avometer, with chassis as negative.

Valve	Anode Volts	Anode Current (mA)	Screen Volts	Screen Current (mA)
V1 VP4B*	195	7·1	210	2·9
V2 FC4	190	2·4	80	2·4
V3 VP4B	250	8·1	210	3·0
V4 TDD4	90	1·0	—	—
V5 ACO44	280	53·0	—	—
V6 1561	300†	—	—	—

* Osc. anode (G2) 100 V, 2·6 mA.
† Each anode, A.C.

GENERAL NOTES

Switches.—The switches **S1-S42** are ganged in seven units, indicated in the under-chassis view, and shown in detail in separate diagrams. Each unit is numbered, and the arrows in the under-chassis illustration show the direction in which each unit is viewed, from the under-side of the chassis. In the table overleaf, the column headed "Function" contains letters W, M and G. W indicates wavechange, M indicates radio muting and G indicates gramophone. As usual, O and C stand for open and closed respectively.

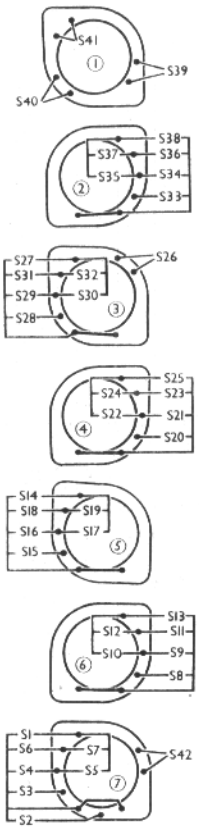
(*Continued overleaf*)

PHILIPS 575A (*continued*)

Switch	Function	S.W.	M.W.	L.W.	Gram.
S1	M	O	O	O	C
S2	W	O	C	C	C
S3	W	C	O	O	C
S4	W	O	C	O	O
S5	W	C	O	O	O
S6	W	O	O	C	O
S7	W	C	C	O	O
S8	W	C	O	O	C
S9	W	O	C	O	O
S10	W	C	O	O	O
S11	W	O	O	C	O
S12	W	C	C	O	O
S13	M	O	O	O	C
S14	M	O	O	O	C
S15	W	C	O	O	C
S16	W	O	C	O	O
S17	W	C	O	O	O
S18	W	O	O	C	O
S19	W	C	C	O	O
S20	W	C	O	C	O
S21	W	O	C	O	O
S22	W	C	O	O	O
S23	W	O	O	C	O
S24	W	C	C	O	O
S25	M	O	O	O	C
S26	W	C	O	O	C
S27	M	O	O	O	C
S28	W	C	O	O	C
S29	W	O	C	O	O
S30	W	C	O	O	O
S31	W	O	O	C	O
S32	W	C	C	O	O
S33	W	C	O	O	C
S34	W	O	C	O	O
S35	W	C	O	O	O
S36	W	O	O	C	O
S37	W	C	C	O	O
S38	M	O	O	O	C
S39	W	C	O	O	C
S40	G	O	O	O	C
S41	G	C	C	C	O
S42	W	C	O	O	O

S43 and **S44** are the two Q.M.B. mains switches, ganged with the volume control **R27**, while **S45** is the internal speaker switch, mounted at the top of the cabinet.

Coils.—The coils are arranged in screened tubular units, of which there are four (including I.F. transformers) on the chassis deck, and seven beneath the chassis. Each unit contains two coils only. **L1** and **L24** are the only unscreened coils, and these are beneath the chassis.



Diagrams of the switch units, numbered and viewed from the underside of the chassis in the direction shown by the arrows in the under-chassis view below. Note that in some cases one contact is common to two different switches. The top unit (1) is actually mounted in front of the chassis.

Scale Lamps. — These are two Philips centre contact small bayonet types, rated at 6 V, 0·5 A (3 W).

External Speaker. — Sockets are provided at the rear of the chassis for the connection of a high resistance external speaker. The two outer sockets of the three should be used.

Condenser C34.—This is a 3 μF paper type in a screening can, mounted on a bracket inside the cabinet at the right.

Paralleled Resistances.—In several cases two or three resistances are wired in parallel to give the required resistance value, notably **R6, R7, R18, R23, R24** and **R38.**

Additional Resistance.—In some chassis there may be an extra resistance of 12,500 O shunted across the tuning indicator.

CIRCUIT ALIGNMENT

This is rather complicated, according to the makers' instructions, a summary of which is given below.

I.F. Circuits.—Feed a 115 KC/S signal via a 0·1 μF condenser to the top cap of **V2.** Switch set to "Gram." Keep receiver volume control at maximum, and selectivity control with maximum coupling. Connect 30,000 O resistances across **C55** and **C58.** Adjust **C56** and **C57** for maximum output. Now transfer the resistances to **C56** and **C57** and adjust **C55** and **C58** for maximum. Repeat these operations as a final check.

Aerial Filter.—Switch set to L.W. Adjust selectivity coupling to minimum. Feed a 115 KC/S signal via an artificial aerial to aerial socket. Turn volume control and tuning control to maximum. Adjust **C40** for *minimum* output.

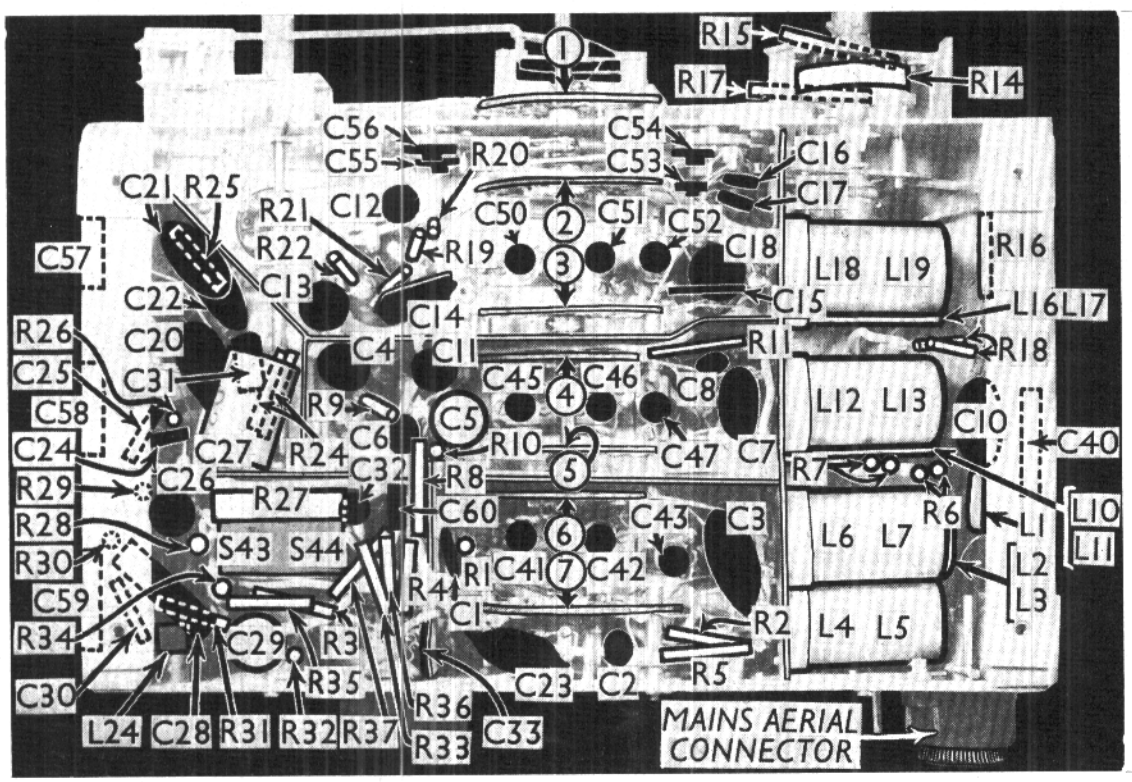
H.F. Circuits.—Adjust **C42, C46** and **C51** so that the outer tubes are 5, 7 and 3 m.m. respectively below the top of the central insulating rod. Switch set to M.W., earth the chassis, short circuit **S42,** keep the volume control at maximum and selectivity at minimum. Put oscillator out of action by shorting **C14** to the wavechange switch. Connect a 25 $\mu\mu$F condenser from the anode of **V2** to the pick-up input grid socket of an auxiliary receiver to act as an amplifier, and connect output meter to auxiliary receiver. Fit an auxiliary dial (Code No. 09, 991, 300).

Feed at 214 m. signal via artificial aerial to aerial socket. Adjust scale pointer to 214 m. Adjust **C42** and **C46** for maximum output. Remove auxiliary receiver and oscillator short, and connect output meter to set being aligned. Adjust **C51** for maximum output. The first signal from the minimum setting is the correct one.

Replace auxiliary receiver, etc., inject a 500 m. signal and tune to this signal. Remove aux. receiver, etc., and adjust **C53** for max. output. Feed in 214 m. signal again, tune exactly, and re-trim **C51.** Feed in 500 m. signal again, tune receiver to this, remove aux. receiver, etc., and re-trim **C53.**

Trim L.W. circuits in the same way, at wavelengths of 800 m. and 1900 m., using trimmers **C43, C47, C52** and **C54.**

To trim S.W. circuits, feed in an 18 m. signal via a small artificial aerial to aerial socket. Connect aux. receiver, etc., tune to 18 m. on auxiliary dial and trim **C41** and **C45** for maximum output. Remove aux. receiver, etc., and trim **C50** for maximum output.



Under-chassis view. The switch units are numbered as in the diagrams above. C53 is below C54, and C55 below C56. R25 is below C21. Some of the resistances consist of two units in parallel. Below the four coil units on the right are three further units, indicated by arrows. R15 and R17 are in front of the chassis.