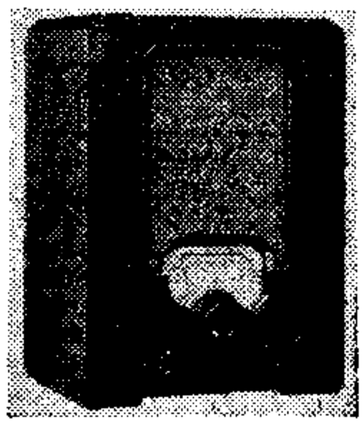
COSSOR 375 AND 385 AC SUPERHETS



The Cossor 375.

THE Cossor 375 is a 4-valve (plus rectifier) 2-band table receiver, designed to operate from AC mains of 200-250 V, 40-100 C/S. Provision is made for the connection of an external speaker, and pick-up input is arranged via a tapped volume control which acts as a fader.

The model 385 is fitted in a different cabinet, but electrically it is identical with the 375, from which this *Service Sheet* was prepared.

Release dates: 375, *September*, 1936; 385, *May*, 1937.

CIRCUIT DESCRIPTION

Aerial input via coupling coil **L1** to inductively coupled band-pass filter. Primary coils **L2, L3** are tuned by **C21**; secondaries **L5, L6** by **C23.** Coupling by mutual inductance and **L4.**

First valve **(V1, Cossor metallised 41MPG)** is a heptode operating as frequency changer with electron coupling. Oscillator grid coils **L7** (MW), plus **L8** (LW), are tuned by **C25.** Parallel trimming by **C26** (MW) and **C27** (LW); series tracking by **C29** (MW) and **C28** (LW). Reaction coupling by **L9** (MW) and **L10** (LW).

Second valve **(V2, Cossor metallised MVS/Pen)** is a variable-mu RF pentode operating as IF amplifier with tuned-primary, tuned-secondary transformer couplings.

Intermediate frequency 465 KC/S.

Diode second detector is part of double diode triode valve **(V3, Cossor metallised DDT).** Audio frequency component in rectified output is developed across **R7** and part of the manual volume control **R8,** which together form the load resistance, and passed via **C11** to CG of triode section. IF filtering by **C10** and **C13.** Variable tone control by **R11, C14** in triode anode circuit.

Pick-up sockets are provided between the lower section of **R8** and chassis, and when a pick-up is connected, **R8** operates as a fader, although radio is muted by turning the waveband control to gram, when **S6** closes and short-circuits **L12.**

Second diode of **V3,** fed from **V2** anode via **C12,** provides DC potential which is developed across load resistance **R13** and fed back through decoupling circuits as GB to FC and IF valves, giving AVC.

Resistance-capacity coupling by **R10, C15, R14** between **V3** triode and DH pentode output valve **(V4, Cossor PT41).** Fixed tone correction by **R15, C16** and **C17,** and provision for high impedance external speaker, in anode circuit.

HT current is supplied by full-wave rectifier **(V5, Cossor 442BU).** Smoothing by speaker field **L18** and electrolytic condensers **C18, C19.** GB for **V3** triode, **V4** and AVC delay are obtained from drop along **R16, R17** in the cathode circuit of **V4,** while fixed GB for **V1** and **V2** is obtained from drop along **R18** in negative HT lead to chassis. The drop along **R18** also increases the AVC delay and the GB applied to **V4.**

DISMANTLING THE SET

The cabinet is fitted with a detachable bottom, upon removal of which (two set screws with metal washers) most of the components beneath the chassis become accessible.

Removing Chassis.—Remove the three control knobs (recessed screws);
remove the two round-head wood screws holding top of scale assembly to the sub-baffle;
disconnect the three speaker leads from their terminals on the speaker transformer, and free them from the cleat on the side of the cabinet;
remove the four set screws (with large metal washers and lock-washers) holding the chassis to the bottom of the cabinet.

When replacing, connect the speaker leads as follows, numbering the terminals on the transformer from top to bottom:
1, no external connection;
2, red;
3, no external connection;
4, blue;
5, yellow.

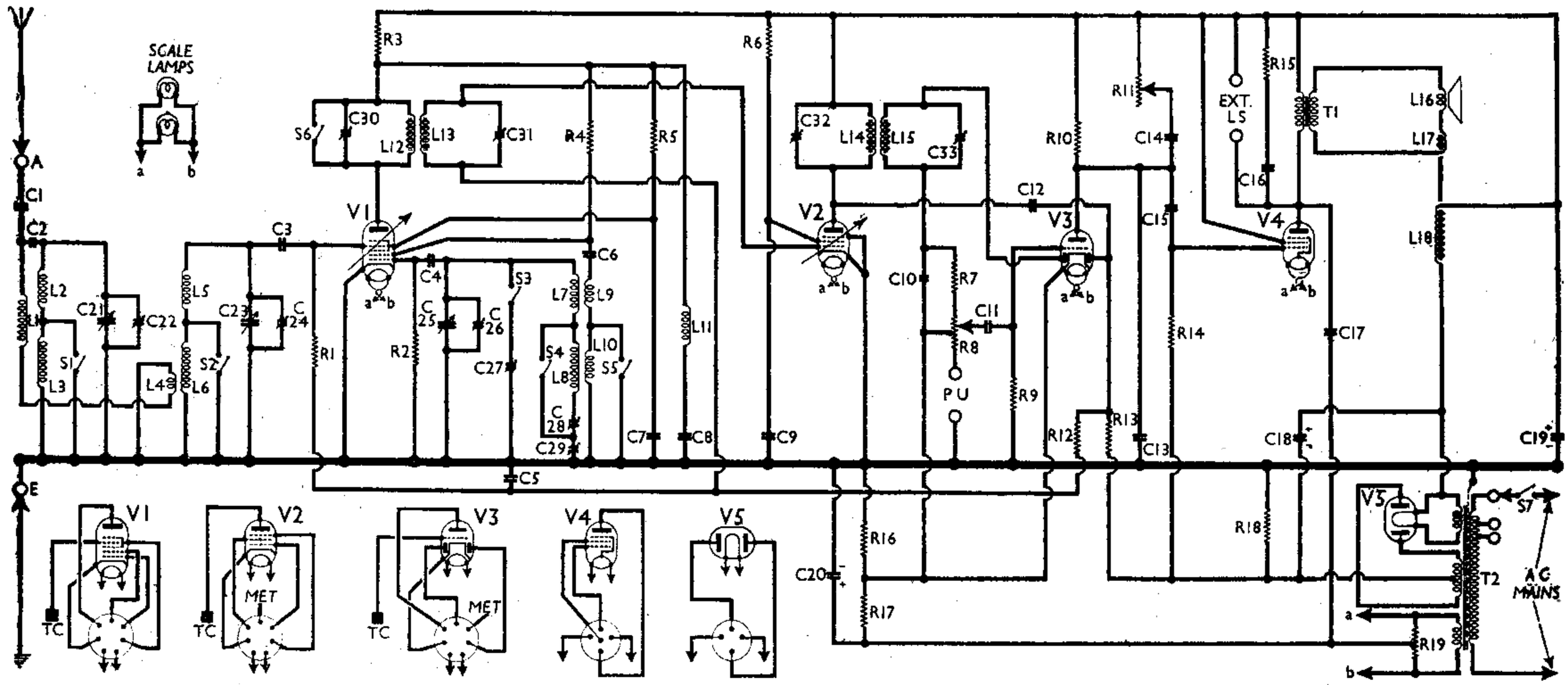
Removing Speaker.—Disconnect the leads from the speaker transformer;
slacken the nuts (with lock-washers) holding the four clamps to the speaker rim, and swivel the clamps.

When replacing, the transformer should be on the right, and the leads should be connected as previously indicated.

COMPONENTS AND VALUES

	RESISTANCES	Values (ohms)
R1	V1 tetrode CG resistance	1,000,000
R2	V1 osc. CG resistance ...	50,000
R3	V1 HT feed	4,000
R4	V1 osc. anode HT feed...	50,000
R5	V1 SG HT feed	50,000
R6	V2 SG HT feed	100,000
R7	V3 signal diode load and	500,000
R8	manual volume control	1,000,000*
R9	V3 triode CG resistance...	2,000,000
R10	V3 triode anode load ...	25,000
R11	Variable tone control ...	20,000
R12	AVC line decoupling ...	2,000,000
R13	V3 AVC diode load ...	2,000,000
R14	V4 CG resistance ...	500,000
R15	Part fixed tone corrector	12,000
R16	V1, V2 fixed GB, V3	75
R17	triode GB, V4 GB and	250
R18	AVC delay resistances	25
R19	Heater circuit pot. ...	25*

* Centre-tapped.

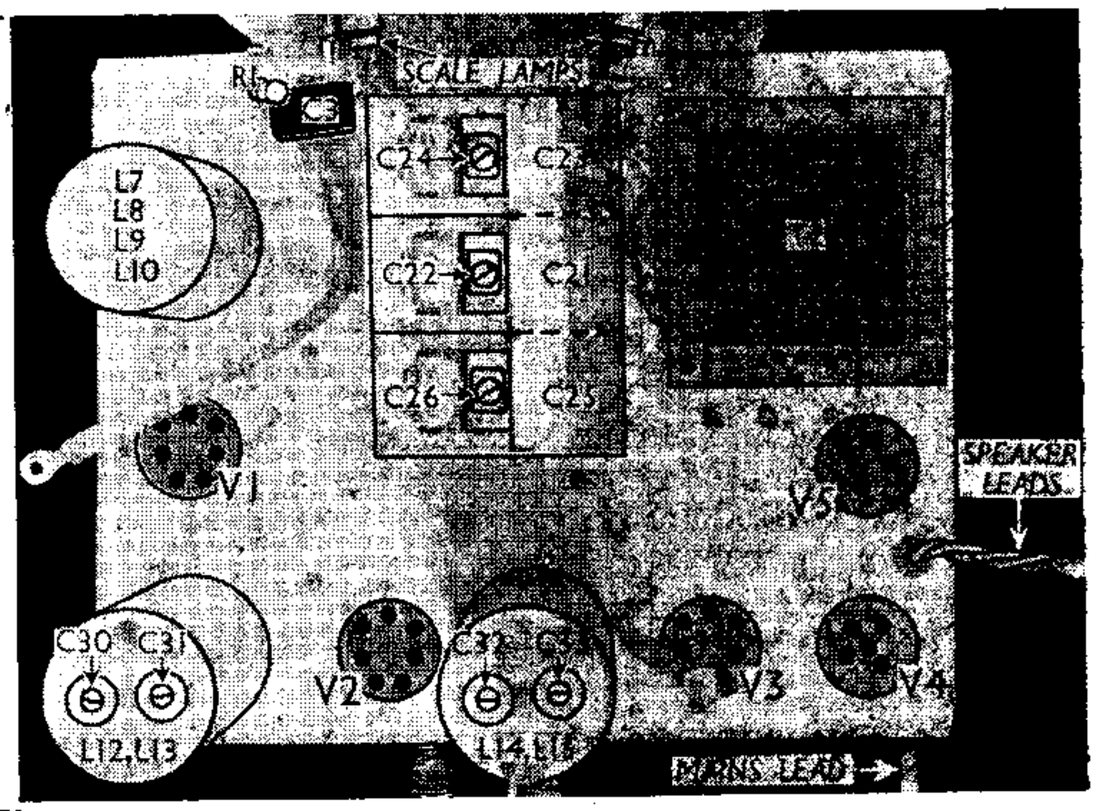


Circuit diagram of the Cossor 375 AC superhet. An identical chassis is employed in the model 385. **R8** is the fader type volume control.

	CONDENSERS	Values (μF)
C1	Aerial series condenser ...	0·0003
C2	Aerial coupling condenser	0·000025
C3	V1 tetrode CG condenser	0·001
C4	V1 osc. CG condenser ...	0·0002
C5	AVC line decoupling ...	0·05
C6	V1 osc. anode coupling ...	0·002
C7	V1 SG decoupling ...	0·1
C8	V1 tet. anode decoupling	0·1
C9	V2 SG decoupling ...	0·1
C10	IF by-pass	0·00005
C11	AF coupling to V3 triode	0·01
C12	Coupling to V3 AVC diode	0·0001
C13	IF by-pass	0·001
C14	Part variable tone control	0·02
C15	V3 triode to V4 coupling...	0·01
C16	Parts fixed tone corrector	0·01
C17	Parts fixed tone corrector	0·002
C18*	HT smoothing condensers	8·0
C19*	HT smoothing condensers	8·0
C20*	GB by-pass	50·0
C21†	Band-pass pri. tuning ...	—
C22‡	B-P pri. MW trimmer ...	—
C23†	Band-pass sec. tuning ...	—
C24‡	B-P sec. MW trimmer ...	—
C25†	Oscillator circuit tuning...	—
C26‡	Osc. circ. MW trimmer ...	—
C27‡	Osc. circ. LW trimmer ...	0·00003
C28‡	Osc. circ. LW tracker ...	0·0004
C29‡	Osc. circ. MW tracker ...	0·00075
C30‡	1st IF trans. pri. tuning...	0·0003
C31‡	1st IF trans. sec. tuning...	0·0003
C32‡	2nd IF trans. pri. tuning...	0·0003
C33‡	2nd IF trans. esc. tuning...	0·0003

* Electrolytic. † Variable. ‡ Pre-set.

	OTHER COMPONENTS	Approx. Values (ohms)
L1	Aerial coupling coil ...	9·0
L2	Band-pass primary coils...	3·4
L3	Band-pass primary coils...	12·5
L4	Band-pass coupling coil ...	Very low
L5	Band-pass secondary coils	3·4
L6	Band-pass secondary coils	12·5
L7	Osc. circ. MW tuning ...	3·0
L8	Osc. circ. LW tuning ...	5·0
L9	Osc. MW reaction coil ...	1·3
L10	Osc. LW reaction coil ...	3·0
L11	RF choke	Very low
L12	1st IF trans. Pri. ...	2·5
L13	1st IF trans. Sec. ...	2·5
L14	2nd IF trans. Pri. ...	2·5
L15	2nd IF trans. Sec. ...	2·5
L16	Speaker speech coil ...	1·8
L17	Hum neutralising coil ...	0·1
L18	Speaker field coil... ...	2,000·0
T1	Speaker input trans. ... Pri. ...	700·0
	Speaker input trans. ... Sec. ...	0·2
T2	Mains trans. Pri., total ...	20·0
	Mains trans. Heater sec. ...	0·06
	Mains trans. Rect. heat. sec. ...	0·11
	Mains trans. HT sec., total ...	406·0
S1-S5	Waveband switches ...	—
S6	Radio muting switch ...	—
S7	Mains switch	—



Plan view of the chassis. The mains voltage adjustment panel is not indicated, but it is on the side of **T2** facing the rear of the chassis.

VALVE ANALYSIS

Valve voltages and currents given in the table below are average values as quoted by the makers in their service manual. They were measured on the 600 V scale of a 1,000 ohms-per-volt meter, whose negative lead was connected to chassis. The receiver was switched to MW and tuned to 325 m, but there was no signal input.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 41MPG	212 Oscillator	2·4	100	2·3
	105	2·1		
V2 MVS/Pen	243	4·6	85	1·6
V3 DDT	185	2·4	—	—
V4 PT41	215	33·0	245	7·2
V5 442BU	335†	—	—	—

† Each anode, AC.

GENERAL NOTES

Switches.—**S1-S5** are the waveband switches, **S6** the radio muting switch, and **S7** the mains switch. They are all comprised in a four-position barrel-type rotary unit beneath the chassis, and are indicated in our under-chassis view. The switch positions, as the control is turned clockwise from the "off" position, are: MW, LW, Gram. On MW, all switches except **S3** and **S6** are closed; on LW, **S3** and **S7** only are closed; and on gram, only **S6** and **S7** are closed.

Coils.—All the aerial and band-pass coils **L1-L6** are in a single unscreened tubular unit beneath the chassis. The oscillator coils **L7-L10** are in a screened unit on the chassis deck. The IF transformers **L12, L13; L14, L15** are in two further screened units on the chassis deck with their associated trimmers. The small stabilising choke **L11** is mounted beneath the chassis, beside **S7**.

Scale Lamps.—These are two MES types, with small spherical bulbs, rated at 6.5 V, 0.3 A, Cossor type 365.

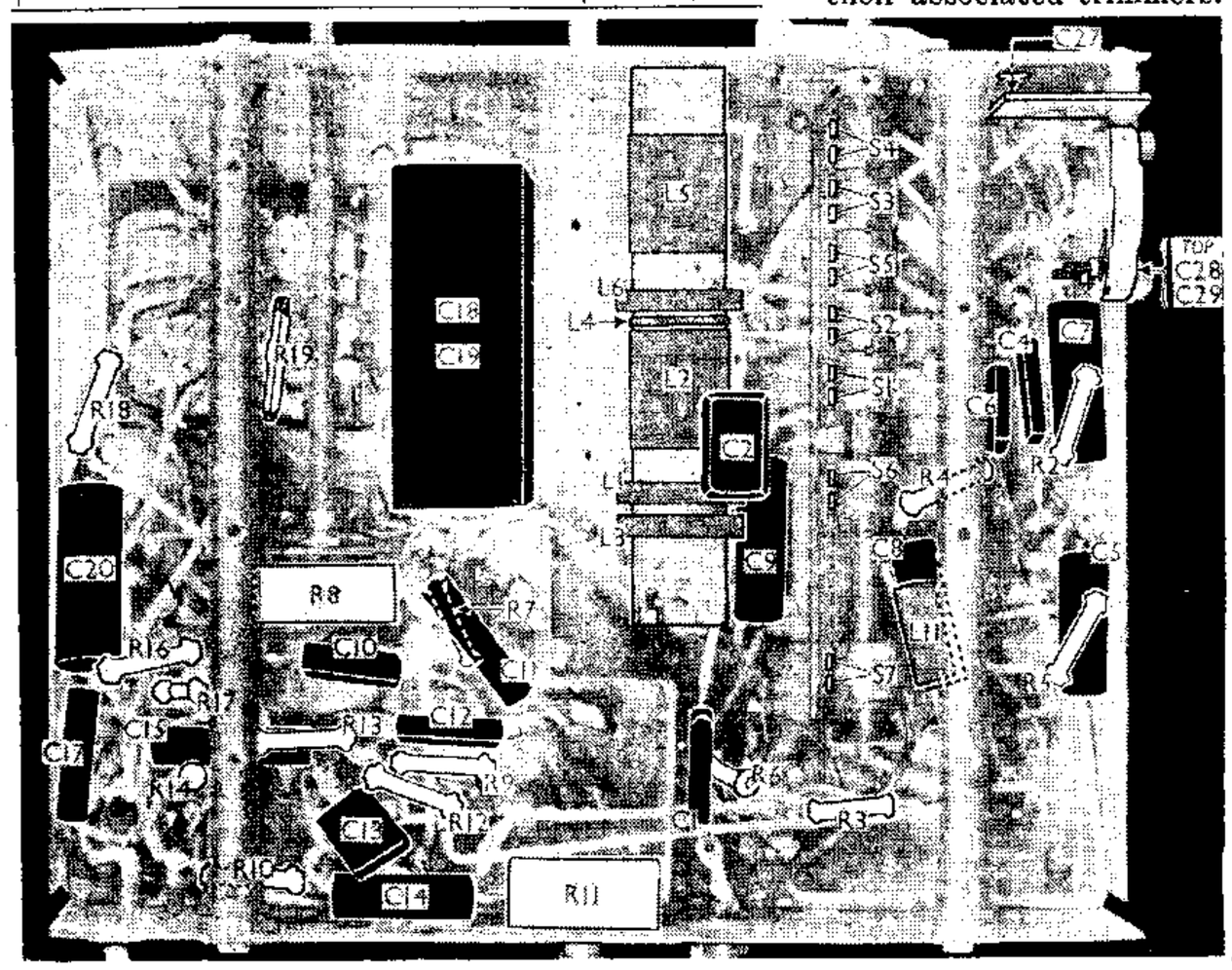
External Speaker.—Two sockets are provided at the rear of the chassis for a high impedance (8,000-10,000 Ω) external speaker. The sockets are "live" to the HT circuit, and the makers suggest the use of a 4 μF condenser, near the receiver, in series with each lead. A single 2 μF condenser could be used in series with one lead only, connected to the socket from **V4** anode, the other speaker lead going to chassis, or a low impedance (about 4 Ω) speaker could be connected across **T1** secondary connections on the speaker unit.

R15, C16.—These two components are fitted directly to the appropriate tags on the speaker assembly, and do not appear in our chassis illustrations.

Condensers C18, C19.—These are two 8 μF dry electrolytics in a single cardboard container beneath the chassis. They are independently connected by four separate leads: red and black are the positive and negative leads respectively of **C18**; and yellow and brown are those of **C19**. Both condensers are rated at 450 V peak working, 500 V surge.

Resistance R8.—This is the manual volume control, which is centre-tapped to operate as a radio/gram fader. The tapping is brought out to a tag mounted on a projection situated diametrically opposite to the slider tag.

Resistance R19.—This is a small fixed wire-wound unit with a centre-tap brought out to a tag. The resistance element is protected by a tape covering.



Under-chassis view. All the switches are in a single unit to the right of the illustration, and are individually identified. **C27** adjustment is reached through a hole in the front chassis member.

CIRCUIT ALIGNMENT

IF Stages.—As the IF circuits are slightly staggered to produce a band-pass characteristic, the Cossor ganging oscillator and oscilloscope should be used when lining them up, to procure the correct wave-shape. Where the equipment is available, the usual procedure should be followed, using a mean intermediate frequency of 465 KC/S (645.16 m).

If it is not available, the following procedure should be adopted:

Connect signal generator via a 0.01 μF condenser to control grid (top-cap) of **V1**, turn the volume control to maximum, feed in a 465 KC/S (645.16 m) signal, and adjust **C33, C32, C31** and **C30** in that order for maximum output. Then adjust the trimmers in turn, while swinging the signal generator frequency either side of 465 KC/S, until by trial and error equal peaks are obtained either side of resonance, about 9 KC/S apart (460.5 KC/S and 469.5 KC/S) with a slight dip at 465 KC/S.

RF and Oscillator Stages.—With the gang at minimum, the pointer should be just below the horizontal line at 200 m on the scale. Transfer signal generator leads to A and E terminals via a suitable dummy aerial.

MW.—Switch set to MW, tune to 214 m on scale, feed in a 214 m (1,400 KC/S) signal, and adjust **C26**, then **C24** and **C22** for maximum output. Feed in 500 m (600 KC/S) signal, and adjust **C29** for maximum output, while rocking the gang for optimum results.

LW.—Switch set to LW, tune to 1,000 m on scale, feed in a 1,000 m (300 KC/S) signal, and adjust **C27** for maximum output. Feed in a 1,875 m (160 KC/S) signal, and adjust **C28** for maximum output, while rocking the gang for optimum results.

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