MAINTENANCE MANUAL

138-174 MHz, 40 WATT POWER AMPLIFIER 19D424583G2 MOBILE "M" SERIES AND **INTERMITTENT DUTY STATION 19D424583G6 MOBILE "E" SERIES** 19D424786G2 CONTINUOUS DUTY STATION 19D414786G5 CONTINUOUS DUTY DUPLEX

TABLE OF CONTENTS

	Page
DESCRIPTION	Front Cover
CIRCUIT ANALYSIS	1
OUTLINE DIAGRAMS	1-2
SCHEMATIC DIAGRAM	4-6
PARTS LIST AND PRODUCTION CHANGES	7

DESCRIPTION

The MASTR II modularized 40-Watt PA assembly contains a 10-watt driver module, a 40-watt PA module, power control circuitry and low pass filter. A total of three transistors, two in the 10-watt driver and one in the 40-watt PA, are used to provide rated RF output power. The output power is adjustable from 10 watts to rated output power and is held constant for normal variations in temperature and voltage.

Supply voltage for the PA is connected through power leads from the system board to feedthrough capacitors C297 and C298 on the bottom of the PA assembly. C297, C298, C299 and L201 prevent RF from getting on the power leads. Diode CR295 will cause the main fuse in the fuse assembly to blow if the polarity of the power leads is reversed, providing reverse voltage protection for the radio.

The PA assembly is insulated from vehicle ground to permit operation in positive or negative ground vehicles.

CAUTION

Mobile and Station Power Amplifier Assemblies ARE NOT interchangeable due to different chassis grounding requirements.

However, the individual driver and power amplifier board may be interchanged between mobiles and stations.

NOTE -

In positive ground vehicles, A - is "hot" with respect to vehicle ground. Shorting the transmitter PA printed wiring board ground pattern to the radio case may cause one of the in-line fuses to blow.



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

Printed in U.S.A.

OUTLINE DIAGRAM

CIRCUIT ANALYSIS

10-WATT DRIVER A201

The exciter output is coupled through an RF cable to PA input jack J201. The RF is coupled through a matching network to the base of Class C amplifier Q1. The coupling network matches the 50-ohm input to the base of Q1 and consists of A201-T1, C4, C5, and C39. R3, C3, R13 and L1 are stabilizing networks in the base circuit of Q1.

Part of the RF input is rectified by CR1 and is applied to voltage divider R1 and R2, The voltage is divided to activate the Power Control circuits and for metering the Ampl-1 drive at J205.

Collector voltage to Q1 and Q2 is controlled by the Power Control circuit and is applied to Q1 through collector stabilizing network L4 and R4 and collector feed network L3 and C6. The collector voltage is metered through R7 at J205-3 (Pos. C).

The output of Q1 is coupled to the base of the second class C amplifier Q2 through a matching network consisting of C10 through C14 and L5 through L7. Collector voltage to Q2 is applied through collector stabilizing network L11 and R6 and collector feed network L8 and C15.

The output of the 10-watt driver is taken from the collector of Q2 and applied to the base of power amplifier A204-Q1 on the 40-watt PA module through an impedance matching network, two 50 ohm micro strips, W30 and a second impedance matching network.

The collector impedance matching network for A201-O2 (L9, L10, C20 and C21) matches the output of Q2 to 50 ohm micro strip A201-W2. C22 is a DC blocking capacitor. W30 interconnects the output of the 10-watt driver to the input of the 40-watt PA module.

40-WATT PA MODULE A204

The base impedance matching network for A204-Q1 (L1-L3, C1-C4, and R1) matches the 50 ohm input impedance to the base of power amplifier A204-Q1. Collector voltage is coupled through collector stabilizing network Z1 and collector feed network L4 and C10.

Collector current for Q1 is metered across tapped manganin resistor R15 at J205-5&5, The reading is taken on the 10-volt scale with the High Sensitivity button pressed and read as 10 amperes full scale.

Following Q1 is an impedance matching network consisting of L5, L6, C7 and C9 that matches the output of Q1 to 50 ohm micro strip W2. The RF energy is then coupled through W31 and the low pass filter to the antenna.



The RF Power Transistors used in the transmitter contain Bervllium Oxide, a TOXIC substance. If the ceramic, or other encapsulation is opened, crushed, broken or abraded, the dust may be hazardous if inhaled. Use care in replacing transistors of this type.

POWER CONTROL CIRCUIT

The power control circuit, located on the 10-watt driver module and PA Assembly, consists of power control IC A201-U1, thermistor RT201, power adjust potentiometer A201-R8, pass transistor Q215 and the directional coupler. The power control IC senses the presence of drive power from the exciter, the heat sink temperature, power output level, reflected power, and input voltage to provide automatic power leveling across the frequency band.

When the transmitter is keyed, rectified RF from A201-CR1 is applied to pin 10 of U1, turning it on. U1 supplies a reference voltage through pin 4 to power adjust potentiometer A201-R8. The voltage appearing at the arm of R8 is applied back to pin 2 of U1. This voltage determines the base voltage of Q215. The conduction of Q215 sets the collector voltage applied to the 10-watt driver transistors A201-Q1 and Q2, thereby controlling the RF drive to the PA. The RF output power varies in direct proportion to the RF drive applied to the PA and can be adjusted from approximately 10 to 40-watts.

Once the power is set to the desired level, U1 compares the setting of power adjust control R8 to the actual output power flowing through the directional coupler and adjusts the collector voltage on the 10-watt driver transistors accordingly. A204-CR1 rectifies the sensed forward power from the directional coupler and A204-R2 sets the forward power reference voltage applied to pin 1 of U1.

Reflected power is sensed by the directional coupler and rectified by A204-CR2. When the reflected power exceeds a preset level established by A204-R3, a DC voltage proportional to the reflected power is applied to pin 3 of U1. U1 lowers the base voltage of Q215, which in turn lowers the collector voltage of A201-Q1, Q2 thereby reducing transmitter output power.

Temperature protection is provided by U1 and thermistor RT201. RT201 is mounted on the heat sink assembly. Under

normal operating conditions, the temperature sensing circuit is inactive. When the heatsink temperature reaches approximately 100C, the resistance of RT101 decreases, decreasing the base voltage of Q215. This in turn reduces the collector voltage applied to A201-Q1, Q2 reducing the transmitter output until at approximately 125C the output power is almost zero. As the temperature of the heatsink decreases the output power increases until full power returns at approximately 100C.

Overvoltage protection for the RF transistors is also provided by U1. Should the supply voltage exceed approximately 18 volts. U1 will switch off the collector voltage to A201-O1, O2 turning them off and thereby removing drive to the PA. The IC will hold A201-Q1, Q2 off until the supply voltage is reduced to a safe level.

MOBILE AND INTERMITTENT DUTY STATION PA







U1 may be damaged if output terminals 12 or 14 are shorted to ground. Use extreme caution when servicing the power control circuit.

138-174 MHz 40 WATT POWER AMPLIFIER Issue 2

OUTLINE DIAGRAM

10-WATT DRIVER A201

STATION PA





(19D424309, Sh. 1, Rev. 16) (19D438434, Sh. 1, Rev 2)

138-174 MHz 40 WATT POWER AMPLIFIER

LBI-30751

•

SOLDER SIDE



⁽¹⁹D424309, Sh. 1, Rev. 16) (19D438434, Sh. 2, Rev 2)

 (\mathbf{f})

(+)

Œ

医夏

 \oplus

€ -

С3

(19C327454, Sh. 1, Rev. 1) (19B227645, Sh. 1, Rev. 1)

TYP. MTG. FOR T1

-020 MAX.

.02 MAX.

TYPICAL FOR DISC. CERAMIC CAPACITORS OF THIS TYPE.







SOLDER SIDE



(19D424872, Rev. 2) (19B232135, Sh. 2, Rev. 1)



COMPONENT SIDE

(+)

111

40 \oplus COMPONENT SIDE



.030 MAX.

TYP. MOUNTING FOR ALL CAPACITORS OF THIS TYPE



(19C327354, Sh. 1, Rev. 2) (19B227651, Sh. 1, Rev. 0)

(Part of FL202) COMPONENT SIDE



(19C330778, Sh. 1, Rev. 0) (19A143200, Sh. 1, Rev. 0)

LBI-30751

FL202



SOLDER SIDE

(19C327354, Sh. 1, Rev. 2) (19B227651, Sh. 2, Rev. 0)

ANTENNA MATCHING UNIT

SOLDER SIDE

138-174 MHz 40 WATT POWER AMPLIFIER (Cont.)







DESCRIPTION	PA ASSEMBLY	REV LTR.	10 WATT DRIVER	REV LTR.	40 WATT PA	REV LTR.	LOW PASS FILTER	REV LTR.
INT DUTY STA "H" SERIES MOB.	19042450362		19D424309Gt	J	3904247 02 01	A	19032745461	
INT DUTY STA. "E" SERIES	19042450366		19042430961	Ŀ	19042478261	A	19032745491	
CONT. DUTY STATION	19042470662	B	19042430961	L	19042478261	A	19032745461	
CONT. DUTY DUPLEX	19042470665	c	19042430961	ل.	19842478261	Ĥ	19032735461	

138-174 MHz 40 WATT POWER AMPLIFIER

LBI-30751

PTT

TO ANT

TO RX

PARTS LIST

138-174 MHz, 40 WATT POWER AMPLIFIER 19D424583G2 HOBILE "M" SERIES & INTER. DUTY STATION 19D424583G6 HOBILE "E" SERIES

ISSUE 9

SYMBOL	GE PART NO.	DESCRIPTION
A2 01		10 WATT DRIVER BOARD 19D424309G1 (See separate Party List)
A204		40 WATT POWER AMPLIFIER BOARD 19042487201 (See separate Parts List)
FL201		LOW PASS FILTER BOARD 19C327454G1
		CAPACITORS
Cl	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.
C5 and C6	19A116655P18	Ceramic disc: 660 pF ±10%, 1000 VDCW; sim to RMC Type JF Discap.
		JACKS
J 20 2 and J 20 3	19A700049P2	Connector, receptacle; 500 VDCW maximum; sim to NTTF-1058.
J 206 and J 207	19A134263P2	Contact, electrical: sim to Selectro 229-1071.
J 208	4033513P4	Contact, electrical: sim to Bead Chain L93-3.
		RELAYS
КI	198700061₽1	Hermetic sealed: 180 to 341 ohms coil res, 8-16.3 VDC; sim to GE 3SAV1760A2, CP Clare HFW-1201558, or Potter-Brumfield HCM6160.
		INDUCTORS
£1	19A129569P1	Coil.
6.2	19A701418P1	Coil.
L3	19A129569P1	Coil.
L.4	19A701420P5	Coil.
L5	19A129569P1	Coil.
L6	19A701418P1	Cail.
L7	19A136907P1	Coil.
Wl thru WS		Part of Printed Wire Board.
		MISCELLANEOUS
	19A129361P2	Shield.
		MAIN ASSEMBLY 19d424583g2, g6
		INDUCTORS
L201	19A129562P1	Coil.
	1011100	TRANSISTORS
Q201	19A134340P1	Silicon, NPN: VHF Amplifier, 4 watts, 12.5 v.
Q202A	19A134340P3	Silicon, NPN: VHF Amplifier, 12 watts.
Q203A	198134340P4	Silicon, NPN, VHF Amplifier: 45 W.
Q215	19A115/42P1	Silicon, NPN; sim to Type 2N6103.

SYMBOL	GE PART NO.	DESCRIPTION
87201	19812937961	Thermistor: 40K ohma #20% color code white:
		sim to Carborundum Type M0806J-5.
		CABLES
W203	19A136942P1	Strap.
W204	7878455P1	Lug terminal; sim to GE89473.
W205	19822791291	Jumper.
W206	19B227931G3	Jumper.
W207	19822793161	Jumper.
		HEAT SINK ASSEMBLY
		19B219668GG7 (Used in G2). 19B219668GG19 (Used in G6).
		CAPACITORS
C297 and C298	19A116708P1	Ceramic feedthru: 0.01 uF -0 +100%, 500 VDCW, rated 20 amps; sim to Erie 327050X5W0103P.
C299	19A115680P10	Electrolytic: 200 uF +150-10%, 18 VDCW; sim to Mallory Type TTX.
		RECTIFIERS
CR295	19A116783P1	Rectifier, silicon: 100 VDC blocking, 6 amp; sim to MR751.
	19A129434P1	Washer, fiber. (Used with C297 & C298).
	NP280071	Nameplate. (CAUTION).
	19A148393P306	Tap screw, TORZ DRIVE: No. 632 x 3/8. (Used in G19).
	198219929₽1	Support, heat sink. (Used in G19).
	19A129639P1	Cover, heat sink. (Used in G19).
	19B201074P305	Tap screw, Phillips POZIDRIV: No. 6-32 x 5/16. (Secures heat sink cover; Used in G19).
	19D416732G7	Heat sink. (Used in G4).
	19041710507	Heat sink, (Used in G19).
	19A129637G6	Hardware kit (Used in G19).
	19A700068P1	Insulator, bushing. (Used with Q215).
	19A700115P3	Insulator, plate. (Used with Q215).
	N80F9006C6	Screw, Machine: No. 4-40 x 3/8. (Used with Q215).
	N402P5C6	Flatwasher: No. 4. (Used with Q215).
	714122592	Hex Nut: No. 4-40. (Used with Q215).
	19C3219B2P1	Insulator. (Under A201).
	1982010749306	Tap screw, Phillips POZIDRIV: No. 6-32 x 3/8. (Betwwen FL201 cover and A204).
	198201074P312	Tap screw, Phillips POZIDRIV: No. 6-32 x 3/4. (Used with FL201 cover).
	19C321442P1	Insulator. (Used with A204).
	N44P9010B6	Screw, Machine. (Secures Q201 - Q203).
	19D416275G2	Casting (Filter).
	NP280427	Nameplate (TX FOWER AMPLIFIER).

PARTS LIST

PARTS LIST

138-174 MHz, 40 WATT POWER AMPLIFIER 19D424786G2 CONTINUOUS DUTY STATION 19D424786G5 CONTINUOUS DUTY DUPLEX STATION ISSUE 10

SYMBOL	GE PART NO.	DESCRIPTION
A201		10 WATT DRIVER BOARD 19042430901 (See separate Parts List)
A204		40 WATT FOMER AMPLIFIER BOARD 19042487201 (See separate Parts List)
		CAPACITORS
C297	19A116708P1	Ceramic: 0.01 uF -0 +100%, 500 VDCW, rated 20 amps; sim to Erie 327050XSW0103P.
C298	19A116708P1	Ceramic: 0.01 uF -0 +100%, 500 VDCW, rated 20 amps; sim to Erie 327050X5W0103P. (Used in G2).
FL201		LOW PASS FILTER BOARD 19032745401 (Used in G2)
		CAPACITORS
cı	19A116679P8D	Metallized teflon: 8 pF ±0.5 pF, 250 VDCW.
C 2	19A700015P12	Teflon/Mica: 22 pF ±5%, 250 VDCW.
C3	19A116795P29J	Teflon: 29 pF <u>+</u> 5%, 250 VDCW.
C4	19A116679F8D	Metallized teflon: 8 pF ±0.5 pF, 250 VDCW.
C5 and C6	19A116655P18	Ceramic disc: 680 pF \pm 10%, 1000 VDCW; sim to RMC Type JF Discap.
		JACKS
J202 and J203	19A700049F2	Connector, receptacle; 500 VDCW maximum; sim to NTTF-1058.
J206 and J207	19A134263P2	Contact, electrical: sim to Selectro 229-1071.
J208	4033513P4	Contact, electrical: sim to Bead Chain L93-3.
		RELAYS
к1	19A700061P1	Hermetic sealed: 180 to 341 ohms coil res, 8-16.3 VDC; sim to GE 35AV1760A2, CP Clare HFW-1201558, or Potter-Brumfield HCM6160,
		INDUCTORS
L1	19A129569P1	Coil.
L2	19A701418P1	Coil.
L3	19A129569P1	Coil.
L4	19A701420P5	Coil.
L5	19A129569P1	Coil.
L6	19A701418P1	Coil.
L7	19A136907P1	Coil.
W1 thru W5		Part of Printed Wire Board.
	19A129361F2	Shield.
FL202 *		LOW PASS FILTER 19G327354G2 (Used in G5)
	19D432248G1	Antenna Filter. Consists of:
		CAPACITORS
C1	19 A 116679P8D	Metallized teflon: 8 pF ±0.5 pF, 250 VDCM.
COMPON	ENTS ADDED, DE	LETED OR CHANGED BY PRODUCTION CHANGES

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

SYMBOL	ge part no.	DESCRIPTION
C 2	193700015012	Teflen/Mica: 22 oF +58 250 UD/19
C3	19A116795P29J	Teflen: 29 pF +5%, 250 VDCW.
C4	19A116679F8D	Metallized tefion: 8 pF +0.5 pF, 250 VDCW.
J1 thru	19A116364P2	Contact, electrical; sim to AMP 86182-7.
J4 J203	19A700049P2	Connector, receptacle; 500 VDCN maximum; sim to NTTF-1058,
		INDUCTORS
Ll	19A129569P1	Coil.
L 2	19A701418P1	Coil.
L3	19A129569P1	Coil.
L 4	19A701420P5	Coil.
£5	19A129569P1	Coil.
L6	19A701418P1	Coil.
		CABLES
Wl thru W3		Part of PWB 19D432086Pl.
		MISCELLANEOUS
	19A129361P2	Shield.
	19C330778G1	Antenna Matching Unit. Consists of:
		CAPACITORS
CIA	19A116192P1	Ceramic: 0.01 uF ±20%, 50 VDCW; sim to Erie 8121 Special.
C2	19A700008P2	Variable: 2.28 to 14.13 pF; sim to EF Johnson 187-0109-005.
СЗА	19A116656P15J0	Ceramic disc: 15 pF ±5%, 500 VDCW, temp coef 0 FPH/'C.
C4A	19A700008F2	Variable: 2.28 to 14.13 pF; sim to EF Johnson 187-0109-005.
C5A	19A116656P10J0	Ceramic disc: 10 pF ±0.5 pF, 500 VDCW, temp coef 0 PPM/'C.
		RECTIFIERS
CR1	19A700047P3	Silicon: 100 mW; sim to 1N6263.
LIA	19A143343F1	Coil.
Rl	19A700106F31	Composition: 47 ohms ±5%, 1/4 w.
		MAIN ASSEMBLY 19D424583G2, G6
		JACKS
J241		Part of W241.
J242		Part of C298. (Used in G2).
J243		Part of W243.
J244		Part of W244. (Used in G2).
L201	19A129562P4	Coil.
		PLUGS
F202		Part of W244. (Used in G2).
P203		Fart of W243.
P 20 6	4036634P1	Contact: sim to AMP 42428-2. (Used in G2).
Q201	19A134340P1	Silicon, NPN: VHF Amplifier, 4 watts, 12.5 v.
Q202A	19A134340P3	Silicon, NPN: VHF Amplifier, 12 watts,
	1	

SYMBOL	ge part no.	DESCRIPTION
02038	19A134340P4	Silicon, NPN, VHF Amplifier: 45 w.
Q215 *	19A116753P1	Silicon, NPN.
RT201	19812937901	Thermistor: 40K ohms ±20%, color code white; sim to Carborundum Type MOBO6J-5.
W203	19813694281	Strap.
W204	7878455P1	Lug terminal; sim to GE89473.
W205	19B227912P1	Jumper.
w220	19B227931G2	Jumper.
₩221	198227931G4	Jumper.
W241		Part of Frame.
W243	19A129312G6	Antenna Cable Assembly.
W244	5491689P104	Cable, RF: approx 4 inches long, 350 VRMS, 500 VDC operating voltage. (Used in G2).
		MISCELLANEOUS
	19C321982P1	Insulator. (Under A201).
	19B201074P308	Tap screw, Phillips POZIDRIV: No. 6-32 x 1/2. (Grounds filter board shield).
	N404P1386	Lockwasher, internal tooth: No. 6. (Used with above screw).
	19092144281	filter board).
	N44P901086	Machine Screw. (Secures 0201-0203).
	19B201074F320	Tap screw, Phillips POZIDRIV: No. 6-32 x 1-1/4.
		(Secures L201 and W221 at spacer).
	198149460G11	Spacer. (Used with L201 and W221).
	713989893	Nut, hex, brass: No. 1/4-28. (Secures C297 & C298).
	N529P18B6	Plug button. (For Feedthru caps when not used).
	NP280427	Nameplate, (TX POWER AMPLIFIER).
	19B201074P204	Tap screw, phillips FOZIDRIV: No. 4-40 x 1/4. (Secures J243 & J244).
	19B219404G1	Web filter. (Near A204, W1).
	19822692964	Plate.
	1982010742306	Tap screw, Phillips POZIDRIV: No. 6-32. (Secures Frame to Plate, 26 places).
	19B226212G1	Heat sink.
	196209103P410	Tap screw, hex head: No. 8-32 x 5/8. (Secures Heat Sink to Plate).
	19B209260P11	Terminal, solderless. (Used with Power and Ground Cables).
	7491823F13	Terminal, solderless. (Used with Ground Cable).
	19B209268P113	Terminal, solderless: sim to AMP 2-34835-4. (Solders to C297-2).
	13389823	Nut, NEX, DIASS: NO. 1/4-28. (Secures C297).
	N403P25B6	Lockwasher, external tooth: 1/4 (Used with C298).
	19A701863P13	Cable clip.
	19B201074F306	Tap screw, Phillips POZIDRIV: No. 6-32 x 3/8. (Secures Clips)
	N402P7B6	Flatwasher, narrow: No. 6. (Used with Clips).
	19B201074P204	Tap screw, Phillips FOZIDRIV: No. 4-40 x 1/4. (Secures J243).
	19D417513G1	PA Cover.
	NP280071	Nameplate. (CAUTION).
	19D417526G3	PA Frame.
	198134260P1	insulator cover. (Used over Q215),
	4036994P1	Terminal, solderless, (Used with 0215).
	19A11522293	Washer, shield. (Used with <u>Q</u> 215).

SYMBOL	GE PART NO.	DESCRIPTION
	N210P9B6 N404P11B6 N80P9007B6 N80P13004B6	Hex Nut. (Used with Q215). Lockwasher; internal: No. 4. (Used with Q215). Screw, Machine. (Used with Q215). Machine screw: No. 6-32 x 1/4. (Secures A201).

PRODUCTION CHANGES

Changes in the equipment to improve performance or to simplify circluits arc 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 40 WATT POWER AMPLIFIER 19D42478662
 REV. A 40 WATT POWER AMPLIFIER 19D42478665
 To improve reliability, changed Q215 from a plastic case to a metal case hermetically sealed transistor.
 REV. B 40 WATT POWER AMPLIFIER 19D42478665
 To improve operation, changed filter FL202 form 19C32735401 to 19C32735402.
- REV. B 40 WATT POWER AMPLIFIER 19D42478662 REV. C - 40 WATT POWER AMPLIFIER 19D42478605 To improve reliability by modifying 19D42430901 power control circuit to eliminate overshoot at key-on, added driver circuit at output of U1. Added components were C44, C45, Q1, R16 and R17.

PARTS LIST

PARTS LIST

138-174 MHz, 10 WATT DRIVER BOARD A201 19D424309G1 ISSUE 10

SYMBOL	GE PART NO.	DESCRIPTION
CIA	19A700105P8	Mica: 12 pF +5%, 500 VDCW.
C2	7489162P39	Silver mica: 330 pF ±5%, 500 VDCW; sim to Sprague Type 118.
C 3	19A700105F28	Mica: 56 pF ±5%, 500 VDCW.
C4A and C5A	19A700015P23	Teflon/Mica: 56 pF ±5%, 250 VDCW.
C6	19A700015P37	Teflon/Mica: 220 nB 45% 250 Woow
C8	19A116080P107	Polyester: 0.1 uF +10%. 50 VDCW.
C9	19A116655P8	Ceramic disc: 150 pF \pm 10%, 1000 VDCW; sim to RMC Type JP Discap.
CIOA	19A700105F30	Mica: 68 pF ±5%, 500 VDCW.
CIIA *	7489162P101	Silver mica: 5 pF ±10%, 500 VDCW; sim to Sprague Type 118.
C12	19A700015P30	Silver mica: 110 pF ±5%, 250 VDCW.
C13A and C14A	19A700014P33	Metallized teflon: 150 pF $\pm 5\%$, 250 VDCW.
C15	19A700015P37	Teflon/Mica: 220 pF +5%, 250 VDCW.
C16	19A134202P15	Tantalum: 6,8 uF ±20%, 35 VDCW.
C17	19A116080F107	Polyester: 0.1 uF ±10%, 50 VDCW.
C18	19A116655P8	Ceramic disc: 150 pF ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C20A	19A700015P27	Silver mica: 82 pF \pm 5%, 250 VDCW.
C21A	19A700015P16	Teflon/Mica: 30 pF <u>+</u> 5%, 250 VDCW.
C228	19A700015P25	Silver mica: 68 pF \pm 5%, 250 VDCW.
C23 thru C25	19A116655P18	Ceramic disc: 680 pF <u>+</u> 10%, 1000 VDCW; sim to RMC Type JF Discap.
C26	19A134202P15	Tantalum: 6.8 uF ±20%, 35 VDCW.
C27	19A116655P19	Ceramic disc: 1000 pF <u>+</u> 20%, 1000 VDCW; sim to RMC Type JF Discap.
C28	19A116655P8	Ceramic disc: 150 pF ±10%, 1060 VDCW; sim to RMC Type JF Discap.
C29 and C30	19A116655P18	Ceramic disc: 680 pF \pm 10%, 1000 VDCW; sim to RMC Type JF Discap.
C31	19A116080P107	Polyester: 0.1 uF <u>+</u> 10%, 50 VDCW.
C32 thru C34	19A116655P18	Ceramic disc: 680 pF ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C35	19A134202P6	Tantalum: 22 uF <u>+</u> 20%, 15 VDCW.
C36	19A134202P15	Tantalum: 6.8 uF ±20%, 35 VDCW.
C37 thru	19A116655P18	Ceramic disc: 680 pF $\pm 10\%$, 1000 VDCW; sim to RMC Type JF Discap.
C42 and C43	19A116655P18	Ceramic disc: 680 pF <u>+</u> 10%, 1000 VDCW; sim to RMC Type JF Discap.
C44 *	19A703314P4	Electrolytic: 47 uF -10+50% tol, 16 VDCW; sim t Panasonic LS Series.
C45 *	19A701602P13	Ceramic: 470 pF \pm 20%, 1000 VDCW; sim to Type JF Discap.
C46	19A116655P18	Ceramic disc: 680 pF <u>+</u> 10%, 1000 VDCW; sim to RMC Type JF Discap.
C48 thru C50	19A116655F18	Ceramic disc: 680 pF <u>+</u> 10%, 1000 VDCW; sim to RNC Type JF Discap.
C52 *	19A700006P17	Mica: 22 pF <u>+</u> 5%, 250 VDCW; sim to Underwood 3H50020.
CR1	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.

SYMBOL	ge part no.	DESCRIPTION
		TERMINALS
El	19A134263P1	Contact, electrical: sim to Selectro 229-1082- 00-0-590.
Gl		Contact, electrical: sim to Selectro 229-1082- 00-0-590.
		JACKS JACKS
J201	19A700049P2	Connector, receptacle; sim to NTTF-1058.
J205	198219374Gl	Connector: 9 contacts.
	100700014025	
1.3.2	198/00024F25	Coil
14	19870109101	Coil
1.52	19813653282	Coil
1.6	19870147085	Coil
6.7	19470109161	Coil
LAA	19A129561P1	Coil.
L9A	19A701420P3	Coil.
L10A	19A129561P1	Coil.
L11	19870109161	Coil.
L12	19A129569P1	Coil.
L13	19A701419P3	Coil.
L14	19A700024P25	Coil, RF: 10.0 uH <u>+</u> 10%, 3.70 ohms max. DC res.
thru L16		
Q1 *	19A700023P1	Silicon, NPN; sim to Type 2N3904.
Rl	19A700106P67	Composition: 1.5K ohms ±5%, 1/4 w.
R2	3R152P241J	Composition: 240 ohms <u>*</u> 5%, 1/4 w.
R3	19A700106P32	Composition: 51 ohms ±5%, 1/4 w.
R4	19A700113P15	Composition: 10 ohms ± 5 %, 1/2 w.
R5A *	19A700113P32	Composition: 51 ohms ±5%, 1/2 w.
R6	19A700113P15	Composition: 10 ohms ±5%, 1/2 w.
R7	3R152P274J	Composition: 270% chms ±5%, 1/4 w.
RSA	19A116559P106	Variable cermet: 10K ohms ± 20 %, 1/2 w; sim to CTS Series 360.
89	19C850605P2	Shunt resistor.
R10	19A700113P51	Composition: 330 ohms ± 5 %, 1/2 w.
R11	3R152P564J	Composition: 560K chms ±5%, 1/4 w.
R12	19A700106P75	Composition: 3.3K ohms ±5%, 1/4 w.
R13	H212CRP910C	Deposited carbon: 1 ohm ± 5 %, 1/4 w.
R15	19C850605P2	Shunt resistor.
R16 *	19A700106P61	Composition: 820 ohms ±5%, 1/4 w.
R17 *	19A700106P49	Composition: 270 ohms ±5%, 1/4 w.
		TRANSFORMERS
Tl	19A129564G1	Coil.
		INTEGRATED CIRCUITS
Ul	19D429709G3	Power Control IC assembly.
		CABLES
Wl and W2		Part of PWB 19D438434P1.
W 3	19822791221	Jumper.
W4	19822791222	Jumper.
-		
		MISCELLANEOUS
	19A701093P2	Strap. (Solders to W2).

PARTS LIST

PRODUCTION CHANGES

Changes in the equipment to improve performance or to simplify circluts 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 afterded by these revisions.

REV. A - <u>10 WATT DRIVER 19D424309G1</u> To improve operation when Solid State Scientific, Inc. (SSS) transistors are used for Q201, deleted C39 and replaced with L2. Also changed C11.

REV. B - <u>10 WATT DRIVER 19D424109G1</u> To improve operation when Communication Transistor Corp. (CTC) transistors are used for Q201, deleted C39 and replaced with L2. Also changed C11 and added C51.

REV. C - <u>10 WATT DRIVER 19D424309G1</u> To improve operation when TRW transistors are used for Q201, deleted C51 and L2, added C39 and changed C11.

REV. D - <u>10 WATT DRIVER 19D424309G1</u> To improve performance, changed R5.

REV. E - <u>10 WATT DRIVER 190424309G1</u> To improve operation of power control circuit, added C51 and C64.

- REV. F <u>10 WATT DRIVER 19D424309G1</u> To delete components not required with improved Power Control IC, deleted C51 and C64.
- REV. G <u>10 WATT DRIVER 19D424309G1</u> To prevent C26 failure if +12 volts is applied without A connected and with antenna connected, reversed C26 polarity.
- REV. H <u>10 WATT DRIVER 19D424309G1</u> To improve operation by reducing spurious output, added C52.

REV. J - <u>10 WATT DRIVER 19D424309G1</u> To improve reliability by modifying power control circuit to eliminate overshoot at key-on, added driver circuit at output of U1. Added components were C44, C45, Q1, R16 and R17.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

LBI-30751

138-174 MHz WATT POWER AMPLIFIER BOARD 19D424872G1 ISSUE 4

SYMBOL	GE PART NO	DESCRIPTION
A204		
		CAPACITORS
C1A	19A700015P18	Metallized teflon: 36 pF ±5%, 250 VDCW.
C2A	19A116795P160J	Silver mica: 160 pF ±5%, 250 VDCW.
C3A	19A700014P38	Metallized teflon: 240 pF ±5%, 250 VDCW.
and C4A		
C7A	19A700014P33	Metallized teflon: 150 pF ±5%, 250 VDCW.
C8	19A700015P37	Teflon/Mica: 220 pF ±5%, 250 VDCW.
C9A	19A700015P16	Teflon/Mica: 30 pF ±5%, 250 VDCW.
C10A	19A700015P37	Teflon/Mica: 220 pF ±5%, 250 VDCW.
C11	19A116655P13	Ceramic disc; 470 pF ±20%, 1000 VDCW.
C12	19A134202P15	Tantalum: 6.8 µF ±20%, 35 VDCW.
C13	19A116080P107	Polyester: 0.1 µF ±10%, 50 VDCW.
C14A	19A700105P23	Mica: 39 pF ±5%, 500 VDCW.
C15 thru C17	19A116655P13	Ceramic disc; 470 pF $\pm 20\%$, 1000 VDCW; sim to RMC Type JF Discap.
C19 thru C21	19A116655P13	Ceramic disc; 470 pF $\pm 20\%,$ 1000 VDCW; sim to RMC Type JF Discap.
C22	19A134202P15	Tantalum: 6.8 μF ±20%, 35 VDCW.
C23 thru C30	19A116655P13	Ceramic disc; 470 pF $\pm 20\%,$ 1000 VDCW; sim to RMC Type JF Discap.
C31	19A134202P15	Tantalum: 6.8 µE +20%, 35 VDCW.
C32	19A116080P107	Polvester: 0.1 µF ±10%, 50 VDCW.
and		
033		
and	19A116052P2	Silicon, fast recovery; sim to Hewlett Packard 5082-2811. THISIS A ATEST
CR2		
		INDUCTORS
L1A	19A136533P1	Coil.
L2		Part of Printed Wire Board.
L3	19A701091G1	Coil.
L4A	19A701848P1	Coil.
L5A	19A137271P1	Coil.
LOA	19A129561P1	
thru	19A700024F13	Coll, RF: 1.0 μH ±10%.
L9		
		RESISTORS
R1A *	7147161P17	Composition: 1.5 ohms ±5%, 1/2 w.
R2	19A700109P1	Variable: 1K ohms ±20%, 1/4 w.
R3		
R4	19A700106P32	Composition: 51 ohms ±5%, 1/4 w.
R5A	19A700106P33	Composition: 56 ohms ±5%, 1/4 w.
		CABLES
W1 thru W4		Part of Printed Wire Board.
W30	19A701093P2	Strap.
and		
W31		
		FILTER
Z1	19B219649G1	Filter.
		MISCELLANEOUS
	19A129361P2	Shield

* COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

PRODUCTION CHANGES

Changes in the equipment to improve performance or to simplify circluts 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 - 40 WATT POWER AMPLIFIER 190424872 To improve operation. Changed R1.