

"TRADER" SERVICE SHEET

985

PILOT JACK

Standard and Low-voltage A.C./D.C. Models

(M.W.) and L11, L12 (L.W.) are tuned by C35. Parallel trimming by C36 (S.W.), C37 (M.W.) and C8, C38 (L.W.). Series tracking by C9

(S.W.), C10 (M.W.) and C11 (L.W.). Inductive reaction coupling from cathode by coils L8 (S.W.), L10 (M.W.) and L12 (L.W.) which form a common impedance in series with the grid circuit to chassis.

Second valve (V2, Brimar 12BA6) is an R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings G4, L13, L14, C5 and C12, L15, L16, C13.

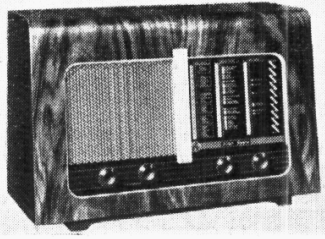
Intermediate frequency 470 kc/s.

Diode signal detector is part of double diode triode valve (V3, Brimar 12Q7GT).

Second diode of V3, fed from V2 anode via C16, provides D.C. potential, giving automatic gain control.

Resistance-capacitance coupling by R11, C22 and R13 between V3 triode and beam tetrode output valve (V4, Brimar 35L6GT), C22 being shunted by C23 on M.W. and L.W. bands. Tone correction by negative feedback on M.W. and L.W. between V4 and V3 anodes via S17 and R12, and between V4 anode and control grid circuit by C25, C26 and tone control R13.

H.T. current is supplied by I.H.C. half-wave rectifying valve (V5, Brimar 35Z4GT).



**A**N unusual oscillator reaction coupling circuit is used in the Pilot Jack receiver (Model T58) employing cathode injection, the normal tapping point on the tuning coil being occupied by the tracking capacitor.

The receiver is a 4-valve (plus rectifier) 3-band superhet, and the standard model is designed to operate from A.C. or D.C. mains of 200-250 V, 40-100 c/s in the case of A.C. Waveband ranges are 13-50 m, 180-550 m and 1,000-2,000 m.

The low-voltage model employs a similar chassis, the differences being explained overleaf. The A.C. model is covered in Service Sheet 986.

Release dates and original prices: Standard, January, 1950, £16 17s; Low-voltage, June, 1950, £17 5s 8d. Purchase tax extra.

CIRCUIT DESCRIPTION

Aerial input on S.W. by coupling coil L1 to single-tuned circuit L4, C34, which precedes heptode valve (V1, Brimar 12BE6) operating as frequency changer with electron coupling. On M.W. and L.W., input is from tuned frame aerials L5, C34 (M.W.) and L6, C34 (L.W.), although provision is made for the connection of an external aerial via frame aerial coupling coils L2 (M.W.) and L3 (L.W.).

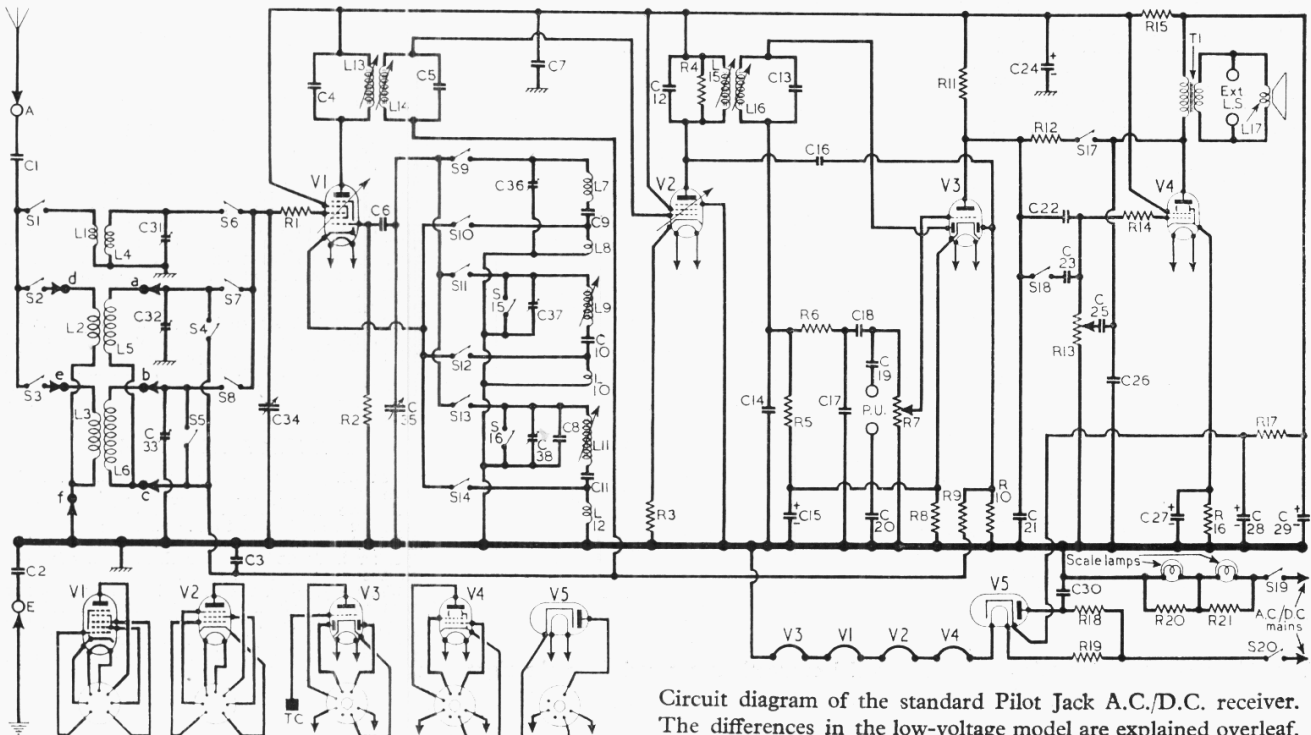
Oscillator grid coils L7, L8 (S.W.), L9, L10

COMPONENTS AND VALUES

CAPACITORS		Values	Locations
C1	Aerial series ...	500pF	H3
C2	Chassis isolator ...	0.002μF	H3
C3	A.G.C. decoupling ...	0.1μF	G4
C4	1st I.F. trans. {	100pF	B2
C5	tuning ... {	100pF	B2
C6	V1 osc. C.G. ...	100pF	H4
C7	H.T. decoupling ...	0.01μF	G4
C8	L.W. osc. trimmer ...	150pF	H4
C9	S.W. osc. tracker ...	0.006μF	H4
C10	M.W. osc. tracker ...	530pF	H4
C11	L.W. osc. tracker ...	225pF	H4
C12	2nd I.F. trans. {	100pF	C2
C13	tuning ... {	180pF	C2
C14	I.F. by-pass ...	100pF	F4
C15*	V3 G.B. by-pass ...	25μF	F4
C16	A.G.C. coupling ...	20pF	F4
C17	I.F. by-pass ...	100pF	F4
C18	A.F. coupling ...	0.01μF	F4
C19	...	0.02μF	F4
C20	P.U. isolators ...	0.02μF	F4
C21	I.F. by-pass ...	100pF	F4
C22	A.F. coupling ...	0.001μF	F3
C23	Tone corrector ...	0.01μF	G3
C24*	H.T. smoothing ...	8μF	G4
C25	Part tone control ...	500pF	F3
C26	Tone corrector ...	0.002μF	F3
C27*	V4 G.B. by-pass ...	25μF	E3
C28*	...	32μF	D1
C29*	H.T. smoothing ...	32μF	D1
C30	R.F. filter ...	0.05μF	E4
C31†	S.W. aerial trim. ...	50pF	H3
C32†	M.W. aerial trim. ...	50pF	H3
C33†	L.W. aerial trim. ...	50pF	H3
C34†	Aerial tuning ...	528pF	B1
C35†	Oscillator tuning ...	528pF	B2
C36†	S.W. osc. trimmer ...	50pF	H4
C37†	M.W. osc. trimmer ...	50pF	H4
C38†	L.W. osc. trimmer ...	50pF	H4

RESISTORS		Values	Locations
R1	V1 C.G. stopper ...	33Ω	G3
R2	V1 osc. C.G. ...	22kΩ	H4
R3	V2 G.B. ...	100Ω	G4
R4	L15 shunt ...	470kΩ	G4
R5	Diode load ...	270kΩ	F4
R6	I.F. stopper ...	47kΩ	F4
R7	Volume control ...	1MΩ	E3
R8	V3 G.B. ...	10kΩ	F4
R9	A.G.C. decoupling ...	1MΩ	F4
R10	A.G.C. diode load ...	1MΩ	F4
R11	V3 anode load ...	470kΩ	F4
R12	Tone corrector ...	2.2MΩ	E3
R13	Tone control ...	500kΩ	E3
R14	V4 C.G. stopper ...	4.7kΩ	F3
R15	H.T. smoothing ...	3.9kΩ	F3
R16	V4 G.B. ...	180Ω	F3
R17	H.T. smoothing ...	680Ω	E3
R18	Surge limiter ...	100Ω	F4
R19	Heater ballast ...	830Ω	D2
R20	...	100Ω	C1
R21	Scale lamp shunts {	100Ω	A1

\* Electrolytic. † Variable. ‡ Pre-set. § "Swing" value, min. to max.



Circuit diagram of the standard Pilot Jack A.C./D.C. receiver. The differences in the low-voltage model are explained overleaf.

OTHER COMPONENTS		Approx. Values (ohms)	Locations
L1	Aerial coupling coils	0.4	H3
L2		0.1	A2
L3		6.0	A1
L4		Very low	H3
L5	Aerial tuning coils	1.0	A2
L6		24.0	A1
L7	S.W. osc. tuning	Very low	H4
L8	S.W. reaction coil	Very low	H4
L9	M.W. osc. tuning	2.5	H4
L10	M.W. reaction coil	0.2	H4
L11	L.W. osc. tuning	12.0	H4
L12	L.W. reaction coil	0.6	H4
L13	1st I.F. trans.	Pri. 7.0	B2
L14		Sec. 7.0	B2
L15	2nd I.F. trans.	Pri. 7.0	C2
L16		Sec. 7.0	C2
L17	Speech coil	2.8	—
T1	Primary	0.5	—
	Secondary	430.0	—
S1-S16	Waveband switches	—	H3
S17, S18	Tone switches	—	H3
S19		—	H3
S20		Mains sw., g'd. R7	—

**VALVE ANALYSIS**

Voltages and currents given in the table below are those measured in our receiver when it was operating from A.C. mains of 220V. The volume control was turned to maximum and the set tuned to the high wavelength end of M.W., but there was no signal input.

Voltage measurements were made with an Avo Electronic Testmeter which introduces no appreciable voltage drop, and allowance must be made for the current drawn by other meters. In every case chassis was the negative connection.

Valve	Anode		Screen		Cath.
	V	mA	V	mA	
V1 12BE6 ...	96	3.6	96	6.4	—
V2 12BA6	96	3.0	96	7.0	1.1
V3 12Q7GT	60	0.12	—	—	1.2
V4 85L6GT	154	34.0	96	3.0	6.0
V5 85Z4GT	†210	—	—	—	220.0

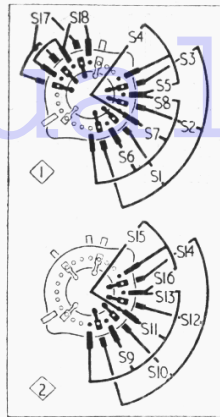
† A.C. volts

**GENERAL NOTES**

**Switches.**—S1-S18 are the waveband switches, ganged in two rotary units beneath the chassis. These are indicated in our under-chassis drawing, and shown in detail in the diagrams inset beside the plan illustration of the chassis.

The table (col. 2) 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.

**Scale Lamps.**—These are two small lamps, with large, clear spherical bulbs and M.E.S. bases, rated at 10 V, 0.2 A.



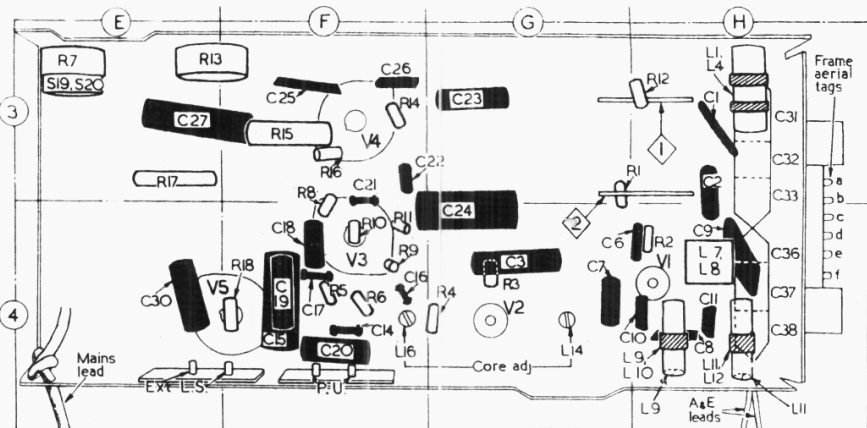
Above: Plan view of chassis.  
Left: Waveband switch diagrams.  
Below: Switch table.

Switch	S.W.	M.W.	L.W.
S1	—	—	—
S2	—	—	—
S3	—	—	—
S4	—	—	—
S5	—	—	—
S6	—	—	—
S7	—	—	—
S8	—	—	—
S9	—	—	—
S10	—	—	—
S11	—	—	—
S12	—	—	—
S13	—	—	—
S14	—	—	—
S15	—	—	—
S16	—	—	—
S17	—	—	—
S18	—	—	—

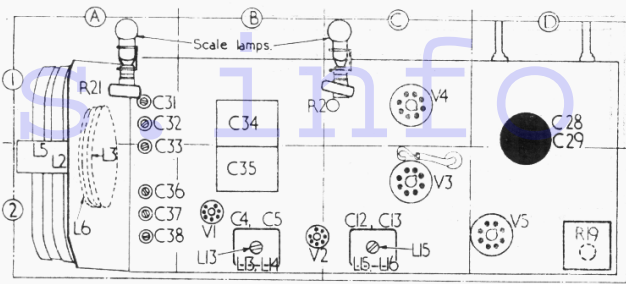
**External Speaker.**—Two sockets are provided at the rear of the chassis for the connection of a low impedance (about 3-4Ω) external speaker.

**Drive Cord Replacement.**—50 inches of fine gauge nylon braided glass yarn is required for a new tuning drive cord, which should be run as shown in the sketch in col. 3, where the system is viewed from the front, as though seen through the scale assembly upon the back of which it is mounted, with the gang at maximum capacitance. The cursor can be slipped on afterwards.

**Low-voltage Model.**—This receiver is fitted with a two-position switch, just beneath the ballast resistor R19, marked "100-120V" one way and "200-250V" the other. In the low-voltage position, R15, R18 and R19 are short-circuited; in the other position they are in circuit as in the standard model. The only other difference from the standard model is that R17 is replaced by an iron-cored smoothing choke.



Underside view of the chassis. The frame aerial connections are coded on the right.

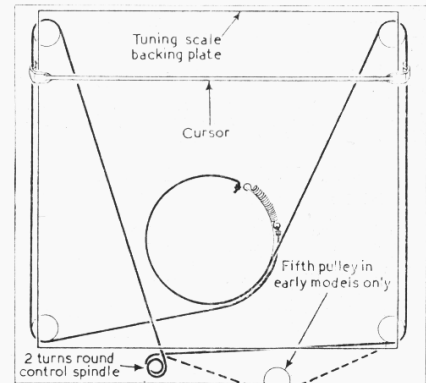


**CIRCUIT ALIGNMENT**

All the adjustments may be made with the chassis in the cabinet, the cores of L14, L16 being made accessible by removing the cabinet base cover, secured by six round-head screws. Before aligning the I.F. stages, the cores should be freed by melting the wax seals.

**I.F. Stages.**—Switch set to L.W., turn gang and volume control to maximum. Connect signal generator output, via a 0.1 μF capacitor in each lead, to control grid (pin 7) of V1 and chassis, feed in a 470 kc/s (638.3 m) signal and adjust the cores of L16 (location reference F4), L15 (C2), L14 (G4) and L13 (B2) for maximum output, reducing the input as the circuits come into line. Re-seal cores.

**R.F. and Oscillator Stages.**—Check that with the gang at maximum capacitance the cursor coincides with the highest wavelength ends of



The tuning drive, as seen from the front.

the tuning scale. The position of the cursor may be adjusted by sliding it up or down the drive cord. Transfer the signal generator leads, via a dummy aerial, to A and E sockets.

**S.W.**—Switch set to S.W., tune to 13.4 m on scale, feed in a 13.4 m (23 Mc/s) signal and adjust C36 (A2) and C31 (A1) for maximum output. Repeat these adjustments.

**M.W.**—Switch set to M.W., tune to 200 m on scale, feed in a 200 m (1,500 kc/s) signal and adjust C37 (A2) and C32 (A1) for maximum output. Tune to 500 m on scale, feed in a 500 m (600 kc/s) signal and adjust the core of L9 (H4) for maximum output. Repeat these adjustments.

**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 C38 (A2) and C33 (A1) for maximum output. Tune to 2,000 m on scale, feed in a 2,000 m (150 kc/s) signal and adjust the core of L11 (H4) for maximum output. Repeat these adjustments.

**DISMANTLING THE SET**

**Removing Chassis.**—Pull off four control knobs with felt washers from front of set;

Remove the three 2BA bolts with washers securing the chassis to the cabinet;

Withdraw the chassis to the extent of the speaker leads and unsolder them from the tags on the output transformer.

When replacing, the short chassis fixing screw goes to the left hand front corner of cabinet base, viewed from rear. Connect the speaker leads to the output transformer as follows, numbering the tags from top to bottom: 1, black; 2, blue; 3, red; 4, green.