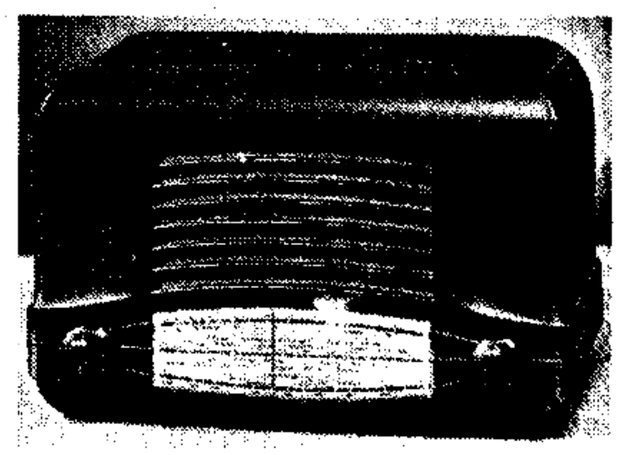
COSSOR

MODEL 464



PROVIDED with a miniature frame aerial for use where expedient, but with full facilities for use with an external aerial, the Cossor 464 is one of the first receivers of the post-war range of this brand. It employs four valves (plus rectifier) and covers three wavebands, the S.W. range being 16-52 m.

Release date and original price: 1946; *£14 16s 3d* plus *£3 3s 9d purchase tax.*

CIRCUIT DESCRIPTION

Aerial input is via I.F. rejector **L1, C1,** series capacitor **C2** and S.W. coupling coil **L2,** for all wavebands, to single-tuned circuits **L3, C29** (S.W.), when **S1** and **S4** close; **L4, C29** (M.W.), when **S2** and **S3** close; or **L4, L5, C29** (L.W.), when **S2** only closes. **L4** is wound as a frame, so that set operates on M.W. and L.W. without an external aerial.

First valve **(V1, Cossor metallised OM10)** is a triode-hexode operating as frequency changer with internal coupling. Triode oscillator grid coils **L6** (S.W.), **L7** (M.W.) and **L8** (L.W.) are tuned by **C30.** Parallel trimming by **C31** (S.W.), **C32** (M.W.) and **C10, C33** (L.W.); series tracking by **C11** (S.W.), **C12** (M.W.) and **C13** (L.W.). Reaction from anode via coils **L9, L10** and **L11** respectively.

Second valve **(V2, Cossor metallised OM6)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned-primary, tuned-secondary iron-cored transformer couplings **C6, L12, L13, C7** and **C15, L14, L15, C16.**

Intermediate frequency 465 kc/s.

Diode second detector is part of double diode triode valve **(V3, Cossor metallised OM4),** the two diodes being strapped together. Audio frequency component in rectified output is developed across manual volume control **R8,** which also operates as load resistor, and passed via **C20** to C.G. of triode section. I.F. filtering by **C18, R7, C19.**

D.C. potential dropped along **R8** is tapped off and fed back through decoupling circuit as G.B. to F.C. and I.F. valves, giving automatic volume control.

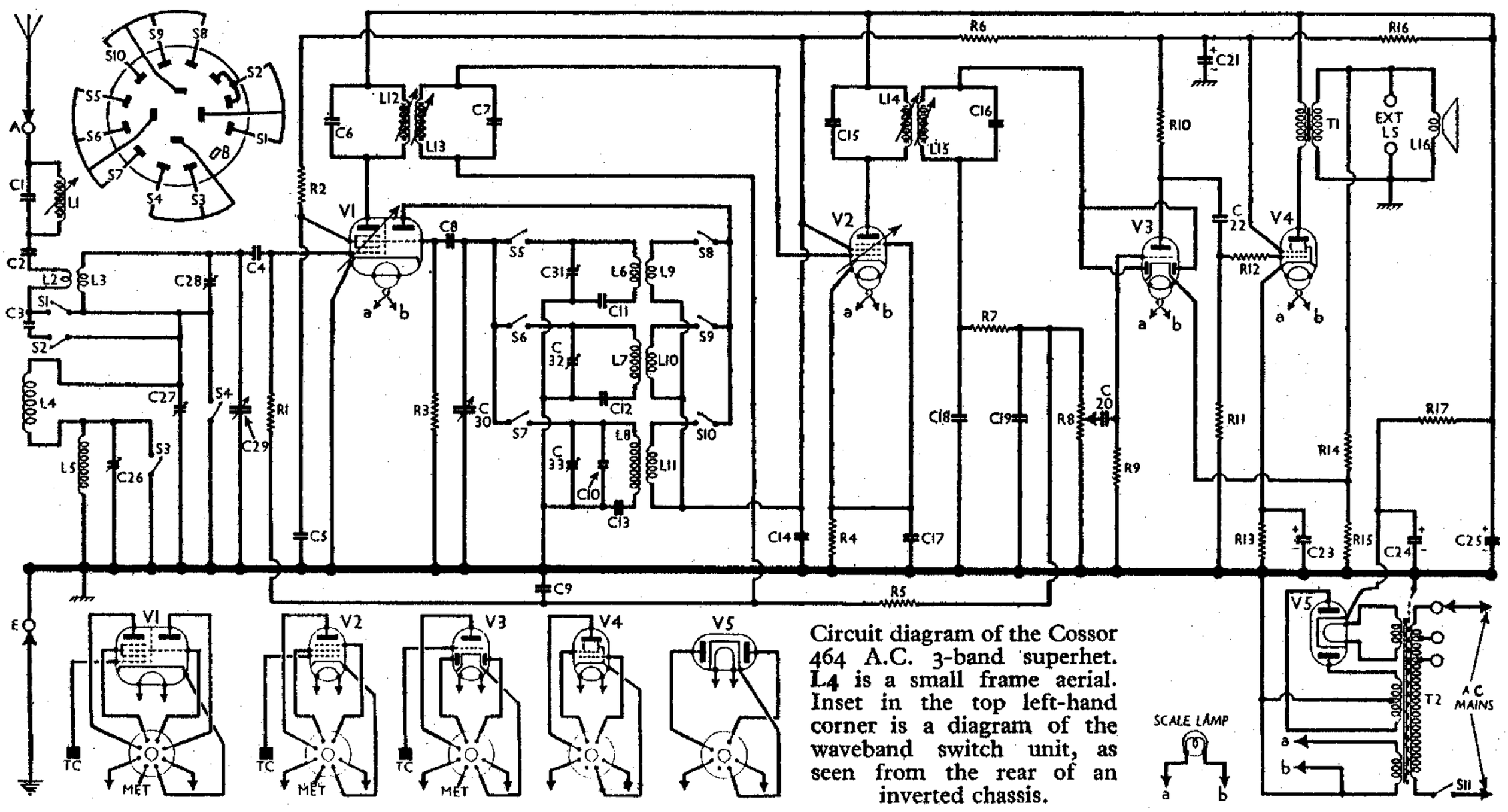
Resistance-capacitance coupling by **R10, C22** and **R11** between **V3** triode and beam tetrode output valve **(V4, Cossor 6V6G).** Provision for connection of low-impedance speaker across secondary of output transformer **T1.** Across **T1** secondary also is connected a potential divider **R14, R15,** across which the output signal is developed. As **R15** is in **V3** cathode return lead, part of the output voltage is returned to **V3,** giving negative feed-back.

H.T. current is supplied by I.H.C. full-wave rectifying valve **(V5, Cossor 6X5G)** whose cathode is isolated from the heater. Smoothing by **C24, R17, C25.**

COMPONENTS AND VALUES

	CAPACITORS	Values (μF)
C1	Aerial I.F. rejector tuning	0·0002
C2	Aerial series coupling capacitors	0·0005
C3	Aerial series coupling capacitors	0·000005
C4	V1 hex. C.G. capacitor	0·0003
C5	V1 S.G. decoupling	0·01
C6	1st I.F. transformer tuning capacitors	0·0001
C7	1st I.F. transformer tuning capacitors	0·0001
C8	V1 osc. C.G. capacitor	0·0001
C9	A.V.C. line decoupling	0·1
C10	Osc. L.W. fixed trimmer	0·00005
C11	Osc. S.W. tracker	0·005
C12	Osc. M.W. tracker	0·00057
C13	Osc. L.W. tracker	0·000185
C14	H.T. feed R.F. by-pass	0·1
C15	2nd I.F. transformer tuning capacitors	0·0001
C16	2nd I.F. transformer tuning capacitors	0·0001
C17	V2 cathode by-pass	0·01
C18	I.F. by-pass capacitors	0·0001
C19	I.F. by-pass capacitors	0·0001
C20	A.F. coupling to V3	0·005
C21*	H.T. smoothing capacitor	8·0
C22	A.F. coupling to V4	0·01
C23*	V4 cathode by-pass	25·0
C24*	H.T. smoothing capacitors	8·0
C25*	H.T. smoothing capacitors	8·0
C26‡	Aerial circ. L.W. trimmer	—
C27‡	M.W. frame aerial trimmer	—
C28‡	Aerial circ. S.W. trimmer	—
C29†	Aerial circuit tuning	—
C30†	Oscillator circuit tuning	—
C31‡	Osc. circ. S.W. trimmer	—
C32‡	Osc. circ. M.W. trimmer	—
C33‡	Osc. circ. L.W. trimmer	—

* Electrolytic. † Variable. ‡ Pre-set.



Circuit diagram of the Cossor 464 A.C. 3-band superhet. **L4** is a small frame aerial. Inset in the top left-hand corner is a diagram of the waveband switch unit, as seen from the rear of an inverted chassis.

RESISTORS		Values (ohms)
R1	V1 hex. C.G. resistor ...	330,000
R2	V1 S.G. H.T. feed ...	2,200
R3	V1 osc. C.G. resistor ...	12,000
R4	V2 fixed G.B. resistor ...	1,000
R5	A.V.C. line decoupling ...	2,200,000
R6	H.T. feed resistor ...	10,000
R7	I.F. stopper	47,000
R8	Manual volume control; V3 diode load	500,000
R9	V3 triode C.G. resistor ...	4,700,000
R10	V3 triode anode load ...	100,000
R11	V4 C.G. resistor	470,000
R12	V4 grid stopper	100,000
R13	V4 G.B. resistor	270
R14	Feed-back pot. divider and	220
R15	V3 G.B. resistor ...	100
R16	H.T. feed resistor ...	3,900
R17	H.T. smoothing resistor ...	1,500

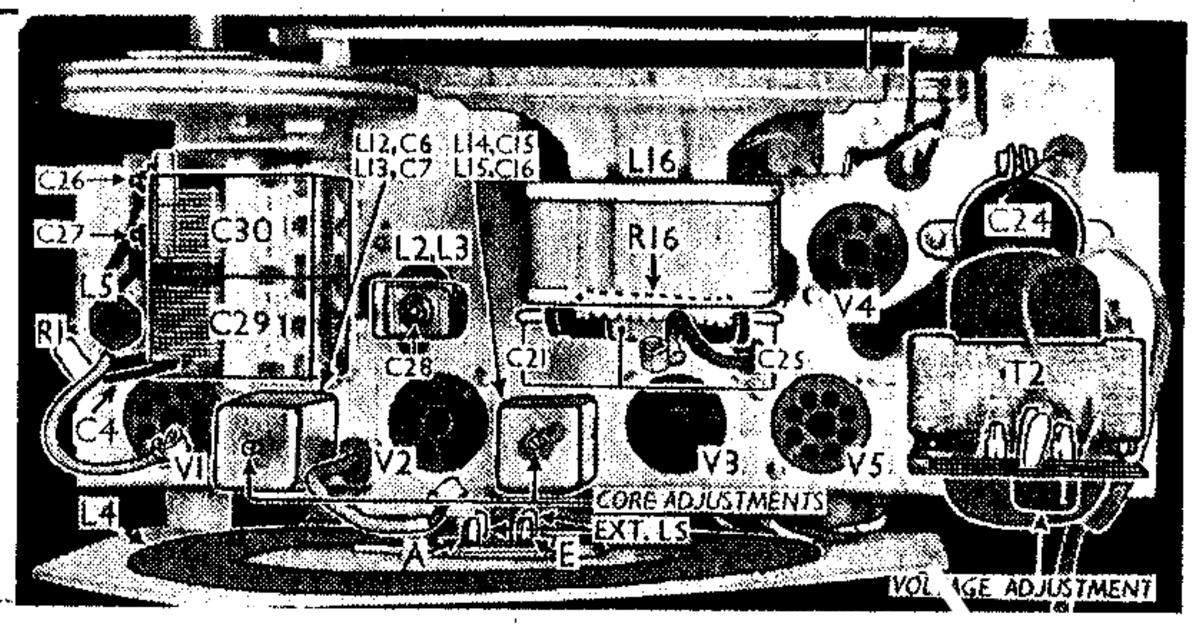
OTHER COMPONENTS		Approx. Values (ohms)
L1	Aerial I.F. rejector coil ...	4·5
L2	Aerial S.W. coupling coil ...	Very low
L3	Aerial S.W. tuning coil ...	Very low
L4	Aerial M.W. tuning (frame)	1·0
L5	Aerial L.W. tuning coil ...	29·0
L6	Osc. S.W. tuning coil ...	Very low
L7	Osc. M.W. tuning coil ...	2·1
L8	Osc. L.W. tuning coil ...	14·3
L9	Osc. S.W. reaction coil ...	29·5
L10	Osc. M.W. reaction coil ...	1·1
L11	Osc. L.W. reaction coil ...	7·8
L12	1st I.F. trans. Pri. ...	9·5
L13	1st I.F. trans. Sec. ...	9·5
L14	2nd I.F. trans. Pri. ...	9·5
L15	2nd I.F. trans. Sec. ...	9·5
L16	Speaker speech coil	2·5
T1	Output trans. Pri. ...	354·0
	Output trans. Sec. ...	0·5
T2	Mains trans. Pri., total ...	470·0
	Mains trans. Heater sec. ...	0·2
	Mains trans. Rect. heat. sec.	0·5
	Mains trans. H.T. sec., total	1,400·0
S1-S10	Waveband switches ...	—
S11	Mains switch, ganged R8	—

VALVE ANALYSIS

Valve voltages and currents given in the table below are those quoted by the makers. Values are approximate, and readings were taken on a receiver working on 200v mains, using the 200v tapping on the mains transformer. The receiver was tuned to 320m, but the aerial was disconnected. Voltages were measured with a meter whose resistance was 1,000 ohms per volt; its negative lead was connected to chassis.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 OM10	280	3·6	95	1·5
	Oscillator			
	103	6·0		
V2 OM6	280	3·0	103	1·0
V3 OM4	53	1·5	—	—
V4 6V6G	266	35·0	220	2·4
V5 6X5G	350†	—	—	—

† Each anode, A.C.



Plan view of the chassis. **L4** and the A, E and Ext. L.S. sockets are mounted on a vertical board behind the chassis. The I.F. core adjustments shown may be primary or secondary. **C21** and **C25** are the two sections of a dual unit tubular units beneath the chassis. The I.F. transformers are miniature types in cans on the chassis deck. The core adjustments project from either end but although these are indicated in our chassis illustrations, the primaries and secondaries are not identified as they vary from chassis to chassis.

GENERAL NOTES

Switches.—S1-S10 are the waveband switches ganged in a single rotary unit beneath the chassis. The unit is indicated in our under-chassis view, and shown in detail in the diagram inset in the top left-hand corner of the circuit diagram overleaf, where it is drawn as seen from the rear of an inverted chassis.

The table below gives the switch positions for the three control settings, starting from the fully anti-clockwise position of the control. A dash indicates open, and **C**, closed.

Switch	S.W.	M.W.	L.W.
S1	C	—	—
S2	—	C	C
S3	—	C	—
S4	C	—	—
S5	C	—	—
S6	—	C	—
S7	—	—	C
S8	C	—	—
S9	—	C	—
S10	—	—	C

S11 is the Q.M.B. mains switch, ganged with the volume control **R8.**

Coils.—Of the aerial coils, the S.W. **(L2, L3)** unit and L.W. **(L5)** unit are on two moulded formers on the chassis deck, while **L4** is wound pancake-fashion on a sheet of pressed card mounted vertically at the rear of the chassis, and acts as a frame aerial if required. The oscillator coils are in three separate unscreened

Scale Lamp.—This is a Cossor type No. M201505 lamp, with an M.E.S. base and a spherical bulb. Our sample was rated at 6.5 V, 0.3 A, and its top was painted to diffuse the light.

External Speaker.—Two sockets are provided on the panel at the rear of the chassis for the connection of a low-impedance (4 Ω) external speaker.

Capacitors C21, C25.—These are two electrolytics in a "Micropack" dual unit on the chassis deck. The two positive tags project from the ends of the unit, and the case forms the common negative.

Capacitor C24.—This is a single "Micropack" surge-limiting tubular unit mounted through the chassis deck, rated at 450 V D.C. working. The case is isolated, and the connections are brought out to two tags at one end.

Chassis Divergencies.—As stated under "Coils," the I.F. core adjustments may be arranged so that primaries or secondaries are at the top. Also, a 0.01 μF capacitor might be connected as a fixed tone corrector between **V4** anode and chassis, and **C21** and **C25** may be in separate containers instead of a dual unit.

CIRCUIT ALIGNMENT

I.F. Stages.—Connect signal generator to control grid (top cap) of **V1** and chassis, short-circuit **C30**, and turn volume control to maximum. Feed in a 465 kc/s (645.16 m) signal, and adjust the cores of **L15, L14, L13** and **L12** in that order for maximum output. Swing oscillator either side of resonance and check that output rises and falls steeply, is flat-topped, and is centred on 465 kc/s. Remove short-circuit from **C30.**

R.F. and Oscillator Stages.—Transfer signal generator leads, via a suitable dummy aerial, to **A** and **E** sockets. With the gang at maximum, the pointer should cover the two thin white lines at the right-hand ends of the outer scales.

I.F. Rejector.—Switch set to M.W., turn the gang to maximum, feed in a 465 kc/s signal, and adjust the core of **L1** for minimum output.

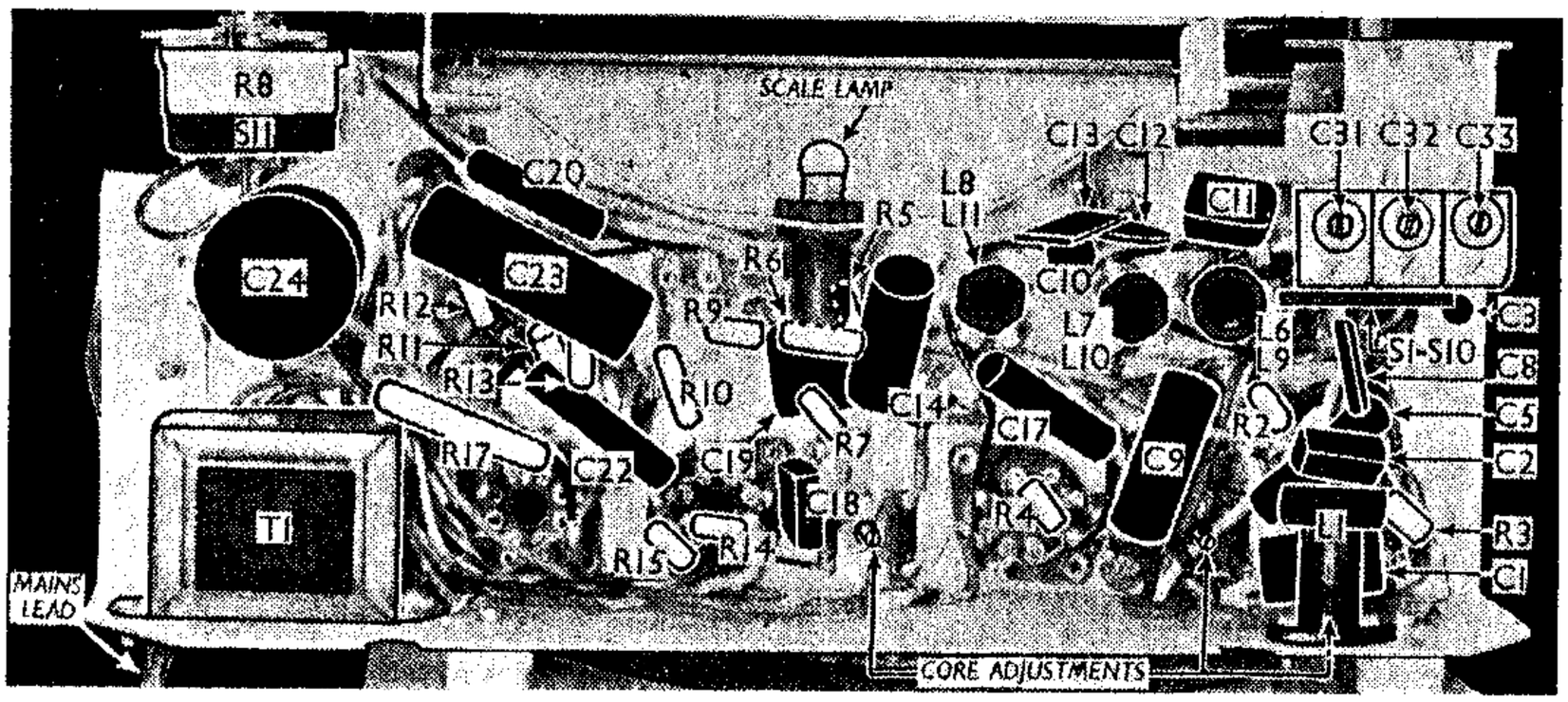
S.W.—Switch set to S.W., tune to 18 Mc/s on scale, feed in an 18 Mc/s (16.67 m) signal, and adjust **C31,** then **C28,** for maximum output.

M.W.—Switch set to M.W., tune to 214 m on scale, feed in a 214 m (1,400 kc/s) signal, and adjust **C32,** then **C27,** for maximum output.

L.W.—Switch set to L.W., tune to 1,000 m on scale, feed in a 1,000 m (300 kc/s) signal, and adjust **C33,** then **C26,** for maximum output.

DISMANTLING THE SET

Removing Chassis.—Remove the three control knobs (recessed grub screws);
remove the two cheese-head screws (with washers) holding the upper corners of the rear member of the chassis to the cabinet;
slacken the screw holding a clamp to the rim of the speaker at about 2 o'clock (top right), and swivel the clamp away, when chassis and speaker may be withdrawn as a single unit.



Under-chassis view. The **S1–S10** switch unit, indicated here on the right, is shown in detail in a diagram inset with the circuit diagram overleaf.

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