ELECTRICE SERVICE MANUAL FOR MODEL E932P

ELECTRICE
Factory Supervised
Service

RADIO

ISSUED BY

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

GENERAL DESCRIPTION

The Model E932P is a nine transistor, battery operated superheterodyne portable receiver designed for the reception of the Medium Wave and three Short Wave bands.

Features of design include:—Ferrite rod aerial with provision for car aerial or external aerial and earth systems; high gain i.f. transformers; high sensitivity; tuning meter; provision for auxiliary power supply type PS9Z.

ELECTRICAL AND MECHANICAL SPECIFICATIONS

Frequency Ranges:

M.W.	525-1620 Kc/s
S.W. 1	1.6-4.25 Mc/s
S.W. 2	4.0-10.5 Mc/s
S.W. 3	10.0-30.0 Mc/s

Intermediate Frequency ..... 455 Kc/s

Battery Complement ..... 9V Eveready Type 2761

Battery Consumption:

Zero Output	15 mA
50mW Output	40 mA
Full Output	100 mA

Loudspeaker:

6″ x 4″	50043
V.C. Impedance	80 ohms centre tapped at 400 cps.
Undistorted Power Output	500mW

Dimensions:
Height ..... $8\frac{1}{4}$″. Width ..... $12\frac{7}{8}$″. Depth ..... $3\frac{7}{8}$″
Weight (with battery) ..... 9 lbs. 2 ozs.

Transistor Complement:

2N2083	R.F. Amplifier
2N2083	Oscillator
2N2083	Converter
2N1638	1st I.F. Amplifier
2N1638	2nd I.F. Amplifier
2N408	Audio Pre-Amplifier
2N408	Driver
2N217S, 2N217S	Push-pull Output
MR1 1N87A	Detector Diode
MR2 1N87A	A.G.C. Diode
MR3 1N87A	Overload Diode
MR4 AS2	Compensation Diode

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, and temperatures in excess of 90°C can cause permanent

ELECTRICE SERVICE MANUAL FOR MODEL E932P

damage. Great care therefore should 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 is the battery. With the receiver switched on, a new battery should read 9 volts, although the 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 the 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, except the R.F. amplifier, the BASE is the signal input terminal (corresponding to the signal grid of vacuum tubes) the COLLECTOR is the signal output terminal (corresponding to the plate) and the EMITTER is the common terminal (corresponding to the cathode).

In the case of the R.F. Amp. the base is the common terminal, the Collector the output terminal and the Emitter the input terminal.

The output circuit used in this receiver is of the "Class B" type and it should be noted that the battery current increases greatly with increased signal input to the base.

Chassis Removal:

Remove the control knobs by pulling them straight off their spindles.

Remove the Philip's head screw holding the small escutcheon on the left hand side of the cabinet.

Open the cabinet back and remove the battery.

Loosen the telescopic aerial by unscrewing it slightly.

The chassis assembly is held in the cabinet by six self tapping screws. Remove these and lift the chassis to gain access to the speaker leads.

Unsolder the speaker leads and the chassis will be free to lift clear of the cabinet.

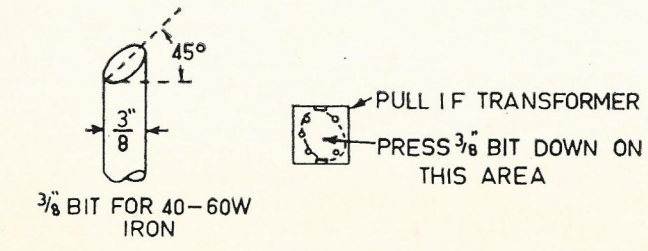


Fig. 1—Soldering Bit and I.F. Removal

Component Removal and Replacement:

Disconnect C48 from the printed board.

Unsolder the six mounting studs and tilt the board forward to gain access to the components mounted on the board.

When removing any component from the printed circuit board 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.

To remove an i.f., r.f. or oscillator transformer it is desirable to have a suitable tip on the soldering iron as shown in fig. 1. All seven connections on the transformer may be freed simultaneously and the transformer pulled from the board. This is the only satisfactory method: any other method using smaller irons will generally result in damage to either the board or the transformer or to both.

Transistors may be removed in a similar manner using a 3/16" bit on an ORYX iron.

All other components may be removed by disconnecting one lead at a time.

Before restoring a replacement component it is advisable to clear the contact hole by heating the contact area and pushing a tapered stainless steel wire through the hole.

Tuning Meter:

The tuning meter is situated in the collector circuit of the r.f. transistor and performs two functions.

1. It indicates battery voltage by indicating collector current with no signal applied to the receiver. Since collector current is dependent only on base bias under these conditions, which is dependent on battery voltage, the latter may be clearly indicated. The meter range is from 9 volts (the thickest part of the red range) to 6 volts (the point of the red range).

2. It serves as a tuning indicator by indicating the drop in collector current due to a.g.c. voltage applied to the r.f. emitter. The indicator is quite sensitive so that the meter can be used to tune weak stations. The extent to which the needle falls at minimum position is a function of a.g.c. voltage and this may be used as an indicator of station strength.

Dial Cord Replacement:

At least 44 inches of dial cord will be necessary for replacement purposes. Commence with the gang fully closed and the anchor bobbin on the drive spindle as indicated in fig. 2. Make sure that the cord is fully tensioned before connecting it to the tension spring which is then anchored to the pin remote from the drive spindle. The pointer may now be attached without decreasing the cord tension.

If the drive spindle or gears have been removed for any reason, re-assembly must conform to that shown in Fig. 2. The flat on the drive spindle is the important item as this determines the position of the anchor bobbin. The split gears may be 180° out to that shown but the hole in each gear must be in line to provide the correct tension to the anti-backlash spring.

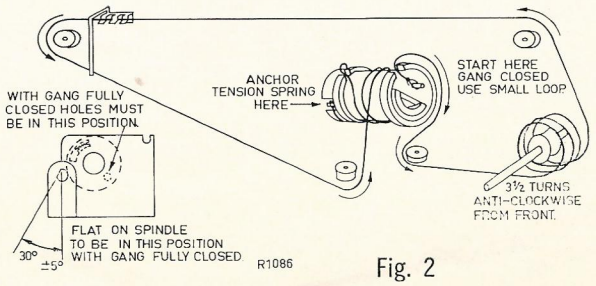


Fig. 2

D.C. RESISTANCE OF WINDINGS

Winding	D.C. Resistance in ohms
1st I.F. Transformer (TR4):	
Primary	7
Secondary	*
2nd I.F. Transformer (TR5):	
Primary	7
Secondary	*
3rd I.F. Transformer (TR6):	
Primary	7
Secondary	*
4th I.F. Transformer (TR7):	
Primary	7
Secondary	*
Driver Transformer (TR8):	
Primary	540
Secondary	540
Ferrite Rod Assembly (TR11)	*
Aerial Transformer SW2 (TR13):	
Primary	1
Secondary	*
Aerial Transformer SW3 (TR14):	
Primary	1
Secondary	*

Winding	D.C. Resistance in ohms
R.F. Transformer MW (TR21):	
Primary	9
Secondary	*
R.F. Transformer SW1 (TR22):	
Primary	2
Secondary	*
R.F. Transformer SW2 (TR23):	
Primary	*
Secondary	*
R.F. Transformer SW3 (TR24)	*
Oscillator Transformer MW (TR31):	
Primary	5
Secondary	*
Oscillator Transformer SW1 (TR32):	
Primary	*
Secondary	2
Oscillator Transformer SW2 (TR33):	
Primary	1
Secondary	*
Oscillator Transformer SW3 (TR34):	
Primary	*
Secondary	*
Aerial Choke (L1)	4

* Less than 1 ohm.

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.

MECHANICAL REPLACEMENT PARTS

ITEM	PART No.
Bracket, Tuning Spindle	64479
Circlip, Tuning Bracket Assembly	2537
Circlip (4 off)	4885
Dial Backing Assembly	64445
Dial Scale	65002
Drum Drive Assembly	64453
Escutcheon, Moulded	65652
Front Panel Assembly	65660
This includes the following:—	
Badge	65927
Cushion, Speaker Fret	64459
Dial Window	64455
Fret, Speaker	64476
Front Panel	64440
Nameplate	65662
Knob Assembly, Fine Tuning	64472
Knob Assembly Tone	64475

ITEM	PART No.
Knob Assembly Tuning	64986
Knob Assembly Volume	64987
Knob Assembly, Wave Change	64474
Pointer Assembly	64461
Pulley (4 off)	17716
Spacer (3 off)	35923
Spring, Tension, Drive Cord	1741
Support, Aerial, Moulded	64459
Variable Capacitor Assembly	64400
This includes the following:—	
Circlip Drive Spindle Retaining	Salter 5103-25
Drive Spindle Assembly	64405
Gear, Anti-backlash Front	64411
Gear, Anti-backlash Rear	64427
Spring, Anti-backlash Gear	44152
Steel Ball (2 off)	129025

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

In later production a complete changeover was made to Philips concentric air trimmers. This necessitated a change in chassis layout and Fig. 3 is incorporated to facilitate location of pertinent components for the alignment procedure with either layout. N.B.: The circuit and code at present show the initial arrangement of mixed trimmers.

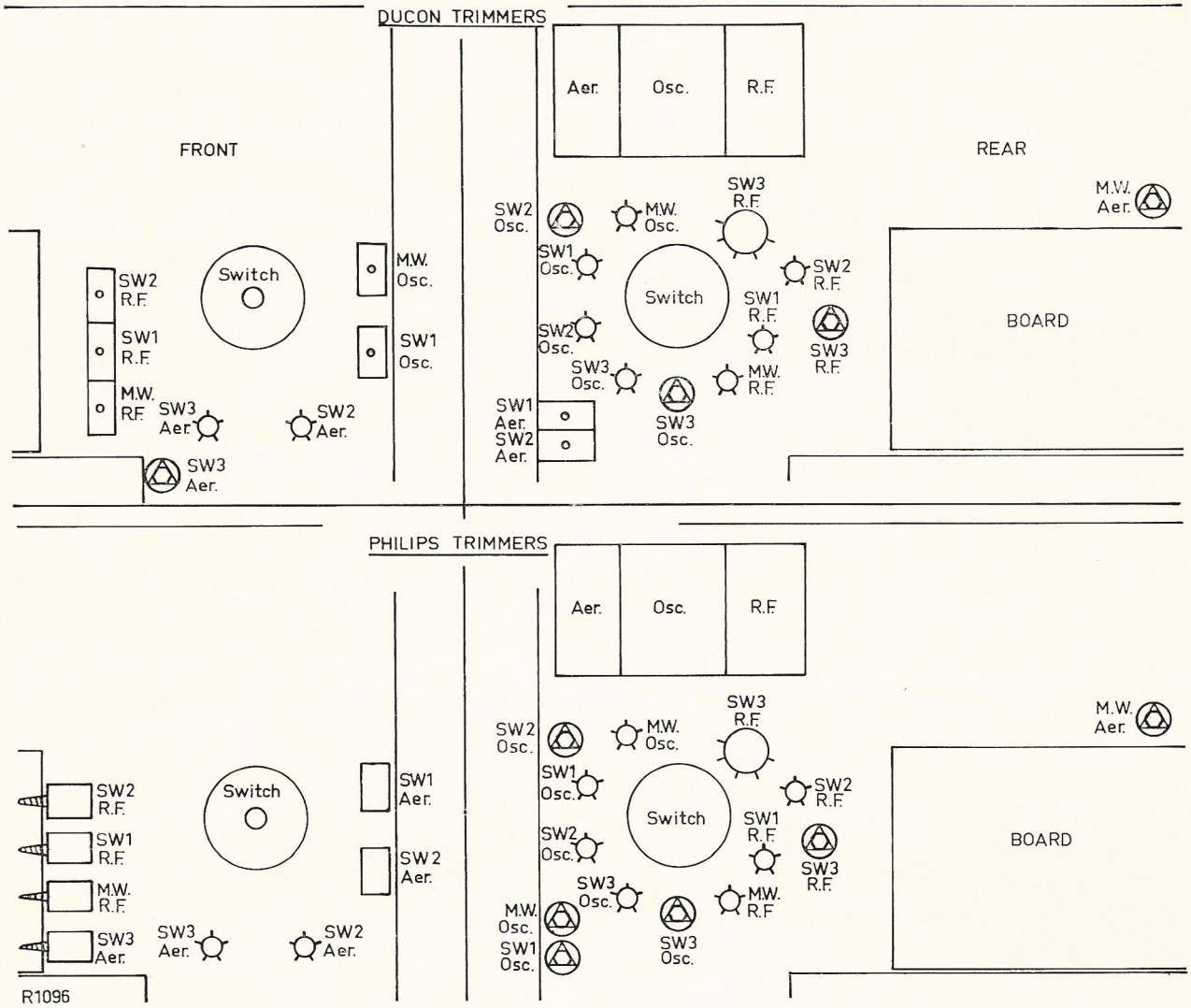


Fig. 3

ALIGNMENT PROCEDURE

Manufacturer's Setting of Adjustments:

The receiver is tested by the manufacturer with precision instruments and all adjusting screws 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 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.g.c. action and set the volume control in the maximum position.

Testing Instruments:

Signal Generator modulated 400 c.p.s. or modulated oscillator.

If the modulated oscillator is used, connect a 0.22 megohms non-inductive resistor across the output terminals.

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 of 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 probes earthed, connected across the output collectors will measure the voltage across the 80 ohms load. The normal alignment level of 50 mW 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 Maximum Peak Output:
Turn the wave switch to medium wave.				
1	R.F. Section of gang	455 Kc/s	Gang fully closed	Cores in TR4, TR5, TR6 and TR7
	Repeat adjustment until maximum output is obtained.			
2	Inductively coupled to rod aerial.*	1620 Kc/s	Gang fully open	Osc. Trimmer (C78)
	Connect a 2.2K ohms resistor between pins 2 and 3 of TR21.			
3	Inductively coupled to rod aerial.*	1500 Kc/s	1500 Kc/s	Aer. Trimmer (C58)
4	Inductively coupled to rod aerial.*	600 Kc/s	600 Kc/s	Osc. Core Adj. (TR31)§
	Repeat 2, 3 and 4. Remove the 2.2K ohms resistor			
5	Inductively coupled to rod aerial.*	1500 Kc/s	1500 Kc/s	R.F. Trimmer (C64)
6	Inductively coupled to rod aerial.*	600 Kc/s	600 Kc/s	R.F. Core Adj. (TR21)
	Repeat 5 and 6.			
Turn the wave change switch to SW1.				
7	Dummy aerial.	4.25 Mc/s	Gang fully open	Osc. Trimmer (C76)
Connect a 2.2K ohms resistor between pins 3 and 5 of TR22.				
8	Dummy aerial.	4.0 Mc/s	4.0 Mc/s	Aer. Trimmer (C57)
9	Dummy aerial.	1.8 Mc/s	1.8 Mc/s	Osc. Core Adj. (TR32)§
	Repeat 7, 8 and 9. Remove the 2.2K ohms resistor.			
10	Dummy aerial.	4.0 Mc/s	4.0 Mc/s	R.F. Trimmer (C65)
11	Dummy aerial.	1.8 Mc/s	1.8 Mc/s	R.F. Core Adj. (TR22)
	Repeat 10 and 11.			
Turn the wave change switch to SW2.‡				
12	Dummy aerial.	10.5 Mc/s	Gang fully open	Osc. Trimmer (C73)
13	Dummy aerial.	4.0 Mc/s	Gang fully closed	Osc. Core Adj. (TR33)
14	Dummy aerial.	9.0 Mc/s	9.0 Mc/s	Aer. Trimmer (C56)
15	Dummy aerial.	5.0 Mc/s	5.0 Mc/s	Aer. Core Adj. (TR13)†
16	Dummy aerial.	9.0 Mc/s	9.0 Mc/s	R.F. Trimmer (C66)
17	Dummy aerial.	5.0 Mc/s	5.0 Mc/s	R.F. Core Adj. (TR23)
	Repeat 12, 13, 14, 15, 16 and 17.			
Turn the wave change switch to SW3.‡				
18	Dummy aerial.	30.0 Mc/s	Gang fully open	Osc. Trimmer (C70)
19	Dummy aerial.	10.0 Mc/s	Gang fully closed	Osc. Core Adj. (TR34)
	Repeat 18 and 19.			
20	Dummy aerial.	25.0 Mc/s	25.0 Mc/s	Aer. Trimmer (C54)
21	Dummy aerial.	13.0 Mc/s	13.0 Mc/s	Aer. Core Adj. (TR14)**
22	Dummy aerial.	25.0 Mc/s	25.0 Mc/s	R.F. Trimmer (C67)
23	Dummy aerial.	13.0 Mc/s	13.0 Mc/s	R.F. Core Adj. (TR24)‖
	Repeat 20, 21, 22 and 23.			

* 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.

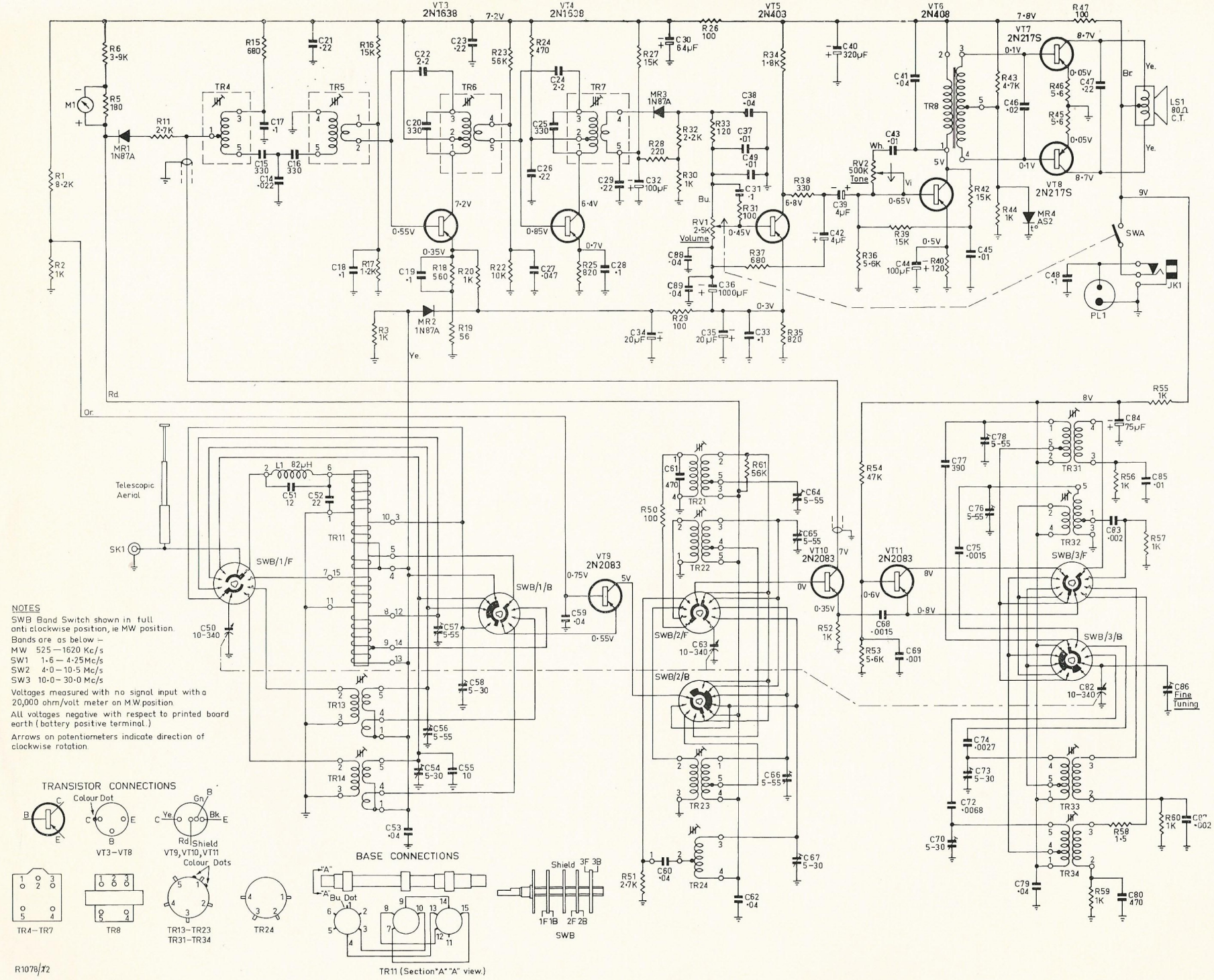
§ Rock the tuning control back and forth through the signal.

† TR13 will resonate in 2 positions. The correct position is with the core nearly protruding from the coil.

‡ If any difficulty is experienced in alignment of the aerial coils on SW2 and SW3, the procedure using r.f. damping as for SW1 must be adopted.

** TR14 will resonate in two positions. The correct position is with the core well into the coil.

‖ If necessary, TR24 is to be adjusted by compressing or expanding the turns on the coil. Its adjustment should first be checked by placing a piece of brass, then a piece of high frequency ferrite into the former. If it needs brass the turns should be opened and if it needs the iron the turns should be compressed.



NOTES

SWB Band Switch shown in full anti clockwise position, ie MW position.

Bands are as below –

MW 525 — 1620 Kc/s
SW1 1·6 — 4·25 Mc/s
SW2 4·0 — 10·5 Mc/s
SW3 10·0 — 30·0 Mc/s

Voltages measured with no signal input with a 20,000 ohm/volt meter on M.W. position.

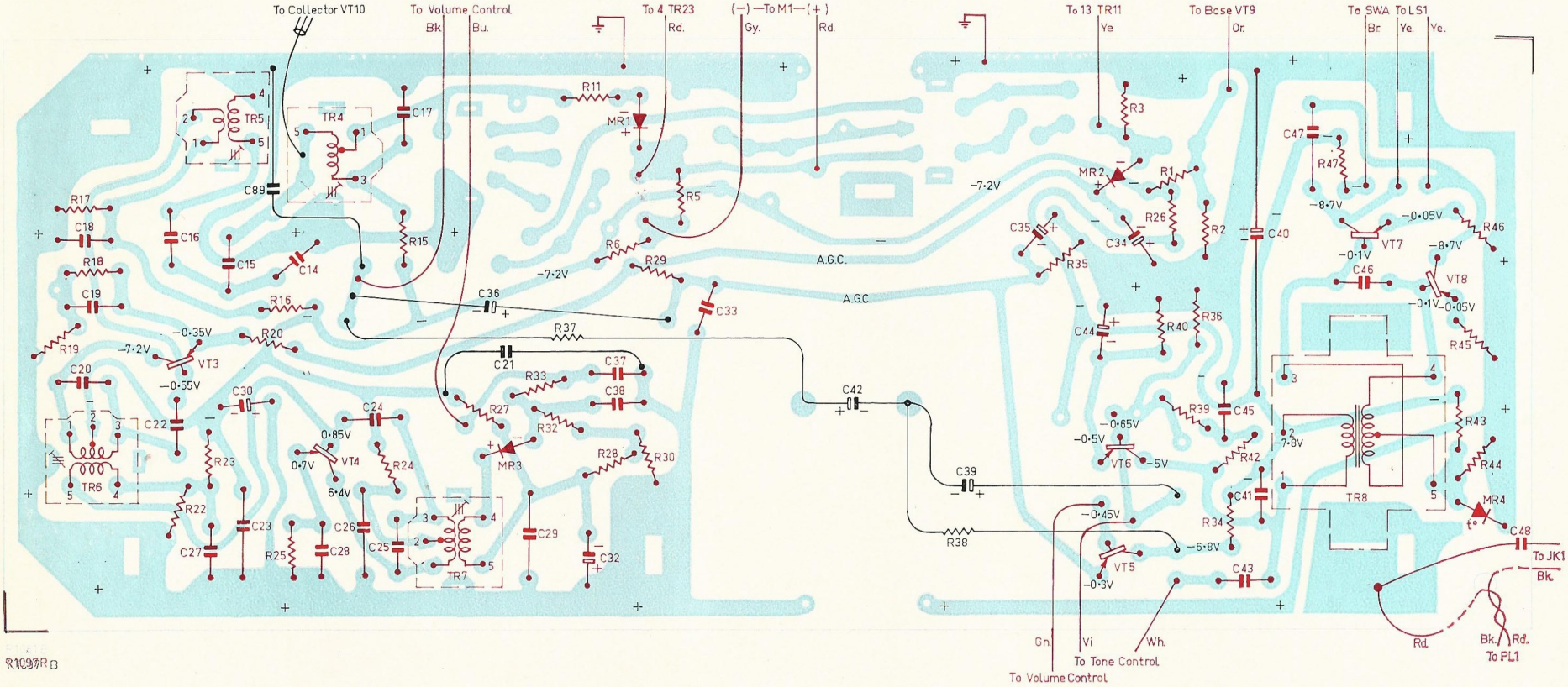
All voltages negative with respect to printed board earth (battery positive terminal.)

Arrows on potentiometers indicate direction of clockwise rotation.

TRANSISTOR CONNECTIONS

BASE CONNECTIONS

R1078/12



Notes: The diagram represents the view from the wiring side of the printed board.
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 negative with respect to the board earth (positive terminal of the battery) and measured with no signal input and volume maximum clockwise using a 20,000 ohm/volt meter.
Blue indicates the printed wiring.

CIRCUIT CODE.

Code No.	Description	Part No.
	RESISTORS	
	All Resistors composition type unless otherwise stated	
R1	8.2K ohms ±5% ½ watt	611847
R2	1K ohms ±5% ½ watt	608029
R3	1K ohms ±5% ½ watt	608029
R4	Not used	
R5	180 ohms ±5% ½ watt	604916
R6	3.9K ohms ±5% ½ watt	610560
R7 R8 R9 R10	Not used	
R11	2.7K ohms ±10% ½ watt	609862
R12 R13 R14	Not used	
R15	680 ohms ±10% ½ watt	607281
R16	15K ohms ±10% ½ watt	612922
R17	1.2K ohms ±10% ½ watt	608312
R18	560 ohms ±10% ½ watt	606844
R19	56 ohms ±10% ½ watt	603363
R20	22K ohms ±10% ½ watt	613655
R21	Not used	
R22	10K ohms ±10% ½ watt	612025
R23	56K ohms ±10% ½ watt	615161
R24	470 ohms ±10% ½ watt	606588
R25	820 ohms ±10% ½ watt	607665
R26	100 ohms ±10% ½ watt	604031
R27	15K ohms ±10% ½ watt	612922
R28	220 ohms ±10% ½ watt	605253
R29	100 ohms ±10% ½ watt	604031
R30	1K ohms ±10% ½ watt	608025
R31	100 ohms ±10% ½ watt	604031
R32	2.2K ohms ±10% ½ watt	609442
R33	120 ohms ±10% ½ watt	601077
R34	1.8K ohms ±10% ½ watt	609077
R35	820 ohms ±10% ½ watt	607665
R36	5.6K ohms ±10% ½ watt	611293
R37	680 ohms ±10% ½ watt	607281
R38	330 ohms ±10% ½ watt	605959
R39	15K ohms ±10% ½ watt	612922
R40	120 ohms ±10% ½ watt	601077
R41	Not used	
R42	15K ohms ±10% ½ watt	612922
R43	4.7K ohms ±10% ½ watt	610932
R44	1K ohms ±10% ½ watt	608025
R45	5.6 ohms ±10% ½ watt	600724
R46	5.6 ohms ±10% ½ watt	600724
R47	100 ohms ±10% ½ watt	604031
R48 R49	Not used	
R50	100 ohms ±10% ½ watt	604031
R51	2.7K ohms ±10% ½ watt	609862
R52	1K ohms ±10% ½ watt	608025
R53	5.6K ohms ±10% ½ watt	611293
R54	47K ohms ±10% ½ watt	614961
R55	1K ohms ±10% ½ watt	608025
R56	1K ohms ±10% ½ watt	608025
R57	1K ohms ±10% ½ watt	608025
R58	1.5K ohms ±10% ½ watt	600431
R59	1K ohms ±10% ½ watt	608025
R60	1K ohms ±10% ½ watt	608025

Code No.	Description	Part No.
RV1 RV2	2.5K ohms Curve S16, Volume W/S 500K ohms Curve C, Tone	620907
	CAPACITORS	
C1-C13	Not used	
C14	0.02μf ±20% 200VW AEE W99	226658
C15	330pf ±5% N750 disc	223715
C16	330pf ±5% N750 disc	223715
C17	0.1μf +80% —20% 25VW Hi-K disc	227074
C18	0.1μf +80% —20% 25VW Hi-K disc	227074
C19	0.1μf +80% —20% 25VW Hi-K disc	227074
C20	330pf ±5% N750 disc	223715
C21	0.22μf +80% —20% 25VW Hi-K disc	227338
C22	2.2pf ±20% NPO bead	221494
C23	0.22μf +80% —20% 25VW Hi-K disc	227338
C24	2.2pf ±20% NPO bead	221494
C25	330pf ±5% N750 disc	223715
C26	0.22μf +80% —20% 25VW Hi-K disc	227338
C27	0.047μf +80% —20% 25VW Hi-K disc	226823
C28	0.1μf +80% —20% 25VW Hi-K disc	227074
C29	0.22μf +80% —20% 25VW Hi-K disc	227338
C30	64μf 10VW Electrolytic	229627
C31	0.1μf ±20% 200VW AEE W48	228931
C32	100μf 3VW Electrolytic	229706
C33	0.1μf +80% —20% 25VW Hi-K disc	227074
C34	25μf 3VW Electrolytic	229428
C35	25μf 3VW Electrolytic	229428
C36	1000μf 3VW Electrolytic	229912
C37	0.01μf ±20% 200VW AEE W99	228609
C38	0.04μf ±20% 200VW AEE W99	228750
C39	4μf 10VW Electrolytic	228194
C40	320μf 10VW Electrolytic	229776
C41	0.04μf ±20% 200VW AEE W99	228750
C42	4μf 10VW Electrolytic	228194
C43	0.01μf ±20% 200VW AEE W99	228609
C44	100μf 3VW Electrolytic	229706
C45	0.01μf ±20% 200VW AEE W99	228609
C46	0.02μf ±20% 200VW AEE W99	226658
C47	0.22μf +80% —20% 25VW Hi-K disc	227338
C48	0.1μf +80% —20% 25VW Hi-K disc	227074
C49	0.01μf ±20% 200VW AEE W99	228609
C50	10-340pf tuning Aerial	64400
C51	12pf ±5% N750 tubular on TR11	220543
C52	22pf ±5% N750 tubular on TR11	221523
C53	0.04μf ±20% 200VW AEE W99	228750
C54	5-30pf trimmer Aerial (SW3)	231136
C55	10pf ±10% N750 tubular	221508
C56	5-55pf trimmer Aerial (SW2)	231218
C57	5-55pf trimmer Aerial (SW1)	231218
C58	5-30pf trimmer Aerial (MW)	231136
C59	0.04μf ±20% 200VW AEE W99	228750
C60	0.04μf ±20% 200VW AEE W99	228750
C61	470pf ±20% K2000 tubular	221972
C62	0.04μf ±20% 200VW AEE W99	228750
C63	10-340pf tuning R.F. linked with C50	
C64	5-55pf trimmer R.F. (MW)	231218

Code No.	Description	Part No.
C65	5-55pf trimmer R.F. (SW1)	231218
C66	5-55pf trimmer R.F. (SW2)	231218
C67	5-30pf trimmer R.F. (SW3)	231136
C68	0.0015μf ±10% 400VW polyester	225390
C69	0.001μf ±20% K2000 disc	225039
C70	5-30pf trimmer Osc. (SW3)	231136
C71	Not used	
C72	0.0068μf ±2½% 50VW polystyrene	226238
C73	5-30pf trimmer Osc. (SW2)	231136
C74	0.0027μf ±2½% 50VW polystyrene	225745
C75	0.0015μf ±2½% 50VW polystyrene	225391
C76	5-55pf trimmer Osc. (SW1)	231218
C77	390pf ±2½% 125VW polystyrene	223888
C78	5-55pf trimmer Osc. (MW)	231218
C79	0.04μf ±20% 200VW AEE W99	228750
C80	470pf ±20% K2000 tubular	221972
C81	Not used	
C82	10-340pf tuning, Osc. linked with C50	
C83	0.002μf ±20% 400VW AEE W99	225635
C84	75μf 10VW Electrolytic	229675
C85	0.01μf ±20% 200VW AEE W99	228609
C86	Fine Tuning	
C87	0.002μf ±20% 400VW AEE W99	225635
C88	0.04μf ±20% 200VW AEE W99	228750
C89	0.04μf ±20% 200VW AEE W99	228750
	TRANSFORMERS	
TR1-3	Not used	
TR4	1st I.F. Transformer	52100
TR5	2nd I.F. Transformer	52102
TR6	3rd I.F. Transformer	52194
TR7	4th I.F. Transformer	52104
TR8	Driver Transformer	52440A
TR9, TR10	Not used	
TR11	Ferrite Rod Aerial (MW & SW1) includes C51, C52 and L1	52166
TR12	Not used	
TR13	Aerial (SW2)	52113
TR14	Aerial (SW3)	52115
TR21	R.F. (MW)	52117
TR22	R.F. (SW1)	52119
TR23	R.F. (SW2)	52121
TR24	R.F. (SW3)	52123
TR31	Oscillator (MW)	52125
TR32	Oscillator (SW1)	52127
TR33	Oscillator (SW2)	52129
TR34	Oscillator (SW3)	52131
	INDUCTORS	
L1	Aerial Choke (incl. on TR11)	52167
	MISCELLANEOUS	
SWA	On/Off Switch (on RV1)	
SWB	Band Selector Switch	64464
SK1	External Aerial Socket	49257
JK1	External Power Supply Jack	417405
PL1	Battery Plug	
M1	Tuning Meter	454606
LS1	6" x 4" Speaker	50043