CONTROLS:

TUNING - by adjustable handspan wheel through 350° rotation.
VOLUME & ON/OFF - combined.

EXTERNAL CONNECTIONS:

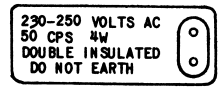
Aerial Socket:-

(LEFT HAND END OF SET) for the connection of a wire type aerial.

Radio Earth Socket:-

(RIGHT HAND END OF SET) for connection of ground wire. These sockets make connection to a separate coupling winding on the ferrite rod.

Rating Plate:-



NOTE that the Rating Plate describes the receiver as being "double insulated" and that it should not be earthed. It does however, permit the use of a separate "radio earth," i.e. an earth connection other than to the mains earth.

Connection of 240 Volt AC Power Mains:-

The M217 is designed to operate from power mains and/or internal dry battery. Plug in the separate approved power cord supplied to the mains socket at back of set, and to a suitable power point. N.B. Supply must be 230 to 250 volts AC only.

Note that the dial is illuminated ONLY when the set is operating from power mains. This proves that power from the mains is reaching the set and automatically reactivating the dry battery. The On/Off switch on set controls both dry battery and AC power supply, thus the power point may be left on. If the power point is switched off or a "blackout" occurs, it is normal for the set to continue to operate. Regular use of the set from power mains will extend the effective life of the battery many times.

ROUTINE SERVICE ADJUSTMENTS:

Replacing the Battery:-

1. Remove 2 screws securing cabinet back. - FIG. 1.
2. Unplug and remove battery - FIG. 2.
3. Fit new battery and replace back, making sure it locates correctly before tightening screws.

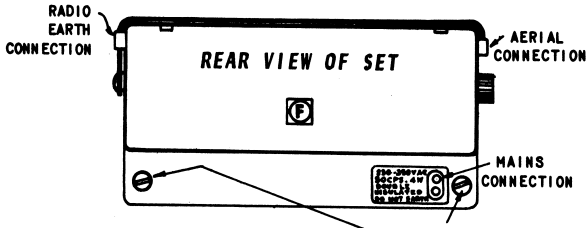


Fig. 1

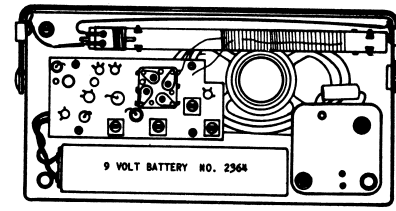


Fig. 2 REAR VIEW - BACK REMOVED

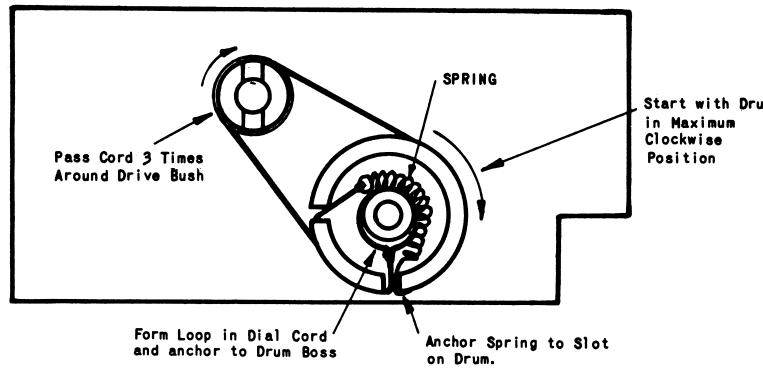
Removing Printed Board from Case:-

1. Remove case back.
2. Remove 4 screws marked D - FIG. 3.
3. Printed board can now be swung clear of moulded case.

NOTE when replacing the printed board, ensure that the dial drive boss engages accurately with the cord drive bush.

Dial Cord Replacement:-

1. Remove the printed board as previously described.
2. Re-string in accordance with diagram.

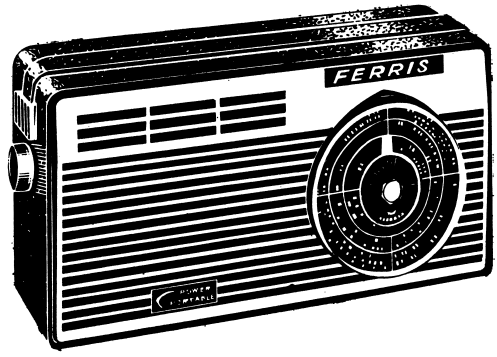


SERVICE MANUAL

FERRIS

7 TRANSISTOR - MODEL 217

Power Portable



AUSTRALIAN MADE

DESIGN:

The FERRIS MODEL 217 is a medium sized BATTERY/MAINS TRANSISTOR PORTABLE. Features include ABS moulded case with vinyl surround and removable ABS moulded back. Frontal treatment includes electro-plated grille and large handspan tuning wheel which gives a total tuning sweep of 350°.

The 7 transistor circuitry is preceded by a very large and efficient Ferrite rod aerial with a separate link winding for external aerial and earth connections. Other circuit features include Autodyne mixer followed by two stages of IF amplification. The diode detector and AVC circuit is followed by a low distortion transformerless audio amplifier.

Mains operation provides battery reactivation and illumination of the dial.

SPECIFICATIONS:

BAND COVERAGE	.....	525-1760 Kc/s
INT. FREQUENCY	.....	455 Kc/s
SPEAKER	.....	5" x 3" Oval 15 Ohm Voice Coil
POWER OUTPUT	.....	Undistorted 330 mw Maximum 420 mw
CURRENT DRAIN	.....	10 ma at 9V
BATTERY	.....	Type ER2364
TRANSISTORS	.....	2N1639 Converter 2N1638 1st IF Amplifier 2N1638 2nd IF Amplifier AC172 Audio Amplifier AC125 Audio Driver AC127) Power Output AC128) Complementary Pair
DIODES	.....	OA90 Detector & AVC OA90 Signal Overload
DIMENSIONS	.....	10" x 5" x 2½"
WEIGHT	.....	3 lbs. 10¾ ozs.

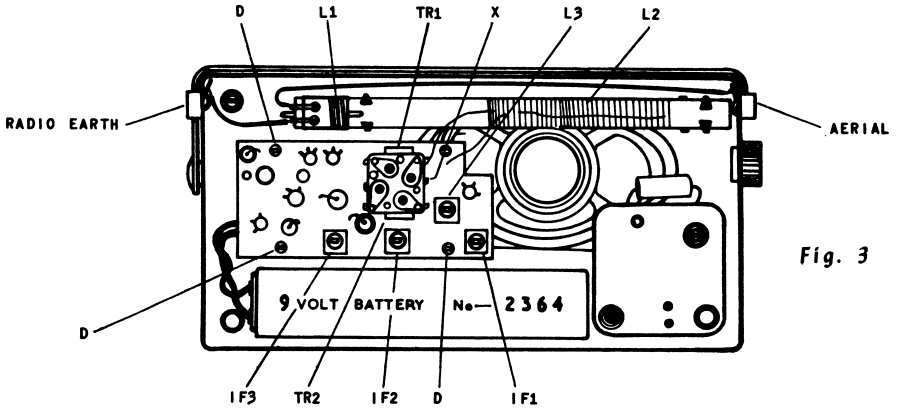


Fig. 3

ALIGNMENT PROCEDURE:

For IF alignment operations connect the ground side of the signal generator to the earth lug of the gang (point marked "X"). Keep the generator output as low as possible to avoid AVC action. Set volume control at maximum.

N.B. Use the correct alignment tool for making adjustments. Cores are easily broken by improper handling, thus making replacement of the entire coil or transformer necessary.

STEP	CONNECT SIG. GEN. TO	TUNE SIG. GEN. TO	TUNE RECEIVER TO	ADJUST FOR MAXIMUM OUTPUT
1	Emitter of 2N1639		Max. H.F. end	IF3 Peak Core
2	Converter via .1 uf	455 Kc/s	of Band	IF2 toward top
3	Capacitor			IF1 of can
4	REPEAT ABOVE ADJUSTMENTS UNTIL NO FURTHER INCREASE CAN BE OBTAINED			
5	Aerial & earth sockets (at ends of set)	525 Kc/s	Max. L.F. end of band	Osc. Coil Core L3
6	via std. dummy aerial		Max. H.F. end of band	Osc. Trimmer TR2
7	REPEAT STEPS 5 & 6 UNTIL BAND LIMITS ARE 525-1760 Kc/s			
8	Aerial & earth sockets	600 Kc/s	600 Kc/s	Aerial Coil Core L
9		1500 Kc/s	1500 Kc/s	Aerial Trimmer TR1
REPEAT STEPS 8 & 9 UNTIL NO FURTHER INCREASE CAN BE OBTAINED. CHECK SENSITIVITY AT 1500, 1000 AND 600 Kc/s FOR SATISFACTORY PERFORMANCE				

DC RESISTANCE OF WINDINGS

		OHMS.
FERRITE ROD AERIAL) L1		
FERRITE ROD AERIAL) L2	.....	1.0
OSCILLATOR COIL PRIMARY)	.....	0.25
OSCILLATOR COIL SECONDARY TOTAL) L3	.....	2.0
IF1 PRIMARY	.....	2.0
IF1 SECONDARY	.....	0.3

		OHMS.
IF2 PRIMARY TOTAL	.....	2.0
IF2 SECONDARY	.....	0.3
IF3 PRIMARY TOTAL	.....	2.0
IF3 SECONDARY	.....	1.0

SERVICE HINTS:

Extreme care should be taken to avoid accidental shorting of transistor elements to circuit ground. This is especially true of the output transistors.

Since a transistor needs only low voltage applied to its terminals for conduction, testing continuity of a circuit which includes a transistor can result in misleading indications and damage to the transistor. To avoid this, remove the transistor from the circuit board before making continuity tests.

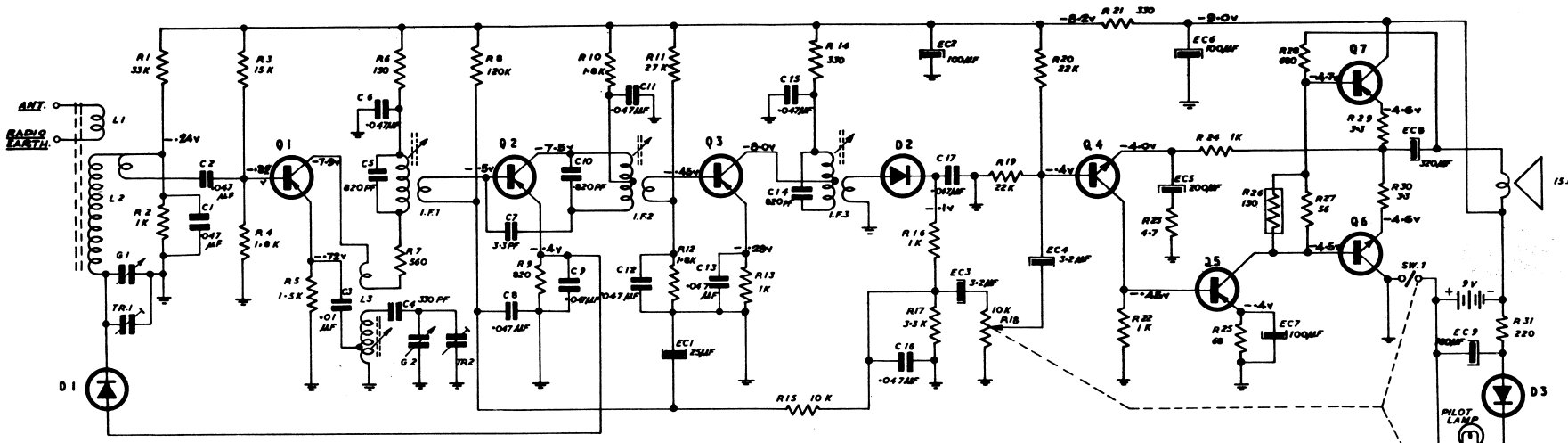
The first thing to check when the receiver is inoperative is the battery. With the receiver switched on a new battery should measure 9 volts, although the set will still operate at 5 volts.

Voltmeters used for test purposes must have a sensitivity of at least 20,000 ohms per volt. The use of low impedance meters will give misleading results as serious shunting effects will occur. When checking for a circuit fault causing excessive battery drain an over all current measurement and supplementary voltage measurements should be made.

Signal tracing by signal injection from a signal generator is carried out on transistor radios in exactly the same manner as has been done for many years with conventional valve radios. The signal generator should be connected in series with a capacitor (.1 uf) to avoid shorting out bias voltages.

The output of this receiver is of the "Class B" type. It should be noted that in Class B output, the battery current increases with increase in power output.

Transistors and printed circuit board can be damaged by excessive heat. Whenever soldering is necessary on the printed circuit board, use a soldering iron which is both HOT and CLEAN. Do not hold the soldering iron on a soldering point any longer than is absolutely necessary. This minimises the amount of heat which will be radiated from the point of soldering. When soldering or unsoldering a transistor grasp the transistor lead with a pair of long-nose pliers to provide a heat sink. Excessive heat can damage a transistor.



RESISTORS (ALL ½ WATT):

R1	33K	10% RESISTOR
R2	1K	10% RESISTOR
R3	15K	10% RESISTOR
R4	1.8K	10% RESISTOR
R5	1.5K	10% RESISTOR
R6	150 OHM	10% RESISTOR
R7	560 OHM	10% RESISTOR
R8	120K	10% RESISTOR
R9	820 OHM	10% RESISTOR
R10	1.8K	10% RESISTOR
R11	27K	10% RESISTOR
R12	1.8K	10% RESISTOR
R13	1K	10% RESISTOR
R14	330 OHM	10% RESISTOR
R15	10K	10% RESISTOR
R16	1K	10% RESISTOR
R17	3.3K	10% RESISTOR
R18	10K	POTENTIOMETER
R19	22K	10% RESISTOR
R20	22K	10% RESISTOR
R21	330 OHM	10% RESISTOR
R22	1K	10% RESISTOR

RESISTORS CONTINUED

R23	4.7 OHM	10% RESISTOR
R24	1K	10% RESISTOR
R25	68 OHM	10% RESISTOR
R26	130 OHM	N.T.C. RESISTOR
R27	56 OHM	10% RESISTOR
R28	680 OHM	10% RESISTOR
R29	3.3 OHM	10% RESISTOR
R30	3.3 OHM	10% RESISTOR
R31	220 OHM	10% RESISTOR

COILS:

L1 - AER. COUPLING WINDING TYPE 7124/1
L2 - FERRITE AER. ROD (C/W WINDING) TYPE 7124
L3 - OSC. COIL TYPE 7325

I.F. TRANSFORMERS:

IF1 - 455 K/C TRANSFORMER TYPE 9133
IF2 - 455 K/C TRANSFORMER TYPE 9133
IF3 - 455 K/C TRANSFORMER TYPE 9134
T1 - POWER TRANSFORMER TYPE 3265

CAPACITORS:

C1	.047	uf 25V CAPACITOR
C2	.047	uf 25V CAPACITOR
C3	.01	uf 25V CAPACITOR
C4	330	pf 125V CAPACITOR STYROSEAL
C5	820	pf 125V CAPACITOR STYROSEAL
C6	.047	uf 25V CAPACITOR
C7	3.3	pf 500V CAPACITOR CERAMIC
C8	.047	uf 25V CAPACITOR
C9	.047	uf 25V CAPACITOR
C10	820	pf 125V CAPACITOR STYROSEAL
C11	.047	uf 25V CAPACITOR
C12	.047	uf 25V CAPACITOR
C13	.047	uf 25V CAPACITOR
C14	820	pf 125V CAPACITOR STYROSEAL
C15	.047	uf 25V CAPACITOR
C16	.047	uf 25V CAPACITOR
C17	.047	uf 25V CAPACITOR
C18	.1	uf 125V CAPACITOR POLYESTER

ELECTROS:

EC1	25	uf	6V ELECTRO
EC2	100	uf	10V ELECTRO
EC3	3.2	uf	6V ELECTRO
EC4	3.2	uf	6V ELECTRO
EC5	200	uf	6V ELECTRO
EC6	100	uf	10V ELECTRO
EC7	100	uf	4V ELECTRO
EC8	320	uf	6V ELECTRO
EC9	100	uf	16V ELECTRO

TRANSISTORS AND DIODES:

Q1 -	2N1639	2N374 AF116
Q2 -	2N1638	2N373 AF117
Q3 -	2N1638	2N373 AF117
Q4 -	AC172	2N649
Q5 -	AC125	2N406
Q6 -	AC127	2N649
Q7 -	AC128	2N406
D1 -	OA90	IN60A
D2 -	OA90	IN60A

T1 - TRIMMER) MOUNTED
T2 - TRIMMER) ON GANG
G1) 6-340 pf TUNING CAPACITOR
G2)

BATTERY: 9 VOLT TYPE ER2364

Band Coverage 525-1760 Kc/s
IF Frequency 455 Kc/s

Total Battery Current 10 mA for 9 volt battery.
Collector current of output stage for zero signal, 2 mA.
All Resistors ½W unless otherwise stated.
Note: All voltages checked with 40,000 ohms per volt meter at zero signal input.

DO NOT OPERATE SET WITHOUT SPEAKER CONNECTED

CIRCUIT DIAGRAM FERRIS MODEL 217

R.2015.

15.1. R.A. 19.11.68

FERRIS MODEL 217