MAINTENANCE MANUAL

138-174 MHz RF OUTPUT MODULE 19D429881G1

TABLE OF CONTENTS

DESCRIPTION

The RF Output Module contains the PA/Antenna Switch Assembly for the MASTR®Executive II Vehicular Repeater and uses a single RF power transistor to provide a power output of 300 milliwatts. A solid state antenna switch is used to switch the antenna from the receiver to the power amplifier output circuit.

Supply voltage for the PA is connected through cable W215 to the System Board. C3, C4, C5 and L4 prevent RF from getting on the power input lines.

The hinged PA heat sink pivots 90° to provide access to the power amplifier/antenna switch board and low pass filter.

CIRCUIT ANALYSIS

The exciter output is coupled through an RF cable W216 to H2. The RF is then coupled by the microstrip to the base of RF power transistor Q1. A ground on the TX ENABLE line turns Q2 on and forward biases CR1 permitting the RF output of Q1 to be coupled through cable W214 to the low pass filter. The RF is prevented from reaching the receiver circuit due to CR2 being reversed biased. CR2 is reversed biased since Q3 is turned on by the ground on the TX ENABLE line which turns off Q4. L5 and L6 prevent RF from affecting Q2 and Q4 operation.

The PA output is coupled through the low pass filter and appears at the antenna jack J202. A 20 dB pad provides isolation between the antenna circuit and the monitor receiver jack J201. Isolation is also provided by the pad between the repeater receiver and transmitter circuit and monitor receiver.

A receive signal at J202 is coupled through the low pass filter and cable W214 to the antenna switch circuit. When the transmitter is not keyed, the TX ENABLE is high. Q3 is turned off, so Q4 is turned on. With Q4 on, CR2 is forward biased and permits the receive signal to appear at P102. CR1 is reversed biased to prevent any RF from the exciter from being coupled to the receiver since Q2 will be off.

The receive signal is applied to the monitor receiver circuit J201 through the 20 dB pad on the low pass filter module.

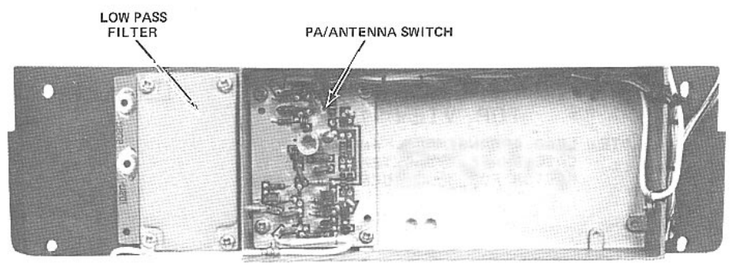

Figure 1 - PA/Antenna Switch

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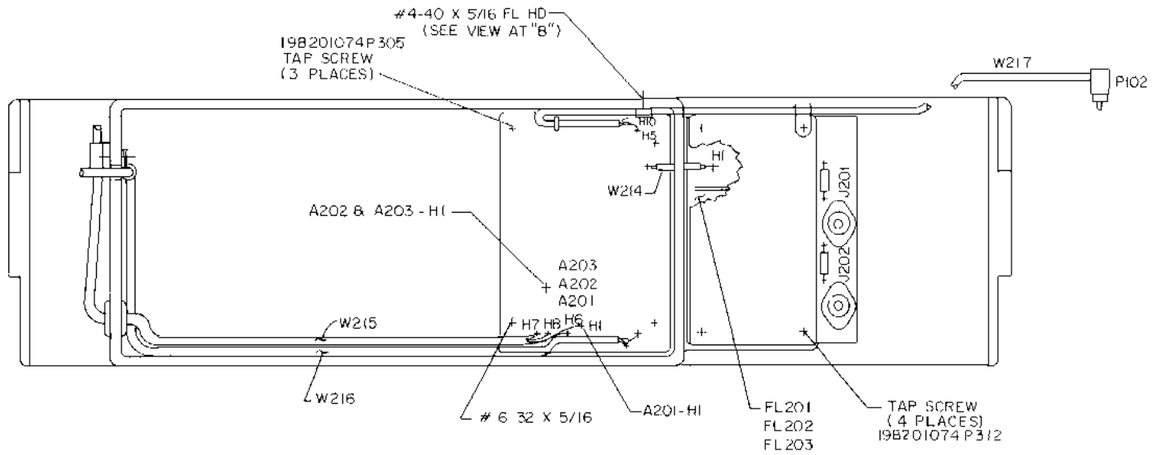
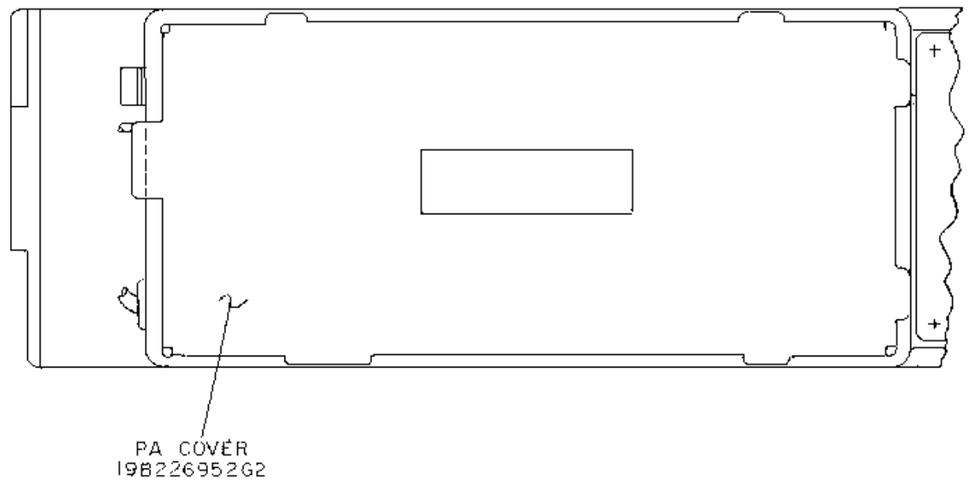
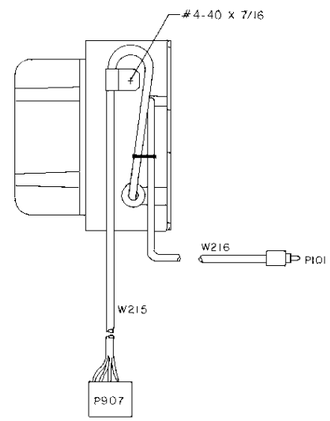
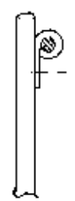






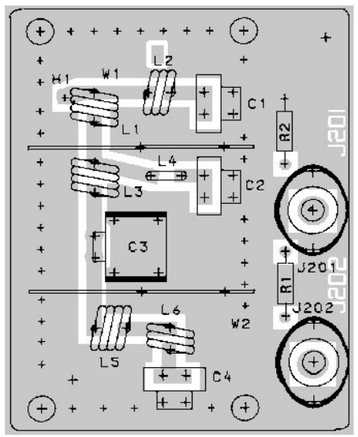


PA/ANTENNA SWITCH & RF OUTPUT MODULE

(19C330483, Rev. 0)

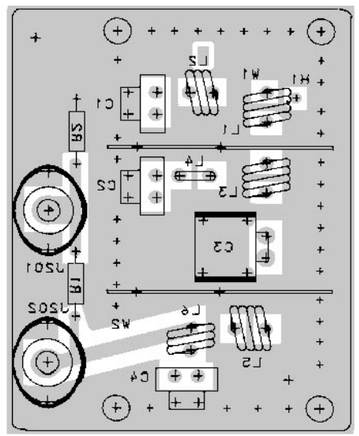
LOW PASS FILTER

COMPONENT SIDE



(19C328541, Rev. 1)
(19A138405, Sh. 1, Rev. 0)

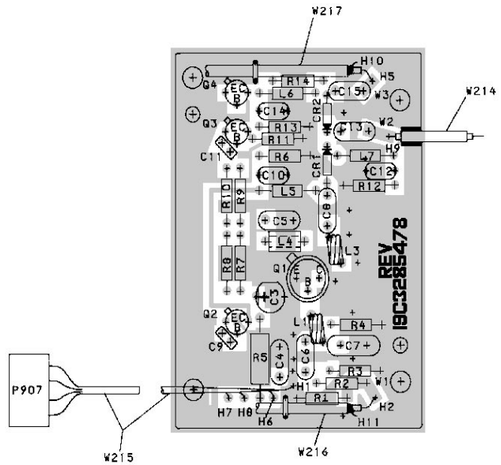
SOLDER SIDE



(19C328541, Rev. 1)
(19A138405,Sh. 2, Rev 0)

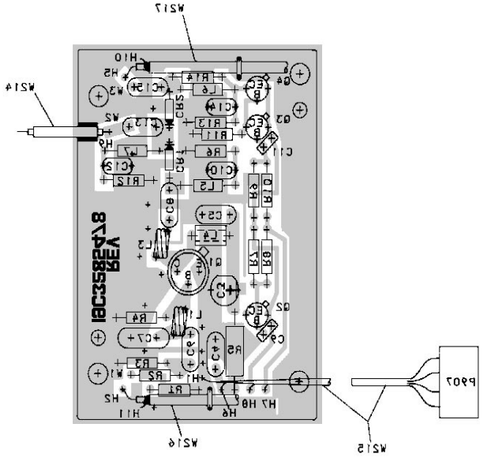
RF OUTPUT BOARD

COMPONENT SIDE



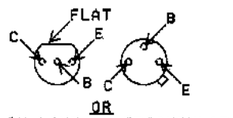
(19C328548, Rev. 1)
(19A138408, Sh. 1, Rev. 1)

SOLDER SIDE



(19C328548, Rev. 1)
(19A138408, Sh. 2, Rev. 1)

LEAD IDENTIFICATION
FOR Q1-Q4



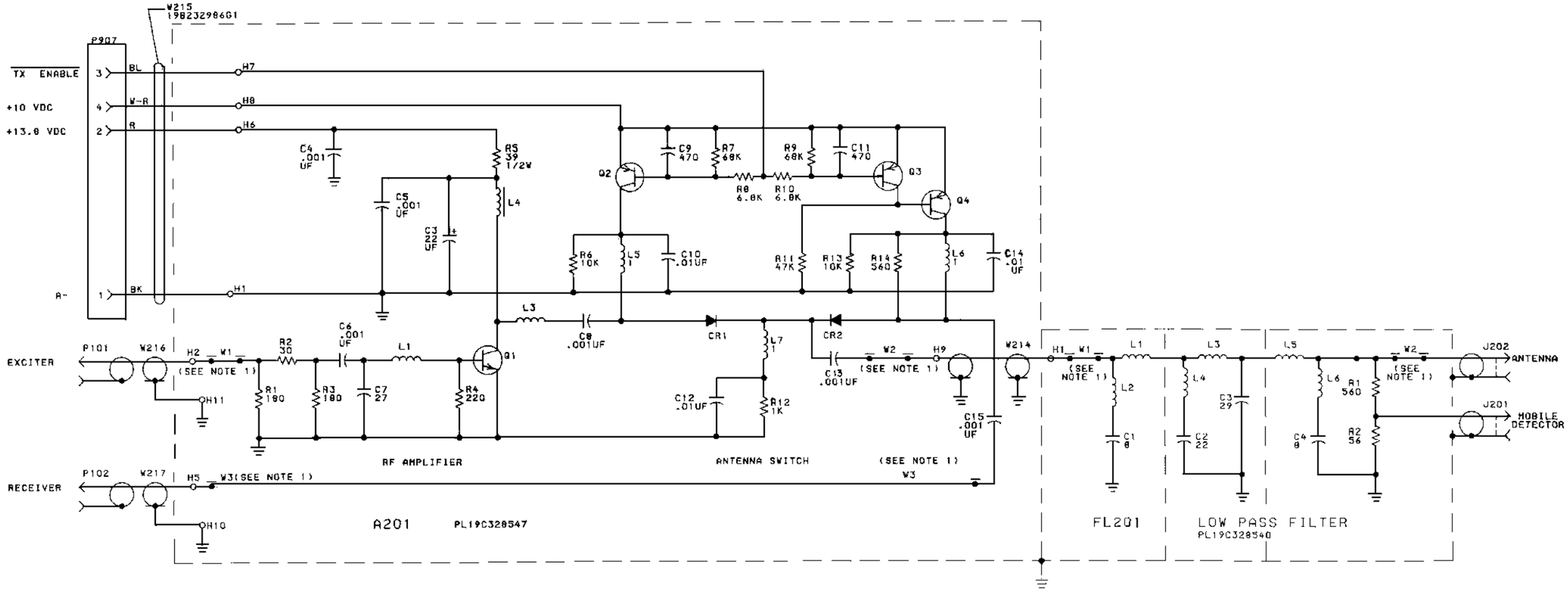
OR

IN-LINE TRIANGULAR

TOP VIEW

NOTE: LEAD ARRANGEMENT, AND NOT CASE SHAPE, IS DETERMINING FACTOR FOR LEAD IDENTIFICA

FROM	TO
W215 BK	H1
W215 R	H6
W215 BL	H7
W215 WR	H8
W217 CENT.COND.	H5
W217 SHIELD	H10
W216 CENT.COND.	H2
W216 SHIELD	H11
W214 CENT.COND.	H9



NOTES:
1. MICROSTRIP (PART OF P.W. BD.)

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.

MODEL NO	REV LETTER
PL19D429881G1	
PL19C328547G1	
PL19C328540G1	

RF OUTPUT MODULE 19D429881G1

(19D429662, Rev. 1)

PARTS LIST

138-174 MHz RF OUTPUT MODULE
19D429881G1
ISSUE 2

SYMBOL	GE PART NO.	DESCRIPTION
A201		AMPLIFIER/ANTENNA SWITCH 19C328547G1
		- - - - - - - - - - CAPACITORS - - - - - - - - -
C3	19A134202P6	Tantalum: 22 uF ±20%, 15 VDCW.
C4 thru C6	19A116655P20	Ceramic disc: 1000 pF ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C7	7489162P13	Silver mica: 27 pF ±5%, 500 VDCW; sim. to Sprague Type 118.
C8	19A116655P20	Ceramic disc: 1000 pF ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C9	19A116192P2	Ceramic: 470 pF ±20%, 50 VDCW; sim to Erie 811-A050-W5R-471M.
C10	19A700005P7	Polyester: 0.01 uF ±10%, 50 VDCW.
C11	19A116192P2	Ceramic: 470 pF ±20%, 50 VDCW; sim to Erie 811-A050-W5R-471M.
C12	19A700005P7	Polyester: 0.01 uF ±10%, 50 VDCW.
C13	19A116655P20	Ceramic disc: 1000 pF ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C14	19A700005P7	Polyester: 0.01 uF ±10%, 50 VDCW.
C15	19A116655P20	Ceramic disc: 1000 pF ±10%, 1000 VDCW; sim to RMC Type JF Discap.
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1 and CR2	19A116925P1	Silicon, pin: 35 volt Reverse Breakdown, 400 mW.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L1	19A129774P1	Coil.
L3	19A129774P1	Coil.
L4	19A701091G1	Coil.
L5	19A700024P13	Coil, RF: 1.0 uH ±10%.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P907		(Part of W215).
		- - - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A116868P1	Silicon, NPN; sim to Type 2N4427.
Q2 thru Q4	19A700022P1	Silicon, PNP; sim to Type 2N3906.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	19A700106P45	Composition: 180 ohms ±5%, 1/4 w.
R2	3R152P300J	Composition: 30 ohms ±5%, 1/4 w.
R3	19A700106P45	Composition: 180 ohms ±5%, 1/4 w.
R4	19A700106P47	Composition: 220 ohms ±5%, 1/4 w.
R5	19A700113P29	Composition: 30 ohms ±5%, 1/2 w.
R6	19A700106P87	Composition: 10K ohms ±5%, 1/4 w.
R7	19A700106P107	Composition: 68K ohms ±5%, 1/4 w.
R8	19A700106P83	Composition: 6.8K ohms ±5%, 1/4 w.
R9	19A700106P107	Composition: 68K ohms ±5%, 1/4 w.
R10	19A700106P83	Composition: 6.8K ohms ±5%, 1/4 w.
R11	19A700106P103	Composition: 47K ohms ±5%, 1/4 w.
R12	19A700106P63	Composition: 1K ohms ±5%, 1/4 w.
R13	19A700106P87	Composition: 10K ohms ±5%, 1/4 w.
R14	19A700106P57	Composition: 560 ohms ±5%, 1/4 w.
		- - - - - - - - - - CABLES - - - - - - - - - -
W1 thru W3		(Part of printed board 19C328546P1).
W214	19A130607G1	Cable, RF: approx 1.14 inches long.
W215		CABLE ASSEMBLY 19B232886G1
		- - - - - - - - - - PLUGS - - - - - - - - - -
P907		Connector. Includes:
	19A116659P84	Shell.
	19A116781P6	Contact, electrical: wire range No. 22-26 AWG; sim to Molex 08-50-0108. (Quantity 4).
W216	19A130909G3	Cable, RF: approx 15.75 inches long.
W217	19A130909G4	Coil, RF: approx 23 inches long.
FL201		LOW PASS FILTER 19C328540G1
		- - - - - - - - - - CAPACITORS - - - - - - - - -
C1	19A116679P8D	Metallized teflon: 8 pF ±0.5 pF, 250 VDCW.
C2	19A700015P12	Teflon/Mica: 22 pF ±5%, 250 VDCW.
C3	19A116795P29J	Teflon: 29 pF ±5%, 250 VDCW.
C4	19A116679P8D	Metallized teflon: 8 pF ±0.5 pF, 250 VDCW.
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J201 and J202	19A700048P2	Connector, receptacle; 500 VDCW maximum; sim to NTTF-1058.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L1	19A701419P3	Coil.
L2	19A701418P1	Coil.
L3	19A701419P3	Coil.
L4	19A701420P5	Coil.
L5	19A701419P3	Coil.
L6	19A701418P1	Coil.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	19A700106P57	Composition: 560 ohms ±5%, 1/4 w.
R2	19A700106P33	Composition: 56 ohms ±5%, 1/4 w.
		- - - - - - - - - - CABLES - - - - - - - - - -
W1 and W2		(Part of printed board 19C328539P1).
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	19C321591G9	Heat sink casting.
	19D416275P3	Casting. (FL201).
	19B226952G2	PA Cover.
	4029851P3	Clip, loop: 1/8 inch. (Secures W215).
	N80P9007C6	Machine screw, phillips: No. 4-40 x 7/16. (Secures W215 clip loop).
	19B201074P312	Tap screw, Phillips POZIDRIV®: No. 6-32 x 3/4. (Secures FL201 casting).
	19B201074P305	Tap screw, Phillips POZIDRIV®: No. 6-32 x 5/16. (Secures A201 board - 3 places).
	N80P13005C6	Machine screw: No. 6-32 x 5/16. (Secures A201 - 1 place).
	19A129361P2	Shield. (Located on FL201).
	4036555P1	Insulator, washer: Nylon. (Used with Q1 on A201).
	19A701887P1	Heat sink. (Used with Q1 on A201).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

LBI-30817

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