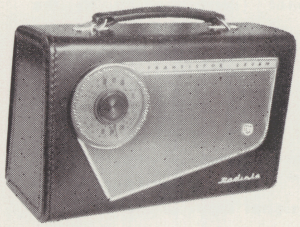
TECHNICAL INFORMATION AND SERVICE DATA

MANUFACTURERS AWA SUPERVISED SERVICE



Radiola

Model 157-P

ISSUED BY
AMALGAMATED WIRELESS (AUSTRALASIA) LTD.

GENERAL DESCRIPTION

Model 157P is a seven transistor, battery operated superheterodyne portable receiver designed for the reception of the Medium Wave Band.

Features of the design include:
Ferrite Rod Aerial with provision for external aerial; high gain IF transformers; Autodyne converter; high sensitivity 7" x 5" elliptical speaker and economical battery life.

ELECTRICAL AND MECHANICAL SPECIFICATIONS

Frequency Range ..... 540-1650 Kc/s. (555-182 Metres)
Intermediate Frequency ..... 455 Kc/s.
Battery Complement ..... 9 Volt Battery Type 276-P
Battery Consumption ..... For zero audio output = 15mA
For full audio output = 80mA

Transistor Complement:
AWV 2N219 ..... Converter
AWV 2N218 ..... 1st I.F. Amplifier
AWV 2N218 ..... 2nd I.F. Amplifier
AWV 2N218 ..... 1st Audio
AWV 2N408 ..... Driver
AWV 2N270 ..... Output
AWV 2N270 ..... Output

Three GEX 34 diodes are also used as (1) Audio Detector and A.V.C. (2) Converter Clamp and (3) Overload Diode.

Loudspeaker:
7" x 5" permanent magnet No. 21602.
V.C. Impedance, 16 ohms at 400 c.p.s.

Undistorted Power Output ..... 400 mW

Controls:
Tuning Control — front left-hand of cabinet.
On/off Volume Control — right-hand end of cabinet.
Tone Control — bottom right-hand end of cabinet.

Dimensions:
Height — $7\frac{3}{4}$"; Width — $11\frac{1}{4}$"; Depth — $4\frac{1}{2}$".
Weight with battery — 7lbs.

Chassis Removal:

Remove the tuning, tone and volume control knobs. These knobs are only a push on fit; however, in the case of the tuning control forcing the knob past its normal travel with a twisting action is necessary to overcome friction between the knob and the gang spindle.

Remove the two screws from the top and one screw from the bottom of the cabinet.

The chassis is now free to lift from the cabinet.

Chassis replacement is the reverse of the above. After replacing the tuning knob the pointer should be lined up on the State Monograms on either side of the dial scale. Check the calibration on some known station and correct for any tracking error by forcing the knob past its free travel in the appropriate direction.

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 ohmeter. 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 (VT4) 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.

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) The output impedance from collector to collector is 250 ohms. If an indication only is required then Output Meter, type 2M8832. is switched to 5,000 ohms and connected across the output collectors, should be adequate. If other types of meters are used with the correct loading, the speaker MUST BE DISCONNECTED, otherwise the maximum dissipation of the transistors will be exceeded at full audio output.

ALIGNMENT TABLE

Alignment Order	Connect "high" side of Generator to:	Tune Generator to:	Tune Receiver to:	Adjust for Maximum Peak Output:
1	Aerial Section of Gang	455 Kc/s.	Gang fully closed	Cores in T5, T4 and T3
Repeat adjustment until maximum output is obtained.				
2	Inductively coupled to Rod Aerial°	600 Kc/s.	600 Kc/s.	L.F. Osc. Core Adj. (T2) †
3	Inductively coupled to Rod Aerial°	1500 Kc/s.	1500 Kc/s.	H.F. Osc. Adj. (C6)
4	Inductively coupled to Rod Aerial°	1500 Kc/s.	1500 Kc/s.	H.F. Aerial Adj. (C4)

° 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.

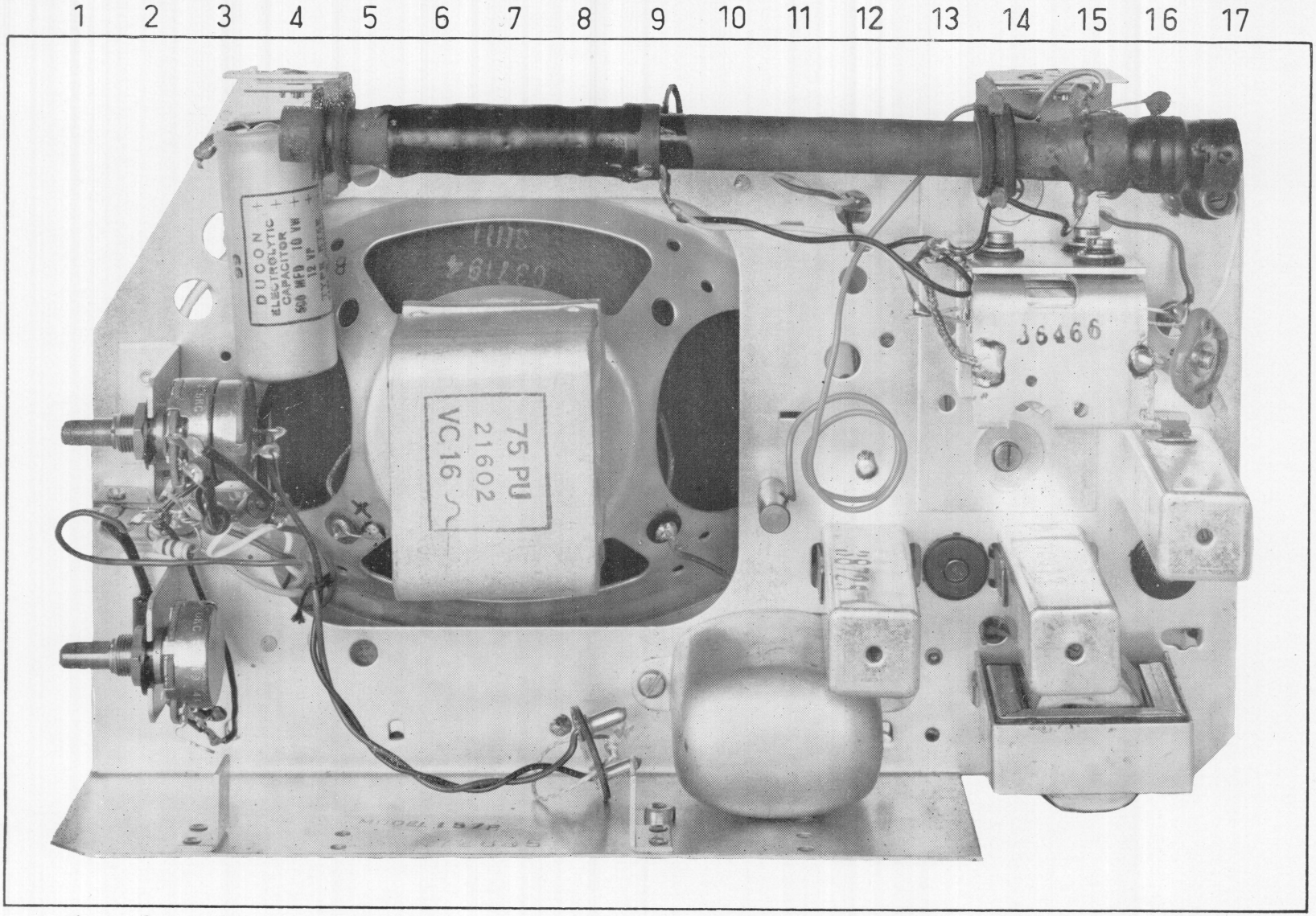

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
A B C D E F G H J K L
DUCON
ELECTROLYTIC
CAPACITOR
75 PU
21602
VC 16
J6466

FIG. 1

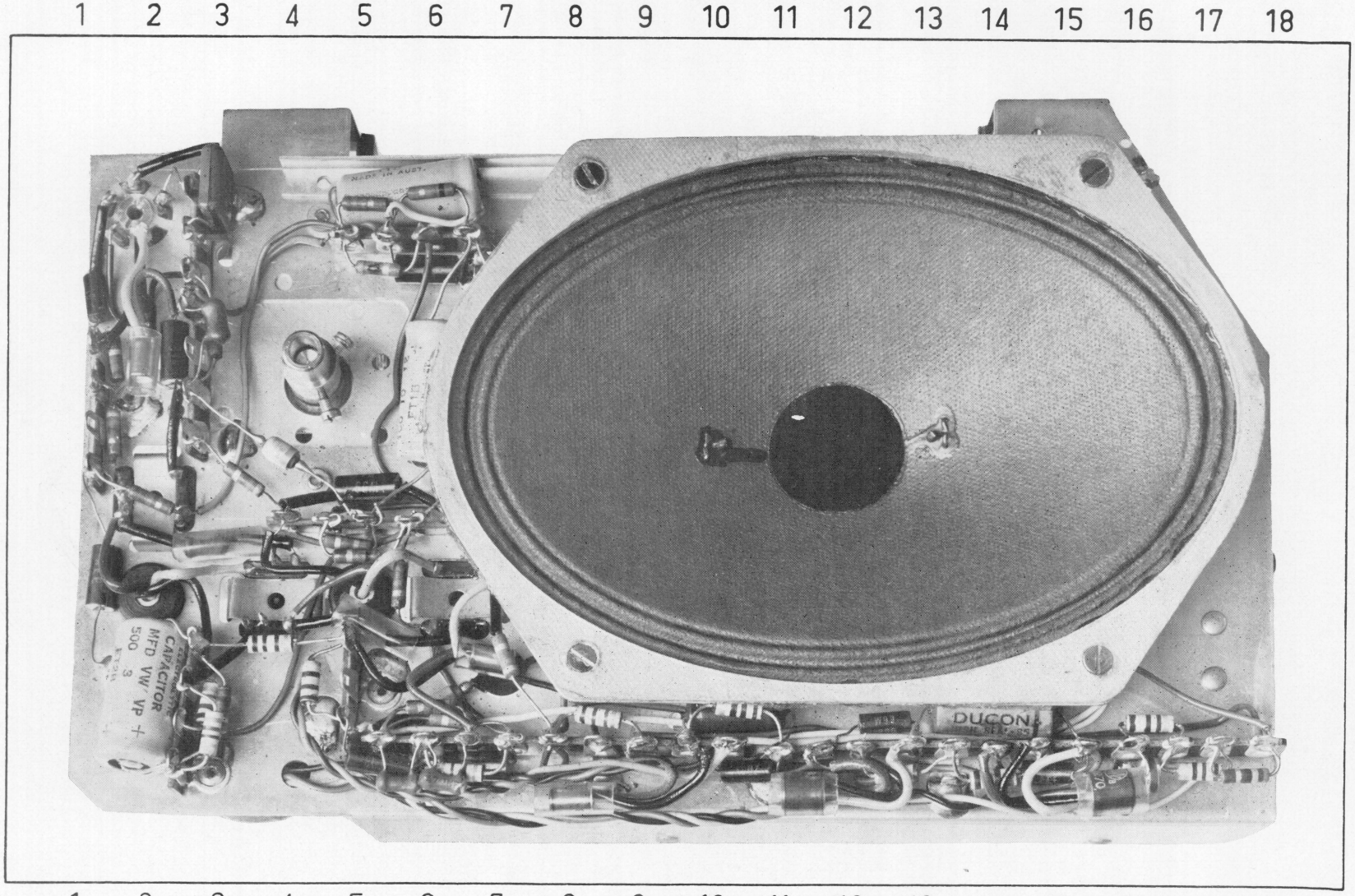

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
A B C D E F G H J K L
CAPACITOR
MFD VW VP
500 3
DUCON

FIG. 2

D. C. RESISTANCE WINDINGS

Winding	D.C. Resistance in ohms.
Ferrite Rod Assembly T1:	
Primary	18
Secondary	*
Oscillator Coil T2:	
Primary	4
Secondary	*
I.F. Transformer Windings T3 & T4:	10
I.F. Transformer Winding T5:	
Primary	5
Secondary	10
Driver Transformer T6:	
Primary	550
Secondary	800
Output Transformer T7:	
Primary	20
Secondary	1.8

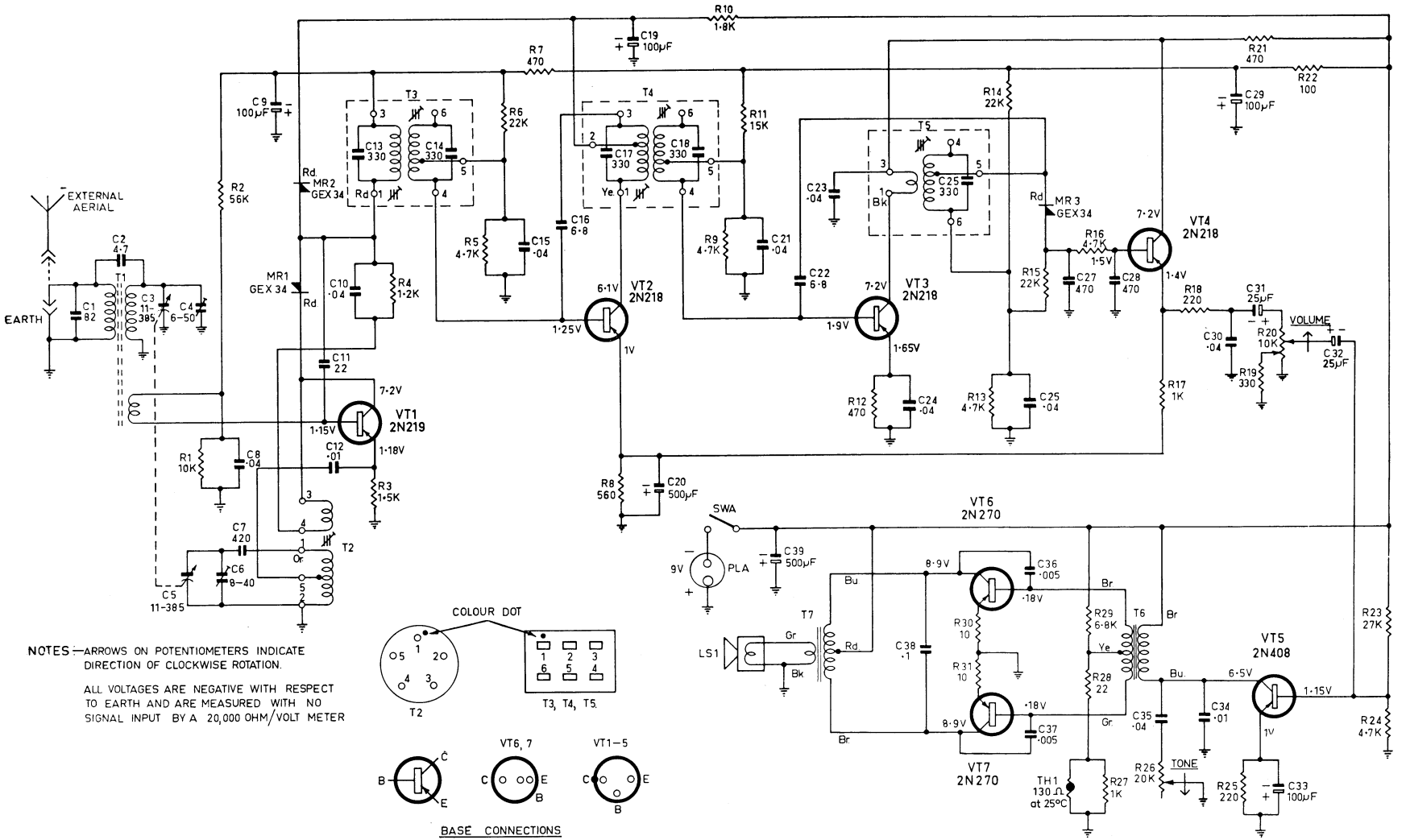
The above readings were taken on a standard chassis, but substitution of materials during manufacture may cause variations and it should not be assumed that a component is faulty if a slightly different reading is obtained.

* Less than 1 ohm.

MECHANICAL REPLACEMENT PARTS

Item	Part Number
Chassis Assembly:	
Bracket Assembly, Ferrite Rod Mounting	38427
Bracket, Gang Mounting	36477
Clip, I.F. Mounting	27780
Cone Assembly, Speaker	34967
Coupling, Gang Spindle	36468
Nut, Top Chassis Mounting	36447
Retainer, Top Chassis Mounting Nut	23288
Screw Oscillator Coil Mounting	34147
Cabinet Fitting:	
Cabinet	37775
Dial Scales:	
N.S.W.	32288
VIC.	32289
QLD.	32290
S.A.	32291
W.A.	32292
TAS.	32293
Fret, Speaker	36437
Knob Assembly, Tone	38432
Knob Assembly, Tuning	35290A
Knob Assembly, Volume	38431
Label, Component Layout	37707
Retainer, Dial Scale	36472
Trim Frame	36436/1

When ordering, always quote the above Part Numbers and in the case of coloured parts such as cabinets, knobs, etc., the colour plus the Part Number.



NOTES:—ARROWS ON POTENTIOMETERS INDICATE DIRECTION OF CLOCKWISE ROTATION.

ALL VOLTAGES ARE NEGATIVE WITH RESPECT TO EARTH AND ARE MEASURED WITH NO SIGNAL INPUT BY A 20,000 OHM/VOLT METER

CIRCUIT CODE — RADIOLA 157-P

Code No.	Description	Part No.	Fig. No.	Location
	RESISTORS			
	All Resistors ± 10% unless otherwise stated			
R1	10K ohms ± 5% ½ watt	612019	2	B6
R2	56K ohms ± 5% ½ watt	601618	2	B5
R3	1.5K ohms ± 5% ½ watt	608695	2	E2
R4	1.2K ohms ½ watt	601220	2	D3
R5	4.7K ohms ± 5% ½ watt	610951	2	F2
R6	22K ohms ± 5% ½ watt	613641	2	G2
R7	470 ohms ½ watt	601180	2	C5
R8	560 ohms ½ watt	601173	2	K3
R9	4.7K ohms ½ watt	601340	2	K3
R10	1.8K ohms ½ watt	601267	2	G5
R11	15K ohms ½ watt	601450	2	J3
R12	470 ohms ½ watt	601180	2	F3
R13	4.7K ohms ± 5% ½ watt	610951	2	K6
R14	22K ohms ± 5% ½ watt	613641	2	H6
R15	22K ohms ½ watt	601490	2	K6
R16	4.7K ohms ½ watt	601340	2	K6
R17	1K ohms ½ watt	601210	2	J4
R18	220 ohms ½ watt	601091	2	J4
R19	330 ohms ½ watt	601130	1	F3
R20	10K ohms tapped 1.2K ohms, Volume W/S	620079	1	E3
R21	470 ohms ½ watt	601180	2	J7
R22	100 ohms ½ watt	601070	2	G5
R23	27K ohms ½ watt	601520	2	K8
R24	4.7K ohms ½ watt	601340	1	G2
R25	220 ohms ½ watt	601091	2	J10
R26	20K ohms Log Carbon, Tone	620251	1	J3
R27	1K ohms ½ watt	601210	2	K16
R28	22 ohms ½ watt	602320	2	K17
R29	6.8K ohms ½ watt	601362	2	K18
R30	10 ohms ± 5% ½ watt	601001	2	K14
R31	10 ohms ± 5% ½ watt	601001	2	K13
	CAPACITORS			
C1	82 pF ± 5% N750 tubular	222128	1	B16
C2	4.7 pF ± 20% N.P.O. tubular	220219	1	A16
C3	11-385 pF tuning (Aerial)	21209	1	A14
C4	6-50 pF trimmer (Aerial)	31954	1	D16
C5	11-385 pF tuning (Osc.)	21209	1	D14
C6	8-40 pF trimmer (Osc.)	231185	1	E16
C7	420 pF ± 2½% padder	227070	2	B3
C8	0.04 μF ± 20% 200 VW AEE W99	228750	2	C6
C9	100 μF 10 VW Electrolytic	229704	2	B5
C10	0.04 μF ± 20% 200 VW AEE W99	228750	2	D2
C11	22 pF ± 10% N750 tubular	220882	2	D3
C12	0.01 μF ± 20% 200 VW AEE W99	228609	2	D1
C13	330 pF ± 5% silvered mica (in 1st I.F.)	223709	2	G3
C14	330 pF ± 5% silvered mica (in 1st I.F.)	223709	2	G2

Code No.	Description	Part No.	Fig. No.	Location
	CAPACITORS		1	B16
C15	0.04 μF ± 20% 200 VW AEE W99	228750	2	H1
C16	6.8 pF ± 10% N.P.O. tubular	220378	2	G3
C17	330 pF ± 5% silvered mica (in 2nd I.F.)	223709	2	H4
C18	330 pF ± 5% silvered mica (in 2nd I.F.)	223709	2	H4
C19	100 μF 10 volt working Electrolytic	229704	2	E6
C20	500 μF 3 volt working Electrolytic	229854	2	J2
C21	0.04 μF ± 20% 200 VW AEE W99	228750	2	K3
C22	6.8 pF ± 10% N.P.O. tubular	220378	2	H5
C23	0.04 μF ± 20% 200 VW AEE W99	228750	2	G7
C24	0.04 μF ± 20% 200 VW AEE W99	228750	2	G5
C25	330 pF ± 5% silvered mica (in 3rd I.F.)	223709	2	H7
C26	0.04 μF ± 20% 200 VW AEE W99	228750	2	K7
C27	470 pF + 50% - 20% K1000 tubular	224208	2	L6
C28	470 pF + 50% - 20% K1000 tubular	224208	2	L6
C29	100 μF 10 volt working Electrolytic	229704	2	E7
C30	0.04 μF ± 20% 200 VW AEE W99	228750	2	K5
C31	25 μF 3 volt working Electrolytic	229562	1	G4
C32	25 μF 3 volt working Electrolytic	229562	1	G3
C33	100 μF 3 volt working Electrolytic	229706	2	J10
C34	0.01 μF ± 20% 200 VW AEE W99	228609	2	K10
C35	0.04 μF ± 20% 200 VW AEE W99	228750	1	H2
C36	0.005 μF ± 20% 200 VW AEE W99	226005	2	K15
C37	0.005 μF ± 20% 200 VW AEE W99	226005	2	K12
C38	0.1 μF ± 20% 200 VW paper	227022	2	K14
C39	500 μF 10 Volt Working Electrolytic	229855	1	C4
	TRANSFORMERS			
T1	Ferrite Rod Aerial	38744	1	B9
T2	Oscillator Coil	38742	2	C2
T3	1st I.F. Transformer	36911	2	F2
T4	2nd I.F. Transformer	36913	2	H4
T5	3rd I.F. Transformer	38725	2	H6
T6	Driver Transformer	21447	1	K15
T7	Output Transformer	38182	1	K11
	TRANSISTORS			
VT1	AWV 2N219		2	E2
VT2	AWV 2N218		2	H2
VT3	AWV 2N218		2	H5
VT4	AWV 2N218		2	J7
VT5	AWV 2N408		2	L8
VT6	AWV 2N270		2	L16
VT7	AWV 2N270		2	L11
	MISCELLANEOUS			
MR1	Germanium Diode GEX 34	597049	2	D2
MR2	Germanium Diode GEX 34	597049	2	F4
MR3	Germanium Diode GEX 34	597049	2	J6
TH1	130 ohms at 25°C N.T.C. Thermistor	893703	2	K16
LS1	7" x 5" Permanent Magnet	21602	2	E12