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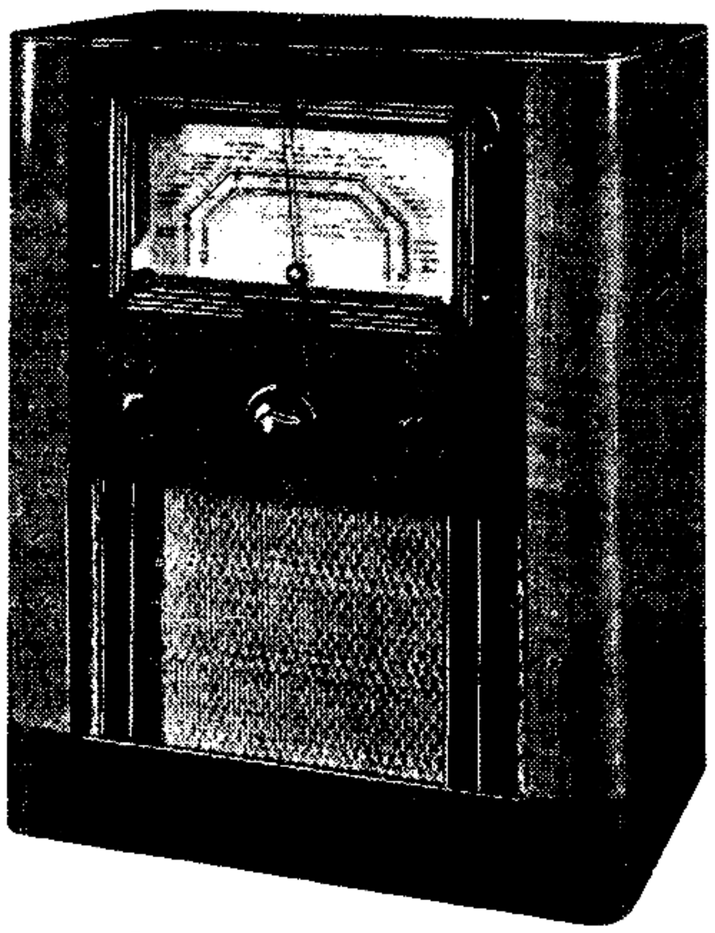
COSSOR 55

ALL-DRY BATTERY TRANSPORTABLE



The Cossor 55 all-dry battery transportable. It is fitted in a large table cabinet.

THE Cossor 55 is a 4-valve all-dry battery transportable superhet covering the medium and long wavebands. It is fitted in a large table cabinet with hand grips at the side, and a turntable beneath. A combined LT and HT dry battery is provided.
Release date : *May*, 1940.

CIRCUIT DESCRIPTION

Tuned frame aerial input **L1** (MW), plus **L2** (LW), tuned by **C25,** which precedes first valve **(V1, Cossor metallised 1A7VG).**

Provision for connection of external aerial and earth, the output from which is developed across the shunt resistance **R2** and coupling condensers **C1, C2** and fed from the junction of **C1** and **C2** to frame aerial circuit. Normally **C2** operates as **V1** pentode CG decoupling condenser.

V1 oscillator control grid coils **L3** (MW) and **L4** (LW) are tuned by **C26.** Parallel trimming by **C27** (MW) and **C6, C28** (LW); series tracking by **C7** (MW) and **C8, C29** (LW). Reaction coupling by coils **L5** (MW) and **L6** (LW) from oscillator anode.

Second valve **(V2, Cossor metallised 1N5VG)** is a variable-mu RF pentode operating as intermediate frequency amplifier with tuned-primary, tuned-secondary iron-dust cored transformer couplings **C3, L7, L8, C4** and **C11, L9, L10, C12.** The tuning condensers are fixed and tuning adjustments are carried out by manipulating the coil cores, which are threaded.

Intermediate frequency 465 KC/S.

Diode second detector is part of single diode triode valve **(V3, Cossor 1H5G).** Audio frequency component in rectified output is developed across manual volume control **R7,** which also operates as load resistance, and passed via audio frequency coupling condenser **C15** and control grid resistance **R8** to control grid of triode section, which operates as AF amplifier.

IF filtering by **C13, R5** and **C14** in diode circuit.

DC potential developed across **R7** is fed back via decoupling circuits as grid bias voltage to frequency changer pentode and IF amplifier control grid circuits, giving automatic volume control.

Resistance-capacity coupling by **R9, C16** and **R11,** via grid stopper **R12,** between **V3** triode section and pentode output valve **(V4, Cossor 1C5G).** Variable tone control by **R10, C17** in control grid circuit, across **R11.** Fixed tone correction by resistance-capacity filter **C18, R13** and **C19** in anode circuit. Provision for connection of high impedance external speaker between anode and HT positive line.

Switch **S8,** which opens when external speaker connecting plug is fully inserted, disconnects output transformer **T1** primary from **V4** anode to mute internal speaker. It should be noted that the HT current then flows via the external speaker circuit to **V4** anode.

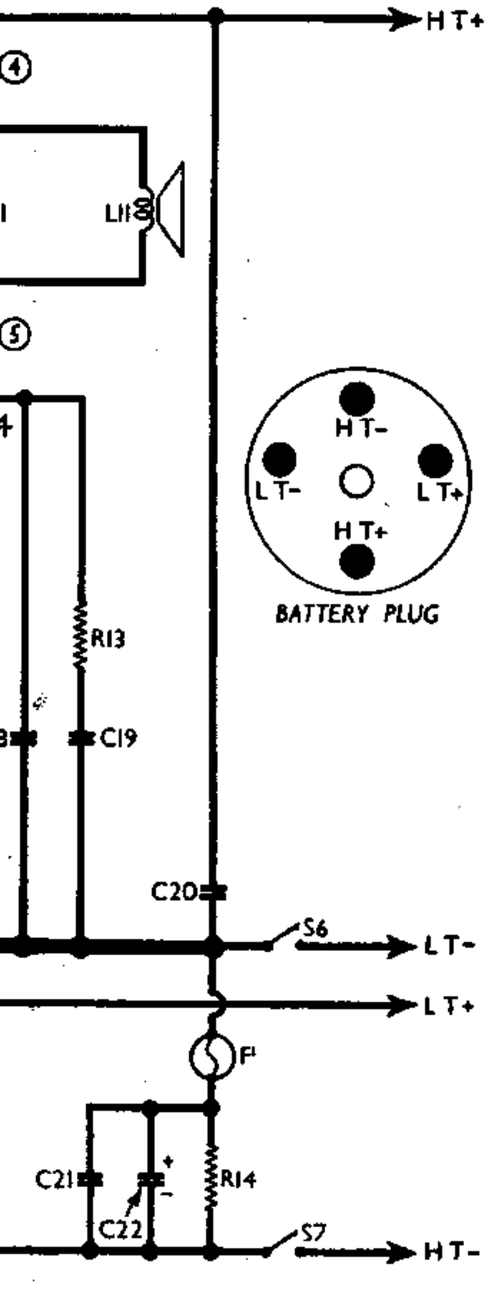
Grid bias potential for **V4** is obtained automatically from drop along resistance **R14** in negative HT lead to chassis. **C21** and the electrolytic condenser **C22** bypass **R14,** while the fuse lamp **F1** prevents a large current from flowing in the HT circuit.

COMPONENTS AND VALUES

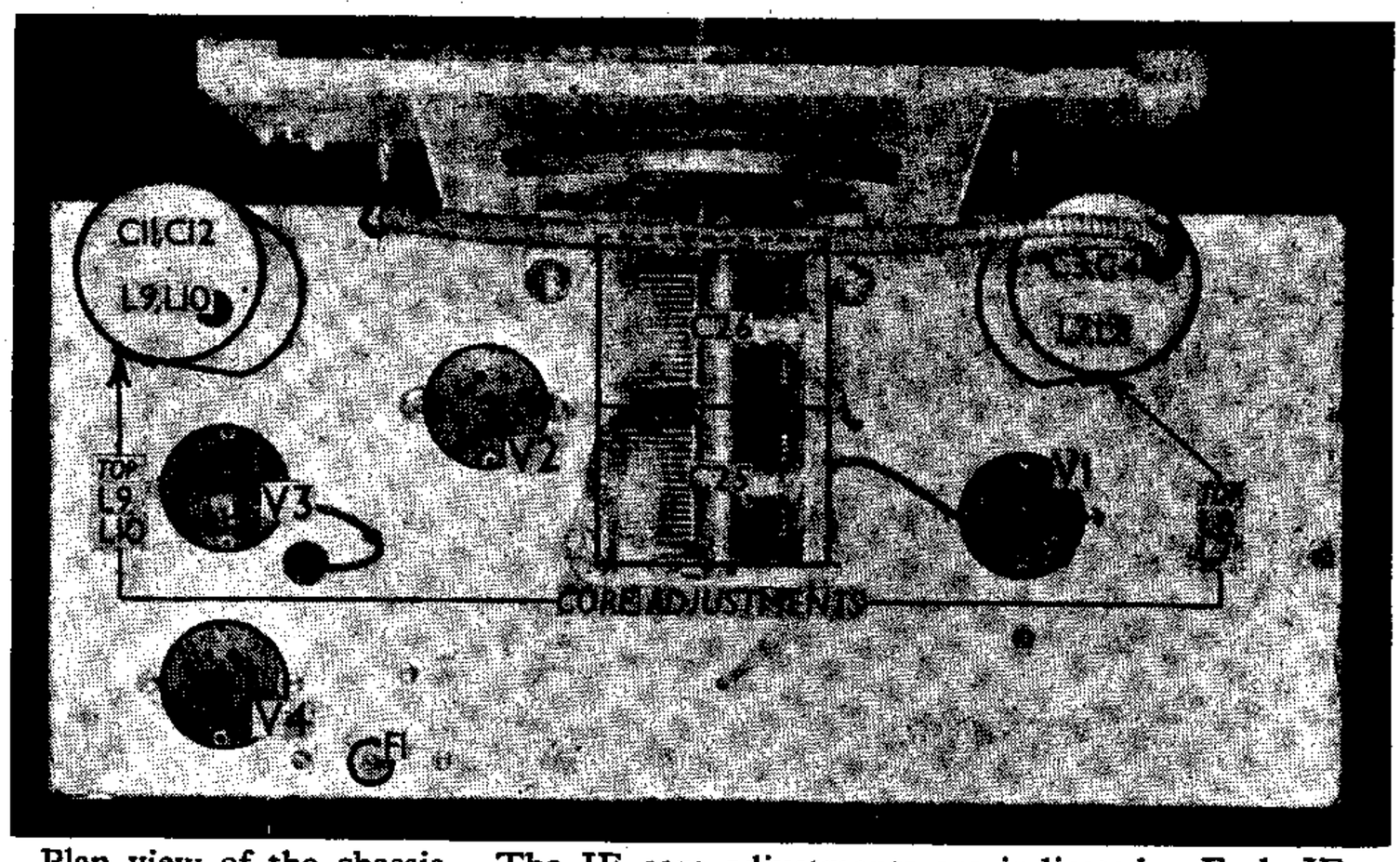
	RESISTANCES	Values (ohms)
R1	V1 pentode CG decoupling	1,000,000
R2	External aerial shunt ...	10,000
R3	V1 osc. CG resistance ...	200,000
R4	V1 SG HT feed	20,000
R5	IF stopper	50,000
R6	AVC line decoupling ...	3,000,000
R7	Manual volume control; V3 diode load resistance ...	500,000
R8	V3 triode CG resistance ...	2,000,000
R9	V3 triode anode load resistance	500,000
R10	Variable tone control ...	2,000,000
R11	V4 CG resistance	2,000,000
R12	V4 grid stopper	100,000
R13	Part of fixed tone corrector	20,000
R14	V4 auto GB resistance ...	800

	CONDENSERS	Values (μF)
C1	External aerial coupling and V1 pentode CG decoupling	0·01
C2		0·0046
C3	1st IF transformer tuning condensers	0·000065
C4		0·000058
C5	V1 osc. CG condenser ...	0·0001
C6	Osc. circ. LW fixed trimmer	0·00005
C7	Osc. circuit MW tracker...	0·000598
C8	Osc. circ. LW fixed tracker	0·00014
C9	V1 SG decoupling ...	0·05
C10	V2 CG decoupling ...	0·05
C11	2nd IF transformer tuning condensers	0·000065
C12		0·00007
C13	IF by-pass condensers ...	0·00005
C14		0·00005
C15	AF coupling to V3 triode	0·05
C16	V3 triode to V4 AF coupling	0·01
C17	Part of variable tone control	0·003
C18	Parts of fixed tone corrector	0·001
C19		0·005
C20	HT reservoir condenser...	2·0
C21	Auto GB RF by-pass ...	0·1
C22*	Auto GB AF by-pass ...	50·0
C23‡	Frame aerial LW trimmer	—
C24‡	Frame aerial MW trimmer	—
C25†	Frame aerial tuning ...	—
C26†	Oscillator circuit tuning...	—
C27‡	Osc. circuit MW trimmer	—
C28‡	Osc. circuit LW trimmer	—
C29‡	Osc. circuit LW tracker...	—

* Electrolytic. † Variable. ‡ Pre-set.



Circuit diagram of the Cossor 55. The frame aerial plug connections are shown numbered and also colour - coded, while a view of the plug from the free ends of the pins is inset. There are similar insets of the speaker and battery plugs.



Plan view of the chassis. The IF core adjustments are indicated. Each IF transformer also contains its fixed trimming capacities.

	OTHER COMPONENTS		Approx. Values (ohms)
L1	Frame aerial windings ...		2·0
L2			8·5
L3	Osc. circuit MW tuning coil		5·0
L4	Osc. circuit LW tuning coil		12·5
L5	Oscillator MW reaction coil		2·7
L6	Oscillator LW reaction coil...		5·6
L7	1st IF trans.	Pri.	7·5
L8		Sec.	7·5
L9	2nd IF trans.	Pri.	7·5
L10		Sec. ...	16·0
L11	Speaker speech coil ...		2·0
T1	Speaker input trans.	Pri.	600·0
		Sec.	0·4
S1-S5	Waveband switches ...		—
S6	LT circuit switch		—
S7	HT circuit switch		—
S8	Speaker muting switch ...		—
F1	Fuse lamp		—

DISMANTLING THE SET

Removing Chassis.—Remove the four control knobs (recessed screws);
remove the back cover of the receiver (two cheese-head screws, with washers);
withdraw the frame aerial plug from the socket on the frame aerial assembly, mounted inside the back cover;
withdraw the connecting plug from the battery in the lower compartment of the cabinet, and remove the battery;
withdraw the connecting plug from its socket on the speaker assembly;
remove the four cheese-head screws (with large metal washers) holding the chassis to the battens which form a shelf inside the cabinet.

When replacing, note that a large rubber washer is fitted to each chassis fixing bolt, between the chassis and the batten.

Removing Speaker.—Withdraw the connecting plug as indicated above;
slacken the four round-head clamp screws and swivel the clamps out of the way, when the speaker can be lifted out.

When replacing, the transformer should be on the left.

VALVE ANALYSIS

Valve voltages and currents given in the table (next col.) are those measured in our receiver when it was operating with a new battery, the HT section of which was reading 96V on load.

The receiver was tuned to the lowest wavelength on the medium wave band, and the volume control was at maximum; in order, however, to prevent the receiver from responding to a possible signal the frame aerial plug was withdrawn from its socket, and a small screwdriver was wedged between its three wired pins to connect together the input CG and the AVC line.

Voltages were measured on the 400V scale of a model 7 Universal Avometer, chassis being negative.

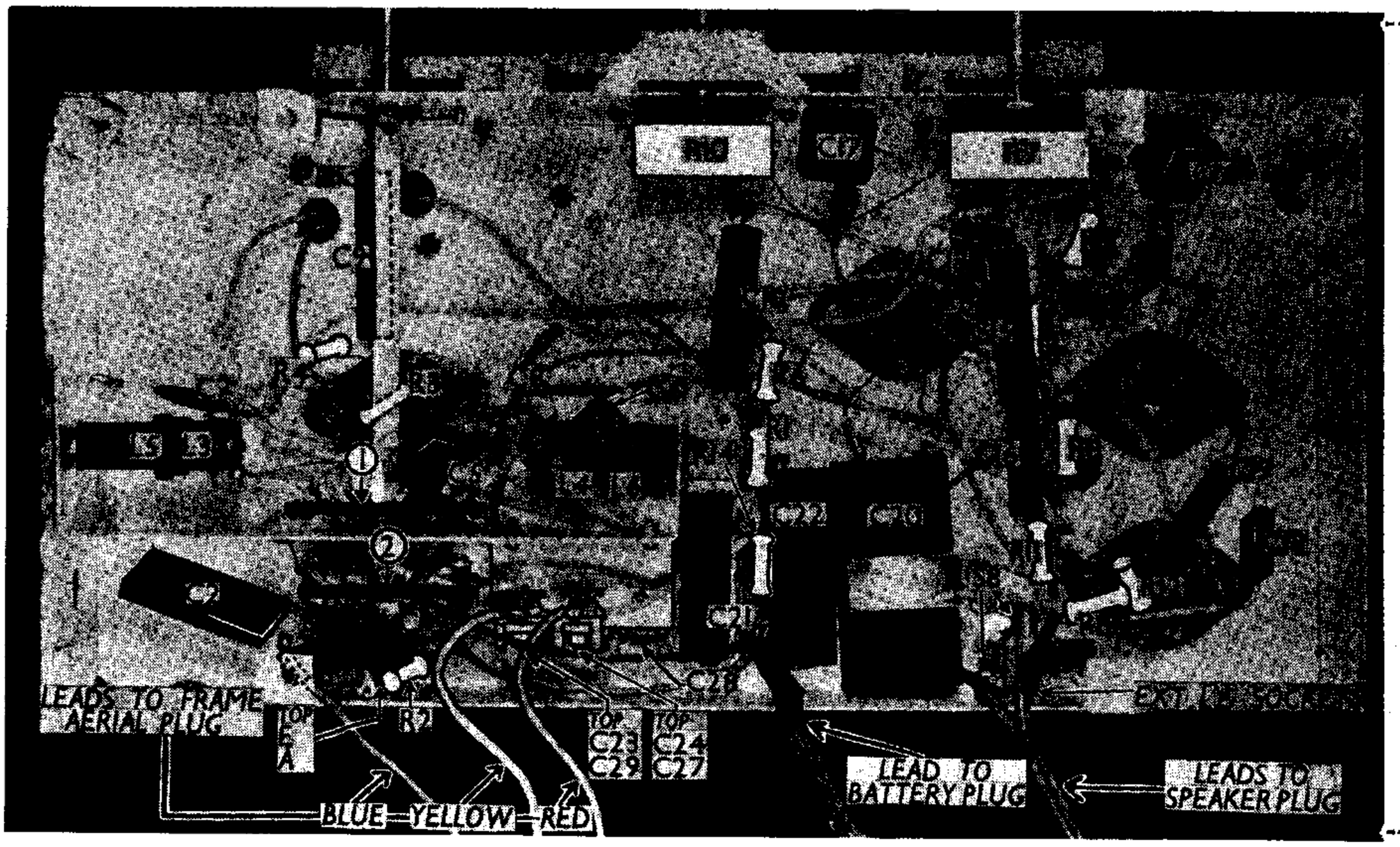
Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 1A7VG	86	1·1	54	1·3
	Oscillator			
	86	1·3		
V2 1N5VG	86	1·2	86	0·35
V3 1H5G	23	0·07	—	—
V4 1C5G	84	5·0	86	1·2

GENERAL NOTES

Switches.—**S1-S5** are the waveband switches, and **S6, S7** the LT and HT circuit switches respectively, ganged in two rotary units beneath the chassis. These are indicated in our under-chassis view, and shown in detail in the diagrams overleaf, where they are drawn as seen looking from the front of the underside of the chassis. The table (overleaf) gives the switch positions for the three control settings, starting from fully anti-clockwise. A dash indicates open and **C**, closed.

S8 is the internal speaker muting switch, associated with one of the external speaker sockets. When the external speaker plug is fully inserted, **S8** opens and mutes the internal speaker.

Coils.—**L1, L2** are the frame aerial windings, on two frames fitted inside the back of the receiver. The outer one (MW) is **L1**, and the inner one (LW) is **L2**. These windings terminate in a small 4-pin socket (of which three pins are used), fitted inside the back of the set. The connections are shown by arrows and circles numbered 1 to 3 in the circuit, and a diagram of the plug, looking at



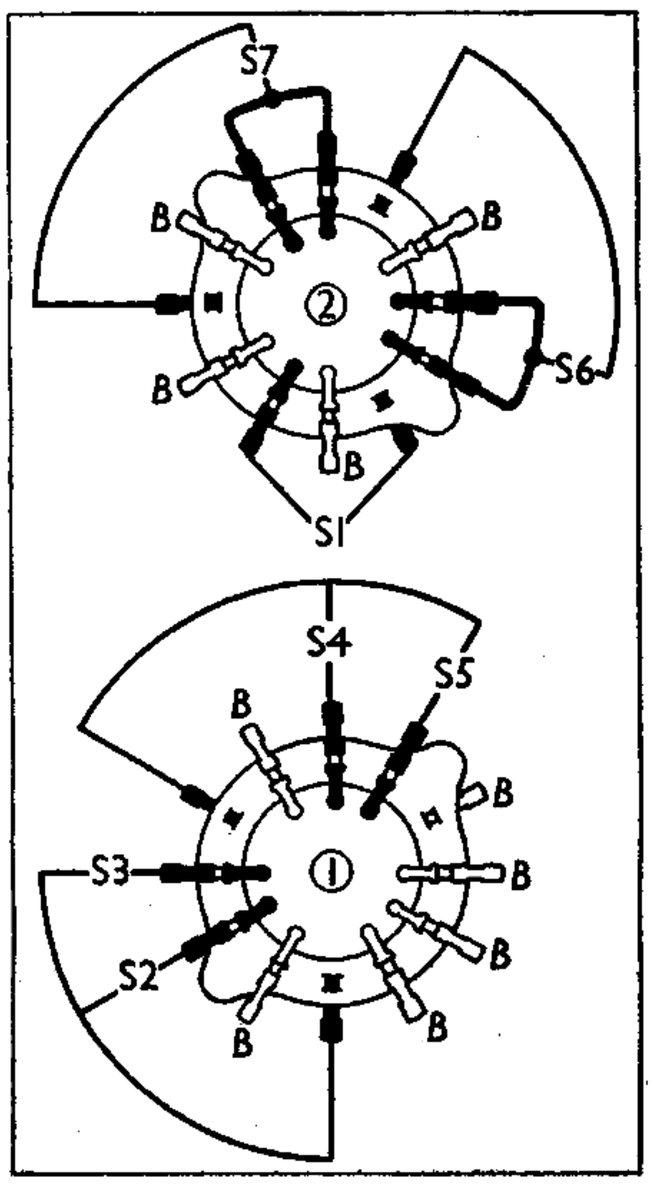
Under - chassis view. The leads to the frame aerial plug are indicated and colour - coded. Diagrams of the two switch units are on this page. **S8** is associated with one of the external speaker sockets. The five trimmers indicated at the bottom are reached through holes in the rear chassis member.

the free ends of the pins, is inset below the circuit.

L3, L5 and **L4, L6** are in two unscreened units beneath the chassis. The IF transformers **L7, L8** and **L9, L10** are in two screened units on the chassis deck. These units have adjustable iron cores, reached through holes in the sides of the cans, and the positions of the adjustments are indicated in the plan chassis view. In addition, each unit also contains its two fixed trimmer condensers.

Switch Table

Switch	Off	MW	LW
S1	—	C	—
S2	—	C	—
S3	—	—	C
S4	—	C	—
S5	—	—	C
S6	—	C	C
S7	—	C	C



Diagrams of the two switch units as seen from the front of the underside of the chassis.

External Speaker.—Two sockets are provided at the rear of the chassis for a high impedance (8,000) external speaker. On fully inserting the plug, **S8** opens and mutes the internal speaker.

Fuse F1.—This is an Osram MES lamp bulb, rated at 3.5V, 0.15A, which screws into a holder at the back of the chassis deck.

Trimmers.—Apart from the IF core adjustments there are five pre-set condensers mounted in a group and reached through holes in the rear chassis member. The three nearest the chassis deck are, from left to right, **C28, C27** and **C29.** The two beneath them are, from left to right, **C24** and **C23.**

Speaker Plug.—The speaker leads from the chassis terminate in a small 4-pin plug, of which two pins are used. This plug fits a corresponding socket on the speaker input transformer. The connections are indicated in the circuit by arrows and circles numbered 4 and 5, and a diagram of the plug, as seen looking at the free ends of the pins, is beneath the circuit.

Battery.—This is a Siemen's Full o' Power combined 1.5V LT and 90V HT dry battery, type No. 1438. It is fitted with a standard 4-pin socket for the connections.

Battery Plug.—The battery leads from the chassis terminate in a 4-pin plug which fits the socket on the battery. A diagram of the plug, looking at the free ends of the pins, is inset on the right of the circuit, the pin connections being marked. The colour coding of the leads to the plug is : LT−, black; LT+, green; HT−, brown; HT+, red.

CIRCUIT ALIGNMENT

IF Stages.—Connect signal generator via a 0.1μF condenser, to control grid (top cap) of **V1** and chassis. Have the frame aerials connected, but lying down at the rear of the chassis. Leave existing top cap connecter of **V1** in place, but short-circuit the oscillator section of the gang **(C26).** Feed in a 465 KC/S signal, and adjust cores of **L10, L9, L8** and **L7** in turn for maximum output. The wax sealing will first have to be softened with a hot screwdriver. Check these settings, then seal the cores again.

RF and Oscillator Stages.—With gang at maximum, pointer should be under the horizontal lines at the upper wavelength ends of the scales. The chassis, battery and frame aerials should be in their normal positions in the cabinet for the next adjustments. The necessary pre-set condensers can be reached through an aperture in the back of the set. The signal generator can be coupled by a turn or two of wire round the cabinet, or by connection to the external **A** and **E** sockets.

MW.—Switch set to MW, tune to 214m on scale, feed in a 214m (1,400 KC/S) signal, and adjust **C27,** then **C24,** for maximum output. There is no variable tracking on this band, but the calibration should be checked at about 520m.

LW.—Switch set to LW, tune to 1,200m on scale, feed in a 1,200m (250 KC/S) signal, and adjust **C28,** then **C23,** for maximum output. Feed in a 1,875m (160 KC/S) signal, tune it in, and adjust **C29** for maximum output, while rocking the gang for optimum results.