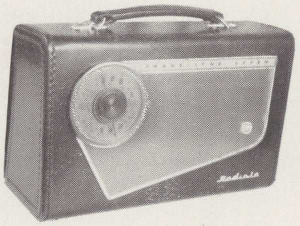
MANUFACTURERS AWA SUPERVISED SERVICE

TECHNICAL INFORMATION AND SERVICE DATA



Radiola
Transistor 7 Portable
Models 117-P, 117-PZ

ISSUED BY
AMALGAMATED WIRELESS (AUSTRALASIA) LTD.

GENERAL DESCRIPTION

Models 117-P and 117-PZ are seven transistor, battery operated superheterodyne portable receivers designed for the reception of the Medium Wave Band.

Features of the design include:

Ferrite Rod Aerial with provision for external aerial; high gain I.F. transformers; Autodyne converter; ganged volume control; high sensitivity 7" x 5" elliptical speaker and economical battery operation.

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 2N408	1st Audio
AWV 2N408	Driver
AWV 2N270	Output
AWV 2N270	Output

On model 117-P two GEX/34 Crystal Diodes are also used as (1) Audio Detector, (2) Converter Clamp.

On model 117-PZ an additional diode is provided as an 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.

CIRCUIT CODE — RADIOLA 117-P, 117-PZ

Code No.	Description	Part No.	Fig. No.	Location
	RESISTORS			
	All Resistors ± 10% unless otherwise stated			
R1	10K ohms ½ watt		2	B4
R2	56K ohms ½ watt		2	C3
R3	470 ohms ½ watt		2	F1
R4	1.5K ohms ½ watt		2	E1
R5	4.7K ohms ± 5% ½ watt		2	F1
R6	27K ohms ± 5% ½ watt		2	G1
R7	2.2K ohms ½ watt		2	H4
R8	820 ohms ± 5% ½ watt (117-P)		2	K2
	560 ohms ± 5% ½ watt (117-PZ)		2	K2
R9	4.7K ohms ½ watt		2	K3
R10	47K ohms ½ watt		2	K3
R11	470 ohms ½ watt		2	L7
R12	470 ohms ½ watt		2	L4
R13	1K ohms ± 5% ½ watt		2	J3
R14	4.7K ohms ± 5% ½ watt		2	D4
R15	22K ohms ± 5% ½ watt		2	E6
R16	220 ohms ½ watt (117-P)		2	K5
	1.2K ohms ½ watt (117-PZ)		2	K5
R17	1.8K ohms ½ watt (117-PZ)		2	K6
R18	2.5K ohms Log Carbon. Volume W/S	37218	1	F3
R19	4.7K ohms ½ watt		2	C4
R20	100 ohms ½ watt		2	E5
R21	27K ohms ½ watt		2	D5
R22	470 ohms ½ watt (117-P)		2	B7
	220 ohms ½ watt (117-PZ)		2	B7
R23	100 ohms ½ watt		2	L7
R24	6.8K ohms ½ watt		2	B12
R25	22 ohms ½ watt		2	C13
R26	1K ohms ½ watt		2	B14
R27	20K ohms Log Carbon. Tone	37219	1	J3
R28	10 ohms ½ watt		1	C6
R29	10 ohms ½ watt (117-P)		1	C7
	CAPACITORS			
C1	0.1 μF 200 volt working paper		2	B4
C2	11-385 pF tuning (Aerial)	21209	1	E15
C3	6-50 pF trimmer (Aerial)	31954	1	D13
C4	11-385 pF tuning (Osc.)	21209	1	E15
C5	8-40 pF trimmer (Osc.)	231185	1	C13
C6	420 pF ± 2½% padder		2	C3
C7	0.1 μF 200 volt working paper		2	C3
C8	0.01 μF 200 volt working paper		2	D3
C9	330 pF ± 5% silvered mica (in 1st I.F.)		2	G2
C10	330 pF ± 5% silvered mica (in 1st I.F.)		2	G1
C11	0.047 μF 200 volt working paper		2	H1
C12	6.8 pF ± .5 pF N.P.O. tubular		2	H3
C13	0.047 μF 200 volt working paper (117-PZ)		2	G4
C14	330 pF ± 5% silvered mica (in 2nd I.F.)		2	H4

Code No.	Description	Part No.	Fig. No.	Location
	CAPACITORS (Cont.)			
C15	100 μF 3 volt working Electrolytic (117-P)		2	K2
	500 μF 3 volt working Electrolytic (117-PZ)		2	K2
C16	0.047 μF 200 volt working paper		2	K3
C17	6.8 pF ± .5 pF N.P.O. tubular		2	H5
C18	0.047 μF 200 volt working paper		2	L6
C19	330 pF ± 5% silvered mica (in 3rd I.F.)		2	H6
C20	330 pF ± 5% silvered mica (in 3rd I.F.)		2	J6
C21	0.047 μF 200 volt working paper		2	K4
C22	0.0047 μF 600 volt working paper (117-P)		2	F5
	470 pF ± 10% 500 volt working mica (117-PZ)		2	F5
C23	25 μF 3 volt working Electrolytic		1	G4
C24	25 μF 3 volt working Electrolytic		1	G3
C25	100 μF 10 volt working Electrolytic		2	F4
C26	100 μF 10 volt working Electrolytic		2	L9
C27	100 μF 10 volt working Electrolytic		2	B7
C28	0.047 μF 200 volt working paper		1	J2
C29	0.0047 μF 600 volt working paper (117-PZ)		2	B14
C30	0.022 μF 200 volt working paper (117-PZ)		2	C8
C31	0.01 μF 200 volt working paper		2	B7
C32	0.22 μF 200 volt working paper		2	B12
C33	400 μF 12 volt working Electrolytic (117-PZ)		1	E5
C34	0.047 μF 200 volt working paper		2	C5
	TRANSFORMERS			
T1	Ferrite Rod Aerial	38076	1	B10
T2	Oscillator Coil	38074	1	C17
T3	1st I.F. Transformer	36911	1	G17
T4	2nd I.F. Transformer	38072	1	J15
T5	3rd I.F. Transformer	36921	1	J12
T6	Audio Driver Transformer	21447A	1	E11
T7	Audio Output Transformer	38118	1	C3
	TRANSISTORS			
VT1	AWV 2N219		2	E2
	AWV 2N372 (On some 117-PZ chassis)		2	E2
VT2	AWV 2N218		2	H2
VT3	AWV 2N218		2	H5
VT4	AWV 2N408		2	E6
VT5	AWV 2N408		2	C6
VT6	AWV 2N270		2	B16
VT7	AWV 2N270		2	B9
	MISCELLANEOUS			
MR1	Germanium Diode GEX 34		2	D3
MR2	Germanium Diode GEX 34 (117-PZ)		2	G3
MR3	Germanium Diode GEX 34		2	H6
TH1	Thermistor 130 ohms at 25° C. N.T.C.	893703	2	B13
PLA	Battery Plug	34623	1	L9
SWA	ON/OFF Switch (On R18)		1	F3
LS1	7" x 5" P.M. Speaker	21602	2	F11

D. C. RESISTANCE WINDINGS

Winding	D.C. Resistance in ohms.
Ferrite Rod Assembly T1:	
Primary	1
Secondary	*
Oscillator Transformer T2:	
Primary	4.2
Secondary	*
I.F. Transformer Windings T3 & T5:	10
I.F. Transformer T4	
Primary	10
Secondary	*
Driver Transformer T6:	
Primary	380
Secondary	160
Output Transformer T7:	
Primary	20
Secondary	1.7

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.

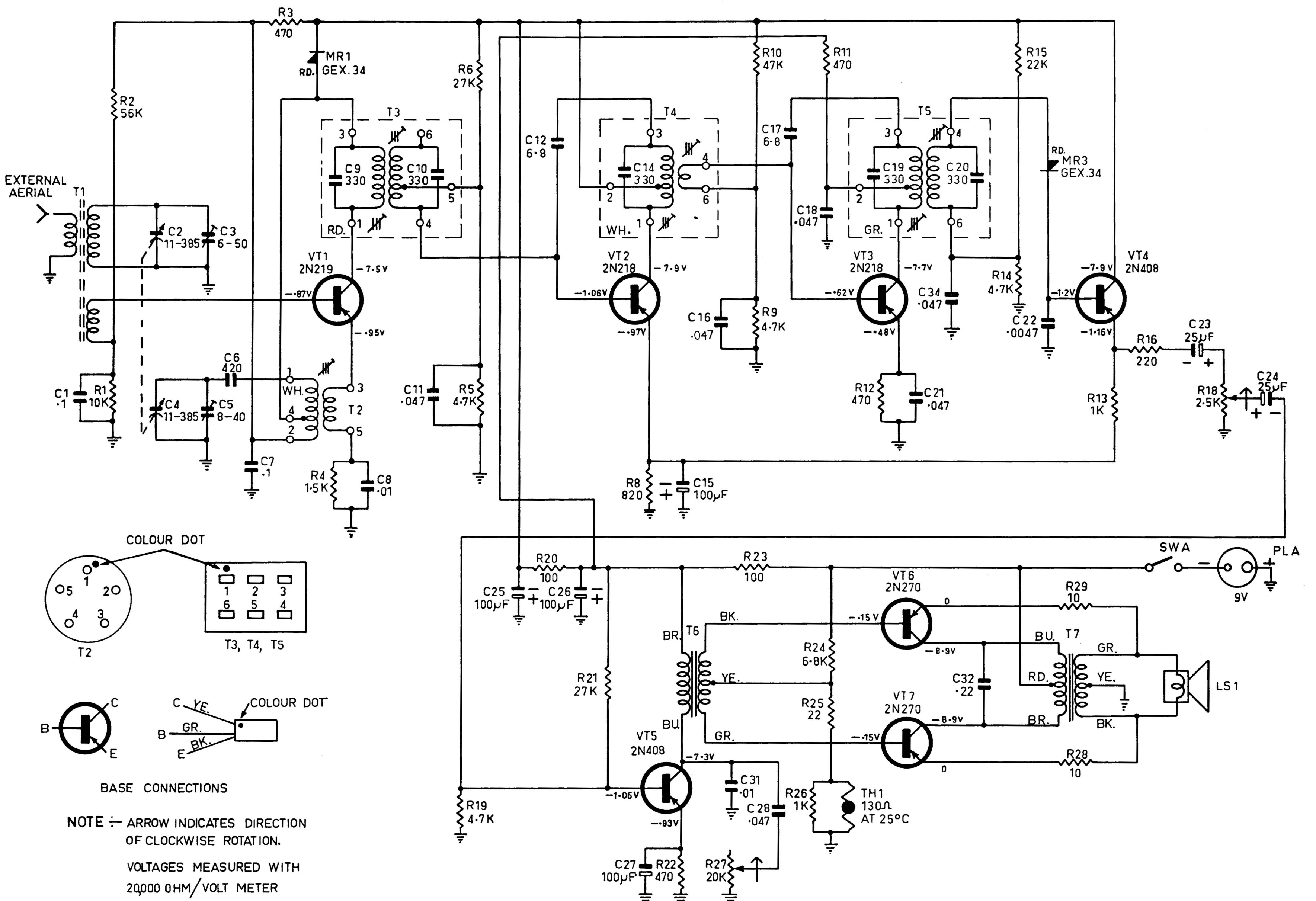
* Less than 1 ohm.

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	31373
Cabinet Fitting:	
Cabinet	37775
Dial Scales:	
N.S.W.	32288
VIC.	32289
QLD.	32290
S.A.	32291
W.A.	32292
TAS.	32293
Fret, Speaker	36437A
Knob Assembly, Tone	38432
Knob Assembly, Tuning	35290A
Knob Assembly, Volume	38431
Label, Component Layout	37686
Retainer, Dial Scale	36472
Trim Frame	36436

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.

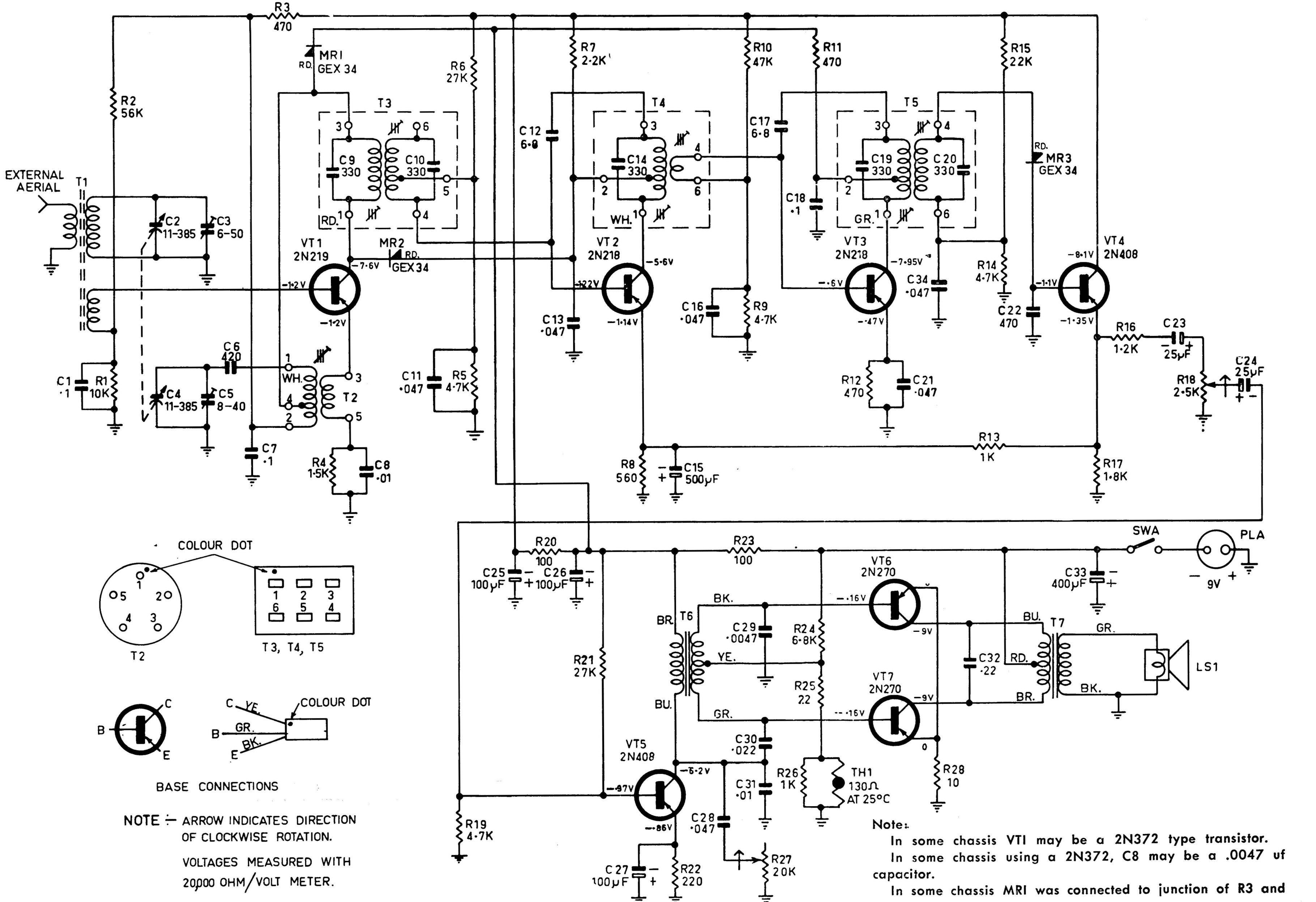
CIRCUIT — RADIOLA 117-P



NOTE :- ARROW INDICATES DIRECTION OF CLOCKWISE ROTATION.

VOLTAGES MEASURED WITH 20,000 OHM/VOLT METER

CIRCUIT — RADIOLA 117-PZ



Note:

In some chassis VTI may be a 2N372 type transistor.

In some chassis using a 2N372, C8 may be a .0047 uf capacitor.

In some chassis MRI was connected to junction of R3 and R6.

In some chassis C33 was deleted.

In future chassis R20 will be deleted.

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 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. (C5)
4	Inductively coupled to Rod Aerial°	1500 Kc/s.	1500 Kc/s.	H.F. Aerial Adj. (C3)

° 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.

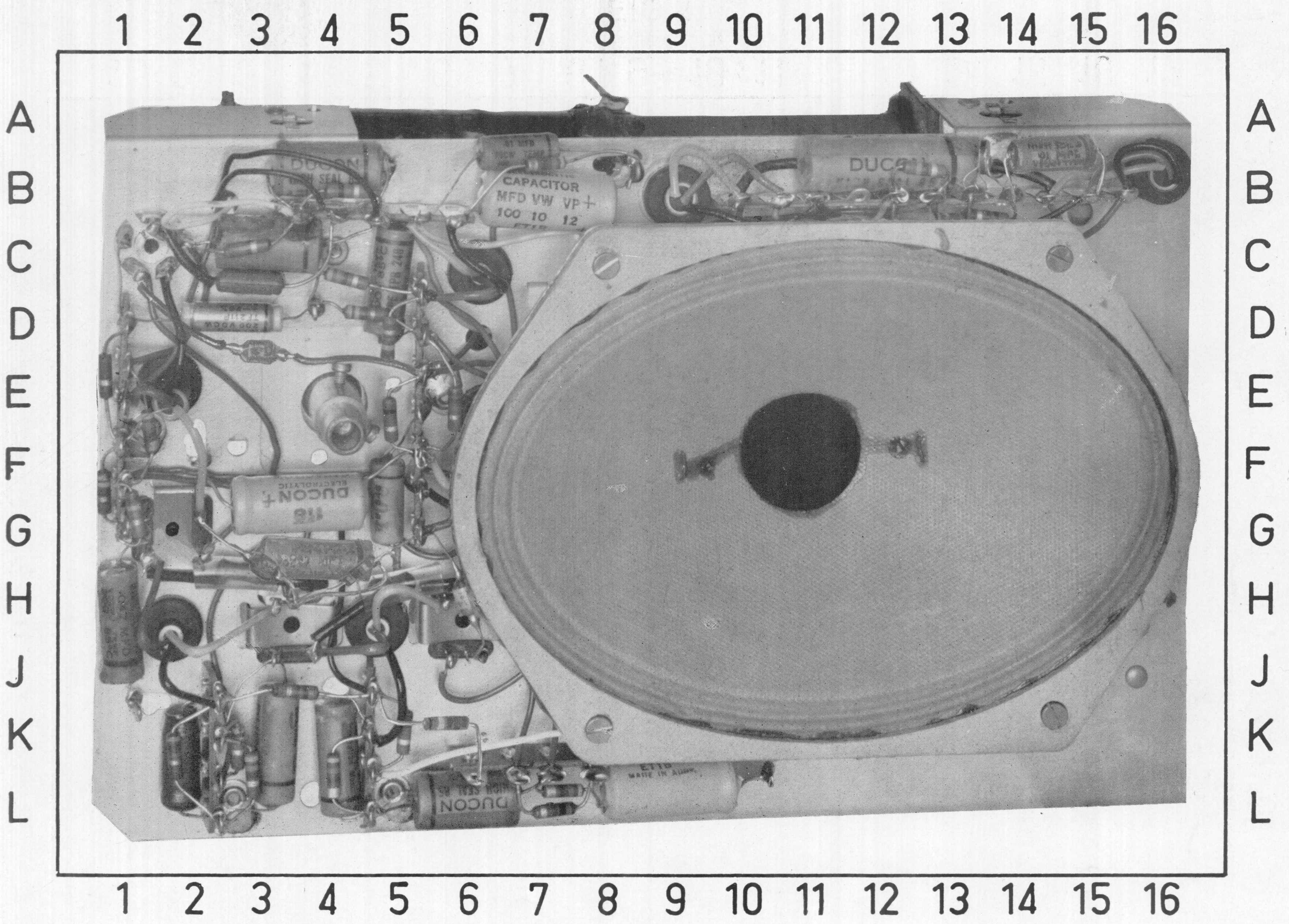

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
A B C D E F G H J K L
DUCON
CAPACITOR
MFD VW VP +
100 10 12
DUCON +
ELECTROLYTIC
DUCON
HIGH SEAL

FIG. 2

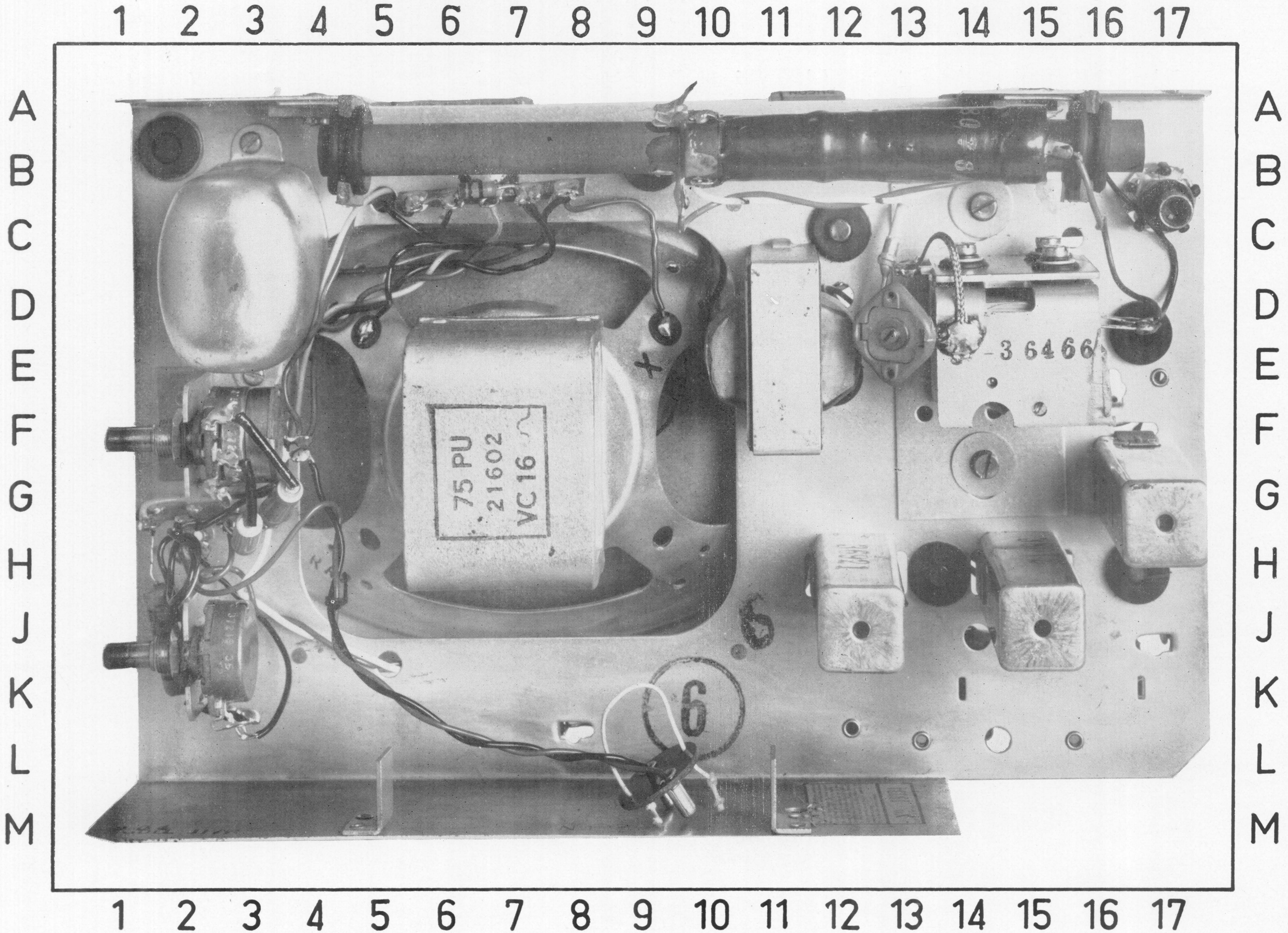

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
A B C D E F G H J K L M
75 PU
21602
VC 16
-3 6466

FIG. 1