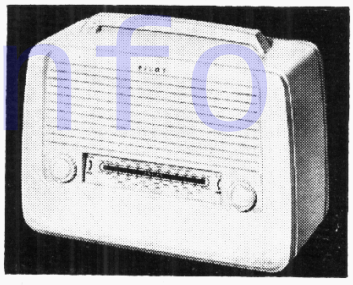
"TRADER" SERVICE SHEET 1018

PILOT "DANDY"

A.C./D.C./Battery Portable



DESIGNED to operate from A.C. or D.C. mains or self-contained batteries, the Pilot "Dandy" is a 4-valve (plus rectifier) 2-band superhet portable covering 190-530 m and 1,200-2,000 m. The self-contained frame aerial operates on M.W. and L.W., but provision is made also for an external aerial.

Release date and original price: June 1951; £13 19s complete with batteries. Purchase tax extra.

CIRCUIT DESCRIPTION

Tuned frame aerial input **L1, C31** (M.W.) or with loading coil **L2** (L.W.) precedes heptode valve **(V1, Osram X17)** operating as frequency changer with electron coupling. For reception in areas of weak signal strength an external aerial may be connected via **C1** (L.W.) or **C1, C2** (M.W.) to the junction of **L1** and **L2.**

Single oscillator tuning coil **L3** is tuned by **C32.** Parallel trimming by **C33** (M.W.) and **C9, C34** (L.W.); series tracking by **C10** (M.W. and L.W.). Reaction coupling from anode by **C11, L4** and the common impedance of **C10.**

Second valve **(V2, Osram W17)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings **C6, L5, L6, C7** and **C15, L7, L8, C16.**

Intermediate frequency 470 kc/s.

Diode signal detector is part of diode R.F. pentode valve **(V3, Osram ZD17).** Audio frequency component in rectified output is developed across volume control **R9,** which is the diode load, and passed via **C21** to control grid of pentode section, which operates as A.F. amplifier. I.F. filtering by **C17, R8, C18** and **C22.** D.C. potential developed across **R8, R9** is fed back as bias via decoupling circuit **R7, C12** to I.F. stage giving automatic gain control.

Resistance-capacitance coupling by **R12, C23** and **R14** between **V3** pentode and control grid of pentode output valve **(V4, Osram N18).** Fixed tone correction in anode circuit by **C26.**

For battery operation the filaments are connected in series, and power supplies are carried by switches **S9 (B), S12 (B)** and **S14 (B),** which close in that position as indicated by the suffix **(B).** For mains operation **S10 (M), S11 (M)** and **S13 (M)** close. **S7** and **S8** are "on/off" switches.

H.T. current on mains is supplied by half-wave metal rectifiers **(MR1, MR2, SenTerCel RM2's)** connected in series via surge limiting resistor **R19** for 200-250 V mains coverage. Smoothing by **R17, R18** and electrolytic capacitors **C24, C27.** Filament current is taken from the H.T. circuit, the filaments still being connected in series and fed via **R16.**

For operation on low-voltage mains in the neighbourhood of 100V, the two voltage adjustment leads are connected to terminal **a** on the ballast resistor, as shown by the appropriate dotted lines in our circuit diagram. With this arrangement **R18, R19** and one section of the rectifier, **MR1,** are short-circuited.

Grid bias is obtained from the filament voltage-drop, grid circuits being returned to appropriate points in the chain. **R5, R6, R11** and **R15** are shunts to by-pass the H.T. current past the filaments. **C13, C19** and **C25** act as R.F. and A.F. by-pass capacitors for the individual filaments. Mains R.F. filtering by **C28.**

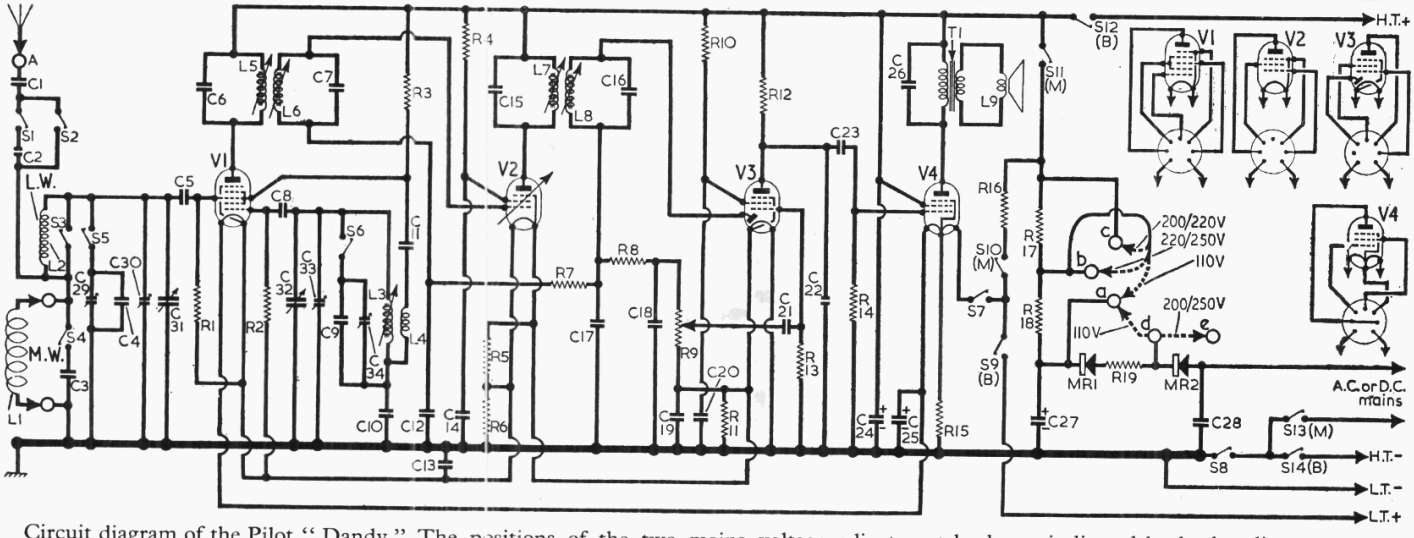
COMPONENTS AND VALUES

	CAPACITORS	Values	Locations
C1	Aerial series	300pF	G3
C2	M.W. aerial coup. ...	20pF	G3
C3	L.W. fixed trimmers	0·001μF	G3
C4		110pF	G3
C5	V1 C.G.	110pF	F2
C6	1st I.F. trans. tuning	100pF	B1
C7		100pF	B1
C8	V1 osc. C.G. ...	110pF	F2
C9	L.W. fixed trim. ...	450pF	F3
C10	Osc. tracker ...	630pF	F3
C11	Osc. anode coup. ...	0·01μF	F2
C12	A.G.C. decoupling ...	0·01μF	F3
C13	V1 fil. by-pass ...	0·1μF	F2
C14	V2 S.G. decoup. ...	0·01μF	E3
C15	2nd I.F. trans. tuning	100pF	B1
C16		100pF	B1
C17	I.F. by-passes	110pF	E3
C18		110pF	E2
C19	V2, V3 fil. by-pass...	0·1μF	F3
C20	V3 S.G. decoup. ...	0·04μF	E2
C21	A.F. coupling ...	0·01μF	D2
C22	I.F. by-pass ...	50pF	E2
C23	A.F. coupling ...	0·01μF	E3
C24*	H.T. smoothing ...	40μF	B1
C25*	V4 fil. by-pass ...	50μF	E2
C26	Tone corrector ...	0·001μF	E3
C27*	H.T. smoothing ...	40μF	B1
C28	R.F. by-pass ...	0·01μF	C1
C29‡	L.W. aerial trim. ...	120pF	G3
C30‡	M.W. aerial trim. ...	50pF	A1
C31†	Aerial tuning ...	528pF	A1
C32†	Oscillator tuning ...	528pF	A1
C33‡	M.W. osc. trimmer...	60pF	G3
C34‡	L.W. osc. trimmer...	120 pF	G3

* Electrolytic. † Variable. ‡ Pre-set.

	RESISTORS	Values	Locations
R1	V1 C.G.	1MΩ	F2
R2	V1 osc. C.G. ...	100kΩ	F2
R3	Osc. anode feed ...	10kΩ	F2
R4	V2 S.G. feed ...	47kΩ	F2
R5	Filament shunts ...	270Ω	E3
R6		1kΩ	F3
R7	A.G.C. decoupling...	2·2MΩ	F3
R8	I.F. stopper ...	47kΩ	E2
R9	Volume control ...	1MΩ	D2
R10	V3 S.G. feed ...	4·7MΩ	D3
R11	Filament shunt ...	270Ω	E2
R12	V3 anode load ...	1MΩ	D3
R13	V3 C.G.	10MΩ	E2
R14	V4 C.G.	3·3MΩ	E3
R15	Filament shunt ...	1kΩ	E3
R16	Filament ballast ...	1,690Ω	C1
R17	H.T. smoothing ...	680Ω	C1
R18		1,350Ω	C1
R19	Surge limiter ...	180Ω	C1

	OTHER COMPONENTS	Approx. Values (ohms)	Locations
L1	Frame aerial ...	1·0	—
L2	L.W. loading coil...	11·0	A1
L3	Osc. tuning coil ...	2·5	G2
L4	Osc. reaction coil ...	1·2	G2
L5	1st I.F. trans. Pri.	7·5	B1
L6	1st I.F. trans. Sec.	7·5	B1
L7	2nd I.F. trans. Pri.	7·5	B1
L8	2nd I.F. trans. Sec.	7·5	B1
L9	Speech coil ...	3·0	C1
T1	O.P. trans. Pri.	440·0	B1
	O.P. trans. Sec.	0·6	
S1-S6	Wavechange switches	—	G3
S7, S8	Power sw., g'd R9	—	D2
S9-S14	Mains/battery sw.	—	D3
MR1	SenTerCel RM2	—	C1
MR2	rectifiers ...	—	C1



Circuit diagram of the Pilot "Dandy." The positions of the two mains voltage adjustment leads are indicated by broken-line arrows.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured on our receiver while it was operating from A.C. mains of 230 V. The set was tuned to the high wavelength end of M.W. with the volume control at maximum.

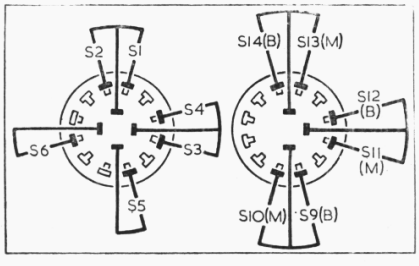
Voltage readings were measured with an Avo Electronic TestMeter, and as this instrument draws no appreciable current, allowance should be made for the current drawn by other meters. Chassis was the negative connection. The D.C. voltage across **C27** should be about 100 V.

Valve	Anode		Screen	
	V	mA	V	mA
V1 X17	85	1·0	60	2·4
V2 W17	85	1·9	54	0·7
V3 ZD17	23	0·05	22	*
V4 N18	81	7·0	85	1·0

* No appreciable reading.

DISMANTLING THE SET

Removing Chassis.—Remove two control knobs (pull off), and disconnect frame aerial plug from rear left-hand corner of chassis; disconnect H.T. and L.T. plugs if batteries are fitted;



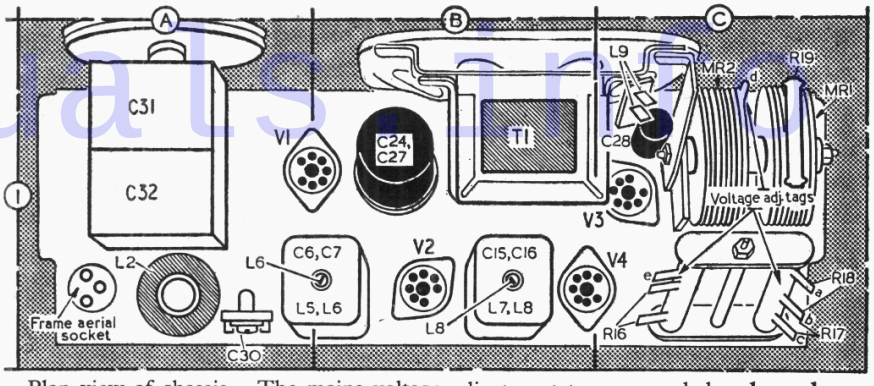
Diagrams of the two switch units. Left, the waveband switch unit; right, the mains/battery switch unit, on which (M) switches close for mains operation, and (B) switches for battery.

remove two 4BA bolts (with plain washers and shake-proof washers) securing rear edges of chassis to cabinet;
release two captive screws securing front edges of chassis to cabinet and withdraw chassis.

GENERAL NOTES

Switches.—**S1-S6** are the waveband switches, ganged in a 2-position rotary unit mounted beneath the chassis concentrically with the tuning control spindle. This spindle is spring-loaded, and engages with the switch control spindle only when depressed.

The unit is indicated in our under-chassis drawing, and shown in detail in the left-hand diagram (above), where it is viewed from the rear of an inverted chassis. On M.W. (control knob anti-clockwise) **S1** and **S3** only close; on L.W. all switches except **S1** and **S3** close.



Plan view of chassis. The mains voltage adjustment tags are coded **a, b, c, d, e.**

S7, S8 are the Q.M.B. power switches, controlling the on/off function of the receiver on battery or mains. They are ganged with the volume control **R9.**

S9-S14 are the mains/battery change-over switches, ganged in a two-position rotary switch unit, mounted beneath the chassis against the rear member. The control lever forms a plate which, in the battery position, closes the aperture in the rear member which gives access to the mains connections, so that the mains connecting plug must be withdrawn before the switch can be set to the battery position.

The unit is indicated in our underside drawing of the chassis, and shown in detail in the right-hand diagram in col. 1, where it is viewed from the front of an inverted chassis. The action of the switches is explained in the switch diagram and the circuit diagram by the suffix letters **(M)** for mains and **(B)** for battery, which indicate when they close.

Mains Voltage Adjustment.—Five terminal points are provided for voltage adjustment, in conjunction with two leads. The points are coded **a, b, c, d, e** in our plan view and circuit diagram, and the two leads are permanently anchored to points **b** and **d.**

Tags **a, b, c** are tappings on **R17, R18,** and the three positions of their adjustment lead are shown in the circuit diagram by dotted lines. Tag **d** is on an outer fin of the metal rectifier **MR2,** and the two positions for its adjustment lead are **a,** on **R18,** for 100 V mains, or **e,** at the top of **R16** unit but insulated from it, for 200 V mains and upwards.

Drive Cord Replacement.—Our sketch in col. 3 shows the tuning drive system as it appears when viewed from the front with the gang at maximum. It requires about 30 inches of nylon braided glass yarn.

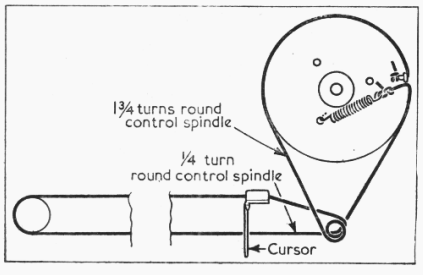
Although our sketch shows the gang at maximum, where the cursor registers with a mark on the scale backing plate, the cord should be run with the gang at minimum, so that it can be pulled against the gang stop. It makes 1¾ turns round the control spindle before making the first horizontal run, and another quarter of a turn round it after the return horizontal run.

Batteries.—Batteries recommended by the makers are: L.T., Ever Ready "Alldry 38" or Drydex H1187, 7.5 V; H.T., Ever Ready "Batrymax B126" or Drydex 526, 90 V. Non-reversible plugs of dissimilar design are provided for the connections, and the makers warn the user always to ensure that the cardboard separator is in position between the batteries and the chassis. Grooves are provided for it on the sides of the carrying case.

CIRCUIT ALIGNMENT

Remove chassis from cabinet and stand it on its rear chassis member on the bench with frame aerial connected.

I.F. Stages.—Switch set to M.W. and connect output of signal generator, via a 0.01 μF capacitor in "live" lead, to control grid (pin 6) of **V1.** Feed in a 470 kc/s (638.3 m) signal and adjust the cores of **L8** (location reference B1),



Sketch of the tuning drive system.

L7 (E3), **L6** (B1) and **L5** (F3) for maximum output, reducing the input as the circuits come into line to avoid A.G.C. action.

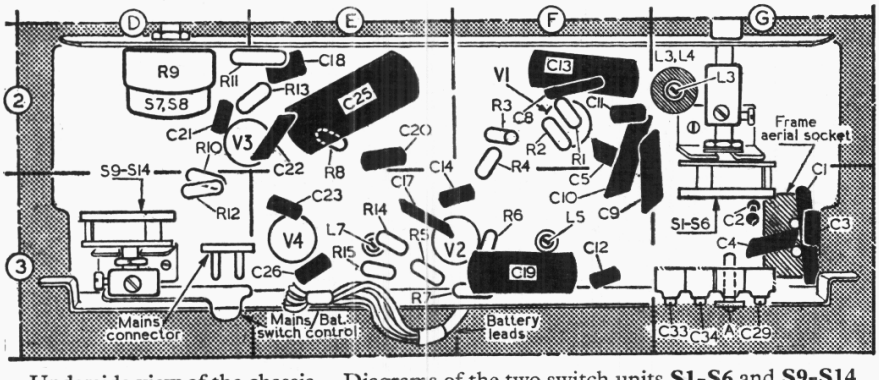
R.F. and Oscillator Stages.—Check that with the gang at maximum capacitance the cursor covers the short vertical line stamped into the bottom right-hand edge of the scale backing plate.

As the tuning scale remains fixed in the cabinet when the chassis is withdrawn it is necessary to make a substitute tuning scale which can be attached to the scale backing plate. A piece of paper or cardboard, about the same size as the tuning scale, should be used, and holding it against the tuning scale the following alignment points should be marked on it: 214.3 m, 1,304 m and 500 m. A vertical mark should also be made against the right-hand edge of the clear section of the tuning scale to represent the maximum capacitance setting of the cursor.

Secure the substitute scale by tape or paper clip to the scale backing plate and position it so that with the gang at maximum the cursor coincides with its vertical mark. Transfer signal generator "live" lead via a dummy aerial to **A** socket.

M.W.—Switch set to M.W., tune to 214.3 m mark on substitute scale, feed in a 214.3 m (1,400 kc/s) signal and adjust **C33** (G3) and **C30** (A1) for maximum output. Tune set to 500 m mark, feed in a 500 m (600 kc/s) signal and adjust the core of **L3** (G2) for maximum output.

L.W.—Switch set to L.W., tune to 1,304 m mark, feed in a 1,304 m (230 kc/s) signal and adjust **C34** (G3) and **C29** (G3) for maximum output.



Underside view of the chassis. Diagrams of the two switch units **S1-S6** and **S9-S14** appear in col. 1. The arrows here show the directions in which they are viewed.

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