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DESCRIPTION

The 30-50 MHz PA assembly for Custom MVP uses two RF power transistors to provide a power output of 25 Watts. The output power is adjustable using power adjust control R19 over a range of 8 to 25 Watts. A single transistor is used in the power adjust circuit.

Supply voltage (A+) for the PA is connected from J1 on the back of the radio through FL210-C5 on the side of the radio. C201, C202 and L15 prevent RF from getting on the power leads. Diode CR201 will cause the main fuse assembly to blow if the polarity of the power leads is reversed, providing reverse voltage protection for the radio.

Centralized metering jack J5 is provided for use with GE Test Set Model 4EX3A11 or Test Kit 4EX8K12. The Test Set meters the Ampl-1 drive (exciter output), power adjust voltage, PA current and voltage.

CIRCUIT ANALYSIS
RF AMPLIFIERS

The exciter output is coupled through cable W201 to PA input jack J1. The RF is coupled through DC blocking capacitor C1 and an impedance matching network to the base of Class C amplifier Q201. The network matches the 50-ohm input to the base of Q201, and consists of C3, C4, C5, L1 and L2. R3, R4, R5 and R6 lower the gain of the amplifier stage. L3 provides the DC return to the base of Q201.

Part of the RF input is rectified by CR1 and applied to voltage divider R1 and R2. This voltage is used to meter the AMPL-1 drive at J5-4.

Collector voltage to Q201 (Ampl-1) is controlled by the power adjust circuit, Q215 and is applied through collector stabilizing network (L5 and R7) and collector feed network L4 and C8. The collector voltage of Q201 is metered through R18 and J5-3.

Following Q201 is a matching network (C6, C7, C11, C212, C213, L6 and L27) to a resistive pad (R8, R9 and R10). The output of the resistor network is applied to the base of Power Amplifier Q202 through a match-

ing network consisting of C14, C15, C16, L8 and L9. Resistors R11 through R16 lower the gain of Q202 and adjust the impedance levels. L10 provides the DC return to the base of Q202.

Collector voltage to Q202 is coupled through a collector stabilizing network consisting of L12 and R17 and collector feed network L11 and C19. PA voltage is metered from tapped manganin resistor R20 to ground. The reading is taken in position G on the 15 volt scale (4EX3A11) and read as 15 volts full scale. The meter polarity must be reversed.

Collector current for Q202 is metered through tapped manganin resistor R20 at J5-7 (PA CURRENT). The reading is taken on the one-volt scale with the High Sensitivity button pressed, and read as 10 amperes full scale.

Following Q202 is a matching network (C17, C18, C21, C22, C23, L11, L13 and L14) that matches the PA output to the input of the low pass filter through a 50 ohm microstrip W2, cable W202 and a matching 50-ohm microstrip W1 on the input to the low pass filter. The output of the low pass filter is coupled through a third 50-ohm microstrip to antenna relay K1 and then to antenna connector J3. The receiver connection is made at J2.

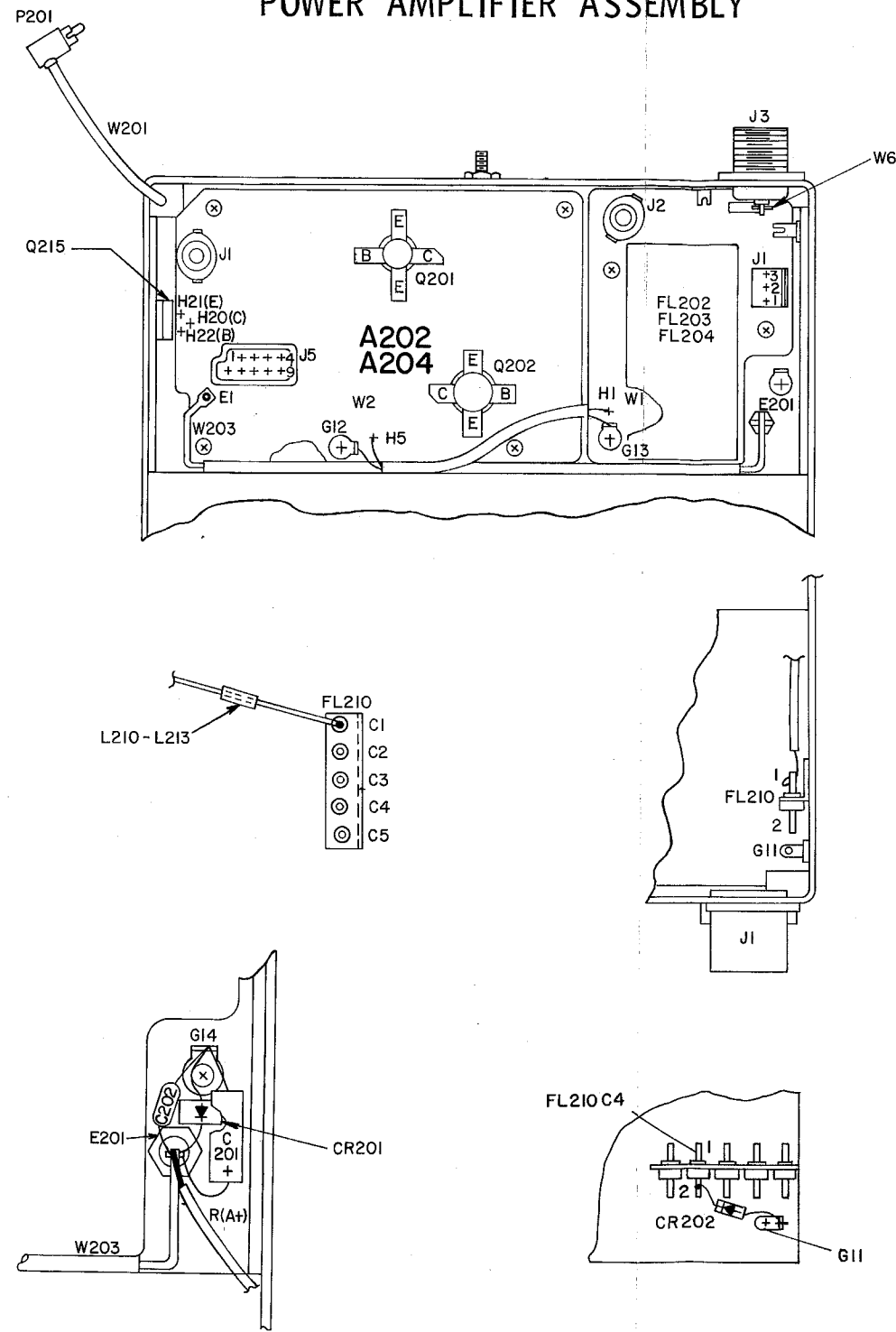
WARNING

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 ADJUST CIRCUIT

The power adjust circuit consists of R19 and Q215. R19 controls the base voltage and conduction of Q215. Q215 emitter is connected in series with the collector feed network for Q201 thereby controlling the drive to Power Amplifier Q202 and the output power. R19 is adjusted to provide the desired output power. The collector voltage for Q201 is measured on position C on the 15 volt scale and read as 0-15 volts full scale.

POWER AMPLIFIER ASSEMBLY

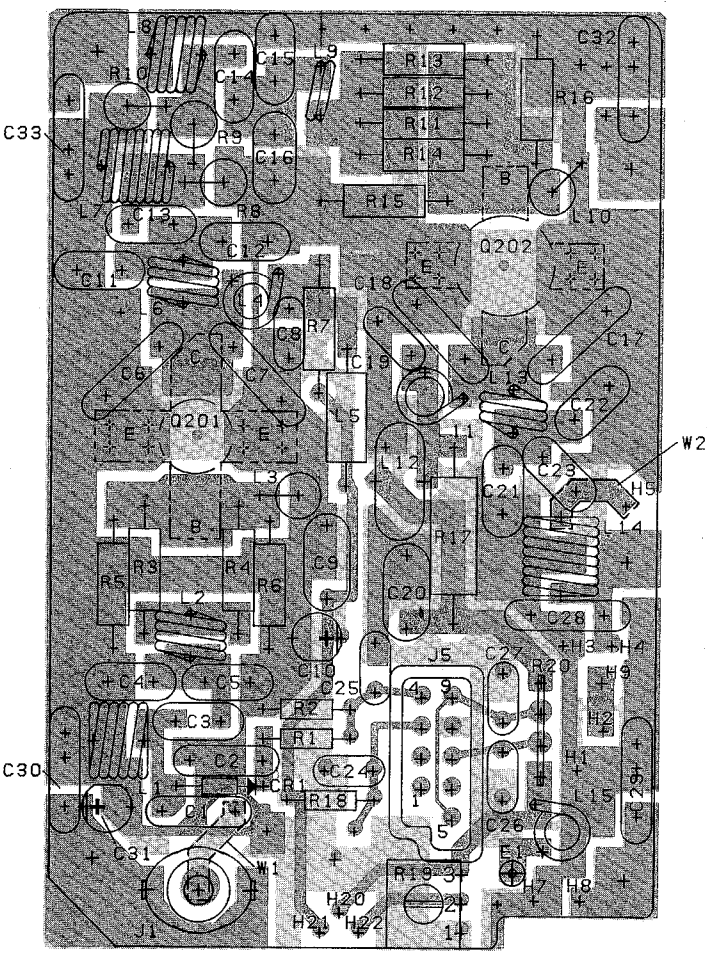


(19C327308, Rev. 1)

OUTLINE DIAGRAM

30—50 MHz POWER AMPLIFIER

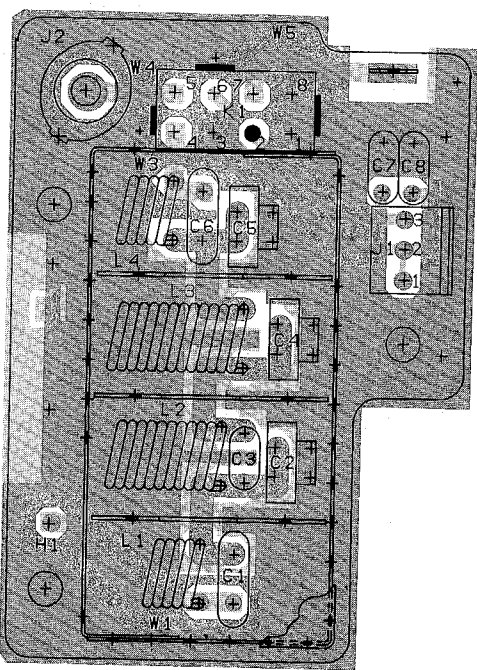
PA BOARD



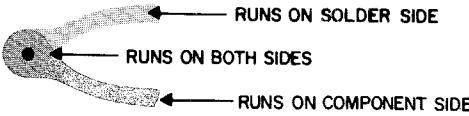
CONNECTION CHART		
FROM	TO	WIRE SIZE
H3	H4	08
H7	H8	08

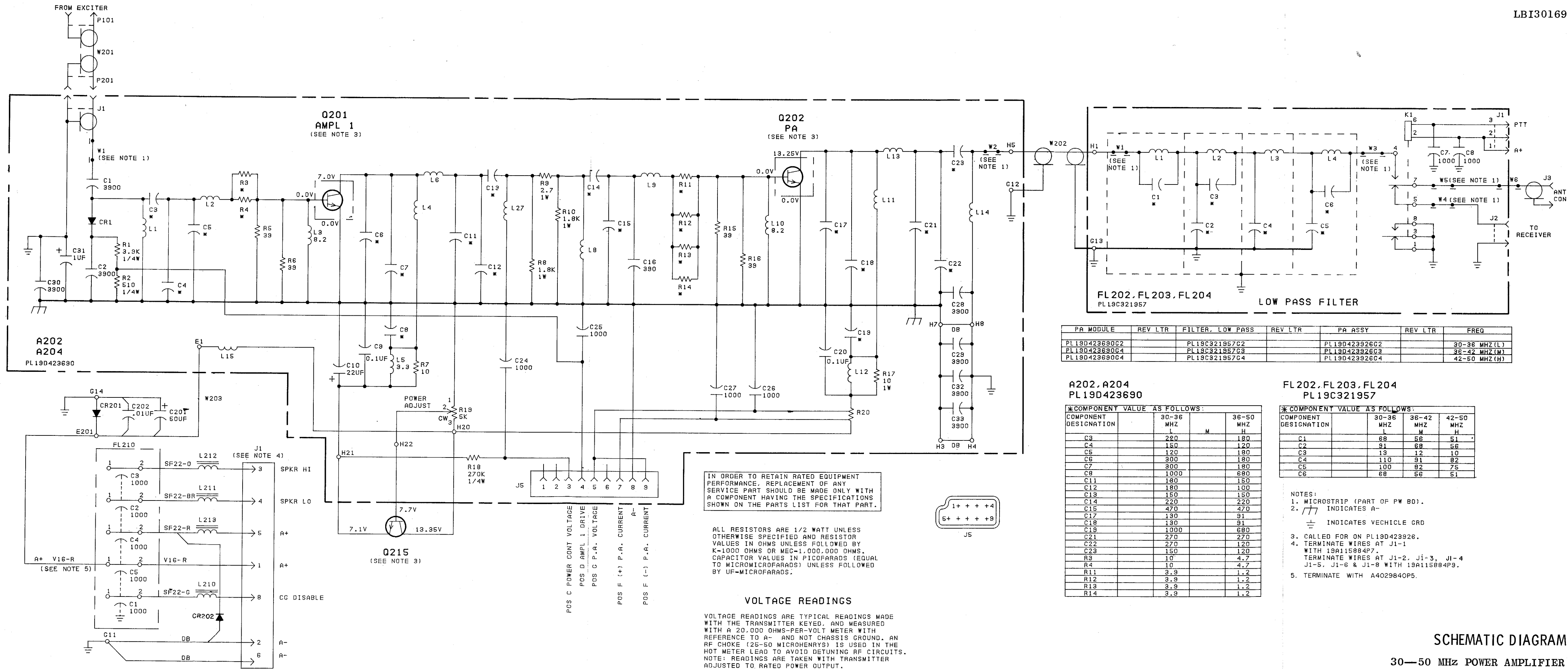
(19C327141, Rev. 0)
(19B227209, Sh. 1, Rev. 1)
(19B227209, Sh. 2, Rev. 1)

FILTER BOARD



(19C327143, Rev. 1)
(19B227218, Sh. 1, Rev. 1)
(19B227218, Sh. 2, Rev. 0)





PARTS LIST		
LBI-30170A		
30-50 MHz POWER AMPLIFIER		
19D423928G2 30-36 MHz (L)		
19D423928G3 36-42 MHz (M)		
19D423928G4 42-50 MHz (H)		
SYMBOL	GE PART NO.	DESCRIPTION
A202 and A204		POWER AMPLIFIER MODULE 19D423928G2 30-36 MHz 19D423928G4 36-50 MHz
----- CAPACITORS -----		
C1 and C2	19A116655P23	Ceramic disc: 3900 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C3L	7489162P35	Silver mica: 220 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C3H	7489162P33	Silver mica: 180 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C4L	7489162P31	Silver mica: 150 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C4H	7489162P29	Silver mica: 120 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C5L	7489162P29	Silver mica: 120 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C5H	7489162P33	Silver mica: 180 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C6L	19A116656P300J15	Ceramic disc: 300 pf ±5%, 500 VDCW, temp coef -1500 PPM.
C6H	19A116656P180J4	Ceramic disc: 180 pf ±5%, 500 VDCW, temp coef -470 PPM.
C7L	19A116656P300J15	Ceramic disc: 300 pf ±5%, 500 VDCW, temp coef -1500 PPM.
C7H	19A116656P180J4	Ceramic disc: 180 pf ±5%, 500 VDCW, temp coef -470 PPM.
C8L	19A116655P19	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C8H	19A116655P17	Ceramic disc: 680 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C9	19A116966P107	Metallized polyester: .1 µf ±10%, 50 VDCW.
C10	19A134202P6	Tantalum: 22 µf ±20%, 15 VDCW.
C11L	7489162P33	Silver mica: 180 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C11H	7489162P31	Silver mica: 150 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C12L	7489162P33	Silver mica: 180 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C12H	7489162P27	Silver mica: 100 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C13L	7489162P31	Silver mica: 150 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C13H	7489162P31	Silver mica: 150 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C14L	7489162P35	Silver mica: 220 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C14H	7489162P35	Silver mica: 220 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C15L	7489162P43	Silver mica: 470 pf ±5%, 300 VDCW; sim to Electro Motive Type DM-15.
C15H	7489162P43	Silver mica: 470 pf ±5%, 300 VDCW; sim to Electro Motive Type DM-15.
C16	7489162P41	Silver mica: 390 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C17L	19A116656P130J1	Ceramic disc: 130 pf ±5%, 500 VDCW, temp coef -150 PPM.
C17H	19A116656P91J0	Ceramic disc: 91 pf ±5%, 500 VDCW, temp coef 0 PPM.

SYMBOL	GE PART NO.	DESCRIPTION
C18L	19A116656P130J1	Ceramic disc: 130 pf ±5%, 500 VDCW, temp coef -150 PPM.
C18H	19A116656P91J0	Ceramic disc: 91 pf ±5%, 500 VDCW, temp coef 0 PPM.
C19L	19A116655P19	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C19H	19A116655P17	Ceramic disc: 680 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C20	19A116966P107	Metallized polyester: .1 µf ±10%, 50 VDCW.
C21L	7489162P37	Silver mica: 270 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C21H	7489162P37	Silver mica: 270 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C22L	7489162P37	Silver mica: 270 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C22H	7489162P29	Silver mica: 120 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C23L	7489162P31	Silver mica: 150 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C23H	7489162P29	Silver mica: 120 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C24 thru C27	19A116655P19	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C28 thru C30	19A116655P23	Ceramic disc: 3900 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C31	19A134202P14	Tantalum: 1 µf ±20%, 35 VDCW.
C32 and C33	19A116655P23	Ceramic disc: 3900 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
----- DIODES AND RECTIFIERS -----		
CR1	19A115250P1	Silicon.
----- TERMINALS -----		
E1	19A134263P1	Contact, electrical: sim to Selectro X-L-070174-1
----- JACKS AND RECEPTACLES -----		
J1	19A130924G1	Receptacle, coaxial: jack type; sim to Cinch 14H11613.
J5	19B219374G1	Connector: 9 contacts.
----- INDUCTORS -----		
L1L	19C320617P23	Coil.
L1H	19C320617P24	Coil.
L2L	19C320617P5	Coil.
L2H	19C320617P25	Coil.
L3	7488079P42	Choke, RF: 8.20 µh ±10%, 0.25 ohms DC res max; sim to Jeffers 4422-3.
L4L	19C320618P6	Coil.
L4H	19C320618P1	Coil.
L5	7488079P10	Choke, RF: 3.30 µh ±10%, 0.15 ohms DC res max; sim to Jeffers 4421-1.
L6L	19C320617P26	Coil.
L6H	19C320617P6	Coil.
L7L	19C320617P28	Coil.
L7H	19C320617P29	Coil.
L8L	19C320617P30	Coil.
L8H	19C320617P45	Coil.
L9L	19C320618P7	Coil.
L9H	19C320619P6	Coil.
L10	7488079P42	Choke, RF: 8.20 µh ±10%, 0.25 ohms DC res max; sim to Jeffers 4422-3.
L11L	19C320618P6	Coil.
L11H	19C320618P8	Coil.

SYMBOL	GE PART NO.	DESCRIPTION
L12	19A129346G1	Coil.
L13L	19C320617P4	Coil.
L13H	19C320617P12	Coil.
L14L	19C320617P38	Coil.
L14H	19C320617P39	Coil.
L15	19C320318P1	Coil.
----- RESISTORS -----		
R1	3R152P392J	Composition: 3900 ohms ±5%, 1/4 w.
R2	3R152P511J	Composition: 510 ohms ±5%, 1/4 w.
R3L	3R77P100J	Composition: 10 ohms ±5%, 1/2 w.
R3H	7147161P13	Composition: 4.7 ohms ±5%, 1/2 w.
R4L	3R77P100J	Composition: 10 ohms ±5%, 1/2 w.
R4H	7147161P13	Composition: 4.7 ohms ±5%, 1/2 w.
R5 and R6	3R77P390J	Composition: 30 ohms ±5%, 1/2 w.
R7	3R77P100J	Composition: 10 ohms ±5%, 1/2 w.
R8	3R78P182J	Composition: 1800 ohms ±5%, 1 w.
R9	5490203P16	Composition: 2.7 ohms ±5%, 1 w.
R10	3R78P182J	Composition: 1800 ohms ±5%, 1 w.
R11L	7147161P34	Composition: 3.9 ohms ±5%, 1/2 w.
R11H	7147161P22	Composition: 1.2 ohms ±5%, 1/2 w.
R12L	7147161P34	Composition: 3.9 ohms ±5%, 1/2 w.
R12H	7147161P22	Composition: 1.2 ohms ±5%, 1/2 w.
R13L	7147161P34	Composition: 3.9 ohms ±5%, 1/2 w.
R13H	7147161P22	Composition: 1.2 ohms ±5%, 1/2 w.
R14L	7147161P34	Composition: 3.9 ohms ±5%, 1/2 w.
R14H	7147161P22	Composition: 1.2 ohms ±5%, 1/2 w.
R15 and R16	3R77P390J	Composition: 30 ohms ±5%, 1/2 w.
R17	3R78P100K	Composition: 10 ohms ±10%, 1 w.
R18	3R152P274J	Composition: 0.27 megohm ±5%, 1/4 w.
R19	19A116556P102	Variable, cermet: 5000 ohms ±20%, .5 w; sim to CTS Series 360.
R20	19C320212P2	Shunt resistor.
----- CABLES -----		
W1 and W2		(Part of printed board 19D423668P1).
----- CAPACITORS -----		
C201	19A115680P4	Electrolytic: 50 µf +150% -10%, 25 VDCW; sim to Mallory Type TTX.
C202	19A116080P101	Polyester: 0.01 pf ±10%, 50 VDCW.
----- DIODES AND RECTIFIERS -----		
CR201	19A116783P1	Silicon.
CR202	4037822P1	Silicon.
----- TERMINALS -----		
E201	7143206P1	Terminal standoff.
----- FILTERS -----		
FL202 thru FL204		FILTER BOARD FL202 19C321957G2 30-36 MHz (L) FL203 19C321957G3 36-42 MHz (M) FL204 19C321957G4 42-50 MHz (H)
----- CAPACITORS -----		
CL1	19A116656P68J1	Ceramic disc: 68 pf ±5%, 500 VDCW, temp coef -150 PPM.
CLM	19A116656P56J1	Ceramic disc: 56 pf ±5%, 500 VDCW, temp coef -150 PPM.

SYMBOL	GE PART NO.	DESCRIPTION
C1H	19A116656P51J1	Ceramic disc: 51 pf ±5%, 500 VDCW, temp coef -150 PPM.
C2L	19A116679P91J	Mica: 91 pf ±5%, 250 VDCW.
C2M	19A116679P68J	Mica: 68 pf ±5%, 250 VDCW.
C2H	19A116679P56J	Mica: 56 pf ±5%, 250 VDCW.
C3L	19A116656P13J1	Ceramic disc: 13 pf ±5%, 500 VDCW, temp coef -150 PPM.
C3M	19A116656P12J1	Ceramic disc: 12 pf ±5%, 500 VDCW, temp coef -150 PPM.
C3H	19A116656P10J1	Ceramic disc: 10 pf ±0.5 pf, 500 VDCW, temp coef -150 PPM.
C4L	19A116679P110J	Mica: 110 pf ±5%, 250 VDCW.
C4M	19A116679P91J	Mica: 91 pf ±5%, 250 VDCW.
C4H	19A116679P82J	Mica: 82 pf ±5%, 250 VDCW.
C5L	19A116679P100J	Mica: 100 pf ±5%, 250 VDCW.
C5M	19A116679P82J	Mica: 82 pf ±5%, 250 VDCW.
C5H	19A116679P75J	Mica: 75 pf ±5%, 250 VDCW.
C6L	19A116656P68J1	Ceramic disc: 68 pf ±5%, 500 VDCW, temp coef -150 PPM.
C6M	19A116656P56J1	Ceramic disc: 56 pf ±5%, 500 VDCW, temp coef -150 PPM.
C6H	19A116656P51J1	Ceramic disc: 51 pf ±5%, 500 VDCW, temp coef -150 PPM.
C7 and C8	19A116655P19	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
J1	19A116656P55	Connector, printed wiring: 3 contacts; sim to Molex 09-65-1031.
J2	19A130924G1	Connector, receptacle: coaxial, jack type; sim to Cinch 14H11613.
----- JACKS AND RECEPTACLES -----		
K1	19B209558P1	Hermetic sealed: 180 to 330 ohms coil res, 2 form C contacts, 8.0 to 16.3 VDC nominal; sim to GE 3SAVL760A2.
----- INDUCTORS -----		
L1L	19A129360P8	Coil.
L1M	19A129360P4	Coil.
L1H	19A129360P1	Coil.
L2L	19A129360P7	Coil.
L2M	19A129360P3	Coil.
L2H	19A129360P2	Coil.
L3L	19A129360P8	Coil.
L3M	19A129360P5	Coil.
L3H	19A129360P3	Coil.
L4L	19A129360P6	Coil.
L4M	19A129360P4	Coil.
L4H	19A129360P1	Coil.
----- CABLES -----		
W1		(Part of printed board 19C321934P1).
W3 thru W5		(Part of printed board 19C321934P1).
W6	19A136512P1	Antenna strap.
----- FILTERS -----		
FL210		FILTER ASSEMBLY 19A136680G1
----- CAPACITORS -----		
C1 thru C5	5493392P7	Ceramic, feed-thru: 1000 pf +100% -0%, 500 VDCW; sim to Allen-Bradley Type FASC.

SYMBOL	GE PART NO.	DESCRIPTION
G11 thru G14	7135118P2	----- TERMINALS ----- Terminal, solderless.
J1	19A115884P12	----- JACKS AND RECEPTACLES ----- Connector. Includes: Shell.
	19A115884P7	Contacts, male: wire size 14-20; sim to AMP 60528-1. (Quantity 2).
	19A115884P9	Contacts, male: wire size 22-30; sim to AMP 60910-1. (Quantity 5).
J3	4029493P1	Connector, receptacle: coaxial; sim to Amphenol 83-798.
L210 thru L213	19A126140P3	----- INDUCTORS ----- Core, toroidal, ferrite: sim to Stackpole 88-31959.
P201		----- PLUGS ----- (Part of W201).
----- TRANSISTORS -----		
Q201	19A116965P1	Silicon, NPN.
Q202	19A134104P1	Silicon, NPN.
Q215	19A116742P1	Silicon, NPN.
----- CABLES -----		
W201	5491689P91	Cable, RF: approx 7-1/2 inches long.
W202	19A136528G1	Cable: approx 4 inches long.
W203	19B227302P1	Jumper.
----- MISCELLANEOUS -----		
	19A136518P1	Shield. (Used with FL202-FL204).
	19B219555P1	Cover. (Used with FL202-FL204).
	19C321982P1	Insulator. (Located under A202, A204).
	4033714P11	Solderless terminal: sim to Zierick 349. (Used with FL202-FL204).
	19B209209P304	Tap screw, Phillips Pozidriv®: No. 6-32 x 1/4. (Secures FL210).
	19B201074P204	Tap screw, Phillips POZIDRIV®: No. 4-40 x 1/4. (Secures J3).
	5492178P2	Washer, spring tension: sim to Wallace Barnes 375-20. (Used with Q201, Q202).
	N207P15C6	Nut, hex: No. 8-32. (Secures Q201).
	X207P16C6	Nut, hex: No. 10-32. (Secures Q202).
	19A116023P1	Insulator, plate. Dupont No. 300 Kapton H. (Used with Q215).
	19A134016P1	Insulator, bushing. (Used with Q215).
	7878243P11	Nut, hex: No. 8-32. (Secures stud that mates with wing nut securing radio to case).
	NP280071	Nameplate. (CAUTION).

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