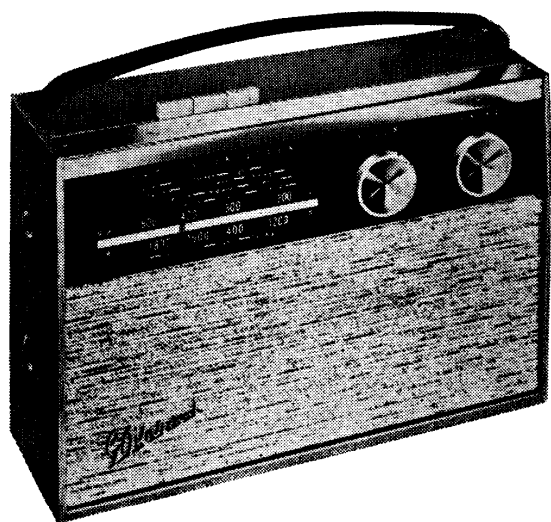


Marconiphone

SERVICE MANUAL



"Marconiphone" products are made to a standard of design and quality approved by The Marconiphone Company Limited, registered proprietor of the trade mark.



SPECIFICATION

BATTERY

9 volt Ever Ready PP9, Drydex DT9, Siemens TR9 or Vidor T6009.

WAVERANGES

MEDIUM: 183-556 metres (1640-540 Kc/s.)

LONG: 1136-2040 metres (264-147 Kc/s).

AERIAL

8 in. ferrite rod.

LOUDSPEAKER

6 in. x 4 in. elliptical, 35 Ω speech coil.

POWER OUTPUT

750mW.

BATTERY CONSUMPTION

20mA for average output.

CASE DIMENSIONS—OVERALL

10 $\frac{7}{8}$ in. wide \times 8 in. high \times 3 $\frac{3}{4}$ in. deep.

TAPE SOCKET

Impedance: 50K Ω (minimum).

TRANSISTORS AND DIODES

VT1	AF117	Self-oscillating mixer
VT2	AF117	1st IF amplifier.
VT3	AF117	2nd IF amplifier.
VT4	OC71 or AC155	Audio amplifier.
VT5	OC81D or AC113	Audio driver.
VT6	OC81 or AC154	} Push-pull output (matched pair)
VT7	OC81 or AC154	
W1	OA79	
W2	OA90	Audio detector.

SERVICE NOTES

1. Make full use of the voltage measurements given in the circuit diagram. Although the receiver will still operate when the battery voltage falls to about 6 volts, a new battery should be used for checking purposes. Distortion will be apparent if the voltage of the battery falls appreciably.

2. Apart from total current consumption, no other current measurements should be attempted. Under 'no signal' conditions, the total current consumption will be approximately 12mA. Consumption rises immediately a signal is applied, to approximately 20mA for average listening volume.

3. When a signal generator is used for circuit checking, use the direct output, and inject via a 0.1 μ F capacitor.

4. To check oscillator operation, measure the voltage across VT1 emitter stabilizing resistor R3. This should be approximately 1 volt. Short-circuit the oscillator section of the tuning gang and check if the voltage across R3 changes. The voltage should drop by approximately 0.2 volt. If there is no change, it may be assumed that the oscillator is not operating.

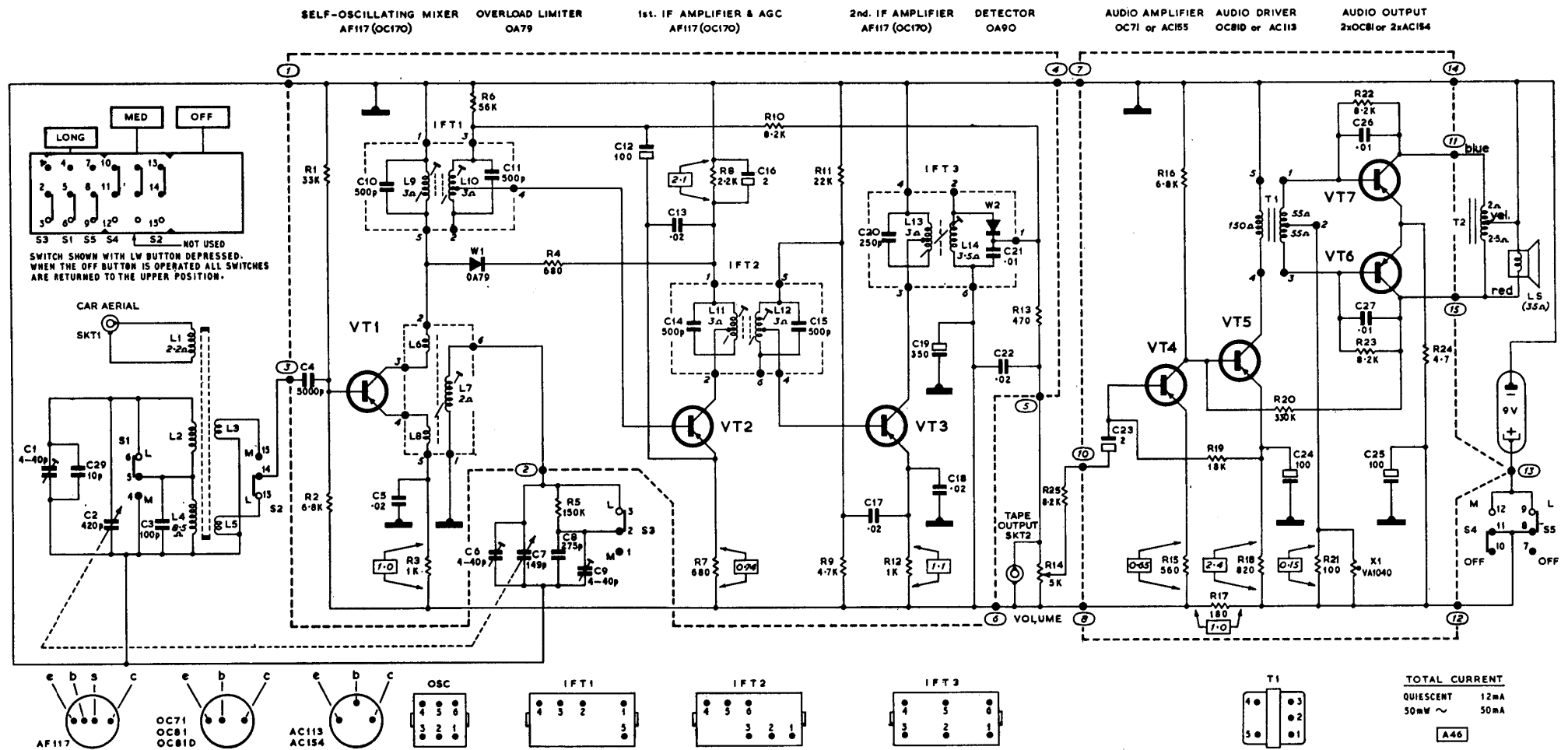
5. Transistors should not be replaced unless voltage checks, etc., indicate that replacement is necessary. The power output transistors are a matched pair: if one becomes faulty both must be replaced by a new matched pair.

6. Extreme care should be taken when unsoldering or soldering transistors as they can easily be damaged by excessive heat. The lead wires of a replacement transistor must not be shorter than the one removed. Do not apply the iron for longer than necessary and grip the wires with a pair of pliers to reduce heat conduction to the transistor.

7. If the DC resistance of some inductors are measured in circuit, two readings can be obtained depending on which way round the meter is connected. The higher readings are shown in the circuit diagram.

The manufacturers reserve the right to vary specifications or use alternative materials as may be deemed necessary or desirable at any time.

PRICE 1/-



Model 4110 Circuit Diagram. Figures in rectangles indicate voltages measured with a 20,000 ohm/volt meter. DC resistance readings are shown against inductances where these are 1 ohm or greater. Ringed figures show printed board tag connecting points.

CIRCUIT NOTES

Overload and AGC Circuit

When the receiver is tuned to a very strong signal, overloading is avoided by W1 and R4 connected in series. VT2 is controlled by the main AGC system, but during reception of a strong signal, the feedback

circuit of W1 and R4 acts as a supplementary AGC line, effectively damping the first two IF stages and preventing overloading. The reservoir formed by C16 and R8 provides a standing bias to control the operating level of W1. The main AGC line feeds a positive bias, developed from the rectified signal at W2, via R10 and L10 to VT2 base. No AGC is applied to the second IF amplifier VT3, its base bias being

derived solely from the potential divider formed by R9 and R11.

Output Stage Bias Stabilization

The resistor R21, which provides base bias for the push-pull output stage, VT6 and VT7, is shunted by the varistor X1 which tends to stabilize the bias current and thus effectively limits distortion due to temperature variations.

ACCESS FOR SERVICE

Remove the two plated screws and cup washers from the back of the cabinet and also one from underneath. Take out the two woodscrews securing the plated trim and pull off the control knobs. The cabinet may now be detached from the front panel and chassis assembly.

For easy access to all components, lay the front panel and chassis assembly face downwards and stand the cabinet alongside.

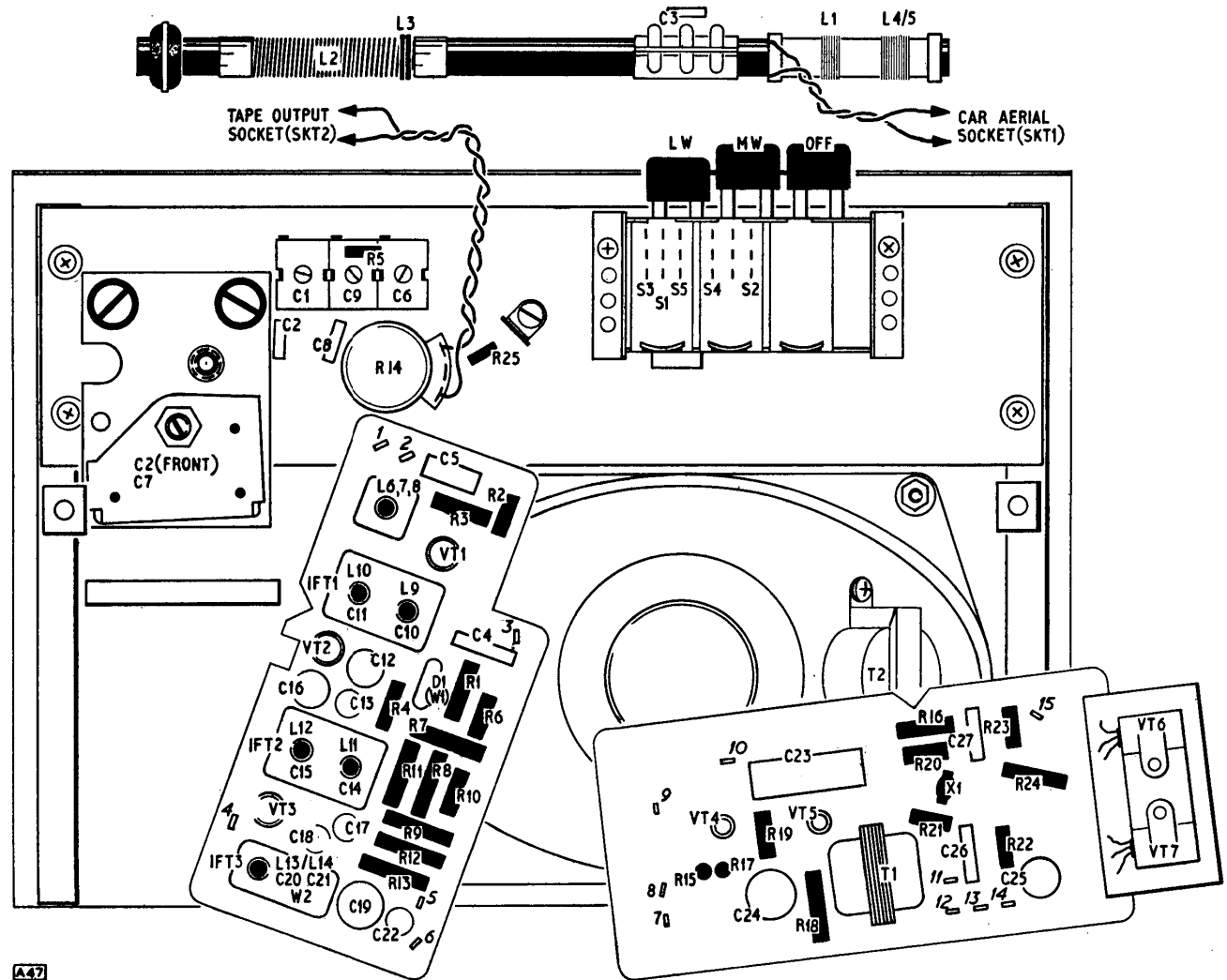
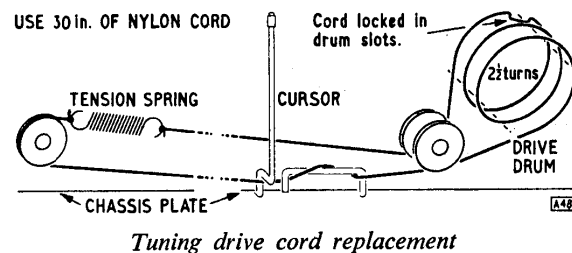
The printed boards may be lifted free from their plastic retainers within the limit of their leads.

View of receiver chassis showing printed boards withdrawn from their mountings

DRIVE CORD REPLACEMENT

Remove the front panel and chassis assembly as described in "Access For Service", then take out the four woodscrews and washers securing the chassis plate to the baffle board. Free the IF printed board to enable the chassis plate to be swung outwards to give access to the drive cord arrangement. Remove the scale backing plate, held in place by two screws (one of which also secures a tag strip). Use approximately 30 inches of nylon braided cord; tie one end to the tension spring, then wind the cord as indicated in the diagram, finally tying it to the free end of the tension spring: avoid overstretching the spring.

After fitting to the cord, the cursor must be hooked on to the lower edge of the chassis plate which acts as a guide rail.



PRINTED BOARD TAG CONNECTIONS

1. To C3 on ferrite rod.
2. To C7 and switch S3, contact 3.
3. To switch S2, contact 14.
4. To tag 7 (earth line) on audio printed board.
5. To lower tag on volume control.
6. To upper tag on volume control and tag 8 on audio printed board.
7. To tag 4 (earth line) on IF printed board.
8. To tag 6 on IF printed board.
9. No connection.
10. To R25.
11. To transformer T2 (blue lead).
12. To switch S4, contact 11.
13. To switch S4, contact 12, and battery positive terminal.
14. To lower loudspeaker tag and battery negative terminal.
15. To upper loudspeaker tag.

CIRCUIT ALIGNMENT

A signal from a suitable generator, 30% amplitude modulated by an AF signal, is required for circuit alignment. Tuning indication is best obtained either with an output meter having an impedance of 30–40Ω and connected across the LS winding of T2 with the loudspeaker disconnected or a Model 8 Avometer, set to the 2.5V AC range, connected in parallel with the loudspeaker.

Throughout alignment the signal input level to the receiver should be adjusted to maintain the audio output at approximately 50mW (1 volt AC) with the volume control set at maximum in order to avoid alignment error due to AGC action.

IF CIRCUITS

Switch receiver to MW and turn gang to minimum. Apply a 475 Kc/s modulated signal through a 0.1μF capacitor across the aerial section of the tuning gang. Adjust L14/L13, L12 and L11, L10 and L9 in that order for maximum output. Repeat in the same order until no further improvement is obtained.

RF CIRCUITS

MW must be aligned first. Signals should be injected via a loop loosely coupled to the ferrite rod aerial. Fully close gang and check that pointer coincides with extreme left-hand calibration mark on tuning scale.

When aligning the LW range the receiver should be positioned for minimum signal from Light programme transmission.

	Inject	Tune to:	Adjust
MW	1500 Kc/s	200 Metre calibration pip	C6 C1
MW	600 Kc/s	500 Metre calibration pip	L7 L2†
LW	200 Kc/s	Light Programme	C9 L4*

* Adjust by sliding coil along aerial rod.
† Slide ring along aerial rod.

INDUCTORS AND TRANSFORMERS

Ref.	Function	Part No.
L 1	Car aerial coupling	} Ferrite rod aerial assembly Y33852
L 2	MW aerial coupling	
L 3	MW base coupling	
L 4	LW aerial coil	
L 5	LW base coupling	
L 6–7–8	Oscillator coils	X91778
L 9–10	IFT 1	X91375
L11–12	IFT 2	X91378
L13–14	IFT 3	X91222
T1	Driver transformer	Y33919
T2	Output transformer	X33874

MISCELLANEOUS

Ref.	Function	Part No.
LS	Loudspeaker	N50352
SKT1	Car aerial socket	N90418/1
SKT2	Tape socket	N33683
S1–5	Wavechange/On-Off control	X33809/3
X1	Varistor VA 1040	Z4558/13

CAPACITORS

350V DC working, 20% tolerance, unless otherwise stated.

Ref.	Value	Tol.	Volts	Function
C 1	4.40pF	Trimmer		MW aerial trimmer
C 2*	420pF	Variable		Aerial tuning
C 3	100pF			LW aerial tracking
C 4	5000pF			VT1 base coupling
C 5	0.02μF		150V	VT1 emitter bypass
C 6	4.40pF	Trimmer		MW oscillator trimmer
C 7*	149pF	Variable		Oscillator tuning
C 8	275pF	2%		} LW oscillator trimming
C 9	4.40pF	Trimmer		
C10	500pF			L9 tuning
C11	500pF			L10 tuning
C12	100μF	Elect.	6V	AGC decoupling
C13	0.02μF		150V	VT2 emitter decoupling
C14	500pF			L11 tuning
C15	500pF			L12 tuning
C16	2μF	Elect.	6V	W1 bias
C17	0.02μF		150V	VT3 emitter decoupling
C18	0.02μF		150V	VT3 emitter bypass
C19	350μF		9V	Supply decoupling
C20	250pF			L13 tuning
C21	0.01μF		150V	} IF filter
C22	0.02μF			
C23	2μF		150V	VT4 audio coupling
C24	100μF	Elect.	9V	VT5 emitter bypass
C25	100μF	Elect.	9V	Supply decoupling (Audio board)
C26	0.01μF			} NFB tone correction
C27	0.01μF			
C29	10pF			MW aerial trimming

* Part gang assembly Y33811/3

RESISTORS

Carbon type ¼ Watt 10% tolerance, unless otherwise stated.

Ref.	Value	Tolerance	Function and Part No.
R 1	33K Ω		} VT1 base bias potential divider
R 2	6.8K Ω		
R 3	1K Ω		VT1 emitter stabilizing
R 4	680 Ω		Aux. AGC feed
R 5	150K Ω		MW oscillator damping
R 6	56K Ω		VT2 base bias
R 7	680 Ω		VT2 emitter stabilizing
R 8	2.2K Ω		W1 bias
R 9	4.7K Ω		Pt. VT3 base bias pot. divider
R10	8.2K Ω		AGC decoupling
R11	22K Ω		Pt. VT3 base bias pot. divider
R12	1K Ω		VT3 emitter stabilizing
R13	470 Ω		IF filter
R14	5K Ω	Log. pot.	Volume control Y20209/13
R15	560 Ω	5%	VT4 emitter load
R16	6.8K Ω	5%	VT4/5 coupling
R17	180 Ω	5%	DC dropper and decoupling
R18	820 Ω	5%	VT5 emitter stabilizing
R19	18K Ω	5%	VT4 base bias
R20	330K Ω		Audio feedback
R21	100 Ω	5%	VT6/7 base bias
R22	8.2K Ω		} NFB tone correction
R23	8.2K Ω		
R24	4.7 Ω		VT6/7 emitter stabilizing
R25	8.2K Ω		VT4 audio coupling

REPLACEMENT PARTS LIST

Description	Part No.
Battery connector	N33850
Cabinet assembly	V91827
Handle	{ blue V91827/2
	{ black X91831
Drive drum	X91831/1
Drive cord tension spring	Z33878
Ferrite rod aerial supports (2)	Z10486
Knobs: Tuning, Volume	Z25864
Pointer	Y90700/7
Tape input plug	Y50362/1
Tuning scale	{ for blue cabinet N20400
	{ for black cabinet N91838
	N91838/1

BRITISH RADIO CORPORATION LIMITED

SERVICE DEPOTS:

LONDON: Eley's Estate, Angel Road, N.18 · Edmonton 3060

BIRMINGHAM: 24 Sheepcote Street, 15 · Midland 5291

GLASGOW: 160-162 Battlefield Road, S.2 · Langside 9251/2/3/4

N20595