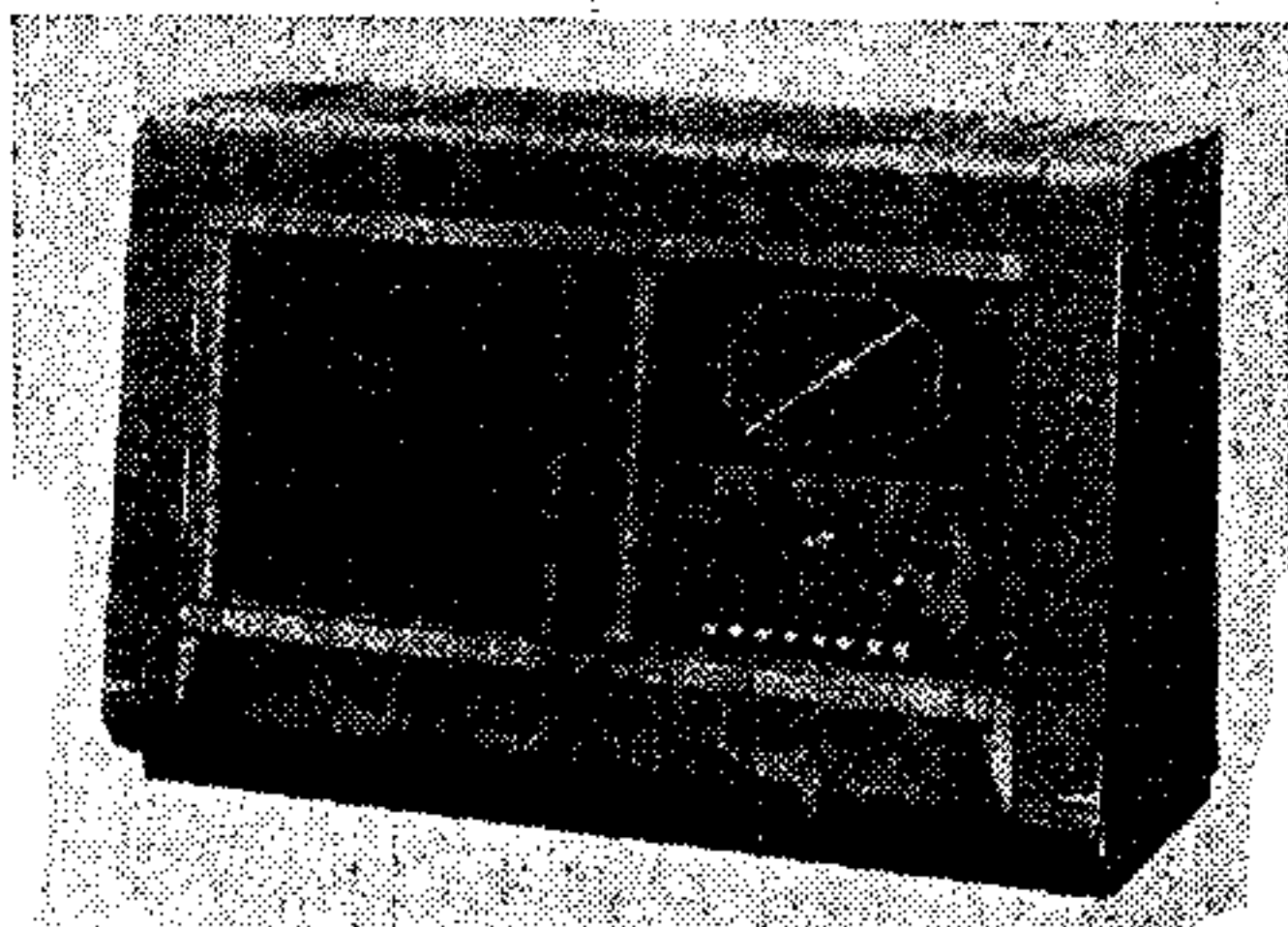
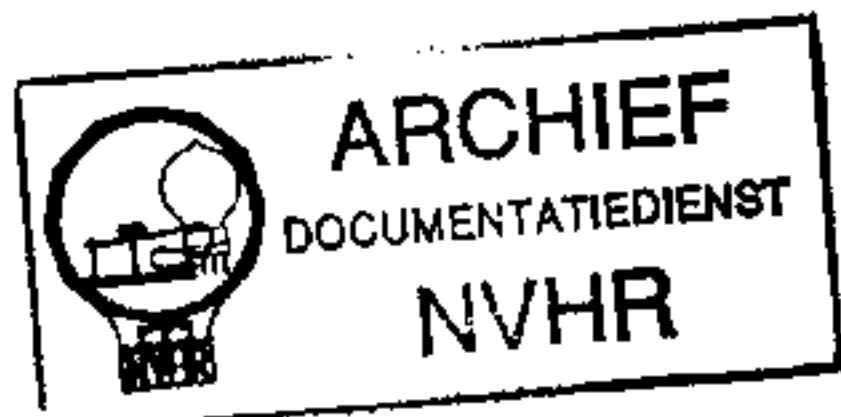


DECCA PT/AW

PC/AW AND PG/AW

Ned. Ver. v. Historie v/d Radio



The Decca PT/AW table receiver.

PRESS-BUTTON tuning of the trimmer type for five stations is included in the Decca PT/AW. 4-valve (plus rectifier) AC 3-band superhet, and press-button switches are also used for wave-changing. The receiver covers a short-wave range of 19-60 m and has provision for both a gramophone pick-up and an extension speaker. Model PC/AW is a console, with an identical chassis, while the modifications for the PG/AW radiogram are given under "PG/AW Modifications."

Release dates: PT/AW, August, 1938; PC/AW and PG/AW, September, 1938.

CIRCUIT DESCRIPTION

All the switches in the diagram, excepting the mains switch, have been given

numbers with suffix letters to indicate their functions. All switches bearing the same number are operated by the same press-button; a suffix a, or b, indicates that the switch closes when its button is pressed; an x indicates that it opens when the button is pressed.

Aerial input is via coupling coils L1 (SW) and L2 (MW and LW) to single-tuned circuits comprising coils L3 (SW), L5 (MW) and L4 (LW) tuned by C26 via switches S8a, S8b (SW), S1a (MW) or S7a (LW) for manual tuning, or by pre-set condensers C34 to C39 via selector switches S2a to S6a for automatic tuning. During MW operation, manual or automatic, S5x, S6x and S7x are closed to short-circuit L4, whereas on LW, one of these will be open and S1x to S4x will be closed to connect C33 across L5; L5, C33 then form part of the aerial coupling to L4.

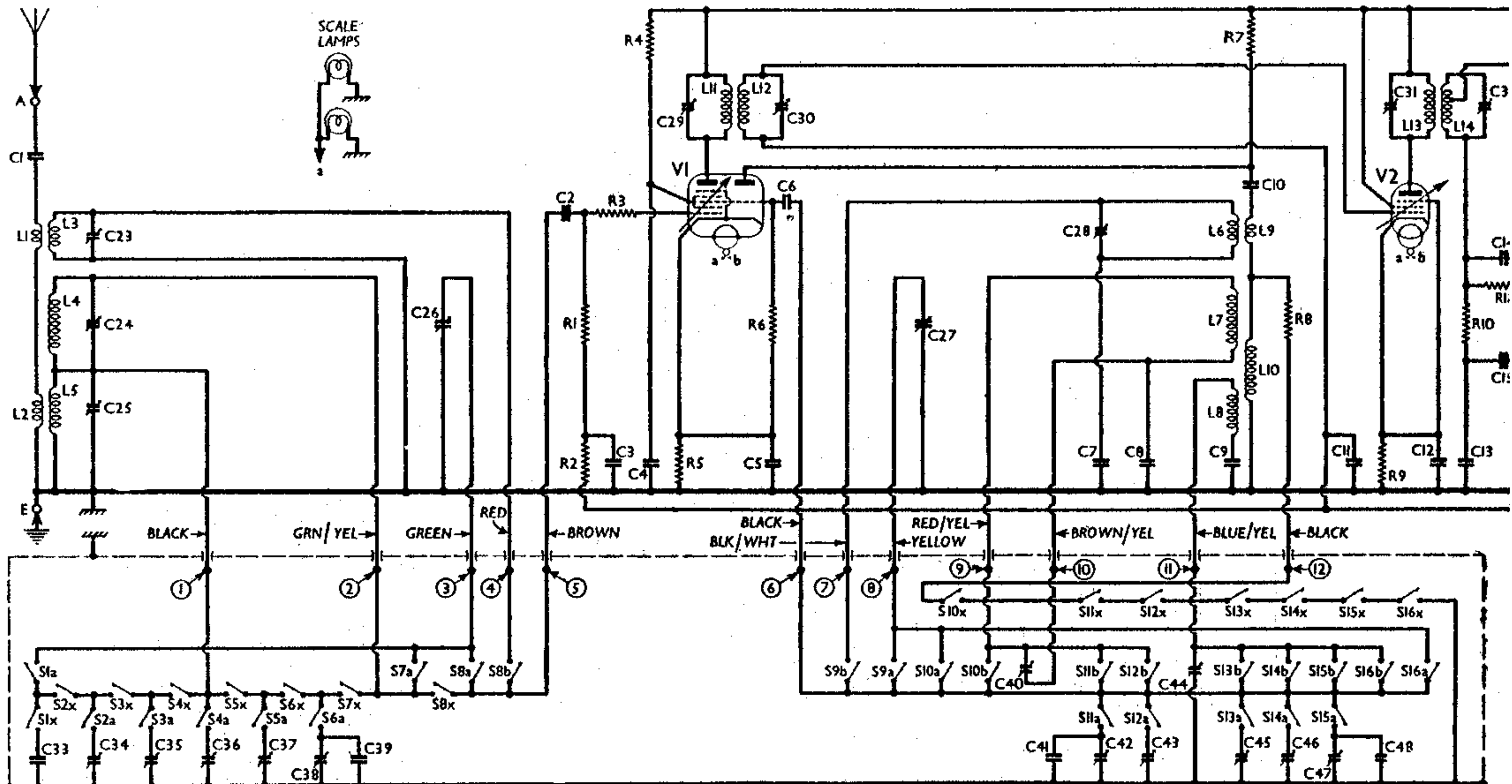
First valve (V1, Mazda metallised AC/TH1) is a triode pentode operating as frequency changer with internal coupling. Triode oscillator grid coils L6 (SW), L8 (MW) and L7 (LW) are tuned by C27 via switches S9a, S9b (SW), S10a, S10b (MW) or S10a, S10b (LW) for manual tuning, or by pre-set condensers C41, C42, C43 and C45 to C48 via selector switches S11a and S11b to S15a and S15b for automatic tuning. Parallel trimming by C28 (SW),

C44 (MW) and C40 (LW). As C40 and C44 are located physically on the press-button assembly, they are shown there in our diagram. Series tracking by condensers C7 (SW), C9 (MW) and C8 (LW). Reaction by coils L9 (SW) and L10 (MW and LW). During MW and LW operation, one of the series switches S10x to S16x is open, but on SW all are closed so that R8 is connected across L10, between L9 and chassis.

Second valve (V2, Mullard metallised VP4B) is a variable-mu RF pentode operating as intermediate frequency amplifier with tuned-primary tuned-secondary transformer couplings C29, L11, L12, C30, and C31, L13, L14, C32.

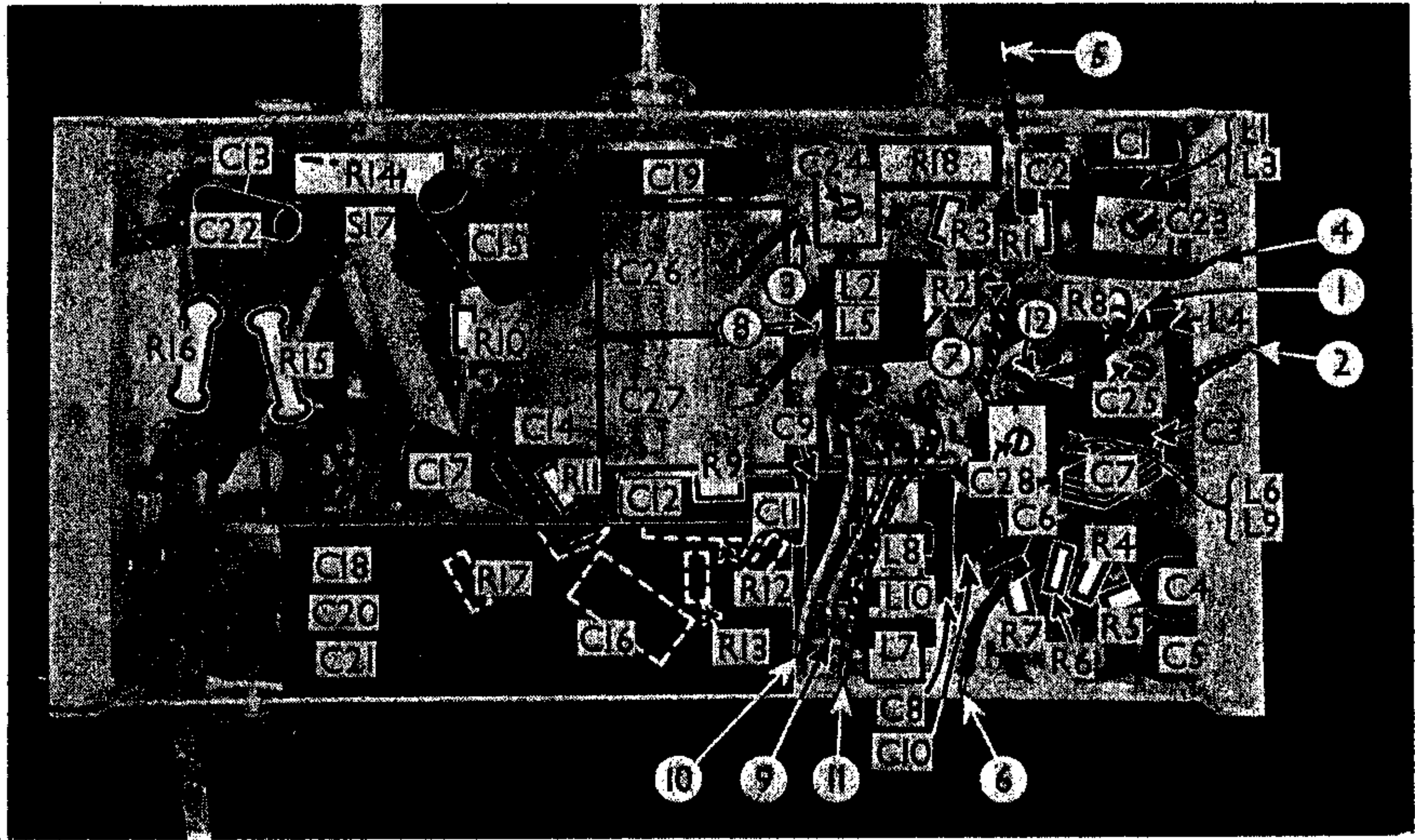
Intermediate frequency 465KC/S.

Diode second detector is part of separate double diode valve (V3, Mullard metallised 2D4A). Audio frequency component in rectified output is developed across load resistance R11 and passed via IF stopper R10, AF coupling condenser C15 and manual volume control R14 to CG of beam tetrode output valve (V4, Mazda AC5/Pen). Provision for connection of gramophone pick-up across R14. Fixed tone correction by C17 in anode circuit; variable tone control by C19, R18, also in anode circuit. Provision for connection of high impedance external speaker across primary of internal speaker input transformer T1.

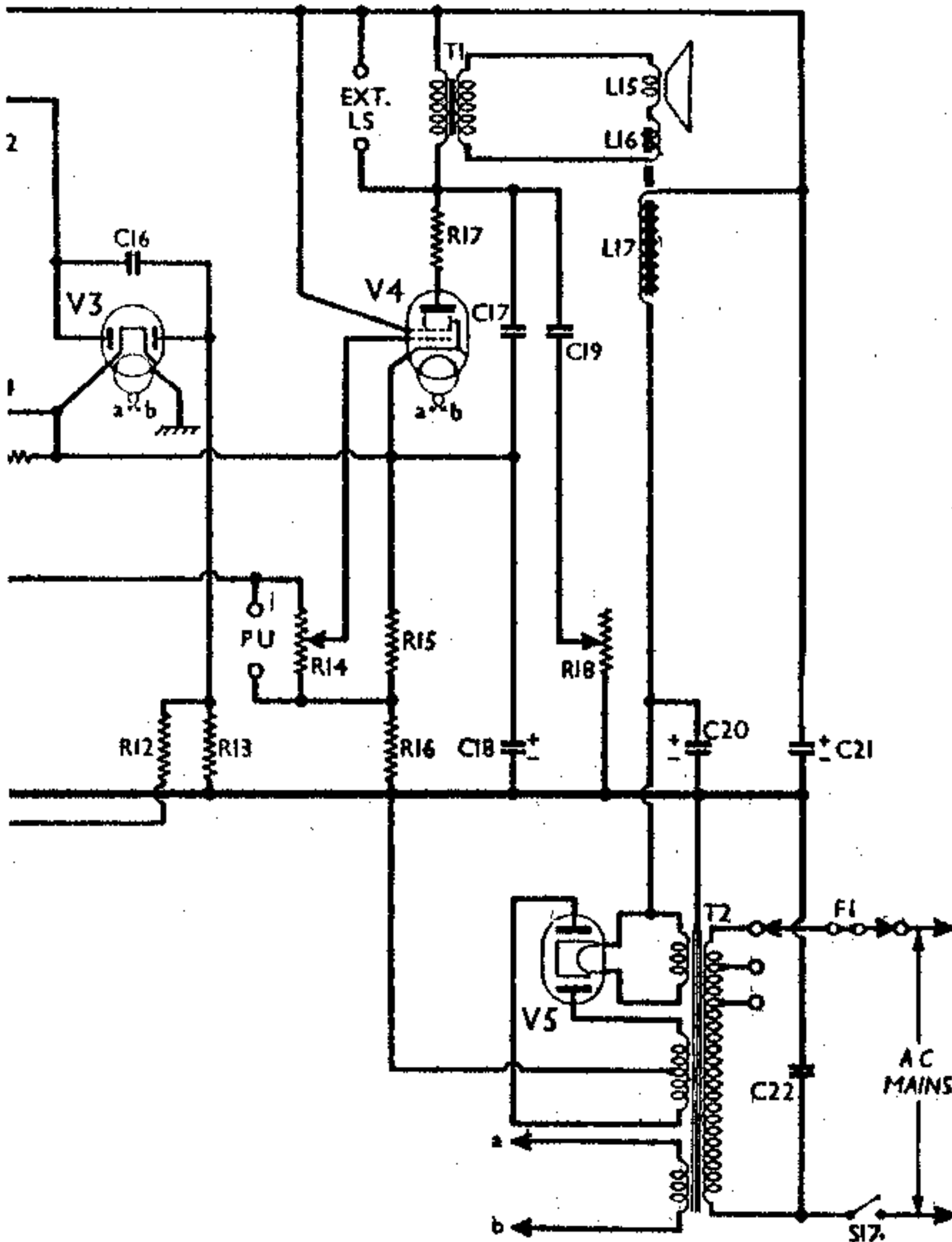


Circuit diagram of the Decca PT/AW 3-band press-button superhet. The PC/AW console is identical, while the modifications for the PG/AW MW coils are below the LW coils.

Under-chassis view, with the press-button tuning unit removed. The connections to this unit are numbered to agree with the circuit diagram, and the view of the unit overleaf. S17 is the only switch apart from those in the press-button unit.



Second diode of V3, fed from tap on L14 via C16, provides DC potential which is developed across load resistance R13 and fed back through decoupling circuits as GB to FC and IF valves, giving automatic volume control. Delay voltage is obtained from drop along resistances R15, R16 in V4 cathode lead to chassis. HT current is supplied by IHC full-wave rectifying valve (V5, Brimar R2). Smoothing by speaker field L17 and dry electrolytic condensers C20 and C21.



COMPONENTS AND VALUES

CONDENSERS		Values (μF)
C1	Aerial series condenser ..	0.0004
C2	V1 pentode CG condenser ..	0.0001
C3	V1 pentode CG decoupling ..	0.02
C4	V1 SG decoupling ..	0.1
C5	V1 cathode by-pass ..	0.1
C6	V1 osc. CG condenser ..	0.0001
C7	Osc. circuit SW tracker ..	0.0043
C8	Osc. circuit LW tracker ..	0.00028
C9	Osc. circuit MW tracker ..	0.000565
C10	V1 osc. anode coupling ..	0.0002
C11	V2 CG decoupling ..	0.02
C12	V2 cathode by-pass ..	0.1
C13	IF by-pass condensers ..	0.0001
C14		0.0001
C15	AF coupling to V4 ..	0.02
C16	Coupling to V3 AVC diode ..	0.0001
C17	Fixed tone corrector ..	0.006
C18*	V4 cathode by-pass ..	50.0
C19	Part of variable tone control ..	0.05
C20*	HT smoothing condensers ..	8.0
C21*		8.0
C22	Mains RF by-pass ..	0.006
C23†	Aerial circuit SW trimmer ..	—
C24†	Aerial circuit LW trimmer ..	—
C25†	Aerial circuit MW trimmer ..	—
C26†	Aerial circuit manual tuning ..	—
C27†	Osc. circuit manual tuning ..	—
C28†	Osc. circuit SW trimmer ..	—
C29†	1st IF trans. pri. tuning ..	—
C30†	1st IF trans. sec. tuning ..	—
C31†	2nd IF trans. pri. tuning ..	—
C32†	2nd IF trans. sec. tuning ..	—
C33	Aerial LW coupling ..	0.00125
C34†	Aerial circuit MW automatic tuning trimmers ..	—
C35†		—
C36†		—
C37†	Aerial circuit LW automatic tuning trimmers ..	—
C38†		—
C39	Osc. circuit LW trimmer ..	0.0002
C40†	Oscillator circuit LW automatic tuning trimmers ..	—
C41	Oscillator circuit LW automatic tuning trimmers ..	0.0002
C42†		—
C43†	Osc. circuit MW trimmer ..	—
C44†		—
C45†	Oscillator circuit MW automatic tuning trimmers ..	—
C46†		—
C47†		—
C48		0.00003

RESISTANCES		Values (ohms)
R1	V1 pentode CG resistance ..	500,000
R2	V1 pentode CG decoupling ..	500,000
R3	V1 pentode CG stopper ..	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	Osc. SW reaction damping ..	75
R9	V2 fixed GB resistance ..	200
R10	IF stopper ..	70,000
R11	V3 signal diode load ..	300,000
R12	AVC line decoupling ..	500,000
R13	V3 AVC diode load ..	500,000
R14	Manual volume control ..	500,000
R15	V4 GB and AVC delay resistances ..	140
R16		160
R17	V4 anode RF stopper ..	150
R18	Variable tone control ..	50,000

OTHER COMPONENTS		Approx. Values (ohms)
L1	Aerial SW coupling coil ..	0.2
L2	Aerial MW and LW coupling ..	13.0
L3	Aerial SW tuning coil ..	Very low
L4	Aerial LW tuning coil ..	12.0
L5	Aerial MW tuning coil ..	2.5
L6	Osc. circuit SW tuning coil ..	Very low
L7	Osc. circuit LW tuning coil ..	3.3
L8	Osc. circuit MW tuning coil ..	1.6
L9	Oscillator SW reaction ..	0.4
L10	Osc. LW and MW reaction ..	5.3
L11	1st IF trans. { Pri. ..	5.5
L12		Sec. ..
L13	2nd IF trans. { Pri. ..	5.5
L14		Sec., total ..
L15	Speaker speech coil ..	1.5
L16	Hum neutralising coil ..	0.2
L17	Speaker field coil ..	1,000.0
T1	Speaker input trans. { Pri. ..	250
		Sec. ..

*G/AW radiogram are given overleaf. Note that the

* Electrolytic. † Variable. ‡ Pre-set.

Continued overleaf

OTHER COMPONENTS <i>Continued</i>		Approx. Values (ohms)
T2	Mains trans. { Pri, total .. Heater sec. .. Rect. heat. sec. .. HT sec., total ..	30.0 0.05 0.2 550.0
F1	Mains circuit fuse	—
S1a, x and S16a, b, x	MW manual tuning switches	—
S2a, x to S6a, x	Aerial automatic tuning selector switches	—
S7a, x and S10a, b, x	LW manual tuning switches	—
S8a, b, x and S9a, b	SW tuning switches	—
S11a, b, x to S15a, b, x	Oscillator automatic tuning selector switches	—
S17	Mains switch, ganged R14 ..	—

DISMANTLING THE SET

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

Removing Chassis.—If it is desired to remove the chassis from the cabinet, remove the three control knobs (recessed grub screws) and the two bolts (with claw and spring washers) holding the chassis to the bottom of the cabinet. Now remove the aerial, earth and pick-up socket panel (three round-head wood screws), when the chassis can be withdrawn to the extent of the speaker leads, which should be sufficient for normal purposes.

Before access can be gained to the components beneath the chassis it is necessary to remove the press-button unit. This is done by unsoldering the twelve leads and removing the four self-tapping screws holding the unit to the chassis. *When replacing*, consult the illustrations of the under-chassis and the press-button unit for the connections.

To free the chassis entirely unsolder the speaker leads, and *when replacing*, connect them as follows, numbering the tags from bottom to top:—1, no external connection; 2, red; 3, black; 4, yellow.

Removing Speaker.—The speaker can be removed from the cabinet by unsoldering the leads and removing the nuts and lock washers from the four screws holding it to the sub-baffle. *When replacing*, see that the transformer is on the right and connect the leads as follows, numbering the tags from bottom to top:—1, no external connection; 2, two red leads; 3, two black leads; 4, yellow.

VALVE ANALYSIS

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 AC/THr	{ 238 Oscillator .95	{ 3.2 5.1	112	8.6
V2 VP4B	238	8.4	238	2.9
V3 2D4A	—	—	—	—
V4 AC/5Pen	220	39.0	238	7.1
V5 R2	302†	—	—	—

† Each anode, AC.

Valve voltages and currents given in the table above 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.

GENERAL NOTES

Switches.—S1a, x to S16a, b, x are all press-button switches, in a double-sided assembly in the auto-tuning unit beneath the chassis, and a separate detached view of this is given. This shows the contacts of all the switches, and also the various pre-set condensers and other components associated with this unit.

There are eight press-buttons, three for wavechanging and five for station selection. Each controls two series of switches, one on each side of the switch bank. Thus the left-hand button (looking at the front of the cabinet) controls S1a, x and S16a, b, x, the second controls S2a, x and S15a, b, x, and so on.

The suffixes a, b, x, have the usual significance. When a button is pressed, a and b switches close, while the x switches open, and vice versa.

S17 is the QMB mains switch, ganged with the volume control R14.

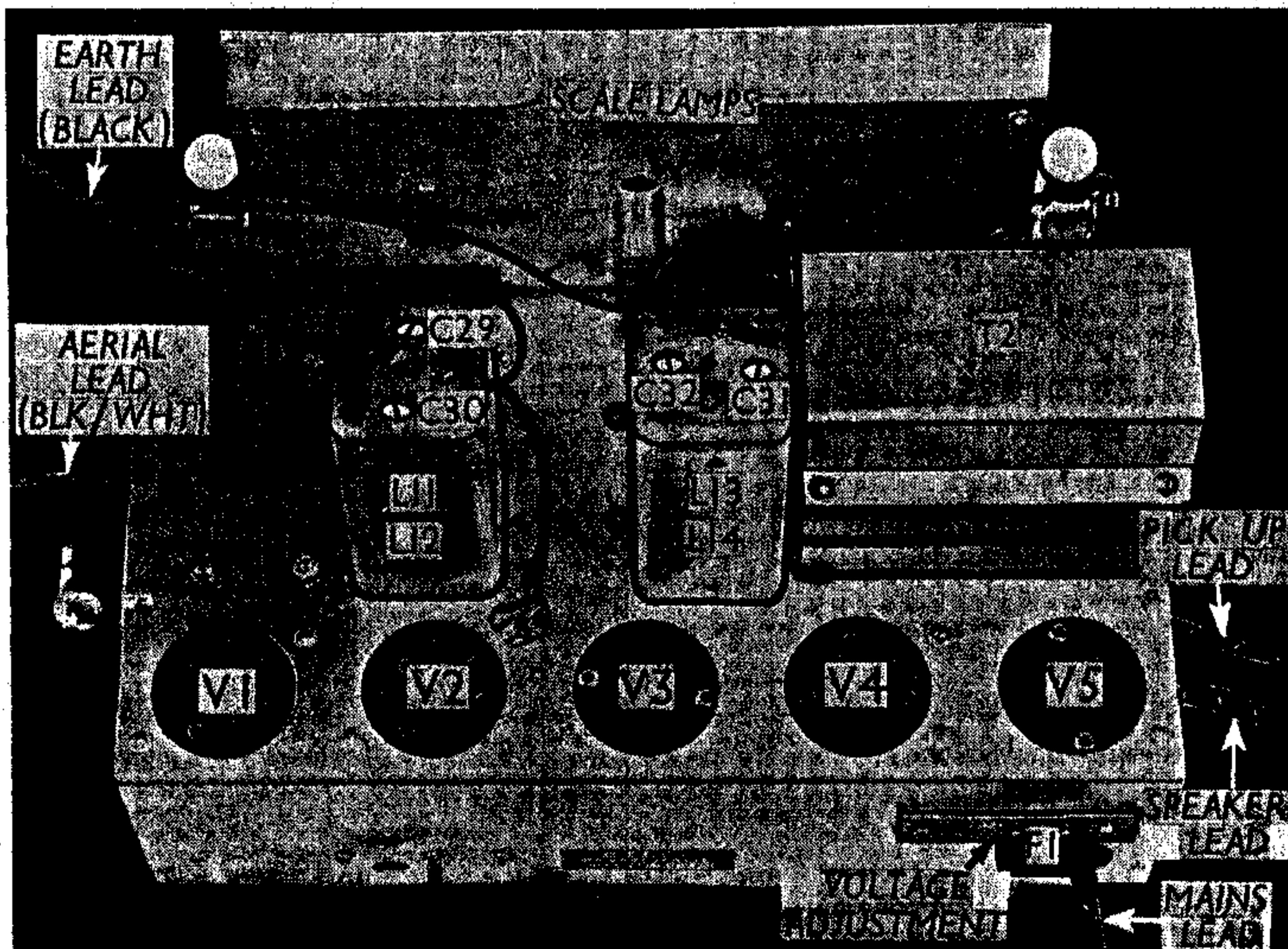
Coils.—L1, L3; L2, L5; L4; L6, L9; and L7, L8, L10 are in five unscreened units beneath the chassis. The IF transformers L11, L12 and L13, L14 are in two screened units on the chassis deck, with their associated trimmers.

Fuse F1.—This is combined with the mains voltage adjustment plug, a piece of 2A wire being connected between the two pins.

Scale Lamps.—These are two MES types, rated at 6.0 V, 0.3 A.

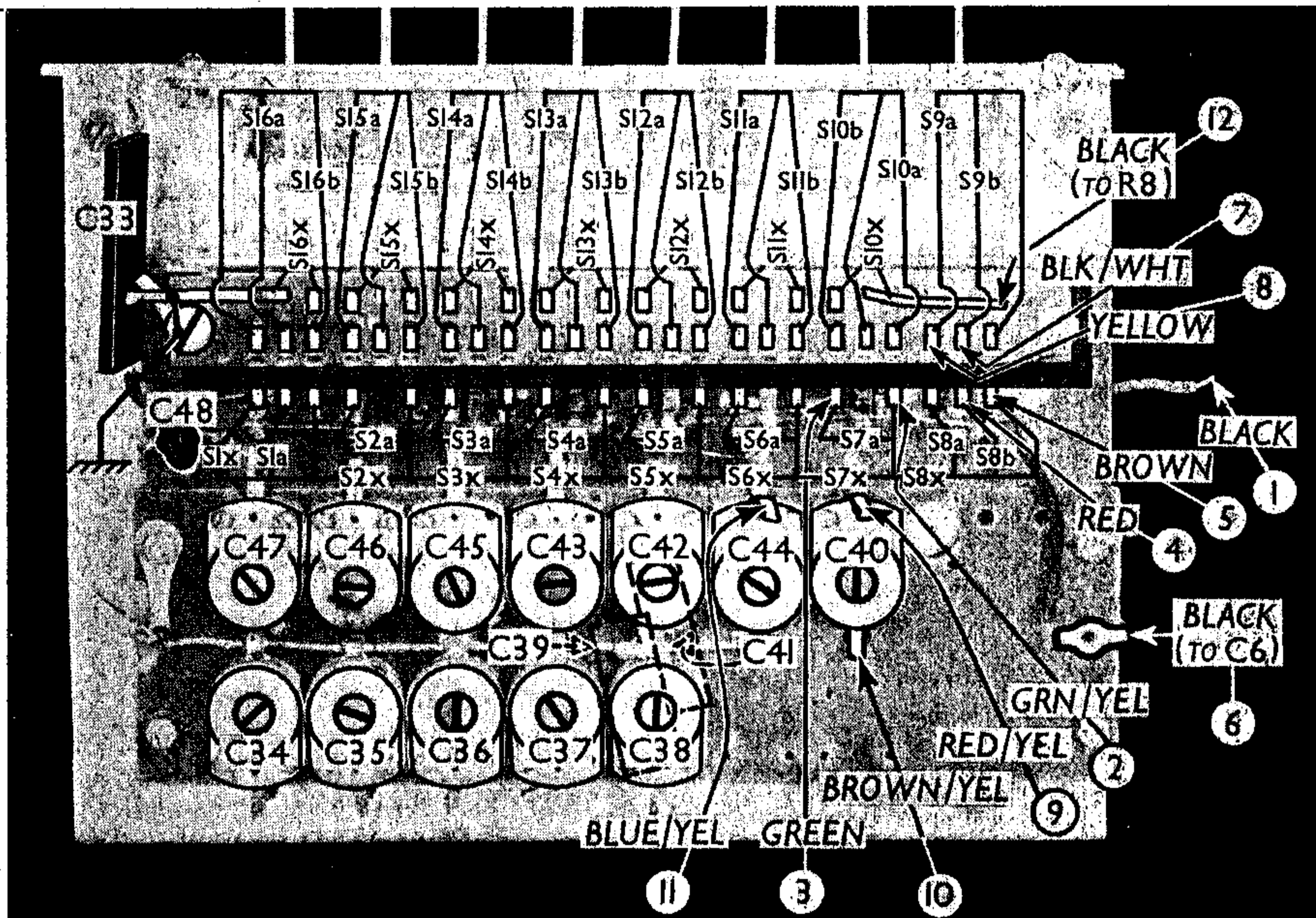
External Speaker.—Two sockets are provided at the rear of the cabinet for a high impedance (8,000 O) external speaker. The sockets are not isolated from the HT supply.

Condensers C18, C20, C21.—These are three dry electrolytics in a single carton



Plan view of the chassis. F1 is a fuse incorporated in the mains voltage adjustment plug.

View of the press-button tuning unit as seen from the underside of the chassis. The tags of all the switches are indicated, and the connections to the main chassis are numbered and colour-coded to agree with the circuit and the under-chassis view.



beneath the chassis, having a common negative (black) lead. The yellow lead is the positive of C18 (50 μ F, 15 peak volts); the blue lead is the positive of C20 (8 μ F, 525 PV) and the red lead the positive of C21 (8 μ F, 450 PV).

Auto-Tuning Unit.—All the inter-connecting leads (of which there are twelve) are indicated and colour-coded on the circuit diagram, and on the under-chassis view and auto-tuning unit illustration.

The auto-unit contains all the press-button switches, twelve Tempa trimmers (of which ten are for the pre-tuned stations, and two are the MW and LW oscillator trimmers), three extra fixed trimmers (C39, C41 and C48), and the aerial LW coupling condenser C33.

Note that in the circuit diagram the MW coils are below the LW coils, a

reversal of the usual practice. Thus L4 and L7 are LW coils and L5 and L8 are MW coils.

PG/AW MODIFICATIONS

The radiogram model is very similar, except for the addition of a gramophone motor, and a pick-up. The pick-up is switched into circuit by a single-pole changeover switch, which either connects the upper pick-up socket to the top of R14, on gram., or vice-versa on radio.

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.—See that pointer is vertical when gang is at maximum. Connect signal generator to A and E sockets, via a suitable dummy aerial.

SW.—Press SW manual button, tune to 15 MC/S on scale, feed in a 15 MC/S (20 m) signal, and adjust C28, then C23, for maximum output.

MW.—Press MW manual button, tune to 200 m on scale, feed in a 200 m (1,500 KC/S) signal, and adjust C44 (on auto-unit), then C25, for maximum output.

LW.—Press LW manual button, tune to 1,200 m on scale, feed in a 1,200 m (250 KC/S) signal, and adjust C40 (on auto-unit), then C24, for maximum output.

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