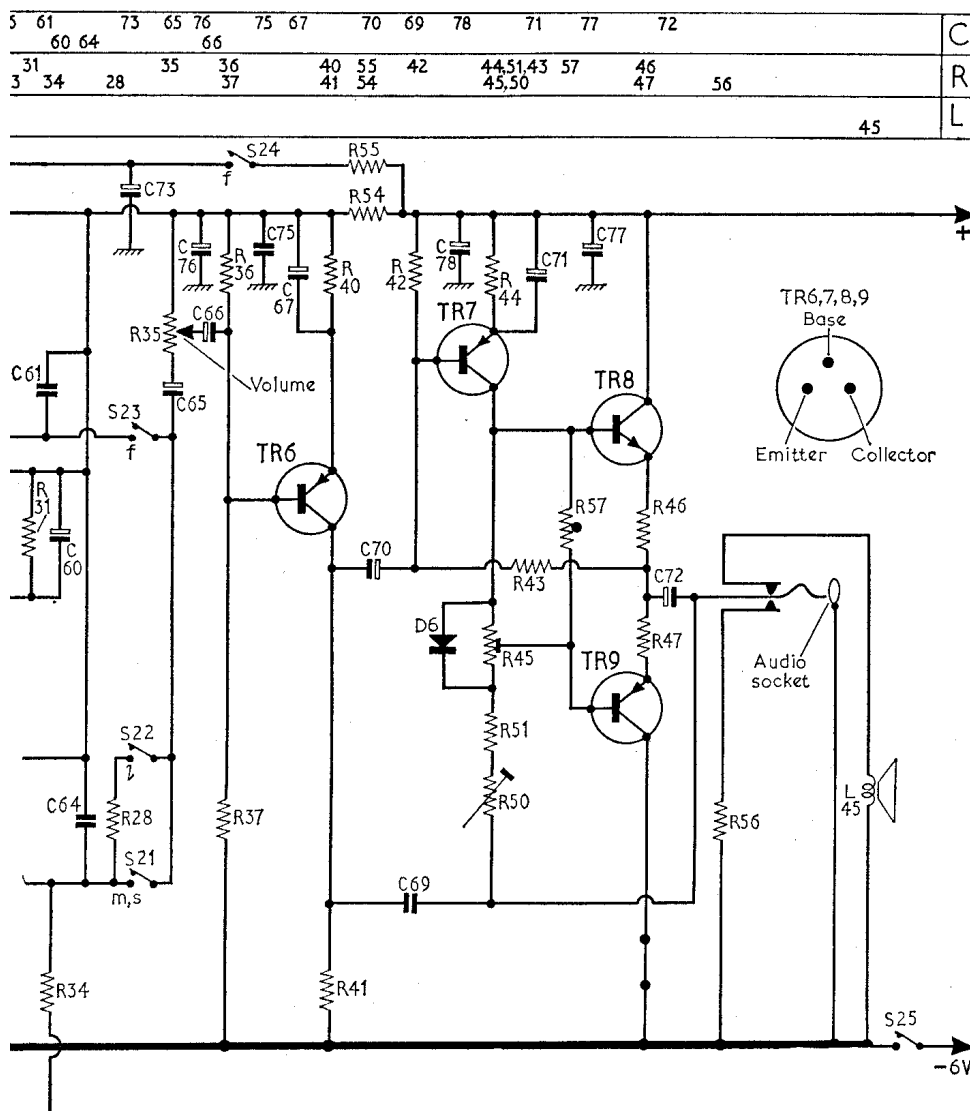


Resistors			Capacitors			Coils			Miscellaneous		
R1	820Ω	D3	C1	33pF	D3	L1	—	D3	D1	AA119	D3
R2	5.6kΩ	D3	C2	4,700pF	D3	L2	—	D3	D2	AA119	B2
R4	3.9kΩ	D3	C3	4,700pF	D3	L3	—	D3	D3	AA119	B2
R5	18kΩ	D3	C4	4,700pF	D3	L4	—	D3	D4	OA90	A2
R6	470Ω	D3	C5	16pF	D3	L5	—	D3	D5	OA90	B2
R7	220Ω	D3	C6	4pF	D3	L6	—	D3	D6	BA100	B2
R10	1.5kΩ	A1	C7	4,700pF	D3	L7	—	D3	D7	—	A1
R11	10kΩ	B1	C8	4,700pF	D3	L8	—	D3	S1-S24	—	B2
R12	1.8kΩ	B1	C9	470pF	D3	L9	—	D3	S25	—	A1
R13	330Ω	B1	C10	2.7pF	D3	L10	—	D3			
R14	15Ω	B1	C11	6pF	D3	L11	—	D3			
R15	1kΩ	B1	C12	15pF	D3	L12	—	D3			
R16	82kΩ	B1	C13	82pF	D3	L13	—	D3			
R20	1kΩ	A2	C14	82pF	D3	L14	—	D3			
R21	1.2kΩ	B2	C15	4,700pF	D3	L15	—	D3			
R22	220Ω	B2	C16	47pF	C1	L16	—	D3			
R23	2.2kΩ	B2	C17†	1,000pF	C1	L17	—	D3			
R24	1.5kΩ	B2	C18	330pF	B1	L18	—	D3			
R25	220Ω	B2	C19	40pF	B1	L19	—	D3			
R26†	1kΩ	B2	C20	150pF	B1	L20	—	D3			
R28	1.5kΩ	B1	C21	40pF	B1	L21	—	D3			
R30	220Ω	B2	C22	40pF	B1	L22	—	D3			
R31	10kΩ	B2	C23	68pF	B2	L23	—	D3			
R32	10kΩ	A2	C24	—	B2	L24	—	D3			
R33	1.8kΩ	A2	C25	—	B2	L25	—	D3			
R34	15kΩ	A2	C26	—	B2	L26	—	D3			
R35	10kΩ	A1				L27	—	D3			
R36	10kΩ	A1				L28	—	D3			
R37	39kΩ	A1				L29	—	D3			
R40	680Ω	A1				L30	—	D3			
R41	1.5kΩ	A1				L31	—	D3			
R42	4.7kΩ	A2				L32	—	D3			
R43	22kΩ	A2				L33	—	D3			
R44	56Ω	A2				L34	—	D3			
R45	500Ω	A2				L35	—	D3			
R46	2.7Ω	A2									
R47	2.7Ω	A2									



Transistor Table

Transistor	Emitter (V)	Base (V)	Collector (V)
TR1	AF121	1.4	1.7
TR2	AF124	1.3	1.35
TR3	AF126	1.5	1.8
TR4	AF126	1.3	1.5
TR5	AF121	1.5	1.8
TR6	AC125	1.4	1.5
TR7	AC126	0.3	0.45
TR8	AC127	3.35	3.2
TR9	AC128	3.35	3.5

GENERAL DESCRIPTION

HOUSED in a padded leathercloth plastics case of "pocket-portable" dimensions, Philips L2X42T (242T) is an a.m./f.m. 6V battery operated nine transistor radio receiver.

Waveband ranges are 1,150–2,000m (l.w.), 184.9–580m (m.w.), 40.54–50.8m (s.w.) and 87.5–104Mc/s (f.m.), with waveband selection by means of a slider switch operated by a lever located at the rear of the receiver.

A telescopic aerial is fitted for f.m. and s.w. reception while an internal ferrite rod aerial provides reception on m.w. and l.w.

A socket is provided for the connection of an external loudspeaker or earphone, the internal loudspeaker being muted automatically on insertion of a jack plug into this socket.

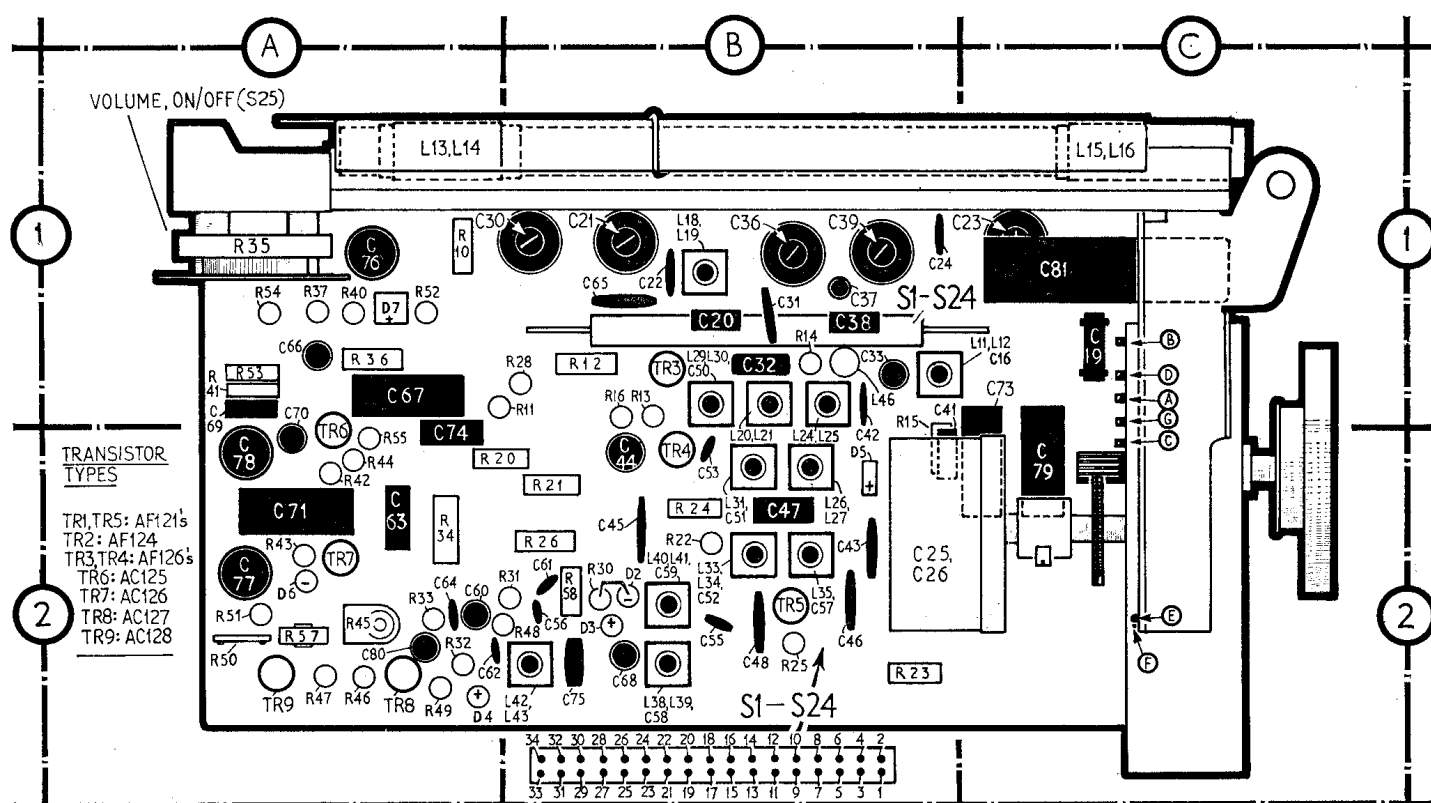
200mW audio output is available which is handled by the internal 3in loudspeaker.

Four 1.5V U12 batteries supply operating power and are fitted in a separate compartment in the bottom of the case.

TRANSISTOR ANALYSIS

Transistor voltages quoted in the table above were taken from data supplied by the manufacturers and were measured on a 40,000Ω/V test meter. All readings are negative with respect to battery positive.

(Continued overleaf col.1)



General view of chassis as seen from the front when removed from the case. The numbers on the waveband switch (location ref. B2) agree with those in the sketch below.

Continued from overleaf—

CIRCUIT DESCRIPTION

Operation on A.M.—On m.w. and l.w., signals induced into the ferrite rod aerial coils L13 (m.w.) and L15 (l.w.), are tuned by C30 and C25 on m.w. and by C23, C24 and C25 on l.w. They are coupled by L14 and L16 respectively to the base of TR3 via the appropriate switch contacts.

On s.w. a separate aerial coil (L18) is used in conjunction with the telescopic aerial. L18 is tuned by C20, C21, C22 and C25. Signals are coupled to the base of TR3 by L19.

TR3 and TR5 derive their base bias from a stabilised bias line fed from the potential divider R53/D7 and filtered by R52/C74. TR4 is a.g.c. controlled.

TR3 functions as a self-oscillating mixer on a.m. and an i.f. amplifier on f.m.

On m.w., L20 is the oscillator coil, tuned by C36, C38 and C26 while on l.w. the same coil is used but C37 is switched in parallel with C36 and C38/C26.

On s.w. L24 is the oscillator coil, tuned by C39, C42, C38 and C26.

The a.m. i.f. component appears across the first a.m. i.f. transformer L26 and is coupled to the base of TR4 by L27, L31

and C51. D5 is effectively connected across L26 and damps L26 progressively as the voltage across R23 varies due to a.g.c. action on TR4.

After amplification by TR4 i.f. signals appear across L35, the second a.m. i.f. transformer, and are bottom-coupled by C57 to the base of TR5. After further amplification signals appear across the final a.m. i.f. transformer L42 and are coupled, via L43, to the a.m. demodulator diode D4.

Audio output from the demodulator is filtered by C62, R33 and C64 and passed, via the appropriate switch contacts and C65 to the volume control R35.

Signals coupled from the volume control via C66 to the base of the a.f. amplifier TR6 appear across TR6 collector load R41, are passed to the driver transistor TR7 and, after amplification, appear in the base circuits of the complementary output transistors TR8 and TR9. Output from these is fed via C72 to the 8Ω loudspeaker L45.

Operation on F.M.—On f.m. the a.m. aerial and oscillator circuits are disconnected and TR3 becomes an f.m. i.f. amplifier. The i.f. output of the f.m. tuner unit being fed into the emitter of TR3 by S10, C32.

Signals from the telescopic aerial are coupled via L1/L2 to the base of TR1 which operates as an r.f. amplifier. Base bias for TR1 is derived from the stabilised bias line mentioned in "A.M. operation".

After amplification the signal appears across the permeability tuned r.f. coil L3 and are coupled to the emitter of TR2 via C6.

TR2 operates as a self-oscillating mixer. L5 is the permeability tuned oscillator coil tuned by C11 and C12. F.m. i.f. output appears across L6 and is coupled via L7, L11 and L12 to the emitter of TR3.

TR4 and TR5 function as f.m. i.f. amplifiers and the signal after amplification by TR4 and TR5 appears across the primary of the discriminator transformer which employs two separate transformers coupled together by L39 and L41.

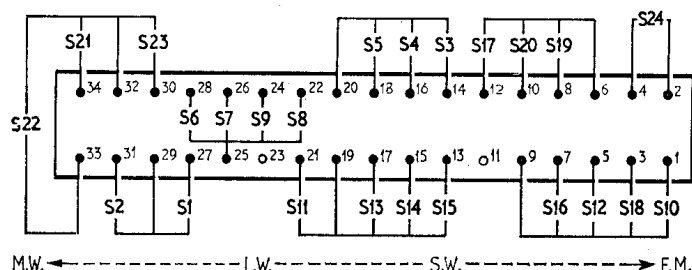
Audio output from the discriminator is fed via S23 to the audio amplifier stages.

CIRCUIT ALIGNMENT

Equipment Required.—An a.m. signal generator covering the range 150kc/s–104Mc/s; an audio output meter with an impedance to match 8Ω and a valve voltmeter. Also required are: two matched 220kΩ resistors connected in series, with a crocodile clip at the free end of each resistor; a 10kΩ resistor with crocodile clips at each end; one 0.033μF capacitor; one 1,500pF capacitor; a length of insulated wire with which to form an r.f. coupling loop around the ferrite rod aerial and suitable non-ferrous trimming tools.

A.M. CIRCUITS

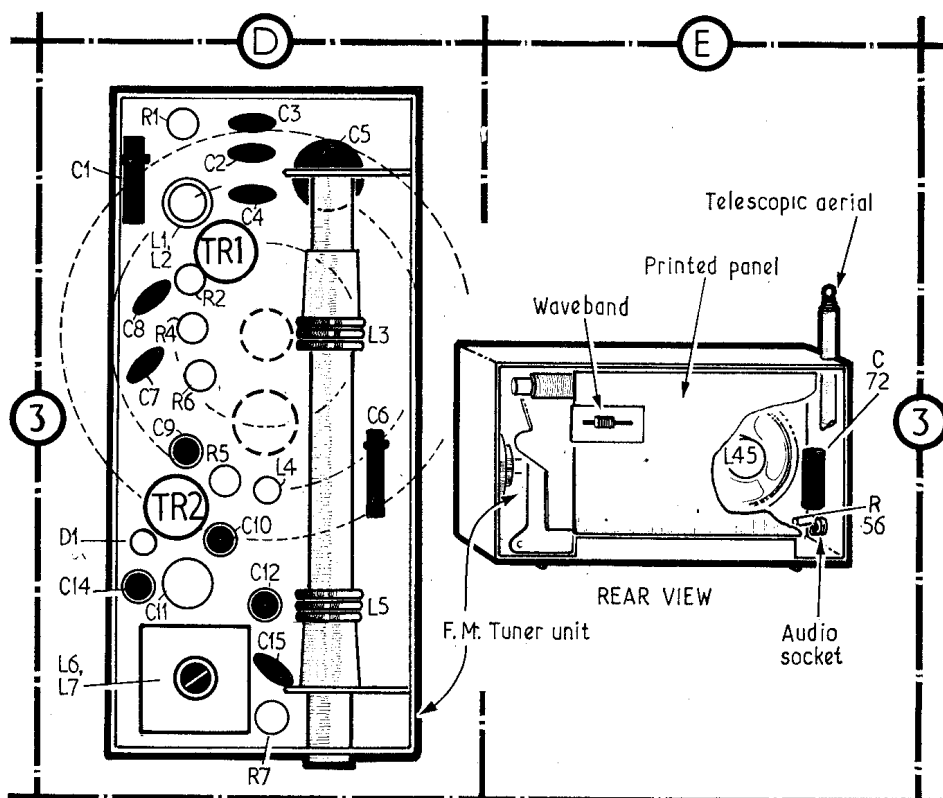
- 1.—Connect the audio output meter in place of the loudspeaker. Connect the output of the signal generator to the base



Left: Waveband switch (S1-S24.) as viewed from the component side of the panel as in the above illustration.

of TR3 via a 0.033 μ F capacitor. Switch to m.w.

- 2.—Turn the volume control to maximum and the tuning gang to minimum capacitance. Feed in a 470Kc/s signal 30 per cent modulated.
- 3.—Adjust the cores of L42, L35, L31 and L26 for maximum output, adjusting the input level to maintain an output of approximately 50mW.
- 4.—Disconnect the 0.033 μ F capacitor and connect the output of the signal generator to a few turns of insulated wire wound round the ferrite rod aerial.
- 5.—With the receiver still switched to m.w., turn the tuning gang to maximum capacitance and feed in a 510kc/s signal.
- 6.—Adjust L20 for maximum output.
- 7.—Turn gang to minimum capacitance and feed in a 1,650kc/s signal.
- 8.—Adjust C36 for maximum output.
- 9.—Tune receiver to 517m. and feed in a 550kc/s signal, adjust L13 for maximum output.
- 10.—Tune to 222m and feed in a 1,350kc/s signal. Adjust C30 for maximum output.
- 11.—Switch to l.w., turn tuning gang to maximum and feed in a 147kc/s signal.
- 12.—Adjust C37 for maximum output.
- 13.—Tune to 1,765m and feed in a 170kc/s signal.
- 14.—Adjust L15 for maximum output.
- 15.—Tune to 1,200m and feed in a 250kc/s signal.
- 16.—Adjust C23 for maximum output.
- 17.—Switch to s.w., turn gang to maximum capacitance. Extend the telescopic aerial and slide the r.f. coupling loop off the ferrite aerial and down over the telescopic aerial.
- 18.—Feed in a 5.85Mc/s signal and adjust L24 and then L18, both for maximum output.
- 19.—Turn gang to minimum capacitance and feed in a 7.6Mc/s signal.
- 20.—Adjust C39 and then C21, both for maximum output.
- 21.—Repeat all operations until no further improvement can be obtained.

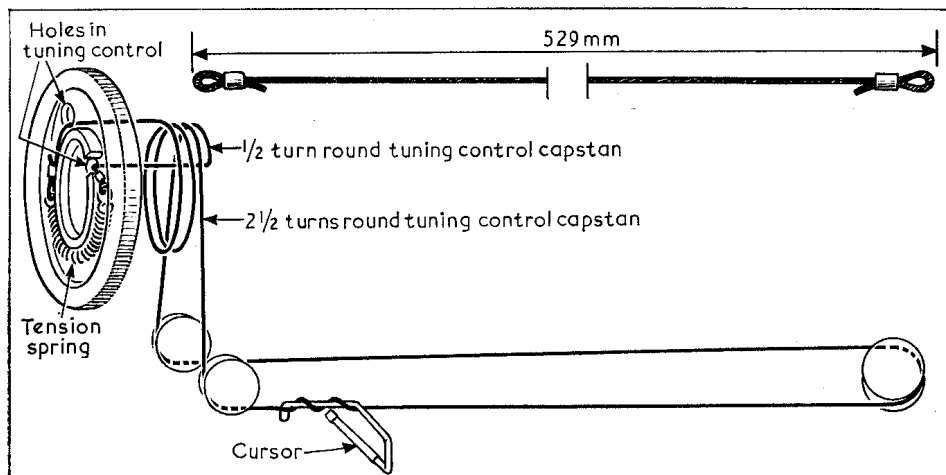


The component side of the f.m. tuner unit. Right: General view of the receiver with the back cover removed.

F.M. CIRCUITS

- 1.—Disconnect the audio output meter and remove the r.f. coupling loop.
- 2.—Connect the output of the signal generator to the telescopic aerial via a 1,500pF capacitor.
- 3.—Connect the valve voltmeter across C60 and switch to its 5V range.
- 4.—Tune to the low frequency end of the scale and switch to f.m. Turn the volume control to minimum.
- 5.—Unscrew the cores of all f.m. i.f. transformers until they protrude from the formers.
- 6.—Feed in a 10.7Mc/s a.m. signal and adjust L38 for maximum d.c. output on the valve voltmeter.

- 7.—Connect a 10k Ω damping resistor across L38 and the two 220k Ω resistors across C60, connect the valve voltmeter between the junction of the 220k Ω resistors and the junction of R58/C61.
- 8.—Adjust the core of L40 for zero reading on the valve voltmeter.
- 9.—Remove the 220k Ω resistors and re-connect the valve voltmeter, as before, across C60.
- 10.—Adjust the cores of L33, L29, L11 and L6 for maximum d.c. output on the valve voltmeter.
- 11.—Repeat operations 6–10.
- 12.—Tune receiver to 88.2Mc/s and feed an 88.2Mc/s a.m. signal into the telescopic aerial.
- 13.—Adjust L5 for maximum d.c. output on the valve voltmeter.
- 14.—Tune receiver to 102.6Mc/s and feed in a 102.6Mc/s signal.
- 15.—Adjust C11 for maximum output.
- 16.—Tune receiver to 95Mc/s and feed in a 95Mc/s signal.
- 17.—Adjust L3 for maximum output.
- 18.—Repeat operations 12–17.



Sketch of the tuning drive cord assembly with the gang at maximum, as seen from the component side with the chassis inverted.