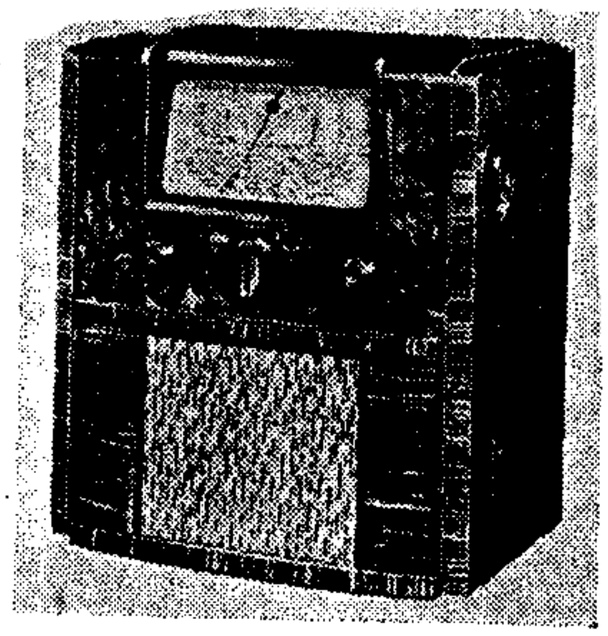
COSSOR 583

3-BAND BATTERY SUPERHET



IRON-CORED IF transformers which are lined up by adjusting the cores are included in the Cossor 583 5-valve battery 3-band superhet. The valve arrangement comprises a heptode mixer, a triode oscillator, a variable-mu pentode IF amplifier, a double-diode triode and a double pentode output valve in a QPP stage.

The short-wave range covered is 16-52·2 m and provision is made for an extension speaker and a doublet aerial.

CIRCUIT DESCRIPTION

Aerial input on MW and LW via high impedance aerial coils **L1, L2,** coupling coils **L3, L4,** and coupling condensers **C1, C2,** to inductively coupled band-pass filter. Primary coils **L5, L6** are tuned by **C27**; secondaries **L9, L10** by **C31**; coupling by mutual inductance. On SW, input is via coupling coil **L7** to single-tuned circuit **L8, C31.** Provision for connection of di-pole aerial via sockets **A1, A2** across **L7.** When used with an ordinary aerial a special strap provided connects **A2** to **E** socket.

First valve (**V1, Cossor metallised 210PG**) is a heptode with normal oscillator anode and screen grids strapped, operating as frequency changer, using normal oscillator CG as injector grid in conjunction with separate oscillator valve (**V2, Cossor metallised 210LF**). Oscillator grid coils **L14** (SW), **L15** (MW) and **L16** (LW) are tuned by **C38**; parallel trimming by **C35** (SW), **C36** (MW) and **C11, C37** (LW); series tracking by **C10, C32** (SW), **C33** (MW) and **C34** (LW). Reaction by coils **L11** (SW), **L12** (MW) and **L13** (LW).

Third valve (**V3, Cossor metallised 210VPT**) is a variable-mu RF pentode operating as intermediate frequency amplifier with tuned-primary tuned-secondary transformer couplings **C6, L17, L18, C7** and **C15, L19, L20, C16. C6, C7, C15, C16** are fixed trimmers, tuning being accomplished by adjusting the iron cores. Variable coupling between **L17** and **L18** provides variable selectivity, control being ganged with variable tone control potentiometer **R14.**

Intermediate frequency 465 KC/S.

Diode second detector is part of double diode triode valve (**V4, Cossor metallised 210DDT**). Audio frequency component in rectified output is developed across manual volume control **R9,** which also operates as load resistance, and passed via AF coupling condenser **C19,** CG resistance **R11** and stopper **R10** to CG of triode section, which operates as AF amplifier. IF filtering by **C8, R10, C20.** Variable tone control by RC filter **R14, C22** in anode circuit.

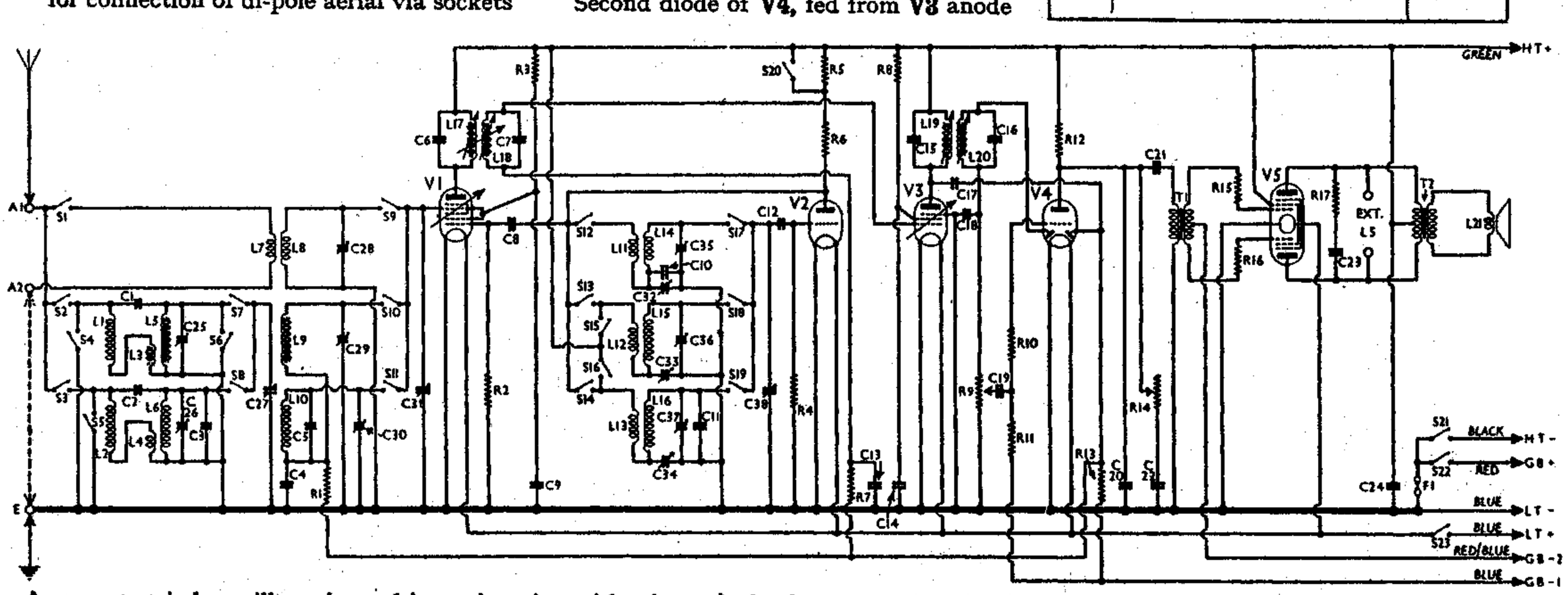
Second diode of **V4,** fed from **V3** anode via **C17,** provides DC potential which is developed across load resistance **R13** and fed back through decoupling circuits as GB to FC (except on SW) and IF valves, giving automatic volume control. Delay voltage is obtained from tapping on GB battery.

Parallel-fed transformer coupling by **R12, C21, T1** between **V4** triode and quiescent push-pull output stage comprising a double pentode output valve (**V5, Cossor 240QP**). Fixed tone correction by **R17, C23** between anodes. Provision for connection of high pedance external speaker across primary of internal speaker input transformer **T2.**

Fuse **F1** provides protection against accidental short-circuits in HT or GB circuits.

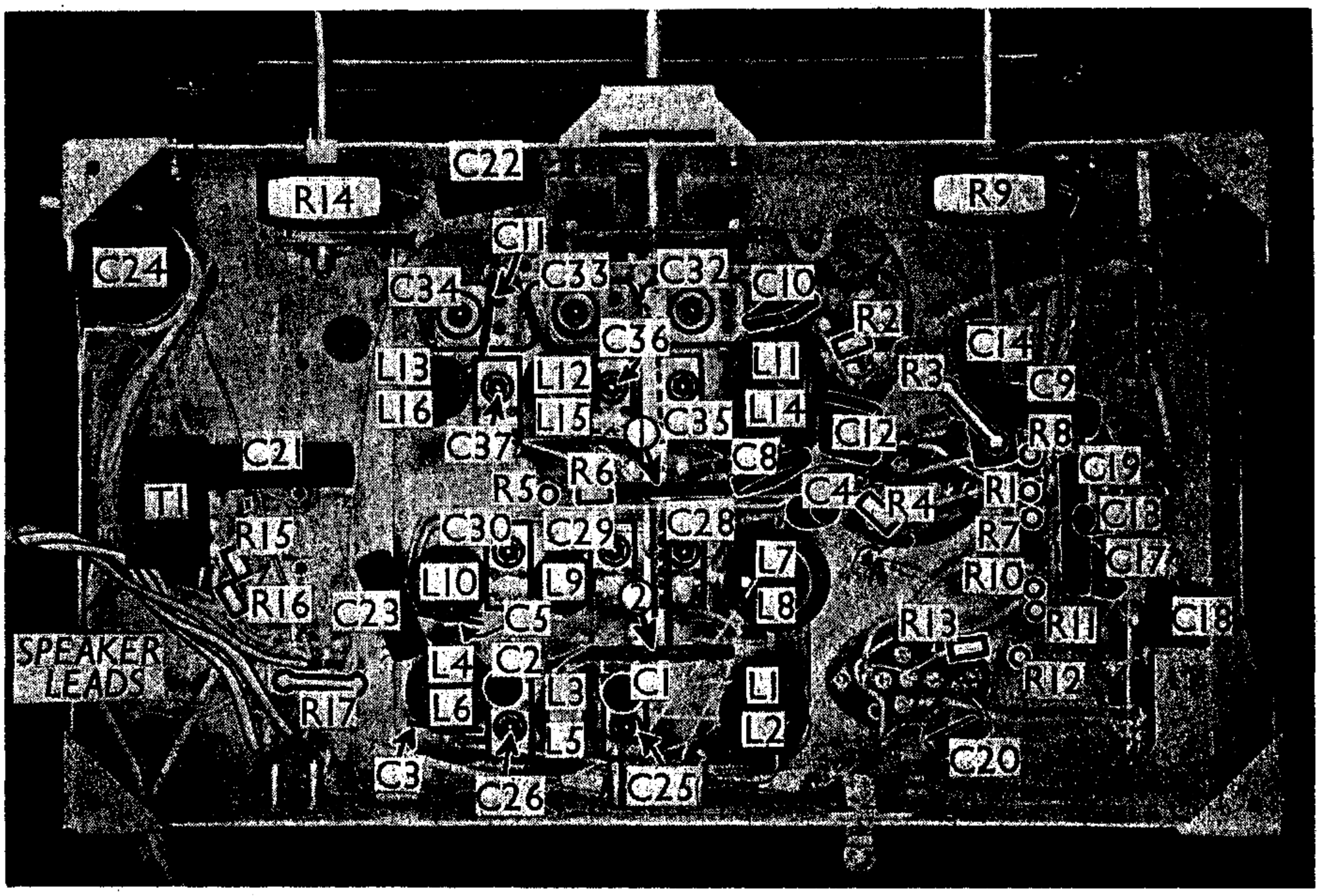
COMPONENTS AND VALUES

	RESISTANCES	Values (ohms)
R1	V1 CG decoupling	3,000,000
R2	V1 injector grid resistance ..	2,000,000
R3	V1 SG HT feed	25,000
R4	V2 CG resistance	40,000
R5	V2 anode HT feed resistances	80,000
R6		20,000
R7	V3 CG decoupling	3,000,000
R8	V3 SG HT feed	70,000
R9	V4 signal diode load and manual volume control ..	500,000
R10	V4 triode grid stopper ..	100,000
R11	V4 CG resistance	2,000,000
R12	V4 triode anode load	100,000
R13	V4 AVC diode load	2,000,000
R14	Variable tone control	20,000
R15	V5 grids stopper resistances	100,000
R16		100,000
R17	Part of fixed tone corrector ..	50,000



A separate triode oscillator is used in conjunction with a heptode for frequency changing in the Cossor 583 3-band battery superhet. The band-pass input filter has iron-cored coils for the MW band, and the IF transformers are tuned by means of variable iron cores.

All the RF and oscillator coils and their associated trimmers, switches and gang condenser are assembled as a separate unit, which is rubber mounted on the main chassis. Diagrams of the two waveband switch units, drawn as seen from the direction of the arrows shown here, appear on the next page.



CONDENSERS		Values (μF)
C1	Part MW aerial coupling ..	0·0000135
C2	Part LW aerial coupling ..	0·000009
C3	Band-pass pri. LW fixed trimmer	0·00008
C4	V1 CG, MW and LW decoupling	0·05
C5	Band-pass sec. LW fixed trimmer	0·00008
C6	1st IF trans. pri. trimmer ..	0·00013
C7	1st IF trans. sec. trimmer ..	0·00013
C8	V1 injector grid condenser ..	0·0005
C9	V1 SG decoupling	0·1
C10	Osc. circuit SW fixed tracker..	0·002
C11	Osc. circuit LW fixed trimmer	0·0001
C12	V2 CG condenser	0·00005
C13	V3 CG decoupling	0·01
C14	V3 SG decoupling	0·1
C15	2nd IF trans. pri. trimmer ..	0·00006
C16	2nd IF trans. sec. trimmer ..	0·00008
C17	Coupling to V4 AVC diode ..	0·00005
C18	IF by-pass	0·00005
C19	AF coupling to V4 triode ..	0·01
C20	IF by-pass	0·0002
C21	AF coupling to T1	0·1
C22	Part of variable tone control..	0·03
C23	Part of fixed tone corrector ..	0·002
C24	HT reservoir condenser ..	2·0
C25‡	Band-pass pri. MW trimmer..	—
C26‡	Band-pass pri. LW trimmer ..	—
C27†	Band-pass primary tuning ..	—
C28‡	Aerial circuit SW trimmer ..	—
C29‡	Band-pass sec. MW trimmer..	—
C30‡	Band-pass sec. LW trimmer ..	—
C31†	Aerial SW and band-pass secondary tuning	—
C32‡	Osc. circuit SW tracker ..	—
C33‡	Osc. circuit MW tracker ..	—
C34‡	Osc. circuit LW tracker ..	—
C35‡	Osc. circuit SW trimmer ..	—
C36‡	Osc. circuit MW trimmer ..	—
C37‡	Osc. circuit LW trimmer ..	—
C38†	Oscillator circuit tuning ..	—

† Variable. ‡ Pre-set.

OTHER COMPONENTS		Approx. Values (ohms)
L1	High impedance aerial coils	9·0
L2	High impedance aerial coils	84·0
L3	Band-pass primary aerial coupling oils ..	0·4
L4	Band-pass primary aerial coupling oils ..	8·0
L5	Band-pass primary coils	2·1
L6	Band-pass primary coils	24·0
L7	Aerial SW coupling coil ..	0·25
L8	Aerial SW tuning coil.. ..	Very low
L9	Band-pass secondary coils	1·5
L10	Band-pass secondary coils	18·0
L11	Oscillator SW reaction coil ..	0·6
L12	Oscillator MW reaction coil ..	1·0
L13	Oscillator LW reaction coil ..	3·25
L14	Osc. circuit SW tuning coil ..	Very low
L15	Osc. circuit MW tuning coil ..	1·0
L16	Osc. circuit LW tuning coil ..	6·0
L17	1st IF trans. Pri.	4·5
L18	1st IF trans. Sec.	5·0
L19	2nd IF trans. Pri.	6·5
L20	2nd IF trans. Sec.	6·5
L21	Speaker speech coil	1·8
T1	Intervalve trans. Pri. ..	900·0
	Intervalve trans. Sec., total	2,100·0
T2	Speaker input trans. Pri., total	1,190·0
	Speaker input trans. Sec. ..	0·17
F1	HT and GB circuit fuse ..	—
S1-S20	Waveband switches	—
S21	HT circuit switch	—
S22	GB circuit switch	—
S23	LT circuit switch	—

DISMANTLING THE SET

Removing Chassis.—To remove the chassis from the cabinet, remove the three control knobs at the front of the cabinet (recessed screws, two in the wave-change switch knob), the tuning knob with its extension (two screws accessible from the inside of the cabinet) and the on-off switch knob with its extension (screw accessible from the inside of the cabinet).

Now remove the four bolts (with lock washers, washers and paper washers) holding the chassis to the shelf, when the chassis can be withdrawn to the extent of the speaker leads, which is just sufficient to give access to the underside of the chassis. *When replacing*, see that two paper washers are placed on each chassis fixing bolt, between the chassis and platform.

To free the chassis entirely, disconnect the speaker leads (screw terminals) and *when replacing*, take them through the large hole at the right of the chassis platform and connect the two blue leads to the outer terminals and the red lead to the centre terminal.

Removing Speaker.—If it is desired to remove the speaker from the cabinet, disconnect the leads and slacken the four clamps (nuts) holding it to the sub-baffle. *When replacing*, see that the transformer is on the left and connect the leads as above.

VALVE ANALYSIS

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 210PG	120	0·5	G2 65 G3 G5 65	G2 0·5 G3 G5 1·7
V2 210LF	27	0·8	—	—
V3 210VPT	120	2·5	65	0·6
V4 210DDT	68	0·4	—	—
V5 240QP	118†	1·3†	120	0·5

† Each anode.

Valve voltages and currents given in the table above are those measured in our receiver when it was operating with an

Continued overleaf

COSSOR 583—*Continued*

HT battery reading 120 V, 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.

GENERAL NOTES

Switches.—S1-S20 are the waveband switches, in two rotary units beneath the chassis. They are indicated in our underchassis view, and are shown in detail in the diagrams in col. 3, where they are as seen looking from the front of the underside of the chassis.

The table (col. 2) gives the switch positions for the three control settings, starting from fully anti-clockwise. A dash indicates open, and **C** closed.

S21-S23 are the battery circuit switches, ganged in a rotary unit on a bracket at one corner of the chassis, and indicated in our plan chassis view. A diagram of this unit is given below. In the clockwise position of the knob ("on") all the switches are closed, and in the anti-clockwise position they are all open.

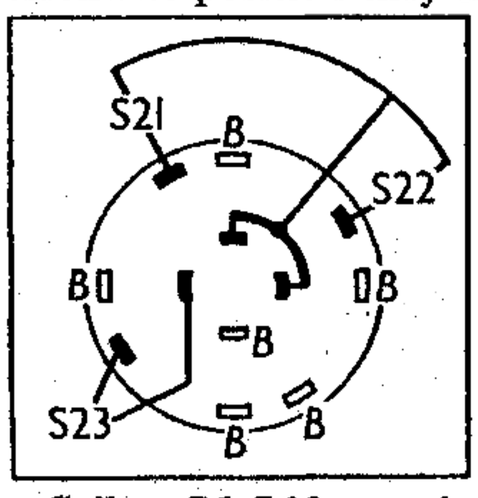


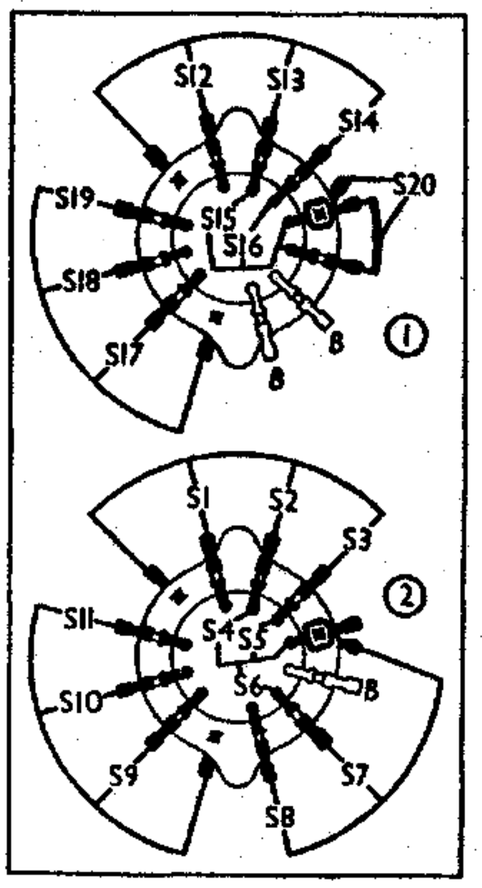
Diagram of the battery circuit switches, which are mounted at the side of the chassis.

Coils.—L1-L10 are in six unscreened units beneath the RF sub-chassis, between the rear main chassis member and a vertical screening plate. **L11-L16** are in three further units between the screening plate and the front main chassis member.

TABLE AND DIAGRAMS OF SWITCH UNITS

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

Diagrams of the waveband switch units, as seen when viewed in the direction of the arrows shown in the underchassis illustration on the previous page. A table of the switch positions is on the left.



The IF transformers **L17, L18** and **L19, L20** are in two screened units on the chassis deck. The cans also contain the fixed trimmers. Variable trimming is accomplished by adjusting the iron cores. Their ends are slotted, and are reached through holes in the sides of the cans.

In the case of the **L17, L18** unit, **L18** is mounted on a spring hinge device, linked up with the tone control **R14,** and on adjusting this, the coupling between **L17** and **L18** is altered, thus giving variable selectivity.

Trimmers and Trackers.—There are eleven of these, and all are mounted beneath the RF sub-chassis, the chassis forming one of the electrodes in each case. The adjusting screws are beneath the chassis.

Fuse F1.—This is an Osram 3·5 V 0·15 A M.E.S. lamp bulb, which screws into a holder at the rear of the chassis.

External Speaker.—Two sockets are provided at the rear of the chassis for a high impedance (20,000 O) external speaker.

Aerial Connections.—With a normal aerial, use socket **A1,** and see that **A2** is connected to **E** by the metal strap provided. When using a di-pole aerial, use sockets **A1** and **A2,** with the metal strap removed.

Batteries.—LT, 2V 70 AH cell, Cossor type E370. HT, Cossor 120 V double capacity dry battery, type 2120. GB, Cossor 9 V dry battery, type 933.

Battery Leads and Voltages.—Blue lead, black spade tag, LT negative; blue lead, red spade tag, LT positive 2 V; black lead and plug, HT negative; green lead, black plug, HT positive, 120 V; red lead, black plug, GB positive; blue lead, black plug, GB-1, —1·5 V; red/blue lead, black plug, GB-2, —9 V.

CIRCUIT ALIGNMENT

IF Stages.—The IF transformers are of the variable permeability type. The windings are partially tuned by fixed condensers, final trimming being by screwing the iron cores in or out. They are reached through holes in the sides of the IF cans.

The cores are sealed with wax, and this must be softened before making adjustments. The best way to do this is to heat a small stout screwdriver with a soldering iron, push through the wax, find the slot in the core and then screw in and out for several turns. Actual alignment should be carried out with a non-metallic screwdriver.

Set the variable selectivity control for maximum selectivity (i.e., coils furthest apart). Swamp the oscillator circuit by shorting **C38.** Connect signal generator to top cap of **V1** and chassis, and feed in a 465 KC/S signal. Adjust **L17, L18, L19** and **L20** in turn for maximum output, keeping the input low.

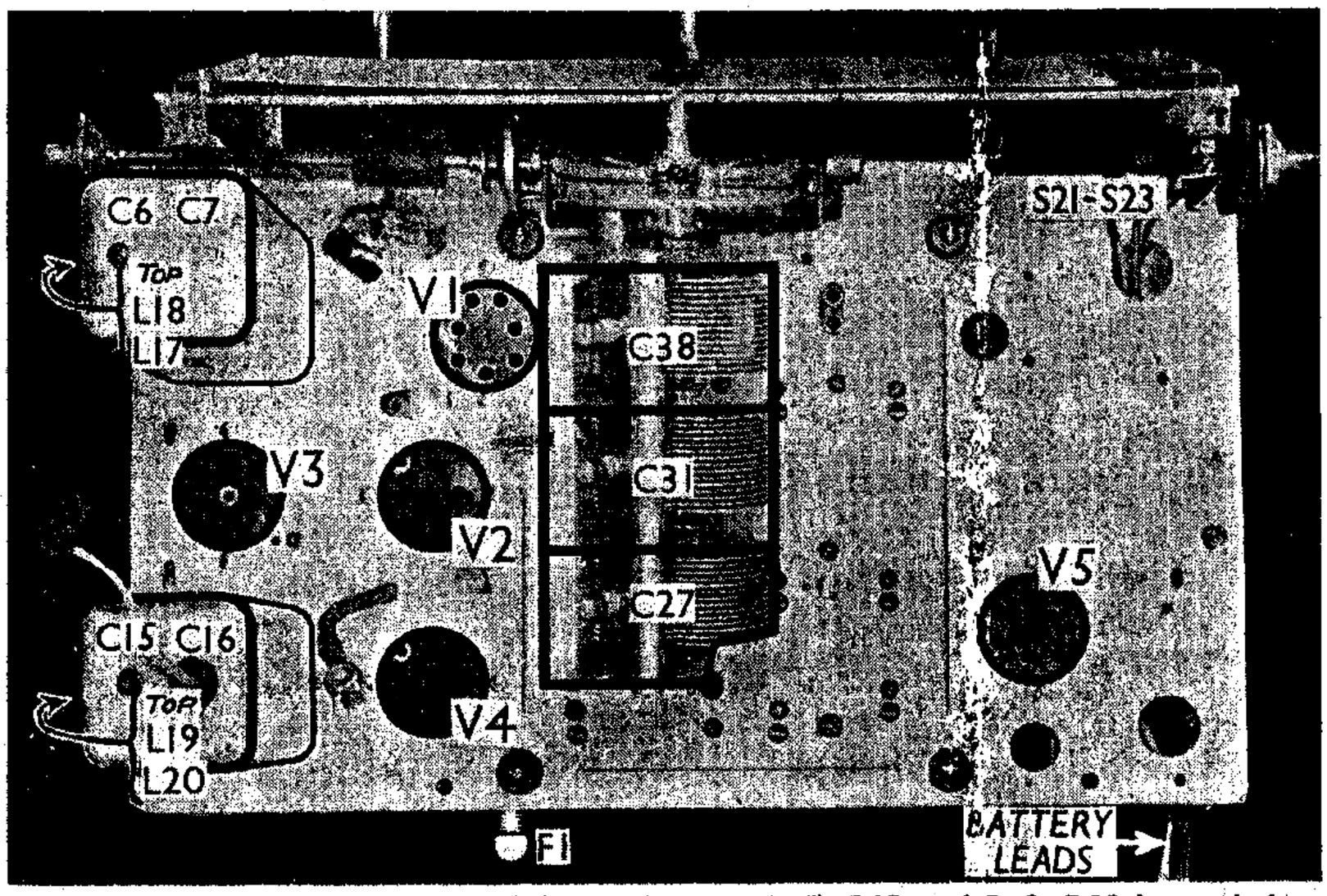
RF and Oscillator Stages.—Connect signal generator to **A** and **E** sockets, and adjust the following condensers, in the order given, and at the frequencies specified.

LW.—300 KC/S (1,000 m), **C37, C30, C26**; 160 KC/S (1,875 m), **C34.**

MW.—1,400 KC/S (214 m), **C36, C29, C25**; 575 KC/S (522 m), **C33.**

SW.—18 MC/S (16·7 m.), **C35, C28**; 6MC/S (50 m), **C32.**

When adjusting at the high frequency (low wavelength) end of each scale, tune receiver to wavelength of the test signal as marked on the scale. At the low frequency (high wavelength) end, tune in the signal, irrespective of exact scale setting, and rock the gang slightly, when adjusting the trackers, for optimum results.



Adjustment of the tuning of the IF transformers **L17, L18** and **L19, L20** is carried out by screwing in or out the iron cores, which are reached through holes in the sides of the cans. Note the battery circuit switches **S21-823.**

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