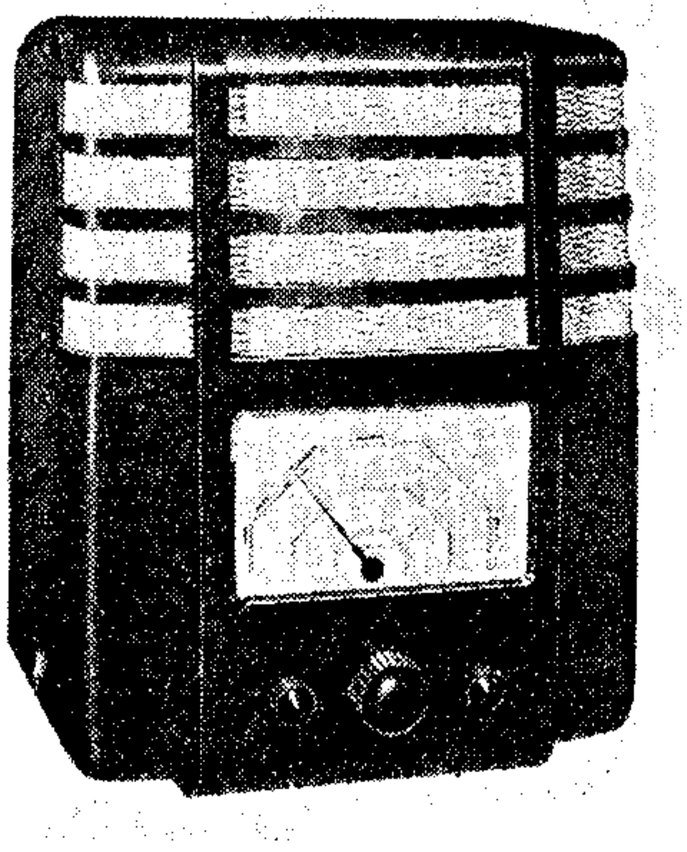
EKCO BAW69

BATTERY 3-BAND SUPERHET



A SHORT-WAVE range of 15-52 m is covered by the Ekco BAW69 3-band battery superhet. The receiver uses an octode frequency changer, while the output stage employs a double-pentode QPP valve. A sensitivity switch is included. Provision is made for an extension speaker, and the internal speaker can be cut out of circuit when desired.

It is regretted that permission to publish the circuit diagram is still not obtainable, but sufficient information is given to enable any competent engineer to effect repairs.

CIRCUIT DESCRIPTION

Aerial input on MW and LW via SW coupling coil **L4** and on MW coupling condenser **C1** or, on LW, coupling coil **L1,** to mixed coupled band-pass filter. Primary coils **L2, L3** are tuned by **C23 ;** secondaries **L6, L7** by **C28.** On SW, coupling is via **L4** to single tuned circuit **L5, C28.** Image suppression is carried out by **C25.**

First valve (**V1, Mullard metallised FC2A**) is an octode operating as frequency changer with electron coupling. Oscillator grid coils **L8** (SW), **L9** (MW) and **L10** (LW) are tuned by **C30 ;** parallel trimming by **C31** (SW), **C32** (MW) and **C33** (LW) ; series tracking by **C5** (MW) and **C6** (LW). Reaction by coils **L11** (SW), plus **L12, L13** (MW and LW) connected in series between oscillator anode and HT positive line, **L12, L13** being short-circuited on SW by switch **S13.**

Second valve (**V2, Mullard metallised VP2B**) is a variable-mu hexode, with second and fourth grids strapped, operating as intermediate frequency amplifier with tuned-primary tuned-secondary transformer couplings **C34, L14, L15, C35** and **C36, L16, L17, C37.**

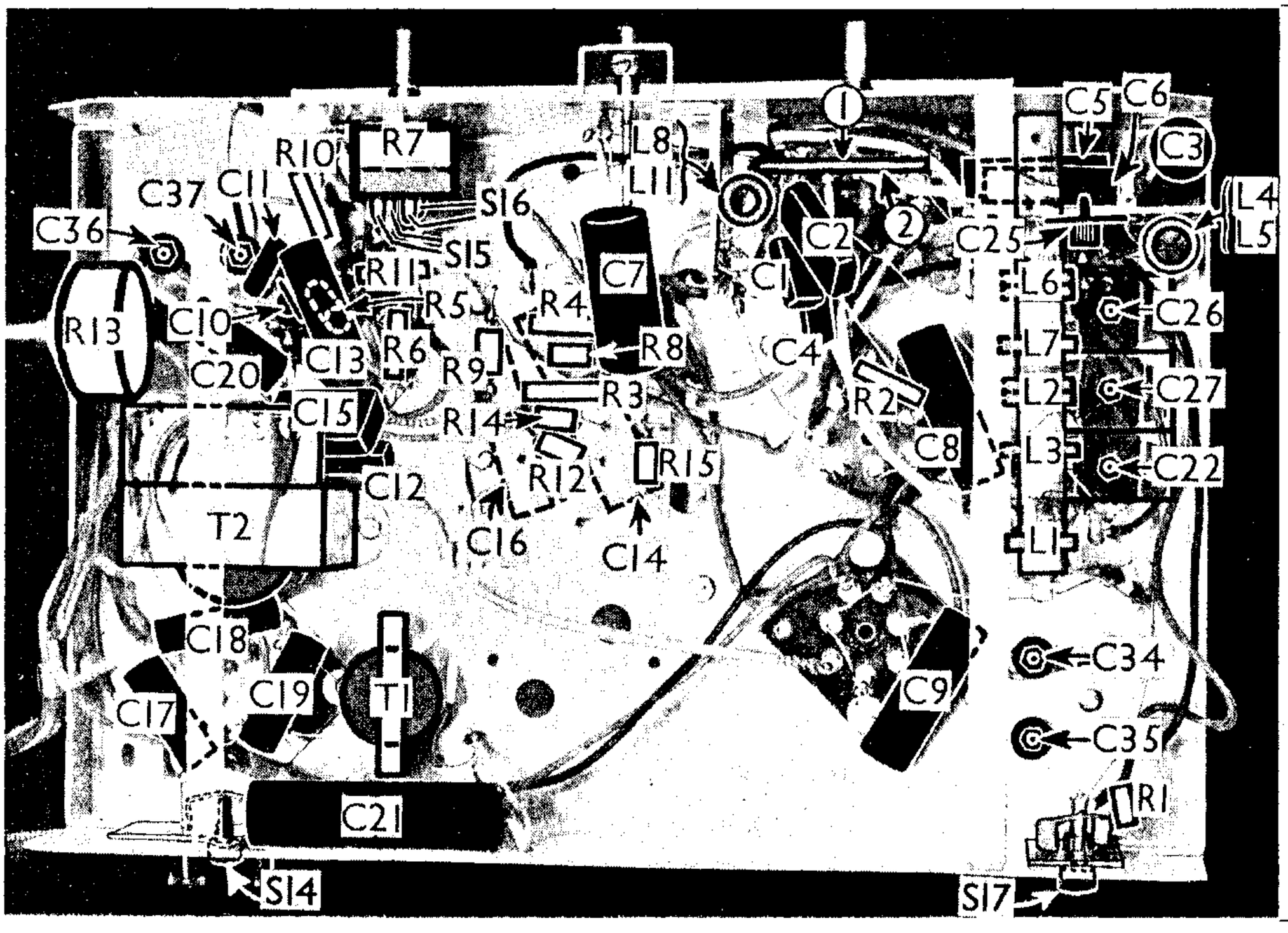
Intermediate frequency 126·5 KC/S.

Diode second detector is part of double diode triode valve (**V3, Mullard metallised TDD2A**). Audio frequency component in rectified output is developed across load resistance **R6** and passed via AF coupling condenser **C13** and manual volume control **R7** to CG of triode section, which operates as AF amplifier. IF filtering by **C11, R5, C12** between **L17** and **R6,** and by **C15** from triode anode to chassis.

HT feed for **V1** and **V2** screens and **V3** triode anode is via **R8** from HT positive line, other anode circuits being connected directly to HT positive line.

Second diode of **V3,** fed from **V2** anode via **C10,** provides DC potential which is developed across load resistance **R10** and fed back via decoupling circuit **R11, C3** as GB to FC and IF valves, giving automatic volume control.

Parallel-fed transformer coupling by **R9, C16** and **T1** between **V3** triode and quiescent push-pull output valve (**V4, Mazda QP230**). Fixed tone correction by condensers **C17, C18,** one between each anode and chassis, and **C19** connected between the two anodes. Variable tone control by **C20, R13,** also connected between the two anodes. Provision for



Under-chassis view of the BAW69. The wavechange switch unit is double-sided, and detailed diagrams of it are on page IV. All the trimmers, except those on and near the gang condenser, are seen in this illustration. **S14** and **S17** are screw-type switches.

connection of low impedance external speaker across secondary of output transformer **T2,** while switch **S14,** in internal speaker speech coil circuit, permits the latter to be muted.

Potentials are automatically developed across resistances **R14, R15** in negative HT lead to chassis to provide GB for **V4** (across both resistances) and at their junction GB for **V3** triode, minimum GB for **V1, V2** and AVC delay.

DISMANTLING THE SET

Removing Chassis.—Remove the three control knobs from the front of the cabinet (recessed grub screws) and one from the side (recessed grub screw inside cabinet), the two screws (with metal and paxolin washers) holding the scale to the front of the cabinet, and four bolts (with lock washers) holding the chassis to the bottom of the cabinet, and slip the leads from under the clip holding them to the speaker baffle, when the chassis may be withdrawn to the extent of the speakers leads, which will be sufficient for normal purposes.

When replacing, see that a paxolin washer is in front of, and a metal washer behind, the lugs holding the scale to the front of the cabinet, and slip the leads under the clip on the speaker baffle.

To free the chassis entirely, unsolder the two blue leads from the panel on the speaker.

Removing Speaker.—To remove the speaker, remove the four bolts (with brass washers) holding it to the sub-baffle. These are screwed into threaded washers fixed to the other side of the sub-baffle. *When replacing*, see that the connecting panel is on the right.

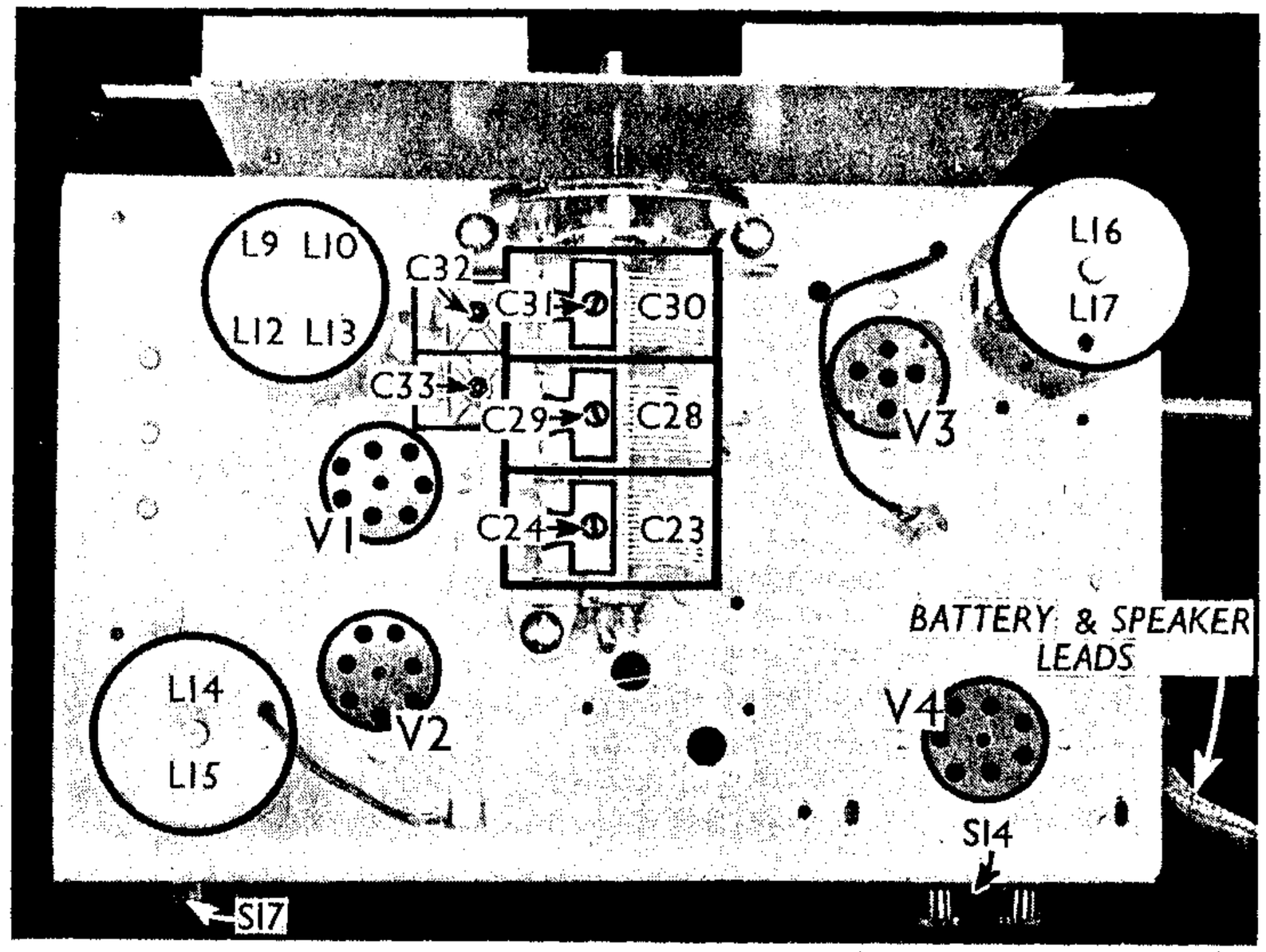
COMPONENTS AND VALUES

	CONDENSERS	Values (μF)
C1	Aerial MW coupling	0·001
C2	Band-pass pri. LW shunt (SW and MW only)	0·00012
C3	V1 hexode CG decoupling	0·1
C4	V1 osc. CG condenser	0·00005
C5	Osc. circuit MW tracker	0·002
C6	Osc. circuit LW tracker	0·0008
C7	HT circuit RF by-pass	0·1
C8	V1 SG decoupling	0·1
C9	V2 SG decoupling	0·1
C10	Coupling to V3 AVC diode	0·000015
C11	IF by-pass condensers	0·0002
C12	IF by-pass condensers	0·0002
C13	AF coupling to V3 triode	0·01
C14*	V3 triode anode and V1, V2 SG's decoupling	4·0
C15	IF by-pass	0·0003
C16	AF coupling to T1	0·1
C17	V4 anodes circuit fixed tone correctors	0·005
C18	V4 anodes circuit fixed tone correctors	0·005
C19	V4 anodes circuit fixed tone correctors	0·003
C20	Part of variable tone control	0·02
C21*	HT circuit reservoir	10·0
C22‡	Band-pass pri. LW trimmer	—
C23†	Band-pass pri. tuning	—
C24‡	Band-pass pri. MW trimmer	—
C25‡	Image suppressor	—
C26‡	Band-pass sec. MW trimmer	—
C27‡	Band-pass sec. LW trimmer	—
C28†	Band-pass sec. and SW aerial tuning	—
C29‡	Aerial circuit SW trimmer	—
C30†	Oscillator circuit tuning	—
C31‡	Osc. circuit SW trimmer	—
C32‡	Osc. circuit MW trimmer	—
C33‡	Osc. circuit LW trimmer	—
C34‡	1st IF trans. pri. tuning	—
C35‡	1st IF trans. sec. tuning	—
C36‡	2nd IF trans. pri. tuning	—
C37‡	2nd IF trans. sec. tuning	—

* Electrolytic. † Variable. ‡ Pre-set.

	RESISTANCES	Values (ohms)
R1	Aerial sensitivity shunt	200
R2	V1 osc. CG resistance	50,000
R3	V1 SG HT feed	70,000
R4	V2 SG HT feed	175,000
R5	IF stopper	75,000
R6	V3 signal diode load	500,000
R7	Manual volume control	850,000
R8	V3 triode anode and V1, V2 SG's decoupling	6,000
R9	V3 triode anode load	50,000
R10	V3 AVC diode load	750,000
R11	AVC line decoupling	1,000,000
R12	V4 CG's decoupling	100,000
R13	Variable tone control	50,000
R14	V3 triode and V4 GB; V1, V2 fixed GB; AVC delay, potential divider	750
R15	V3 triode and V4 GB; V1, V2 fixed GB; AVC delay, potential divider	75

	OTHER COMPONENTS	Approx. Values (ohms)
L1	Aerial LW coupling coil and part L3	27·0
L2	Band-pass primary coils	2·5
L3	Band-pass primary coils	26·0
L4	Aerial SW coupling coil	0·4
L5	Aerial SW tuning coil	0·05
L6	Band-pass secondary coils	2·6
L7	Band-pass secondary coils	26·0
L8	Osc. circuit SW tuning coil	0·05
L9	Osc. circuit MW tuning coil	8·5
L10	Osc. circuit LW tuning coil	18·0
L11	Oscillator SW reaction	0·6
L12	Oscillator MW reaction	2·25
L13	Oscillator LW reaction	3·0
L14	1st IF trans. Pri.	70·0
L15	1st IF trans. Sec.	75·0
L16	2nd IF trans. Pri.	70·0
L17	2nd IF trans. Sec.	75·0
L18	Speaker speech coil	3·0
T1	Intervalve trans. Pri.	370·0
T1	Intervalve trans. Sec., total	3,000·0
T2	Output trans. Pri., total	1,350·0
T2	Output trans. Sec.	0·3
S1-S13	Waveband switches	—
S14	Speaker switch	—
S15	HT circuit switch ganged R7	—
S16	LT circuit switch ganged R7	—
S17	Sensitivity switch	—



Plan view of the chassis. Five of the trimmers are indicated, the remainder being beneath the chassis.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating with a new HT battery reading 140 V overall, on load. 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.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 FC2A	125	0·35	50	0·9
	oscillator			
	125	2·9		
V2 VP2B	125	1·15	35	0·5
V3 TDD2A	72	0·6	—	—
V4 QP230	125†	2·45†	125	1·2

† Each anode.

GENERAL NOTES

Switches.—S1-S13 are the waveband switches, in a double-sided rotary unit beneath the chassis. The sides are marked 1 and 2 in the under-chassis view, and diagrams of them are given in detail on page IV.

The table (p. IV) gives the switch positions for the three control settings, starting from fully anti-clockwise. A dash indicates open, and **C** closed.

S14 is the internal speaker switch of the screw type, operated by a small knob at the rear of the chassis. When this is unscrewed, the internal speaker speech coil circuit is broken.

S15, S16 are the QMB battery circuit switches, ganged with the volume control, **R7.**

S17 is the screw-type sensitivity switch, operated by a small knob at the rear of

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the chassis. When it is screwed up, **S17** is closed, and connects **R1** across the aerial circuit, thus reducing the sensitivity.

Coils.—**L1, L2, L3, L6, L7** are in a single unscreened unit beneath the chassis, while **L4, L5** and **L8, L11** are on two moulded tubular formers, also beneath the chassis. **L4** and **L11** are interwound with **L5** and **L8** respectively.

L9, L10, L12, L13 and the IF transformers **L14, L15** and **L16, L17** are in three screened units on the chassis deck. The trimmers for these are reached from beneath the chassis.

External Speaker.—Two sockets are provided at the rear of the chassis for a low impedance (2·5-4 O) external speaker. **S14** cuts out the internal speaker if desired.

Condenser C20.—This is given by the makers as 0·01 μF but is 0·02 μF in our chassis.

Condenser C2.—This is given as 12$\mu\mu$F in the makers' information, but is 0·00012 μF (120 $\mu\mu$F) in our chassis.

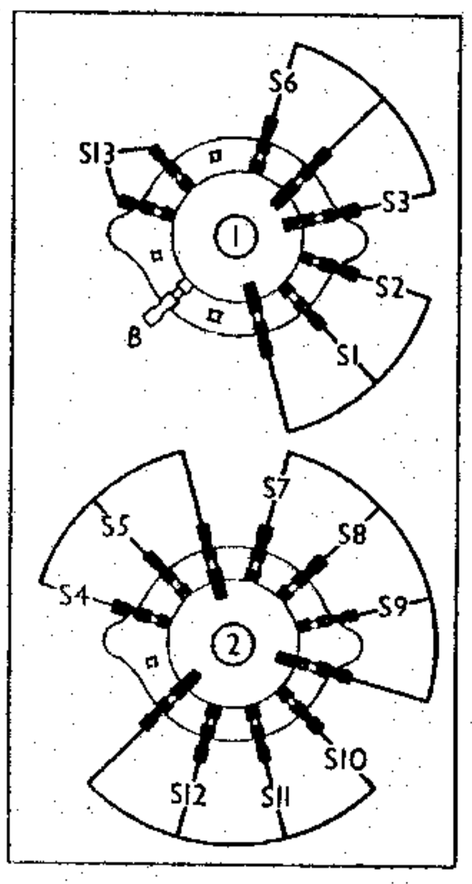
Batteries.—Recommended types are: LT, 2 V 20-40 AH cell, Exide CZ3, CZH3; Pertrix SU24, PXC2; Hellensens T300, Ever Ready T300, Y2/30; Dagenite PM7.

HT, 135 V dry battery, Drydex H1131; Pertrix 494; Hellesens A230; Ever Ready Portable 53, Siemens 1,314. No GB battery is used.

Battery Leads and Voltages.—Black lead, spade tag, LT negative; red/white lead, spade tag, LT positive 2 V; brown lead, white plug, HT negative; red lead and plug, HT positive 135 V.

SWITCH TABLE AND DIAGRAMS

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



Diagrams of the single switch unit, as seen from the front and rear of the chassis.

CIRCUIT ALIGNMENT

IF Stages.—Turn gang to maximum, volume control to maximum, and switch set to LW. Connect signal generator via a 0·02 μF condenser to grid (top cap) of **V1** and chassis, and feed in a 126·5 KC/S signal. Adjust **C34, C35, C36, C37** for maximum output. Repeat these adjustments.

RF and Oscillator Stages.—With gang fully closed, set pointer to datum line (horizontal) on scale. Connect signal generator to **A** and **E** sockets.

SW.—Switch set to SW, and set pointer to 15 MC/S mark on scale, feed in a 15 MC/S (20 m) signal, and adjust **C31** for maximum output, choosing the peak involving the least trimmer capacity. Then adjust **C29** for maximum output.

MW.—Switch set to MW. Adjust **C25** to minimum capacity. Tune to 200 m on scale, feed in a 200 m (1,500 KC/S) signal, and adjust **C32** for maximum output. Tune to 250 m on scale, feed in a 250 m (1,200 KC/S) signal, and adjust **C24** and **C26** for maximum output. Now feed in a fairly strong 850 KC/S (352 m) signal, and tune in its image (at about 500 m). Adjust **C25** for *minimum* output.

LW.—Switch set to LW and tune to 1,200 m on scale. Feed in a 1,200 m (250 KC/S) signal, and adjust **C33,** then **C27** and **C22,** for maximum output.