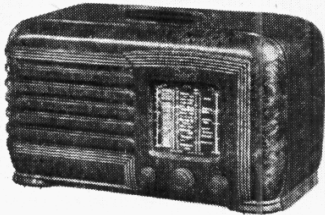


"TRADER" SERVICE SHEET

810

PILOT MAJOR MAESTRO
THREE-BAND A.C./D.C. SUPERHET



THE post-war A.C./D.C. 3-band Pilot Major Maestro is a 4-valve (plus rectifier) superhet designed to operate from A.C. or D.C. mains of 200-250V, 40-100 c/s in the case of A.C. The S.W. range is 13-51 m. The L.W. band distinguishes this model from the pre-war version, which had only S.W. and M.W. bands and was covered by Service Sheet 479.

Release date and original price: November, 1946; £14 14s plus £3 3s 3d purchase tax.

CIRCUIT DESCRIPTION

On S.W., aerial input is via coupling coil L1 to single tuned circuit L3, C25, S1 being closed; on M.W. and L.W., S1 opens, and input is then obtained from the common coupling coil L2, and the capacitive potential divider C2, C3 which provides "bottom" coupling, to single tuned circuits L4, C25 (M.W.) and L5, C25 (L.W.).

First valve (V1, Brimar 6K8G) is a triode hexode operating as frequency changer with electron coupling. Oscillator grid coils L6 (S.W.), L7 (M.W.), and L8 (L.W.) are tuned by C26. Parallel trimming by C27 (S.W.), C28

(M.W.) and C29 (L.W.); series tracking by C6 (S.W.), C30 (M.W.) and C31 (L.W.).

Reaction coupling from anode, via C7, is obtained from the common impedance of trackers on S.W. and M.W., with additional inductive coupling on S.W. by L9. On L.W., inductive coupling by L10 only is used.

Second valve (V2, Brimar 6K7G) is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned-primary, tuned secondary transformer couplings C32, L11, L12, C33 and C34, L13, L14, C35.

Intermediate frequency 451 kc/s.

Diode detector is part of double diode triode valve (V3, Brimar 6Q7G), the diode sections of which are strapped in parallel. Audio frequency component in rectified output is developed across manual volume control R9, which also acts as diode load resistor, and passed via A.F. coupling capacitor C13 to C.G. of triode section, which operates as A.F. amplifier. I.F. filtering by C10 in diode circuit and C14 in triode anode circuit. Provision for connection of a gramophone pick-up across R9, via isolating capacitor C12.

D.C. potential developed across R9 is tapped off and fed back via decoupling circuits as G.B. to F.C. (except on S.W.) and I.F. valves, giving automatic volume control.

Resistance-capacitance coupling by R11, C15 and R12 between V3 triode and pentode output valve (V4, Brimar 25A6G). Fixed tone correction by C16 in anode circuit. Provision is made for the connection of a low-impedance external speaker across the secondary winding of T1.

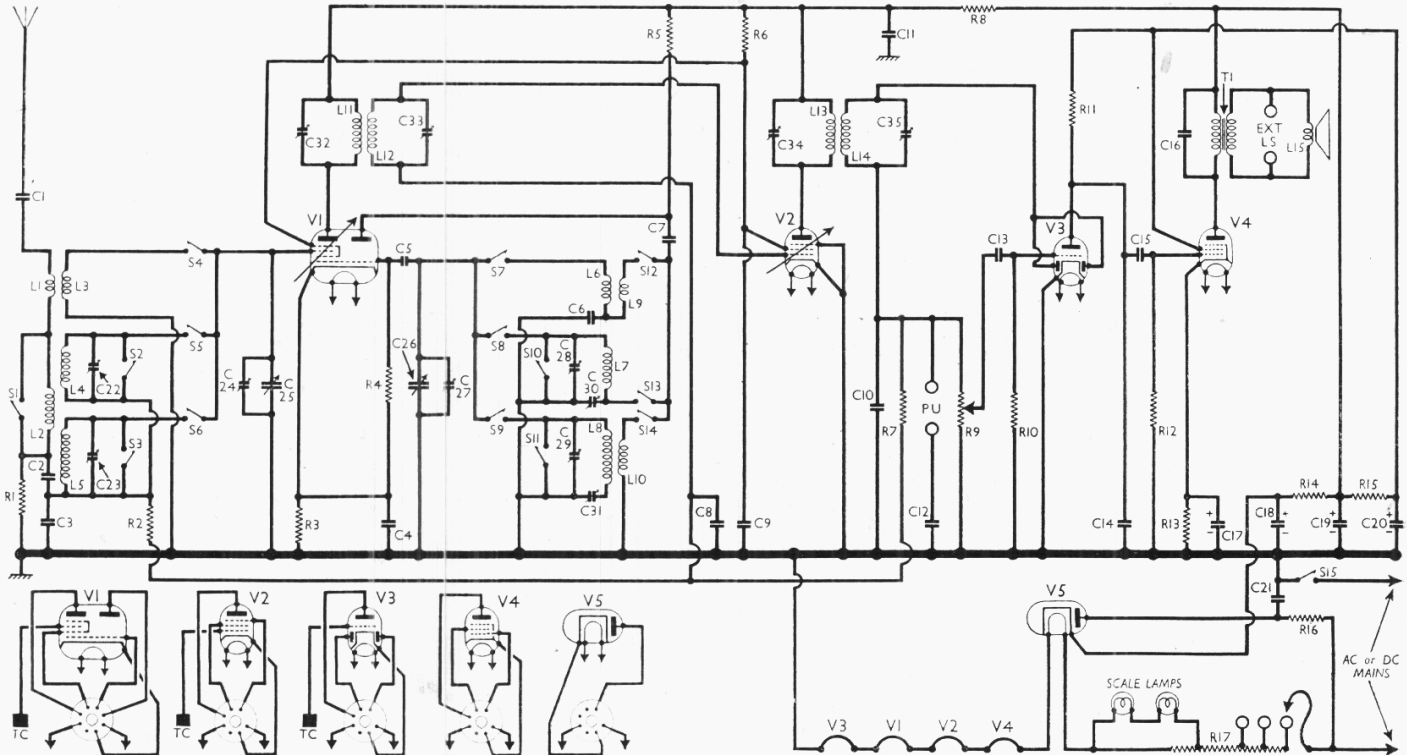
When the receiver is operated from A.C. mains, H.T. current is supplied by half-wave rectifying valve (V5, Brimar 25Z4G) which, with D.C. mains, behaves as a low resistance. Smoothing is effected by resistors R14, R15 and electrolytic capacitors C18, C19 and C20.

Valve heaters, together with scale lamps and adjustable ballast resistor R17, are connected in series across mains input. Mains R.F. filtering by C21.

COMPONENTS AND VALUES

CAPACITORS		Values (μF)
C1	Aerial isolator	0-001
C2	Aerial M.W. coupling cap.	0-02
C3	V1 acitors	0-002
C4	V1 cathode by-pass	0-05
C5	V1 osc. C.G. capacitor	0-00006
C6	Osc. circ. S.W. tracker	0-0006
C7	V1 osc. anode coupling	0-0001
C8	V2 C.G. decoupling	0-1
C9	V1, V2 S.G.'s decoupling	0-1
C10	I.F. by-pass capacitor	0-0001
C11	V1, V2 H.T. decoupling	0-1
C12	Pick-up isolator	0-02
C13	A.F. coupling to V3 C.G.	0-002
C14	I.F. by-pass capacitor	0-0003
C15	A.F. coupling to V4 C.G.	0-01
C16	Fixed tone corrector	0-01
C17*	V4 cathode by-pass	25-0
C18*		16-0
C19*	H.T. smoothing capacitors	16-0
C20*		8-0
C21	Mains R.F. by-pass	0-05
C22‡	Aerial circ. M.W. trimmer	0-00005
C23‡	Aerial circ. L.W. trimmer	0-0001
C24‡	Aerial circ. S.W. trimmer	0-00003
C25†	Aerial circuit tuning	0-000528
C26†	Oscillator circuit tuning	0-000528
C27†	Osc. circ. S.W. trimmer	0-00003
C28‡	Osc. circ. M.W. trimmer	0-00005
C29‡	Osc. circ. L.W. trimmer	0-0001
C30‡	Osc. circ. M.W. tracker	0-0007
C31‡	Osc. circ. L.W. tracker	0-0003
C32‡	1st I.F. trans. pri. tuning	—
C33‡	1st I.F. trans. sec. tuning	—
C34‡	2nd I.F. trans. pri. tuning	—
C35‡	2nd I.F. trans. sec. tuning	—

* Electrolytic. † Variable. ‡ Pre-set.



Circuit diagram of the Major Maestro 3-band A.C./D.C. superhet. V5 holder is wired to accept either a 25Z4 or 25Z6 rectifier.

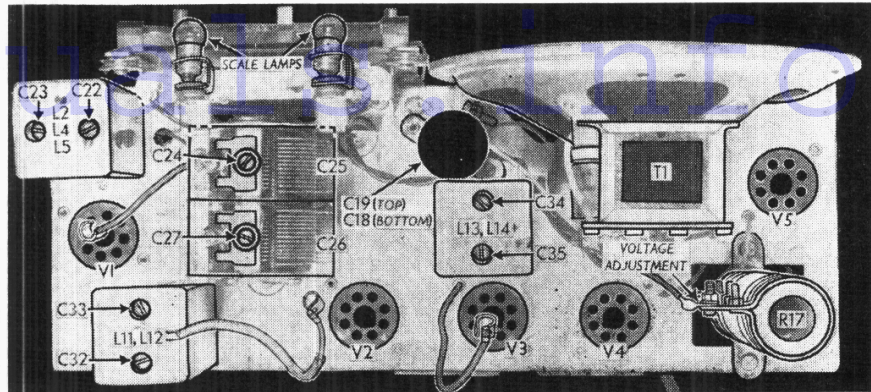
RESISTORS		Values (ohms)
R1	Aerial circuit shunt	1,000
R2	V1 hex. C.G. decoupling	100,000
R3	V1 fixed G.B. resistor	220
R4	V1 osc. C.G. resistor	47,000
R5	V1 osc. anode H.T. feed	22,000
R6	V1, V2 S.G.'s H.T. feed	6,800
R7	A.V.C. line decoupling	1,000,000
R8	V1, V2 H.T. decoupling	1,000
R9	Manual volume control	500,000
R10	V3 triode C.G. resistor	10,000,000
R11	V3 triode anode load	270,000
R12	V4 C.G. resistor	270,000
R13	V4 G.B. resistor	470
R14	} H.T. smoothing resistors {	1,000
R15		22,000
R16		V5 anode surge limiter
R17	Heater ballast resistor	625*

* Tapped at 150 Ω + 375 Ω + 50 Ω + 50 Ω from V5 heater.

OTHER COMPONENTS		Approx. Values (ohms)
L1	Aerial S.W. coupling coil	0.3
L2	Aerial M.W. and L.W. coupling coil	2.9
L3	Aerial S.W. tuning coil	Very low
L4	Aerial M.W. tuning coil	3.0
L5	Aerial L.W. tuning coil	13.5
L6	Osc. S.W. tuning coil	Very low
L7	Osc. M.W. tuning coil	3.7
L8	Osc. L.W. tuning coil	7.0
L9	Osc. S.W. reaction coil	0.3
L10	Osc. L.W. reaction coil	100.0
L11	} 1st I.F. trans. {	Pri. ... 10.0
L12		Sec. ... 10.0
L13	} 2nd I.F. trans. {	Pri. ... 10.0
L14		Sec. ... 10.0
L15	Speaker speech coil	3.0
T1	Output trans. {	Pri. ... 450.0
	Sec. ... 0.4	
S1-S14	Waveband switches	—
S15	Mains switch, ganged R9	—

Switch Table

Switch	S.W.	M.W.	L.W.
S1	C	—	—
S2	C	—	—
S3	C	C	—
S4	C	—	—
S5	—	C	—
S6	—	—	C
S7	C	—	—
S8	C	C	—
S9	—	—	C
S10	C	—	—
S11	C	C	—
S12	C	—	—
S13	—	C	—
S14	—	—	C



Plan view of the chassis. C18, C19 is a double unit with a positive connection at each end. C22 and C23 may be transposed, according to which way round the can is fitted.

GENERAL NOTES

Switches.—S1-S14 are the waveband switches ganged in a single rotary unit beneath the chassis. This unit is indicated in our under-chassis view, and shown in detail in the diagram below, where it is drawn as seen from the rear of an inverted chassis. The table

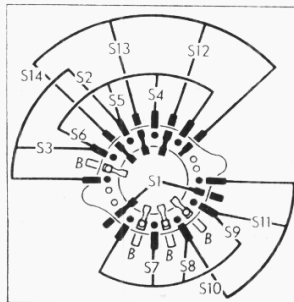


Diagram of the waveband switch unit seen from the rear of an inverted chassis. B indicates blank tags.

(col. 1) gives the switch positions for the three control settings, starting from the fully anti-clockwise position of the control knob. A dash indicates open, and C, closed.

S15 is the Q.M.B. mains switch, ganged with the volume control R9.

Scale Lamps.—These are two Osram M.E.S. types, with small clear spherical bulbs, rated at 6.5V, 0.3A. They are shunted by a 150Ω section of the heater ballast resistor R17.

External Speaker.—Two sockets are provided

at the rear of the chassis for the connection of a low impedance (about 3.6 Ω) external speaker.

Capacitors C18, C19, C20.—C18 and C19 are in a single tubular metal container mounted on the chassis deck, with a positive lead at each end, the case forming the common negative connection. Both are rated at 16 μF, 350 V D.C. working, 130 mA A.C. max. Ours was a Dubilier "Drylitic." C20 was a Plessey rated at 8 μF, 200 V working, in a cardboard tubular case.

Chassis Divergencies.—R8 and C11 were inserted during the production run, and may not be present in early chassis. The L2, L4, L5 can may be fitted either way round, so that C22 and C23 may be transposed.

CIRCUIT ALIGNMENT

I.F. Stages.—Connect signal generator via a 0.1 μF capacitor in each lead to control grid (top cap) of V1 and chassis. Feed in a 451 kc/s (665.18 m) signal, and adjust C32, C33, C34 and C35 for maximum output. Repeat these adjustments.

R.F. and Oscillator Stages.—With gang at maximum, pointer should coincide with the lower ends of the scales. Connect signal generator to aerial side of C1 and, via a 0.1 μF capacitor, to chassis.

S.W.—Switch set to S.W., tune to 15 m on scale, feed in a 15 m (20 Mc/s) signal, and adjust C27, then C24, 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 C28, then C22, 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.

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 C29, then C23, for maximum output. Feed in a 2,000 m (150 kc/s) signal, tune it in, and adjust C31 for maximum output, while rocking the gang for optimum results.

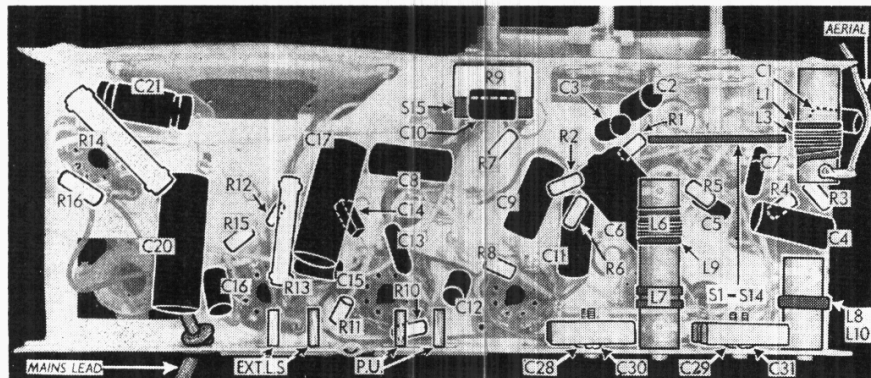
VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on A.C. mains of 224 V, using the 215-235 V tapping on the heater ballast resistor. The receiver was tuned to the lowest wavelength on the M.W. band, and the volume control was at maximum, but there was no signal input.

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

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 6K8GT	150	2.65	102	5.7
	Oscillator			
	72	4.0		
V2 6K7G	150	12.0	102	2.8
V3 6Q7G	35	0.2	—	—
V4 25A6G	162	26.5	100	4.0
V5 25Z4G†	—	—	—	—

† Cathode to chassis, 232 v, D.C.



Under-chassis view, in which the position of the waveband switch S1-S14 is indicated. If the leads to C30 are twisted together they should not be disturbed.