ALBA 812

AC SUPERHET

THE Alba 812 receiver is a 4-valve (plus valve rectifier) 3-band AC table superhet, designed to operate from mains of 190-250 V, 40-100 C/S. The SW range is 16-50 m.

There is provision for connection of a gramophone pick-up, and radio/gram switching permits it to be left connected permanently. An external high impedance speaker can also be used if desired.

Release date: January, 1941.

CIRCUIT DESCRIPTION

Aerial input via series condenser **C1** and coupling coils **L1** (SW) and **L2** (MW and LW) to single tuned circuits **L3, C28** (SW), **L4, C28** (MW), and **L5, C28** (LW). Coupling is modified on MW by the inclusion of the small "top" coupling condenser **C2.**

First valve **(V1, Mullard Amerty 6K8G)** is a triode-hexode operating as frequency changer with internal coupling. The two sections of the valve are disposed on opposite sides of the cathode, and the oscillator grid surrounds it, so that it forms the second element in each of the two cathode streams so formed, and thus establishes coupling between them.

Oscillator grid coils **L6** (SW), **L7** (MW) and **L8** (LW) are tuned by **C29.** Parallel trimming by **C30** (SW), **C31** (MW) and **C32** (LW); series tracking by **C33** (MW) and **C34** (LW). Reaction coupling by anode coils **L9** (SW), plus **L10** (MW), plus **L11** (LW), which are connected in series, **L11** being short-circuited on MW, and **L10, L11** being short-circuited on SW.

Second valve **(V2, Mullard Amerty 6K7G)** is a variable-mu RF pentode operating as intermediate frequency amplifier with tuned-primary, tuned-secondary iron-cored transformer couplings **C35, L12, L13, C36** and **C37, L14, L15, C38.** The iron-dust cores are fixed, and alignment is carried out by adjusting the preset trimmer screws in the usual manner.

Intermediate frequency 470 KC/S.

Diode second detector is part of double diode triode valve **(V3, Mullard Amerty 6Q7G).** Audio frequency component in rectified output is developed across load resistance **R8** and passed via AF coupling condenser **C14,** switch **S13** and manual volume control **R9** to CG of

Circuit diagram of the Alba model 812 AC superhet. Provision is made for the connection of a gramophone pick-up and a high impedance exter
five valves employed appear beneath the circuit diagram. Two diagrams are shown for **V5,** the **5Z4G** being an alternati

triode section, which operates as AF amplifier.

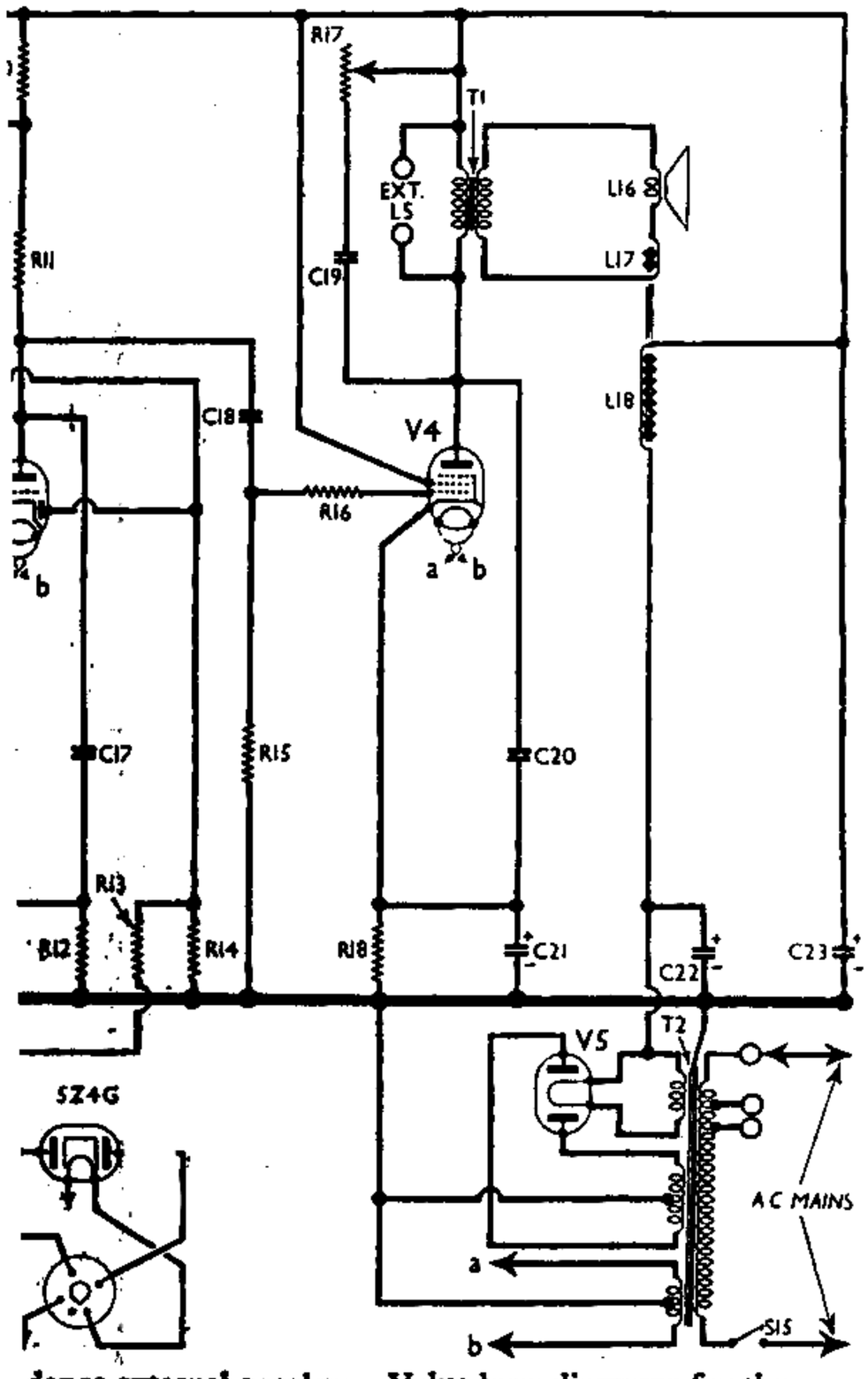
IF filtering by **C12, R7** and **C13** in diode circuit, and **C17** in triode anode circuit. Provision for connection of gramophone pick-up via switch **S14** across **R9. S14** closes when the waveband control is turned to the gram position, while at the same time **S13** opens to mute radio. The pick-up, therefore, may be left permanently connected.

Second diode of **V3,** fed from **L15** via the small coupling condenser **C16,** provides DC potential which is developed across load resistance **R14** and fed back through decoupling circuits as GB to FC (except on SW band) and IF valves, giving automatic volume control.

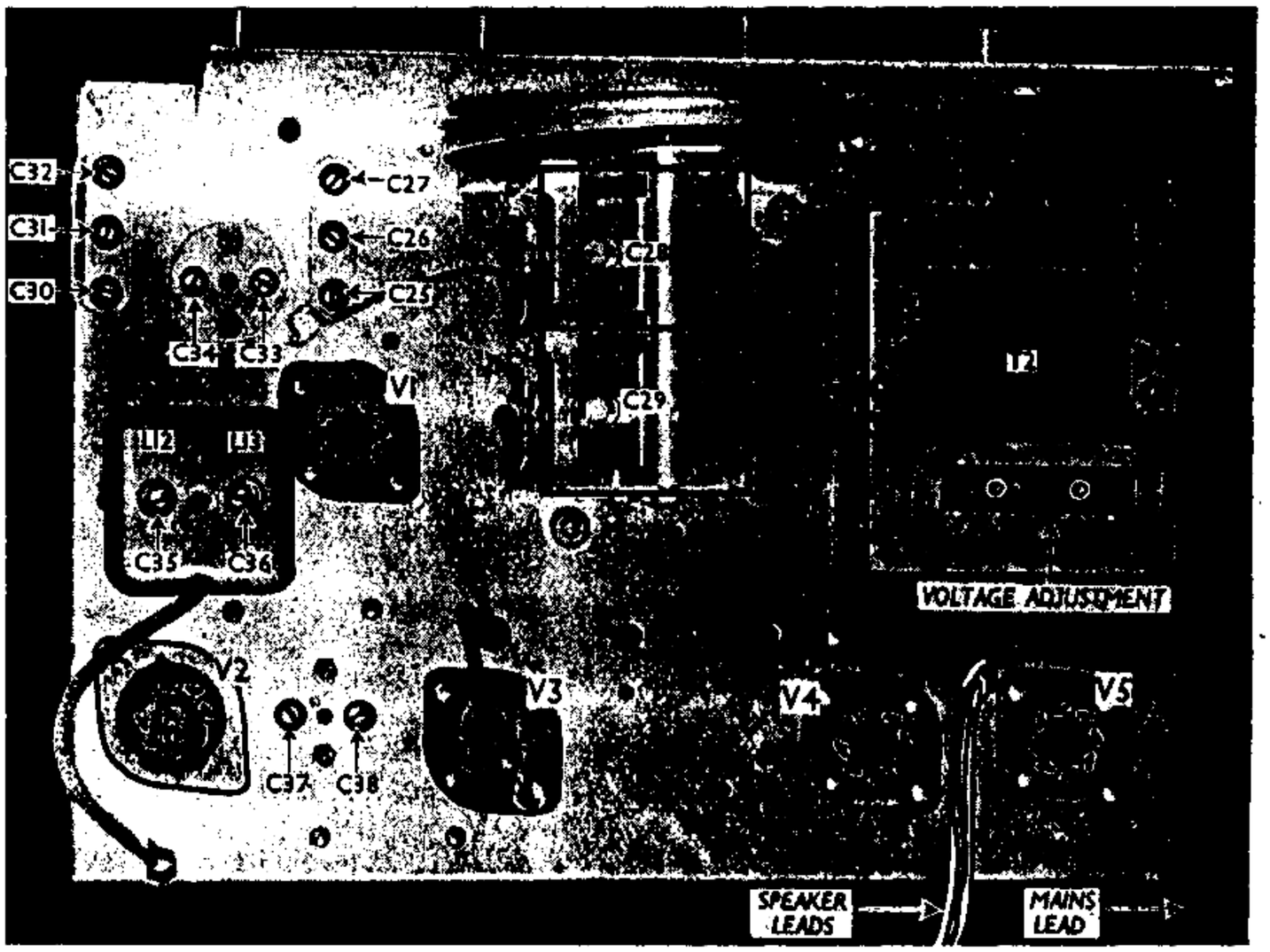
Delay voltage, together with GB for triode section, is obtained from drop along resistance **R12** in cathode lead.

Resistance-capacity coupling by **R11, C18** and **R15,** via grid stopper **R16,** between **V3** triode and pentode output valve **(V4, Mullard Amerty 6F6G).** Provision for connection of high impedance external speaker across primary of internal speaker input transformer **T1.** Fixed tone correction by **C20,** connected between anode and cathode, and variable tone control by **R17, C19,** also in anode circuit, but this time returned to HT positive line.

HT current is supplied by full-wave rectifying valve **(V5, Mullard Amerty 5Y3G** or **5Z4G).** Smoothing by speaker field **L18** and dry electrolytic condensers **C22, C23.** HT circuit RF filtering by **C24.**



dance external speaker. Valve base diagrams for the an alternative to the 5Y3G.



Plan view of the chassis. All the trimmer adjustments are indicated. The second IF transformer is beneath the chassis.

COMPONENTS AND VALUES

	RESISTANCES	Values (ohms)
R1	V1 hexode CG decoupling	200,000
R2	V1 fixed GB resistance ..	300
R3	V1 osc. CG resistance ...	50,000
R4	V1 osc. anode HT feed ...	40,000
R5	V1, V2 SG's HT feed ...	20,000
R6	V2 fixed GB resistance ...	220
R7	IF stopper	50,000
R8	V3 signal diode load ...	500,000
R9	Manual volume control ...	500,000
R10	V3 triode anode decoupling	100,000
R11	V3 triode anode load ...	150,000
R12	V3 GB triode GB; AVC delay	2,500
R13	AVC line decoupling ...	1,000,000
R14	V3 AVC diode load ...	1,000,000
R15	V4 CG resistance... ...	200,000
R16	V4 grid stopper	50,000
R17	Variable tone control ...	50,000
R18	V4 GB resistance... ...	400

	OTHER COMPONENTS	Approx. Values (ohms)
L1	Aerial SW coupling ...	0·6
L2	Aerial MW and LW coupling coil	35·0
L3	Aerial SW tuning coil ...	0·05
L4	Aerial MW tuning coil ...	1·7
L5	Aerial LW tuning coil...	13·0
L6	Osc. circ. SW tuning coil	0·05
L7	Osc. circ. MW tuning coil	3·0
L8	Osc. circ. LW tuning coil	9·0
L9	Oscillator SW reaction...	21·0
L10	Oscillator MW reaction...	33·0
L11	Oscillator LW reaction...	70·0
L12	1st IF trans. Pri. ...	4·25
L13	1st IF trans. Sec. ...	4·25
L14	2nd IF trans. Pri. ...	4·25
L15	2nd IF trans. Sec. ...	4·25
L16	Speaker speech coil ...	1·5
L17	Hum neutralising coil ...	0·25
L18	Speaker field coil ...	1,000·0
T1	Speaker Input trans Pri. ...	450·0
	Speaker Input trans Sec. ...	0·2
T2	Mains trans. Pri., total ...	37·0
	Mains trans. Heater sec. .	0·1
	Mains trans. Rect. heat sec.	0·15
	Mains trans. HT sec., total	500·0
S1-S12	Waveband switches ...	—
S13, S14	Radio/gram change switches	—
S15	Mains switch, ganged R17	—

	CONDENSERS	Values (μF)
C1	Aerial series condenser ...	0·0002
C2	Aerial MW coupling ...	0·000005
C3	V1 hexode CG decoupling	0·05
C4	V1 cathode by-pass ...	0·1
C5	V1 osc. CG condenser ...	0·0001
C6	Osc. circuit SW tracker ...	0·004
C7	V1 osc. anode coupling ...	0·0005
C8	V2 CG decoupling ...	0·05
C9	V1, V2 SG's decoupling ...	0·1
C10	V2 cathode by-pass ...	0·1
C11*	V3 cathode by-pass ...	25·0
C12	IF by-pass condensers ...	0·0001
C13	IF by-pass condensers ...	0·0001
C14	AF coupling to V3 triode	0·005
C15	V3 triode anode decoupling	0·25
C16	Coupling to V3 AVC diode	0·000075
C17	IF by-pass	0·0001
C18	V3 triode to V4 AF coupling	0·01
C19	Part of variable tone control	0·05
C20	Fixed tone corrector ...	0·005
C21*	V4 cathode by-pass ...	25·0
C22*	HT smoothing condensers	8·0
C23*	HT smoothing condensers	8·0
C24	HT circuit RF by-pass ...	0·1
C25‡	Aerial circuit SW trimmer	—
C26‡	Aerial circuit MW trimmer	—
C27‡	Aerial circuit LW trimmer	—
C28†	Aerial circuit tuning ...	—
C29†	Oscillator circuit tuning...	—
C30‡	Osc. circuit SW trimmer...	—
C31‡	Osc. circuit MW trimmer	—
C32‡	Osc. circuit LW trimmer...	—
C33‡	Osc. circuit MW tracker...	—
C34‡	Osc. circuit LW tracker ...	—
C35‡	1st IF trans. pri. tuning...	—
C36‡	1st IF trans. sec. tuning...	—
C37‡	2nd IF trans. pri. tuning...	—
C38‡	2nd IF trans. sec. tuning...	—

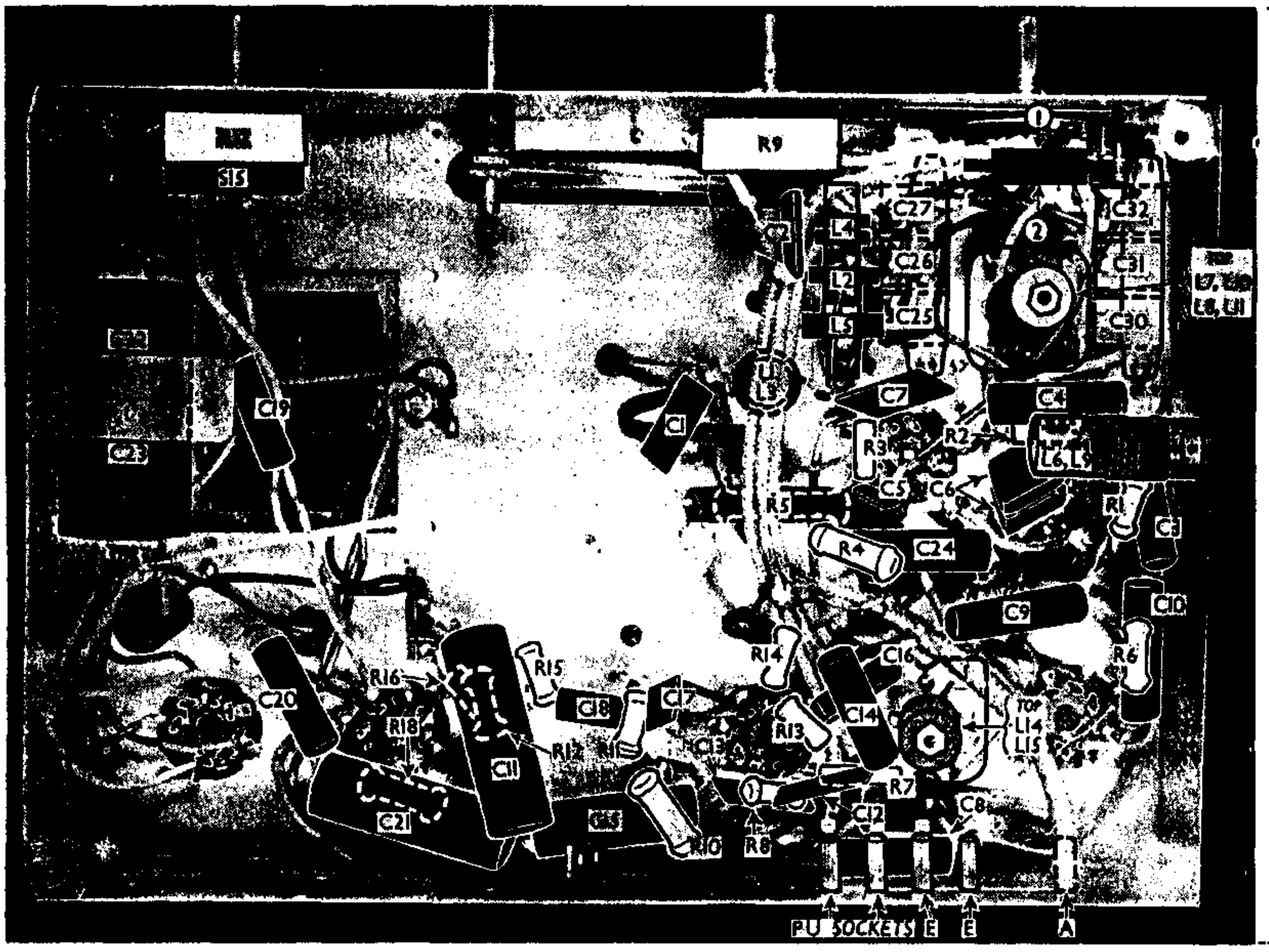
* Electrolytic. † Variable. ‡ Pre-set.

DISMANTLING THE SET

Removing Chassis.—Remove the four control knobs (recessed grub screws) from the front of the receiver;

remove the four cheese-head set-screws (with metal washers) holding the chassis to the bottom of the cabinet.

Chassis may now be withdrawn to the extent of the speaker leads, which is sufficient for normal purposes.



Under - chassis view. The adjustments of the trimmers seen here are indicated in the plan view. The double - sided switch unit is shown, its two sides being indicated by numbered arrows. Diagrams of the unit appear in column 6 opposite. All the coil units, except that of the first IF transformer, are shown in this view.

To free chassis entirely, unsolder from the speaker transformer the three leads connecting it to chassis.

When replacing, the speaker leads should be connected as follows, numbering the tags on the speaker transformer from top to bottom :

1, blue;
2, (terminal) yellow;
3, no external connection;
4 (terminal) and 5; red.

Note that a felt washer is fitted to each of the four control spindles, between the knob and the cabinet.

Removing Speaker.—Unsolder the three leads as previously described;

remove the four brass nuts holding the speaker assembly to the sub-baffle.

When replacing, the transformer should be on the right of the speaker.

The three leads should be connected to the transformer as previously indicated.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on mains of 228 V, using the 230 V tapping on the mains transformer.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 6K8G	230	1·7		
	Oscillator		94	6·2
	85	3·9		
V2 6K7G	238	6·5	94	1·5
V3 6Q7G	76	0·5	—	
V4 6F6G	223	32·0	238	5·4
V5 5Y3G	328†			

† Each anode, AC.

The receiver was tuned to the lowest wavelength on the MW 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 valve adaptors are used to make current measurements, the metal screen should be left on **V2**, and earthed while the readings are being taken, as otherwise instability may occur and influence the reading.

GENERAL NOTES

Switches.—**S1-S12** are the waveband switches, and **S13, S14** the radio/gram change switches, ganged in a four-position double-sided single rotary unit. The two sides of the unit are indicated in our under-chassis view by arrows and numbers in circles, one pointing to either side of the unit.

Diagrams of the two sides of the unit, drawn as seen when viewed in the directions of the arrows in the under-chassis view, appear in column 6. The table in column 3 gives the switch positions for the four control settings, starting from the fully anti-clockwise position of the control knob. A dash indicates open, and **C**, closed.

S15 is the QMB mains switch, ganged with the tone control **R17.**

Coils.—The aerial coils **L1, L3;** and **L2, L4, L5,** and the oscillator coils **L6, L9;** and **L7, L8, L10, L11** are in four unscreened tubular units beneath the chassis. In the case of the **L1, L3** and **L6, L9** units, **L3** and **L6** are the thicker windings.

The first IF transformer **L12, L13** is mounted in a screening can on the chassis deck, with its associated trimmers. The second IF transformer **L14, L15** forms an unscreened unit, mounted on its associated trimmer assembly beneath the chassis at the side of **V2** holder.

Gramophone Pick-up.—Two sockets are fitted, on a panel containing five sockets altogether at the rear of the chassis, for the connection of a gramophone pick-up. Since the waveband switching includes a gramophone position, the pick-up plugs may remain permanently inserted in their sockets.

External Speaker.—Two terminals connected to the two ends of the internal speaker input transformer **T1** are provided for the connection of a high impedance (about 10,000 Ω) external speaker.

Switch Table

Switch	SW	MW	LW	Gram
S1	C	—	—	C
S2	C	—	—	—
S3	—	C	—	—
S4	—	—	C	—
S5	—	—	—	C
S6	C	—	—	—
S7	—	C	—	—
S8	—	—	C	—
S9	—	—	—	C
S10	—	C	—	—
S11	—	C	—	—
S12	C	—	—	—
S13	C	C	C	—
S14	—	—	—	C

Condensers C11, C21.—These are the 25 μF electrolytic cathode-by-pass condensers for **V3** and **V4** respectively. They are of Plessey manufacture, in tubular cardboard containers, supported on their connecting wires, and are rated at 25 V working, 35 V surge.

Condensers C22, C23.—These are two Plessey 8 μF condensers in a single tubular aluminium container, mounted in a

clip on one of the end chassis members. They are rated at 450 V working. The can forms the common negative connection. The tag marked with a red spot is the positive of **C22,** and is connected to the blue speaker lead and pin 8 of **V5;** the plain tag is the positive of **C23,** connected to the red speaker lead, pin 1 of **V4** and the top of **R5.**

Condenser C6.—This is the SW tracking condenser, and is made up as a unit of two condensers connected in parallel, matched together to produce the required capacity. In our chassis, the two condensers were marked as 0.004 μF total, although the makers' manual quotes the value as 0.0025 μF.

Pre-set Condensers.—All the pre-set trimmers and trackers are accessible from the chassis deck, and can be reached while the chassis is in the cabinet.

The aerial and oscillator circuit trimmers are in two triple units, each mounted beneath the chassis close to its respective coil units. The two pre-set trackers **C33, C34** form a dual unit on which the MW and LW coil unit is mounted.

Alternative Rectifier V5.—In the makers' service information, **V5** is quoted as 5Z4G or 5Y3G, the two types being alternatives.

The base connections of both types are similar, and the difference between them is that, while the 5Y3G is directly heated, the 5Z4G is indirectly heated, but with the cathodes connected internally to one side of the filaments.

In the base connection diagrams beneath the circuit diagrams, both valves are shown as alternatives. Our chassis was fitted with a 5Y3G.

Chassis Divergencies.—In some chassis, components may be found to have values which differ from those quoted in our tables. In our chassis, **R1** and **R15** were both 200,000 O, whereas in the makers' information they are quoted as 250,000 O; **R2** was 300 O, and **R6** 220 O, as against 200 O and 300 O respectively in the makers' diagram. **C16** was 0.000075 μF, as against 0.00006 μF; and **C6** (which is made up as a double unit, see under "Condenser C6") was marked as 0.004 μF total in our chassis, as against 0.0025 μF in the makers' diagram.

Except in the case of **R2, R6** and **C6,** these divergencies are small enough to be regarded as negligible. In the case of these three components, however, it would be advisable when making replacements to adhere to the value of the original component where that can be ascertained.

CIRCUIT ALIGNMENT

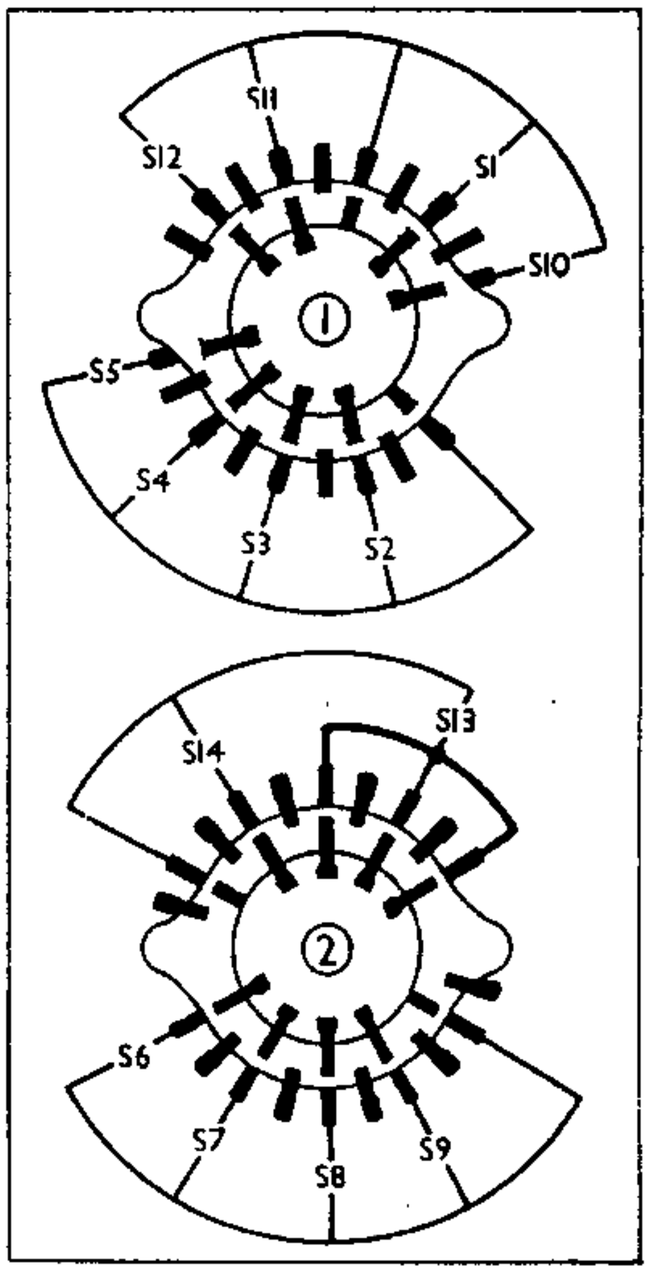
IF Stages.—Connect signal generator lead to control grid (top cap) of **V1** and chassis. Short-circuit **C29,** switch receiver to MW, and turn volume control to maximum. Feed in a 470 KC/S (638.3 m) signal, and adjust **C38, C37, C36** and **C35** for maximum output. Repeat these adjustments until no further improvement results. Remove short-circuit from **C29.**

RF and Oscillator Circuits.—With the gang at minimum, the pointer should be horizontal. Transfer signal generator lead to aerial and earth sockets, and insert a suitable dummy aerial.

SW.—Switch set to SW, tune to 31 m on scale, feed in a 31 m (9.68 MC/S) signal and adjust **C30,** then **C25,** for maximum output. There is no variable tracker, but the calibration should be checked at each end of the band.

MW.—Switch set to MW, tune to 250 m on scale, feed in a 250 m (1,200 KC/S) signal, and adjust **C31,** then **C26,** for maximum output. Feed in a 500 m (600 KC/S) signal, tune it in, and adjust **C33** for maximum output, while rocking the gang for optimum results. Repeat the 250 m adjustments.

LW.—Switch set to LW, tune to 1,300 m on scale, feed in a 1,300 m (235 KC/S) signal, and adjust **C32,** then **C27,** for maximum output. Feed in a 1,900 m (158 KC/S) signal, tune it in, and adjust **C34** for maximum output, while rocking the gang for optimum results. Repeat the 1,300 m adjustments.



Diagrams of the two sides of the switch unit, as seen when viewed in the directions of the arrows in the underchassis view.