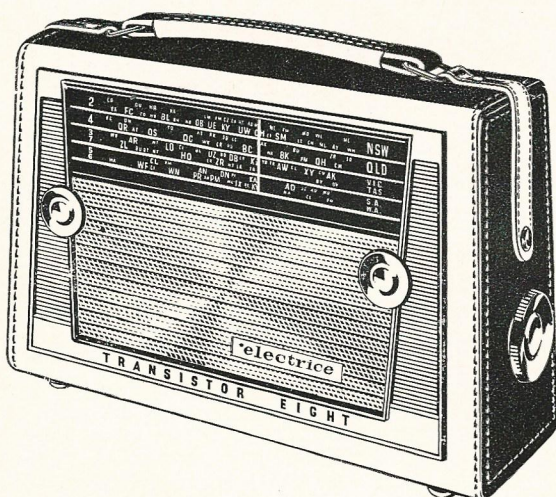


ELECTRICE SERVICE MANUAL FOR MODEL E830P



RADIO

ELECTRICE SERVICE MANUAL FOR MODEL E830P



This model is an eight transistor, battery operated, superheterodyne portable receiver designed for the reception of the Medium Wave Band.

Features of design include:

Ferrite rod aerial with provision for car aerial or external aerial and earth system; high gain i.f. transformers; Autodyne convertor; high sensitivity; centre-tapped 80 ohms impedance speaker; provision for operating from an external battery saver power supply.

ISSUED BY

EMAIL LIMITED

CONSUMER PRODUCTS DIVISION (SYDNEY)
Joynton Avenue, Waterloo, 69-0411

ELECTRICAL AND MECHANICAL SPECIFICATIONS

Frequency Range .. 540-1620 Kc/s (555-185 metres)
Intermediate Frequency 455 Kc/s
Battery Complement 9 Volt battery
Eveready type 276-P

Battery Consumption:

For Zero audio output 14mA
For 50mW audio output 50mA
For full audio output 110mA

Loudspeaker:

6" x 4" 50043
V.C. Impedance 80 ohms at 400 C.P.S.
Undistorted power output 400 mW

Controls:

Tuning Control—right-hand side
On/off Volume Control—front left-hand
Tone Control—front right-hand

Dimensions:

Height 8"; Width 11"; Depth....4½"
Weight with battery 6 lbs. 3 ozs.

Transistor Complement:

A.W.V. 2N1637 R.F. Amplifier
A.W.V. 2N1639 Converter
A.W.V. 2N410 1st I.F. Amplifier
A.W.V. 2N410 2nd I.F. Amplifier
A.W.V. 2N410 1st Audio
A.W.V. 2N408 Driver
A.W.V. 2N217SP Output
A.W.V. 2N217SP Output
A diode 1N295, OA90 or OA80 is also used as Audio
Detector and A.G.C.

Service Notes for Transistor Receivers:

Whilst transistors, when used within the manufacturer's ratings, should give considerably longer life in service than vacuum tubes, the following precautions should be observed when servicing receivers to prevent damage to transistors.

Transistors can be damaged when checking circuit continuity by the D.C. voltage present in an ohmmeter. To avoid damaging a transistor or getting a misleading resistance reading the transistors must be disconnected from the circuit.

The use of screwdrivers as a means of checking high tension, as is commonly done in mains operated receivers, is not only a waste of time but can permanently damage the transistors. Similarly, the indiscriminate shorting out of bias resistors as a means of checking whether certain stages are operating will almost certainly have drastic results, particularly in the output stages.

Transistors are extremely sensitive to heat, temperatures in excess of 90°C can cause permanent damage. Great care should therefore be exercised when soldering transistor leads, keeping the soldering iron as far away from the transistor body as practicable and applying heat for as short a time as possible.

It should be noted that all electrolytic capacitors have their positive terminal going to earth or to the earthy part of the circuit.

Fault Finding:

The first thing to check when the receiver is inoperative is the battery. With the receiver switched on a new battery should measure 9 volts, although a receiver will still operate satisfactorily at 6 volts.

Voltmeters used for test purposes must be at least 20,000 ohms per volt. The use of low impedance meters will only give misleading results as serious shunting effects will occur.

If the receiver is inoperative to R.F. and the converter is suspect, the oscillator can be checked by measuring the voltage between base and emitter of the converter. If the base is negative with respect to the emitter by more than 0.12 volts then the converter is not oscillating.

When checking for a circuit fault causing excessive battery drain, an overall current measurement and supplementary voltage measurements should be made. For reasons stated above continuity measurements can be misleading.

Signal tracing by injection of a signal from a signal generator is carried out on transistor radios in exactly the same manner as has been done for many years with conventional vacuum tube radios. The signal generator should be connected (as in past practice) in series with a capacitor to avoid shorting out bias voltages. With the transistors used in this receiver, the BASE is the signal input terminal (corresponding to the signal grid of vacuum tubes), the COLLECTOR is the signal output terminal (corresponding to plate), and the EMITTER is the common terminal (corresponding to the cathode). The exception to the above is in the 1st audio stage (VT5) where the output is taken from the EMITTER instead of the COLLECTOR.

The output circuit used in this receiver is of the "Class B" type; this type of output circuit has seldom been used in commercial radios for the past several years. It should therefore be noted that in "Class B" output the battery current increases greatly with increased signal input to the base.

Component Removal and Replacement:

It is not necessary to disconnect the printed board from the chassis to gain access to components on top of the board as the speaker may be readily removed from chassis.

Always use a soldering iron which is very clean and just hot enough to achieve a quick soldering operation as prolonged application of heat will damage the printed wiring.

Before installing a replacement component it is advisable to clear the contact hole by heating the contact area and pushing a tapered stainless steel wire into the hole. Small screwdriver kits are available on the market containing a suitable spiked bit.

The cans on all coils except the 3rd IF transformer may be removed without disturbing the coil formers. This is done by unsoldering the can lugs only and pulling the can free. When replacing the cans make sure the coil former is concentric with the hole on top of the can.

Chassis Removal:

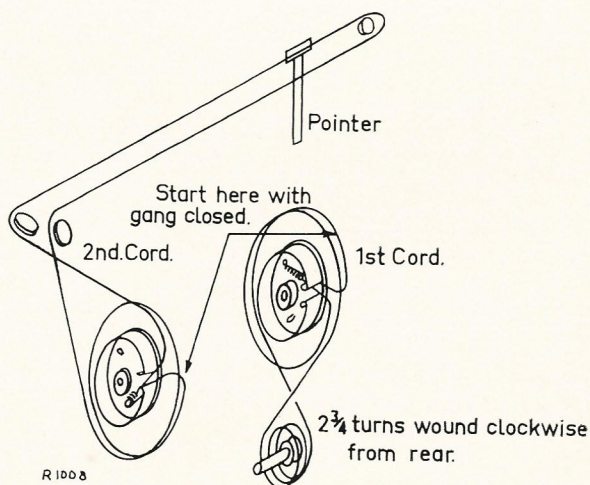
Remove all control knobs, these being a push-on fit.

Remove the two Philip's head screws on the handle pivots. Open the cabinet back and remove the battery.

The chassis assembly is now held by two screws on the outer edge of the chassis near the two front controls. Remove these screws and the chassis may be lifted out of the cabinet.

Dial Cord Replacement:

Two dial cords are used on this model; one connects the tuning spindle to the dial drum and the other connecting the dial drum to the pointer. The former is put on first starting with a looped end of the cord, following the path shown and terminating with the tension spring at the original anchor point. All successive turns around the drum progress outward from the gang.



R 1005

ALIGNMENT PROCEDURE

Manufacturer's Setting of Adjustments:

The receiver is tested by the manufacturer with precision instruments and all adjusting screws are sealed. Re-alignments 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 in association with the correct testing instruments listed below.

Under no circumstances should the plates of the ganged tuning capacitor be bent, as the unit is accurately aligned during manufacture and can only be re-adjusted by skilled operators using special equipment.

For all alignment operations, keep the generator output as low as possible to avoid A.V.C. action and set the volume control in the maximum clockwise position.

Testing Instruments:

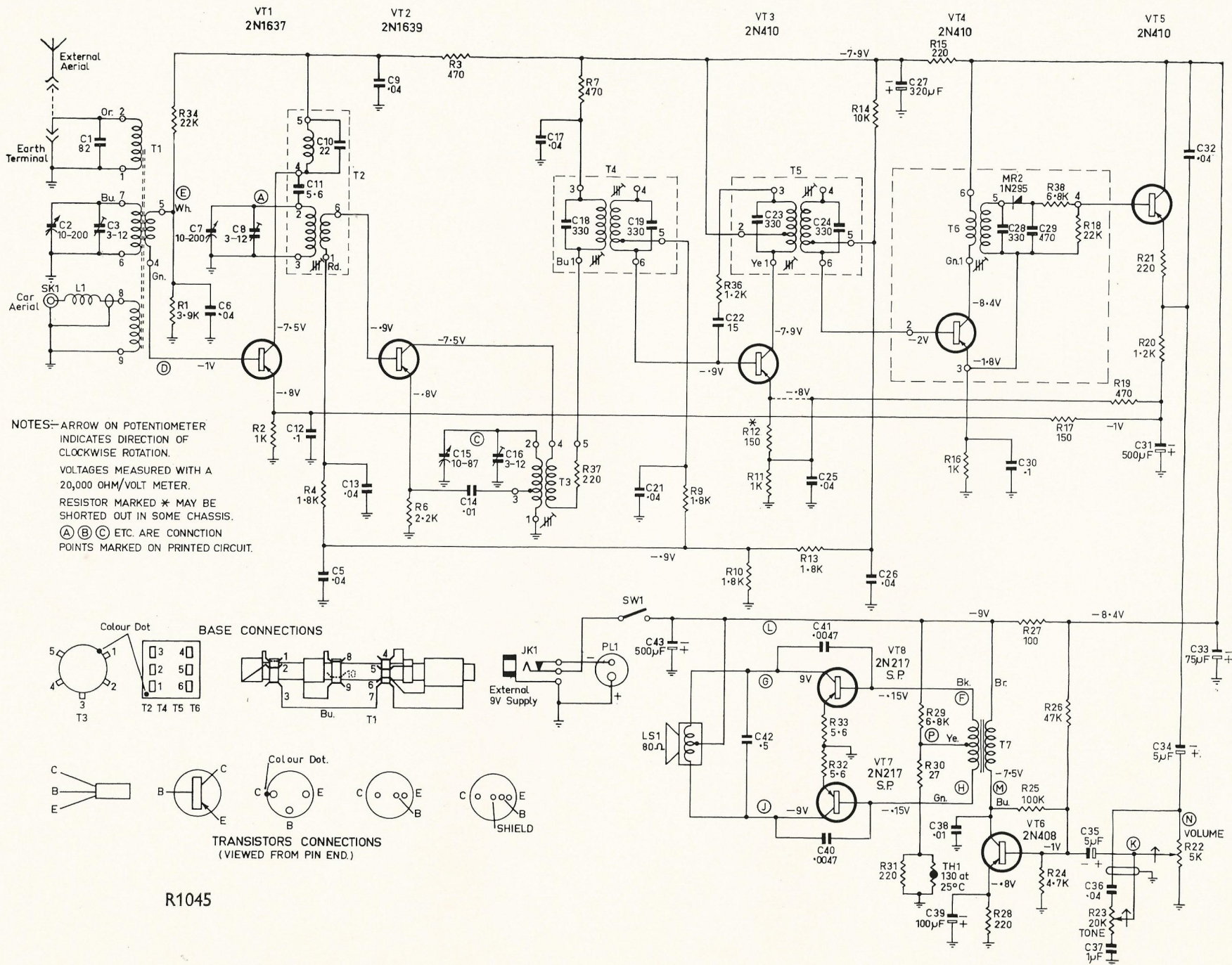
- (1) A.W.A. Junior Signal Generator, type 2R7003; or
- (2) A.W.A. Modulated Oscillator, Series J6726.
If the modulated oscillator is used, connect a .22 megohms non-inductive resistor across the output terminals.
- (3) No output transformer is used in this receiver since the speaker has a centre tapped 80 ohm voice coil and is connected directly to the collectors on the output transistors. For output measurement, if an indication only is required, Output Meter type 2M8832, switched to 5000 ohms and connected across the output collectors, should be adequate. For correct reading of power output an A.C. meter, with neither probe earthed, connected across the output collectors will measure the voltage across the 80 ohms load. The normal alignment level of 50mw occurs when 2 volts is indicated on the A.C. voltmeter.

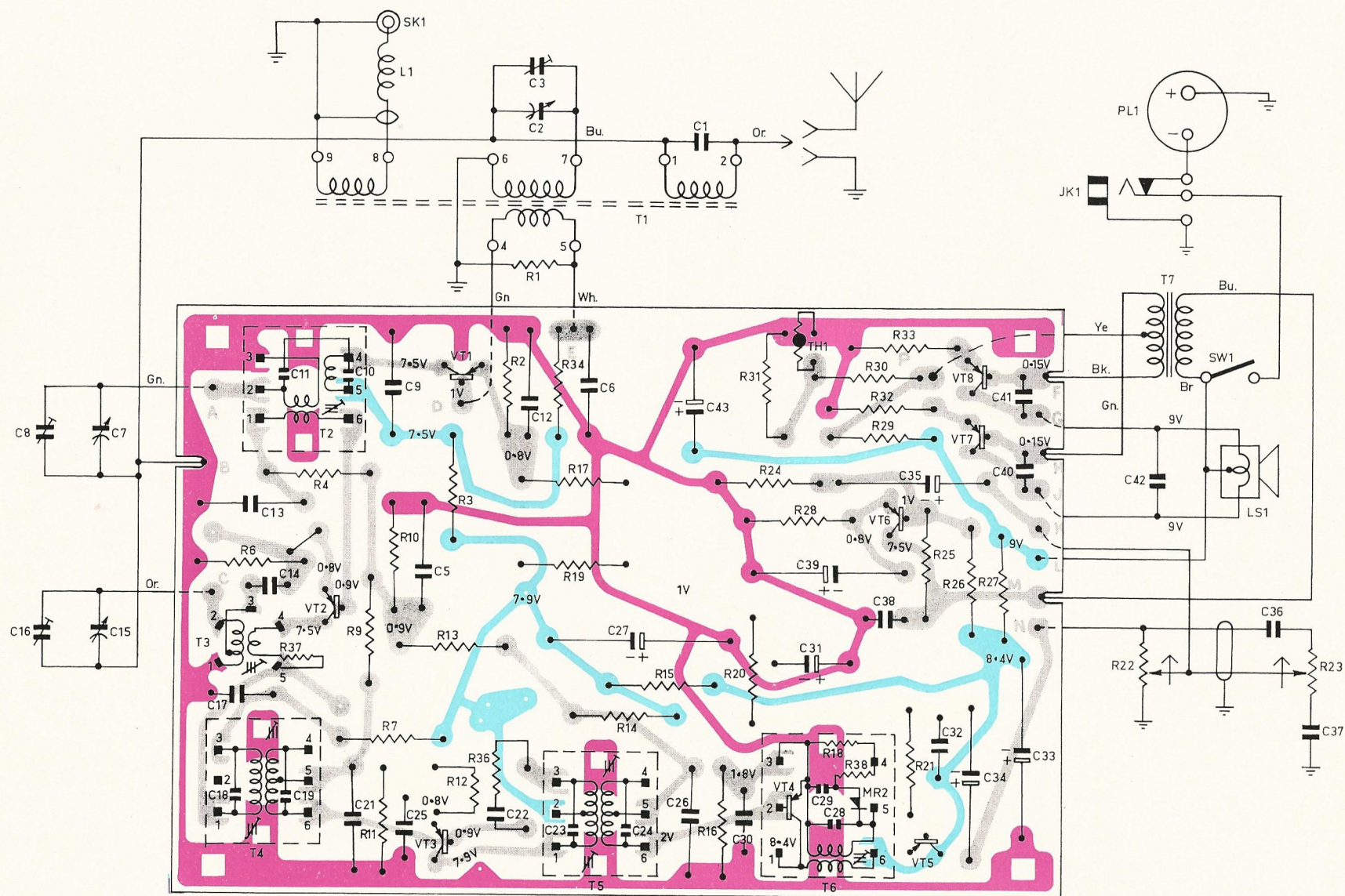
ALIGNMENT TABLE

ORDER	CONNECT "HIGH" SIDE OF GENERATOR TO:	TUNE GENERATOR TO:	TUNE RECEIVER TO:	ADJUST FOR MAX. PEAK OUTPUT
1	R.F. Section of Gang	455 Kc/s	Gang fully closed	Cores in T6, T5 and T4
Repeat adjustment until maximum output is obtained Shunt R.F. section of gang (rear section) with a 3K ohm resistor				
2	Inductively coupled to Rod Aerial*	600 Kc/s	600 Kc/s	L.F. Osc. Core Adj. (T3)†
Remove shunt resistor on R.F. section				
3	Inductively coupled to Rod Aerial*	600 Kc/s	600 Kc/s	L.F. R.F. Core Adj. (T2)
4	Inductively coupled to Rod Aerial*	1,620 Kc/s	Gang fully open	H.F. Osc. Adj. (C16)
5	Inductively coupled to Rod Aerial*	1,500 Kc/s	1,500 Kc/s	H.F. Aerial Adj. (C3)
6	Inductively coupled to Rod Aerial*	1,500 Kc/s	1,500 Kc/s	H.F. R.F. Adj. (C8)

* A coil comprising 3 turns of 16 gauge D.C.C. wire about 12 inches in diameter should be connected between the output terminals of the test instrument, placed concentric with the rod aerial and distant not less than 1 foot from it.

† Rock the tuning control back and forth through the signal.





R1052 BR B

CIRCUIT CODE

CODE No.	DESCRIPTION	PART No.	CODE No.	DESCRIPTION	PART No.
RESISTORS					
R1	3.9K ohms	610560	C17	0.04uf $\pm 20\%$ 200VW Hunts W99	228750
R2	1K ohms	608022	C18	330pf $\pm 5\%$ 125VW Styrofoam	223722
R3	470 ohms	606588	C19	330pf $\pm 5\%$ 125VW Styrofoam	223722
R4	1.8K ohms	609077	C20	Not used	
R5	Not used		C21	0.04uf $\pm 20\%$ 200VW Hunts W99	228750
R6	2.2K ohms	609442	C22	15pf $\pm 5\%$ NPO tubular	220706
R7	470 ohms	606588	C23	330pf $\pm 5\%$ 125VW Styrofoam	223722
R8	Not used		C24	330pf $\pm 5\%$ 125VW Styrofoam	223722
R9	1.8K ohms	609077	C25	0.04uf $\pm 20\%$ 200VW Hunts W99	228750
R10	1.8K ohms	609080	C26	0.04uf $\pm 20\%$ 200VW Hunts W99	228750
R11	1K ohms	608022	C27	320uf 10VW Electrolytic	229776
R12	150 ohms	604677	C28	330pf $\pm 5\%$ 125VW Styrofoam	223722
R13	1.8K ohms	609080	C29	470pf $\pm 20\%$ Hi-K tubular	221972
R14	10K ohms	612019	C30	0.1uf $\pm 80\%$ —20% Hi-K 33VW disc	222074
R15	220 ohms	605253	C31	500uf 3VW Electrolytic	229854
R16	1K ohms	608025	C32	0.04uf $\pm 20\%$ 200VW Hunts W99	228750
R17	150 ohms	604679	C33	75uf 10VW Electrolytic	229675
R18	22K ohms	613653	C34	20uf 10VW Electrolytic	229309
R19	470 ohms	606591	C35	20uf 10VW Electrolytic	229309
R20	1.2K ohms	608312	C36	0.04uf $\pm 20\%$ 200VW Hunts W99	228750
R21	220 ohms	605253	C37	1uf $\pm 20\%$ 200VW Hunts W48	227731
R22	5K ohms Log Carbon, Volume W/S	620060	C38	0.01uf $\pm 10\%$ 200VW Hunts W99	226363
R23	2.5K ohms Log Carbon, Tone	620256	C39	100uf 3VW Electrolytic	229706
R24	4.7K ohms	610932	C40	0.005uf $\pm 20\%$ 200VW Hunts W99	226005
R25	100K ohms	616017	C41	0.005uf $\pm 20\%$ 200VW Hunts W99	226005
R26	47K ohms	614961	C42	0.5uf $\pm 20\%$ 200VW Hunts W48	229116
R27	100 ohms	604031	C43	500uf 10VW Electrolytic	229856
R28	220 ohms	605253	TRANSFORMERS AND INDUCTORS		
R29	6.8K ohms	611526	T1	Ferrite Rod Ass'y	51065
R30	27 ohms	602593	T2	R.F. Transformer	50620
R31	220 ohms	605253	T3	Oscillator Transformer	50622
R32	5.6 ohms	600714	T4	1st I.F. Transformer	50637
R33	5.6 ohms	600714	T5	2nd I.F. Transformer	50639
R34	22K ohms	613656	T6	3rd I.F. Transformer	50641
R35	Not used		T7	Driver Transformer	50459
R36	1.2K ohms	608312	L1	Aerial Choke	34336
R37	220 ohms	605253	TRANSISTORS AND DIODES		
R38	6.8K ohms	611526	VT1	AWV 2N544 or 2N1637	
CAPACITORS					
C1	82pf $\pm 5\%$ N750 tubular	222128	VT2	AWV 2N412, 2N544, 2N374 or 2N1639	
C2	10—200pf tuning Aerial	21370	VT3	AWV 2N410	
C3	3—12pf trimmer Aerial		VT4	AWV 2N410	
C4	Not used		VT5	AWV 2N410	
C5	0.04uf $\pm 20\%$ 200VW Hunts W99	228750	VT6	AWV 2N408	
C6	0.04uf $\pm 20\%$ 200VW Hunts W99	228750	VT7	AWV 2N217 SP	
C7	10—200pf tuning R.F.	21370	VT8	AWV 2N217 SP	
C8	3—12pf trimmer R.F.		MR1	Not used	
C9	0.04uf $\pm 20\%$ 200VW Hunts W99	228750	MR2	Germanium Diode IN295, OA90 or OA80	
C10	22pf $\pm 5\%$ N750 tubular	221523	MISCELLANEOUS		
C11	5.6pf $\pm 5\%$ NPO tubular	227074	SW1	On/Off Switch on R22	50043
C12	0.1uf $\pm 20\%$ 25VW disc	228750	LS1	6" x 4" Permanent Magnet Speaker	893703
C13	0.04uf $\pm 20\%$ 200VW Hunts W99	228750	TH1	130 ohms at 25° C. NTC Thermister	63629
C14	0.01uf $\pm 20\%$ 200VW Hunts W99	226363	JK1	Jack	34623
C15	10—87pf tuning Osc.		PL1	Battery Plug	49051
C16	3—12pf trimmer Osc.	21370	SK1	Aerial Socket	

D.C. RESISTANCE OF WINDINGS

WINDING	OHMS RESISTANCE IN	WINDING	RESISTANCE IN OHMS
Ferrite Rod Assembly T1:		1st and 2nd I.F. Transformers Windings	
Primary 1-2	20	T4, T5	10
Secondary 6-7	1.5		
Tertiary 4-5	*	3rd I.F. Transformer T6:	
R.F. Transformer T2:		Primary 1-6	6
Primary 4-5	78	Secondary 3-5	10
Secondary 2-3	10.6		
Tertiary 1-6	*	Coupling Transformer T7:	
Oscillator Transformer T3:		Primary Bu-Br	70
Primary 1-2	5.5	Secondary Bk-Gr	230
Secondary 4-5	1		

The above readings were taken on 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.
 * Less than one ohm.

MECHANICAL REPLACEMENT PARTS

ITEM	PART No.	ITEM	PART No.
Nameplate, Electric	39827/2	Knob Assembly, On-Off/Volume	64004
Bracket, Moulded, Aerial Mounting	39625	Knob Assembly, Tone	64003
Cabinet	60246	Knob Assembly, Tuning	64005
Dial Scale	37978	Label, Component Layout	62952
Drive Cord, B184 Glass Fibre Nylon Covered 21" and 39"	250007	Pointer	39627
Drive Drum Assembly	39641	Spindle, Tuning	60096
Fret	64017	Spring, Dial Cord Tension	1741
Gang Mounting:		Terminal, Spring Earthing	5458
Grommet	36826/2	Gear Case Assembly	39618
Screw, 4BA x $\frac{5}{16}$ " Ch. hd.	714010	Grommet,	38429
Spacer	39624	Jack, Earphone	417409
Washer, Flat	13156	Jack, Power Supply	63629
Washer, 4BA, ITL	921204		

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.