



CONDENSERS		Values (μF)
C1	Mains isolating condenser...	0.007
C2	Aerial SW fixed trimmer...	0.000015
C3	V1 Heptode CG condenser...	0.0005
C4	1st IF transformer tuning...	0.000139
C5	condensers	0.00015
C6	V1 osc. CG condenser	0.0002
C7	V1 cathode by-pass	0.05
C8	AVC line decoupling	0.05
C9	Osc. circuit MW tracker	0.0007
C10	V1 osc. anode coupling	0.0001
C11	V1, V2 SG's decoupling	0.05
C12	2nd IF transformer tuning...	0.000139
C13	condensers	0.00015
C14	IF by-pass	0.0002
C15	AF coupling to V3 triode	0.025
C16	V3 triode CG decoupling	0.1
C17	V3 triode to V4 coupling	0.025
C18	Fixed tone corrector	0.02
C19*	HT smoothing condensers	32.0
C20*		32.0
C21	Mains RF by-pass	0.04
C22†	Aerial circ. MW trimmer	0.000035
C23†	Aerial circuit tuning	—
C24†	Aerial circ. SW trimmer	—
C25†	Osc. circuit MW trimmer	0.000035
C26†	Oscillator circuit tuning	—
C27†	Osc. circuit SW trimmer	—

\* Electrolytic. † Variable. ‡ Pre-set.

## VALVE ANALYSIS

Valve voltages and currents given in the table (col. 3) are those measured in our receiver when it was operating on mains of 234 V, using the 220-230 V tapping on the mains resistance. The receiver was tuned to the lowest wavelength on the MW band and the volume control was at maximum; there was no signal input.

Voltages were measured on the 400 V scale of a model 7 Universal Avometer, chassis being negative.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 TH233	{ 107 66 66 } Oscillator	{ 1.4 4.2 4.2 }	107	4.3
V2 VP133	143	2.9	107	0.5
V3 HL133DD	64	0.6	—	—
V4 Pen 383	130	45.0	143	8.9
V5 U493	215†	—	—	—

† Cathode to chassis, DC.

## GENERAL NOTES

**Switches.**—S1-S10 are the waveband switches, in a single rotary unit beneath the chassis. It is indicated in our under-chassis view, and shown in detail in the top left-hand corner of the circuit diagram. S1, S3, S5, S7 and S9 are closed on SW and open on MW; S2, S4, S6, S8, S10 are closed on MW and open on SW.

S11, S12 are the QMB mains switches, ganged with the volume control R10.

**Coils.**—L1-L4 are the aerial coils in two unscreened units on the chassis deck, and L5-L8 two oscillator units beneath the

chassis. All have adjustable cores, and the adjustments are indicated in our under-chassis view.

The IF transformers L9, L10; L11, L12 are in two screened units on the chassis deck with their fixed tuning condensers. Their iron-dust core adjustments are approximately indicated in our plan view.

**Pilot Lamp.**—This is an Osram MES type, rated at 3.5 V, 0.15 A, with a clear spherical bulb. It is mounted with its shunt R18 on a removable paxolin holder.

**External Speaker.**—Two sockets are provided at the rear of the chassis for a low impedance (4-8 Ω) external speaker. The sockets are in metallic contact with the earth socket, and are isolated from the mains.

**Condensers C19, C20.**—In our chassis, these two electrolytics were both 32 μF condensers in a single rectangular carton. Their positive leads were red, and the common negative black. Originally, two 16 μF condensers were employed, and they were in a tubular cardboard container which lay horizontally beneath the chassis at right-angles to the block in our under-chassis view, so that one end projected through the front chassis member, upon which it was mounted below T1.

**Chassis Divergencies.**—Several changes from the original design were incorporated in our chassis, and others have been introduced since our chassis was made. Originally, C18 was 0.025 μF, C1 was 0.01 μF, and C2 was 0.00001 μF. The pilot lamp and R18 were omitted.

In chassis later than ours, R2 and C7 may be deleted, and fixed GB for V1 and V2 is obtained via the AVC line by "splitting" the chassis line between V1, V2 and V3, V4 and inserting an 80 Ω resistance in the gap. C1 may go to the chassis end of the mains instead of directly to chassis. C11 may be 0.005 μF, as may also C15 and C17. R14 may be 1,000,000 Ω.

RESISTANCES		Values (ohms)
R1	V1 Heptode CG resistance	1,000,000
R2	V1 fixed GB resistance	300
R3	V1 osc. CG resistance	22,000
R4	SW reaction damping	47
R5	MW reaction damping	470
R6	V1 osc. anode HT feed	15,000
R7	V1, V2 HT feed resistance	5,100*
R8	AVC line decoupling	2,200,000
R9	V3 signal diode load	470,000
R10	Manual volume control	1,000,000
R11	V3 triode CG decoupling	1,500,000
R12	V3 triode grid stopper	270,000
R13	V3 triode anode load	47,000
R14	V4 CG resistance	470,000
R15	V4 grid stopper	47,000
R16	V3 triode V4 GB resistance	140
R17	V3 triode and V4 GB	20†
R18	Pilot lamp shunt	15
R19	V5 anode surge limiter	47
R20	Heater circuit ballast	574‡

\* Approx. 12,000 Ω + 9,000 Ω in parallel.

† Two 40 Ω resistances in parallel.

‡ Tapped at 405 Ω + 84.5 Ω + 84.5 Ω from V5 heater.

## CIRCUIT ALIGNMENT

**IF Stages.**—Unless an oscilloscope is used, it is essential to damp the transformer primary while trimming the secondary, and vice versa. The damping shunt could consist of a 50,000 Ω resistance and a 0.05 μF condenser in series. Connect signal generator to control grid (top cap) of V2 and chassis via a 0.1 μF condenser, and turn volume control to maximum.

Connect damping shunt between V2 anode and chassis, feed in a 465 KC/S (645.16 m) signal, and adjust the core of L12 for maximum output. Transfer top of shunt to pin 7 of V3, and adjust L11 for maximum. Transfer signal generator lead to V1 top cap, and top of shunt to V1 heptode anode; adjust core of L10 for maximum output. Transfer top of shunt to control grid of V2, and adjust L9 for maximum output.

**RF and Oscillator Stages.**—With the gang at maximum, the pointer should cover the vertical lines at the right-hand ends of the tuning scales. Connect signal generator to A and E sockets via a suitable dummy aerial, which should be 400 Ω for the SW band.

**SW.**—Switch set to SW, tune to 49 m on scale, feed in a 49 m (6.2 MC/S) signal and adjust L7 core to correct calibration errors, then L3 for maximum output. Tune to 17 m on scale, feed in a 17 m (17.6 MC/S) signal, and adjust C27, then C24, for maximum output. Repeat the 49 m and 17 m adjustments for optimum results.

**MW.**—Switch set to MW, tune to 500 m on scale, feed in a 500 m (600 KC/S) signal, and adjust L8 core to correct calibration, then L4 for maximum output. Tune to 200 m on scale, feed in a 200 m (1,500 KC/S) signal, and adjust C25, then C22, for maximum output. Repeat the 500 m and 200 m adjustments for optimum results.

OTHER COMPONENTS		Approx. Values (ohms)
L1	Aerial SW coupling coil	0.15
L2	Aerial MW coupling coil	0.6
L3	Aerial SW tuning coil	Very low
L4	Aerial MW tuning coil	2.3
L5	Oscillator SW reaction	0.05
L6	Oscillator MW reaction	0.8
L7	Osc. circ. SW tuning coil	Very low
L8	Osc. circ. MW tuning coil	1.3
L9	1st IF trans. { Pri. ...	6.0
L10		6.0
L11	2nd IF trans. { Sec. ...	6.0
L12		6.0
L13	Speaker speech coil	4.0
L14	Hum neutralising coil	0.1
L15	Speaker field coil	900.0
T1	Output { Pri. ...	270.0
		1.2
S1-S10	Waveband switches	—
S11, S12	Mains switches, ganged R10	—

Intermediate frequency 465 KC/S.