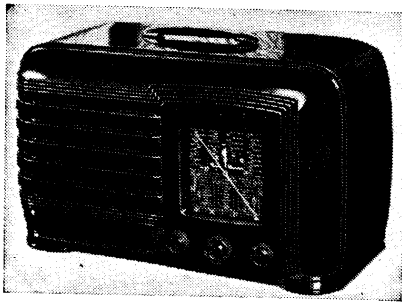


"TRADER" SERVICE SHEET

479

PILOT MAJOR MAESTRO

2-BAND AC/DC SUPERHET



THE Pilot Major Maestro receiver is a 4-valve (plus valve rectifier) AC/DC 2-band superhet, covering the MW and one SW band (17-54 m.). It has a moulded cabinet, a permanently attached aerial, and the standard model is suitable for 200-250 V AC or DC mains. A 110V model is also available.

Release date: March, 1940.

CIRCUIT DESCRIPTION

Aerial input via coupling coils L1 (SW), L2 (MW) and C2 to single tuned circuits L3, C20 (SW) and L4, C20 (MW), which precede heptode valve (V1, Brimar 6A8G) operating as frequency changer with electron coupling.

Oscillator grid coils L5 (SW) and L6 (MW) are tuned by C22; parallel trimming by C23 (SW) and C24 (MW); series tracking by C6 (SW) and C25 (MW). Reaction by coils L7 (SW) and L8 (MW).

Second valve (V2, Brimar 6K7G) is a variable-mu RF pentode operating as IF amplifier with tuned-primary, tuned secondary transformer couplings C26, L9, L10, C27 and C28, L11, L12, C29.

Intermediate frequency 451 KC/S.

Diode second detector is part of double diode triode valve (V3, Brimar 6Q7G). Audio frequency component is developed across manual volume control R7 and passed via AF coupling condenser C11 to CG of triode section. IF filtering by C9, R5 and C10.

DC potential across R5, R7 is fed via R6 and V3 AVC diode back as GB to FC and IF valves, giving AVC.

Resistance-capacity coupling by R9, C12 and R10 between V3 triode and pentode output valve (V4, Brimar 25A6G). Fixed tone correction by C14 in anode circuit.

When the receiver is used with AC mains, HT current is supplied by rectifying valve (V5, Brimar 25Z6G), which with DC mains behaves as a low resistance. Smoothing by speaker field L15, electrolytic condensers C15, C16 and C17 and R12.

Valve heaters, together with ballast resistance R13 and scale lamps, are connected in series across mains input.

DISMANTLING THE SET

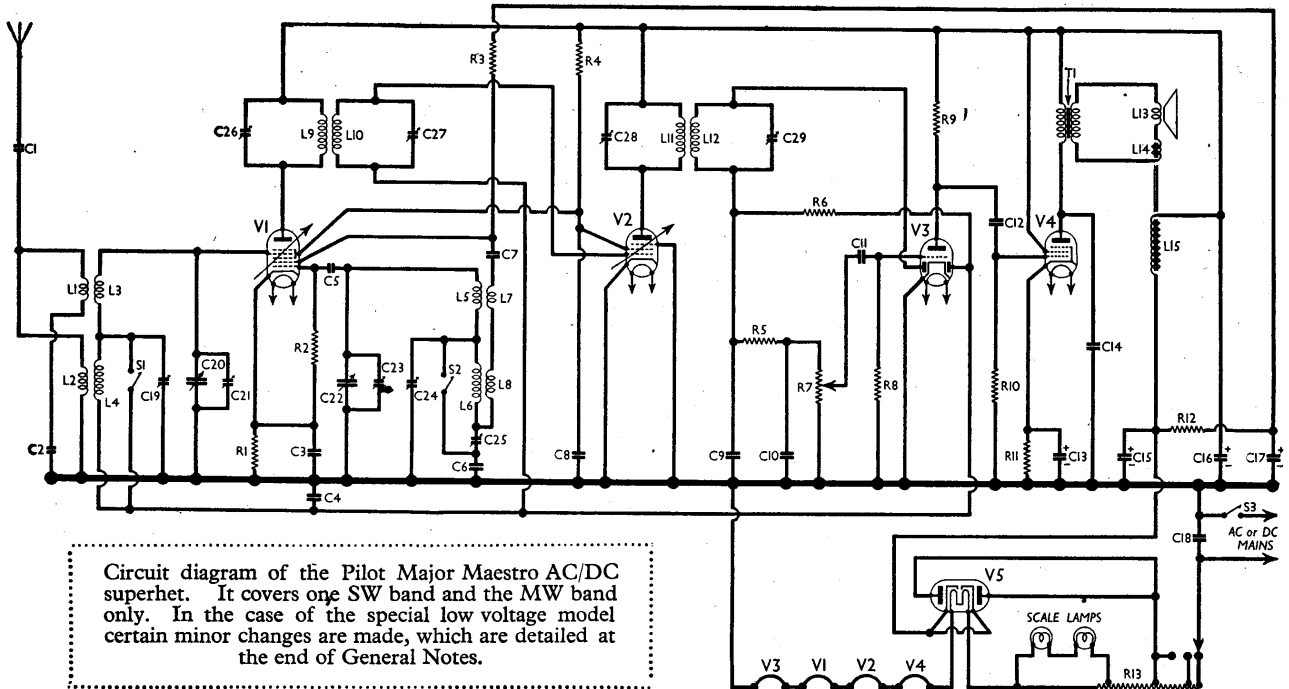
Removing Chassis.—Remove the three control knobs (pull-off); remove the three screws (with washers) holding the chassis to the bottom of the cabinet.

COMPONENTS AND VALUES

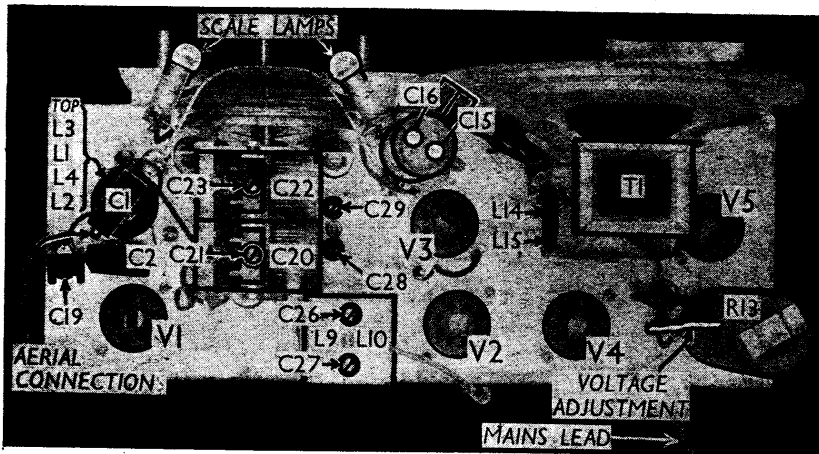
RESISTANCES		Values (ohms)
R1	V1 fixed GB resistance ...	220
R2	V1 osc. CG resistance ...	39,000
R3	Part V1 osc. anode HT feed ...	22,000
R4	V1, V2 SG's HT feed ...	22,000
R5	IF stopper ...	35,000
R6	AVC line feed resistance ...	1,000,000
R7	Manual volume control; V3 signal diode load ...	1,000,000
R8	V3 triode CG resistance ...	9,500,000
R9	V3 triode anode load ...	100,000
R10	V4 CG resistance ...	270,000
R11	V4 GB resistance ...	470
R12	Part V1 osc. anode HT feed ...	10,000
R13	Heater circuit ballast ...	660*

*Tapped at 150 O + 360 O + 120 O + 30 O from V5 heater end.

CONDENSERS		Values (μF)
C1	Aerial isolating condenser...	0-00006
C2	Aerial SW coupling condenser ...	0-00006
C3	V1 cathode by-pass ...	0-025
C4	AVC line decoupling ...	0-04
C5	V1 osc. CG condenser ...	0-00006
C6	Osc. circuit SW tracker ...	0-006
C7	V1 osc. anode coupling ...	0-00015
C8	V1, V2 SG's decoupling ...	0-05
C9	IF by-pass condensers ...	0-00015
C10		0-00015
C11	AF coupling to V3 triode ...	0-004
C12	V3 triode to V4 AF coupling ...	0-025
C13*	V4 cathode by-pass ...	25-0
C14	Fixed tone corrector ...	0-01
C15*	HT smoothing condensers...	20-0
C16*		20-0
C17*		8-0



Circuit diagram of the Pilot Major Maestro AC/DC superhet. It covers one SW band and the MW band only. In the case of the special low voltage model certain minor changes are made, which are detailed at the end of General Notes.



Plan view of the chassis. Note the double condenser C15, C16. Its negative connection is beneath the chassis. R13 is the tapped ballast resistor. The aerial is connected to one side of C1.

CONDENSERS (continued)		Values (μF)
C18	Mains RF by-pass ...	0.1
C19†	Aerial circuit MW trimmer ...	0.00003
C20†	Aerial circuit tuning ...	—
C21†	Aerial circuit SW trimmer ...	0.00003
C22†	Oscillator circuit tuning ...	—
C23†	Osc. circuit SW trimmer ...	0.00003
C24†	Osc. circuit MW trimmer ...	0.000025
C25†	Osc. circuit MW tracker ...	0.00065
C26†	1st IF trans. pri. tuning ...	—
C27†	1st IF trans. sec. tuning ...	—
C28†	2nd IF trans. pri. tuning ...	—
C29†	2nd IF trans. sec. tuning ...	—

*Electrolytic. †Variable. ‡Pre-set.

OTHER COMPONENTS		Approx. Values (ohms)
L1	Aerial SW coupling coil ...	2.2
L2	Aerial MW coupling coil ...	16.0
L3	Aerial SW tuning coil ...	Very low
L4	Aerial MW tuning coil ...	2.7
L5	Osc. circuit SW tuning coil ...	Very low
L6	Osc. circuit MW tuning coil ...	2.5
L7	Oscillator SW reaction coil ...	0.2
L8	Oscillator MW reaction coil ...	0.2
L9	1st IF trans. Pri. ...	9.0
L10	1st IF trans. Sec. ...	9.0
L11	2nd IF trans. Pri. ...	30.0
L12	2nd IF trans. Sec. ...	30.0
L13	Speaker speech coil ...	2.5
L14	Hum neutralising coil ...	0.1
L15	Speaker field coil ...	1,000.0
T1	Speaker input trans. (Pri. ...)	450.0
	Sec. ...	0.5
S1, S2	Waveband switches ...	—
S3	Mains switch, ganged R7 ...	—

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on our AC mains of 235V, using the top tapping on the mains resistance. The receiver was tuned to the lowest wavelength on the MW band and the volume

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 6A8G	130	2.0	51	2.6
	55	3.2		
V2 6K7G	130	3.8	51	0.9
V3 6Q7G	55	0.6	—	—
V4 25A6G	115	34.0	130	7.8
V5 25Z6G	185†	—	—	—

† Cathode to chassis, DC.

control was at maximum, but there was signal input.

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

GENERAL NOTES

Switches.—S1, S2 are the waveband switches, in a rotary unit beneath the chassis. This is indicated in our under-chassis view, and a drawing is also inset in this view showing the tags of the two switches. Both are closed on SW, and open on MW.

S3 is the QMB mains switch, ganged with the volume control R7.

Coils.—L1-L4 are in an unscreened unit on the chassis deck; L5, L7 and L6, L8 are in two unscreened units beneath the chassis, while the second IF transformer L11, L12 is also unscreened, and beneath the chassis. The first IF transformer L9, L10 is in a screened unit on the chassis deck.

External Speaker.—No provision is made for this, but a low resistance (about 30) type could be connected across the speech coil of the internal speaker.

Scale Lamps.—These are two Ever Ready types with miniature bayonet cap bases, rated at 7.3V, 0.25A.

Condensers C15, C16.—These are two 20μF, 250V DC working dry electrolytics in a tubular carton mounted vertically in a clip on the chassis deck. The common negative connection is a tag reached from beneath the chassis. The positive tags are indicated in our plan chassis view.

Resistance R13.—This is the wire-wound ballast resistance mounted on the chassis deck. The tags from the lowest upwards are the connections from left to right on R13 in our circuit diagram.

Chassis Divergencies.—R1 is 2200, not 2000 as shown by the makers; C4 is 0.04μF, not 0.05μF; C11 is 0.004μF, not 0.005μF. C18 is from the unswitched side of the mains to chassis; in the maker's diagram it is from the anodes of V5 to chassis.

110V Model.—In the 110V model the place of the speaker field is taken by an iron-cored choke; the speaker field is then connected from the cathode of V5 to chassis. The resistance of the field in this model is 2,500 O. R3 and R4 both become 10,000 O instead of 22,000 O; C7 becomes 0.0004μF instead of 0.00015μF; C17 becomes 40μF instead of 8μF, and R13 has a total resistance of 215 O instead of 660 O.

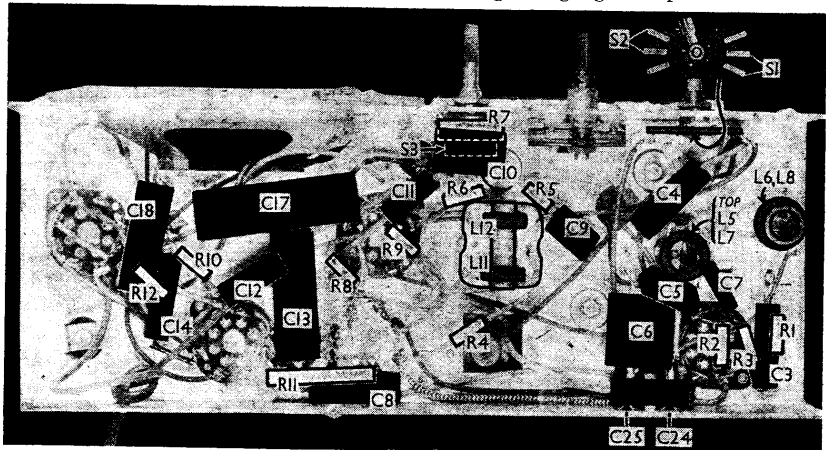
CIRCUIT ALIGNMENT

IF Stages.—Connect signal generator, via a 0.1μF condenser, to control grid (top cap) of V1, and, via another 0.1μF condenser, to chassis. Feed in a 451 KC/S signal, and adjust C29, C28, C27 and C26 in turn for maximum output. Repeat these adjustments.

RF and Oscillator Stages.—With gang at maximum, pointer should be horizontal. Connect signal generator to aerial side of C1 and, via a 0.1μF condenser, to chassis.

SW.—Switch set to SW, tune to 17 m on scale, feed in a 17 m (17.6 MC/S) signal, and adjust C23, then C21, for maximum output. C23 should be set to the peak involving the lesser trimmer capacity.

MW.—Switch set to MW, tune to 200 m on scale, feed in a 200 m (1,500 KC/S) signal, and adjust C24, then C19, for maximum output. Feed in a 500 m (600 KC/S) signal, tune it in, and adjust C25 for maximum output, while rocking the gang for optimum results.



Under-chassis view. A drawing of the switch unit is inset at the top right hand corner. C24 and C25 are adjustable through holes in the rear chassis member.