MOBILE RADIO

MAINTENANCE MANUAL

138-174 MHz, 65 WATT POWER AMPLIFIER

19D424583G3 MOBILE "M" SERIES AND INTERMITTENT DUTY STATION

19D424583G7 MOBILE "E" SERIES

19D424786G3 CONTINUOUS DUTY STATION

19D424786G6 CONTINUOUS DUTY DUPLEX

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DESCRIPTION

The MASTR® II modularized 65-Watt PA assembly contains a 25-Watt driver module, a 65-Watt PA module, power control circuitry and low pass filter. A total of three transistors, two in the 25-Watt driver and one in the 65-Watt PA, are used to provide 65 watts RF output power. The output power is adjustable from 13 watts to rated output power and is held constant for normal variations in temperature and voltage.

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.

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.

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.

Centralized metering jack J205 is provided for use with GE Test Set Model 4EX3A11 or Test Kit 4EX8K12. The Test Set meters Ampl-1 drive (exciter output), power control voltage, driver, and PA current.

CIRCUIT ANALYSIS

25-WATT DRIVER A202

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 A202-T1, 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

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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 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, C12, C13, 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 25-Watt driver is taken from the collector of Q2 and applied to the base of power amplifier A205-Q1 on the 65-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 A202-Q2 (L9, L10, C19, C20 and C21) matches the output of Q2 to 50 ohm micro strip A202-W2. C22 is a DC blocking capacitor. W30 interconnects the output of the 25-Watt driver to the input of the 65-Watt PA module A205.

65-WATT PA MODULE A205

The base impedance matching network for A205-Q1 (L1-L3, C1-C4, and R1) matches the 50 ohm input impedance to the base of A205-Q1. Collector voltage is coupled through collector stabilizing network Z1 and collector feed network L4 and C5.

Collector current for A205-Q1 is metered across tapped manganin resistor R15 at J205-5&6. The reading is taken on the 10-volt scale with the High Sensitivity button pressed and read as 10 amperes full scale.

Following A205-Q1 is an impedance matching network consisting of (L4, L6 and C5 through C9) that matches the output of A205-Q1 to 50 ohm micro strip W2. The RF energy is then coupled through W31 and the low pass filter to the antenna.

WARNING

The RF Power Transistors used in the transmitter contain Beryllium 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 25-Watt driver module and the PA Assembly, consists of power control IC A202-U1, thermistor RT201, power adjust potentiometer A202-R8, pass transistor Q215 and the directional coupler. The power control IC senses the presence of drive power from the exciter, the heatsink 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 A202-CR1 is applied to pin 10 of U1, turning it on. U1 supplies a reference voltage through pin 4 to power adjust potentiometer A202-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 for AMPL-1, A202-Q1, 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 13 to 65 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 A202-Q1 accordingly. A205-CR1 rectifies the sensed forward power from the directional coupler and A205-R2 sets the forward power reference voltage applied to pin 2 of U1.

Reflected power is sensed by the directional coupler and rectified by A205-CR2. When the reflected power exceeds a preset level established by A205-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 A202-Q1, thereby reducing transmitter output power.

Temperature protection is provided by U1 and thermistor RT201. RT201 is mounted on the heatsink assembly. Under normal operating conditions, the temperature sensing circuit is inactive. When the heatsink temperature reaches approximately 100°C, the resistance of RT101 descreases, decreasing the base voltage of Q215. This in turn reduces the collector voltage applied to A202-Q1, reducing the transmitter output until at approximately 125°C the output power is almost zero. As the temperature of the heatsink decreases, the output power increases until full power return at approximately 100°C.

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 A202-W1, turning it off and thereby removing drive to the PA. The IC will hold A202-Q1 off until the supply voltage is reduced to a safe level.

CAUTION

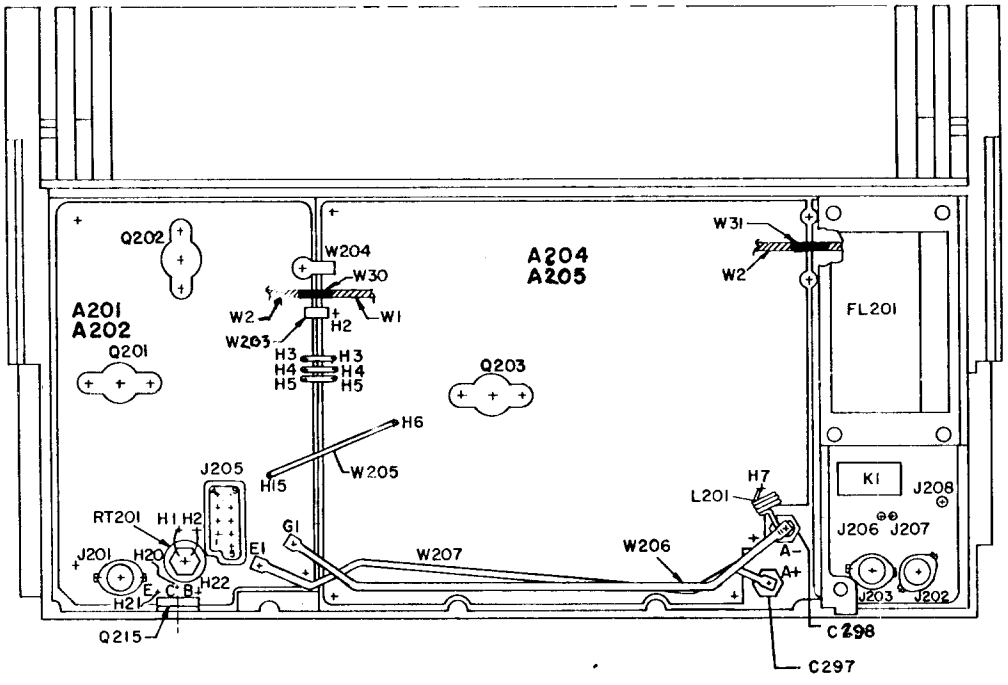
U1 may be damaged if output terminals 12 or 14 are shorted to ground. Use extreme caution when servicing the power control circuit.

ANTENNA MATCHING UNIT

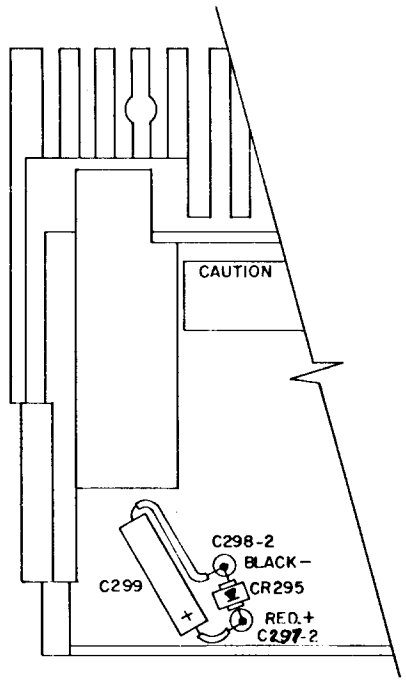
The Antenna Matching Unit is used only in continuous duty duplex stations to optimize impedance matching between the power amplifier and the load. It consists of a Pi network (C2-C5 and L1) and a reverse directional coupler. RF from the low pass filter is applied to the Pi network through the reverse directional coupler and then to the duplexer load. The reverse directional coupler permits monitoring the reflected power by connecting a DC voltmeter across TP1 (+) and ground (-). C2 and C4 are tuned for minimum DC voltage which represents minimum reflected Power. The turns of L1 may also be spread or compressed to further reduce the DC voltage. C2, C4, and L1 should be alternately tuned until an absolute minimum voltage reading is obtained. The residual voltage reading after tuning may vary from one transmitter to the next depending on output power level, operating frequency, and the load.

MOBILE AND INTERMITTENT DUTY STATION

TOP VIEW



BOTTOM VIEW

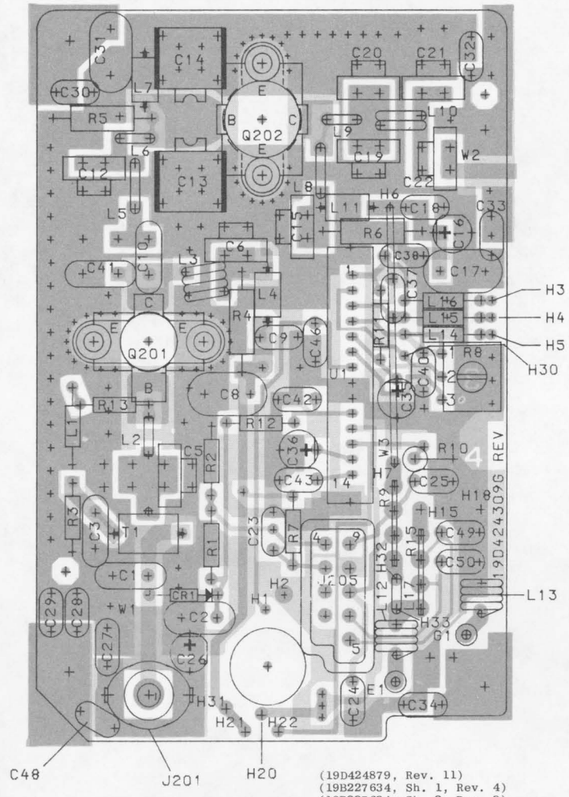


(19D429850, Rev. 1)

OUTLINE DIAGRAM

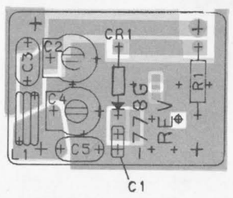
138—174 MHz, 65 WATT POWER AMPLIFIER

A202, 25 WATT DRIVER



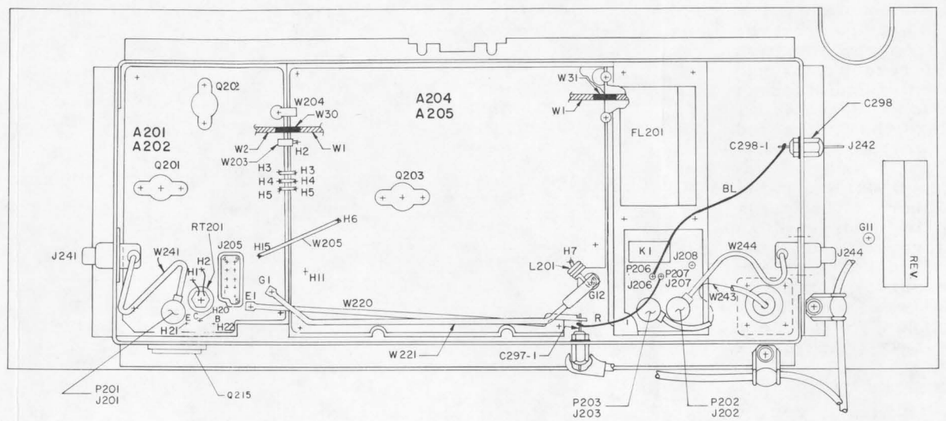
(19D424879, Rev. 11)
(19B227634, Sh. 1, Rev. 4)
(19B227634, Sh. 2, Rev. 3)

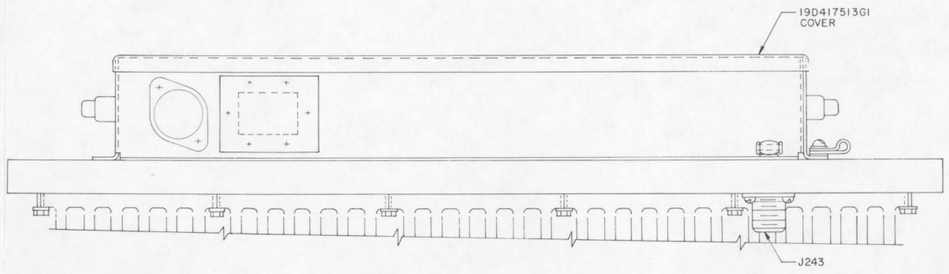
ANTENNA MATCHING UNIT



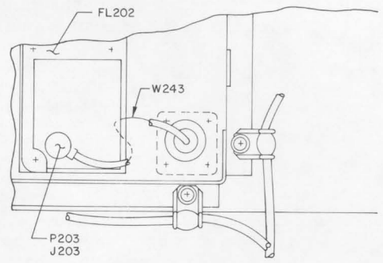
(19B233800, Rev. 0)
(19A143200, Sh. 1, Rev. 0)
(19A143200, Sh. 2, Rev. 0)

STATION PA





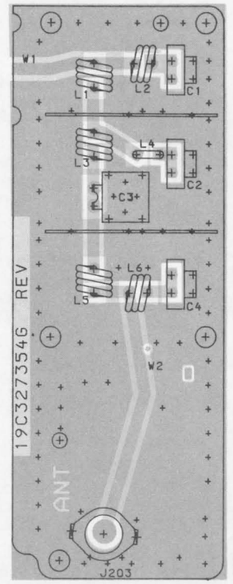
DUPLEX STATIONS



(19D429849, Rev. 2)

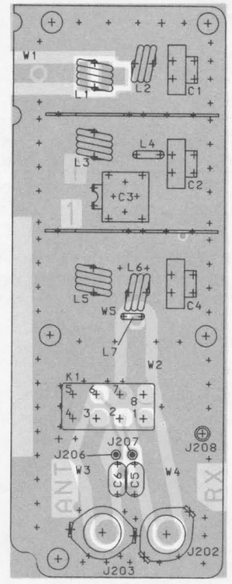
RUNS ON SOLDER SIDE
RUNS ON BOTH SIDES
RUNS ON COMPONENT SIDE

STATION FILTER



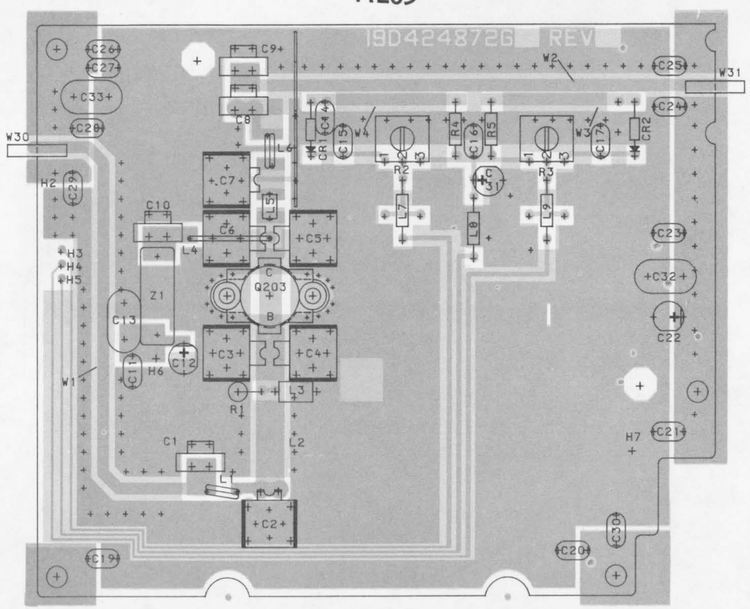
(19C327841, Rev. 1)
(19B227651, Sh. 1, Rev. 0)
(19B227651, Sh. 2, Rev. 0)

MOBILE & INTERMITTENT DUTY STATION FILTER



(19C327842, Rev. 1)
(19B227654, Sh. 1, Rev. 1)
(19B227654, Sh. 2, Rev. 1)

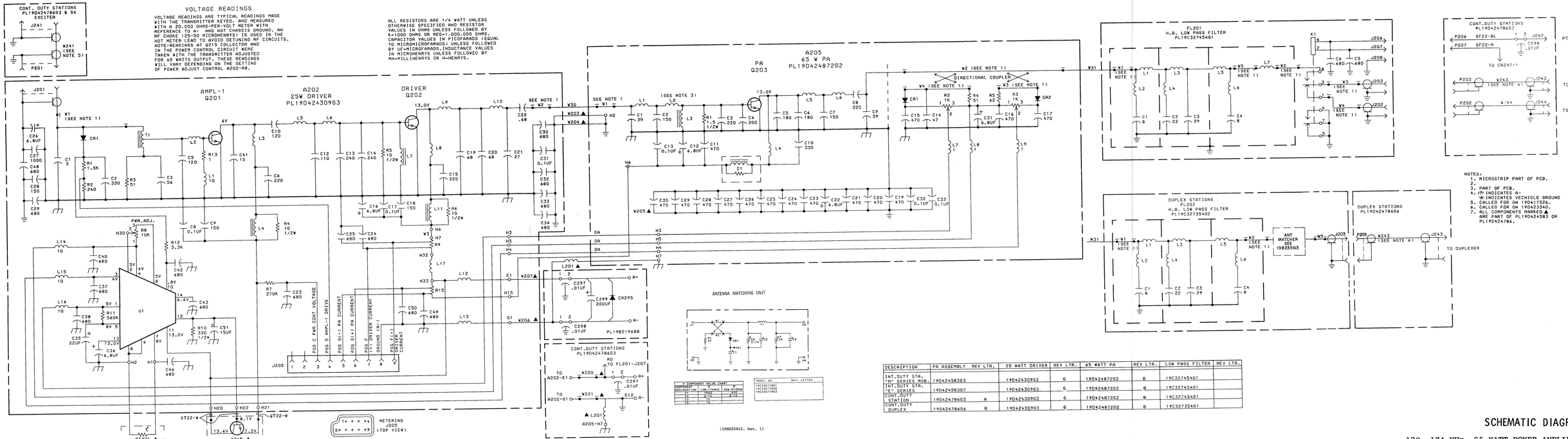
A205



(19D429838, Rev. 2)
(19B232135, Sh. 1, Rev. 1)
(19B232135, Sh. 2, Rev. 1)

OUTLINE DIAGRAMS

138—174 MHz, 65 WATT POWER AMPLIFIER



DESCRIPTION	PA ASSEMBLY	REV LTR.	25 WATT DRIVER	REV LTR.	65 WATT PA	REV LTR.	LOW PASS FILTER	REV LTR.
INT.DUTY STA. "M" SERIES MOB.	19D424583G3		19D424309G3	G	19D424872G2	B	19C327454G1	
INT.DUTY STA. "E" SERIES	19D424583G7		19D424309G3	G	19D424872G2	B	19C327454G1	
CONT.DUTY STATION	19D424786G3	A	19D424309G3	G	19D424872G2	B	19C327454G1	
CONT.DUTY DUPLEX	19D424786G6	B	19D424309G3	G	19D424872G2	B	19C327354G1	

SCHEMATIC DIAGRAM

138—174 MHz, 65 WATT POWER AMPLIFIER

Issue 3

PARTS LIST

138-174 MHz POWER AMPLIFIER ASSEMBLIES

19D424583G1 25 WATT "M" SERIES MARINE
19D424583G2 40 WATT "M" SERIES MOBILE & INT. DUTY STATION
19D424583G3 65 WATT "M" SERIES MOBILE & INT. DUTY STATION
19D424583G4 110 WATT "M" SERIES MOBILE & INT. DUTY STATION
19D424583G5 25 WATT "E" SERIES MARINE
19D424583G6 40 WATT "E" SERIES MOBILE
19D424583G7 65 WATT "E" SERIES MOBILE
19D424583G8 110 WATT "E" SERIES MOBILE
ISSUE 8

SYMBOL	GE PART NO.	DESCRIPTION
A201	19D424309G1	10 Watt Driver. (Used with 19D424583G2, G4, G6 & G8).
A202	19D424309G3	25 Watt Driver/PA. (Used with 19D424583G1, G3, G5, & G7).
A203	19D424328G1	Coupler. (Used with 19D424583G1, G5).
A204	19D424872G1	40 Watt Power Amplifier. (Used with 19D424583G2, G6).
A205	19D424872G2	65 Watt Power Amplifier. (Used with 19D424583G3, G7).
A206	19D424266G1	110 Watt Power Amplifier. (Used with 19D424583G4, G8).
		- - - - - - - - - - - - FILTERS - - - - - - - - - - - -
FL201		COMPONENT BOARD 19C327454G1
		- - - - - - - - - - - - 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.
C5 and C6	19A116655P18	Ceramic disc: 680 pF ±10%, 1000 VDCW; sim to RMC Type JF Discap.
		- - - - - - - - JACKS AND RECEPTACLES - - - - - - - -
J202 and J203	19A700049P2	Connector, receptacle: 500 VDCW maximum; sim to NTTF-1058.
J206 and J207	19A134263P2	Contact, electrical: sim to Selectro 229-1071.
J208	403351SP4	Contact, electrical: sim to Bead Chain L93-3.
		- - - - - - - - - - - - RELAYS - - - - - - - - - - - -
K1	19A700061P1	Hermetic sealed: 180 to 341 ohms coil res, 8-16.3 VDC; sim to GE 3SAV1760A2, CPClare 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.
		- - - - - - - - - - - - CABLES - - - - - - - - - - - -
W1 thru W5		(Part of printed board 19D424357P1).

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L201 and L202	19A129562P1	Coil.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q201	19A134340P1	Silicon, NPN: VHF Amplifier, 4 watts, 12.5 v.
Q202A	19A134340P3	Silicon, NPN: VHF Amplifier, 12 watts.
Q202B	19A134340P2	Silicon, NPN: NHF Amplifier, 25 watts, 12.5 v.
Q203A	19A134340P4	Silicon, NPN, VHF Amplifier: 45 w.
Q203B	19A134387P1	Silicon, NPN.
Q204 and Q205	19A134387P1	Silicon, NPN.
Q215	19A116742P1	Silicon, NPN.
		- - - - - - - - - - THERMISTORS - - - - - - - - - -
RT201	19A129379G1	Thermistor: 40K ohms ±20%, color code white; sim to Carborundum Type MO806J-5.
		- - - - - - - - - - - - CABLES - - - - - - - - - - - -
W203	19A136942P1	Strap.
W204	7878455P1	Lug terminal; sim to GE89473.
W205	19B227912P1	Jumper.
W206	19B227931G3	Jumper.
W207	19B227931G1	Jumper.
W208	19B227074G1	Jumper. 6 inches long.
W209	19B226725G1	Jumper. 5-3/4 inches long.
W210	19B227934G1	Cable: approx 13 inches long.
W211	19A137006P2	Jumper.
		HEAT SINK ASSEMBLY 19B219688G7 "M" SERIES 19B219688G19 "E" SERIES
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C297 and C298	19A116708P1	Ceramic: 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.
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR295	19A116783P1	Rectifier, silicon: 100 VDC blocking, 6 amp; sim to WR751.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19D416732G7	Heat sink. ("M" SERIES).
	19D417105G7	Heat sink. ("E" SERIES).
	19A700068P1	Insulator, bushing. (Used with Q215).
	19A700115P3	Insulator, plate. (Used with Q215).
	19C321982P1	Insulator. (Located under A201, A202).
	19C321442P1	Insulator. (Located under A203-A206).
	NP280427	Nameplate. (25, 40, 65 Watt - Located on FL201).
	NP280428	Nameplate. (110 Watt - Located on FL201).
	19B210174P306	Tap screw, Phillips POZIDRIVE®: No. 6-32 x 3/8. (Located between FL201 cover and A203-A206 - Quantity 2).
	N404P13C6	Lockwasher, internal tooth: No. 6. (Located between FL201 cover and A203-A206).
	19B210174P312	Tap screw, Phillips POZIDRIVE®: No. 6-32 x 3/4. (Secures FL201 cover).
	N44P9010C6	Machine screw: No. 4-40 x 5/8. (Secures Q1 & Q2 on A201, A202; Q1 on A204, A2095, Q1-Q3 on A206).

SYMBOL	GE PART NO.	DESCRIPTION
	N80P13006C6	Machine screw, phillips head: No. 6-32 x 3/8. (Secures A201-A206 boards).
	N80P9006C6	Machine screw: No. 4-40 x 3/8. (Used with Q215 mounting).
	N402P5C6	Flatwasher, steel: No. 4. (Used with Q215 mounting).
	7141225P2	Hex nut: No. 4-40. (Used with Q215 mounting).
	19A129434P1	Washer, fiber. (Used with C297 & C298).
	19B219929P1	Support, heat sink.
	19A148393P306	Tap screw, TORX®Drive: No. 632 x 3/8. (Secures support to heat sink - Quantity 3).
	19A129639P1	Cover, heat sink.
	19B201074P305	Tap screw, Phillips POZIDRIVE®: No. 6-32 x 5/16. (Secures heat sink cover).
	19D416275P2	Filter casting. (FL201).

PARTS LIST

138-174 MHz POWER AMPLIFIER ASSEMBLIES

19D424786G2 40 WATT CONTINUOUS DUTY STATION
19D424786G3 65 WATT CONTINUOUS DUTY STATION
19D424786G4 100 WATT CONTINUOUS DUTY STATION
19D424786G5 40 WATT CONTINUOUS DUTY DUPLEX STATION
19D424786G6 65 WATT CONTINUOUS DUTY DUPLEX STATION
19D424786G7 100 WATT CONTINUOUS DUTY DUPLEX STATION
ISSUE 7

SYMBOL	GE PART NO.	DESCRIPTION
A201	19D424309G1	10 Watt Driver. (Used with 19D424786G2, G4, G5, G7).
A202	19D424309G3	25 Watt Driver. (Used with 19D424786G3, G6).
A204	19D424872G1	40 Watt Power Amplifier. (Used with 19D424786G2, G5).
A205	19D424872G2	65 Watt Power Amplifier. (Used with 19D424786G3, G6).
A206	19D424266G1	110 Watt Power Amplifier. (Used with 19D424786G4, G7).
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C297 and C298	19A116708P1	Ceramic: 0.01 uF -0 +100%, 500 VDCW, rated 20 amps; sim to Erie 327050X5W0103P.
		- - - - - - - - - - FILTERS - - - - - - - - - -
FL201		COMPONENT BOARD 19C327454G1
		- - - - - - - - - - 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.
C5 and C6	19A116655P18	Ceramic disc: 680 pF ±10%, 1000 VDCW; sim to RMC Type JF Discap.
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J202 and J203	19A700049P2	Connector, receptacle: 500 VDCW maximum; sim to NTTF-1058.
J206 and J207	19A134263P2	Contact, electrical: sim to Selectro 229-1071.
J208	403351SP4	Contact, electrical: sim to Bead Chain L93-3.
		- - - - - - - - - - RELAYS - - - - - - - - - -
K1	19A700061P1	Hermetic sealed: 180 to 341 ohms coil res, 8-16.3 VDC; sim to GE 3SAV1760A2, CPClare 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.
		- - - - - - - - - - CABLES - - - - - - - - - -
W1 thru W5		(Part of printed board 19D424357P1).

SYMBOL	GE PART NO.	DESCRIPTION
FL202*		ANTENNA FILTER W MATCHER 19C327354G2 (Added by REV. B)
		ANTENNA FILTER 19D432248G1
		- - - - - - - - - - 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 - - - - - - -
J1 thru J4	19A116364P2	Contact, electrical: sim to AMP 86182-7.
J203	19A700049P2	Connector, receptacle: 500 VDCW maximum; sim to NTTF-1058.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L1	19A129569P1	Coil.
L2	19A701418P1	Coil.
L3	19A129569P1	Coil.
L4	19A701420P5	Coil.
L5	19A129569P1	Coil.
L6	19A701418P1	Coil.
		- - - - - - - - - - CABLES - - - - - - - - - -
W1 thru W3		(Part of printed circuit board 19D432086P1).
		ANTENNA MATCHER 19C328778G1
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1A	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 187-0108-005.
C3A	19A116656P15J0	Ceramic disc: 15 pF ±5%, 500 VDCW, temp coef 0 PPM.
C4A	19A700008P2	Variable: 2.28 to 14.13 pF; sim to EF Johnson 187-0108-005.
C5A	19A116656P10J0	Ceramic disc: 10 pF ±0.5 pF, 500 VDCW, temp coef 0 PPM.
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1	19A700047P3	Silicon: 100 mW; sim to 1N6263.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L1A	19A143343P1	Coil.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	19A700106P31	Composition: 47 ohms ±5%, 1/4 w.
FL202*		COMPONENT BOARD 19C327254G1 (Deleted by REV. B)
		- - - - - - - - - - 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.

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J203	19A130924G1	Connector, receptacle: coaxial, jack type; sim to Cinch 14S11613.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L1	19A129569P1	Coil.
L2	19A129570P1	Coil.
L3	19A129569P1	Coil.
L4	19A129575P1	Coil.
L5	19A129569P1	Coil.
L6	19A129570P1	Coil.
		- - - - - - - - - - CABLES - - - - - - - - - -
W1 and W2		(Part of printed board 19D424362P1).
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L201	19A129562P4	Coil.
L202	19A129562P3	Coil.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P206	4036634P1	Contact, electrical; sim to amp 42428-2.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q201	19A134340P1	Silicon, NPN: VHF Amplifier, 4 watts, 12.5 v.
Q202A	19A134340P3	Silicon, NPN: VHF Amplifier, 12 watts.
Q202B	19A134340P2	Silicon, NPN: NHF Amplifier, 25 watts, 12.5 v.
Q203A	19A134340P4	Silicon, NPN, VHF Amplifier: 45 w.
Q203B	19A134387P1	Silicon, NPN.
Q204 and Q205	19A134387P1	Silicon, NPN.
Q215	19A116753P1	Silicon, NPN; sim to Type 2N5302. Earlier than REV A:
	19A116742P1	Silicon, NPN.
		- - - - - - - - - - THERMISTORS - - - - - - - - - -
RT201	19A129379G1	Thermistor: 40K ohms ±20%, color code white; sim to Carborundum Type MO806J-5.
		- - - - - - - - - - CABLES - - - - - - - - - -
W203	19A136942P1	Strap.
W204	7878455P1	Lug terminal; sim to GE89473.
W205	19B227912P1	Jumper.
W210	19B227934G1	Cable: approx 13 inches long.
W211	19A137006P2	Jumper.
W220	19B227931G2	Jumper.
W221	19B227931G4	Jumper.
W243		CABLE ASSEMBLY 19A129312D6
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J203		Connector. Includes:
	19A700067P1	Receptacle, coax; sim to Amphenol 83-798.
	402908P2	Cover.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P203	5491689P108	Plug. (Includes 10 inches of RF cable).
W244	5491689P104	Cable, RF: approx 4 inches long. (Includes J244).

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	19C321982P1	Insulator. (Located under A201 & A202).
	19C321442P1	Insulator. (Located under A204-A206).
	19B219404G1	Shield electrical. (Located under FL201 casting).
	19D416275P2	Filter casting. (FL201).
	19D417513G1	PA Cover.
	19B226212G1	Heat sink. (The 3 center heat sinks on 75, 100, 110 WATT & the only 2 heat sinks on the 40, 65 WATT power amplifiers).
	19B226212G2	Heat sink. (Located on J243 end of the 75, 100, 110 WATT Power amplifiers - Quantity 1).
	19B226212G3	Heat sink. (Located on W241 end of the 75, 100, 110 WATT Power amplifiers - Quantity 1).
	7150186P127	Spacer. (Termination for L201 & W221).
	NS299P18C6	Plug button. (Used when C298 is not used - Duplex).
	19A701863P13	Cable clip. (Located near J243 - Quantity 2).
	19B209268P113	Terminal, solderless: sim to AMP 2-34835-4. (Solders to C297-2).
	7491823P13	Terminal, solderless. (Used on power ground wire at PA).
	7139898P3	Nut, hex, brass: No. 1/4-28. (Secures C297 & C298).
	N80P13016C6	Machine screw, phillips head: No. 6-32 x 1. (Secures FL201 casting - Quantity 5).
	19B210174P308	Tap screw, Phillips POZIDRIVE®: No. 6-32 x 1/2. (Located between FL201 casting and A204-A206 - Grounds FL201 shield).
	N44P9010C6	Machine screw: No. 4-40 x 5/8. (Secures Q1, Q2 on A201 & A202, Q1-Q3 on A204-A206).
	19B210174P320	Tap screw, Phillips POZIDRIVE®: No. 6-32 x 1-1/4. (Secures L201 & W221 at spacer).
	19B210174P204	Tap screw, phillips POZIDRIVE®: No. 4-40 x 1/4. (Secures J243 & J244).
	19B209103P416	Tap screw, hex head: No. 8-32 x 5/8. (Secures heat sinks).
	19B210174P306	Tap screw, Phillips POZIDRIVE®: No. 6-32 x 3/8. (Secures cable clip loops and power ground terminal).
	19A134260P1	Insulator cover. (Used with Q215).
	4029974P1	Insulator, plate: aluminum. (Used with Q215).
	19A115222P3	Washer, shield. (Used with Q215).
	4036694P1	Terminal, solderless. (Used with Q215).
	N210P9C6	Hex nut, steel: No. 4-40. (Secures Q215).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

PARTS LIST

A205
138-174 MHz, 65 WATT POWER AMPLIFIER
19D424872G2 REV B
ISSUE 4

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1B	19A700015P19	Teflon/Mica: 39 pF ±5%, 250 VDCW.
C2B	19A116795P150J	Mica: 150 pF ±5%, 250 VDCW.
C3B	19A700014P37	Metallized teflon: 220 pF ±5%, 250 VDCW.
C4B	19A700014P36	Metallized teflon: 200 pF ±5%, 250 VDCW.
C5 and C6	19A700014P35	Metallized teflon: 180 pF ±5%, 250 VDCW.
C7B	19A700014P33	Metallized teflon: 150 pF ±5%, 250 VDCW.
C8	19A700015P37	Teflon/Mica: 220 pF ±5%, 250 VDCW.
C9B	19A700015P19	Teflon/Mica: 39 pF ±5%, 250 VDCW.
C10B	19A700015P41	Teflon/Mica: 330 pF ±5%, 250 VDCW.
C11	19A116655P13	Ceramic disc: 470 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C12	19A134202P15	Tantalum: 6.8 uF ±20%, 35 VDCW.
C13	19A116080P107	Polyester: 0.1 uF ±10%, 50 VDCW.
C14B	19A700105P26	Mica: 47 pF ±5%, 500 VDCW.
C15 thru C17	19A116655P13	Ceramic disc: 470 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C19 thru C21	19A116655P13	Ceramic disc: 470 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C22	19A134202P15	Tantalum: 6.8 uF ±20%, 35 VDCW.
C23 thru C30	19A116655P13	Ceramic disc: 470 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C31	19A134202P15	Tantalum: 6.8 uF ±20%, 35 VDCW.
C32 and C33	19A116080P107	Polyester: 0.1 uF ±10%, 50 VDCW.
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1 and CR2	19A116052P2	Silicon, fast recovery; sim to Hewlett Packard 5082-2811.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L1B	19A136533P1	Coil.
L2		(Part of printed board 19D424845P1).
L3	19A701091G1	Coil.
L4B	19A136716P2	Coil.
L5B	19A130270P2	Coil.
L6B	19A136533P1	Coil.
L7 thru L9	19A700024P13	Coil, RF: 1.0 uH ±10%.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1B*	7147161P17	Composition: 1.5 ohms ±5%, 1/2 w.
		Earlier than REV A:
	3R77P100J	Composition: 10 ohms ±5%, 1/2 w.
R2 and R3	19A700109P1	Variable, cermet: 1K ohms ±20%, 1/4 w.
R4	19A700106P32	Composition: 51 ohms ±5%, 1/4 w.
R5B	3R152P620J	Composition: 62 ohms ±5%, 1/4 w.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - CABLES - - - - - - - - - -
W1 thru W4		(Part of printed board 19D424845P1).
W30 and W31	19A701093P2	Strap.
		- - - - - - - - - - NETWORKS - - - - - - - - - -
Z1	19B219649G1	Filter. Includes:
L1	19A129346G2	Coil.
R1	19A700112P15	Composition: 10 ohms ±5%, 1 w.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19A129361P2	Shield.

PARTS LIST

A202
138-174 MHz, 25 WATT DRIVER/PA
19D424309G3 REV F
ISSUE 4

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1B	19A700105P1	Mica: 4.7 pF ±5%, 500 VDCW.
C2	7489162P39	Silver mica: 330 pF ±5%, 500 VDCW; sim to Sprague Type 118.
C3	19A700105P28	Mica: 56 pF ±5%, 500 VDCW.
C5B*	19A700015P31	Teflon/Mica: 120 pF ±5%, 250 VDCW.
		In REV B & earlier:
	19A116679P100J	Mica: 100 pF ±5%, 250 VDCW.
C6	19A700015P37	Teflon/Mica: 220 pF ±5%, 250 VDCW.
C8	19A116080P107	Polyester: 0.1 uF ±10%, 50 VDCW.
C9	19A116655P8	Ceramic disc: 150 pF ±10%, 1000 VDCW; sim. to RMC Type JF Discap.
C10B	19A700105P36	Mica: 120 pF ±5%, 500 VDCW.
C12	19A700015P30	Silver mica: 110 pF ±5%, 250 VDCW.
C13B	19A700014P38	Metallized teflon: 240 pF ±5%, 250 VDCW.
C14B	19A700014P38	Metallized teflon: 240 pF ±5%, 250 VDCW.
C15	19A700015P37	Teflon/Mica: 220 pF ±5%, 250 VDCW.
C16	19A134202P15	Tantalum: 6.8 uF ±20%, 35 VDCW.
C17	19A116080P107	Polyester: 0.1 uF ±10%, 50 VDCW.
C18	19A116655P8	Ceramic disc: 150 pF ±10%, 1000 VDCW; sim. to RMC Type JF Discap.
C19	19A700015P25	Silver mica: 68 pF ±5%, 250 VDCW.
C20B	19A700015P25	Silver mica: 68 pF ±5%, 250 VDCW.
C21B	19A700015P15	Teflon/Mica: 27 pF ±5%, 250 VDCW.
C22B	19A700015P25	Silver mica: 68 pF ±5%, 250 VDCW.
C23 thru C25	19A116655P18	Ceramic disc: 680 pF ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C26	19A134202P15	Tantalum: 6.8 uF ±20%, 35 VDCW.
C27	19A116655P19	Ceramic disc: 1000 pF ±20%, 1000 VDCW; sim to RMC Type JF Dmcap.
C28	19A116655P8	Ceramic disc: 150 pF ±10%, 1000 VDCW; sim. to RMC Type JF Discap.
C29 and C30	19A116655P18	Ceramic disc: 680 pF ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C31	19A116080P107	Polyester: 0.1 uF ±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 ±20%, 15 VDCW.
C36	19A134202P15	Tantalum: 6.8 uF ±20%, 35 VDCW.
C37 and C38	19A116655P18	Ceramic disc: 680 pF ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C40	19A116655P18	Ceramic disc: 680 pF ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C41	19A700105P11	Mica: 15 pF ±5%, 500 VDCW.
C42 and C43	19A116655P18	Ceramic disc: 680 pF ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C46	19A116655P18	Ceramic disc: 680 pF ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C48 thru C50	19A116655P18	Ceramic disc: 680 pF ±10%, 1000 VDCW; sim to RMC Type JF Discap.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

SYMBOL	GE PART NO.	DESCRIPTION
C51*	19B209723P5	Tantalum: 15 uF ±20%, 20 VDCW. Added by REV D. Deleted by REV E.
	19A116679P10J0	Metallized teflon: 10 pF ±5%, 250 VDCW. Added by REV B. Deleted by REV C.
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
		- - - - - - - - - - TERMINALS - - - - - - - - - -
E1	19A134263P1	Contact, electrical: sim to Selectro 229-1082-00-0-590.
G1	19A134263P1	Contact, electrical: sim to Selectro 229-1082-00-0-590.
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J201	19A700049P2	Connector, receptacle; 500 VDCW maximum; sim to WTTF-1058.
J205	19B219374G1	Connector: 9 contacts.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L1	19A700024P25	Coil, RF: 10.0 uH ±10%, 3.70 ohms DC res max.
L2*	19A137270P2	Coil. Added by REV B. Deleted by REV C.
L3A	19A136530P1	Coil.
L4	19A701091G1	Coil.
L5B	19A136532P1	Coil.
L6	19A701420P5	Coil.
L7	19A701091G1	Coil.
L8B	19A136531P1	Coil.
L9B	19A701420P5	Coil.
L10B	19A136533P1	Coil.
L11	19A701091G1	Coil.
L12	19A129569P1	Coil.
L13	19A701419P3	Coil.
L14 thru L16	19A700024P25	Coil, RF: 10.0 uH ±10%, 3.70 ohms DC res max.
L17	19A701420P5	Coil.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	19A700106P67	Composition: 1.5K ohms ±5%, 1/4 w.
R2	3R152P241J	Composition: 240 ohms ±5%, 1/4 w.
R3	19A700106P32	Composition: 51 ohms ±5%, 1/4 w.
R4 thru R6	19A700113P15	Composition: 10 ohms ±5%, 1/2 w.
R7	3R152P274J	Composition: 270K ohms ±5%, 1/4 w.
R8A	19A116655P106	Variable, cermet: 10K ohms ±20%, 0.5 w; sim to CTS Series 360.
R9	19C850605P2	Shunt resistor.
R10	19A700113P51	Composition: 330 ohms ±5%, 1/2 w.
R11	3R152P564J	Composition: 560K ohms ±5%, 1/4 w.
R12	19A700106P75	Composition: 3.3K ohms ±5%, 1/4 w.
R13	19A116216P18OJ	Deposited carbon: 1.0 ohms ±5%, 1/4 w; sim to Kepco Electra Type CR25.
R15	19C850605P2	Shunt resistor.
		- - - - - - - - - TRANSFORMERS - - - - - - - - -
T1	19A129564G1	Transformer.
		- - - - - - - - - INTEGRATED CIRCUITS - - - - - - - - -
U1*	19D429709G3	IC, Power Control.
		In REV D & earlier:
	19D429709G3	IC, Power Control.

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - CABLES - - - - - - - - - -
W1 and W2		(Part of printed board 19D424308P1).
W3	19B227912P1	Jumper.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19A701093P2	Strap. (Solders to W2).

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 descriptions of parts affected by these revisions.

REV. A - D - 25 Watt Driver PA Assembly 19D424309G3
Incorporated in initial shipment.

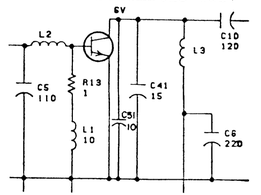
REV. A - 65 Watt Power Amplifier 19D424872G2, A205
To improve performance. Changed R1A and R1B.

REV. A - 25 Watt Driver 19D424309G3
To improve operation when Solid State Scientific, Inc. (SSS) transistors are used for Q201. Delete C39. Change C11 and add L2.

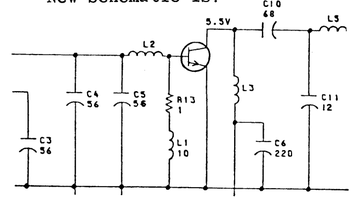
REV. B - To improve operation when Communication Transistor Corp. (CTC) transistors are used for Q201. Delete C39, add L2. Changed C11 and added C51.

REV. C - To improve operation when TRW transistors are used for Q201. Deleted C51 and L2. Added C39 and changed C11.

Old Schematic Was:



New Schematic is:



REV. D - To improve operation of power control circuit. Added C51.

REV. E - To delete components not required with improved Power Control IC. Deleted C51.

REV. F - To increase Power output at high end. Change C1B and C5B.
Deleted C39. Added L2 (replaced C39 with L2).
C1B was: 19A700105P8 - Mica: 12 pf ±5%, 500 VDCW.
C5B was: 19A700015P29 - Metallized teflon: 100 pf ±5%, 250 VDCW.
In REV. B and earlier,
19A116679P100J - Silver mica: 100 pf ±5%, 250 VDCW.
C39 was: 19A116655P18 - Ceramic disc: 680 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap. Deleted by REV. A. Added by REV. C.

REV. G - To reverse polarity of C26.

REV. B - Power Amplifier Module 19D424872G2
To increase power output at high end. Changed C1B.
C1B was: 19A700015P17 - Metallized teflon: 33 pf ±5%, 250 VDCW.

REV. A - 65-Watt Continuous Duty Duplex Stations 19D424786G3, G6
To incorporate new transistor. Changed Q215.

REV. B - To incorporate new Antenna Matching unit FL202 on low pass filter board.
FL202 was: 19C327354G1.