TECHNICAL INFORMATION AND SERVICE DATA

ISSUED BY AMALGAMATED WIRELESS (AUSTRALASIA) LTD.

MANUFACTURERS AWA SUPERVISED SERVICE

A.W.A. CRUISER ALL TRANSISTOR MANUALLY TUNED CAR RADIO

Model MF28

GENERAL DESCRIPTION

This model is a six transistor, 12 volt operated, manually tuned car radio designed for the reception of the Medium Wave Broadcasting Band.

The receiver covers positive or negative earth operation, polarity change-over being effected by reversing the positions of the red and black plug-in leads within the receiver.

Various kits supplement this receiver making it universal in scope. To date the following kits are available.

Kit No. 67170 for EJ and EH Holden.
Kit No. 67171 for HR Holden.
Kit No. 67172 for AP5, AP6 and VC Valiant.
Kit No. 67173 for Universal Underdash with 7″ x 5″ Speaker Box.
Kit No. 67174 for Universal Underdash with 6″ x 4″ Speaker Box.
Kit No. 67175 for VE Valiant.

For details of the variables in these kits refer to the Mechanical Parts List.

ELECTRICAL AND MECHANICAL SPECIFICATIONS

Frequency Range	525-1,620 kHz
Intermediate Frequency	455 kHz
Battery Voltage	12 Volts
Battery Polarity	+ or — Earth
Battery Consumption	0.6 Amps
V.C. Impedance 15 ohms at 400 Hz	
Undistorted Power Output	2 Watts

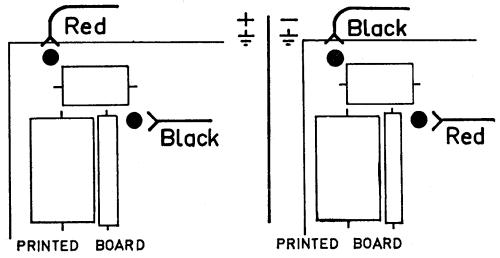
Controls:
Tuning, Volume.

Transistor and Diode Complement:

AWV AS301 R.F. Amplifier (Silicon).
AWV AS300 Converter (Silicon).
AWV AS300 I.F. Amplifier (Silicon).
AWV 2N408 Audio Amplifier (Germanium).
AWV AS313 Driver (Silicon).
AWV 2N301 Output (Germanium).
AWV 1N87A A.G.C.
AWV 1N87A Detector.

POLARITY CHANGE

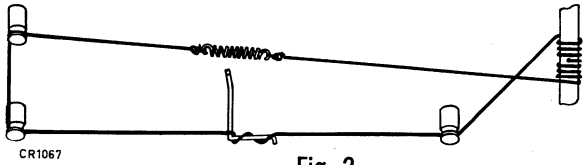
To change polarity, remove the lid and connect the red and black plug-in leads to the printed board as indicated in fig. 1.



CR1141 Fig. 1

DRIVE CORD REPLACEMENT.

The cord assembly is at centre travel (Fig. 2) when the tuning spindle is turned 3 turns clockwise from its full anti-clockwise position. Then, both spring and pointer are in the mid position.



CR1067 Fig. 2

SERVICE NOTES

TRANSISTOR MOUNTING.

Power transistors are thermally connected to but electrically insulated from the heat sink.

If a transistor is removed or replaced for any reason, it is essential that the following method of mounting be carefully adopted.

On no account must the old mica insulator be used again.

To mount the transistor, first liberally smear the relevant surfaces of the heat sink, the transistor and both sides of the mica insulator with Silicone Heat Sink Compound, type 340 (Code No. 217016).

Place the mica insulator and transistor in place on the heat sink and secure the assembly to the heat sink with two $\frac{1}{2}$" No. 6 self-tapping screws.

Warning: Excessive tightening of these screws can distort the transistor base with the danger of rupture to the mica insulator.

Finally check with an ohmmeter the insulation between the collector (mounting flange) and the heat sink (should be greater than 1 megohm). For this check, connections to the transistor socket should be removed.

PRINTED BOARD REMOVAL.

Remove the ten Philips Head screws securing the lid to the cabinet body and remove the lid.

From the rear of the receiver, release the board retaining clips and tilt the board to clear the clips.

Move the board backwards to clear the board locating slots in the cabinet body.

Lift the left-hand end of the board upwards to clear the top of the cabinet body and the board can be tilted to reveal the wiring side.

Re-assembly is the reverse of the above.

Power Transistor Test:

Power transistors are easily checked for short or open circuit by careful use of an ohmmeter to determine the forward and reverse resistance of each junction (as a diode).

An ohmmeter, either multimeter or vacuum tube type, having a small battery voltage of 1.5 volts applied on the X1 range must be used. Check this with a voltmeter before using, as a higher voltage will cause damage. Also check the polarity of the meter leads in the ohmmeter position. Often this is the reverse of the polarity when used as a voltmeter or ammeter.

Fig. 3 shows the correct resistance readings between the junctions of the 2N301 power transistor with the + and — signs indicating the correct polarity of the applied ohmmeter leads. The base and emitter leads should be disconnected from a mounted transistor.

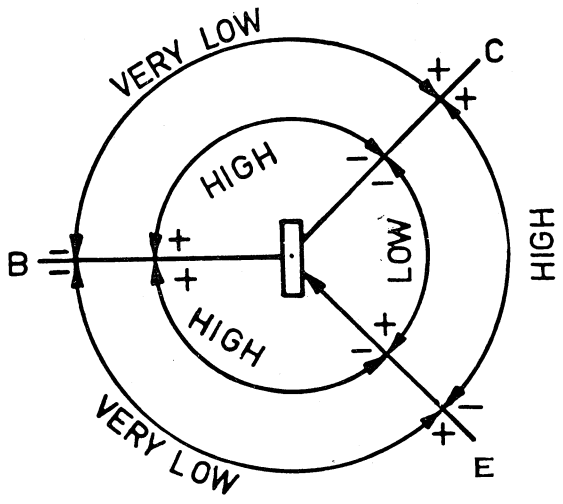


Fig. 3

ALIGNMENT PROCEDURE

Manufacturer's Setting of Adjustments:

The receiver is tested by the manufacturer with precision instruments and all adjusting screws, except the aerial trimmer, are sealed. Re-alignment should be necessary only when components in tuned circuits are repaired or replaced, or when it is found that the seals over the adjusting screws have been broken.

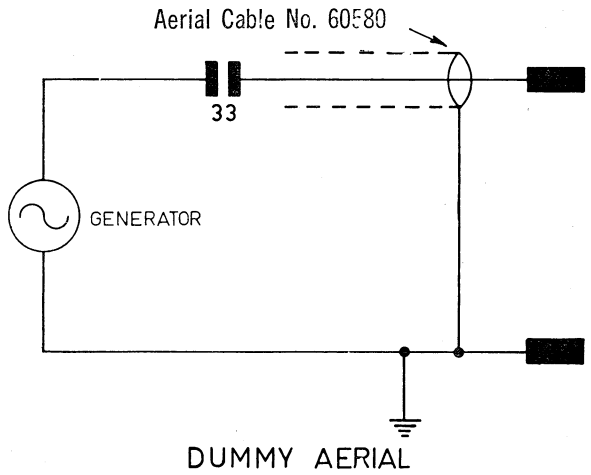
It is especially important that the adjustments should not be altered unless the correct instruments, listed below, are used.

For all alignment operations connect the "low" side of the signal generator to the receiver chassis and keep the generator output as low as possible to avoid a.g.c. action. Also keep the volume control in the maximum clockwise position.

When the generator is connected to the aerial terminal, use the dummy aerial as shown in the diagram.

Testing Instruments:

Signal Generator—Modulated 400 Hz or Modulated Oscillator.
Dummy Aerial—See diagram.
Output Meter—15 ohms impedance.
I.F. Alignment Tool No. 39462.



ALIGNMENT TABLE

A. GENERAL

ALIGN. ORDER	CONNECT GENERATOR TO:	TUNE GENERATOR TO:	TUNE RECEIVER TO:	ADJUST FOR MAX. PEAK OUTPUT
1	Collector of VT1*	455 kHz	H.F. Limit	TR3 Secondary Core
2	Collector of VT1*	455 kHz	H.F. Limit	TR3 Primary Core
3	Collector of VT1*	455 kHz	H.F. Limit	TR2 Secondary Core
4	Collector of VT1*	455 kHz	H.F. Limit	TR2 Primary Core
Repeat the above adjustments until maximum output is obtained.				
5	Aerial Terminal via Dummy Aerial	1,620 kHz (Accurate)	H.F. Limit	Oscillator Trimmer (C14)
6	Aerial Terminal via Dummy Aerial	1,550 kHz	1,550 kHz	R.F. Trimmer (C6)
7	Aerial Terminal via Dummy Aerial	1,550 kHz	1,550 kHz	Aerial Trimmer (C1)
Repeat adjustments 5, 6 and 7 until no further improvement is possible.				

* A 0.01 μF capacitor should be connected in series with the high side of the generator.

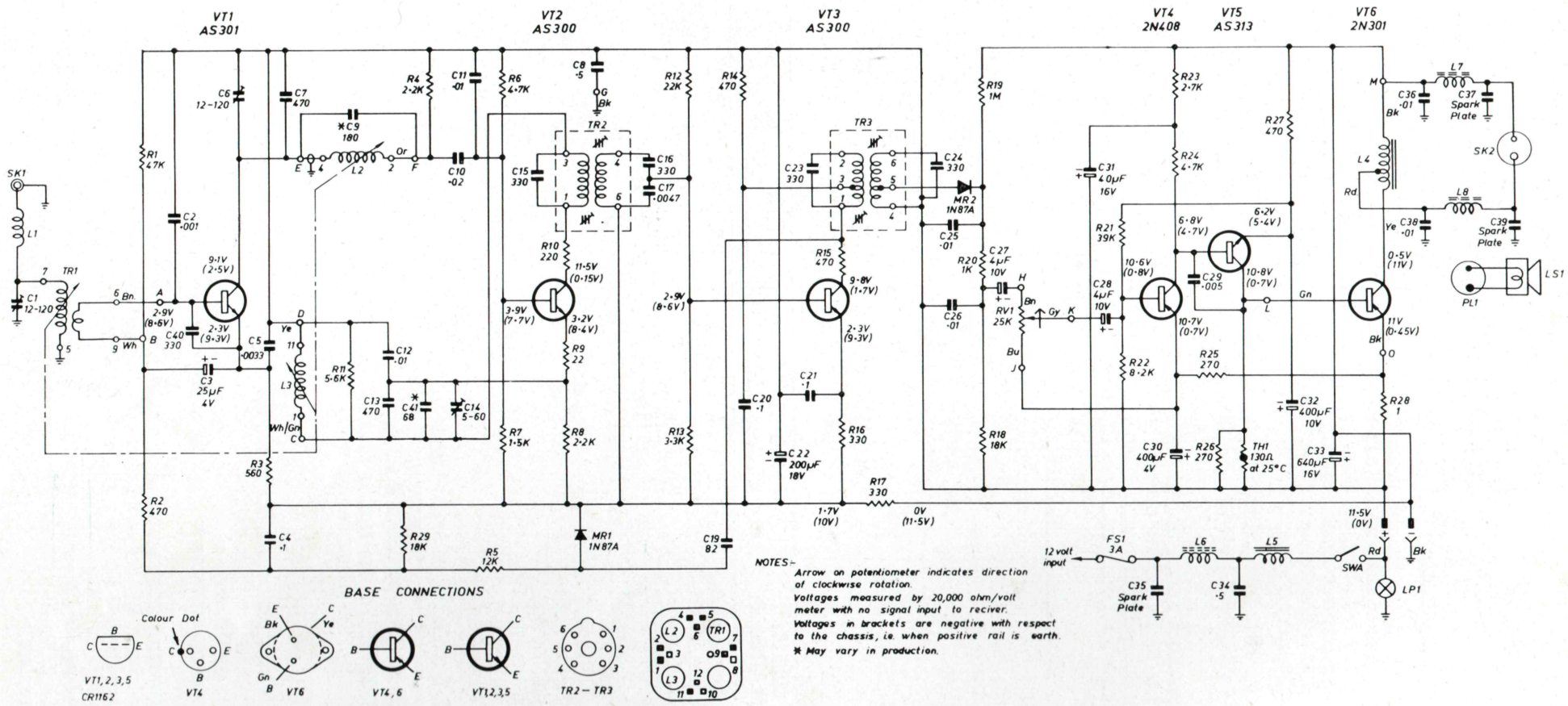
B. CALIBRATION ALIGNMENT: With the receiver connected to an aerial, the dial scale calibration may be checked and corrected if necessary. The pointer may be moved relative to the dial scale by sliding it along the dial cord.

C. TUNER ALIGNMENT

Adjustment of the tuner cores should not be made unless a coil has been replaced or it is suspected that the alignment has been interfered with, in which case, carefully follow the procedure below:

1. Adjust the tuner to the H.F. end stop and back all cores out of the coils as far as possible.
2. Tune the signal generator accurately to 1,620 kHz and adjust the oscillator, R.F. and aerial trimmers for maximum output.
3. Tune the signal generator accurately to 600 kHz and the core carriage to a point 0.680″ from the H.F. end stop. Adjust the oscillator, R.F. and aerial cores for maximum output.
4. Tune the signal generator to 1,620 kHz and tuner to the H.F. end stop and re-adjust the oscillator trimmer for maximum output.
5. Tune the signal generator and tuner to 1,550 kHz and adjust the R.F. and aerial trimmers for maximum output.
6. Repeat steps 3, 4 and 5 until no further improvement is obtained.
7. Seal the tuning core studs.

A.W.A. CRUISER CAR RADIO MF28



BASE CONNECTIONS

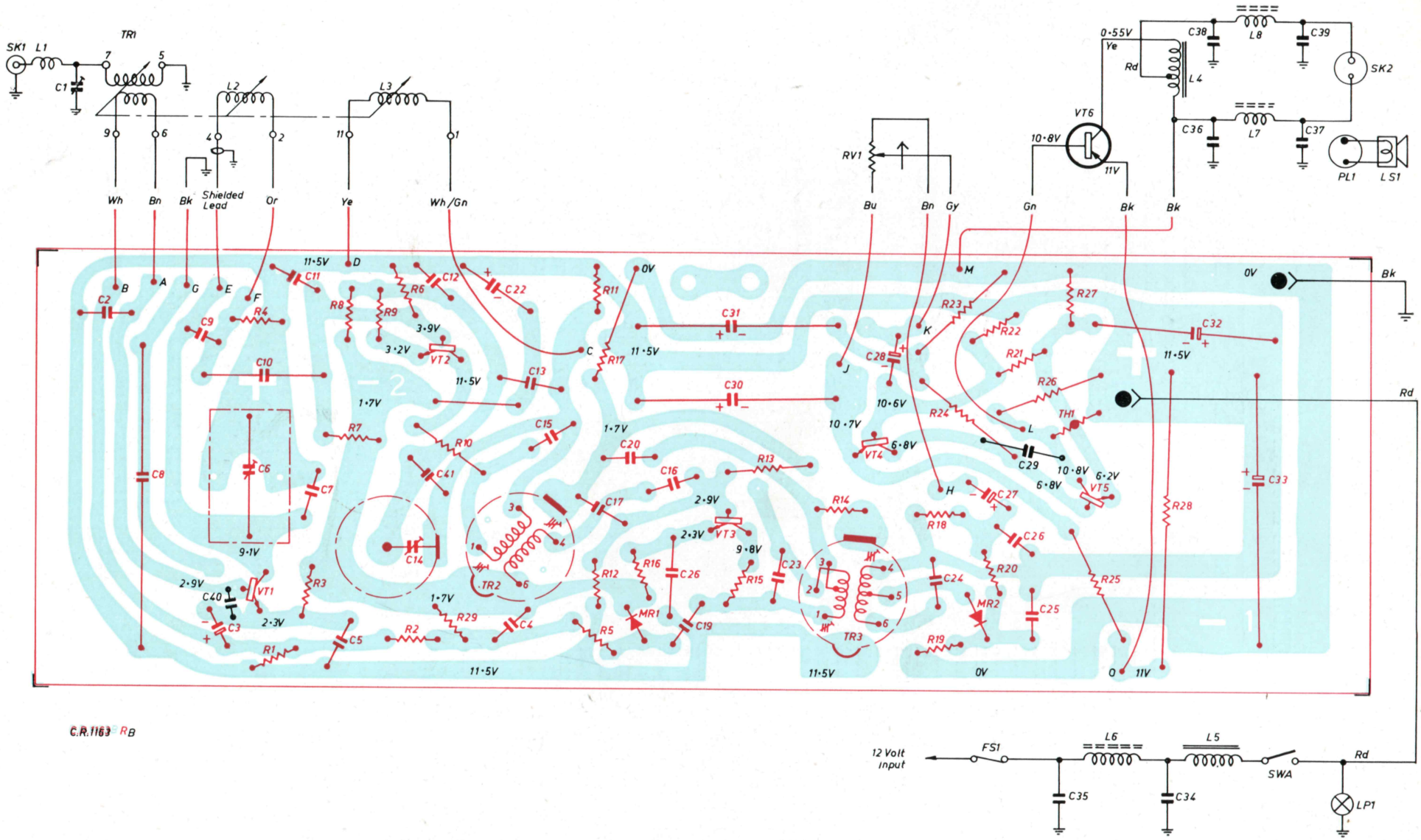
NOTES:-

Arrow on potentiometer indicates direction of clockwise rotation.

Voltages measured by 20,000 ohm/volt meter with no signal input to reciver.

Voltages in brackets are negative with respect to the chassis, i.e. when positive rail is earth.

* May vary in production.



Notes: The diagram represents the view from the wiring side of the printed board.
Blue indicates the printed wiring.
Red indicates components and leads mounted on the remote side of the board.
Black indicates those components and leads mounted on the wiring side or completely removed from the board.
All voltages shown are positive with respect to the board earth (i.e. Polarity Leads in negative earthed position) and measured with no signal input and volume maximum clockwise using a 20.000 ohm/volt meter.

CIRCUIT CODE MODEL MF28

CODE No.	DESCRIPTION	PART No.
	RESISTORS	
	All Resistors composition type unless otherwise stated.	
R1	47K ohms ±10% ½ watt	
R2	470 ohms ±10% ½ watt	
R3	560 ohms ±10% ½ watt	
R4	2.2K ohms ±10% ½ watt	
R5	12K ohms ±10% ½ watt	
R6	4.7K ohms ±10% ½ watt	
R7	1.5K ohms ±10% ½ watt	
R8	2.2K ohms ±10% ½ watt	
R9	22 ohms ±10% ½ watt	
R10	220 ohms ±10% ½ watt	
R11	5.6K ohms ±10% ½ watt	
R12	22K ohms ±10% ½ watt	
R13	3.3K ohms ±10% ½ watt	
R14	470 ohms ±10% ½ watt	
R15	470 ohms ±10% ½ watt	
R16	330 ohms ±10% ½ watt	
R17	330 ohms ±10% ½ watt	
R18	18K ohms ±10% ½ watt	
R19	1 Megohm ±10% ½ watt	
R20	1K ohms ±10% ½ watt	
R21	39K ohms ±10% ½ watt	
R22	8.2K ohms ±10% ½ watt	
R23	2.7K ohms ±10% ½ watt	
R24	4.7K ohms ±10% ½ watt	
R25	270 ohms ±10% ½ watt	
R26	270 ohms ±10% ½ watt	
R27	470 ohms ± 5% ½ watt	
R28	1 ohm ±10% 1 watt	
R29	18K ohms ±10% ½ watt	
RV1	25K ohms curve S33 carbon Volume W/S	620244
	CAPACITORS	
C1	12-120pF Trimmer Aerial	231010
C2	0.001µF ±10% 125VW Polystyrene	
C3	25µF 4VW Electrolytic	229428
C4	0.1µF +80% —20% 25VW Hi-K disc	
C5	0.0033µF ±10% 400VW Polyester**	
C6	12-120pF Trimmer R.F.	231018
C7	470pF ±2½% 630VW Polystyrene	
C8	0.5µF ±20% 200VW AEE W48	
C9	180pF ±5% 180VW Polystyrene*	
C10	0.02µF ±20% 200VW AEE W99	
C11	0.01µF ±20% 200VW AEE W99	
C12	0.01µF ±20% 200VW AEE W99	
C13	470pF ±2½% 630VW Polystyrene	
C14	5-60pF Trimmer Oscillator	231020
C15	330pF ±5% N750 disc	
C16	330pF ±5% N750 disc	
C17	0.0047µF ±10% 400VW Polyester	
C18	Not used	
C19	82pF ±10% N750 disc	
C20	0.1µF +80% —20% 25VW Hi-K disc	
C21	0.1µF +80% —20% 25VW Hi-K disc	
C22	200µF 18VW Electrolytic	229763
C23	330pF ±5% N750 disc	
C24	330pF ±5% N750 disc	
C25	0.01µF ±20% 200VW AEE W99	
C26	0.01µF ±20% 200VW AEE W99	
C27	4µF 10VW Electrolytic	228189
C28	4µF 10VW Electrolytic	228189
C29	0.22µF ±20% 25VW Hi-K disc	
C30	400µF 4VW Electrolytic	229854
C31	40µF 16VW Electrolytic	229552
C32	400µF 10VW Electrolytic	229786
C33	640µF 16VW Electrolytic	229880
C34	0.5µF ±20% 200VW AEE W48	
C35	Spark Plate	64494
C36	0.01µF ±20% 200VW AEE W99	
C37	Spark Plate	64808
C38	0.01µF ±20% 200VW AEE W99	
C39	Spark Plate	64808
C40	330pF +80% —2% Hi-K disc	
C41	68pF ±10% N750 disc	
	INDUCTORS	
L1	Aerial Choke	205914
L2	Tuning Coil R.F.	54172
L3	Tuning Coil Oscillator	54189
L4	Output Choke	53071/004
L5	L.T. Choke	50548/006
L6	L.T. Choke	205970
L7	Filter Choke	205970
L8	Filter Choke	205970
	TRANSFORMERS	
TR1	Tuning Coil Aerial	54177
TR2	1st I.F. Transformer	52797
TR3	2nd I.F. Transformer	52798
	TRANSISTORS & DIODES	
VT1	AS301	
VT2	AS300	
VT3	AS300	
VT4	2N408	
VT5	AS313	
VT6	2N301	
MR1	1N87A	
MR2	1N87A	
	MISCELLANEOUS	
FS1	3 Amp. Fuse	370011
LP1	Pilot Lamp, 12 volt	428147
LS1	Speaker (varies with Kits, refer Mech. Replacements)	
PL1	Speaker Plug	581215
SK1	Aerial Socket	66790
SK2	Speaker Socket	794539
SWA	ON/OFF Switch (on RV1)	
TH1	130 ohms at 25°C NTC Thermistor	893703

* May vary in production
**Philips only

MECHANICAL REPLACEMENT PARTS

Item	Part No.
Cable Assembly, Speaker	54541
Cable, Low Tension, Female	49923
Cable, Low Tension, Male	50602
Clip, Spring, Board Retaining	67633
Insulator, Transistor Mounting	38568
Knob, Assembly (2)	68282
Pointer	68273
Spring, Drive Cord	60717

Item	Part No.
Tuner Assembly	63920/023
Comprising:	
Clip, Thrust	63926
Core, Tuning (2) (Aerial, R.F.)	63939
Core, Tuning (Oscillator)	63940
Grommet, Core Mounting	33913
Spindle, Tuning	68272
Spring, Tension	44179

KIT VARIATIONS

Kit No. 67170	
Dial Scale	65052
Speaker 9″ x 6″	50281
Trimplate	69332
Kit No. 67171	
Dial Scale	65053
Speaker 9″ x 6″	50281
Speaker Baffle Ass'y	65578
Trimplate	69330/002
Kit No. 67172	
Dial Scale	65052
Speaker 9″ x 6″	50281
Speaker Baffle	65818
Trimplate	69347

Kit No. 67173	
Dial Scale	65052
Speaker 7″ x 5″	52838
Speaker Box	60549
Trimplate	69349
Kit No. 67174	
Dial Scale	65052
Speaker 6″ x 4″	52837
Speaker Box	69506
Trimplate	69349
Kit No. 67175	
Dial Scale	65052
Speaker 9″ x 6″	50281
Speaker Baffle	69393/001
Trimplate	69332

Note: When ordering spares, always quote the above Part Numbers, and in the case of coloured parts, such as knobs, etc., also quote the colour.

D.C. RESISTANCE OF WINDINGS

Winding	D.C. Resistance in ohms
Aerial Choke L1	3
Aerial TR1:	
Primary	6.5
Secondary	*
Oscillator L3	2.5
R.F. L2	1.6
Output Choke L4	2.4
L.T. Choke L5	*

Winding	D.C. Resistance in ohms
L.T. Choke L6	*
Filter Choke L7, L8	*
1st I.F. Transformer TR2:	
Primary	6
Secondary	6
2nd I.F. Transformer TR3:	
Primary	6
Secondary	6

* Less than 1 ohm.

The above readings were taken on components from a standard chassis, but substitution of materials during manufacture may cause variations and it should not be assumed that a component is faulty if a slightly different reading is obtained.