AERODYNE 52
AND MODEL 60 RADIO-GRAM

THE chassis fitted in the Aerodyne 52 receiver is a 3-valve (plus rectifier) A.C. 3-band type, with a short-wave range of 16·5-50 metres.

A very similar chassis is fitted in the model 60 radio-gramophone, which, however, has pick-up switching and an automatic bias circuit for **V2.** This *Service Sheet* was prepared on the table model.

CIRCUIT DESCRIPTION

Two alternative aerial input connections. **A1** includes Droitwich rejector **L1, C15,** and **A2** goes direct to coupling coils **L6** (S.W.), **L2** (M.W.) and **L4** (L.W.). On M.W. and L.W. input is via capacity coupled band-pass filters. Primaries **L3** (M.W.), **L5** (L.W.), are tuned by **C16**; secondaries **L8** (M.W.), **L9** (L.W.), are tuned by **C20**; common coupling condenser **C1.** On S.W. band input is via single tuned circuit comprising **L7** and **C20.**

First valve (**V1, Mullard metallised VP4B**) is a variable-mu pentode operating as radio frequency amplifier with gain control by variable cathode resistance **R4** which varies G.B. applied.

Tuned-anode coupling by **L11, C25** (S.W.), **L13, C25** (M.W.) and **L14, C25** (L.W.) between **V1** and triode detector (**V2, Mazda metallised AC/HL**) which operates on grid leak system with **C5** and **R7.** Reaction is applied from anode by coils **L10** (S.W.) and **L12** (M.W. and L.W.) and controlled by variable condenser **C22.** Provision for connection of gramophone pick-up in grid circuit. H.F. filtering in anode circuit by **R11, R10, L15** and condensers **C8, C26.**

Resistance-capacity coupling by **R9, C19** and **R13** between detector and pentode output valve (**V3, Mullard Pen A4**). Fixed tone correction in anode circuit by R.C. filter **R15, C10.** Provision for connection of low-impedance external speaker across secondary of internal speaker transformer **T1.**

H.T. current is supplied by I.H.C. full-wave rectifying valve (**V4, Mullard IW4/350**). Smoothing by speaker field coil **L18** and dry electrolytic condensers **C12, C13.** Mains aerial coupling by **C14.**

DISMANTLING THE SET

Removing Chassis.—First remove the reaction and volume control knobs (pull off) and the tuning and switch knobs (recessed grub screws). Then remove the two round-head wood screws holding the top of the tuning scale and the three bolts (with washers) holding the chassis to the bottom of the cabinet.

By tilting the back upwards, the chassis can now be withdrawn to the extent of the speaker leads, which should be just sufficient for normal purposes.

To free the chassis entirely, unsolder the speaker leads and *when replacing,* connect them as follows, numbering the tags from bottom to top: 1, black; 2, blue; 3 and 4, blank; 5 and 6 joined together, red. The blue rubber-covered lead is soldered to frame of speaker.

Removing Speaker.—To remove the speaker from the cabinet, slacken the four clamps (nuts and lock nuts) and remove the two round-head wood screws (with washers) which hold the speaker to the sub-baffle. *When replacing,* see that the transformer is on the right.

COMPONENTS AND VALUES

	CONDENSERS	Values (μF)
C1	Band-pass coupling	0·02
C2	V1 S.G. by-pass	0·1
C3	V1 cathode by-pass	0·1
C4	V1 anode decoupling	0·1
C5	V2 grid condenser	0·00005
C6	V2 anode decoupling	1·0
C7	V2 heater by-pass	0·01
C8	V2 anode H.F. by-pass	0·0005
C9	V2 to V3 L.F. coupling	0·01
C10	Part of T.C. filter	0·01
C11*	V3 cathode by-pass	25·0
C12*	H.T. smoothing	8·0
C13*		8·0
C14	Mains aerial coupling	0·0002
C15‡	Droitwich rejector tuning	0·002
C16†	Band-pass primary tuning	0·00035
C17‡	Band-pass primary trimmer	—
C18‡	Band-pass sec. L.W. trimmer	0·000035
C19‡	Band-pass sec. M.W. trimmer	0·000035
C20†	Band-pass sec. and S.W. tuning	0·00035
C21‡	Aerial S.W. trimmer	—
C22†	Reaction control	0·0005
C23‡	V1 anode circuit L.W. trimmer	0·000035
C24‡	V1 anode circuit M.W. trimmer	0·000035
C25†	V1 anode circuit tuning	0·00035

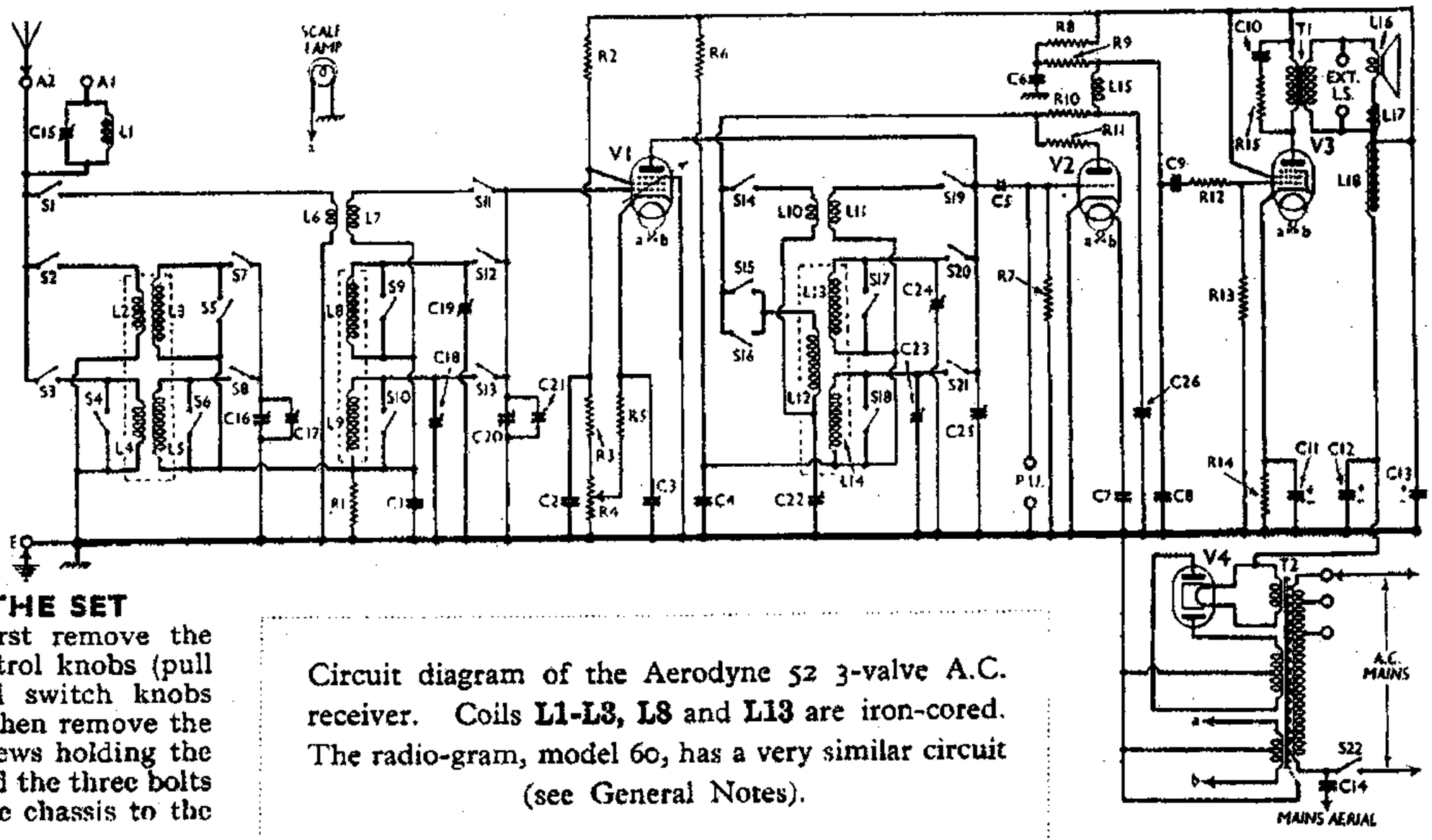
* Electrolytic. † Variable. ‡ Pre-set.

	RESISTANCES	Values (ohms)
R1	V1 C.G. decoupling	1,000
R2	V1 S.G. H.T. potential divider	20,000
R3		20,000
R4	V1 gain control	10,000
R5	V1 fixed G.B. resistance	140
R6	V1 anode decoupling	8,000
R7	V2 grid leak	500,000
R8	V2 anode decoupling	20,000
R9	V2 anode load	50,000
R10	V2 anode H.F. stoppers	5,000
R11		40
R12	V3 C.G. H.F. stopper	100,000
R13	V3 C.G. resistance	500,000
R14	V3 G.B. resistance	140
R15	Part of T.C. filter	20,000

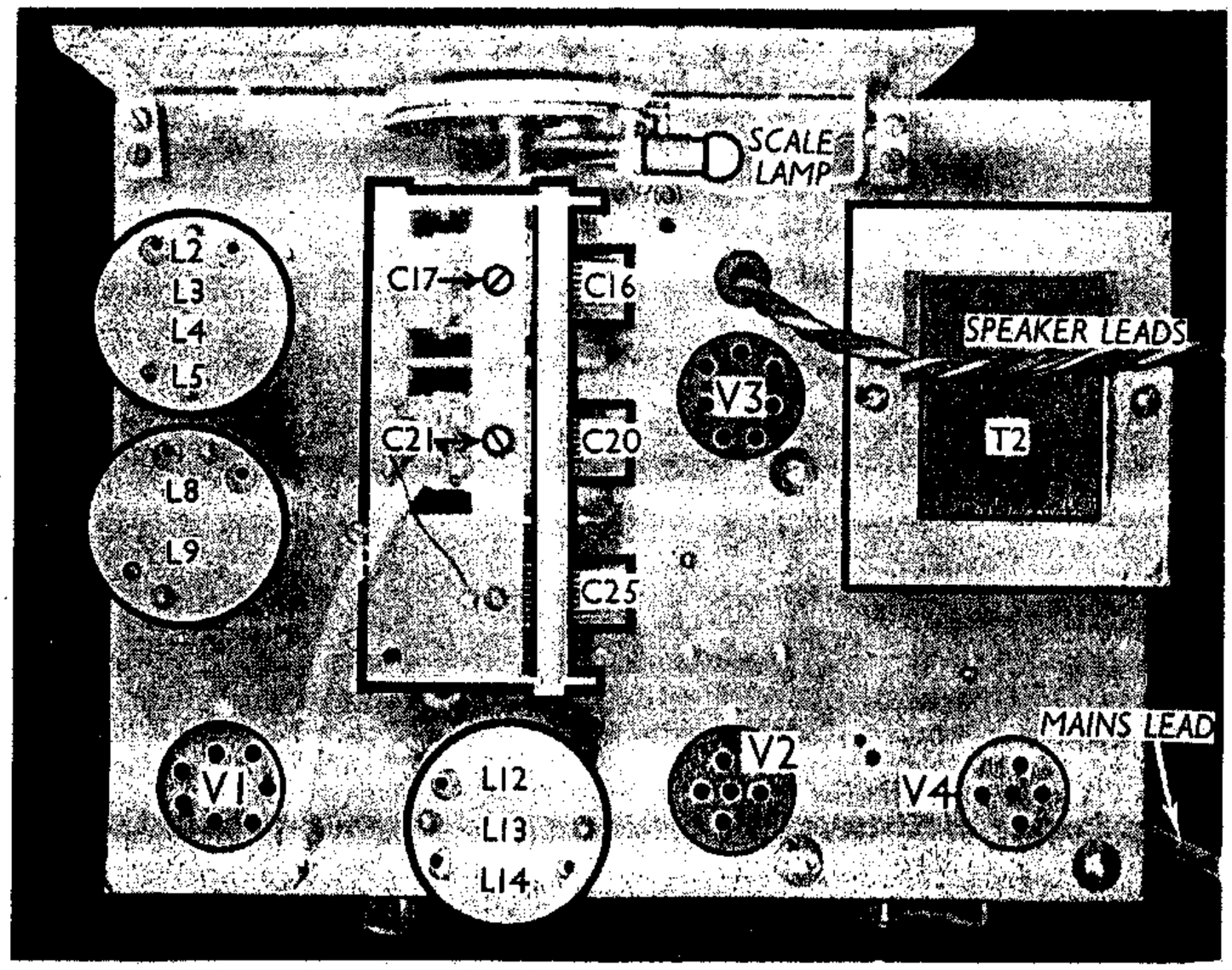
	OTHER COMPONENTS		Approx. Values (ohms)
L1	Droitwich rejector coil		1·5
L2	Aerial M.W. coupling coil		0·3
L3	M.W. band-pass primary		1·5
L4	Aerial L.W. coupling coil		15·0
L5	L.W. band-pass primary		16·0
L6	Aerial S.W. coupling coil		0·3
L7	Aerial S.W. tuning coil		0·05
L8	M.W. band-pass secondary		1·5
L9	L.W. band-pass secondary		16·0
L10	S.W. reaction coil		0·3
L11	V1 anode S.W. tuning coil		0·05
L12	M.W. and L.W. reaction coil		3·0
L13	V1 anode M.W. tuning coil		1·5
L14	V1 anode L.W. tuning coil		16·0
L15	V2 anode H.F. choke		200·0
L16	Speaker speech coil		2·2
L17	Hum neutralising coil		0·1
L18	Speaker field coil		2,000·0
T1	Speaker input trans.	Pri.	600·0
		Sec.	0·25
T2	Mains trans.	Pri. total	25·0
		Heater sec.	0·05
		Rect. heat. sec.	0·05
		H.T. sec. total	450·0
S1-21	Waveband switches		—
S22	Mains switch, ganged R4		—

VALVE ANALYSIS

Valve voltages and currents given in the table (col. 2) are those measured in



Circuit diagram of the Aerodyne 52 3-valve A.C. receiver. Coils **L1-L3, L8** and **L13** are iron-cored. The radio-gram, model 60, has a very similar circuit (see General Notes).



Plan view of the chassis. Note that there is no trimmer above C25.

our receiver when it was operating on mains of 215 V, using the 230 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 the reaction control was at minimum. There was no signal input.

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

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 VP4B ..	170	4·9	110	1·8
V2 AC/HL	50	2·0	—	—
V3 PenA4..	190	30·0	210	4·1
V4 IW4/350	265†	—	—	—

† Each anode, A.C.

GENERAL NOTES

Switches.—**S1-S21** are the wavechange switches, in three ganged rotary units beneath the chassis, indicated by numbers in circles in the under-chassis view. The arrows show the directions in which the units are viewed in the diagrams on this page. The table below gives the switch positions for the three control settings, O indicating open, and C, closed.

Switch	L.W.	M.W.	S.W.
S1	O	O	C
S2	O	C	O
S3	C	O	O
S4	O	C	O
S5	O	C	O
S6	O	C	O
S7	O	C	O
S8	O	C	O
S9	O	C	O
S10	O	C	O
S11	O	C	O
S12	O	C	O
S13	O	C	O
S14	O	C	O
S15	O	C	O
S16	O	C	O
S17	O	C	O
S18	O	C	O
S19	O	C	O
S20	O	C	O
S21	C	O	O

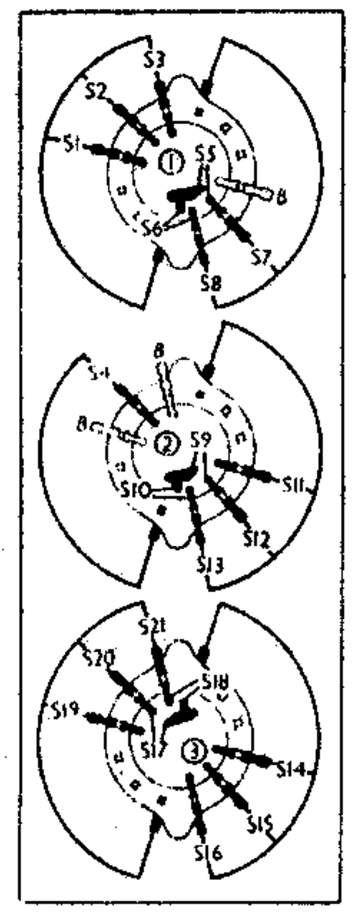
S22 is the Q.M.B. mains switch, ganged with the gain control **R4.**

Coils.—**L1** is beneath the chassis; **L2-L5, L8, L9** and **L12-L14** are in three screened units on the chassis deck; while **L6, L7** and **L10, L11** are on two tubular units beneath the chassis. **L7** and **L11** are the thick wire windings, **L6** and **L10,** each consisting of about one turn of fine wire close to one end of **L7** and **L11** respectively. **L15** is also beneath the chassis.

External Speaker.—Two sockets are provided on **T1** terminal panel for a low resistance (about 2O) external speaker.

Scale Lamp.—This is an Osram M.E.S. type rated at 3.5 V, 0.15 A.

Condensers C12, C13.—These are two 8 μF dry electrolytics in a single unit beneath the chassis, with a common negative (black) lead. The red lead to the **V4** valve-holder is the positive of **C12,** and the red lead to one end of **R2** (H.T. line) the positive of **C13.**



Switch diagrams, looking from the rear of the underside of the chassis. The units are numbered as in the under-chassis view.

Alternative Valves.—**V2,** Mullard 354V or Mazda AC/HL; **V3,** Mullard Pen 4 VB or Pen A4; **V4,** Mullard IW3 or IW4/350.

Chassis Divergencies.—In some chassis **C26** may be 0.0005 μF (not 0.001 μF), and may be connected from the top of **L12** to chassis. **R15** may not occur in some chassis, **C10** being directly across the primary of **T1.**

Radio-gram Modifications.—In the radio-gram (Model 60) the circuit is identical except for certain additions. One pick-up socket goes to chassis, as in the table model, but the other goes to the fixed contact of an extra switch. The junction

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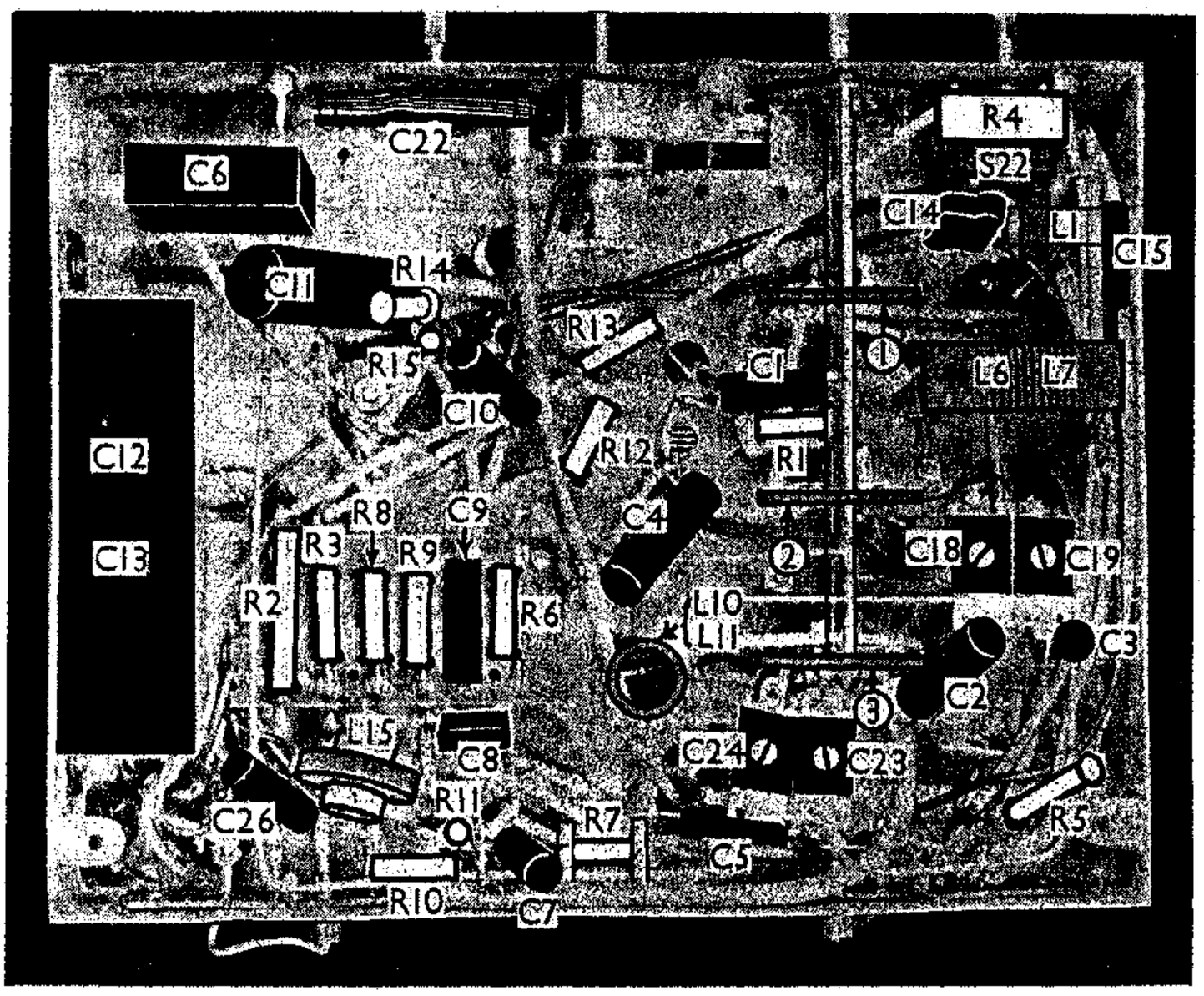

Under-chassis view. L6, L7 and L10, L11 are S.W. coil units.

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between **C5** and **R7** goes to the fixed contacts of three further switches (which are common). The control grid of **V2** goes to the common moving contact of the four switches. The pick-up is connected direct to grid in the gram. position while on radio it is disconnected. On gram. the radio input is disconnected.

In addition, **R7** is taken to cathode of **V2,** and not to chassis, while between cathode and chassis a bias resistance of 500 O is connected. In parallel with this is a 25 μF 15 V peak electrolytic condenser.

CIRCUIT ALIGNMENT

S.W.—Feed in a 19 m. signal from the signal generator to the **A2** and **E** sockets. Tune it in on the receiver, and adjust **C21** for maximum output, rocking the gang for optimum results. Feed in a 50 m. signal and tune it in. If set needs re-alignment here and calibration is correct, adjust loose turn on **L7** so that the minimum amount of reaction is needed to cause the set to oscillate. If calibration is wrong at 50 m., adjust loose turn on **L11** first, then proceed as above with **L7.**

M.W.—Adjust **C24** for correct calibration at 250 m., then adjust **C19** and **C17.**

L.W.—Whilst rocking the gang slightly adjust **C23** for maximum signals at 1,300 m., then adjust **C18.**

C21 should not be touched after it has been adjusted for S.W.

Droitwich Rejector.—Feed in a 1,500 m. signal to **A1** and **E,** tune it in, and adjust **C15** (at side of chassis) for *minimum* output.