

"TRADER" SERVICE SHEET
1672

MARCONIPHONE 4102

Portable Transistor Radio Receiver

MARCONIPHONE 4102 is a portable radio receiver which uses six transistors and covers medium and long wavebands operating from an internal ferrite rod aerial. 6V battery power is obtained from four 1½V dry cells. A socket is provided for the connection of an external car-type aerial.

Waveband ranges are 185-565m (m.w.) and 1,120-2,025m (l.w.). Power output is 400mW.

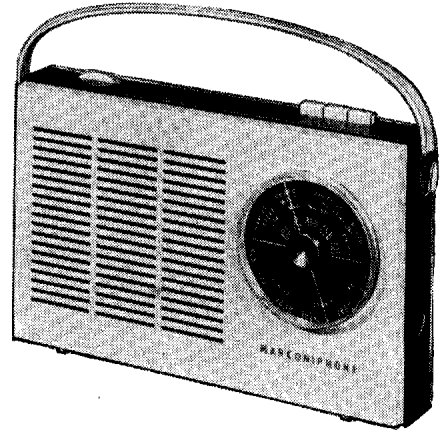
Release date and original price: April, 1962. £10 16s 7d. Purchase tax extra.

TRANSISTOR ANALYSIS

Transistor voltages given in the table in col. 3 were taken from information supplied by the manufacturer. In every case they are negative with respect to battery positive.

Receiver current consumption should be 10mA quiescent, rising to 75mA for 50mW output, and 150mA for 300mW output. Apart from total current consumption, no other current measurements should be attempted.

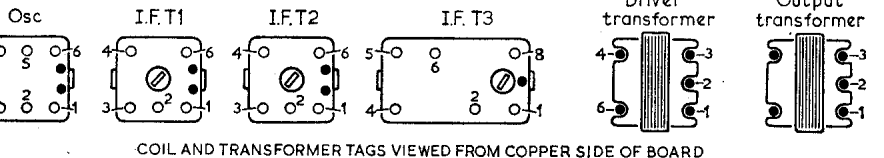
Oscillator Check.—To check the oscillator for operation, measure the voltage across



R2 which should be 0.6V. Then short-circuit the tuning gang oscillator section **C5** when the voltage across **R2** should fall by approximately 0.07V. If no change in voltage occurs, it may be assumed the oscillator is not functioning. The oscillator voltage measured with an oscilloscope across **R2** should be approximately 250mV peak-to-peak.

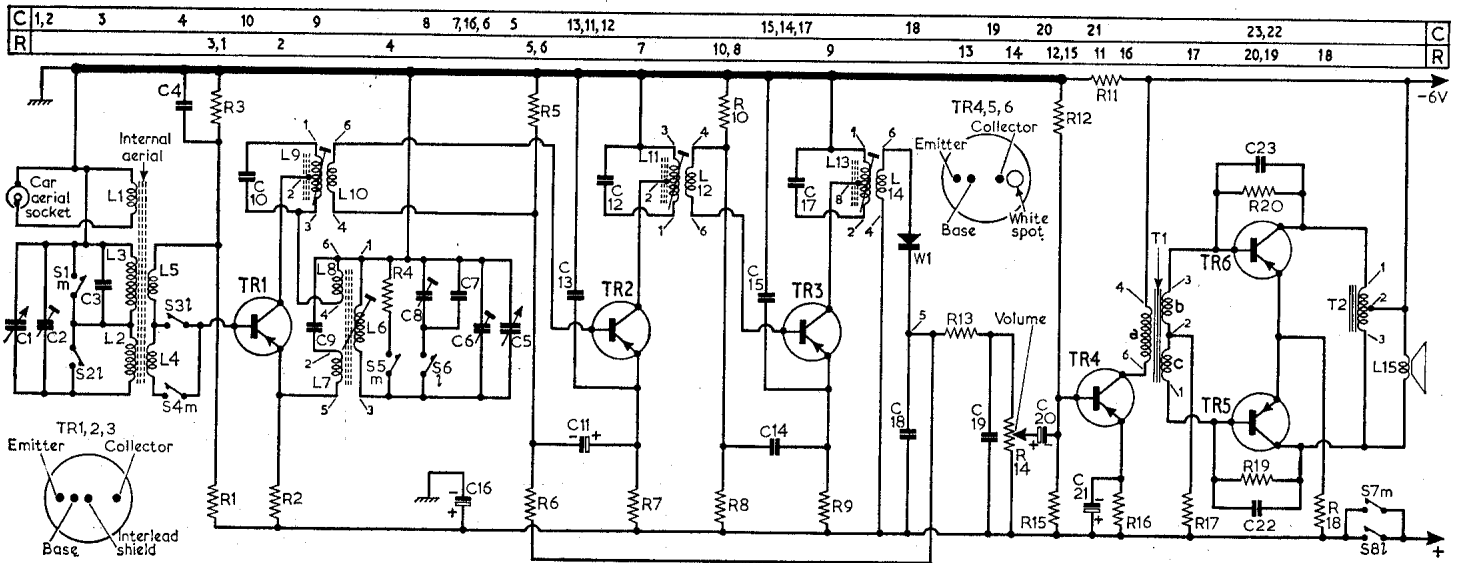
(Continued overleaf, col. 1)

Resistors		Capacitors		Coils*		Transformers*		Miscellaneous	
R1	6.8kΩ	C1	—	L1	—	T1	a 300.0	S1-S8	D1
R2	680Ω	C2	D3	L2	1.25	T1	b 55.0	W1	OA90
R3	33kΩ	C3	D3	L3	13.5	T1	c 55.0		
R4	100kΩ	D1	D1	L4	—	T2	a 1.7		
R5	56kΩ	B1				T2	b 1.7		
R6	8.2kΩ	B2							
R7	470Ω	B2							
R8	4.7kΩ	B2							
R9	680Ω	B3							
R10	22kΩ	B2							
R11	220Ω	A2							
R12	22kΩ	A1							
R13	1kΩ	B1							
R14	5kΩ	A1							
R15	6.8kΩ	A2							
R16	470Ω	B2							
R17	47Ω	B2							
R18	2.2Ω	B2							
R19	5.6kΩ	A2							
R20	5.6kΩ	A3							

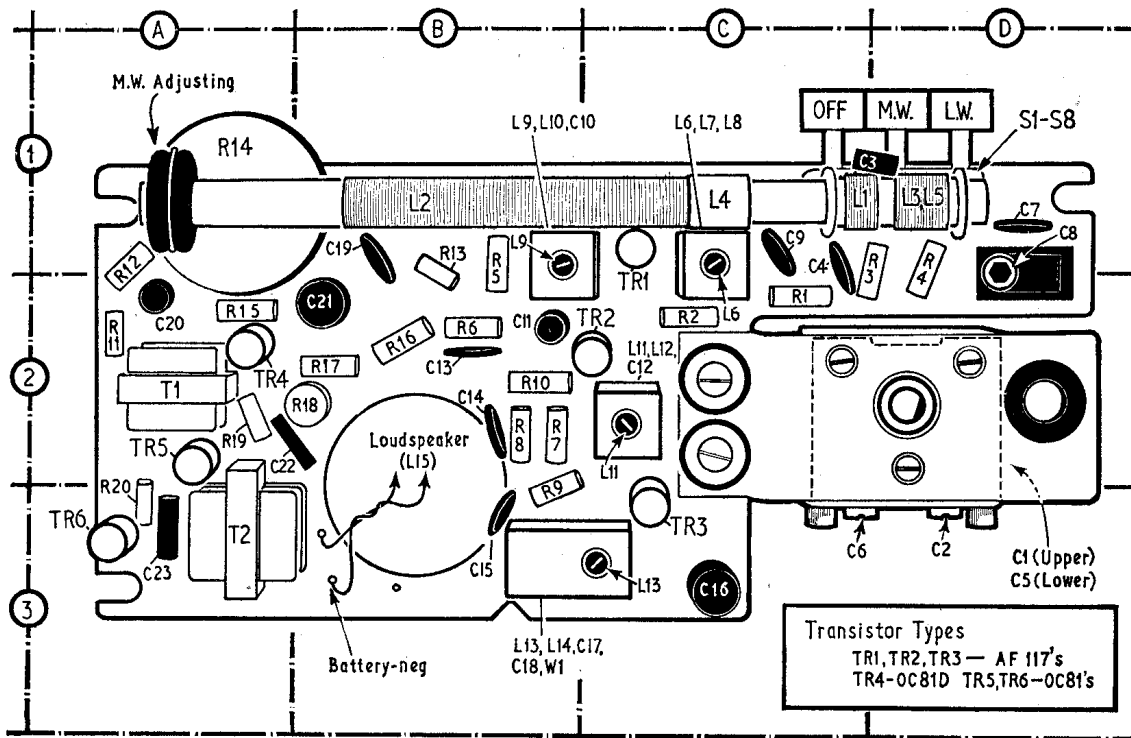


Transistor Table

Transistor	Emitter (V)	Base (V)
TR1	0.6	0.75
TR2	0.47	0.67
TR3	0.6	0.82
TR4	0.84	0.91
TR5	0.13	0.1
TR6	0.13	0.1



Circuit diagram of the Marcomiphone 4102



General view of the chassis showing component side of printed panel after removal from the cabinet. A separate diagram of the waveband switches is illustrated below

Continued—

CIRCUIT DESCRIPTION

Ferrite rod aerial tuned circuits L2 (m.w.) and L3, C3 (l.w.) are inductively coupled via L4 or L5 to the base of the self-oscillating mixer TR1. Tuning components C1 and C2 are common to both m.w. and l.w. sections of the aerial, the windings not in use being appropriately short-circuited by S1 or S2. Signals from the car aerial socket are inductively coupled to TR1 input circuit via L1.

L6 is the oscillator coil which is tuned by C5 and C6, with C7 and C8 added in parallel on l.w., and feedback from collector to emitter is provided by L7 and L8. R4 provides oscillator damping on m.w. Base bias for TR1 is derived from the potential divider R1/R3 in conjunction with the emitter stabilizing resistor R2.

Intermediate frequency signals in TR1 collector circuit are at 475kc/s and these are coupled via the single-tuned transformer L9/L10 to the base of the a.g.c.-controlled i.f. amplifier TR2 and from TR2 collector via a similar coupling L11/L12 to the second i.f. amplifier TR3.

Amplified output from TR3 is applied via L13/L14 to the detector diode W1 and audio output from W1 is filtered by R13 and C19 and developed across the load resistor R14. R14 also operates as the volume control and signals from its slider are coupled via isolating capacitor C20 to the base of TR4. The volume control is also part of the potential dividing network R5, R6, R13, R14 and the positive d.c. voltage output from W1 developed across R13 and R14, is decoupled by C11 and fed to the base of TR2 as a.g.c. bias.

The audio amplifier comprises TR4 (driver) and TR5 and TR6 push-pull output transistors. Output from TR4 is coupled via the split-secondary transformer T1 connected in its collector circuit, to the bases of the output pair TR5 and TR6 which are connected for Class B operation. Negative feedback from collector to base is provided

by R19, C22 and R20, C23. Loudspeaker L15 is fed via the output transformer T2.

CIRCUIT ALIGNMENT

It is necessary to remove the chassis from the case to perform circuit alignment.

Equipment Required.—An audio output meter with an impedance of 35Ω, or alternatively an a.c. voltmeter used as an output meter (Avometer model 8 switched to its 2.5V a.c. range is suitable); an a.m. signal generator 30 per cent modulated; an r.f. coupling loop and a 0.1μF isolating capacitor.

- 1.—Connect the audio output meter in place of the loudspeaker or connect the a.c. voltmeter across the loudspeaker. Set the volume control at maximum. During alignment, adjust the signal input level to maintain an output of 50mW (1 to 1.4V on the voltmeter).
- 2.—Switch receiver to m.w. and turn the tuning gang to minimum capacitance. Connect the signal generator via the 0.1μF capacitor across the tuning gang aerial section C1. Feed in a 475kc/s modulated signal and adjust L13, L11 and L9 for maximum output. Repeat 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. Turn the tuning gang to maximum capacitance. Feed in a 530kc/s signal and adjust L6 for maximum output.
- 4.—Set the tuning gang to minimum capacitance. Feed in a 1,620kc/s signal and adjust C6 for maximum output.
- 5.—Repeat operations 3 and 4 until there is no further improvement.
- 6.—Feed in a 600kc/s signal and tune receiver to this signal. Adjust L2 for maximum output by sliding the adjusting ring along the ferrite rod.
- 7.—Feed in a 1,500kc/s signal and tune receiver to this signal. Adjust C2 for maximum output.
- 8.—Repeat operations 6 and 7 until there is no further improvement.

- 9.—Switch receiver to l.w. and set the tuning gang to a position which is 90 deg from the fully closed position. Feed in a 188kc/s signal and adjust C8 and L3 for maximum output. L3 is adjusted by sliding the former along the ferrite rod.

GENERAL NOTES

Dismantling.—Access to the battery container and the foil side of the printed panel is gained when the back cover is removed by undoing a single captive screw.

To remove the printed panel assembly complete with loudspeaker from the case, first remove the battery container, and pull off the tuning disc.

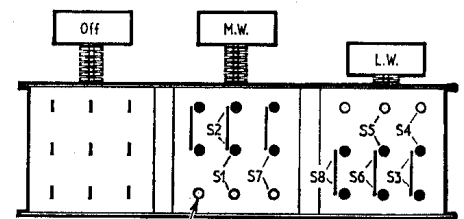
Lay the case face downwards and remove three screws located along the edges of the printed panel, and one screw securing the tuning gang mounting bracket to the case.

Tilt the assembly at the edge nearest the battery container and remove from the case.

The battery contacts may be withdrawn from their slots and the aerial sockets unsoldered.

When replacing the battery the positive contact should be in the slot adjacent to the aerial socket.

Batteries.—Four 1½V cells, Ever Ready U11 or equivalent.



SWITCH SHOWN WITH L.W. BUTTON DEPRESSED. WHEN OFF BUTTON IS OPERATED ALL SWITCHES ARE RETURNED MECHANICALLY TO THE UPPER POSITION