

ACCESS FOR SERVICE

Slide the battery cover downwards to release it and remove the battery. Unscrew the handle fixing studs to free the back cover.

For access to the copper side of the printed board, pull off the tuning knob then gently prise up the lower end of the board which is clipped into moulded lugs on the case.

CIRCUIT NOTES

Complementary Power Output Stage

PNP and NPN type transistors are used in conjunction with a stabilizing diode to provide a transformerless power stage giving an audio output of 300mW.

The audio signal developed across volume control R12 is applied via coupling capacitor C25 to the base of audio amplifier transistor VT4. The amplified signal appearing at the collector of VT4 is directly coupled to the base of driver transistor VT5. The output from VT5 simultaneously drives the bases of both output transistors VT6 and VT7. During positive half-cycles of the signal, NPN transistor (VT7) conducts, resulting in a fall in collector/emitter voltage of VT7. During negative half-cycles of the signal PNP transistor (VT6) conducts, resulting in an increase in collector/emitter voltage of VT7. The loudspeaker is fed via C30 and J1.

VT5 collector load R19 is returned to the "live" side of the loudspeaker and, as this point is coupled to the emitters of VT6 and VT7 through C30, the input signal to the output stage is virtually applied between base and emitter of both VT6 and VT7.

The diode is biased by VT5 collector current and acts as a variable resistance which is sensitive to voltage and temperature variations. The resistance value of W2 is small compared with R19 and the voltage developed across W2 equals the sum of the nominal output transistor (VT6 and VT7) base/emitter voltages and so determines the correct quiescent operating conditions. During low ambient temperature conditions the resistance of W2 increases thus compensating for falling current of the output transistors. This effect also takes place in the event of falling battery voltage. The diode W2 also assists thermal stability at high temperatures and opposes high current drain from the battery.

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BRC



service manual

Price One Shilling

MARCONIPHONE 4142 ULTRA 6146



ULTRA 6146

Marconiphone 4142 is of similar appearance

SPECIFICATION

Battery: 9V Drydex DT6, Ever Ready PP6, Vidor VT6 or equivalent.

Waveranges: Medium Wave: 185-565 metres (1620-530 Kc/s). Long Wave: 1120-2050 metres (268-148 Kc/s). Short Wave: 17-6-51 metres (17-5-9 Mc/s).

Aerials: MW and LW: 6" long \times $\frac{3}{8}$ " dia. ferrite rod, SW: 7-section telescopic aerial (24" extended).

Loudspeaker: 3 $\frac{3}{8}$ " round, 15 ohm impedance, PM moving coil.

Sockets: Car aerial socket and earphone or tape recorder socket.

Power Output: 300 mW.

Case Dimensions (excluding handle): Overall: 5 $\frac{3}{8}$ " high \times 2 $\frac{3}{8}$ " deep \times 9" wide.

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

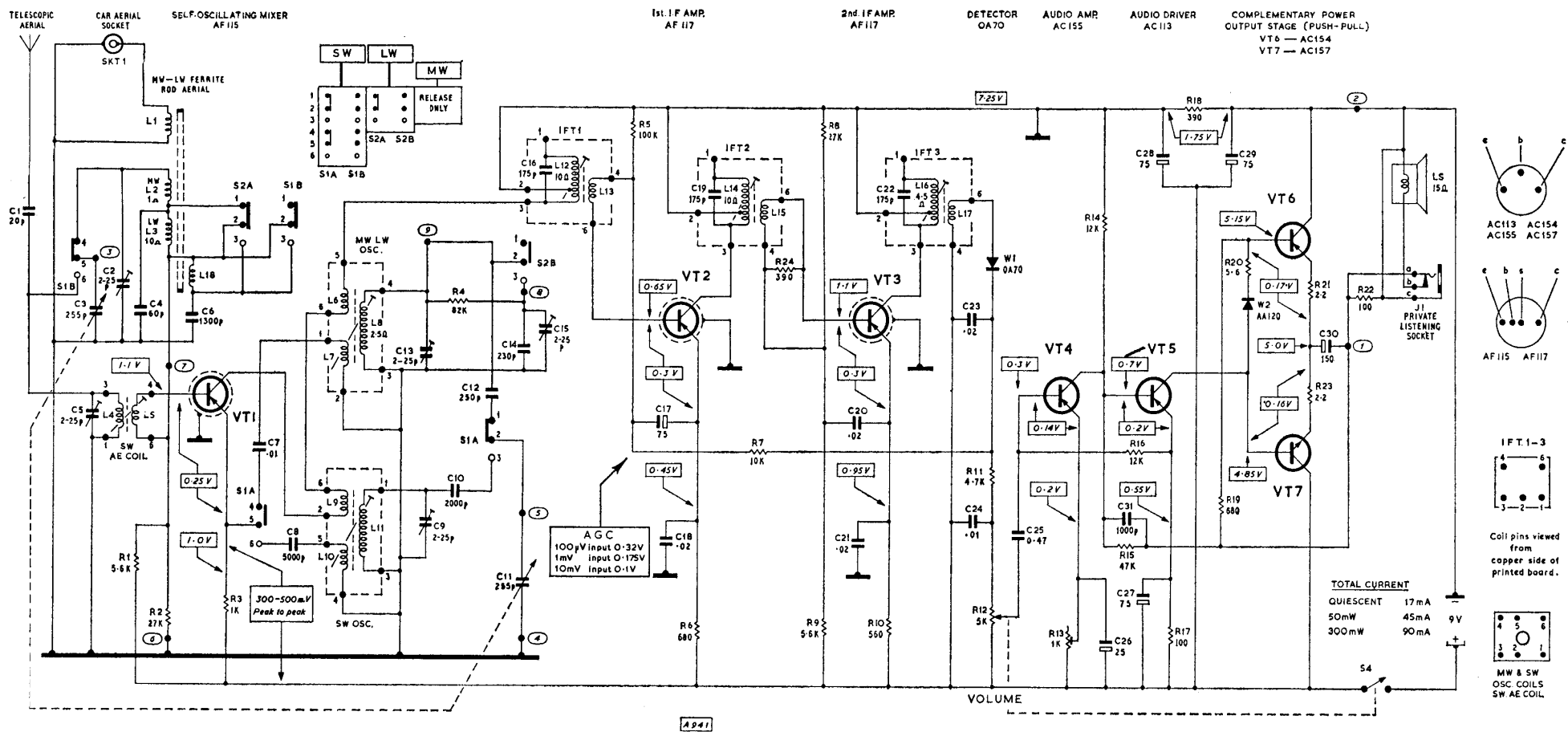
BRITISH RADIO CORPORATION LIMITED

SERVICE DEPOTS

LONDON: Eley's Estate, Angel Road, N.18. Tel. 01-807-3060
Ansafone Spares Ordering Service: Tel. 01-807-6332

BIRMINGHAM: 24 Shepcote Street, 15. Tel. 021-643-9988

GLASGOW: 160-162 Battlefield Road, S.2. Tel. Langside 9251|2|3|4



Circuit shown with medium wave button depressed

R13 is adjusted to give 5.0V at junction of R21, C30

Circuit Diagram. Figures in rectangles indicate voltages measured with a 20,000 ohm/volt meter between positive line and point shown, except where otherwise indicated. DC resistance readings are shown against inductors where these are 1 ohm or greater. Ringed figures show printed board tag connecting points.

TAG CONNECTIONS

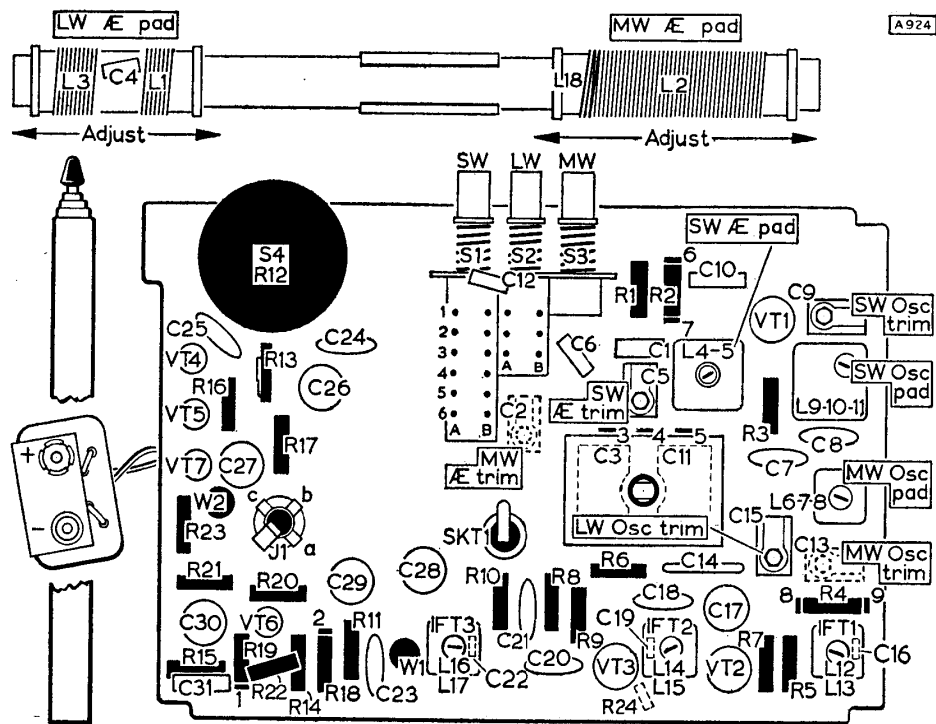
1. To J1, contact 'a'.
2. To J1, contact 'c'.
3. From gang section C3 to switch S1B, contact 5.
4. From gang common 'earth' to tag 6, to aerial socket SKT1 (outer) and also to C6.
5. From gang section C11 to switch S1A, contact 2.
6. To tag 4 and also to junction of C4, L1 on ferrite rod.
7. To switch S2A, contact 2.
8. To switch S2B, contact 3.
9. To switch S2B, contact 2.

BALANCE ADJUSTMENT

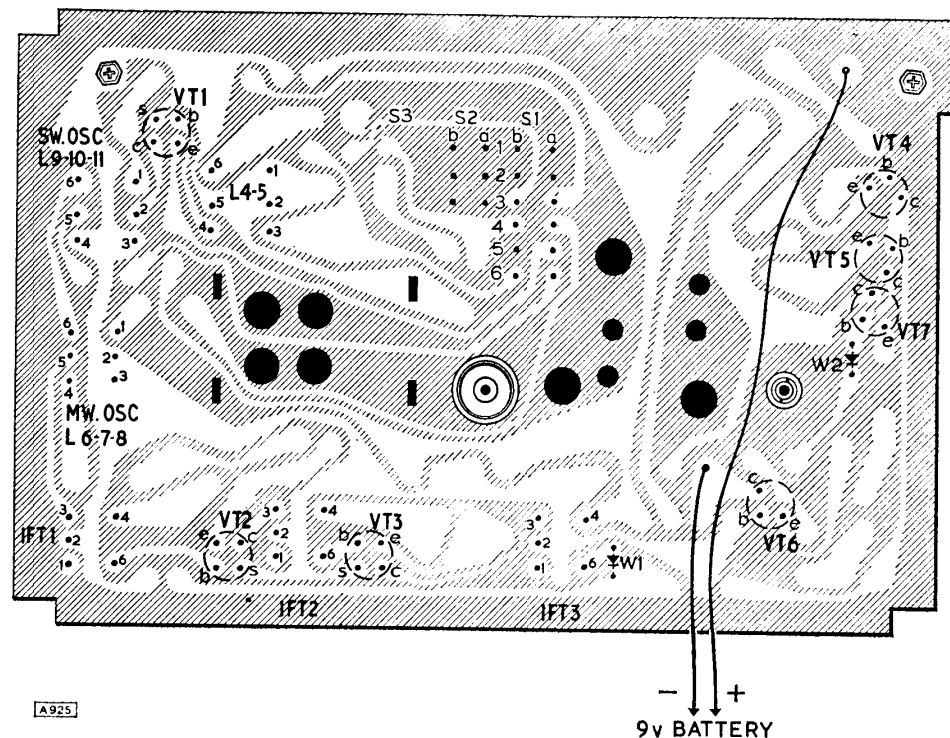
Output transistors VT6 and VT7 are series connected across the 9V battery supply and to ensure a balanced supply voltage to each, an adjustment R13 is incorporated in emitter circuit of VT4. Adjustment of this resistor sets emitter potential and hence collector potential of VT4. It will, therefore, determine the base potential of driver VT5 which is directly coupled to VT4. This bias decides collector potential of VT5 which in turn controls base voltages of VT6 and VT7.

Correct balance is obtained when potential of VT6/VT7 emitter junction is 5V with respect to positive line. The discrepancy from half-battery voltage is due to the emitter bias voltage developed across R17 which determines limit of negative signal excursion before bottoming of VT5 takes place.

An alternative method of balancing operating voltages of VT6 and VT7 is by visual observation, on an oscilloscope, of output waveform at maximum output when adjustment should be made for symmetry of both waveform and clipping at high outputs.



Component Locations and Alignment Adjustments.



Copper side of Printed Board showing transistor and coil connections.

CIRCUIT ALIGNMENT

Connect an output meter, set to 15Ω impedance, in place of loudspeaker. Alternatively, connect a Model 8 Avometer (on 10V AC range) across speech coil.

Set volume control to maximum but, during alignment, adjust signal generator output level to maintain receiver output at 50mW.

IF Circuits

Switch receiver to MW and turn gang to maximum capacitance. Apply a 475 Kc/s (30% modulated) signal, via a 0.1μF blocking capacitor, across C3 (aerial section of gang) then adjust IFT3, IFT2 and IFT1 (in that order) for maximum output.

Repeat until no further improvement results.

RF Circuits

Inject MW and LW signals via a loop loosely coupled to ferrite rod aerial. Align in following order.

Range	Signal Gen.	Tune to	Adjust for max.
MW	525 Kc/s	Gang fully closed	L8 (MW osc. pad)

Repeat until no further improvement results.

Range	Signal Gen.	Tune to	Adjust for max.
MW	600 Kc/s	Gen. signal	L2* (MW aerial pad)
	1500 Kc/s	Gen. signal	C2 (MW aerial trim)

Repeat until no further improvement results.

Range	Signal Gen.	Tune to	Adjust for max.
LW	148 Kc/s	Gang fully closed	C15 (LW osc. trim)
	220 Kc/s	Gen. signal	L3* (LW aerial pad)

*Adjust by sliding coil former along ferrite rod.

Short Wave

Extend telescopic aerial and place signal generator lead nearby to provide a loose coupling.

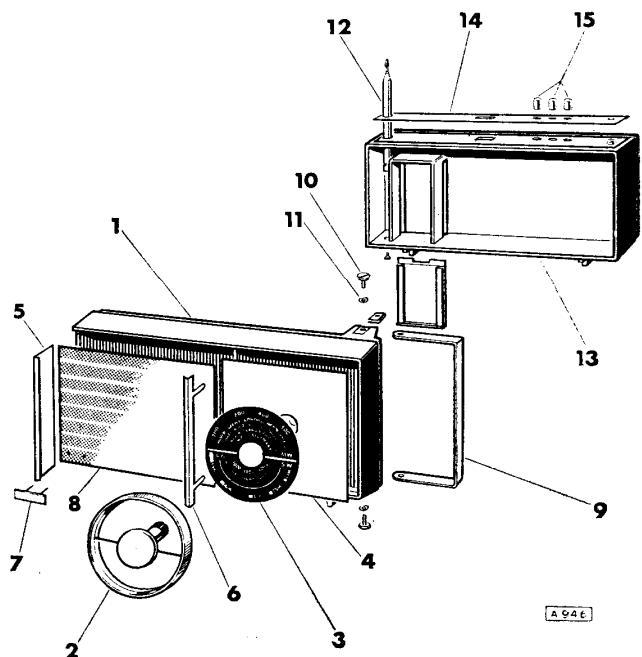
Range	Signal Gen.	Tune to	Adjust for max.
SW	5.9 Mc/s	Gang fully closed	L11 (SW osc. pad)
	17 Mc/s	Gang fully open	C9 (SW osc. trim)

Repeat until no further improvement results.

Range	Signal Gen.	Tune to	Adjust for max.
SW	6.77 Mc/s	Gen. signal	L4 (SW aerial pad)
	15.45 Mc/s	Gen. signal	C5 (SW aerial trim)

Repeat until no further improvement results.

REPLACEMENT PARTS LIST



Cabinet Assembly

1. Cabinet front—Model 4142—inc. items 3-8	...	3M4-619
Model 6146—inc. items 3-8	...	3M4-632
2. Tuning dial knob (clip 3L3-091)	...	3C0-160
3. Scale facia plate	...	3A7-321
4. Scale backing plate	...	3A4-094
5. L/H trim	...	3A2-136
6. R/H trim	...	3A2-135
7. Emblem—Model 4142	...	0A6-110/001
Emblem—Model 6146	...	0A6-110
8. Speaker grille	...	3A4-095
9. Handle	...	3A9-064
10. Handle pivot screw	...	3L6-089
11. Handle pivot screw washer	...	3L6-068
12. Telescopic aerial (screw SB06KP04)	...	3F0-033/002
13. Cabinet back inc. item 14 (clip 3L4-030)	...	3M4-617
14. Top trim	...	3A2-137
15. Push-button	...	3C0-033/001

Chassis Parts

Gang bracket (screw—2 3L6-048)	...	3B1-111
Battery connector	...	3F6-028/001
Ferrite rod aerial support bracket (clip 3B6-013)	...	3B1-010
Printed board	...	0V6-167
Earphone	...	3D7-001

INDUCTORS AND TRANSFORMERS

Ref.	Function	Part No.
L1-3	MW and LW ferrite rod assy	3F0-044
L4	SW aerial coil	} 3D1-041
L5	SW VT1 base coupling coil	
L6-8	MW and LW oscillator coils	3D1-070
L9-11	SW oscillator coils	3D1-030
L12-13	IFT1	3D0-036
L14-15	IFT2	3D0-037
L16-17	IFT3	3D0-038
L18	VT1 base coupling	with L1-3

CAPACITORS

350V DC working, unless otherwise stated.

Ref.	Value	Tol.	Volts	Function	Part No.
C1	20pF	2½%	750V	SW aerial coupling	3M55
C2†	2-25pF	Preset		MW aerial trimmer	
C3*	255pF	Variable		Aerial tuning	
C4	60pF	2½%	120V	LW fixed aerial trimmer	4M10
C5†	2-25pF	Preset		SW aerial trimmer	
C6	1300pF	10%	500V	VT1 base bias decoupling	8M77
C7	·01µF	20%	50V	} VT1 emitter bypass	7M82
C8	5000pF	20%	500V		4M18
C9†	2-25pF	Preset		SW oscillator trimmer	
C10	2000pF	2½%	120V	SW oscillator padder	1M90
C11*	255pF	Variable		Oscillator tuning	
C12	250pF	2½%	30V	MW oscillator padder	5M26
C13†	2-25pF	Preset		MW oscillator trimmer	
C14	230pF	2%		} LW oscillator trimming	5M27
C15†	2-25pF	Preset			
C16	175pF	2½%		L12 tuning	
C17	75µF	Elec	10V	AGC decoupling	0E0-228/04
C18	·02µF	-20 + 80%	50V	VT2 emitter bypass	7M83
C19	175pF	2½%		L14 tuning	
C20	·02µF	-20 + 80%	50V	VT3 base bias decoupling	7M83
C21	·02µF	-20 + 80%	50V	VT3 emitter bypass	7M83
C22	175pF	2½%		L16 tuning	
C23	·02pF	-20 + 80%	50V	} Part IF filter	7M83
C24	·01µF	50V			7M82
C25	0·47µF	-0 + 100%	30V	Audio coupling	7M08
C26	25µF	Elec	12V	VT4 emitter bypass	0E0-225/04
C27	75µF	Elec	10V	VT5 emitter bypass	0E0-228/04
C28	75µF	Elec	10V	Supply line	0E0-228/04
C29	75µF	Elec	10V	decoupling	0E0-228/04
C30	100µF	Elec	10V	VT6/7 emitter decoupling	0E0-229/30
C31	1000pF	20%	500V	Part NFB	7M97

*Tuning gang—Part No. 3E4-036 †Trimmer capacitor—Part No. 3E4-015

RESISTORS

All ¼ watt carbon 10% tolerance, unless otherwise stated.

Ref.	Value	Rating	Function	Part No.
R1	5·6KΩ		} VT1 base bias potential divider	4A57
R2	27KΩ			9A04
R3	1KΩ		VT1 emitter stabilizing	1A58
R4	100KΩ		MW oscillator damping	2B13
R5	100KΩ		VT2 base bias	1A68
R6	680Ω		VT2 emitter stabilizing	2A30
R7	10KΩ		AGC decoupling	4A75
R8	27KΩ		} VT3 base bias potential divider	2A24
R9	5·6KΩ			4A57
R10	560Ω		VT3 emitter stabilizing	2A33
R11	4·7KΩ		Part IF filter	1A32
R12	5KΩ	Log. pot	Volume control and switch (S4)	3E1-053
R13	1KΩ	Preset pot	Balance control	3E5-002/001
R14	12KΩ		VT4/5 coupling	1A89
R15	47KΩ		Part negative feedback	7A85
R16	12KΩ		VT4 base bias	1A89
R17	100Ω		VT5 emitter stabilizing	1A28
R18	390Ω		DC dropper and decoupler	9A05
R19	680Ω		VT5 collector load	9A06
R20	5·6Ω		Bias stabilizer load	2A43
R21	2·2Ω	¼Ω	VT6 emitter stabilizing	1B44
R22	100Ω	20%	Tape recorder load	6A26
R23	2·2Ω	¼Ω	VT7 emitter stabilizing	8A18
R24	390Ω		L15 damping	1B70

MISCELLANEOUS

Ref.	Function	Part No.
S1-3	Push-button switch assembly	3M4-009
S4	On-Off switch	with R12
J1	Private listening socket	3F6-043
LS	Loudspeaker (push-on-fix 3L2-097)	3E3-034
SKT1	Car aerial socket (push-on-fix 3L2-092; spacer 3L7-017/001)	3F6-025/001

