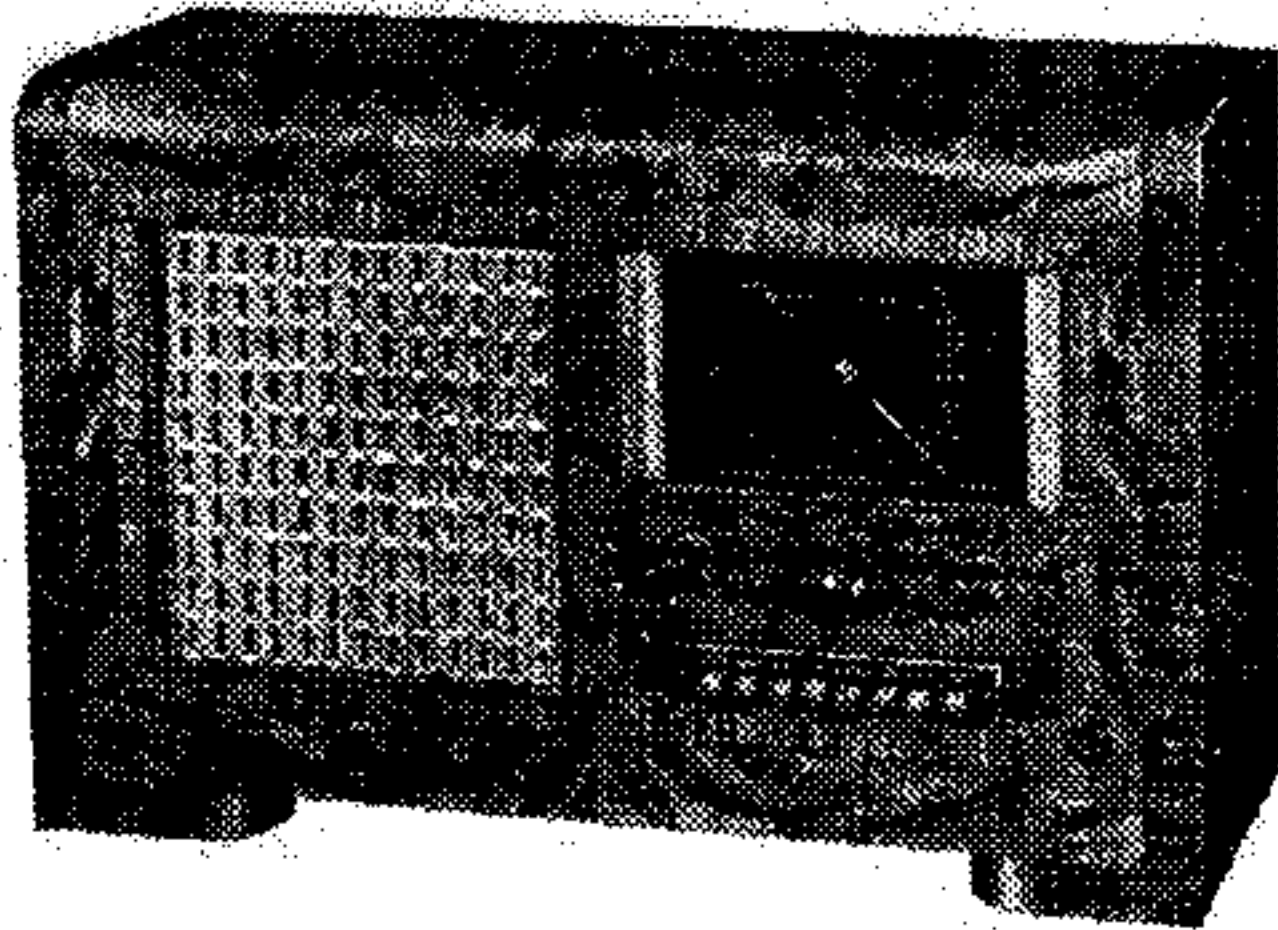
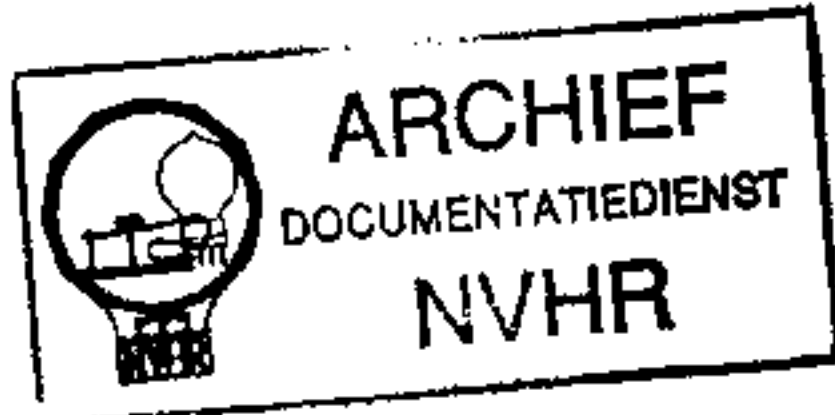


Ned. Ver. v. Historie v/d Radio

DECCA PT/ML

2-BAND AC SUPERHET



PRESS-BUTTON tuning for six stations is incorporated in the Decca PT/ML receiver, the buttons switching into circuit trimmers adjusted to the required wavelengths. There are two other buttons for wave-change switching, these taking the place of the usual rotary wave-change switch. The receiver is a 4-valve (plus rectifier) AC 2-band superhet suitable for mains of 200-250 V, 50-60 C/S. Provision is made for both a gramophone pick-up and extension speaker.

CIRCUIT DESCRIPTION

Aerial input on MW via series condenser C1 and coupling coil L1 to single-tuned circuit L3, C23 (manual), or on LW via C1, L1 and L3 to single tuned circuit L2, C23 (manual). C23 is connected to the top end of either L2 (LW) via S16 or L3 (MW) via S9 and S2, S3, S4, S5. On MW L2 is short-circuited via S6, S7, S8, or on LW C29 is connected across L3, via S1 and S2, S3, S4, S5 to form a MW break-through rejector circuit in series with L2. With auto-tuning, C23 is replaced by the appropriate trimmer via S10, S11, S12 or S13 (MW), or S14 or S15 (LW), according to which button is depressed. First valve (V1, Mazda metallised AC/TH1) is a triode hexode operating as frequency changer with internal coupling. Triode oscillator grid coils L4 (LW, via S32) and L5 (MW, via S25 and S18, S19, S20, S21) are tuned by C24 (manual) or trimmers C38-C45 via S26, S27, S28 or S29 (MW), or S30 or

S31 (LW) according to the button depressed (auto). Parallel trimming by C46, C47 (LW) and C48 (MW); series tracking by C49 (LW) and C50 (MW). Reaction from anode via coil L8 on both bands.

Second valve (V2, Mullard metallised VP4B or Mazda AC/VP2) is an RF pentode operating as intermediate frequency amplifier with tuned-primary tuned-secondary transformer couplings C25, L7, L8, C26 and C27, L9, L10, C28.

Intermediate frequency 465 KC/S. Diode second detector is part of separate double diode (V3, Mullard metallised 2D4A). Audio frequency component in rectified output is developed across load resistance R10 and passed via IF stopper R9, AF coupling condenser C13 and manual volume control R13 to CG of pentode output valve (V4, Mullard PenA4). IF filtering by R9, C11, C12. Fixed tone correction by C15, and variable tone control by C17, R17, in anode circuit. Provision for connection of high impedance external speaker across primary of internal speaker input transformer T1. Provision for connection of gramophone pick-up across R13.

Second diode of V3, fed from tap on L10 via C14, provides DC potential which is developed across load resistance R12 and fed back through decoupling circuits as GB to FC and IF valve, giving automatic volume control.

Delay voltage is obtained from drop along resistances R14, R15 in V4 cathode lead to chassis.

HT current is supplied by IFC full-wave rectifying valve (V5, Brimar R2 or Mullard IW4/350). Smoothing by speaker field L13 and dry electrolytic condensers C18, C19. Mains circuit RF filtering by C20. F1 performs the dual function of voltage adjustment and protection of mains input circuit in case of accidental short-circuit.

DISMANTLING THE SET

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

Removing Chassis.—To remove the chassis from the cabinet, remove the three knobs (recessed grub screws) and the two bolts (with lock and claw washers) holding the chassis to the bottom of the cabinet. Then free the aerial lead from the cleat on the side of the cabinet (round-head wood screw) and remove the aerial, earth and pick-up socket strip from the cabinet (three round-head wood screws). The chassis can now be withdrawn to the extent of the speaker leads, which is sufficient for normal

purposes. When replacing, make sure that the chassis is correctly positioned in the cabinet as otherwise the push-buttons will jam on the escutcheon.

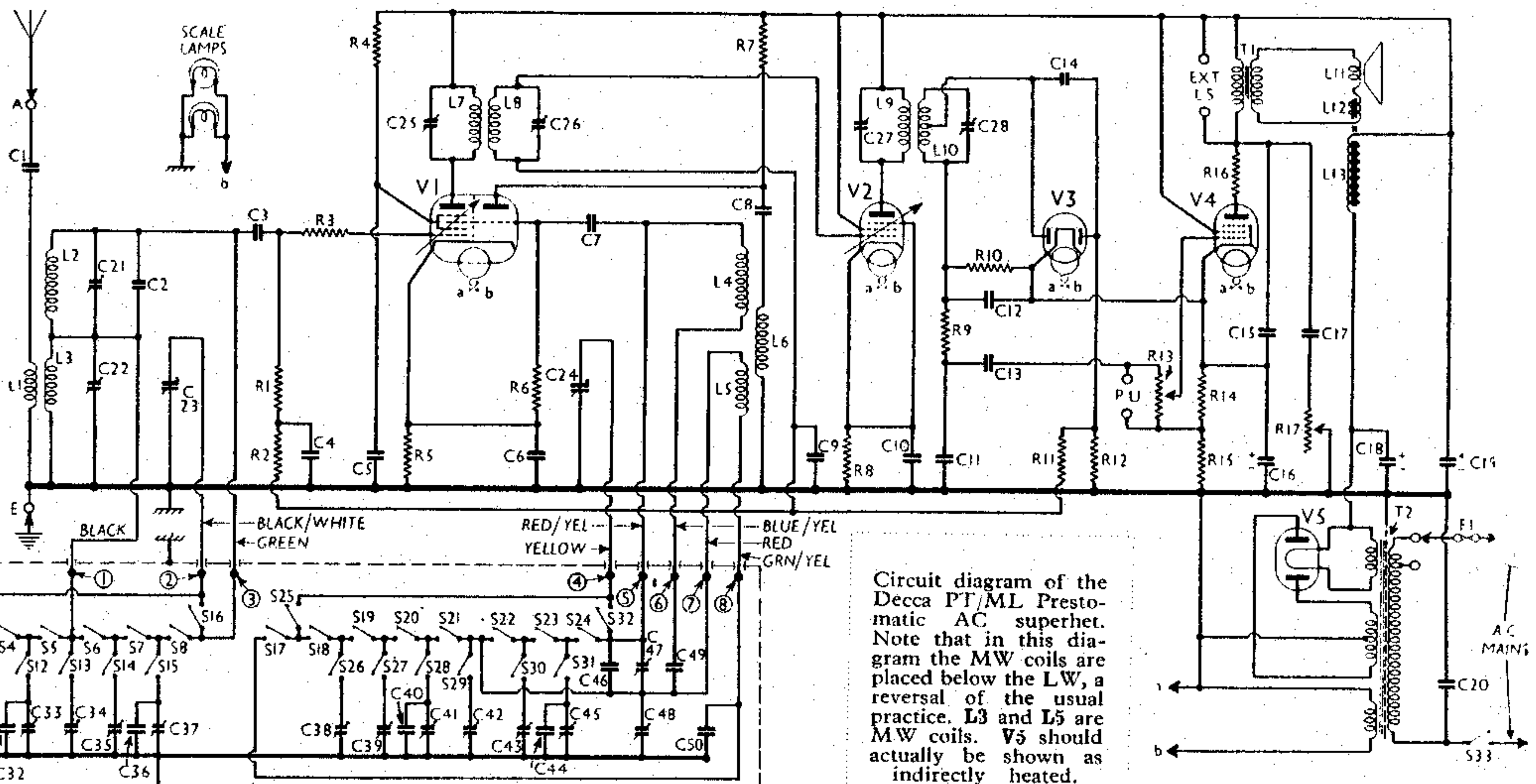
To free the chassis entirely unsolder the speaker leads and when replacing, connect them as follows, numbering the top row of tags from left to right:—1, blue; 2, black; 3, red.

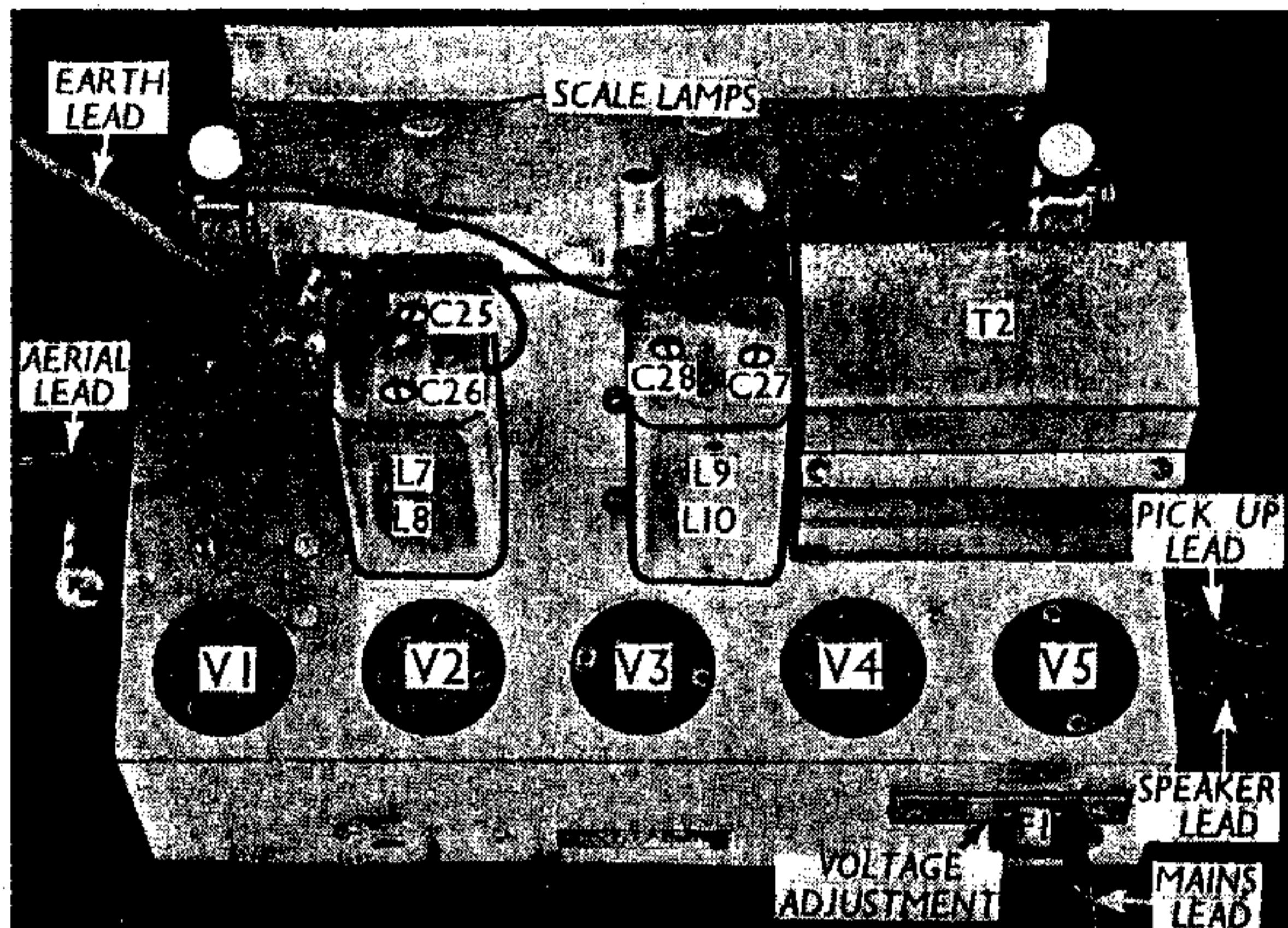
Removing Auto-Unit.—Before access can be gained to the components beneath the chassis, it will be necessary to remove the auto-unit. To do this unsolder the yellow, green, red, black/white, red/yellow, green/yellow and blue/yellow leads connecting it to the main chassis, remove the four self-tapping screws holding it to the main chassis and unsolder the black lead from C21. When replacing, consult the circuit diagram and chassis illustration.

Removing Speaker.—If it is desired to remove the speaker from the cabinet, unsolder the leads and remove the nuts and lock washers from the four screws holding it to the sub-baffle. When replacing, see that the transformer is at the top and connect the leads as follows, numbering the top row of tags from left to right:—1, blue; 2, two black leads; 3, two red leads.

COMPONENTS AND VALUES

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





Plan view of the chassis. F1 is included in the mains voltage adjustment plug

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.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 AC/THr	245	6.2	123	8.0
	90	4.6		
V2 VP4B	245	9.5	245	3.4
V3 2D4A	—	—	—	—
V4 PenA4	230	32.0	245	4.8
V5 R2	305†	—	—	—

† Each anode, AC.

GENERAL NOTES

Switches.—S1-S32 are all push-button switches contained in a 2-bank push-button unit with eight plungers. Each plunger controls four switches, two on the upper and two on the lower paxofin terminal strip. S1-S8 and S17-S24 are of the "series" type, incorporating "L" shaped moving contacts, while S9-S16 and S25-S32 are of the ordinary type, consisting of two straight contacts which are shorted when the plunger is depressed. Push-button switch units of this type were described in articles 8 and 9 of the series "Automatic Tuning" (April 30 and May 7, 1938).

Of the four switches controlled by each plunger, two are of the "L" type, and two of the ordinary type. Thus the left-hand plunger (in our view of the auto-unit), controls S1, S9, S17 and S25. The second from the left controls S2, S10, S18 and S26, and so on.

When all the buttons are out, S1-S8 and S17-S24 are closed and S9-S16 and S25-S32 are open.

When any button is depressed, only its four associated switches are affected; the two "L" types open, while the two ordinary types close.

Thus when the left-hand button is depressed, S1 and S17 open, and S9 and S25 close. All the other switches remain unaltered.

The tags of all the switches are shown in our view of the auto-unit. The tags of the "L" contacts have no external connection to them; in addition, two tags (second from the right, top and bottom bank) are blank, and do not form part of the circuit.

The functions of the various switches are given in the table "Other Components."

S33 is the QMB mains switch, in the main chassis, ganged with the volume control R13.

Coils.—L1, L3; L2 and L4-L6 are in three unscreened units beneath the main chassis. The IF transformers L7, L8 and L9, L10 are in two screened units on the chassis deck, with their associated Tempa trimmers.

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

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

Fuse F1.—This is incorporated in the mains voltage adjustment plug. A length of 2A fuse wire should be used for replacement.

Condensers C16, C18, C19.—These are three dry electrolytics in a single carton beneath the chassis, having a common negative (black) lead. The yellow

Continued overleaf

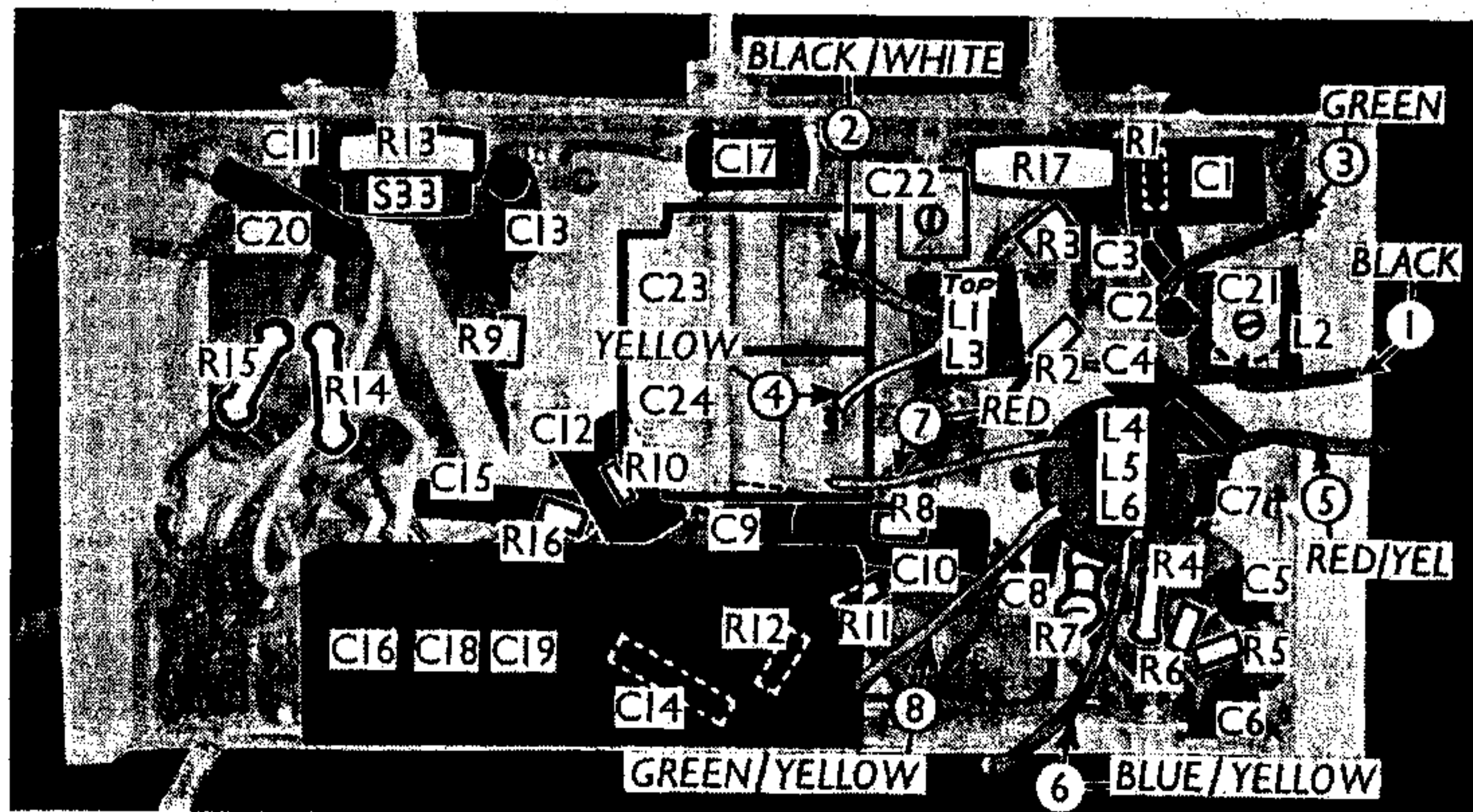
CONDENSERS		Values (μF)
C1	Aerial series condenser	0.0004
C2	Aerial LW fixed trimmer	0.00003
C3	V1 hexode CG condenser	0.0001
C4	V1 hexode CG decoupling	0.02
C5	V1 SG decoupling	0.1
C6	V1 cathode by-pass	0.1
C7	V1 osc. CG condenser	0.0001
C8	V1 osc. anode coupling	0.0002
C9	V2 CG decoupling	0.02
C10	V2 cathode by-pass	0.1
C11	IF by-pass condensers	0.0001
C12		0.0001
C13	AF coupling to V4	0.02
C14	Coupling to V3 AVC diode	0.000075
C15	Fixed tone corrector	0.006
C16*	V4 cathode by-pass	50.0
C17	Part of variable tone control	0.05
C18*	HT smoothing	8.0
C19*		8.0
C20	Mains RF by-pass	0.006
C21†	Aerial circuit LW trimmer	—
C22†	Aerial circuit MW trimmer	—
C23†	Aerial circuit manual tuning	—
C24†	Osc. circuit manual tuning	—
C25†	1st IF trans. pri. tuning	—
C26†	1st IF trans. sec. tuning	—
C27†	2nd IF trans. pri. tuning	—
C28†	2nd IF trans. sec. tuning	—
AUTO-TUNING UNIT		
C29	LW coupling condenser	0.00125
C30‡	—	—
C31‡	—	—
C32	Aerial circuit automatic tuning trimmers	0.000175
C33		—
C34	—	—
C35	—	—
C36	—	—
C37	—	—
C38	—	—
C39	—	—
C40	Oscillator circuit automatic tuning trimmers	0.000175
C41		—
C42	—	—
C43	—	—
C44	—	—
C45	—	—
C46	Osc. circ LW fixed trimmer	0.000175
C47	Osc. circuit LW trimmer	—
C48	Osc. circuit MW trimmer	—
C49	Osc. circuit LW tracker	0.00101
C50	Osc. circuit MW tracker	0.00054

* Electrolytic. † Variable. ‡ Pre-set.

OTHER COMPONENTS (Continued)		Approx. Values (ohms)	
L7	1st IF trans. (Pri.)	6.0	
L8		(Sec.)	6.0
L9	2nd IF trans. (Pri.)	6.0	
L10		(Sec., total)	6.0
L11	Speaker speech coil	1.8	
L12	Hum neutralising coil	0.25	
L13	Speaker field coil	1,000.0	
T1	Speaker input trans. (Pri.)	330.0	
		(Sec.)	0.5
	(Pri., total)	31.0	
T2	Mains trans. (Heater sec.)	0.1	
		(Rect. heat. sec.)	0.2
		(HT sec., total)	600.0
F1	Mains fuse	—	
S1	Rejector circuit switch	—	
S2-S8	Manual auto change switches	—	
S9, S16	Aerial circuit manual waveband switches	—	
S10	Aerial circuit auto trimmer	—	
S15	selector switches	—	
S17	Osc. MW coil shorting switch	—	
S18	Manual/auto change switches	—	
S24		—	
S25	Osc. circuit manual waveband switches	—	
S32		—	
S26	Osc. circuit auto trimmer selector switches	—	
S31		—	
S33	Mains switch ganged R13	—	

VALVE ANALYSIS

Valve voltages and currents given in the table (col 3.) are those measured in our receiver when it was operating on mains of 240 V, using the 240 V tapping on the mains transformer. The receiver was tuned to the



Under-chassis view, with the auto-unit removed. The interconnecting leads are colour-coded and numbered.

OTHER COMPONENTS		Approx. Values (ohms)
L1	Aerial coupling coil	14.0
L2	Aerial circuit LW tuning coil	13.0
L3	Aerial circuit MW tuning coil	2.75
L4	Osc. circuit LW tuning coil	1.75
L5	Osc. circuit MW tuning coil	3.5
L6	Oscillator reaction coil	5.25

DECCA PT/ML—Continued

lead is the positive of C16 (50 μF, 15 peak volts); the blue lead is the positive of C18 (8 μF, 525 peak volts) and the red lead the positive of C19 (8 μF, 450 peak volts).

Auto-Tuning Unit.—This is shown, with all the components included in it, at the bottom left-hand corner of the circuit diagram, and in a separate chassis illustration. All the interconnecting leads (of which there are eight) are indicated and colour-coded on the circuit diagram and on the under-chassis view. Their connection points on the auto-tuning unit are also indicated and numbered on the illustration of this unit. In addition, although there is no wire connecting them, the auto-unit and the main chassis are connected electrically by the bolts holding them together.

The auto-unit contains the switches S1-S32 (see under switches), the fourteen Tempa trimmers, external parallel fixed trimmers across certain of the Tempa types (C32, C36, C40, C44 and C46, the LW coupling condenser C29 and the fixed trackers C49 and C50).

Of the Tempa trimmers, C47 and C48 are LW and MW trimmers (the former having C46 across it). The remaining twelve are for the six pre-set stations.

The circuit may seem a little confusing in that C29 and C46-C50 are shown in the auto-unit, but as they are actually in this part of the receiver it was thought best to place them similarly in the circuit diagram. By tracing this out, it will be seen that they are actually in their usual positions relative to the tuning coils and the gang condenser. Note, however, that the LW coils are above the MW coils, a reversal of the usual practice. Thus L2 and L4 are LW coils, and L3 and L5 MW coils.

CIRCUIT ALIGNMENT

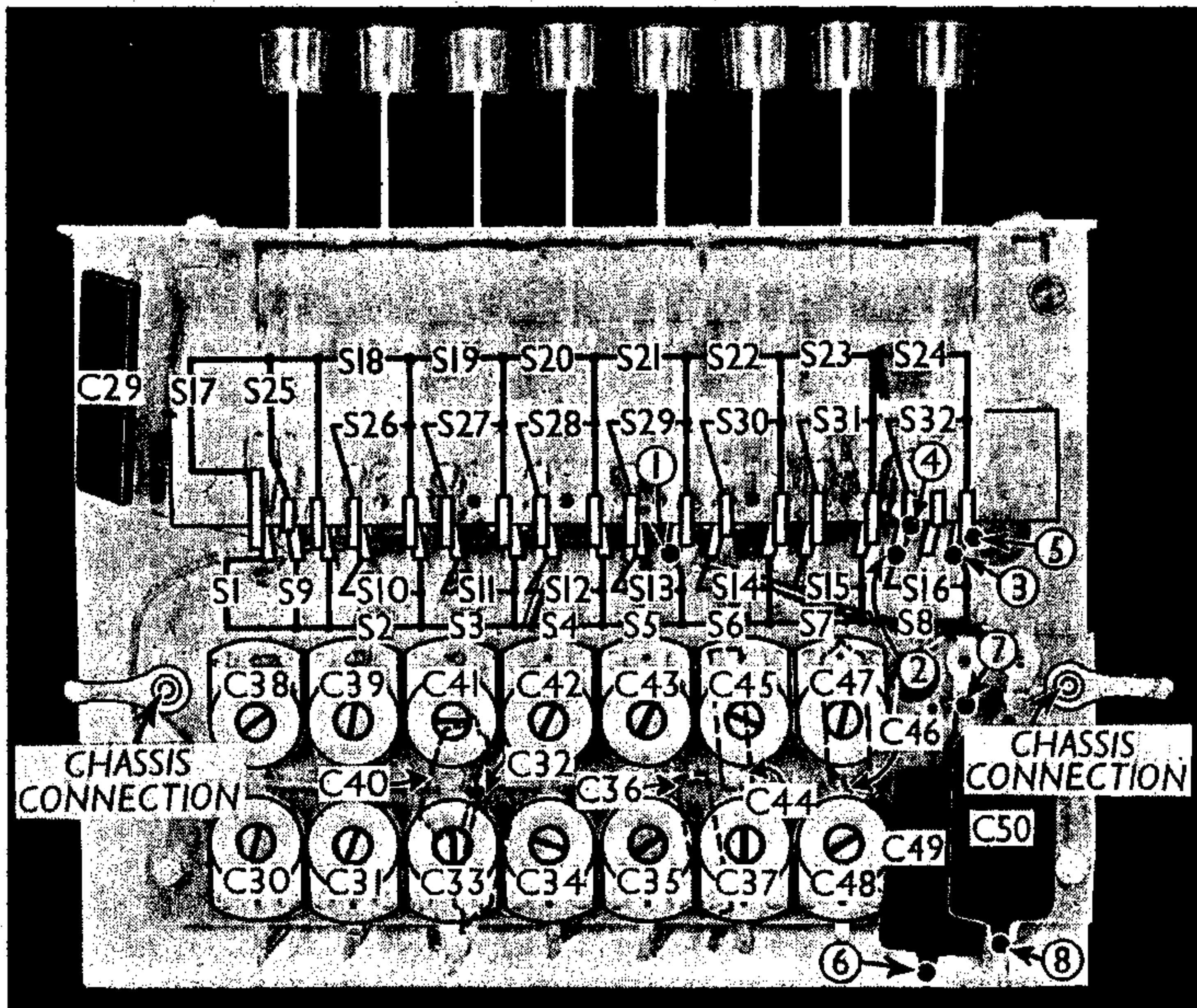
IF Stages.—According to the makers, the IF trimmers are adjusted at the factory for the correct response curve with an oscilloscope, and should not be touched unless they have been tampered with, or a new transformer has been fitted. The IF is 465 KC/S and alignment follows the usual practice.

RF and Oscillator Stages.—Set pointer so that it is vertical when gang is at maximum.

MW.—Press MW manual button, connect signal generator to A and E sockets and feed in a 200 m (1,500 KC/S) signal. Tune to 200 m on scale, and adjust C22 (under main chassis) and C48 (on auto unit) for maximum output.

LW.—Press LW manual button, feed in a 1,200 m (250 KC/S) signal, tune to 1,200 m on scale and adjust C21 (under main chassis) and C47 (on auto unit) for maximum output.

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



The underside of the auto-tuning unit, showing all the switch tags, and the points to which the leads from the main chassis are connected.