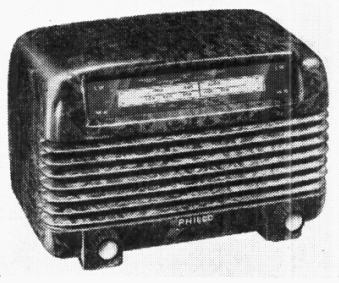
"TRADER" SERVICE SHEET

961

PHILCO B2806



AN isolated chassis is a feature of the Philco B2806, a 4-valve (plus rectifier) 2-band superhet designed to operate from A.C. or D.C. mains of 200-250 V, 40-60-c/s in the case of A.C. The waveband ranges are 187-555 m and 937.5-2,142.8 m.

Release date and original price: December, 1949; £9 19s 6d, increased June, 1950, to £10 7s 7d. Ivory model £10 16s 3d. Purchase tax extra.

CIRCUIT DESCRIPTION

Tuned frame aerial input **L3, C22** (M.W.) precedes a triode-heptode valve **(V1, Brimar 14S7)** which operates as frequency changer with internal coupling. Provision is made for the connection of an external aerial via a second frame winding **L1**. For L.W. operation, loading coil **L2** is connected in series with **L3**.

Oscillator grid coils **L5** (M.W.) and **L4** (L.W.) are tuned by **C25**. Parallel trimming by **C24** (M.W.) and **C26, C5** (L.W.); series tracking by **C7, C28** (M.W.) and **C6, C27** (L.W.). Reaction coupling across the common impedance of the trackers with the addition of inductive coupling by **L6** on M.W.

Second valve **(V2, Brimar 7B7)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned transformer couplings **C3, L7, L8, C4** and **C29, L10, L11, C30**. Stabilization by negative back-coupling via **L9**.

Intermediate frequency 465 kc/s.

Diode signal detector is part of double diode triode valve **(V3, Brimar 12Q7)**. Audio frequency component in rectified output is developed across manual volume control **R6**, which is the load resistor, and is passed via **C13** to C.G. of triode section. I.F. filtering by **C11, R5, C12** and **C14**. D.C. potential appearing across **R5, R6** is applied via decoupling circuit to F.C. and I.F. valves, giving automatic volume control. The A.G.C. line is connected to second diode, which prevents it from acquiring a positive potential.

Resistance-capacitance coupling by **R9, C15** and **R10** between **V3** triode and beam tetrode output valve **(V4, Brimar 35L6)**. Fixed tone correction in anode circuit by **C17**.

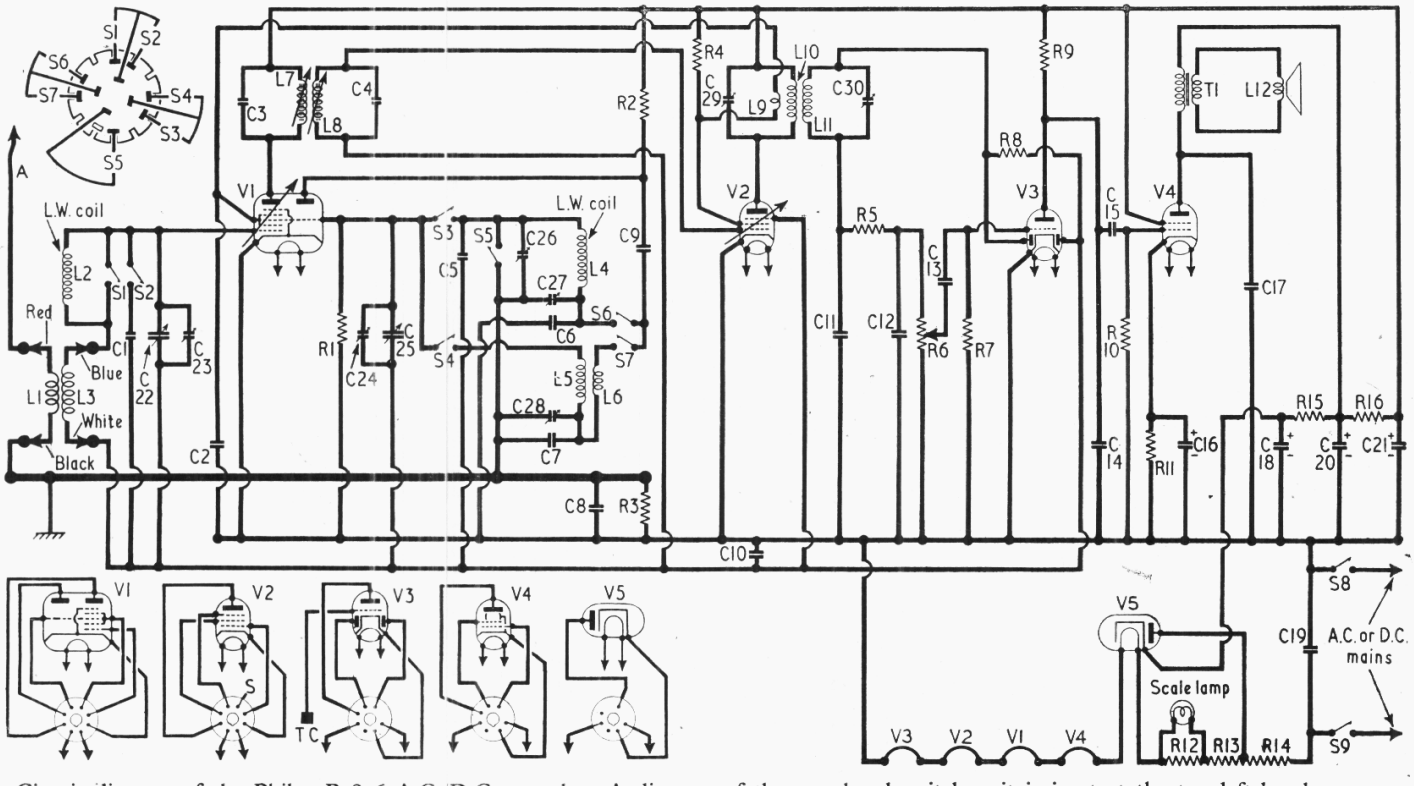
H.T. current is supplied by half wave rectifying valve **(V5, Brimar 35Z4)**. Smoothing by **C18, R15, C20, R16** and **C21**. Valve heaters, together with ballast resistor **R12, R13, R14** and scale lamp, are connected in series across the mains input. The chassis is isolated from the H.T. negative line by **C8** and **R3**.

COMPONENTS AND VALUES

	RESISTORS	Values	Locations
R1	V1 osc. C.G. ...	68kΩ	F3
R2	Osc. anode load ...	22kΩ	F4
R3	Chassis isolator ...	120kΩ	E4
R4	S.G. feed	22kΩ	E4
R5	I.F. stopper ...	47kΩ	C1
R6	Volume control ...	500kΩ	D3
R7	V3 C.G.	10MΩ	E3
R8	A.G.C. decoup. ...	2·2MΩ	E3
R9	V3 anode load ...	470kΩ	D4
R10	V4 C.G.	470kΩ	E4
R11	V4 G.B.	150Ω	D4
R12	Heater ballast resistor	50Ω	A2
R13		412Ω	B2
R14		232Ω	B2
R15	H.T. smoothing resistors	150Ω	F4
R16		1kΩ	D4

	CAPACITORS	Values	Locations
C1	L.W. fixed trim. ...	50pF	G4
C2	S.G. decoup. ...	0·05μF	F3
C3	1st I.F. transformer tuning	75pF	B2
C4		75pF	B2
C5	L.W. trim. ...	20pF	G4
C6	L.W. tracker ...	130pF	G3
C7	M.W. tracker ...	500pF	G3
C8	Chassis isolator ...	0·1μF	E3
C9	Osc. coupling ...	220pF	G4
C10	A.G.C. decoup. ...	0·1μF	G3
C11	I.F. by-passes ...	100pF	C1
C12		100pF	C1
C13	A.F. coupling ...	0·005μF	E3
C14	I.F. by-pass ...	220pF	E3
C15	A.F. coupling ...	0·01μF	E4
C16*	Cath. by-pass ...	30μF	D4
C17	Tone corrector ...	0·02μF	D4
C18*	H.T. smoothing ...	40μF	C2
C19	R.F. by-pass ...	0·05μF	D4
C20*	H.T. smoothing ...	30μF	C2
C21*		20μF	C2
C22†	Aerial tuning ...	—	A2
C23‡	M.W. trimmer ...	—	A2
C24‡	M.W. osc. trim. ...	—	A1
C25†	Osc. tuning ...	—	A1
C26‡	L.W. osc. trim. ...	40pF	G4
C27‡	L.W. osc. track. ...	40pF	G4
C28‡	M.W. osc. track. ...	40pF	G3
C29‡	2nd I.F. transformer tuning	—	C1
C30‡		—	C1

* Electrolytic. † Variable. ‡ Pre-set.



Circuit diagram of the Philco B2806 A.C. D.C. superhet. A diagram of the waveband switch unit is inset at the top left-hand corner.

	OTHER COMPONENTS	Approx. Values (ohms)	Locations
L1	Frame aerial coupling	Very low	—
L2	L.W. loading coil ...	33·0	A2
L3	Frame aerial winding	2·3	—
L4	L.W. osc. tuning	5·2	G3
L5	M.W. osc. tuning ...	2·4	G3
L6	M.W. osc. reaction	1·5	G3
L7	1st I.F. trans. Pri.	9·0	B2
L8	1st I.F. trans. Sec.	13·0	B2
L9	I.F. stabiliser ...	Very low	C1
L10	2nd I.F. trans Pri.	22·0	C1
L11	2nd I.F. trans Sec.	22·0	C1
L12	Speech coil ...	3·0	B1
T1	Output trans. Pri. ...	220·0	B1
	Output trans. Sec. ...	0·7	
S1-S7	Waveband switches	—	G4
S8, S9	Mains sw., g'd. R6	—	D3

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver while it was operating on A.C. mains of 230 V. The receiver was tuned to the highest wavelength on the M.W. band, and the volume control was at maximum, but there was no signal input. Voltages, with the exception of cathode readings, were measured on the 400 V scale of a Model 7 Avometer, the negative connection being the H.T. negative line, and *not* chassis.

Valve	Anode		Screen		Cath.
	V	mA	V	mA	V
V1 14S7	140	0·9	60	2·0	—
	Oscillator				
	80	1·8			
V2 7B7	140	4·8	60	1·3	—
V3 12Q7	40	0·2	—	—	—
V4 35L6	140	56·0	140	3·9	8·8
V5 35Z4	120†	—	—	—	165·0

† A.C.

GENERAL NOTES

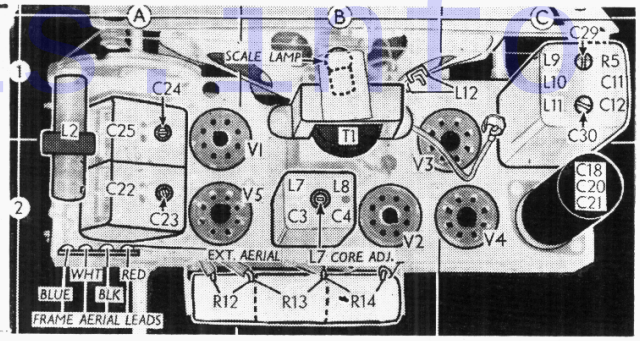
Switches.—**S1-S7** are the waveband switches, ganged in a single two-position rotary unit beneath the chassis. This is indicated in our under-chassis view and shown in detail in the diagram inset in the top left-hand corner of the circuit diagram overleaf, where it is viewed from the front of an inverted chassis. In the M.W. position (control knob clockwise, viewed from the rear) **S1, S4, S5** and **S7** close; in the L.W. position, **S2, S3** and **S6** close.

S8, S9 are the Q.M.B. mains switches, ganged with the volume control **R6.**

Scale Lamp.—This is an Osram lamp, with an M.E.S. base and a small clear spherical bulb, rated at 3.5 V. 0.15 A.

Frame Aerial Windings.—The frame aerial tuning winding **L3** and external aerial coupling winding **L1** are wound on the inside of the rear of the plastic cabinet, being held there by adhesive paper tape. The lead colours indicated in our circuit diagram are actually dabs of dye on the cotton coverings of the wires.

A black lead a few inches long is soldered to the red frame lead tag, as shown in our plan view of the chassis, and held to the side of the case by a piece of adhesive tape. This is intended as the connection for an external aerial where it is desired to use one, the wires then being twisted together.

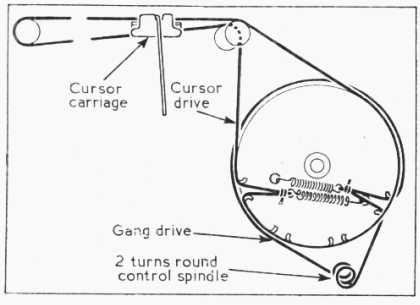


Plan view of the chassis. The frame aerial lead colours are indicated here and shown again in the circuit diagram overleaf.

Chassis Divergencies.—In a small number of early chassis, all the oscillator trimmers and trackers went to chassis. This was altered because better stability was obtained when they were returned to three different points, as shown in our circuit diagram, which shows the connections as we found them in our chassis.

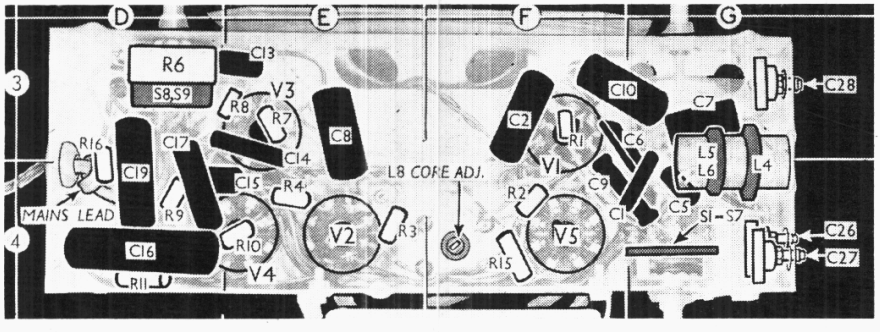
Our chassis also was fitted with a 50L6 output valve instead of a 35L6. While this does no harm, it is not standard, but is a useful modification in the case of receivers operating from mains of about 240 V or 250 V.

Drive Cord Replacement.—Two separate cords are used, one for the gang drive, and one for the cursor drive. About a foot of cord is required for the former, and about a yard for the latter.



The tuning drive cord systems, drawn as seen from the front of the chassis when the gang is at maximum. Two separate cords are used.

The cord in our sample was high quality waxed flax fishing line. The course taken by each cord is shown in the sketch (above), where it is drawn as seen from the front of the chassis, neglecting obstructions, with the gang at maximum.



Under-chassis view. The waveband switch unit **S1-S7** is shown in detail in the diagram in the top left-hand corner of the circuit overleaf, where it is viewed from the front of an inverted chassis.

DISMANTLING THE SET

Removing Chassis.—Remove the three control knobs (pull off);
unsolder the external aerial and frame aerial leads from tag strip on the left-hand rear corner of chassis;
remove three self-tapping screws, with one large washer at rear and two small washers at front, securing chassis to cabinet;
When replacing, connect the frame aerial and external aerial leads as indicated in our plan view of chassis.

Removing speaker.—First dismantle the cursor drive cord, and remove the scale backing plate (two 4BA cheese-head screws with washers and lock-washers);
This involves dismantling the cursor drive cord, as this is supported on the scale assembly.
When replacing, two thick fibre plates are fitted as distance-pieces between the speaker magnet and the chassis deck.
Rubber sleeves should be slipped on to the speaker leads before joining them together, and afterwards they should be slid along the wire to cover the joints.
Instructions for replacing the cursor drive cord are given elsewhere on this page.
unsolder the two leads to the speaker transformer and remove two 2BA cheese-head screws (with lock-washers and distance-pieces) holding speaker magnet to chassis deck.

CIRCUIT ALIGMMENT

To gain access to the I.F. and oscillator trimmers the chassis must be removed from the cabinet, and as the tuning scale remains in the cabinet, it is advisable to mark off the oscillator alignment points with a pencil on the scale backing plate against the left-hand edge of the cursor carriage. These are 500 m, 200 m, 2,000 m and 800 m. First check that with the gang at maximum the cursor is level with the right-hand end of the horizontal black line dividing the M.W. and L.W. scales.

I.F. Stages.—Remove chassis from cabinet and connect a 10 kΩ resistor in place of the frame aerial winding, **L3.** Switch set to M.W., turn the volume control to maximum and the gang to minimum. Connect signal generator, via a 0.1 μF capacitor in each lead, to "live" tag of **C22** and H.T. negative line. Feed in a 465 kc/s (645.16 m) signal and adjust the cores of **L7, L8** and **C29, C30** (location references B2, C1 and F4), in that order, for maximum output, reducing the input as the circuits come into line. If two peaks are found for **L7** and **L8,** use that for which the cores are less screwed into the coil unit.

Oscillator Stage; M.W.—Replace the 0.1 μF capacitor with one of 100 pF (0.0001 μF), tune to 500 m mark on scale, feed in a 500 m (600 kc/s) signal, and adjust **C28** (G3) for maximum output. Tune to 200 m mark, feed in a 200 m (1,500 kc/s) signal, and adjust **C24** (A1) for maximum output. Repeat these adjustments until no improvement can be obtained.

L.W.—Switch set to L.W., tune to 2,000 m mark, feed in a 2,000 m (150 kc/s) signal and adjust **C27** (G4) for maximum output. Tune to 800 m, feed in an 800 m (375 kc/s) signal and adjust **C26** (G4) for maximum output. Repeat these adjustments until no improvement can be obtained.

Aerial Stage.—Remove 10 kΩ resistor and 100 pF capacitor, replace chassis in cabinet and connect up frame aerial. Couple signal generators via a coil of wire of about half a dozen turns, 6ins diameter, located near the receiver. Tune to 200 m on scale, feed in a 200 m (1,500 kc/s) signal, and adjust **C23** (A2) for maximum output.

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