

"TRADER" SERVICE SHEET

1771

OPERATING from a six volt battery supply, Philips L2X10T/15 (210T) portable radio receiver covers the long medium and short wavebands. It is fitted with an internal ferrite rod aerial for long- and medium-wave reception and a telescopic aerial for short wave. Sockets are provided for earphone listening and for the connection of a counterpoise earth to improve s.w. reception.

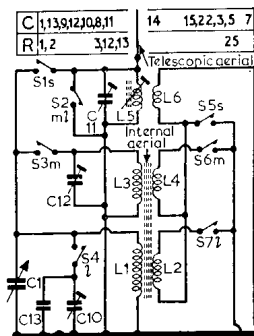
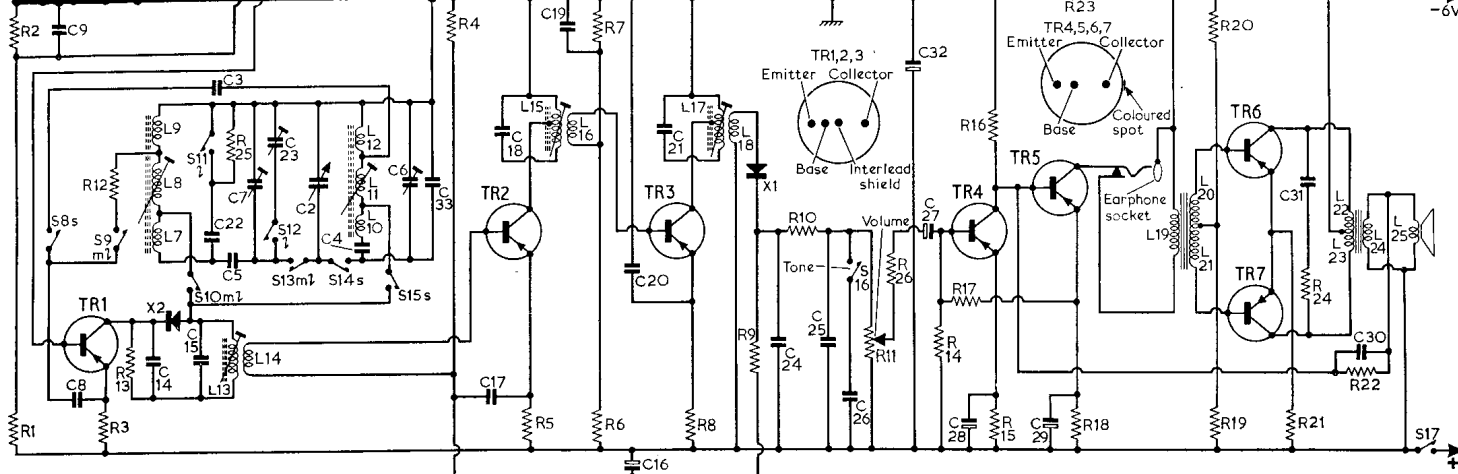
Waveband ranges are: 185-585m (m.w.), 1,150-2,000m (l.w.) and 19.4-51m (s.w.) with a lever-operated slide unit waveband switch. Seven transistors and two diodes are employed and consumption is 20mA for 100mW output.

TRANSISTOR ANALYSIS

Transistor voltages given in the table below were taken from information supplied by the manufacturer. They were measured on a valve voltmeter with an impedance of approximately 10M Ω and are negative with respect to battery positive.

Transistor Table

Transistor	Emitter (V)	Base (V)	Collector (V)
TR1 AF116	1.0	1.1	3.8
TR2 AF117	0.25	0.3	4.8
TR3 AF117	0.8	1.0	4.9
TR4 OC71	0.5	0.6	1.9
TR5 OC71	1.8	1.9	5.2
TR6 OC72	—	0.2	5.6
TR7 OC72	—	0.2	5.6

Circuit diagram of
Philips L2X10T/
15 portable radio
receiver

PHILIPS L2X10T/15

Transistor Portable Radio Receiver

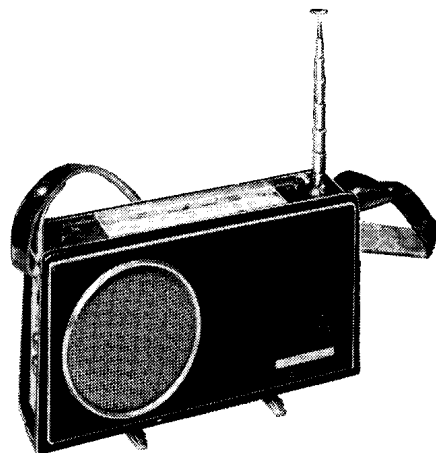
CIRCUIT DESCRIPTION

L1 is the l.w. aerial coil tuned by C1, C10 and C13. On m.w. L3 and C12 are connected in parallel with L1 and C1; C10 and C13 are switched out of circuit by S4. S.w. signals from the telescopic aerial are tuned by L5 and C11.

Inductive coupling is employed from the aerial circuits to the base of the self-oscillating mixer TR1, forward base bias being derived from the potential divider R1, R2.

Two separate oscillator tuned circuits are used in conjunction with the common tuning gang section C2, appropriately switched by S13 and S14. The circuit associated with L7, L8 and L9 is common to long and medium wavebands and is connected in TR1 emitter and collector circuits by the action of S9 and S10. The circuit associated with L10, L11 and L12 is s.w. oscillator tuning connected by S8 and S15.

(Continued overleaf col. 1)



Resistors

R1	2.7k Ω	B1
R2	8.2k Ω	C1
R3	1.2k Ω	B1
R4	120k Ω	B1
R5	560 Ω	B2
R6	4.7k Ω	B2
R7	15k Ω	B2
R8	1k Ω	B2
R9	15k Ω	A2
R10	1k Ω	A2
R11	10k Ω	A1
R12	22 Ω	C2
R13	1.2k Ω	B1
R14	15k Ω	B1
R15	820 Ω	B1
R16	4.7k Ω	B1
R17	22k Ω	A1
R18	1k Ω	A2
R19	100 Ω	A2
R20	3k Ω	A2
R21	10 Ω	A2
R22	33k Ω	B2
R23	220 Ω	A2
R24	270 Ω	A2
R25	180k Ω	C2
R26	1.5k Ω	A1

Capacitors

C1	—	C2
C2	—	C2
C3	2,200pF	B2
C4	3,900pF	B2
C5	270pF	C2

C6	10pF	B2
C7	10pF	C2
C8	0.01 μ F	C1
C9	0.015 μ F	C1
C10	10pF	B1
C11	10pF	C1
C12	12pF	C1
C13	108pF	B1
C14	0.01 μ F	B1
C15	—	B1
C16	6.4 μ F	B1
C17	0.047 μ F	B2
C18	—	B2
C19	0.01 μ F	B2
C20	0.047 μ F	B2
C21	—	B2
C22	232pF	C2
C23	10pF	B2
C24	3,700pF	A2
C25	3,700pF	A2
C26	0.047 μ F	A1
C27	10 μ F	B1
C28	25 μ F	B1
C29	16 μ F	A2
C30	220pF	B2
C31	0.047 μ F	B2
C32	200 μ F	A2
C33	15pF	B2

Coils and Transformers*

L1	4.5	B1
L2	—	B1
L3	1.5	B1
L4	—	C1
L5	—	C1

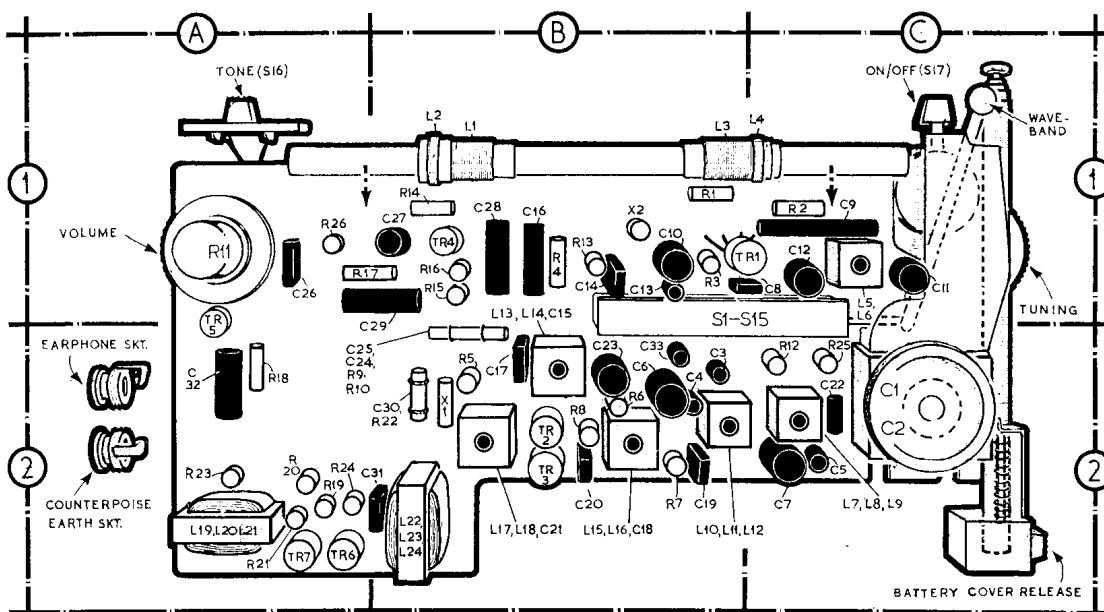
L6	—	C1
L7	—	C2
L8	—	C2
L9	—	B2
L10	—	B2
L11	—	B2
L12	—	C2
L13	1.5	B1
L14	—	B1
L15	—	B2
L16	—	B2
L17	—	B2
L18	—	B2
L19	200.0	A2
L20	46.0	A2
L21	70.0	A2
L22	8.0	B2
L23	8.0	B2
L24	—	B2
L25	10.0	†

Miscellaneous

S1-S15	—	B1
S16	—	A1
S17	—	C1
X1	OA79	B2
X2	OA79	B2

† Speaker

* Approximate d.c. resistance
in ohms.



The printed circuit panel as seen from the rear of the receiver. The counterpoise earth socket takes a plug and lead supplied with the receiver to remove the effects of hand capacitance and improve reception on all wavebands, particularly on s.w.

Circuit Description—continued

The resultant i.f. signal component in TR1 collector is selected by the tuned primary L13 and coupled via L14 to a two-stage i.f. amplifier TR2 and TR3, and the amplified output from TR3 is applied to the detector diode X1. X1 is connected so that the output is positive-going, and the d.c. voltage developed across R11 which is a function of signal strength, is fed via R9 to the base of TR2 as a.g.c. bias. R.f. elements are filtered by C24, R10 and C25 and the a.f. signal present across R11 is coupled via the slider and C27 to the base of the pre-amplifier TR4. High audio frequencies may be attenuated by shunting C26 across the volume control via the tone switch S16.

TR4 is directly coupled to the driver TR5, and output from TR5 is applied in anti-phase to the bases of TR6 and TR7 via the split-secondary transformer L19-L21. Negative feedback is achieved by coupling the secondary of the output transformer L22-L24, via C30 and R22, to TR5 base.

CIRCUIT ALIGNMENT

Equipment Required.—An audio output meter with an impedance to match 10Ω; an a.m. signal generator; a length of insulated wire for r.f. coupling; a 4.7pF capacitor and a 0.03μF capacitor.

During alignment the signal input level should be adjusted so that the receiver output is 50mW with the volume control at maximum.

- 1.—Switch receiver to m.w. and connect the signal generator via a 0.03μF capacitor to L1. Disconnect the loudspeaker and connect the audio output meter across the loudspeaker leads. Turn the volume control to maximum and the tuning gang to minimum.
- 2.—Feed in a 470kc/s signal and adjust L17, L15 and L13 in that order for maximum output. Repeat as necessary.
- 3.—Check that with tuning gang turned to minimum, the cursor lines up with the "m" at the left-hand end of the scale. Adjust if necessary. Couple the signal generator to the receiver by winding two or three turns of insulated wire round the centre of the ferrite rod and connecting a low impedance output from the generator to the wire.
- 4.—Switch receiver to l.w. and turn the tuning gang to maximum. Feed in a 148kc/s modulated signal and adjust L8 for maximum output.
- 5.—Switch receiver to m.w. and turn the

tuning gang to minimum. Feed in a 1,635kc/s signal and adjust C7 for maximum output.

- 6.—Switch receiver to l.w. Feed in a 262kc/s signal and, with the tuning gang at minimum, adjust C23 for maximum output.
- 7.—Switch receiver to s.w. and turn the tuning gang to maximum. Connect the signal generator via a 4.7pF capacitor to the telescopic aerial. Feed in a 5.8Mc/s signal and adjust L11 for maximum output.
- 8.—Turn the tuning gang to minimum. Feed in a 15.6Mc/s signal and adjust C6 for maximum output.
- 9.—Switch receiver to l.w. and connect the signal generator to the r.f. coupling loop. Feed in a 158.5kc/s signal and tune the receiver to this signal for maximum output. Then adjust L1 for maximum output.
- 10.—Feed in a 250kc/s signal and tune receiver to this signal. Then adjust C10 for maximum output.
- 11.—Switch receiver to m.w. and feed in a 517kc/s signal. Tune receiver to this signal then adjust L3 for maximum output.
- 12.—Feed in a 1,635kc/s signal and tune receiver to this signal. Then adjust C12 for maximum output.
- 13.—Switch receiver to s.w. and turn the tuning gang to maximum. Connect the signal generator to the telescopic aerial via a 4.7pF capacitor. Feed in a 5.8Mc/s signal and adjust L5 for maximum output.
- 14.—Feed in a 15.2Mc/s signal and tune receiver to this signal. Then adjust C11 for maximum output.

GENERAL NOTES

Dismantling.—To separate the case moulding for servicing access, place the receiver face

downwards and remove two screws from the receiver back.

Unscrew the waveband lever knob, remove two screws above the tuning knob and two screws above the volume control.

The battery compartment flap can now be removed and the front section of the case lifted away.

When reassembling the case it is important to ensure that the locating lugs on their respective mouldings interlock correctly.

To remove the chassis completely, unsolder the battery negative lead, speaker leads and the leads to the tone switch S4.

Undo the locking nuts and remove the two external sockets.

Unsolder the lead to the telescopic aerial and the printed panel end of the red lead from S17.

Remove two securing screws, one below the tuning gang, the other above the volume control and lift the chassis clear.

Switches.—S1-S15 are waveband switches which are located in a lever-operated slide unit on the printed panel. On the circuit diagram, code letters s, m and l are used against the switch numbers to indicate their closed position.

S16 is the tone switch and S17 the battery on/off switch.

Drive Cord Replacement.—To fit a replacement drive assembly, three separate cords should be made up to the dimensions given in the illustration below. Fit and route the cords as shown in the diagram.

Batteries.—Four 1.5V Ever Ready D14 or U12, or Vidor VOO30 or VOO28.

Drive cord assembly illustrating the condition of each cord (A, B and C) with the tuning drum turned fully anticlockwise

