

# KOLSTER-BRANDES BR20

Model BR20, five-valve all-wave table superhet with band-spread on SW bands. International - octal valves. Made by Kolster-Brandes, Ltd., Footscray, Sidcup, Kent.

**T**HE circuit consists of a triode-hexode frequency changer V1 feeding into a variable-mu HF pentode IF amplifier V2. Signal rectification, automatic volume control and first stage of AF amplification are carried out by a double-diode triode V3. The output valve V4 is a beam tetrode and drives a 6½-in. permanent-magnet speaker. An indirectly heated full-wave rectifier V5 provides the HT.

**Aerial**, whether outdoor or the internal plate, has a series coupler C1 with shunt static drain R1. Two transformer-coupled coils L1-L2 and L3-L4

are fitted for the 19 and 31-metre bands. The primaries L1, L2 are series connected, the signal from either the plate aerial or external aerial being fed via capacitor C1 to top of L1.

On MW and LW single coils L5 and L6 are used, the signal from the aerial being fed via C1, L1 and L3 to between C2 and the bottom ends of the coils.

S1 switches the grid of V1 to the secondaries L2, L4 of the SW aerial transformers and to L5 and L6, the MW and LW coils. S2 is used to switch in parallel capacitor C4 across VC1, the aerial tuning capacitor, on the SW bands, and on MW and LW it short circuits series capacitor C5.

AVC voltage is fed to grid V1 in series with aerial coils from R2. Cathode bias is derived from R4, C8.

**Oscillator** is of the tuned grid parallel-fed type. As with the aerial circuit, the SW coils L7-8, 1-9-10 are of the transformer type, the primaries being in series. Single coils L11 and L12 are used for MW and LW.

S3 switches the grid circuit which is tuned by VC2. C10 with R5 provides self-bias. S4 is used to switch in parallel capacitor C14 on the two SW bands and to short circuit the series capacitances C15, C27 on MW and LW.

Anode reaction voltages are obtained inductively on SW bands by L7 and L9, but on MW and LW it is obtained capacitively from across C11. R6 is anode limiter resistor, C9 the anode coupling capacitor, and R7 the oscillator anode load.

**Switches** are fitted with a following shorting blade so that all tuned coils are shorted out progressively from LW to SW positions and vice versa.

**Band-spreading** is obtained by modifying the tuning capacitances. On the short-wave ranges, a capacitor is connected in shunt with each variable capacitor, thereby limiting the range of variation, and a series capacitor is brought in to reduce the total effective tuning capacitance.

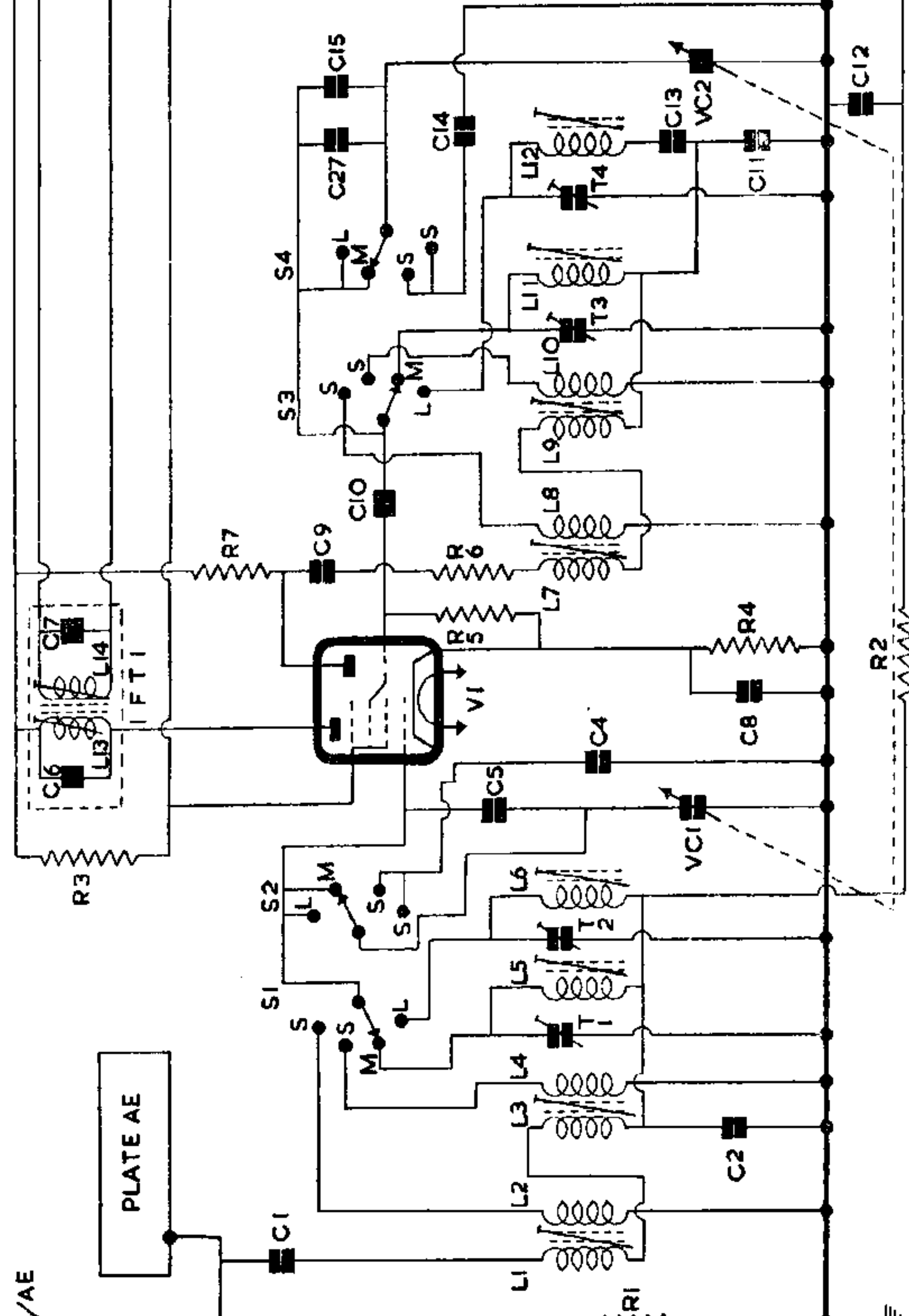
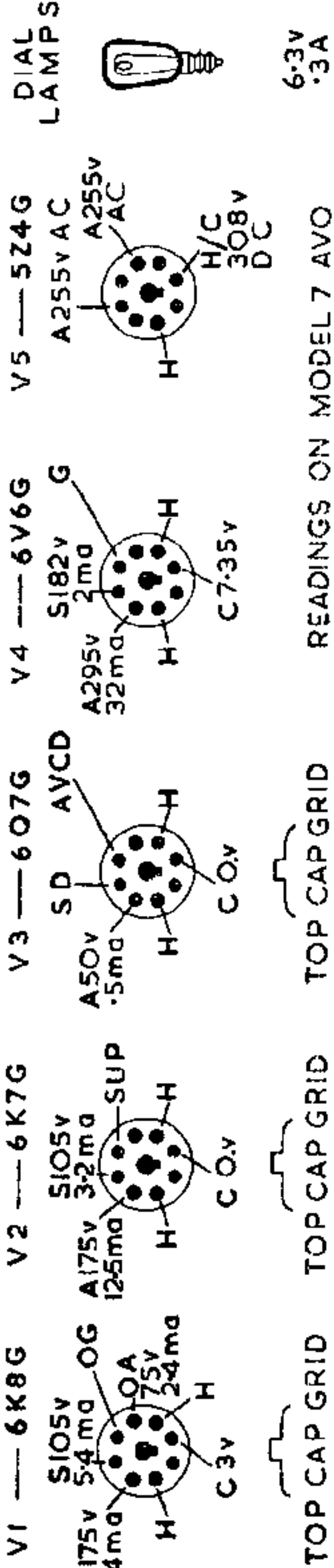
**IF amplifier** operates at a frequency of 470 Kc. IFT1, the primary of which is in the hexode anode circuit of V1, applies the signal to the grid of V2. AVC is fed to the grid in series with secondary direct from the AVC diode anode. No standing bias is applied to this valve, its cathode being connected to earth line. Screen voltage is obtained from R3, which also supplies screen V1. C18 is for decoupling.

**Signal rectification.** Secondary of IFT2 applies the modulated IF signal to the detector diode of V3. R8, the volume control, is also the diode load. R9, C20, and the capacity of screened load to PU socket, form an IF filter.

**Automatic volume control.** The diode is fed via R11 from the secondary of IFT2. Diode load resistance consists of R11, R9 and R8 to chassis.

**Output stage** uses a beam tetrode V4 operated under class A conditions and with a degree of negative feedback. Signal is applied to grid via C22. R14, a potentiometer, functions as grid resistor, and the variable tap, with capacitor C23, acts as a tone control. R13 provides cathode bias

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READINGS ON MODEL 7 AVO

TOP CAP GRID

TOP CAP GRID

TOP CAP GRID

## INDUCTORS

L	Ohms
1	.35
2	.15
3	.4
4	.2
5	.27
6	.15
7	.15
8	very low
9	.2
10	very low
11	4.3
12	9.2
13	5.15
14	5.15
15	5.15
16	5.15
17	425 (tap 23)
18	very low
19	2.75
20	very low
21	200
22	very low
23	total 21.5

## CAPACITORS

C	Mfd
1	.005 tubular 500v
2	.002 tubular 500v
4	400 pf silver mica
5	140 pf silver mica
6	150 pf silver mica
7	150 pf silver mica
8	.02 tubular 500 v
9	.430 pf silver mica
10	100 pf silver mica
11	330 pf silver mica
12	.02 tubular 500 v
13	.230 pf silver mica
14	400 pf silver mica
15	90 pf silver mica
16	150 pf silver mica
17	150 pf silver mica
18	.02 tubular 500 v
20	100 pf silver mica
21	.01 tubular 500 v
22	.01 tubular 500 v
23	.005 tubular 500 v
25	24 electrolytic
26	16 350 v
27	.50 pf ceramic

## RESISTANCES

R	Ohms	Watts
1	2.2 K	1/4 W
2	10 K	1/4 W
3	10 K	1/4 W
4	330	1/4 W
5	50 K	1/4 W
6	47 K	1/4 W
7	100	1/4 W
8	500 K Potentiometer	1/4 W
9	50 K	1/4 W
10	10 Meg	1/4 W
11	680 K	1/4 W
12	220 K	1/4 W
13	240	1/4 W
14	500 K Potentiometer	1/4 W
15	4.7 K	2 Watt

NVHR

# K-B BR20—Contd.

and, being undecoupled, introduces negative feed-back.

Anode circuit of V4 includes the primary of OPI, the speaker matching transformer. The primary is tapped 23 ohms down, and the main HT line fed in at this point. The top end of the winding is taken to R15, and thence to anodes V1—V3. This arrangement is called a "humbucking" circuit by the manufacturers.

The HT supply is resistance-capacity smoothed by R15, C25 and C26.

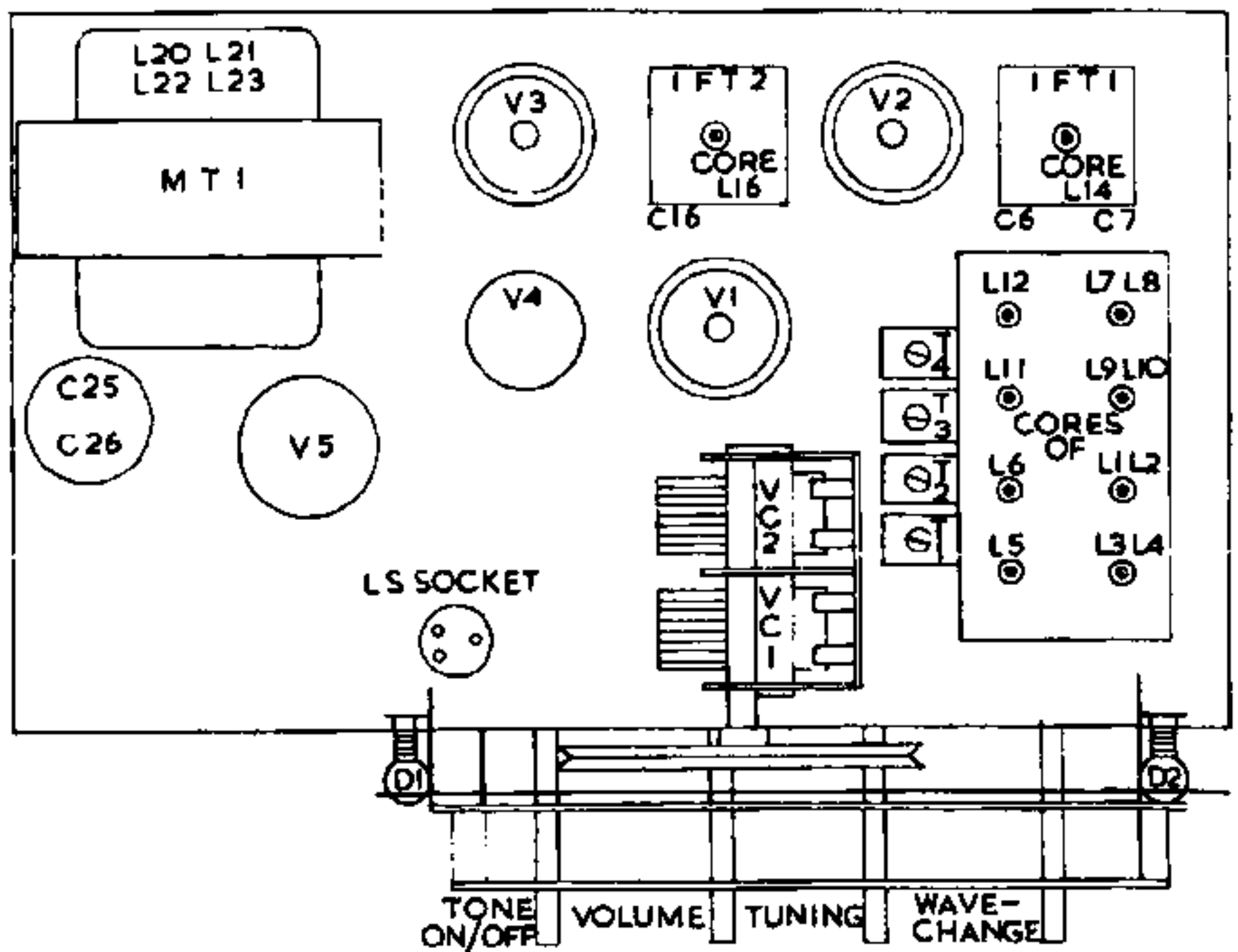
**Heaters.** V1-V4 and dial lights are supplied from L22. The lamps are taken off a 4.5V tap on L22. The primary of MT1 is tapped to allow connection of input voltages of 100 to 160 and 190 to 250 volts AC, 40-60 c.s.

S5, which is ganged to the tone control, is the mains on/off switch.

### Removal of chassis.

1. Do *not* remove knobs.
2. Remove back two moulded feet on underside of cabinet.
3. Remove back of cabinet.

4. Unfasten connection to plate aerial.
5. Withdraw chassis complete with dial plate and knobs.
6. Remove LS plug to withdraw chassis without LS.



## TRIMMING INSTRUCTIONS

Apply Signal as Stated Below.	Tune Receiver to (metres).	Trim in Order stated for Max. Output.
(1) 470 Kc to top cap V1 via .1 capacitor	—	L16, L15, L14, and L13
(2) 600 Kc to Ae. socket via dummy aerial	500 Metres	Core of L11, L5
(3) 1.4 Mc as above	214 Metres	T3, T1
(4) 175 Kc as above	1,714 Metres	Core of L12, L6

(5) 350 Kc as above	856 Metres	T4, T2
(6) 600 Kc as above	500 Metres	} Check and repeat (2) and (3) if necessary
(7) 1.4 Mc as above	214 Metres	
(8) 9.6 Mc. to Ae Socket via 400 ohms non-inductive resistor	9.6 Mcs.	Core of L9-10, L3-4
(9) 15.3 Mc. as above	15.3 Mc.	Core of L7-8, L1-2

