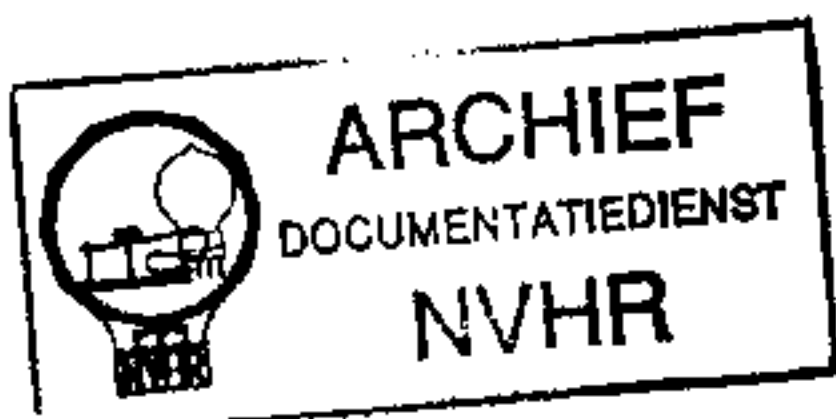


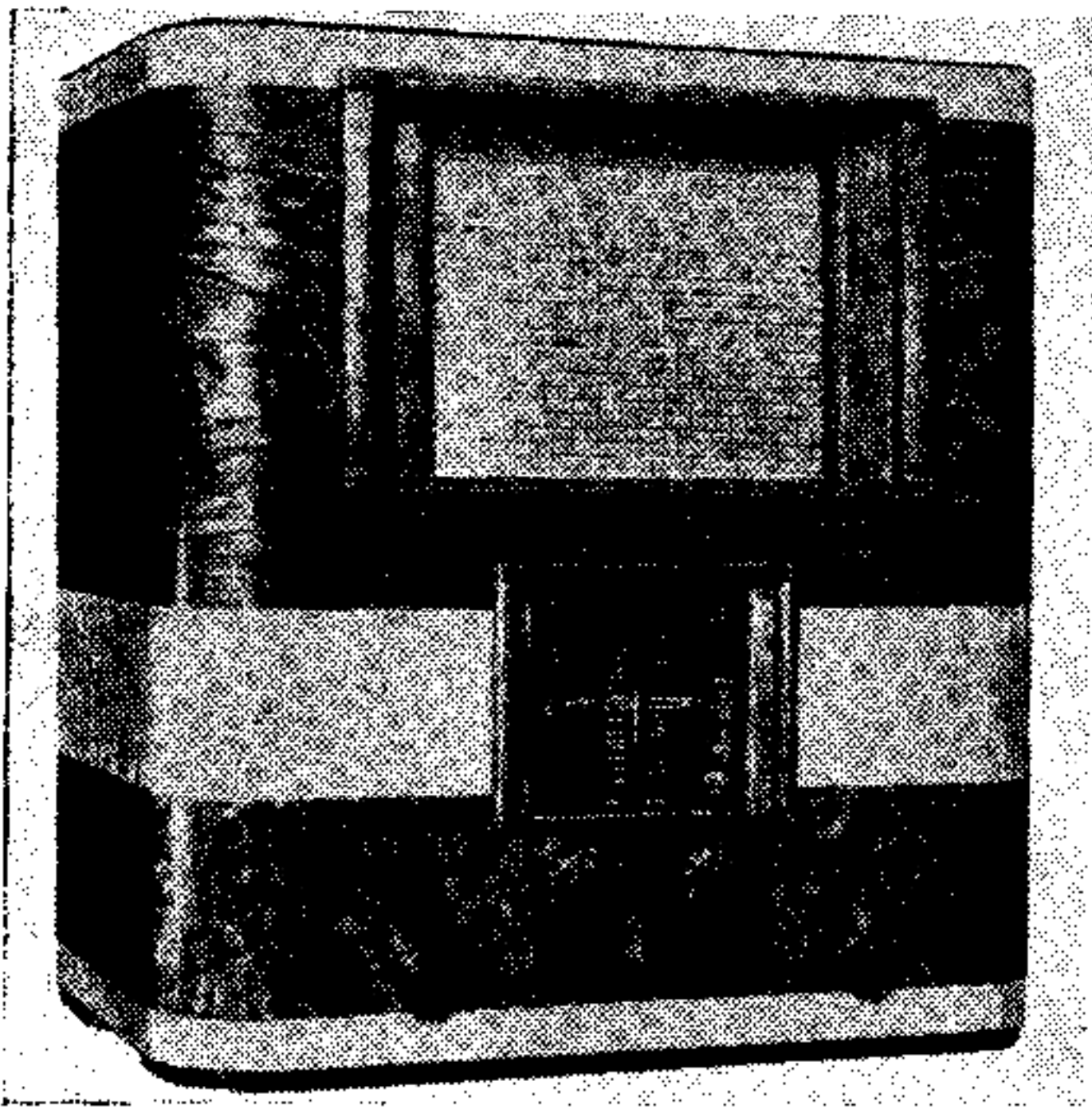
Ned. Ver. v. Historie v/d Radio



BUSH DAC43

DUG43, RG43

REVISED ISSUE OF
SERVICE SHEET No. 214



The Bush DAC43 receiver.

A SHORT-WAVE range of 17-53 metres is covered by the Bush DAC43 4-valve AC/DC 3-band superhet. Suitable for mains of 180-260 V (40/80 C/S in the case of AC), it employs a Westinghouse unit for rectification.

A very similar chassis is fitted in the DUG43 console receiver, and a slightly modified one in the RG43 radio-gramophone and automatic radio-gramophone, but this *Service Sheet* was prepared on a DAC43 table receiver.

Release dates and original prices:

DAC43, January, 1937, £13 2s. 6d.;
DUG43, February, 1937, £16 16s.;
RG43, March, 1937, £30 9s., or £36 15s.
with record changer.

CIRCUIT DESCRIPTION

Aerial input via isolating condenser C1 and on MW and LW via coupling coils L1 (MW) and L3 (LW) to capacity coupled band-pass filter. Primaries L2 (MW), L4 (LW) are tuned by C33; secondaries L7 (MW), L8 (LW) are tuned by C37; top coupling by small condensers C4 (MW), C5 (LW), and bottom coupling by C3. On SW band aerial input is via coupling coil L5 to single tuned circuit comprising L6 and tuning condenser C37.

First valve (V1, Mullard metallised TH21C) is a triode-hexode operating as a frequency changer with internal coupling. Oscillator grid coils L9 (SW), L11 (MW) and L13 (LW) are tuned by C38; parallel trimming by C39 (SW), C40 (MW) and C12, C42 (LW); series tracking by C10 (SW), C11, C41 (MW) and C43 (LW); oscillator anode reaction coils L10 (SW), L12 (MW) and L14 (LW).

Second valve is a variable-mu RF pentode (V2, Mullard metallised VP13C) operating as intermediate frequency amplifier with special triple-tuned transformer couplings C44, L15, L16, C45, L17, C46 and C47, L18, L19, C48, L20, C49.

Intermediate frequency 465 KC/S.

Parallel-fed diode second detector is part of double diode triode valve (V3, Mullard metallised TDD13C). AF component in rectified output is developed across load resistance R14 and passed via coupling condenser C21 and manual volume control R12 to CG of triode sec-

tion, which operates as AF amplifier. Provision for connection of gramophone pick-up across R12 via mains isolating condensers C19 and C20.

Second diode of V3, fed from V2 anode via C24, provides DC potential which is developed across R19 and fed back through decoupling circuits as GB to FC (except on SW) and IF valves, giving automatic volume control. Delay voltage is obtained from drop along V3 cathode resistance R17.

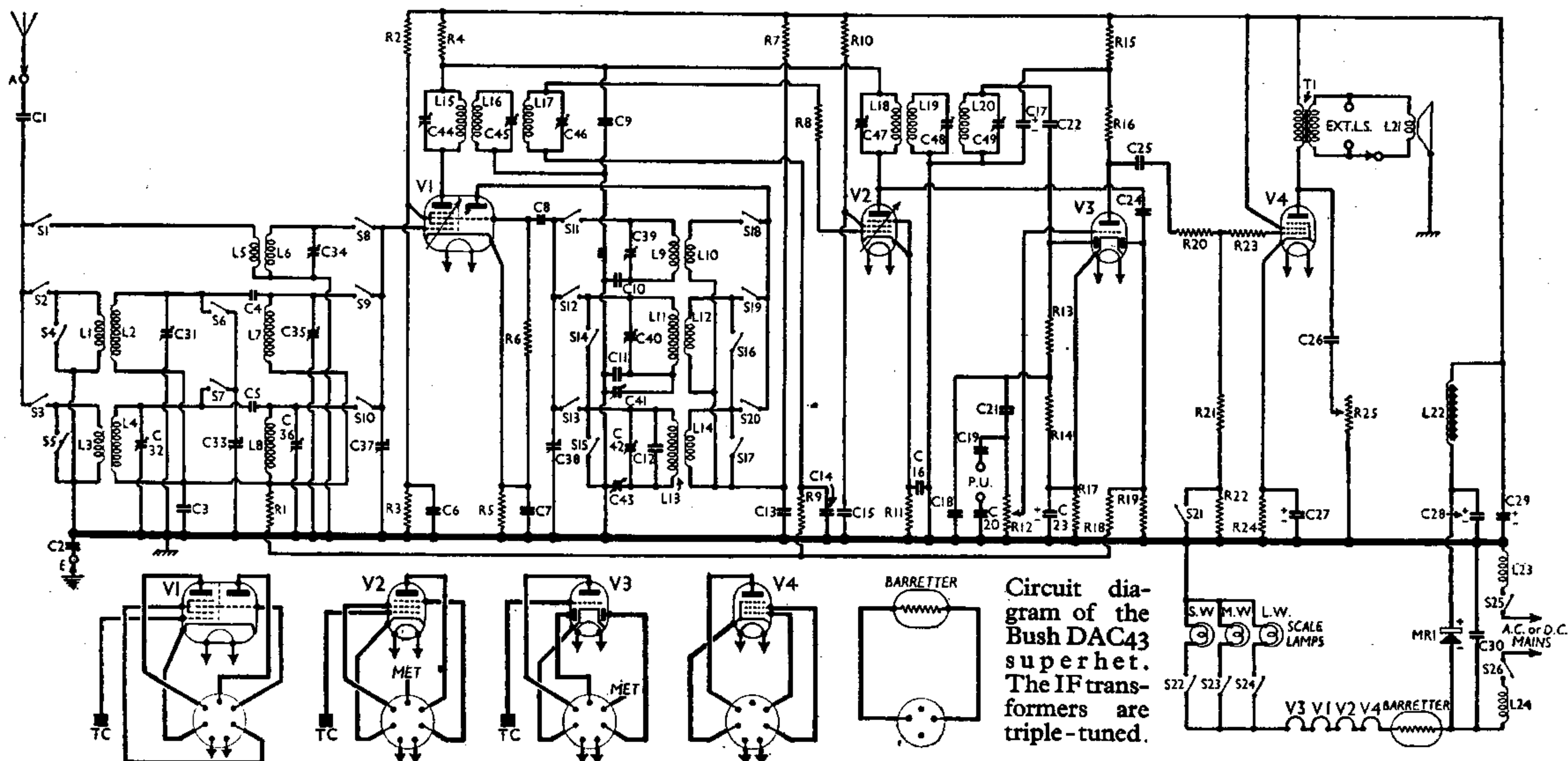
Resistance-capacity coupling by R16, C25, R21, R22 between V3 triode and pentode output valve (V4, Mullard Pen36C). S21 opens on SW, modifying the tone and increasing the gain on that band. Variable tone control by RC filter C26, R25 in anode circuit. Provision for connection of low impedance external speaker across secondary of internal speaker transformer T1. Plug and socket arrangement enables internal speaker speech coil circuit to be broken.

When the receiver is used with AC mains, HT current is supplied by a half-wave metal rectifier (MR1, Westinghouse B27) which, with DC supplies, behaves as a low resistance. Smoothing is effected by iron-cored choke L22 and dry electrolytic condensers C28, C29.

Valve heaters are connected in series together with scale lamps and current regulating barretter lamp (Philips C1), across mains input circuit. Filter, comprising chokes L23, L24 and condenser C30 suppresses mains-borne interference.

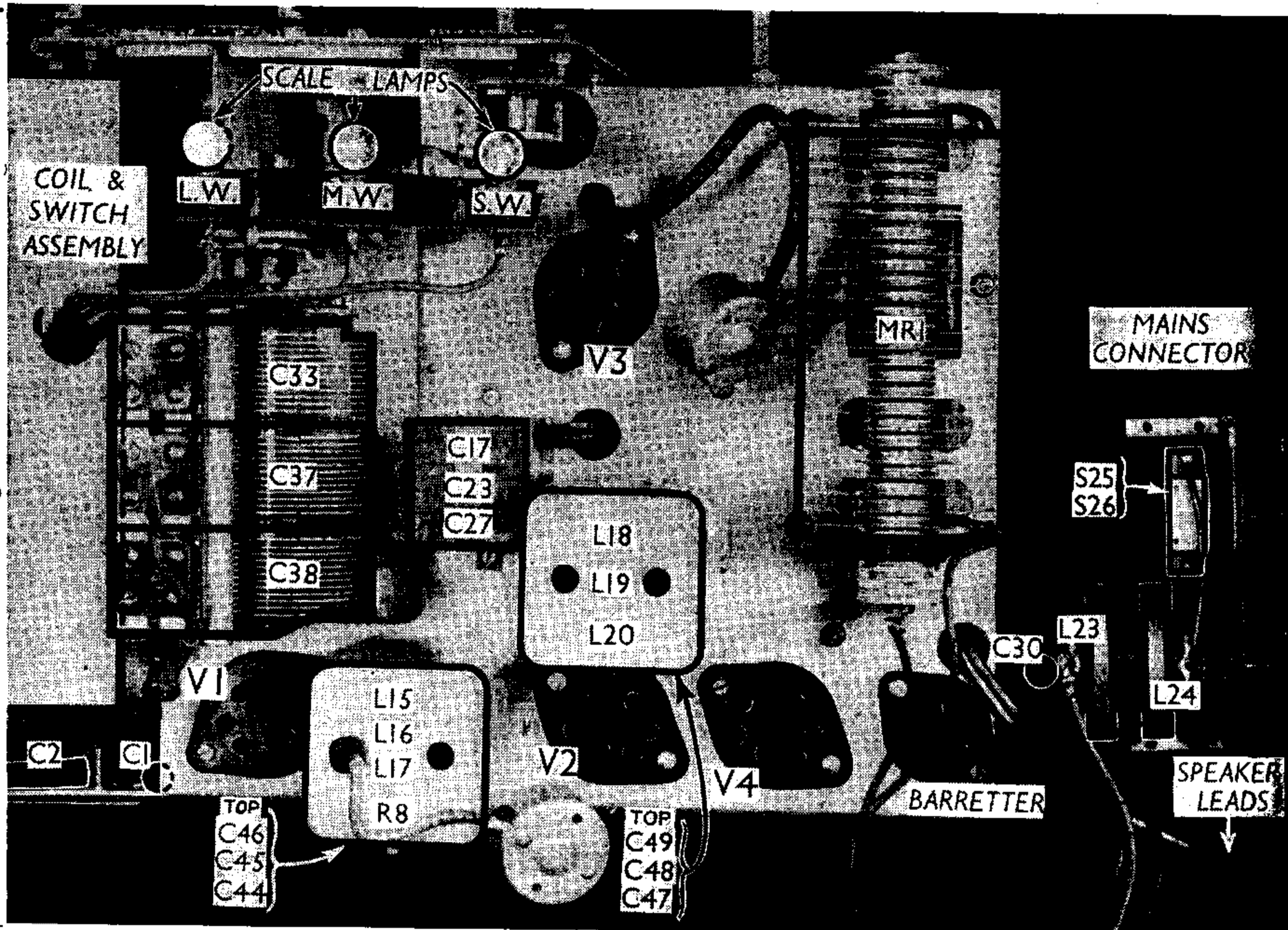
VALVE ANALYSIS

Valve voltages and currents given in the table (col. 4) are those measured in



Circuit diagram of the Bush DAC43 superhet. The IF transformers are triple-tuned.

Plan view of the chassis. Part of the partitioned coil and switch container is seen on the left, beside the gang unit. On the right is the mains input unit, which is attached to the chassis by leads but is fitted on the side of the cabinet when assembled. The positions of the six IF trimmers are approximately indicated by arrows. Their sequence is the same as that of their numbers, reading from top to bottom.



our receiver when it was operating on AC mains of 225 V. 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 1,200 V scale of an Avometer, chassis being negative.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 TH21C	185	2.5	65	5.8
	Oscillator			
V2 VP13C	140	7.4	100	2.2
	185	6.0		
V3 TDD13C	90	2.2		
V4 Pen36C	215	33.0	235	4.7

COMPONENTS AND VALUES

RESISTANCES		Values (ohms)
R1	V1 hexode CG decoupling	1,000,000
R2	V1 hexode SG HT potential divider	20,000
R3	V1 hexode HT feed	20,000
R4	V1, V2 anodes HT feed	5,000
R5	V1 fixed GB	100
R6	V1 osc. CG resistance	30,000
R7	V1 osc. anode HT feed	15,000
R8	V2 CG stabiliser	250
R9	V2 CG decoupling	1,000,000
R10	V2 SG decoupling	50,000
R11	V2 fixed GB resistance	100
R12	Manual volume control	500,000
R13	IF stopper	200,000
R14	V3 signal diode load	1,000,000
R15	V3 triode anode decoupling	10,000
R16	V3 triode anode load	50,000
R17	V3 GB resistance	1,000
R18	AVC line decoupling	1,000,000
R19	V3 AVC diode load	1,000,000
R20	V4 CG IF stopper	100,000
R21	V4 CG resistances	100,000
R22		550,000
R23	V4 CG IF stopper	100,000
R24	V4 GB resistance	350
R25	Variable tone control	50,000

CONDENSERS		Values (µF)
C1	Aerial isolating condenser	0.005
C2	Earth isolating condenser	0.005
C3	Band-pass bottom coupling	0.03
C4	Band-pass MW top coupling	Very low
C5	Band-pass LW top coupling	Very low
C6	V1 SG decoupling	0.1
C7	V1 cathode by-pass	0.1
C8	V1 osc. CG condenser	0.00005
C9	V1, V2 anodes decoupling	0.1
C10	Osc. SW tracker	0.0043
C11	Osc. MW fixed tracker	0.0004
C12	Osc. LW fixed trimmer	0.0001
C13	V1 osc. anode decoupling	0.1
C14	V2 CG decoupling	0.1
C15	V2 SG decoupling	0.1
C16	V2 cathode by-pass	0.1
C17*	V3 triode anode decoupling	2.0
C18	IF by-pass	0.0001
C19	Pick-up isolating condensers	0.03
C20		0.1
C21	AF coupling to V3 triode	0.005
C22	V3 signal diode coupling	0.0001
C23*	V3 cathode by-pass	50.0
C24	V3 AVC diode coupling	0.0001
C25	V3 to V4 AF coupling	0.03
C26	Part of TC filter	0.03
C27*	V4 cathode by-pass	50.0
C28*	HT smoothing condensers	16.0
C29*		24.0
C30	Mains RF by-pass	0.01
C31†	B-P MW pri. trimmer	0.000035
C32†	B-P LW pri. trimmer	0.000035
C33†	Band-pass pri. tuning	—
C34†	Aerial SW trimmer	0.000035
C35†	B-P MW sec. trimmer	0.000035
C36†	B-P LW sec. trimmer	0.000035
C37†	Band-pass sec. tuning	—
C38†	Osc. circuit tuning	—
C39†	Osc. SW trimmer	0.000035
C40†	Osc. MW trimmer	0.00008
C41†	Osc. MW tracker	0.0003
C42†	Osc. LW trimmer	0.00008
C43†	Osc. LW tracker	0.0003
C44†	1st IF trans. pri. tuning	0.00015
C45†	1st IF trans. tert. tuning	0.00015
C46†	1st IF trans. sec. tuning	0.00015
C47†	2nd IF trans. pri. tuning	0.00015
C48†	2nd IF trans. tert. tuning	0.00015
C49†	2nd IF trans. sec. tuning	0.00015

OTHER COMPONENTS		Approx. Values (ohms)
L1	Aerial MW coupling coil	0.7
L2	B-P MW primary coil	2.4
L3	Aerial LW coupling coil	15.5
L4	B-P LW primary coil	7.4
L5	Aerial SW coupling coil	0.2
L6	Aerial SW tuning coil	0.05
L7	B-P MW secondary coil	2.4
L8	B-P LW secondary coil	7.4
L9	Osc. SW tuning coil	0.05
L10	Osc. SW reaction coil	0.2
L11	Osc. MW tuning coil	1.5
L12	Osc. MW reaction coil	1.25
L13	Osc. LW tuning coil	2.45
L14	Osc. LW reaction coil	2.0
L15	1st IF trans.	7.0
L16		7.0
L17	2nd IF trans.	7.0
L18		7.0
L19	2nd IF trans.	7.0
L20		7.0
L21	Speaker speech coil	1.7
L22	HT smoothing choke	160.0
L23	Mains filter chokes	6.0
L24		6.0
T1	Speaker input trans.	600.0
S1-S21	Wavechange switches	—
S22-24	Scale lamp switches	—
S25, 26	Mains switches	—

DISMANTLING THE SET

Removing Chassis.—Remove the five control knobs (recessed grub screws) from the front of the cabinet; free the speaker and mains input unit leads from the cleats holding them to the side of the cabinet; remove the insulating covers (eight round-head wood screws) protecting the heads of the four chassis fixing bolts, and remove the bolts (with washers). The chassis may now be withdrawn to the extent of the leads. To free the chassis entirely, dismantle the mains input unit from the side of the cabinet (four round-head wood screws) and unsolder the speaker leads. When replacing, connect the speaker

* Electrolytic. † Variable. ‡ Pre-set

leads as follows, numbering the tags on the speaker unit from bottom to top: 1, red; 5, yellow.

Removing Speaker.—The speaker may be removed from the cabinet by unsoldering the leads and removing the nuts (and washers) from the four bolts holding it to the sub-baffle.

When replacing, see that the terminal panel is on the right, and connect the leads from the chassis and mains switch unit as above, and the leads from the extension speaker panel as follows: 2, green; 3, brown; 4, black.

The black lead from the mains switch unit goes to the earthing tag on the speaker.

GENERAL NOTES

Switches.—S1-S21 and S22-S24 are the waveband and scale lamp switches, ganged in three rotary units in the coil unit. The units are indicated in our side-chassis view, and are shown in detail in the diagrams in col 3, viewed as seen looking at the underside of the chassis from the rear. The table (col. 2) gives the switch positions for the three control settings, starting from fully anti-clockwise position of the control. A dash indicates open, and C, closed.

S25 and S26 are the QMB mains switches, in a single unit, mounted on the separate mains input unit, with L23, L24 and C30.

Coils.—The signal frequency and oscillator coils, L1-L14, are in a partitioned

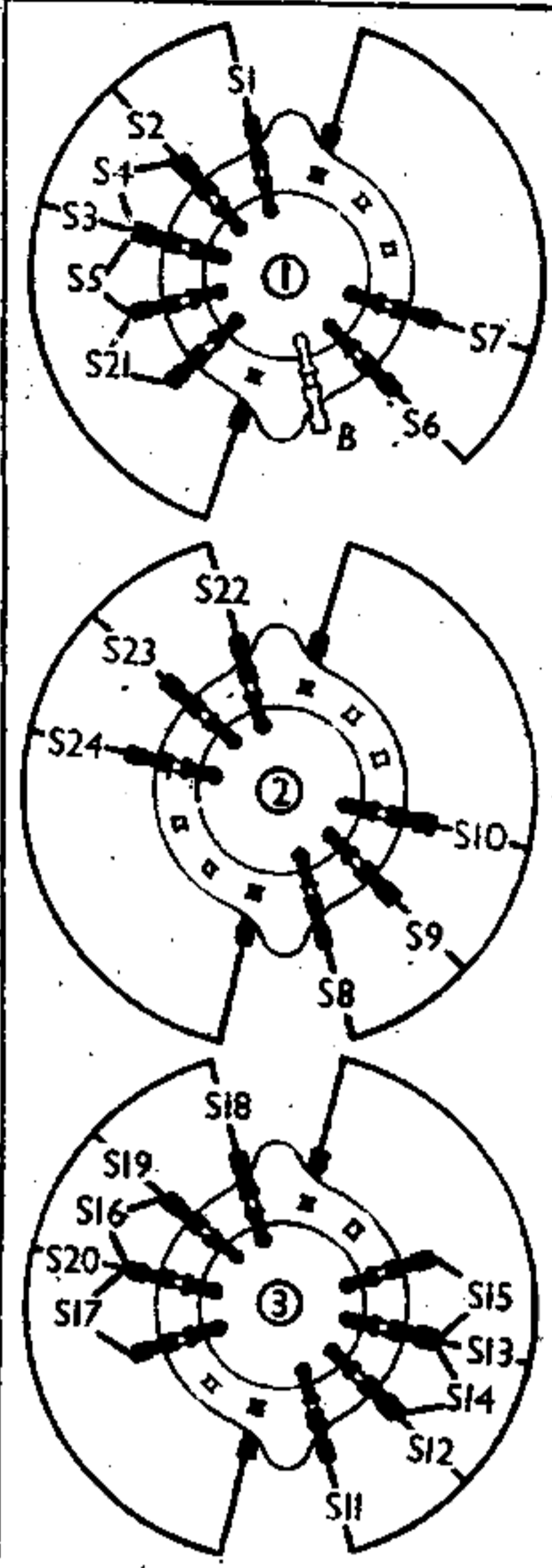
Switch	SW	MW	LW
S1	C	—	—
S2	—	—	—
S3	—	—	—
S4	—	—	—
S5	—	—	—
S6	—	—	—
S7	—	—	—
S8	—	—	—
S9	—	—	—
S10	—	—	—
S11	—	—	—
S12	—	—	—
S13	—	—	—
S14	—	—	—
S15	—	—	—
S16	—	—	—
S17	—	—	—
S18	—	—	—
S19	—	—	—
S20	—	—	—
S21	—	—	—
S22	—	—	—
S23	—	—	—
S24	—	—	—

screened unit, with the waveband switches and several other components. This unit projects above and below the chassis deck. The coils are indicated in detail in our side-chassis view, the metal side plate of the unit having been removed. In all there are eight coil formers, each carrying one or two coils, and each having a trimmer mounted at its end.

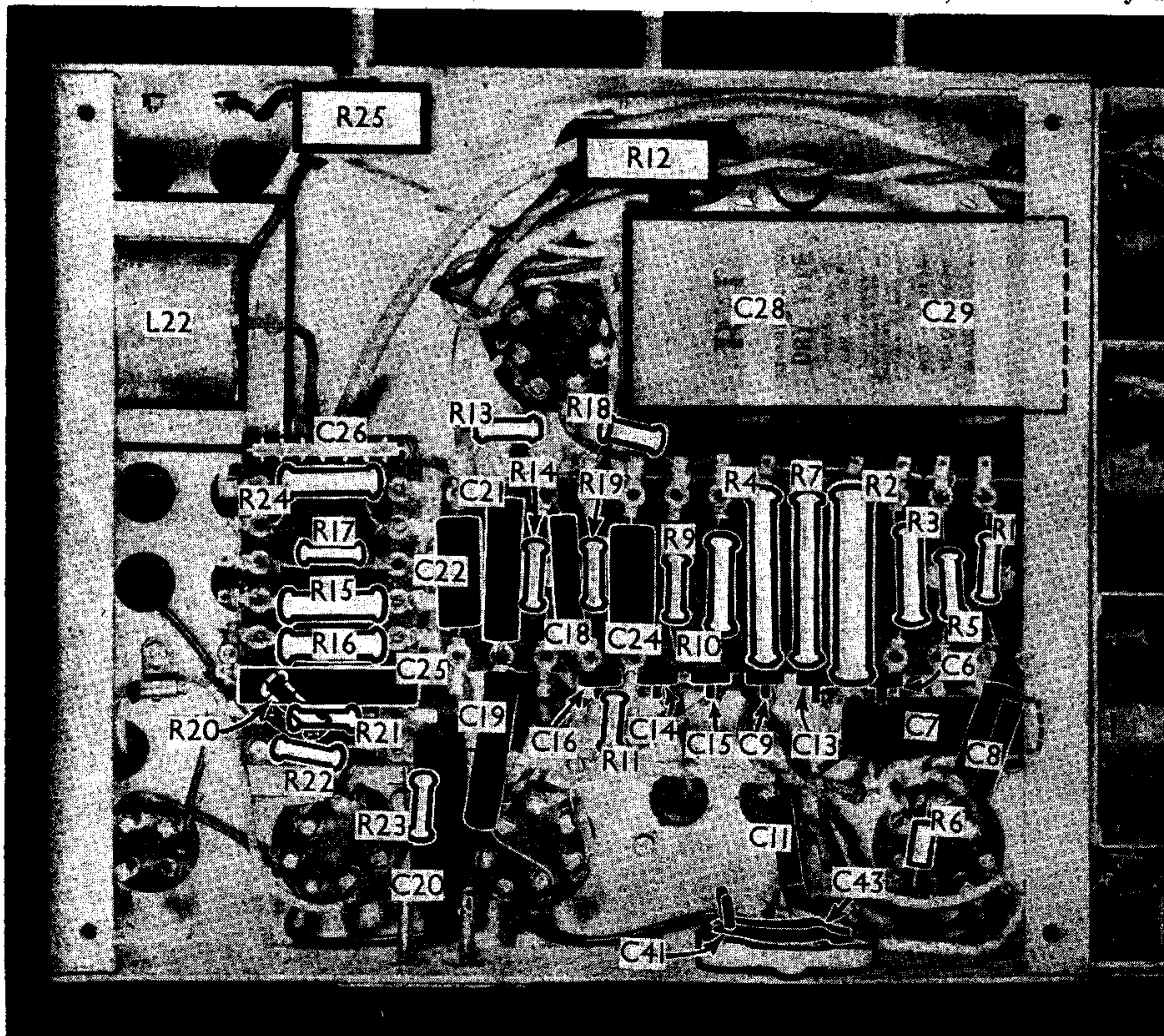
Scale Lamps.—These are three Ever Ready MES types, rated at 6.2 V, 0.3 A. They are switched by S22-S24, according to the waveband in use.

External Speaker.—Provision is made,

On the right are the diagrams of the three waveband switch units, as seen when viewed from the rear of the underside of the chassis. Their positions are indicated in the side - chassis view in cols. 5 and 6. On the left is the switch table.



by a panel at the top of the back of the cabinet, for the use of a low impedance (about 20) external speaker. The internal speaker speech coil may be disconnected by a plug and socket device



Under - chassis view. The bottoms of the coil formers and partitions in the coil and switch unit are seen on the right. Note the six condensers beneath the horizontal component panel. They are in a single metal container whose case forms a common connection to one side of each condenser. The isolated tags are identified by arrows running from the condenser numbers.

which is also mounted on the rear panel.

Condensers C17, C23, C27.—These are three dry electrolytics in a single container, mounted on the chassis deck, and having a common negative (black) lead. The red lead is the positive of C17 (2 μ F), the yellow lead to V3 cathode the positive of C23 (50 μ F), and yellow to V4 cathode the positive of C27 (50 μ F).

Condensers C28, C29.—These are two dry electrolytics in a single carton with a common negative (black) lead. The yellow lead is the positive of C28 (16 μ F) and the red the positive of C29 (24 μ F).

Condensers C6, C9, C13, C14, C15, C16.—These are six 0.1 μ F paper types in a metal case, mounted beneath one of the component strips. The case forms one common connection, and the tags indicated in the under-chassis view belong one to each condenser.

Condensers C4, C5.—These are two very small fixed condensers, formed of spirals of wire wound round straight insulated wires. They are indicated in the side-chassis view.

Speaker.—This is a Rola 8ZA, 9.5 PMP.

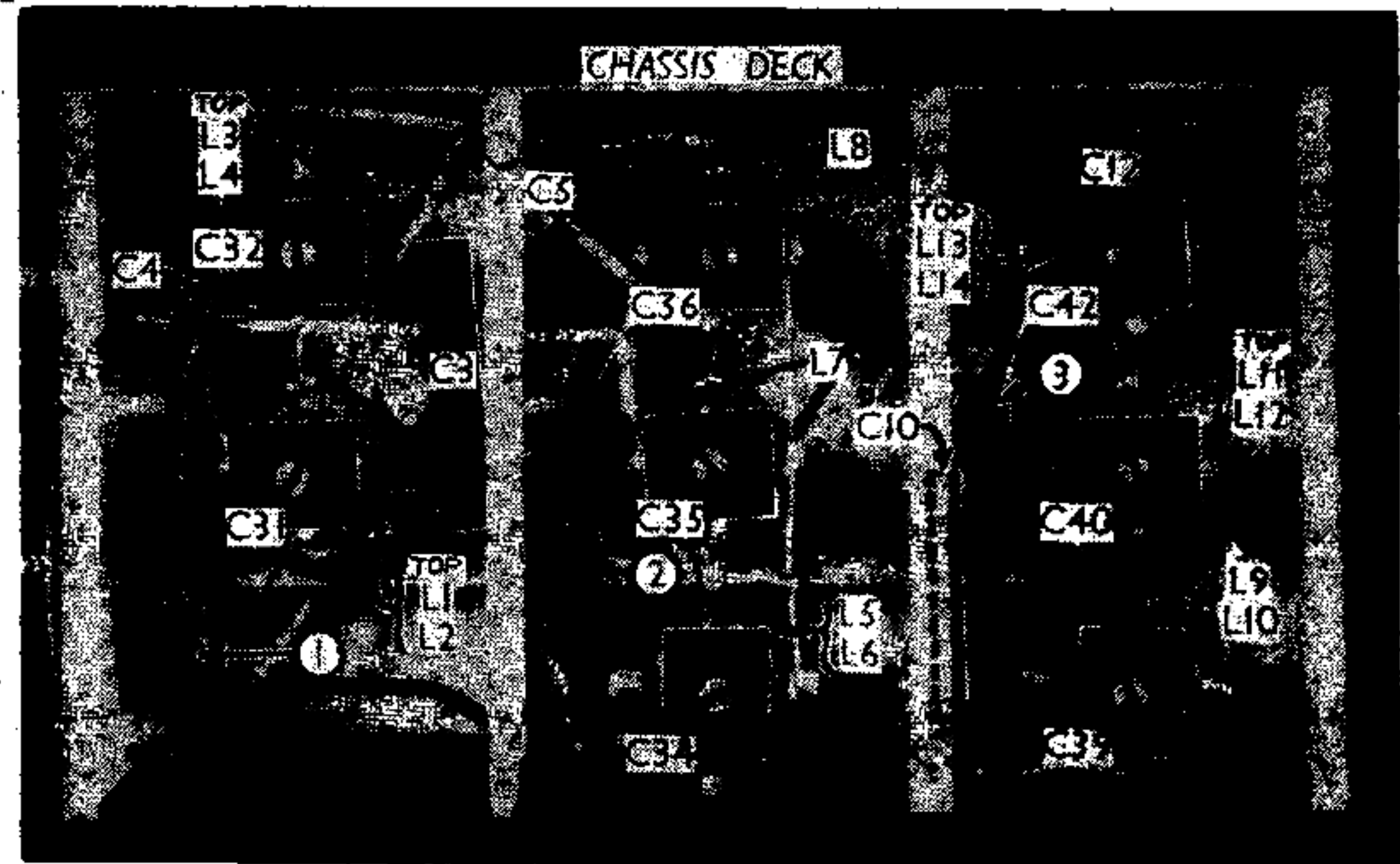
RADIOGRAM MODIFICATIONS

In the radiogram model, RG43, the chassis is basically the same, but there are certain additions and modifications.

In the first place, there are four switch positions instead of three, Gram being fully clockwise. An additional switch unit, outside the coil assembly, is included, while switch units 1 and 2 are modified. The effect of the modifications is to switch all scale lamps "off" on Gram; to short C37 on Gram (thus muting radio); to close S21 on Gram as well as on MW and LW; and to disconnect C21, and connect C19, at top of R12 on Gram, and vice-versa on SW, MW, LW.

The switch S21 is transferred to one side of the additional switch unit, while the other side of this unit is used for the pick-

Side-chassis view, showing the interior of the coil and switch unit. Each coil unit is surmounted by a trimmer. The switch units are indicated, and the numbers in circles agree with those in the detailed diagrams in col. 3, where the switches are viewed from beneath this illustration.



up switching. There are also other minor modifications.

The isolating condenser C20 is omitted (C19 being retained) and the bottom pick-up tag goes direct to chassis. The pick-up arm and screening goes to true earth, not chassis. The motor frame also goes to true earth. R10 becomes 100,000 Ω (not 50,000 Ω).

The speaker is a Rola F10 13/PM. T1 has a primary resistance of 750 Ω and a secondary of 0.5 Ω . L21 has a resistance of 1.6 Ω . In early models the speaker may be a Rola G12 PM.

CIRCUIT ALIGNMENT

IF Stages.—Switch set to LW, turn gang condenser to maximum, and connect signal generator to control grid (top cap) of V1, and chassis. Feed in a 465 KC/S (645.16 m) signal, and adjust C49, C48, C47 and C46, C45, C44 for maximum output in each case, keeping the input low. C48 is very critical.

RF and Oscillator Stages.—Connect signal generator to A and E sockets, via a suitable dummy aerial, which may consist of an inductance of 20 μ H, a capacity

of 200 μ F (0.0002 μ F) and a resistance of 15 Ω in series on MW and LW, and a 400 Ω resistance only on SW. See that with gang at maximum, pointer reads 550 and 2,000 m on scale.

SW.—Switch set to SW, feed in an 18 m (16.7 MC/S) signal. Set pointer to 18 m on scale and adjust C39 for maximum output. Two peaks will be obtained, that which requires the lesser trimmer capacity being correct. Next adjust C34 for maximum output.

MW.—Switch set to MW, feed in a 200 m (1,500 KC/S) signal, tune to 200 m on scale, and adjust C40 for maximum output on the peak requiring the lesser trimmer capacity. Feed in a 300 m (1,000 KC/S) signal, tune to 300 m on scale, and adjust C31 and C35 for maximum output. Feed in a 500 m (600 KC/S) signal, tune to 500 m on scale, and adjust C41 for maximum output. Check on 300 m.

LW.—Adopt procedure as for MW, but adjust C42 on 1,000 m (300 KC/S), C32 and C36 on 1,500 m (200 KC/S) and C43 on 1,800 m (167 KC/S). Check again on 1,500 m.