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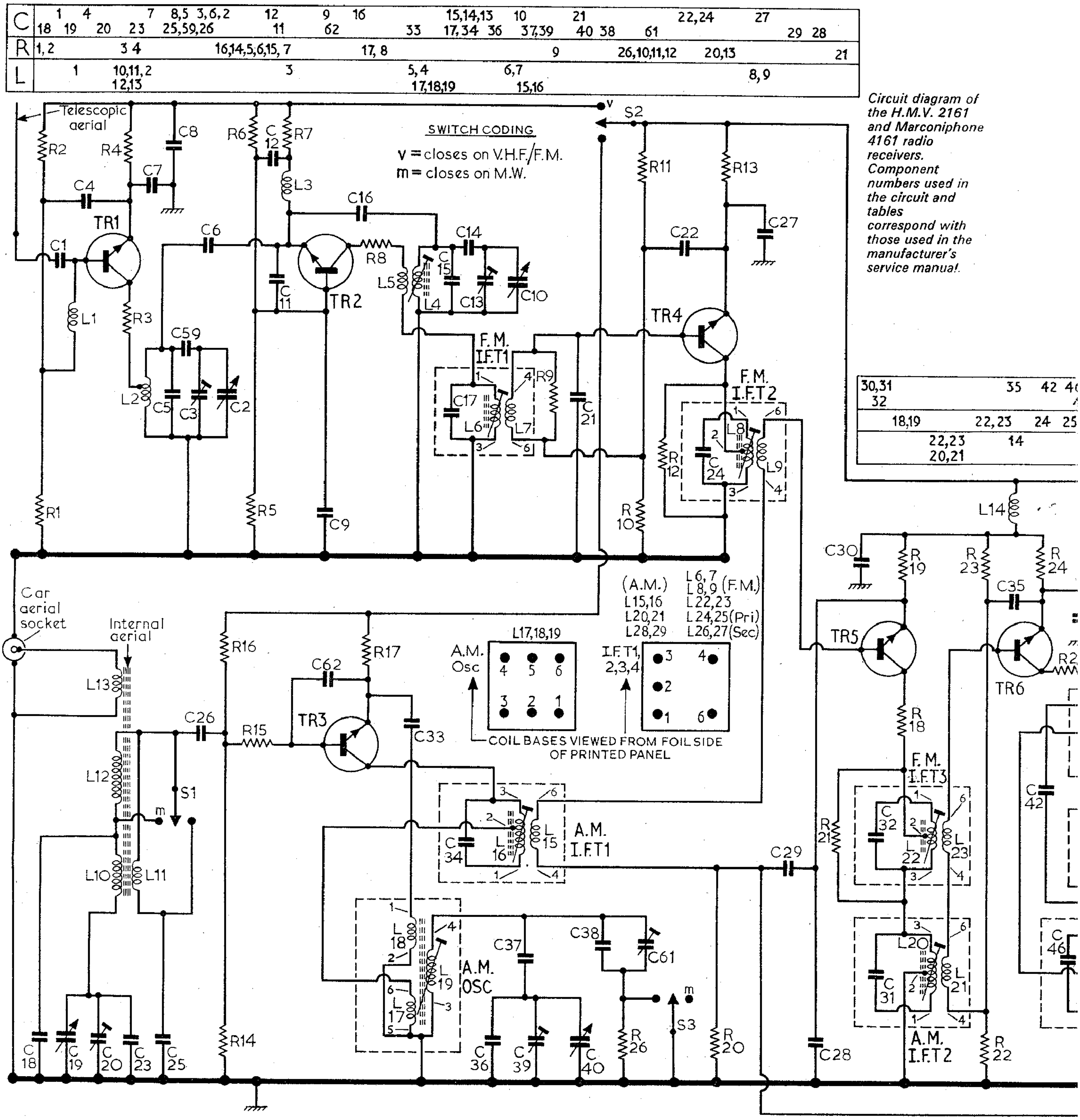

Circuit diagram of the H.M.V. 2161 and Marconiphone 4161 radio receivers. Component numbers used in the circuit and tables correspond with those used in the manufacturer's service manual.

Transistor table

Transistor		A.M. Emitter (V)	Base (V)	Collector (V)	F.M. Emitter (V)	Base (V)	Collector (V)
TR1	BF195	—	—	—	1·7	2·3	6·6
TR2	BF195	—	—	—	1·1	1·6	6·7
TR3	BF195	0·9	—	7·2	—	—	—
TR4	BF194	0·93	1·5	6·8	0·93	1·5	6·8
TR5	BF194	0·7	0·9	6·4	0·65	1·0	6·5
TR6	BF194	1·25	1·6	5·7	0·98	1·55	5·5
TR7	BC148	5·3	6·2	8·3	5·3	6·2	8·3
TR8	2N3702	9·0	8·3	4·8	9·0	8·3	4·8
TR9	AC186	4·7*	4·8	9·0	4·7*	4·8	9·0
TR10	AC131	4·7*	4·7	0	4·7*	4·7	0

** Measured at the junction* ***R43/R44.***
Potential difference across ***R38:*** *A.m. 1·95V; F.m. 2·25V.*
A.m. oscillator volts (r.m.s.), measured at the emitter of ***TR3*** *with an electronic voltmeter:*
M.w. 105-110mV; l.w. 205-268mV.
Quiescent current approximately 13mA.

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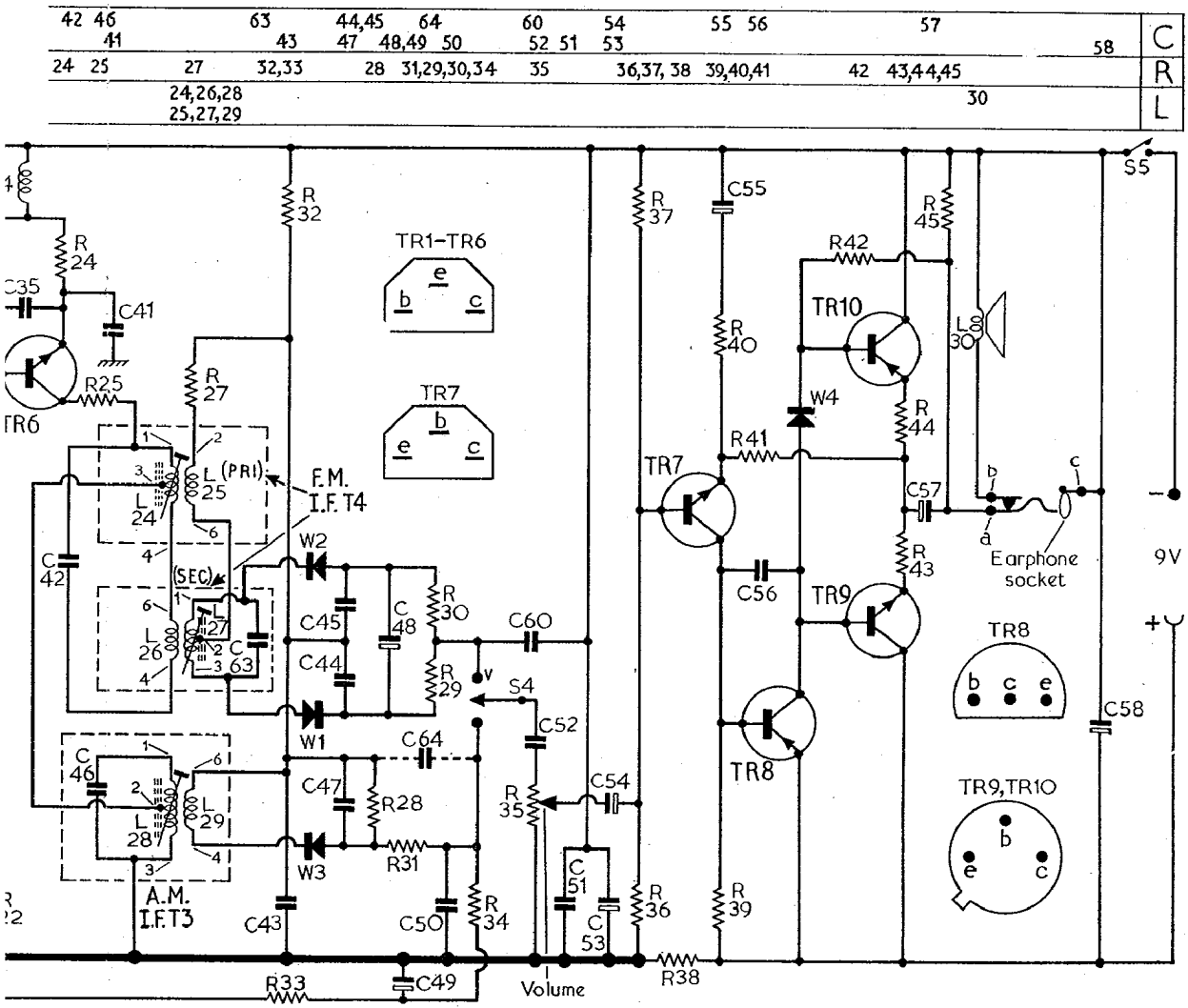
Resistors

R1	12kΩ	C1	R20	100kΩ	B2	R41	2·2kΩ	B1	C14	47pF	C2	C35	0·02μF	B2
R2	6·8kΩ	C1	R21	6·8kΩ	B2	R42	1kΩ	B2	C15	9pF	C2	C36	7pF	C2
R3	68Ω	C1	R22	18kΩ	B2	R43	2·2Ω	B1	C16	3·3pF	C2	C37	230pF	C2
R4	1·5kΩ	C2	R23	6·8kΩ	B2	R44	2·2Ω	B1	C17	50pF	C2	C38	210pF	C2
R5	18kΩ	C2	R24	1kΩ	B2	R45	100Ω	B2	C18	60pF	C1	C39	5pF	C2
R6	6·8kΩ	C2	R25	1kΩ	B2				C19	266pF	C2	C40	266pF	C2
R7	1kΩ	C2	R26	68kΩ	B2	**Capacitors**			C20	5pF	C2	C41	0·02μF	B2
R8	68Ω	C2	R27	330Ω	A2				C21	510pF	C2	C42	30pF	B2
R9	100Ω	C2	R28	12kΩ	B2	C1	30pF	C1	C22	0·02μF	C2	C43	0·02μF	B2
R10	22kΩ	C2	R29	5·6kΩ	A2	C2	20pF	C2	C23	9pF	C2	C44	510pF	A2
R11	6·8kΩ	C2	R30	5·6kΩ	A2	C3	5pF	C2	C24	50pF	B2	C45	510pF	A2
R12	6·8kΩ	B2	R31	5·6kΩ	B2	C4	510pF	C1	C25	2,000pF	C1	C46	180pF	B2
R13	1kΩ	C2	R32	100Ω	A2	C5	9pF	C1	C26	0·02μF	B2	C47	0·02μF	B2
R14	5·6kΩ	B2	R33	12kΩ	B2	C6	3·3pF	C1	C27	0·02μF	B2	C48	8μF	A2
R15	100Ω	B2	R34	18kΩ	B2	C7	1,000pF	C1	C28	0·02μF	B2	C49	2μF	B2
R16	1·5kΩ	B2	R35	20kΩ	B1	C8	0·02μF	C2	C29	0·02μF	B2	C50	0·02μF	B2
R17	1kΩ	B2	R36	8·2kΩ	B1	C9	1,000pF	C2	C30	510pF	B2	C51	1,000pF	B1
R18	470Ω	B2	R37	68kΩ	B1	C10	20pF	C2	C31	180pF	B2	C52	0·1μF	B1
R19	1kΩ	B2	R38	330Ω	B1	C11	20pF	C2	C32	50pF	B2	C53	75μF	A1
			R39	1·5kΩ	B2	C12	510pF	C2	C33	0·01μF	B2	C54	2μF	B1
			R40	4·7Ω	A1	C13	5pF	C2	C34	180pF	B2	C55	150μF	A1



C56	1,000pF	B2	L20	7Ω	B2			
C57	150μF	B1	L21	—	B2			
C58	150μF	B2	L22	—	B2			
C59	47pF	C1	L23	—	B2			
C60	0·02μF	A1	L24	—	B2			
C61	25pF	B2	L25	—	B2			
C62	60pF	B2	L26	—	A2			
C63	90pF	A2	L27	—	A2			
C64†	0·02μF	A2	L28	4·5Ω	B2			
			L29	—	B2			
Coils and transformers*			L30	15Ω	††			
			Miscellaneous					
L1	—	C1						
L2	—	C1	W1‡	OA90	A2			
L3	—	C2	W2‡	OA90	A2			
L4	—	C2	W3‡	OA90	B2			
L5	—	C2	W4**	ANK	B1			
L6	—	C2	S1-S4	—	B1			
L7	—	C2	S5	—	B1			
L8	—	B2						
L9	—	B2						
L10	3·5Ω	B1						
L11	—	B1						
L12	10Ω	C1						
L13	2Ω	C1						
L14	—	B2						
L15	—	B2						
L16	7Ω	B2						
L17	—	B2						
L18	—	B2						
L19	3Ω	B2						

* *Approximate d.c. resistance in ohms.*
† *May be fitted in some receivers.*
‡ *These diodes may be type AA112.*
†† *Loudspeaker.*
** *See under "General notes".*

Circuit alignment

Equipment required. – An r.f. signal generator covering the range 100kc/s-150Mc/s capable of being amplitude modulated 30 per cent and frequency modulated 25kc/s deviation; an audio output meter of 15Ω impedance, to be used in place of loudspeaker, or a model 8 Avometer set to the 10V a.c. range, connected in parallel with the loudspeaker; one 0·1μF capacitor and an r.f. coupling coil.

In order to avoid alignment error due to a.g.c. action, the input signal level to the receiver should be attenuated to maintain an audio output power of approximately 50mW with the volume control set at maximum.

1. – Switch on signal generator and allow 15 minutes to warm up. Connect, in the appropriate manner, the output meter to be used, rotate tuning gang to maximum capacitance and connect signal generator output via a 0·1μF capacitor to the junction **L10/C19.**

2. – Switch receiver to m.w., feed in a 475kc/s a.m. signal and adjust **L28/29, L20/21** and **L15/16** in that order for maximum output. Repeat in same order until no further improvement is obtainable.

Note: M.w. must be aligned first.

3. – Transfer signal generator output to r.f. coupling coil and loosely couple coil to receiver ferrite rod aerial assembly. Tune receiver to centre of 500m scale calibration and feed in a 600kc/s a.m. signal. Adjust **L17** and the position of **L10** on ferrite rod for maximum output.

4. – Tune receiver to centre of 200m scale calibration and feed in a 1,500kc/s a.m. signal. Adjust **C39** and **C20** for maximum output.

5. – Switch receiver to l.w., tune to centre of 1,500m scale calibration and feed in a 200kc/s a.m. signal. Adjust **C61** and the position of **L12** on the ferrite rod.

6. – Repeat operations 3-5 as necessary for maximum output and accurate calibration.

7. – Switch receiver to v.h.f./f.m., and feed in a 10·7Mc/s f.m. signal (25kc/s deviation) via a 0·1μF capacitor to junction of **R8/L5.** Adjust **L24/25, L22/23** and **L8/9** for maximum output.

8. – Switch signal generator to a.m. (30 per cent modulation) and adjust **L26/27** for minimum output (a.m. rejection).

9. – Repeat operations 7 and 8 for maximum f.m. output and minimum a.m. output until no further improvement is obtainable.

10. – Switch signal generator to f.m., transfer signal input to junction of **R7/C12** and adjust **L6/7** for maximum output.

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11. – Disconnect lead to telescopic aerial and feed in f.m. signals via this lead. Tune receiver to 'A' in 'Athlone' as marked on tuning scale. Feed in an 88Mc/s f.m. signal and adjust **L4** and the spacing between turns of coil **L2.**

12. – Tune receiver to 96Mc/s scale calibration and feed in a 96Mc/s f.m. signal. Adjust **C13** and **C3** for maximum output.

13.–Repeat operations 11 and 12 in same order until no further improvement is obtainable.

Transistor analysis

Transistor voltages quoted in the table were obtained from information supplied by the manufacturers. They were measured under quiescent conditions on a 20,000Ω/V meter and are all positive with respec to the negative supply line of each transistor except where otherwise shown.