

"TRADER" SERVICE SHEET
956

PHILCO B2810, B2855

A.C./D.C. Superhet



THE Philco B2810 is a 4-valve (plus rectifier) 3-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 16.67-50 m, 187-555 m and 750-2,140 m. The B2855 employs a similar chassis, but it has two scale lamps and is housed in a wooden cabinet, whereas the B2810 is in a moulded cabinet, as shown illustrated above.

Release dates and original prices: B2810, October 1949, £12 19s 6d; B2855, January 1950, £16 5s. Purchase tax extra.

CIRCUIT DESCRIPTION

Aerial input via coupling coils **L1**, **L2** to single-tuned circuits **L3** (S.W.), **L4**, (M.W.) and **L5** (L.W.) and **C24**, which precede the frequency changer (**V1**, Brimar 14S7). **C2** shunts **L2** on L.W. to shift the resonance to something below 1,000 m.

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 **C7** (S.W.), **C8**, **C30** (Continued col. 1 overleaf)

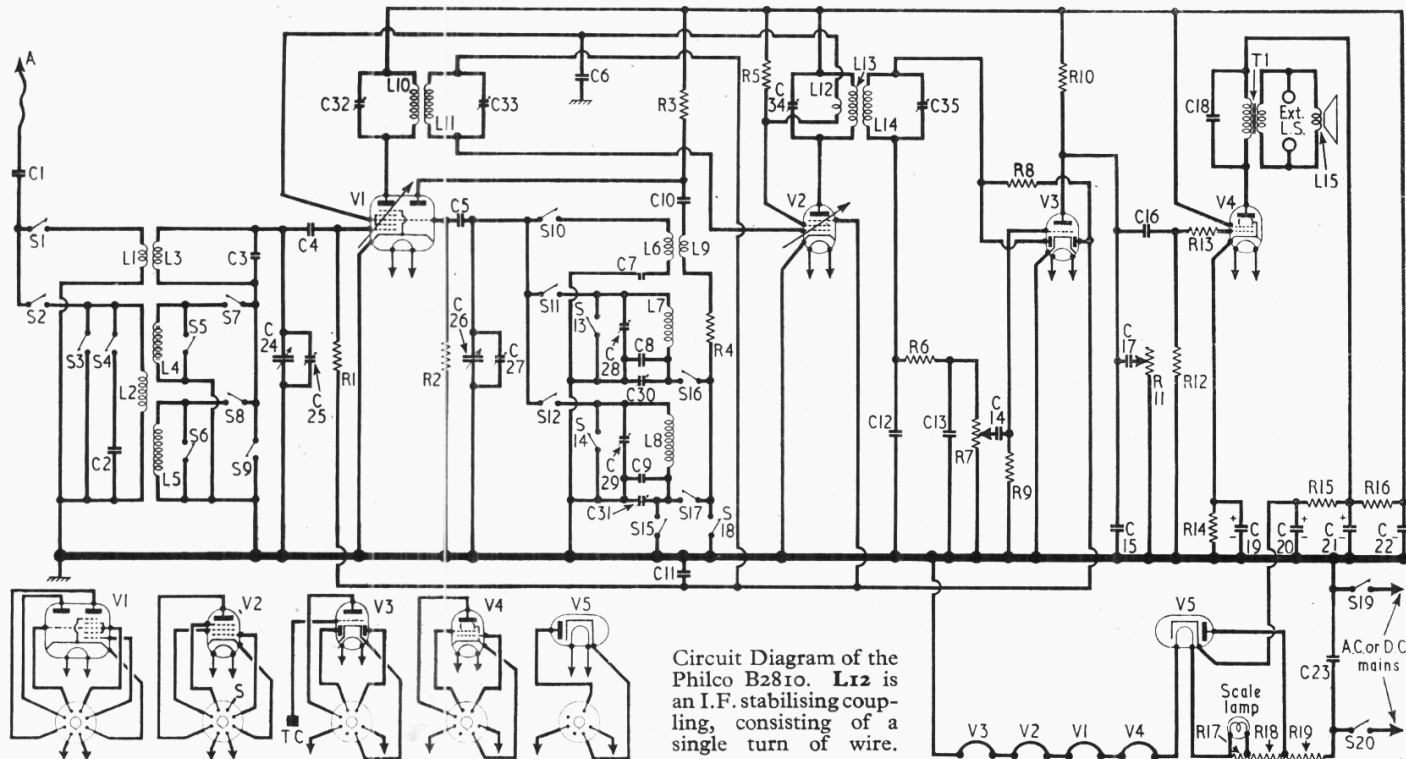
COMPONENTS AND VALUES

CAPACITORS		Values	Locations
C1	Aerial series	0.002μF	H3
C2	L.W. shunt	0.001μF	H3
C3	S.W. trimmer	20pF	G3
C4	V1 hept. C.G.	100pF	G4
C5	V1 osc. C.G.	100pF	G4
C6	V1 screen decoup.	0.05μF	G4
C7	S.W. tracker	3,790pF	H4
C8	M.W. tracker	430pF	H4
C9	L.W. tracker	80pF	H4
C10	Osc. anode coup.	220pF	G3
C11	A.G.C. decoupling	0.05μF	G3
C12	I.F. by-passes	100pF	C2
C13		100pF	C2
C14	A.F. coupling	0.005μF	C1
C15	I.F. by pass	470pF	F3
C16	A.F. coupling	0.01μF	F3
C17	Tone control	0.005μF	F3
C18	Tone corrector	0.02μF	G3
C19*	Cath. by-pass	10μF	B1
C20*	H.T. smoothing	40μF	B1
C21*		30μF	B1
C22*		20μF	B1
C23	R.F. by-pass	0.05μF	E3
C24†	Aerial tuning	420pF	A2
C25†	S.W. trimmer	—	A2
C26†	Osc. tuning	420pF	A1
C27†	S.W. trimmer	—	A1
C28†	M.W. trimmer	20pF	H4
C29†	L.W. trimmer	40pF	H4
C30†	M.W. tracker	40pF	H4
C31†	L.W. tracker	40pF	H4
C32†	I.F. transformer tuning	—	B2
C33†		—	B2
C34†		—	C2
C35†		—	C2
C36†		—	C2

* Electrolytic. † Variable. ‡ Pre-set.
|| Swing value, minimum to maximum.

RESISTORS		Values	Locations
R1	V1 hept. C.G.	1MΩ	G4
R2	V1 osc. C.G.	68kΩ	G4
R3	V1 osc. H.T. feed	10kΩ	G4
R4	React. stabiliser	82Ω	H4
R5	Screen H.T. feed	20kΩ	F4
R6	I.F. stopper	47kΩ	C2
R7	Volume control	500kΩ	D1
R8	A.G.C. decoup.	2.2MΩ	F3
R9	V3 triode C.G.	10MΩ	C1
R10	V3 anode load	470kΩ	F3
R11	Tone control	500kΩ	E3
R12	V4 C.G.	470kΩ	F3
R13	Grid stopper	1.2kΩ	F3
R14	V4 G.B.	150Ω	F4
R15	H.T. smoothing	150Ω	G3
R16		1kΩ	Q3
R17	Heater ballast	50Ω	D2
R18		275Ω	D2
R19		320Ω	D2

OTHER COMPONENTS		Approx. Values (ohms)	Locations
L1	Aerial coupling coils	2.2	G3
L2		28.0	A2
L3		Very low	G3
L4	Aerial tuning coils	3.8	A2
L5		37.0	A2
L6		Very low	H4
L7	Oscillator tuning coils	2.6	H4
L8		22.0	H4
L9	S.W. reaction	0.8	H4
L10	1st I.F. trans.	33.0	B2
L11		33.0	B2
L12	I.F. stabiliser	Very low	C2
L13	2nd I.F. trans.	22.0	C2
L14		22.0	C2
L15	Speech coil	2.8	—
T1	O/p ut trans.	270.0	G3
S1-S18	Waveband switch	—	H3
S19,	Mains sw., g'd R11	—	—
S20		—	E3



Circuit Diagram of the Philco B2810. L12 is an I.F. stabilising coupling, consisting of a single turn of wire.

Circuit Description—Continued.

(M.W.) and C9, C31 (L.W.). Reaction coupling by L9 (S.W.) and the common impedance of the trackers (M.W. and L.W.).

Second valve (V2, Brimar 7B7) is a variable-mu RF pentode operating as intermediate frequency amplifier with tuned transformer couplings. Stabilization by negative coupling via L12.

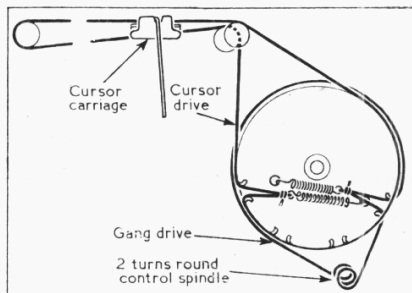
Intermediate frequency 465 kc/s.

Diode second detector is part of double diode triode valve (V3, Brimar 12Q7GT). Audio frequency component in rectified output is developed across manual volume control R7, which is the load resistor, and passed via C14 to C.G. of triode section. I.F. filtering R6, C13 and C16. Tone control by R11, C17 in anode circuit. D.C. potential appearing across R6. R7 is applied via a decoupling circuit to F.C. and I.F. valves, giving automatic gain control. The A.G.C. line is connected to second diode, which holds it to chassis potential.

Resistance-capacitance coupling by R10, C16, R12 between V3 triode and beam tetrode output valve (V4, Brimar 50L6GT). H.T. current is supplied by half-wave rectifying valve (V5, Brimar 35Z4GT) which, with D.C. mains behaves as a low resistance. Smoothing by R15, R16 and C20, C21, C22. Valve heaters, together with ballast resistor R17, R18, R19 and scale lamp are connected in series across mains input.

DISMANTLING THE SET

Removing Chassis.—Remove the four control knobs (recessed screws); unsolder the speaker leads at the speech coil tags; remove one self-tapping screw at each end of the rear chassis member, and slide the chassis out on its guide rail.



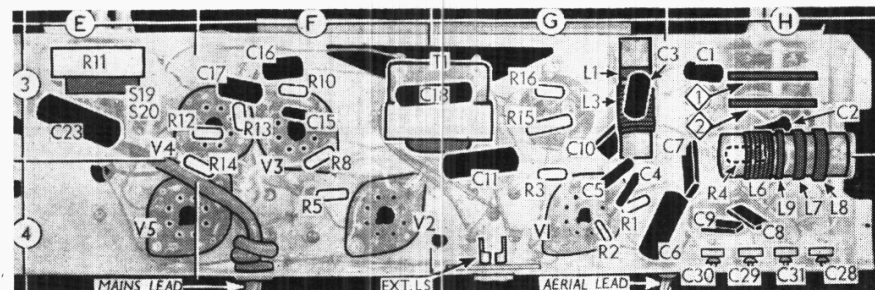
Tuning drive cord system, viewed from the front with gang at maximum.

When replacing, do not omit to re-wax the heads of the control knob fixing screws.
Removing Speaker.—The speaker is held by four 4BA nuts (with lock-washers). The speech coil tags should be at the top.

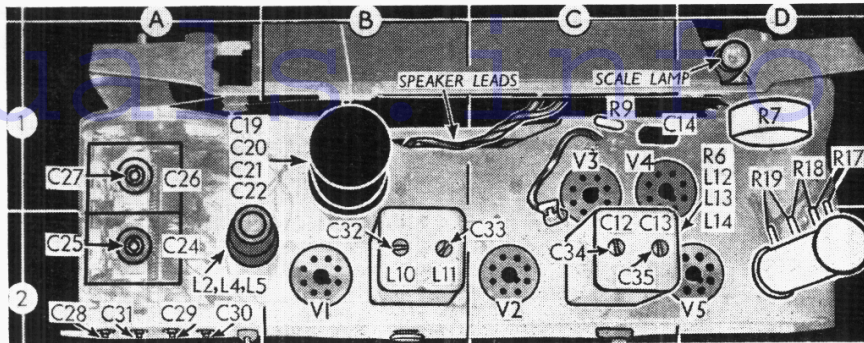
GENERAL NOTES

Switches.—S1-S18 are the waveband switches ganged in two rotary units. These are indicated in our under-chassis view, and shown in detail in the diagrams in col. 3, where they are viewed from the rear of an inverted chassis. The table (col. 3) 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 Lamp.—This is an M.E.S. type lamp,



Under-chassis view. The waveband switch units are numbered 1 and 2 in diamonds.



Plan view of the chassis. R17, R18, R19 is a wire-wound cement-coated unit.

with a small clear spherical bulb, rated at 3.5 V, 0.15 A.

External Speaker.—Two sockets, with a special plug, are provided at the rear of the chassis for the connection of a low impedance (about 2-4 ohms) external speaker.

Drive Cord Replacement.—Two 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 three feet for the latter. The cord on our sample was a very fine gauge Nylon braided glass yarn (Jones, Stroud & Co., MC18). The courses taken by the cords are shown in the sketch (col. 1), as seen from the front with the gang at maximum.

VALVE ANALYSIS

Readings given in the table below were measured in our receiver while operating on A.C. mains of 233 V, using a model 7 Avometer. The receiver was tuned to 555 m, and there was no signal input.

Valve	Anode		Screen		Cath.
	V	mA	V	mA	
V1 14S7	120 (Oscillator)	1.0 2.0	130	2.0	—
V2 7B7	120	4.8	130	1.0	—
V3 12Q7	34	0.2	—	—	—
V4 50L6	118	49.0	120	3.0	7.6
V5 35Z4	160†	—	—	—	142.0

† A.C.

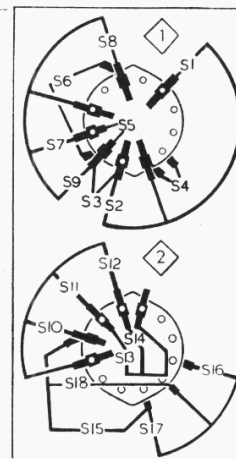
CIRCUIT ALIGNMENT

I.F. Stages.—Switch set to M.W., turn the volume control to maximum, the gang to minimum, and the tone control fully anti-clockwise. Connect signal generator leads, via a 0.1 μF capacitor in each lead, to the live tag of C24 and chassis, feed in a 465 kc/s (645.16 m) signal and adjust C35, C34, C33 and C32, in that order, for maximum output.

R.F. and Oscillator Stages.—With the gang at maximum capacitance, the cursor should coincide with the dots on vertical lines at the long wavelength ends of the scales. Transfer "live" signal generator lead to the aerial lead, using a 400Ω resistor for the S.W. band, and a 200 pF capacitor for M.W. and L.W.

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

Diagrams of the waveband switch units as seen from the rear of an inverted chassis. Above is the associated switch table.



bands, as a dummy aerial. The S.W. band must be adjusted first, and if it is subsequently disturbed the complete alignment must be repeated on all three bands.

S.W.—Switch set to S.W., tune to 17 m on scale, feed in a 17 m (17.65 Mc/s) signal, and adjust C27 for maximum output. If two peaks are found, use that involving the lesser trimmer capacitance. Then adjust C25 for maximum output while rocking the gang for optimum results.

M.W.—Switch set to M.W., tune to 545.4 m on scale, feed in a 545.4 m (550 kc/s) signal, and adjust C30 for maximum output while rocking the gang for optimum results. Tune to 200 m, feed in a 200 m (1,500 kc/s) signal and adjust C28 similarly, while rocking the gang. Then repeat both adjustments.

L.W.—Switch set to L.W., tune to 2,000 m on scale, feed in a 2,000 m (150 kc/s) signal, and adjust C31 for maximum output while rocking the gang for optimum results. Tune to 800 m, feed in an 800 m (375 kc/s) signal, and similarly adjust C29 while rocking the gang. Then repeat both adjustments.