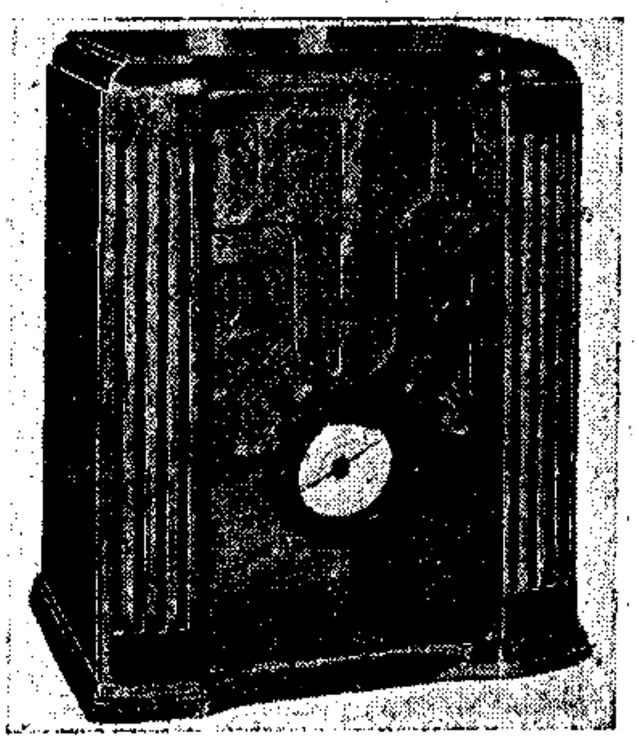
Supplement to The Wireless & Electrical Trader, August 15, 1942

BELMONT 555

AC SUPERHET



THE Belmont 555 is a 4-valve (plus rectifier) 3-band superhet designed to operate from AC mains of 200-260 V 50-60 C/S. No voltage adjustment is provided, and our sample was stamped 220 V, but the valve tolerances will accommodate the range quoted.

Some models were fitted with transformers for 25 C/S mains, and some for 40-60 C/S, while others had tappings for 100-250 V mains. The SW range is 16.5-56.6 m.

CIRCUIT DESCRIPTION

Aerial input on MW and LW via coupling coil **L3** to single tuned circuits **L5** (MW) plus **L6** (LW) and **C24,** with additional coupling via **C1, C21** on MW. **C21** is the MW trimmer. On LW **S1** closes, and **C1** is connected in parallel with **L3** and the aerial IF filter coils **L1, L2.** On SW, input is via **C1, C21** to single tuned circuit **L4, C24.**

First valve **(V1, Ken-Rad 6A7)** is a heptode operating as frequency changer with electron coupling. Oscillator grid coils **L7** (SW), **L8** (MW) and **L9** (LW) are tuned by **C25.** Parallel trimming by **C26** (SW), **C27** (MW) and **C6, C28** (LW); series tracking by **C7** (SW), **C5, C30** (MW) and **C29** (LW). Reaction coupling by **L10** (SW) and **L11,** together with common impedance of trackers, (MW and LW).

Second valve **(V2, Ken-Rad 6D6)** is a variable-mu RF pentode operating as IF amplifier with tuned-primary, tuned-secondary transformer couplings **C31, L12, L13, C32** and **C33, L14, L15, C34.**

Intermediate frequency 465 KC/S.

Diode second detector is part of double-diode RF pentode valve **(V3, Ken-Rad 6B7),** the diode anodes being strapped together. Audio frequency component in rectified output is developed across one half of the manual volume control **R7,** which also operates as load resistance, and passed directly to CG of pentode section. IF filtering by **C12** and **C14.**

Provision for connection of gramophone pick-up between one end of **R7** and chassis, so that this control, whose centre tap is connected to chassis, operates as a radio/gram fader.

DC potential developed across **R7** is fed back via decoupling circuit as GB to IF amplifier, giving AVC. Post-detector AVC is obtained also, as GB for **V3** pentode is obtained from the same source, although its value will depend upon the setting of the control.

Resistance-capacity coupling by **R8, C15** and **R10** between **V3** pentode and pentode output valve **(V4, Ken-Rad 42E).** Fixed tone correction by **C17** in anode circuit, together with two-point tone control by **C18, S8.**

HT current is supplied by full-wave rectifying valve **(V5, Ken-Rad 80).** Smoothing by speaker field **L18** (in negative HT lead) and electrolytic condensers **C19, C20.** GB potential for **V4** is obtained from junction of resistances **R11, R12,** which form a potential divider across **L18.**

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on mains of 237 V. The receiver was tuned to the lowest wavelength on the MW band, and the volume control was at maximum, but the aerial and earth leads were joined together. Voltages were measured on the 400 V scale of a Model 7 Avometer, chassis being negative.

As our sample was not a new one, the valves should be regarded only as a rough guide, particularly in the case of **V4** currents, which probably should be higher in a new receiver.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 6A7	203 / Oscillator / 140	1·8 / 3·5	95	4·7
V2 6D6	203	4·7	95	1·3
V3 6B7	20	0·7	12	0·2
V4 42E	194	16·0	203	3·0
V5 80	270†	—	—	—

† Each anode, AC.

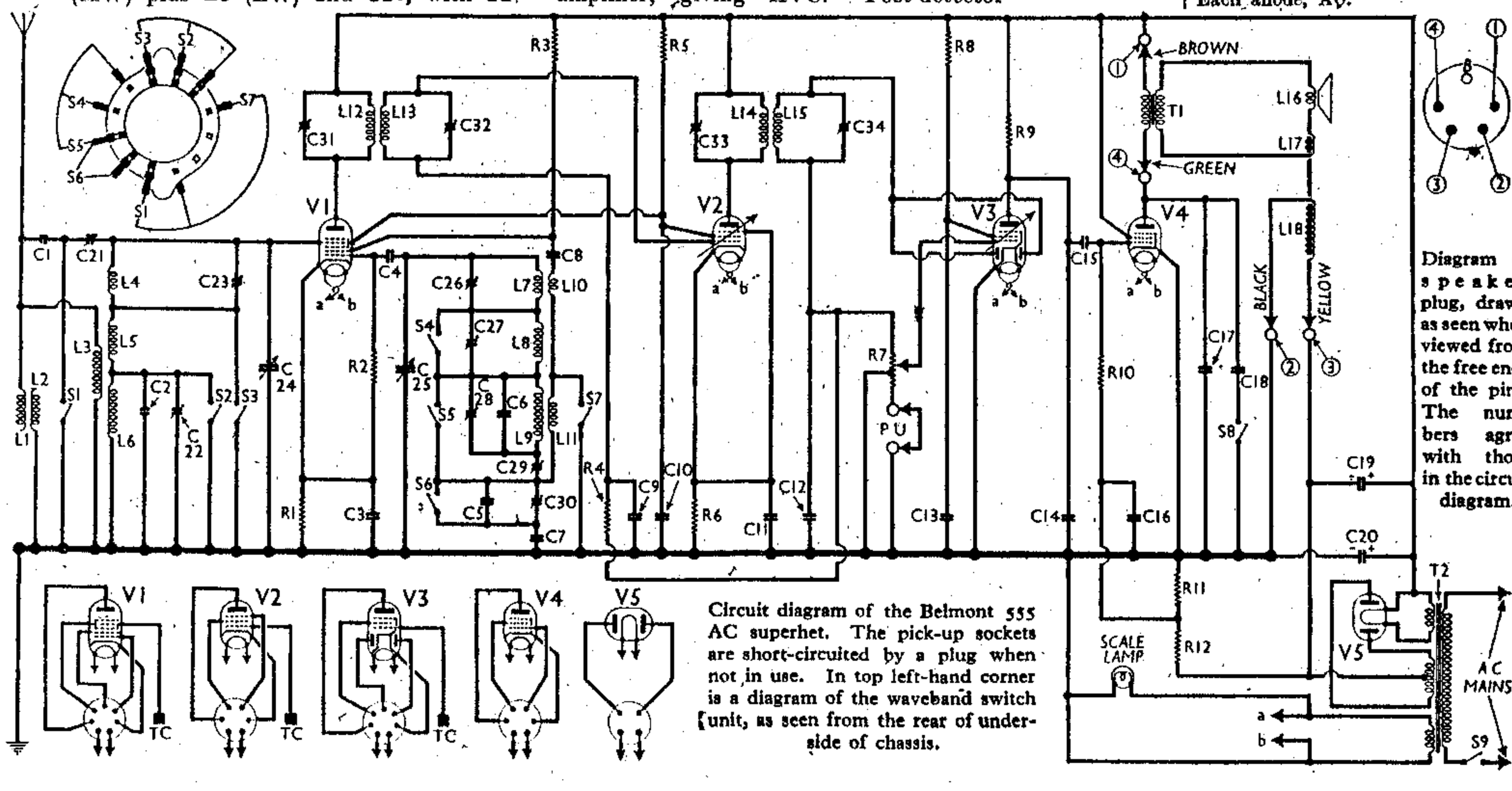
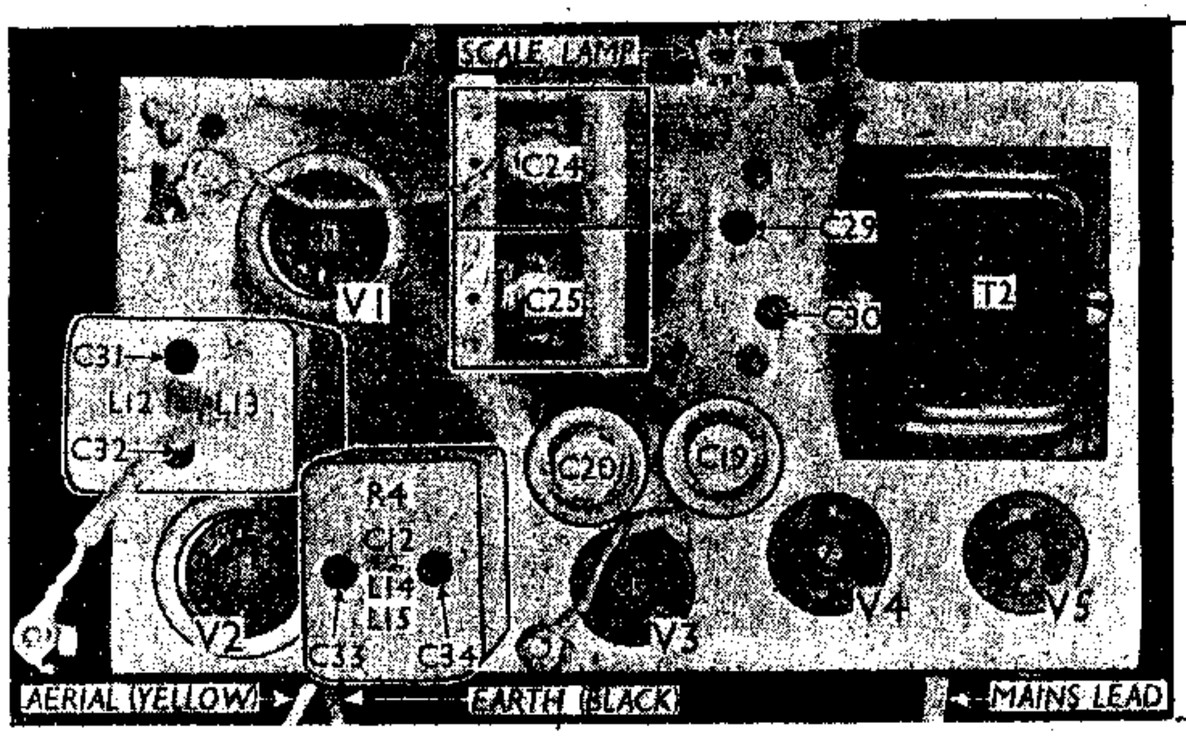


Diagram of speaker plug, drawn as seen when viewed from the free ends of the pins. The numbers agree with those in the circuit diagram.

Circuit diagram of the Belmont 555 AC superhet. The pick-up sockets are short-circuited by a plug when not in use. In top left-hand corner is a diagram of the waveband switch unit, as seen from the rear of underside of chassis.



Plan view of the chassis. The IF tuning and oscillator tracking adjustments are indicated here, but the RF and oscillator trimmers are seen in the under-chassis view below.

COMPONENTS AND VALUES

	RESISTANCES	Values (ohms)
R1	V1 GB resistance	250
R2	V1 osc. CG resistance ...	50,000
R3	V1 osc. anode HT feed ...	15,000
R4	V2 CG decoupling ...	500,000
R5	V1, V2 SG's HT feed ...	19,000
R6	V2 fixed GB resistance ...	350
R7	Manual volume control ...	1,000,000
R8	V3 SG HT feed	1,000,000
R9	V3 pent. anode load ...	250,000
R10	V4 CG resistance	500,000
R11, R12	V4 GB and speaker field pot. divider	201,000 / 800,000

	CONDENSERS	Values (μF)
C1	Aerial coupling condenser	0·00002
C2	Aerial LW fixed trimmer	0·000035
C3	V1 cathode by-pass ...	0·1
C4	V1 osc. CG condenser ...	0·0001
C5	Osc. MW fixed tracker ...	0·000275
C6	Osc. LW fixed trimmer ...	0·000155
C7	Osc. SW tracker ...	0·0038
C8	V1 osc. anode coupling ...	0·002
C9	V2 CG decoupling ...	0·1
C10	V1, V2 SG's decoupling ...	0·1
C11	V2 cathode by-pass ...	0·1
C12	IF by-pass	0·00025
C13	V3 SG decoupling ...	0·1
C14	IF by-pass	0·00025
C15	V3 pent. to V4 coupling	0·02
C16	V4 CG decoupling ...	0·1
C17	Fixed tone corrector ...	0·006
C18	Variable tone control ...	0·025
C19*	HT smoothing condensers	8·0
C20*		8·0
C21‡	Aerial circ. MW trimmer	—
C22‡	Aerial circ. LW trimmer	—
C23‡	Aerial circ. SW trimmer	—
C24†	Aerial circuit tuning ...	—
C25†	Oscillator circuit tuning	—
C26‡	Osc. circ. SW trimmer ...	—
C27‡	Osc. circ. MW trimmer ...	—
C28‡	Osc. circ. LW trimmer ...	—
C29‡	Osc. circ. LW tracker ...	—
C30‡	Osc. circ. MW tracker ...	—
C31‡	1st IF trans. pri. tuning	—
C32‡	1st IF trans. sec. tuning	—
C33‡	2nd IF trans. pri. tuning	—
C34‡	2nd IF trans. sec. tuning	—

	OTHER COMPONENTS	Approx. Values (ohms)
L1, L2	Aerial IF filter coils ...	—
L3	Aerial MW and LW coupling	70·0
L4	Aerial SW tuning coil ...	0·01
L5	Aerial MW tuning coil ...	4·0
L6	Aerial LW tuning coil ...	13·0
L7	Osc. circ. SW tuning ...	0·01
L8	Osc. circ. MW tuning ...	7·0
L9	Osc. circ. LW tuning ...	9·0
L10	Osc. SW reaction ...	1·0
L11	MW and LW reaction ...	10·0
L12	1st IF trans. Pri. ...	13·0
L13	1st IF trans. Sec. ...	21·0
L14	2nd IF trans. Prl. ...	9·0
L15	2nd IF trans. Sec. ...	9·0
L16	Speaker speech coil ...	3·0
L17	Hum neutralising coil ...	0·2
L18	Speaker field coil ...	1,500·0
T1	Speaker input trans. Prl. ...	600·0
	Speaker input trans. Sec. ...	0·3
T2	Mains trans. Prl.	70·0
	Mains trans. Heater sec. ...	0·1
	Mains trans. Rect. heat. sec.	0·1
	Mains trans. HT sec., total	530·0
S1-S7	Waveband switches ...	—
S8	Tone control switch ...	—
S9	Mains switch, ganged R7	—

* Electrolytic. † Variable. ‡ Pre-set.

DISMANTLING THE SET

Removing Chassis.—Remove the three control knobs (pull-off);
remove the three set screws (with metal washers) holding chassis to bottom of cabinet;
withdraw chassis, and pull out speaker plug or not as required.

Removing Speaker.—Remove the three ornamental headed screws and nuts holding speaker to front of cabinet. To withdraw the plug from the chassis, the chassis must also be removed.

When replacing, the transformer should be at the bottom.

GENERAL NOTES

Switches.—**S1-S7** are the waveband switches, in a double-sided rotary unit beneath the chassis. A diagram of the unit appears in the top left-hand corner of the circuit diagram, viewed in the direction of the arrow in the under-chassis view, where the unit is indicated. The table (col. 3) gives the switch positions for the three control settings, starting from the fully anti-clockwise position of the control.

S8 is the two-point tone control switch, fitted on the rear chassis member.

S9 is the QMB mains switch, ganged with the volume control **R7**.

Scale Lamp.—This is an MES type lamp, rated at 6.5 V, 0.3 A.

Gramophone Pick-up.—Two sockets are provided at the rear of the chassis for a gramophone pick-up. Normally, a U-shaped strap short-circuits the sockets, but this is withdrawn and replaced by the pick-up plugs for gram operation. No switching is used, the change-over being effected by a fader-type volume control.

Condensers C9, C10; C11, C13.—These are in two dual tubular units. In each unit the common chassis connection is made via the metal band encircling the case. The two flexible leads emerging from the ends of the units are the high-potential connections.

Condensers C19, C20.—These are two electrolytics mounted on the chassis deck. **C19** is rated at 350 V working, and **C20** at 300 V. The cases form the negative connections, so that care should be taken to insulate **C19** from the chassis.

Switch Table

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

CIRCUIT ALIGNMENT

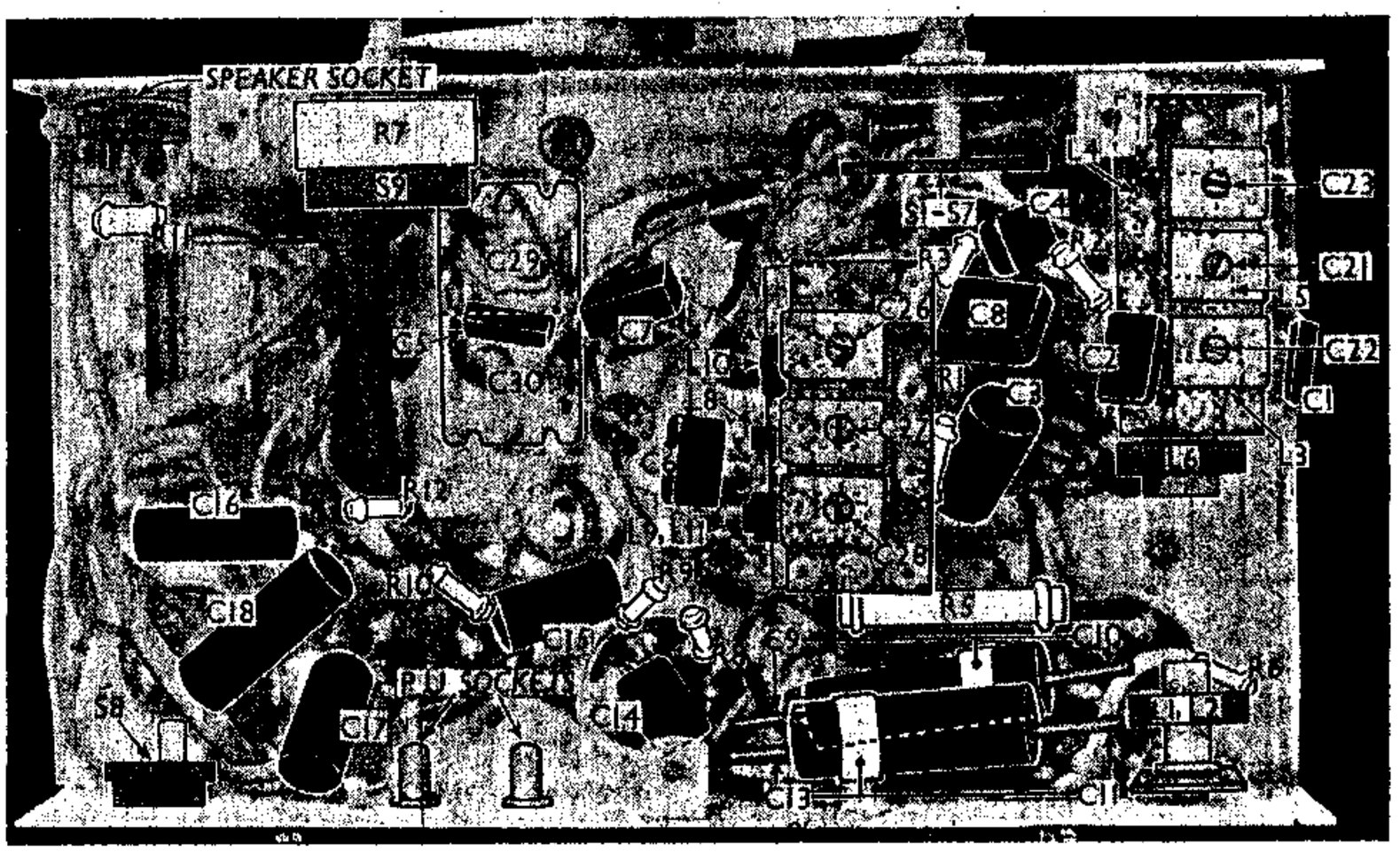
IF Stages.—Switch set to MW, turn gang to minimum and volume control to maximum. Connect signal generator via a 0.1 μF condenser to control grid (top cap) of **V2** and chassis, feed in a 465 KC/S (645.16 m.) signal, and adjust **C33** and **C34** for maximum output. Transfer signal generator lead to top cap of **V1** and adjust **C31, C32,** then readjust **C33, C34,** for maximum output.

RF and Oscillator Stages.—Transfer signal generator leads, via suitable dummy aerial, to **A** and **E** leads. With gang at minimum, the pointer should cover the horizontal line on the scale.

MW.—Switch set to MW, with gang still at minimum, feed in a 187.5 m (1,600 KC/S) signal and adjust **C27** for maximum output. Feed in a 214.3 m (1,400 KC/S) signal, tune it in, and adjust **C21** for maximum output. Feed in a 500 m (600 KC/S) signal, tune it in, and adjust **C30** for maximum output while rocking the gang for optimum results. Check at 300 m (1,000 KC/S) for sensitivity and calibration.

SW.—Switch set to SW, tune to 16.7 m on scale, feed in a 16.7 m (18 MC/S) signal, and adjust **C26,** then **C23,** for maximum output. If two peaks are found for **C26,** select that involving the lesser trimmer capacity. Check calibration and sensitivity at 50 m (6 MC/S).

LW.—Switch set to LW, turn the gang to minimum, feed in a 923 m (325 KC/S) signal, and adjust **C28,** then **C22,** for maximum output. Feed in a 2,000 m (150 KC/S) signal, tune it in, and adjust **C29** for maximum output while rocking the gang for optimum results.



Under-chassis view. A diagram of the **S1-S7** unit appears overleaf.

Printed in Great Britain by The Cornwall Press Ltd., Paris Garden, London, S.E.1