ERICSSON

MAINTENANCE MANUAL
POWER AMPLIFIER BOARD
19C851617G1 (403-440 MHz)
19C851617G2 (440-470 MHz)
19C851617G3 (470-512 MHZ)
FOR MVS

TABLE OF CONTENTS

DESCRIPTION

The Power Amplifier Board (A4) used in the MVS radio is housed in a cavity running parallel to the side of the radio main casting assembly. Refer to the combination manual for a complete mechanical layout of the radio.

The PA Board amplifies the driver output from the RF Board (approximately 10 watts) to a level of approximately 25-30 watts, over the frequency range of 403-512 MHz. There are no tuning adjustments on the board.

The board consists of a single stage RF power amplifier. Also included on the board is a diode for reverse power protection, as well as two multi-pin connectors used to distrib-ute non amplifier related signals in the radio. Two small jacks are used to apply drive to, and take RF output from the amplifier. The 403-512 MHz range of UHF frequencies is covered by three groups of PA Boards:

19C851617 G1: 403-440 MHz
19C851617 G2: 440-470 MHz
19C851617 G3: 470-512 MHz

CIRCUIT ANALYSIS

The driver output from the RF Board (10 watts, 50 ohms impedance) is matched to the base of Q151 by CI51, C152, C153, C154, L151, and L154. Inductor L152 provides a bias return for class "C" operation. A network consisting of L153 and RI51 enhances stability.

Once the drive is amplified to approximately 30 watts by Q151, it is matched back up to 50 ohms by C155, Cl56, C158, L156, and L157. C159 is a DC blocking capacitor, which keeps DC voltage from appearing at the amplifier output.

A+ is supplied to the collector of Q151 through a network consisting of L155, L158, RI 52, C157, C161, and C162. In addition to enhancing stability, these components also prevent RF from getting onto the A+ line.

The amplifier's output is fed back to the radio's RF Board where it passes through the antenna switch, low pass filter, and directional coupler before being applied to the antenna connector.

Diode D151 provides reverse polarity protection. If power is accidentally reversed, this diode will conduct, causing the power cable's A+ fuse to blow, thereby removing power from the radio and preventing serious damage.

A+ is applied through 6 pin connect J903 by feedthrough capacitor assembly Z903. Other non-amplifier related signals are routed through the PA Board for distribution to other boards in the radio. These include A+, switched

A+, Relay, and volume/squelch HI. A wiring harness plugs into J151 for this purpose.

SERVICE NOTES

This amplifier can be easily checked without removing it from the radio. RF input (at J153) and output (at J152) impedances are 50 ohms.

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

There are 9 chip mica capacitors on this PA Board. If any are removed, replace them with a new part since they are easily damaged. Apply them in the exact positions shown in the outline diagram. Failure to do this will have an adverse effect on amplifier gain, bandwidth, and efficiency.

PA TRANSISTOR REPLACEMENT

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

2. Unsolder the six leads of the transistor, and remove it from the printed board. Be careful not to damage the PWB, or capacitors C153, C154, and C156.

3. Remove all excess solder from the board near Q151, and 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.

4. Apply silicon grease to back of the replacementtransistor and place the transistor in the mounting cut out. Make sure that the base and collector leads are not reversed.

5. Replace the transistor mounting screws using a moderate torque of 0.5 Newton meter (4.5 inch-pounds).

6. Solder the 6 transistor leads to the printed board. Agaln, be careful not to damage C153, C154, C155 and C156.

7. Remove any flux left on the board.

NOTE

The PA transistor 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.

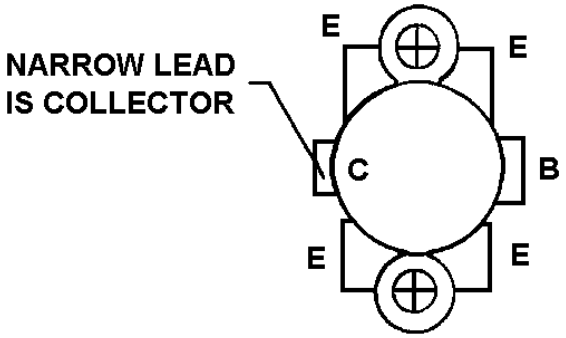
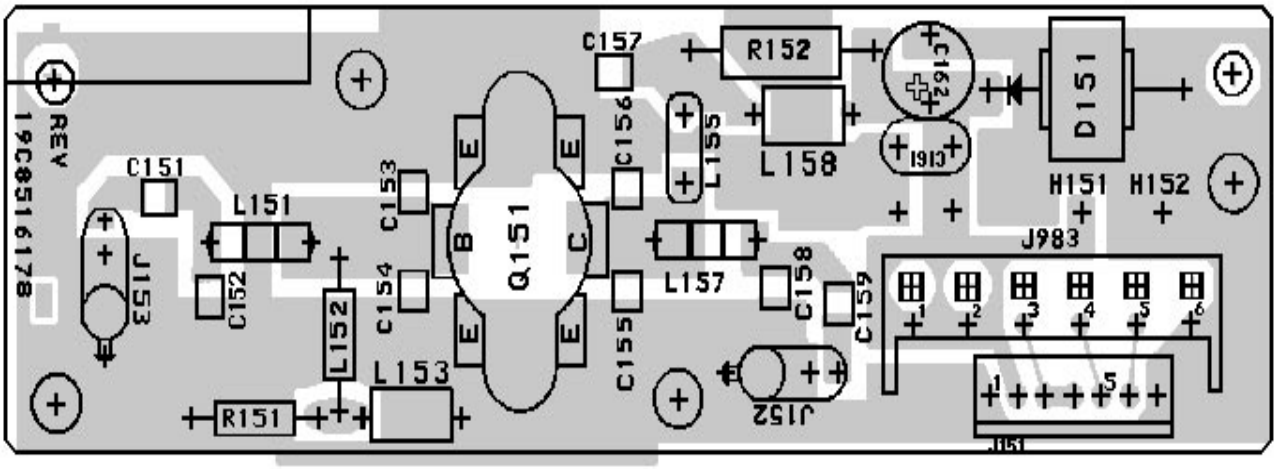


FIG 1 - PA TRANSISTOR LEAD IDENTIFICATION

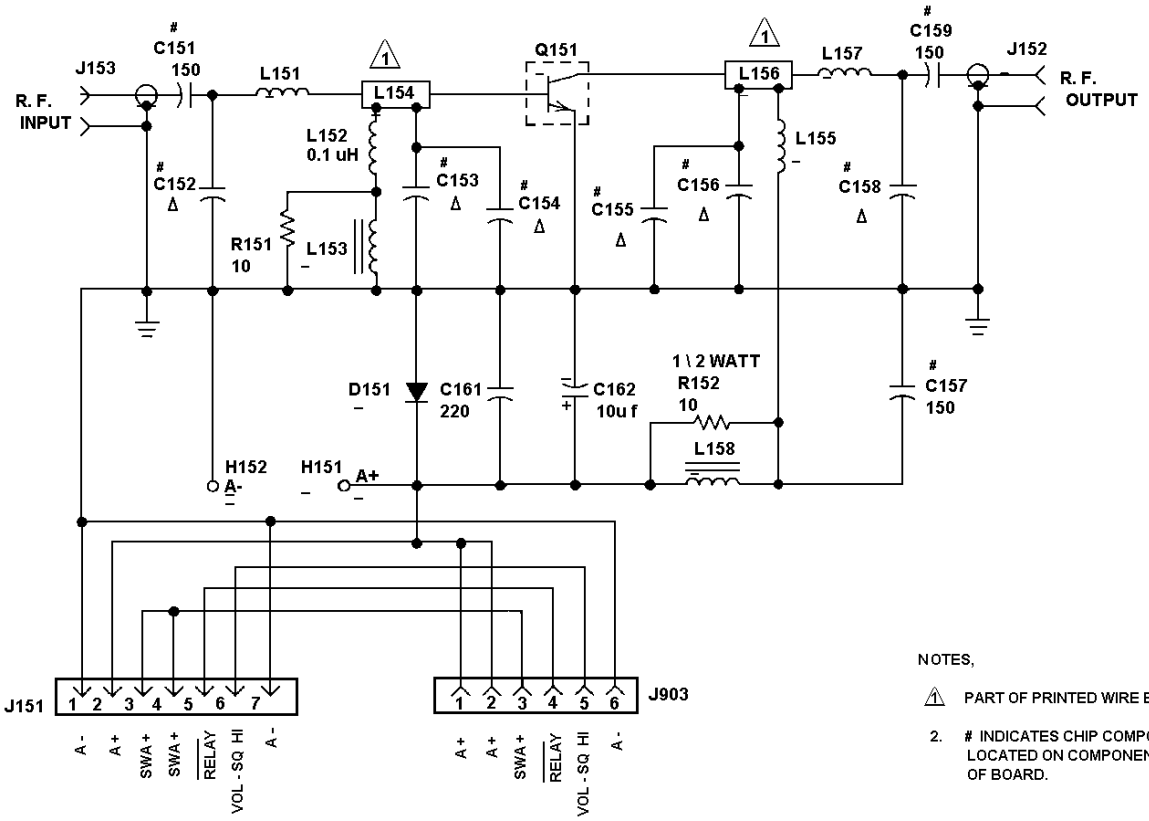
ERICSSON
Ericsson GE Mobile Communications Inc.
Mountain View Road • Lynchburg, Virginia 24502

Printed in U.S.A.



(19C851617, Rev. 1)
(19A705304 Sh. 1, Rev. 0)

POWER AMPLIFIER BOARD
19C851617G1-G3



NOTES,

1. PART OF PRINTED WIRE BOARD.
2. # INDICATES CHIP COMPONENT LOCATED ON COMPONENT SIDE OF BOARD.

△ **COMPONENT IDENTIFICATION CHART**

COMPONENT	403 -- 440 MHZ (G 1)	440 -- 470 MHZ (G 2)	470 -- 512 MHZ (G 3)
C152	11	13	13
C153	33	33	27
C154	33	30	27
C155	39	30	30
C156	43	30	27
C158	17	10	11

ALL RESISTORS ARE 1 / 4 WATT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K -- 1000 OHMS OR MEG -- 1,000,000 OHMS. CAPACITOR VALUES IN PICOFARADS (EQUAL TO MICROMICROFARADS) UNLESS FOLLOWED BY UF -- MICROFARADS. INDUCTANCE VALUES IN MICROHENRYS UNLESS FOLLOWED BY MH - MILLIHENRYS OR H -- HENRYS.

POWER AMPLIFIER BOARD
19C851617G1-G3

(19C851618, REV. 2)

PARTS LIST

POWER AMPLIFIER BOARD
MVS (UHF)
19C851617G1 (403-440 MHz)
19C851617G2 (440-470 MHz)
19C851617G3 (470-512 MHz)
ISSUE 3

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C151	19A705108P80	Mica Chip: 150 pF + or -5%, 100 VDCW, temp coef 0 + 50 PPM/°C.
C152	19A705108P14	Mica Chip: 11 pF + or -5%, 500 VDCW, temp coef 0 + 100 PPM/°C. (Used in G1).
C152	19A705108P16	Mica Chip: 13 pF + or -5%, 500 VDCW, temp coef 0 + 100 PPM/°C. (Used in G2 and G3).
C153	19A705108P25	Mica Chip: 33 pF + or -5%, 500 VDCW, temp coef 0 + 50 PPM/°C. (Used in G1 and G2).
C153	19A705108P23	Mica Chip: 27 pF + or -5%, 500 VDCW, temp coef 0 + 100 PPM/°C. (Used in G3).
C154	19A705108P25	Mica Chip: 33 pF + or -5%, 500 VDCW, temp coef 0 + 50 PPM/°C. (Used in G1).
C154	19A705108P24	Mica Chip: 30 pF + or -5%, 500 VDCW, temp coef 0 + 100 PPM/°C. (Used in G2).
C154	19A705108P23	Mica Chip: 27 pF + or -5%, 500 VDCW, temp coef 0 + 100 PPM/°C. (Used in G3).
C155	19A705108P27	Mica Chip: 39 pF + or -5%, 500 VDCW, temp coef 0 + 50 PPM/°C. (Used in G1).
C155	19A705108P24	Mica Chip: 30 pF + or -5%, 500 VDCW, temp coef 0 + 100 PPM/°C. (Used in G2 and G3).
C156*	19A705108P28	Mica Chip: 43 pF + or -5%, 500 VDCW, temp coef 0 + 50 PPM/°C. (Used in G1).
C156	19A705108P24	Mica Chip: 30 pF + or -5%, 500 VDCW, temp coef 0 + 100 PPM/°C. (Used in G2).
C156	19A705108P23	Mica Chip: 27 pF + or -5%, 500 VDCW, temp coef 0 + 100 PPM/°C. (Used in G3).
C157	19A705108P80	Mica Chip: 150 pF + or -5%, 100 VDCW, temp coef 0 + 50 PPM/°C.
C158	19A705108P200	Mica Chip: 17 pF + or -5%, 500 VDCW, temp coef 0 + 100 PPM/°C. (Used in G1).
C158	19A705108P13	Mica Chip: 10 pF + or -5%, 500 VDCW, temp coef 0 + 200 PPM/°C. (Used in G2).
C158	19A705108P14	Mica Chip: 11 pF + or -5%, 500 VDCW, temp coef 0 + 100 PPM/°C. (Used in G3).
C159	19A705108P80	Mica Chip: 150 pF + or -5%, 100 VDCW, temp coef 0 + 50 PPM/°C.
C161	19A701602P10	Ceramic: 220 pF + or -10%, 1000 VDCW.
C162	19A703314P10	Electrolytic: 10 uF -10+50%, 50 VDCW; sim to Panasonic LS Series.
		- - - - - - - - - - DIODES - - - - - - - - - -
D151	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 - - - - - - - - - -
L151	19A701524P6	Coil. (Used in G1).
L151	19A701006P7	Strap. (Used in G2).
L151	19A701006P5	Strap. (Used in G3).
L152	19A700024P1	Coil, RF: 100 nH + or -10%, 0.08 ohms DC res max, 100 v.
L153	19A701091G1	Coil.
L154		Part of printed wire board 19C851616P1.
L155	19B800890P8	Coil, RF: sim to Paul Smith SK-891-1. (Used in G1).
L155	19B800890P7	Coil, RF: .15.8 nH + or -5%; sim to Paul Smith SK-891-1. (Used in G2 and G3).
L156		Part of printed wire board 19C851616P1
L157*	19A701006P4	Strap. (Used in G1).
L157	19A701006P5	Strap. (Used in G2,G3).
L158	19A701091G1	Coil.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q151	19A134171P2	Silicon, NPN: sim to type 2N5945.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R151	19A700106P15	Composition: 10 ohms + or - 5%, 1/4 w.
R152	19A700113P15	Composition: 10 ohms + or - 5%, 1/2 w.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

PRODUCTION CHANGES

Changes in the equipment to improve performance or to simplify circuits are identified by a "Revision Letter", which is stamped after the model number of the unit. The revision stamped on the unit includes all previous revisions. Refer to the Parts List for the descriptions of parts affected by these revisions.

Rev. A - POWER AMPLIFIER BOARD 19C851617G1

To prevent PA output from slumping and reduce current. C156 was 39pF (19A705108P27) and L157 was 19A701006P5.