MAINTENANCE MANUAL
FOR
900 MHz POWER AMPLIFIER BOARD
19D902944G1

TABLE OF CONTENTS

DESCRIPTION

Power Amplifier Board 19D902944G1 is used in the MTD 900 MHz mobile radio. The PA Board is located under the top cover of the radio.

The PA Board amplifies the 15 watt RF Board output to a level of approximately 30 watts over frequency ranges of 896902 MHz and 935942 MHz without retuning the transmitter.

The 30 watt output is connected back to the RF Board where it is coupled through a PIN diode antenna switch, the lowpass filter and the directional coupler to provide 25 watts power output at the antenna connector.

Refer to the applicable Combination Manual for the Interconnection Diagram and Mechanical Layout.

CIRCUIT ANALYSIS

POWER AMPLIFIER

The PA Board consists of a single stage RF power amplifier in a common base configuration. Also included on the board is a diode for reverse power protection. Two small jacks are used to connect approximately 15 watts of drive to the PA Board and to take the 30 watt output from the final amplifier.

A+ power is supplied to six pin connector J903 through feedthrough capacitor assembly Z903. Diode D1 provides reverse polarity protection. If the A+ power polarity is accidentally reversed, D1 conducts, causing the A+ fuse in the power cable to blow, removing power from the radio and preventing serious damage.

A+ is supplied to the collector of power transistor Q151 through a network consisting of inductors L2 and L1, resistor R1, and capacitors C9, C10, C11. In addition to enhancing stability, these components also prevent RF from getting onto the A+ line.

The driver output from the RF Board (15 watts and 50 ohms impedance) is matched to the emitter of Q151 by capacitors, C152, C153 and C5 and inductors L3 and L153.

Once the drive is amplified to approximately 30 watts by Q151, the transistor is matched back up to 50 ohms by capacitors C154, C155, C12 and C6, and inductor L154. Capacitor C7 is dc blocking capacitor to prevent dc voltage from appearing on the amplifier output. The amplified signal is coupled through a coaxial cable to the Rf Board which

contains the transmitter filter, antenna switch and power leveling circuitry.

Other nonamplifier related signals are routed through the PA Board for distribution to other boards in the radio. These include **A+, SWITCHED A+, RELAY** and **VOL/SQ HI.** A wiring harness plugs into connector J151 for this purpose.

SERVICE NOTES

The PA Board can be easily checked without removing it from the radio. RF input (J153) and output (J152) impedance are 50 ohms.

Remove all power from the radio when servicing the PA Board. The power switch for the radio does not remove A+ power from the PA Board.

Four chips (C152-C155) are on the transistor leads (Q151). If any are removed, replace them with a new part since they are easily damaged. Place them in the exact positions shown in the outline diagram. Failure to do this will reduce amplifier gain, bandwidth, and efficiency.

PA TRANSISTOR REPLACEMENT

NOTE

The transistor (Q151) contains Beryllium Oxide, a **TOXIC** substance. If the ceramic or other encapsulation is opened, crushed, broken, or abraded, the escaping dust may be hazardous if inhaled. Use care when replacing the transistor.

1. Remove the two retaining screws securing PA transistor Q151 to the chassis assembly.

2. Remove and discard the four mica capacitors on the transistor leads (C152-C155). The capacitors are virtually impossible to remove without damage.

3. Unsolder the six leads of the transistor, and remove it from the printed board. Be careful not to damage the board.

4. Remove all excess solder from the board near Q151. Clean the board to allow the new transistor to be positioned properly. Refer to Figure 1 and trim the new transistor leads (if required) to the lead lengths of the removed transistor.

5. Apply silicone grease to the back of the replacement transistor and place the transistor in the mounting cut out. Make sure that the emitter and collector leads are not reversed.

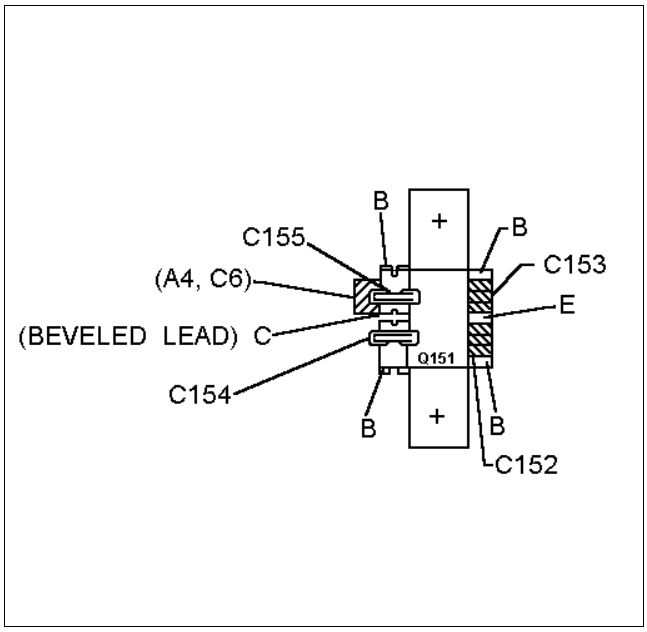


Figure 1 - PA Transistor Lead Identification

6. Replace the transistor mounting screws using a moderate torque of 0.5 Newtonmeter (4.5 inch-pounds).

7. Solder the six transistor leads to the printed board.

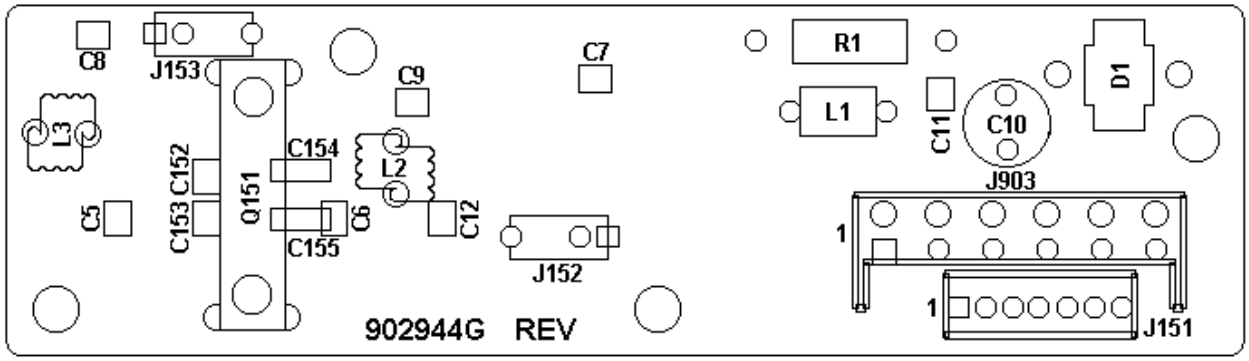
8. Install the new replacement capacitors C152-C155 in the exact positions shown on the outline diagram. Solder carefully to prevent damaging them.

9. Remove any remaining flux on the board.

POWER AMPLIFIER BOARD
19D902944G1
ISSUE 1

SYMBOL	PART NO.	DESCRIPTION
		----------CAPACITORS----------
C5	19A7705108P2	Mica: 3.6 pF ±0.25 pF, 500 VDCW.
C6	19A705108P5	Mica: 4.7 pF ±0.25 pF, 500 VDCW.
C7 AND C8	19A705108P34	Mica: 75 pF ±5%, 500 VDCW.
C9	19A705108P27	Mica Chip: 39 pF ±5%, 500 VDCW, temp coef 0 + 50 PPM/°C.
C10	19A703314P10	Electrolytic: 10 uF -10+50%, 50 VDCW; sim to Panassonic LS Series.
C11	19A705108P27	Mica Chip: 39 pF ±5%, 500 VDCW, temp coef 0 + 50 PPM/°C.
C12	19A705108P6	Mica: 5.1 pF ±0.25 pF, 500 VDCW.
		---------- DIODES ----------
D1	19A700082P1	Rectifier, silicon; sim to MR751.
		---------- JACKS ----------
J151	19A700072P33	Printed wire: 7 contacts rated @ 2.5 amps; sim to Molex 22-27-2071.
J152 AND J153	19B801342P1	Connector, RF.
J903	19A705245P1	Printed wire: 6 contacts, sim to Molex 10-02-1062.
		----------INDUCTORS----------
L1	19A701091G1	Coil. Includes:
	19A700125P10	Wire Magnet, Plastic Coated.
	19A700122P1	Torroidal core.
L2 AND L3	19A701418P1	Coil
		---------- RESISTORS ----------
R1	19A700113P15	Composition: 10 ohms ±5%, 1/2 w.
		---------- MISCELLANEOUS ----------
C152	19A705108P14	Mica Chip: 11 pF ±5%, 500 VDCW, temp coef 0 + 100 PPM/°C.
C153	19A705108P13	Mica Chip: 10 pF ±5%, 500 VDCW, temp coef 0 + 200 PPM/°C.
C154 AND C155	19A701413P45	Mica: 22 pF ±5%, 100 VDCW
Q151	19A702458P2	Silicon NPN: 40 watt, 12.5 volt, 890 - 945 MHz.

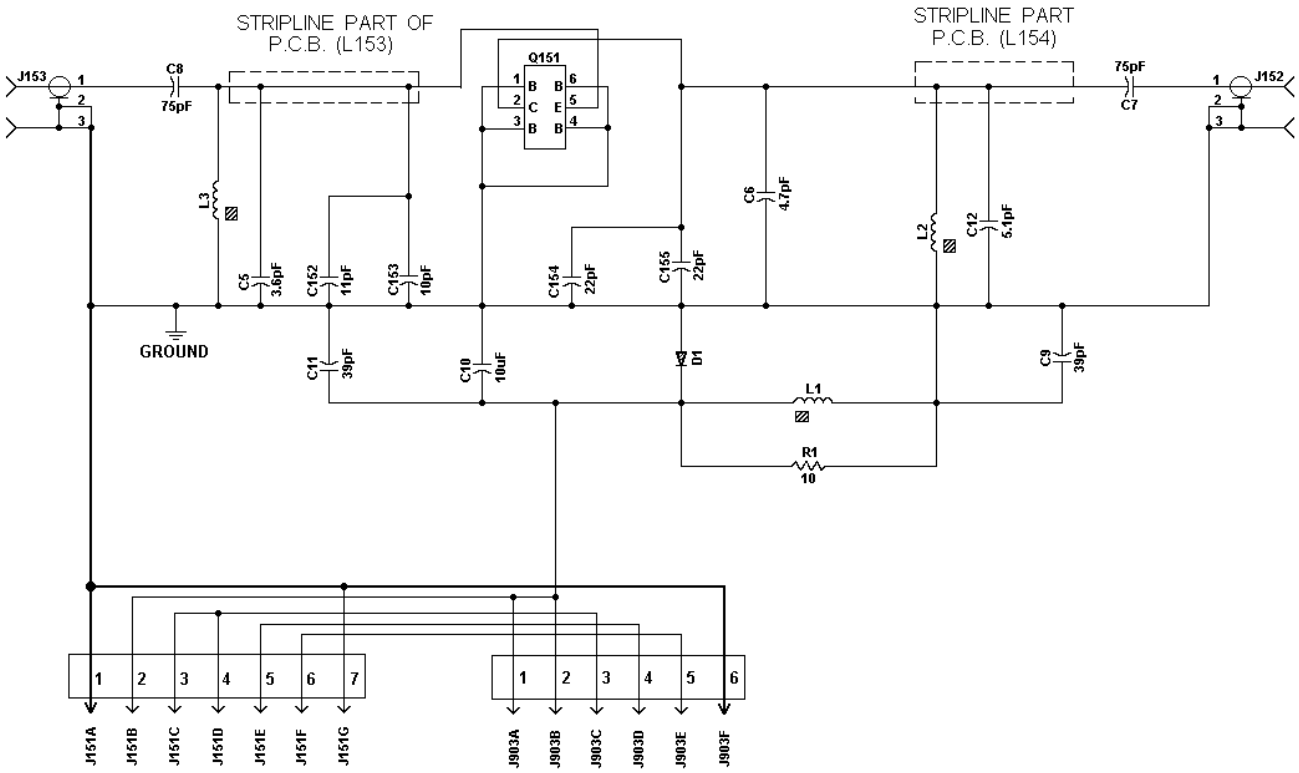
* COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES



POWER AMPLIFIER BOARD
19D902944G1

(19D902944, Sh. 1, Rev. 1A)

SCHEMATIC DIAGRAM



POWER AMPLIFIER BOARD
19D902944G1

(19D902946, Sh. 1, Rev. 0)

Ericsson Inc.
Private Radio Systems
Mountain View Road
Lynchburg,Virginia 24502
1-800-528-7711 (Outside USA, 804-528-7711)

Printed in U.S.A.