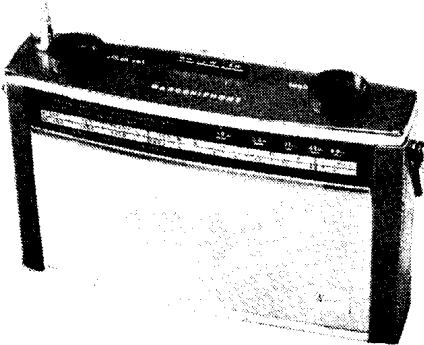


"TRADER" SERVICE SHEET
1708

Marconiphone 4116

Three Waveband Portable Radio Receiver



EMPLYING seven transistors and two crystal diodes, Marconiphone 4116 is a three waveband portable radio receiver which operates from a 9V dry battery.

A ferrite rod internal aerial is used for reception of the m.w. (185-565m) and l.w. (1,120-2,050m) bands; the short waveband (17.6-51m) is covered using a tuned input transformer and telescopic aerial. An external socket provides for the connection of a car type aerial, while a second socket allows the output to be fed to an ear-phone or tape recorder input.

A transformerless complementary push-pull output stage is featured which provides 300mV audio power to a 3 $\frac{1}{2}$ in 15 Ω loud-speaker.

Release date and original price: March 1964
£12 3s 10d. Purchase tax extra.

TRANSISTOR ANALYSIS

Transistor voltages given in the table below were taken from information supplied by the manufacturers. They were measured on a 20,000 Ω /V meter and are negative with respect to battery positive.

CIRCUIT ALIGNMENT

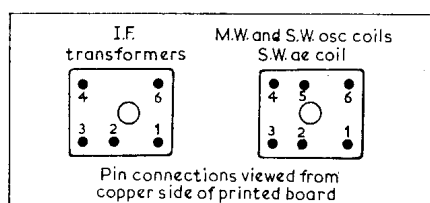
Equipment Required.—An a.m. signal generator modulated 30 per cent; an audio output meter with an impedance of 15 Ω , or alternatively a model 8 Avometer set to its 10V a.c. range; a 0.1 μ F capacitor and a 25pF capacitor, and a length of insulated wire to be used as an r.f. coupling loop.

During alignment the input signal level

(Continued overleaf, col. 1)

Resistors			Capacitors			Coils†			Miscellaneous		
R1	5.6k Ω	A1	C1	6.8pF	A1	L1	—	A1	S1-S15	—	B1
R2	27k Ω	A1	C2	25pF	A1	L2	1.0	A1	S16	—	A1
R3	1k Ω	B1	C3	255pF	C1	L3	10.0	C1	W1	OA70	A2
R4	100k Ω	B1				L4	—	A1	W2	AA120	A2
R5	100k Ω	B2				L5	—	A1			
R6	680 Ω	B2									
R7	10k Ω	B2									
R8	27k Ω	B2									
R9	5.6k Ω	B2									
R10	560 Ω	B2									
R11	4.7k Ω	A2									
R12	5k Ω	A1									
R13	800 Ω	A2									
R14	12k Ω	A2									
R15	82k Ω	A2									
R16	12k Ω	A1									
R17	100 Ω	A2									
R18	390 Ω	A2									
R19	680 Ω	A2									
R20	5.6 Ω	A2									
R21	2.2 Ω	A2									
R22	2.2 Ω	A2									
R23	100 Ω	A2									
R24	10 Ω	B2									

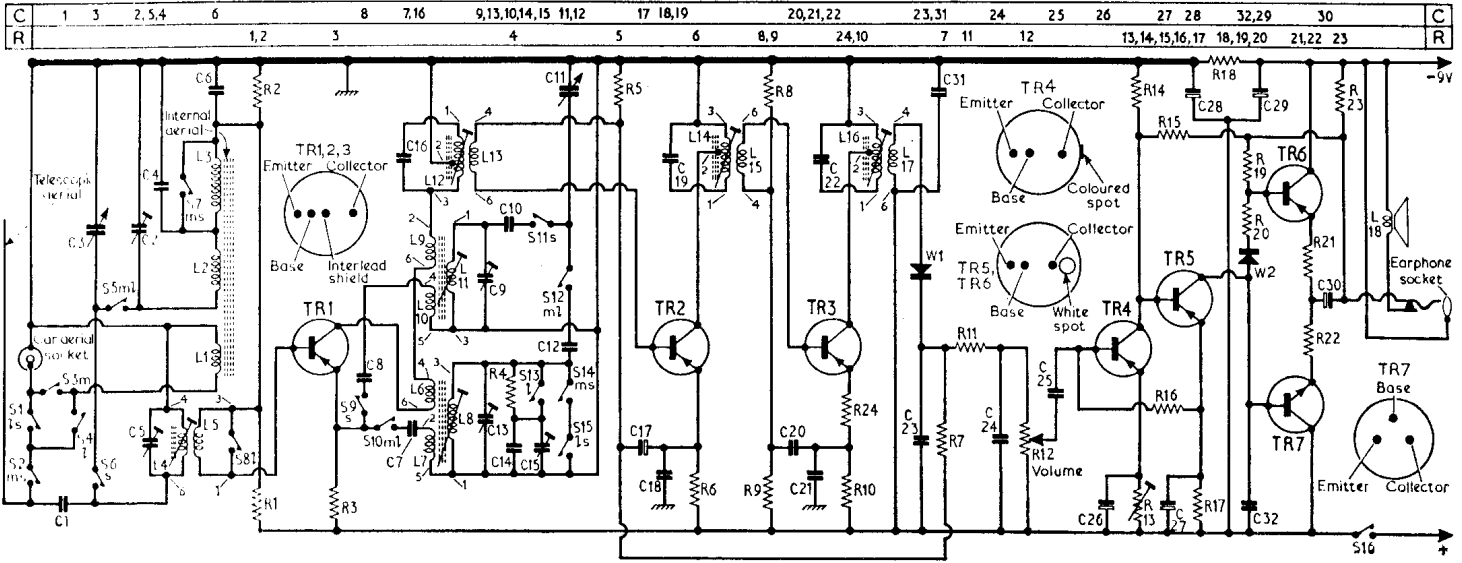
The component numbers in these tables correspond with those used in the receiver manufacturer's service manual



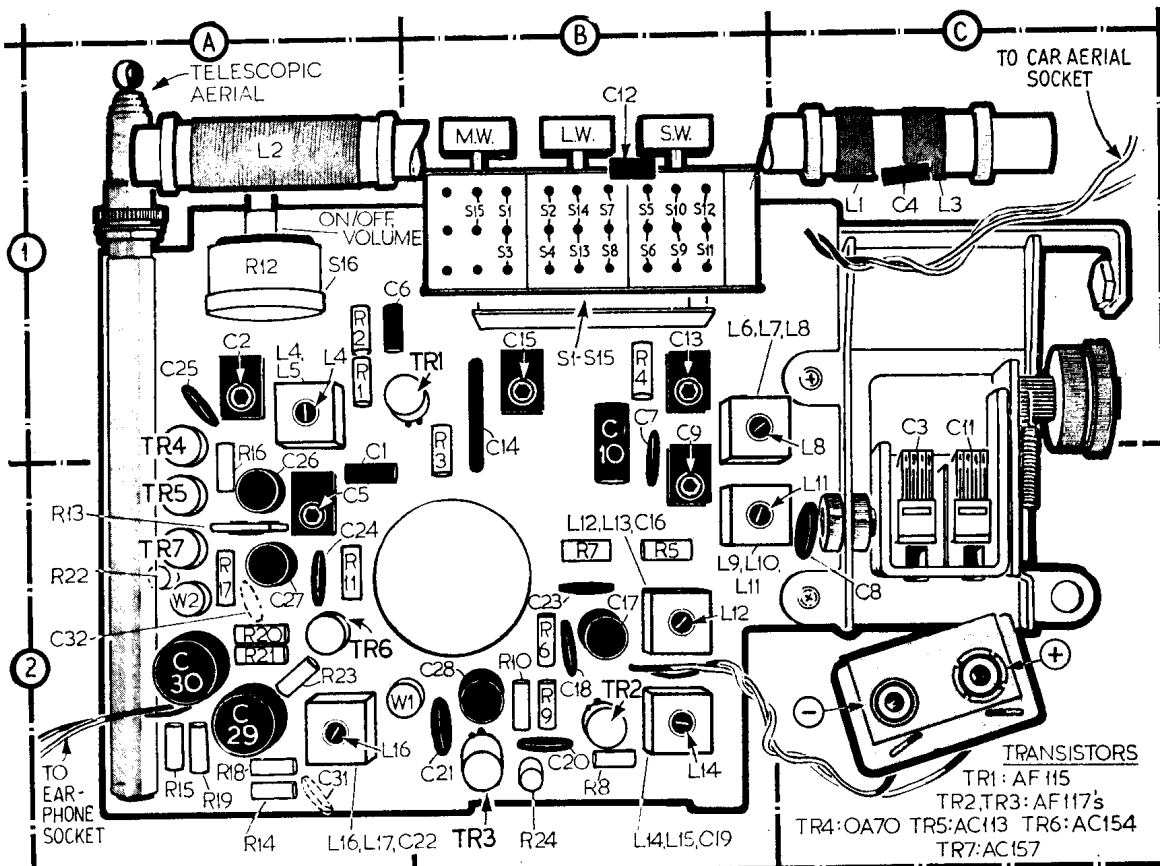
Transistor Table

Transistor	Emitter (V)	Base (V)
TR1 AF115	1.0	1.1
TR2 AF117	0.45	0.65
TR3 AF117	0.95	1.1
TR4 OC71*	0.2	0.3
TR5 OC81D*	0.55	0.7
TR6 OC81*	5.0†	5.15
TR7 AC127*	5.0†	4.85

*In some receivers TR4 may be AC155, TR5 AC113† TR6 AC154 and TR7 AC157.
†Measured at the junction of R21 and R22.



Circuit diagram of Marconiphone 4116 three waveband portable radio receiver



The chassis removed from its case showing component locations, alignment adjustments and wave-band switch connections. Signals from the car aerial socket are coupled to the ferrite rod by winding L1. In the list of transistor types in location reference C2, TR4 should read OC71

Continued—

should be regulated to maintain a receiver output level of 50mW.

- 1.—Switch receiver to m.w. and turn the tuning gang to maximum capacitance. Set the volume control to maximum output. Connect the audio output meter in place of the loudspeaker or connect the Avometer across the speaker speech coil.
- 2.—Connect the signal generator via the 0.1µF capacitor across the tuning gang aerial section C3. Feed in a 475kc/s 30 per cent modulated signal and adjust L16, L14 and L12 for maximum output, repeating until there is no further improvement.
- 3.—Connect the signal generator to the r.f. coupling loop and loosely couple the loop to the ferrite rod aerial. Tune receiver to 500m. Feed in a 600kc/s signal and adjust L8 and L2 for maximum output.
- 4.—Tune receiver to 200m. Feed in a 1,500kc/s signal and adjust C13 and C2 for maximum output.
- 5.—Repeat operations 3 and 4 for correct calibration.
- 6.—Switch receiver to l.w. and adjust the tuning so that the cursor lies exactly under the "14" of 1,400m on l.w. scale. Feed in a 220kc/s signal and adjust C15 and L3 for maximum output.
- 7.—Disconnect the lead from the telescopic aerial tag and connect the signal generator via the 25pf capacitor to the lead. Unscrew the core of L11 until it just protrudes from its can.
- 8.—Switch receiver to s.w. and adjust the tuning so that the m.w. cursor coincides with the centre of the 500m mark on the m.w. scale. Feed in a 6.77Mc/s signal and screw in the core of L11 to obtain maximum output from the third peak. Then adjust L4 for maximum output.
- 9.—Adjust the tuning control so that the

m.w. and l.w. cursor coincides with the centre of the 200m mark on the m.w. scale. Feed in a 15.45Mc/s signal and adjust C9 and C5 for maximum output.

- 10.—Repeat operations 7, 8 and 9 for correct calibration and output.

GENERAL NOTES

Dismantling.—To remove the printed panel from the case, first release the back cover by pulling the lower edge. Remove the battery and pull off the volume control and tuning knobs. Unscrew the handle fixings.

Take out the fixing screw and washer from the bottom right-hand corner of the printed panel and screw and washer securing the tuning gang bracket, when the printed panel may be withdrawn and turned over.

To gain access to the drive cord, unscrew the milled-edge bush from the nut to release the tag connection, then withdraw the telescopic aerial from the front panel. Remove the nut securing the volume control and unsolder the car aerial and tuning gang

Scale drive assembly shown with the tuning gang fully closed. Approximately 30 in of nylon braided cord is required for replacement

leads. Remove six screws and battery lead clamp securing the printed panel to the front panel and tuning gang bracket. The tuning gang and drive cord assembly may now be withdrawn.

Output Balance Adjustment.—R13 is incorporated in the emitter circuit of TR4, and its adjustment sets the collector potential of TR4 and hence the base potential of the driver TR5. TR5 collector is in turn directly coupled to the bases of TR6 and TR7 so that

the setting of R13 ultimately determines the base bias of TR6 and TR7, which should be such that the output transistors are correctly balanced across the battery supply.

Correct balance is obtained when the potential at the emitter junction is 5V with respect to battery positive.

Battery.—9V Ever Ready PP6 or equivalent.

Servicing.—To avoid the risk of short-circuiting series resistor R18, any test equipment which has earthed output connections should be suitably isolated from the receiver chassis. A transistor should not be removed unless voltage checks indicate that it is faulty and requires replacement. Before replacing a transistor check that its failure has not been precipitated by a defective associated circuit component. The lead wires of the new transistor should not be shorter than those of the one removed and should be gripped with a pair of pliers while soldering to reduce heat conduction to the transistor.

