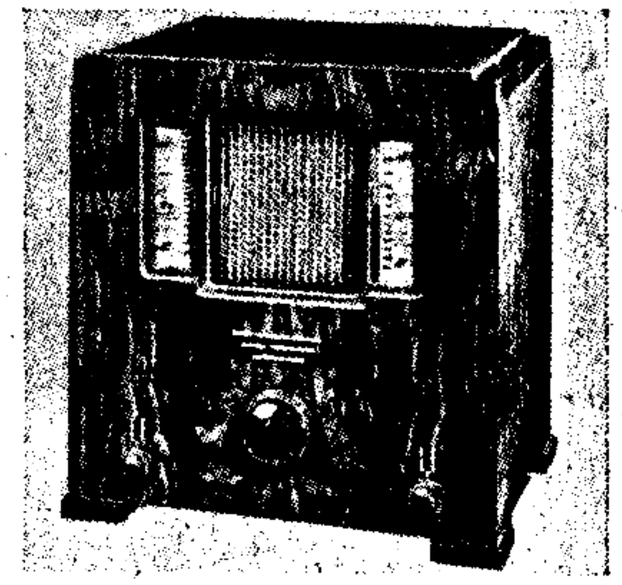
COSSOR 366A

BATTERY SUPERHET



THE Cossor 366A is a 4-valve, 2-band battery operated superhet, fitted with "Thermometer" tuning and using an indirectly-heated double diode detector valve.

It should in no way be confused with the model 366, which is different in many ways and is not covered by this *Service Sheet.*

Release date ond original price of model 366A: July, 1935; £9 9*s. without batteries.*

CIRCUIT DESCRIPTION

Aerial input is via series capacitor **C1** and coupling coil **L1** to inductively coupled band-pass filter. Primary coils **L2, L3** are tuned by **C19; secondaries L4, L5** are tuned by **C21.** Coupling by proximity of primary and secondary coils. "Top" aerial coupling by **C2.**

First valve **(V1, Cossor metallised 210PG)** is a heptode operating as frequency changer with electron coupling. Oscillator grid coils **L6** (MW) and **L7** (LW) are tuned by **C23.** Parallel trimming by **C24** (MW) and **C25** (LW); series tracking by **C6** (MW) and **C5** (LW). Reaction coupling from anode by **L8, L9.**

Second valve **(V2, Cossor metallised 210VPT)** is a variable-mu RF pentode operating as intermediate frequency amplifier with tuned-primary, tuned-secondary transformer couplings.

Intermediate frequency 128 kc/s.

Diode second detector is part of separate double diode valve, with an indirectly-heated cathode **(V3, Cossor 220DD).** Audio frequency component in rectified output is developed across manual volume control **R8** and passed via **C14** and grid stopper **R14** to CG of pentode output valve **(V4, Cossor 220HPT).** High-note emphasis is provided by **C13.** Provision for connection of gramophone pick-up, via **S6** and **L13,** across **R8.** IF filtering by **C11.**

Second diode of **V3,** fed from **L13** via **C15,** provides DC potential which is developed across **R11** and fed back through decoupling circuits as GB to FC and IF valves, giving AVC. Delay voltage is obtained from HT potential divider **R9, R10,** which biases the cathode positively.

Fixed tone correction by **R13, C16** in **V4** anode circuit. Provision for connection of high-impedance external speaker in anode circuit. GB for **V4** is obtained from drop along **R15** in negative HT lead.

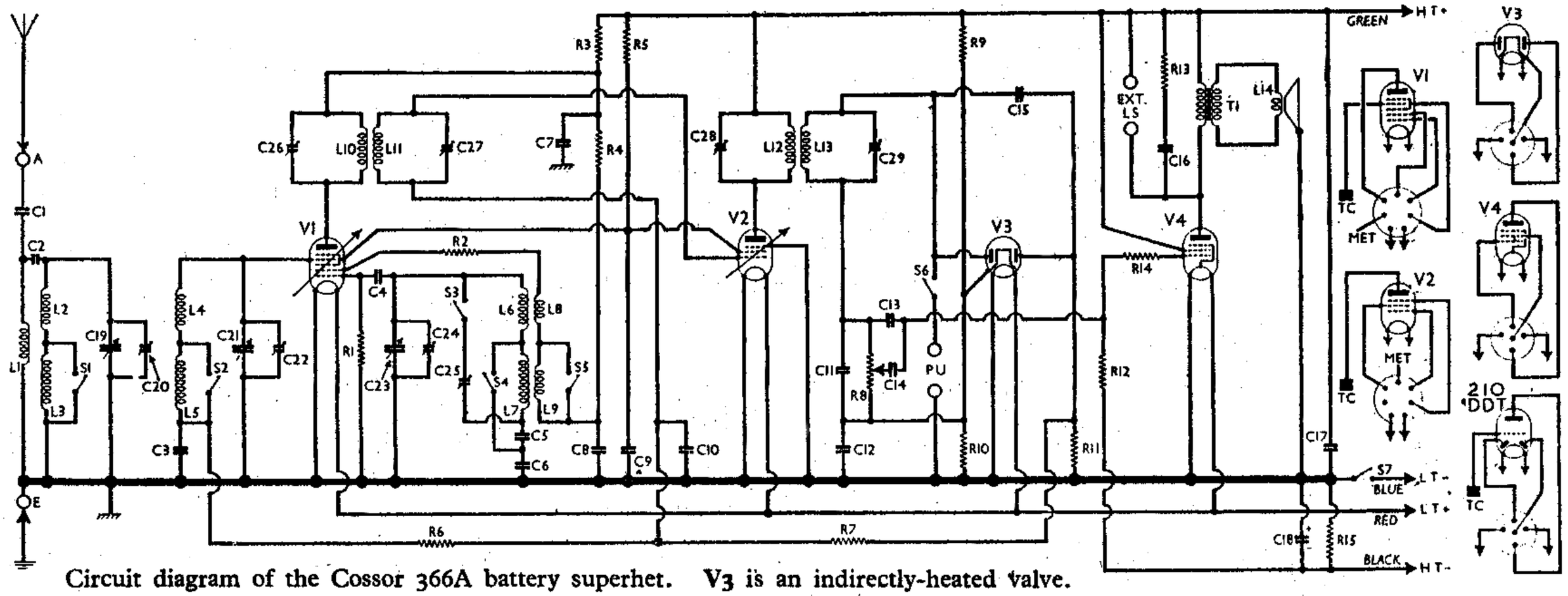
COMPONENTS AND VALUES

CAPACITORS		Values (μF)
C1	Aerial series coupling ...	0·0005
C2	Aerial "top" coupling...	0·000025
C3	V1 CG decoupling ...	0·1
C4	V1 osc CG capacitor ...	0·00025
C5	Osc. circ. LW tracker ...	0·00128
C6	Osc. circ. MW tracker ...	0·00175
C7	V1 anode decoupling ...	0·1
C8	V1 osc anode decoupling	0·01
C9	V1, V2 SG's decoupling...	0·1
C10	AVC line decoupling ...	0·1
C11	IF by-pass	0·0001
C12	V3 cathode by-pass ...	0·1
C13	High-note compensator	0·0002
C14	AF coupling to V4 ...	0·01
C15	Coupling to V3 AVC diode	0·0001
C16	Part tone corrector ...	0·01
C17	HT circuit reservoir ...	2·0
C18*	Auto GB by-pass ...	25·0
C19†	Band-pass pri. tuning ...	0·0005
C20‡	B-P pri. MW trimmer ...	—
C21†	Band-pass sec. tuning ...	0·0005
C22‡	B-P sec. MW trimmer ...	—
C23†	Oscillator circuit tuning	0 0005
C24‡	Osc. circ. MW trimmer...	—
C25‡	Osc. circ. LW trimmer...	0·00003
C26‡	1st IF trans. pri. tuning	0·00007
C27‡	1st IF trans sec. tuning	0·00007
C28‡	2nd IF trans. pri. tuning	0·00007
C29‡	2nd IF trans. sec. tuning	0·00007

* Electrolytic. † Variable. ‡ Pre-set.

RESISTORS		Values (ohms)
R1	V1 osc. CG resistor ...	250,000
R2	Reaction stabiliser ...	5,000
R3	HT feed resistor	10,000
R4	V1 osc. anode HT feed ...	10,000
R5	V1, V2 SG's HT feed ...	40,000
R6, R7	AVC line decoupling	2,000,000 / 1,000,000
R8	Manual volume control; V3 signal diode load...	1,000,000
R9, R10	HT potential divider for AVC delay	1,000,000 / 250,000
R11	V3 AVC diode load ...	1,000,000
R12	V4 CG resistor	2,000,000
R13	Part tone corrector ...	10,000
R14	V4 grid stopper ...	100,000
R15	V4 GB resistor	370

OTHER COMPONENTS		Approx. Values (ohms)
L1	Aerial coupling, total ...	12·0
L2, L3	Band-pass primary coils...	3·0 / 12·5
L4, L5	Band-pass secondary coils	3·0 / 12·5
L6	Osc. MW tuning coil ...	4·5
L7	Osc. LW tuning coil ...	8·0
L8	Osc. MW reaction coil ...	1·5
L9	Osc. LW reaction coil ...	2·5
L10, L11	1st IF trans. Pri. ... / Sec. ...	88·0 / 88·0
L12, L13	2nd IF trans. Pri. ... / Sec. ...	88·0 / 88·0
L14	Speaker speech coil ...	2·0
T1	Speaker input trans. Pri. ... / Sec. ...	250·0 / Very low
S1-S5	Waveband switches ...	—
S6	PU switch	—
S7	LT circuit switch ...	—



Circuit diagram of the Cossor 366A battery superhet. **V3** is an indirectly-heated valve. The fifth valve diagram (right) for a 210DDT is included for **V3** replacement purposes, described in col. 3 overleaf.

DISMANTLING THE SET

The bottom of the cabinet is fitted with a detachable cover, upon removal of which (four set screws with washers) access may be gained to most of the components beneath the chassis.

Removing Chassis.—Remove the three control knobs (recessed grub screws);
free the speaker leads from their terminals on the speaker transformer;
remove the six round head wood screws holding the speaker to the front of the cabinet, and withdraw speaker and baffle together;
remove the four 6 BA screws from the outside corners of the two scale assemblies, taking care not to lose the springy packing pieces beneath them;
remove the detachable cover from the base of the cabinet (four set screws with washers) and the four further set screws (with washers) holding the chassis to the base of the cabinet.

When replacing, do not omit to replace the four packing pieces between the scale assemblies and the corners of the escutcheon moulding.

The speaker transformer should be on the right, and the three leads should be connected as follows: top and bottom (transformer primary), both green; centre terminal, red (earthing lead).

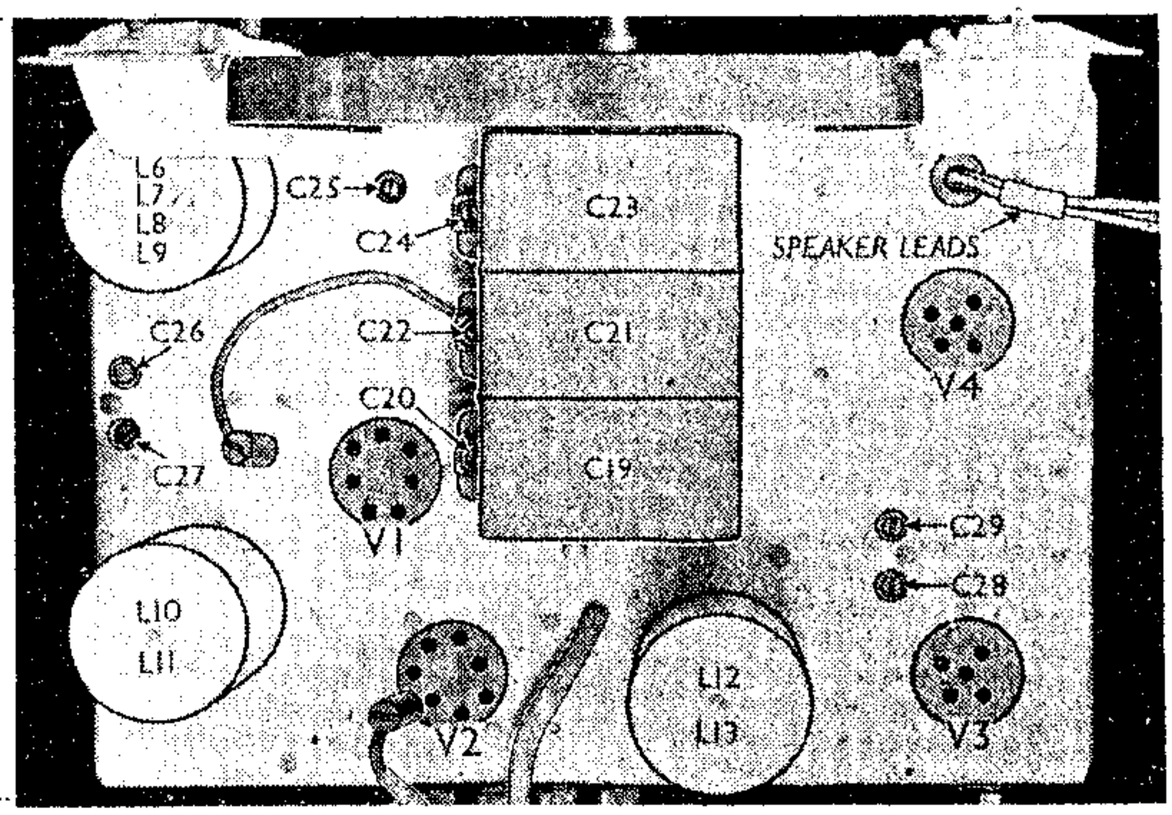
It is important that the loose screening cap should be fitted over the top of **V2.**

VALVE ANALYSIS

Valve voltages and currents given in the table below are those supplied by the makers. They were measured on a receiver operating with an HT battery reading 120 V on load. The receiver was tuned to the lowest wavelength on the MW band, with the volume control at maximum, but with no signal input.

Voltages were measured on a high resistance meter whose negative lead was connected to chassis.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 210PG	95	0·4	60	1·4
	Oscillator			
	83	1·2		
V2 210VPT	116	1·8	60	0·4
V3 220DD	—	—	—	—
V4 220HPT	100	4·5	116	1·5



Plan view of the chassis. The scale assembly seen at the top is actually a 13¼-in. high frame which passes between the speaker and the front of the cabinet. No scale lamps are fitted.

GENERAL NOTES

Switches.—**S1-S5** are the waveband switches, **S6** the PU switch, and **S7** the LT circuit switch, all ganged in a barrel-type assembly beneath the chassis. The switches are identified in our under-chassis view. **S1, S2, S4** and **S5** close on MW; **S3** closes on LW; **S6** closes on gram; otherwise they are open. **S7** closes in all three working positions, but all switches are open in the "OFF" position. The switch seen next to **S7** is not used.

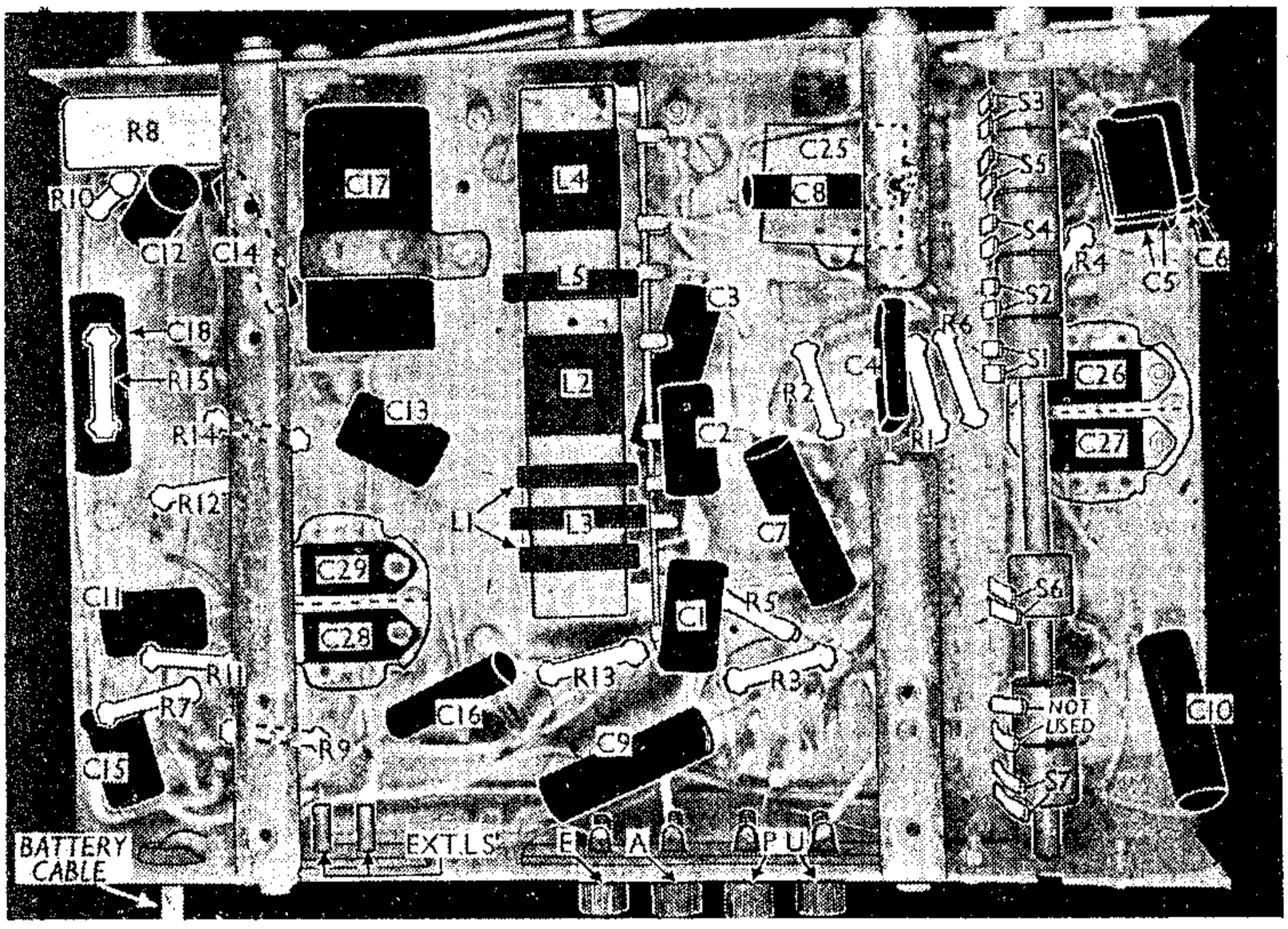
External Speaker.—Two sockets are provided at the rear of the chassis for the connection of a high impedance (about 20,000 Ω) external speaker. A low impedance (about 3 Ω) speaker could be connected across the speech coil of the internal speaker.

Capacitor C17.—This is a 2 μf paper-insulated type, acting as HT circuit reservoir.

Capacitor C18.—This is a tubular electrolytic rated at 25 μF, 25 V working.

Batteries and Leads.—Batteries were not supplied with the receiver, but it is designed for use with a 120 V HT battery and a 2 V accumulator. Grid bias is automatic.

Blue lead, spade tag, LT negative; red lead spade tag, LT positive 2 V; black lead, HT negative; green lead, HT positive 120 V.



Under-chassis view. **C5** and **C6** each consist of two special capacitors connected in parallel. All the switches are on one assembly. **L1** is wound in two sections.

V3 Replacement.—The indirectly heated double diode valve 220DD originally used in this position is no longer obtainable, and the makers recommend that when a replacement is required a Cossor 210DDT should be substituted for it.

As the 210DDT is a double diode triode, and the triode section is not required, the control grid (top cap) and anode connections are left unused. Also, as the 210DDT has the usual directly heated (filament) cathode, AVC delay is dispensed with.

On the right of the circuit diagram overleaf are diagrams showing the internal connections of all the valves used in the receiver as usual, and in addition there is a diagram for the 210DDT. In making the conversion, as both valves have a five-pin base, the original holder may be used, but it must be rewired as follows:

Disconnect the original leads to the cathode (centre) pin;
disconnect **C15, R7** and **R11** from the "anode" pin, and connect them instead to the "cathode" pin, which is now the AVC diode;
disconnect the remaining end of **R9** from the external speaker socket, and both ends of **R10** and **C12** from the volume control and chassis;
connect the tag thus free on the volume control to chassis, together with one end of **C11.**

According to the diagram in the makers' valve chart, pin 3 (left-hand filament pin in our diagram of the 210DDT) should go to chassis (LT negative); the signal diode is then at the negative end of the filament. **R9, R10** and **C12** are no longer required, and may be discarded.

Chassis Divergencies.—In some chassis **R13** and **C16** may be 30,000 Ω and 0.005 μF respectively, giving improved "top." **R10** may be 100,000 Ω instead of 250,000 Ω, reducing the AVC delay voltage.

CIRCUIT ALIGNMENT

To avoid AVC action, unsolder the leads from **C15, R7** and **R11** to **V3** valveholder. Turn the volume control to maximum, connect on 0-5 V meter across **T1** primary, and short-circuit **C23.**

IF Stages.—Connect signal generator leads via a 0.1 μF capacitor to **V2** control grid (pin 2) and chassis, feed in a 128 kc/s (2,344 m) signal, and adjust **C28** and **C29** for maximum output. Transfer signal generator leads to control grid (top cap) of **V1** and chassis, and adjust **C26** and **C27** for maximum output. Now readjust **C29, C28, C27** and **C26** in that order for maximum output.

RF and Oscillator Stages.—Transfer signal generator leads to **A** and **E** terminals, via a dummy aerial or a 0.0002 μF capacitor, and remove short-circuit from **C23.** With the gang at minimum, the MW indicator rod should be level with the 200 m calibration mark on the scale.

MW.—Switch set to MW, tune to 214 metres on scale, feed in a 214 m (1,400 kc/s) signal, and adjust **C24,** then **C22** and **C20** for maximum output.

LW.—Switch set to LW, tune to 1,000 m on scale, feed in a 1,000 m (300 kc/s) signal, and adjust **C25** for maximum output.

Finally, connect up the leads unsoldered from **V3** holder, remove tuning meter, and re-wax trimmer heads.

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