MARCONIPHONE - 4142

Transistor		Emitter (V)	Base (V)	Collector (V)
TR1	AF116	1·0	1·1	—
TR2	AF117	0·45	0·65	—
TR3	AF117	0·95	1·1	—
TR4	AC155	0·2	0·3	0·7
TR5	AC113	0·55	0·7	4·85
TR6	AC154	—	5·15	9·0
TR7	AC157	—	4·85	0

Total Current

Quiescent	17mA
50mW output	45mA
300mW output	90mA

A.G.C. Characteristic

Signal	A.G.C.
100μV	0·32V
1mV	0·175V
10mV	0·1V

Resistors

R1	5·6kΩ	C1
R2	27kΩ	C1
R3	1kΩ	C1
R4	100kΩ	C2
R5	100kΩ	C2
R6	680Ω	C2
R7	10kΩ	C2
R8	27kΩ	C2
R9	5·6kΩ	C2
R10	560Ω	B2
R11	4·7kΩ	B2
R12	5kΩ	B1
R13	1kΩ	B1
R14	12kΩ	B2
R15	47kΩ	B2
R16	12kΩ	B1
R17	100Ω	B1
R18	390Ω	B2
R19	680Ω	B2
R20	5·6Ω	B2
R21	2·2Ω	B2
R22	100Ω	B2
R23	2·2Ω	B2
R24	390Ω	C2

Capacitors

C1	20pF	C1
C2	25pF	C2
C3	255pF	C1
C4	60pF	B1
C5	25pF	C1
C6	1,300pF	C1
C7	0·01μF	C2
C8	5,000pF	C2
C9	25pF	C1
C10	2,000pF	C1
C11	255pF	C1
C12	250pF	B1
C13	25pF	C2
C14	230pF	C2
C15	25pF	C2
C16	175pF	C2
C17	75μF	C2
C18	0·02μF	C2
C19	175pF	C2
C20	0·02μF	C2
C21	0·02μF	C2
C22	175pF	B2
C23	0·02μF	B2
C24	0·01μF	B1
C25	0·47μF	B1
C26	25μF	B1
C27	75μF	B2
C28	75μF	B2
C29	75μF	B2
C30	100μF	B2
C31	1,000pF	B2

Coils and Transformers*

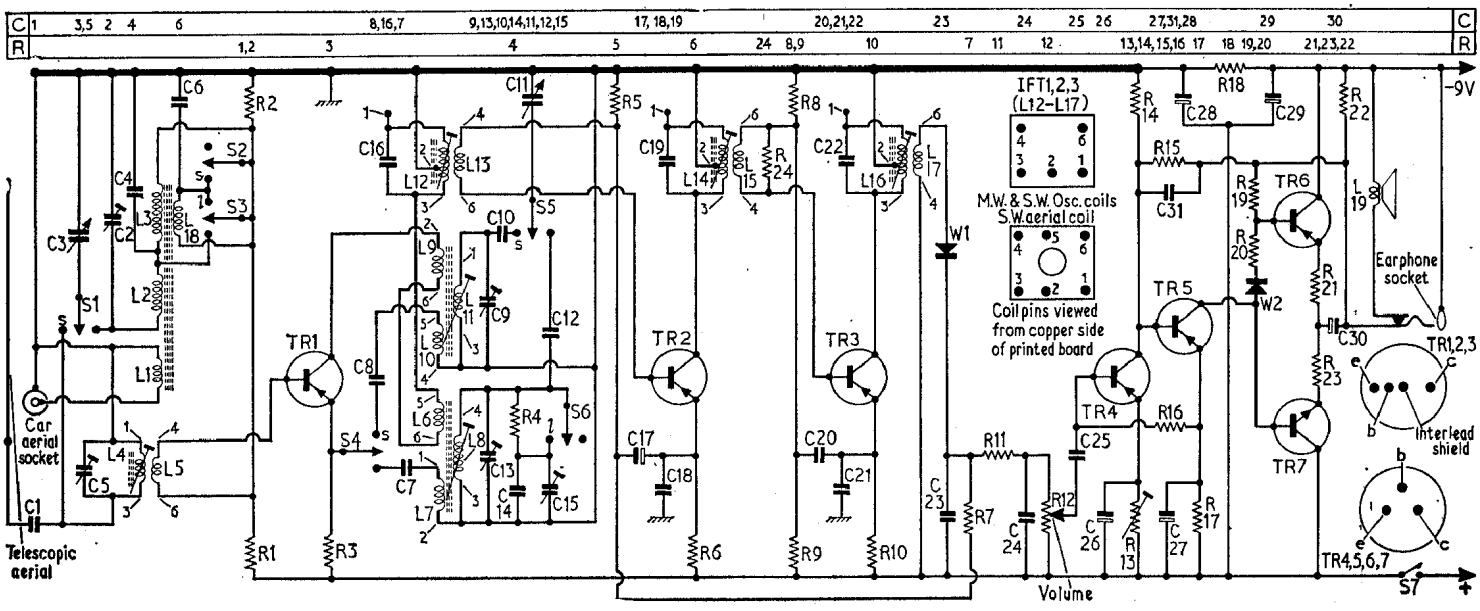
L1	—	B1
L2	1Ω	C1
L3	10Ω	A1
L4	—	C1
L5	—	C1
L6	—	C2
L7	—	C2
L8	2·5Ω	C2
L9	—	C1
L10	—	C1
L11	—	C1
L12	10Ω	C2
L13	—	C2
L14	10Ω	C2
L15	—	C2
L16	4·5Ω	B2
L17	—	B2
L18	—	C1
L19	15Ω	†

Miscellaneous

S1–S6	—	A2
S7	—	B1
W1	OA70	B2
W2	AA120	B2

* *Appropriate d.c. resistance in ohms.*
† *Loudspeaker.*

Below: Circuit diagram of the Marconiphone 4142 and Ultra 6146



TRANSISTOR ANALYSIS

Transistor voltages quoted in the table in col. 1 were obtained from information supplied by the manufacturers. They were measured with a 20,000 ohms per volt meter and are negative with respect to the positive line.

With the oscillator functioning normally, the voltage across **R3** is 300–500mV peak to peak.

CIRCUIT ALIGNMENT

Equipment Required.—An r.f. signal generator amplitude modulated 30 per cent; an audio output meter with an impedance of 15Ω, or alternatively a model 8 Avometer set to its 10V a.c. range; a 0·1μF capacitor and an r.f. coupling loop.

Connect the output meter in place of the loudspeaker. Alternatively, connect the Avometer across the speech coil. Turn the volume control to maximum but, during alignment, adjust the signal generator level to maintain the radio output at 50mW. All adjustments are to be made for maximum output.

1.—Switch the radio receiver to m.w. and turn the tuning gang to maximum capacitance. Connect the signal generator via the 0·1μF capacitor across **C3.**
2.—Feed in a 475kc/s 30 per cent amplitude modulated signal. Adjust **L16, L14** and **L12** in that order. 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. Set tuning gang to maximum. Feed in a 525kc/s signal. Adjust **L8.**
4.—Feed in a 600kc/s signal and tune receiver to this signal. Adjust **L2** by sliding along the ferrite rod.
5.—Feed in a 1,500kc/s signal and tune receiver to this signal. Adjust **C2.**
6.—Repeat operations 3–5 until no further improvement results.
7.—Switch receiver to l.w. Turn tuning gang to maximum capacitance. Feed in a 148kc/s signal. Adjust **C15.**
8.—Feed in a 220kc/s signal and tune receiver to this signal. Adjust **L3** by sliding along the ferrite rod.
9.—Switch to s.w. and extend the telescopic aerial. Place the signal generator lead nearby to provide a loose coupling. Turn tuning gang to maximum capacitance. Feed in a 5·9Mc/s signal. Adjust **L11.**
10.—Turn tuning gang to minimum capacitance. Feed in a 17Mc/s signal. Adjust **C9.**
11.—Repeat operations 9 and 10 until no further improvement results.
12.—Feed in a 6·77Mc/s signal. Tune receiver to this signal. Adjust **L4.**
13.—Feed in a 15·45Mc/s signal. Tune receiver to this signal. Adjust **C5.**
14.—Repeat operations 12 and 13 until no further improvement results.

GENERAL NOTES

Balance Adjustment.—Output transistors **TR6** and **TR7** are series connected across the 9V battery supply and to ensure a balanced supply voltage to each, an adjustment **R13** is incorporated in the emitter circuit of **TR4.** Adjustment of this resistor sets the emitter potential and hence the collector potential of **TR4.** This in turn determines the base potential of the directly coupled driver **TR5.** The base bias of **TR5** determines its collector potential which in its turn controls the base voltages of **TR6** and **TR7.**

Correct balance is obtained when the potential of **TR6/TR7** emitter junction is 5V with respect to the positive line.