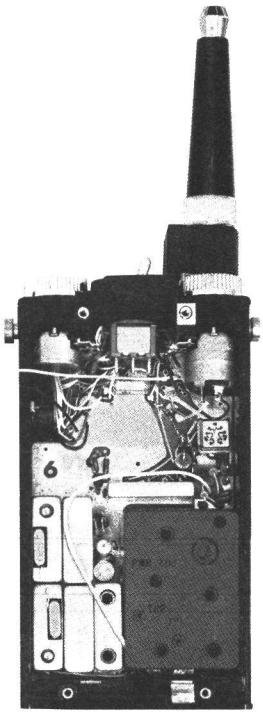
MOBILE RADIO

MASTR® Personal Series

PROGRESS LINE

PE MODELS

SYSTEMS BOARD AND CASE ASSEMBLY 19D423294G1



SYSTEM BOARD AND CASE ASSEMBLY 19D423294G1

SPECIFICATIONS *

MODEL NUMBERS

19D423294G1

CONTROLS:

66-88 MHz

Volume ON-OFF Switch

Squelch Control

Two-Frequency Selector Switch
PTT Switch
Tone Option Switch

Collapsible Antenna

*These specifications are intended primarily for the use of the serviceman. Refer to the appropriate Specification Sheet for the complete specifications.

GENERAL ELECTRIC

TABLE OF CONTENTS

ILLUSTRATIONS

WARNING

No one should be permitted to handle any portion of the equipment that is supplied with high voltage; or to connect any external apparatus to the units while the units are supplied with power. KEEP AWAY FROM LIVE CIRCUITS.

DESCRIPTION

System Board A701 provides system interconnections between the transmitter, receiver, tone options and operating controls in the 66-88 MHz, two-frequency PE Models. The system board contains transmitter oscillator modules A5 and A6, audio amplifier module A1, 5.4 Volt regulator module A2, compensator module A3, modulator module A4, system relay K1 and audio and DC switching circuitry.

Jacks J702 and J703 are connected to the system board and provide contacts for an external antenna, speaker, and microphone. J702 provides contacts for the external antenna and speaker, and J703 provides contacts for an external microphone. Placing the radio into the vehicular charger automatically connects the jack contacts to the external circuitry. The radio is also connected to the external antenna when placed in the desk charger.

CIRCUIT ANALYSIS

AUDIO SWITCHING

Audio switching for local speaker/ microphone LS1 is controlled by a diode as shown in Figure 1.

Pressing PTT switch S701 forward biases diode CR5, permitting audio from LS1 to be applied to transmitter audio module A1.

Keying the external microphone directly applies audio to the audio module.

DC SWITCHING

Operation of system relay K1 is controlled by diode CR2 (See Figure 2). Pressing S701 forward biases CR2, completing the relay path to ground. This energizes relay K1 and switches the battery voltage to the transmitter audio and regulator modules. Energizing K1 also connects the transmitter output to the Antenna Loading Coil.

Keying the external microphone also energizes the relay.

PTT SWITCH

Solid state PTT switch S701 forward biases diode CR2 to energize relay K1 and key the radio. When S701 is pressed PNP transistor Q1 conducts. Transistor Q1 conducting applies a positive voltage to the base of NPN transistor Q2, causing Q2 to also conduct. Transistor Q2 conducting , provides a conduction path to ground for diode CR2. Relay K1 is energize and the radio is keyed.

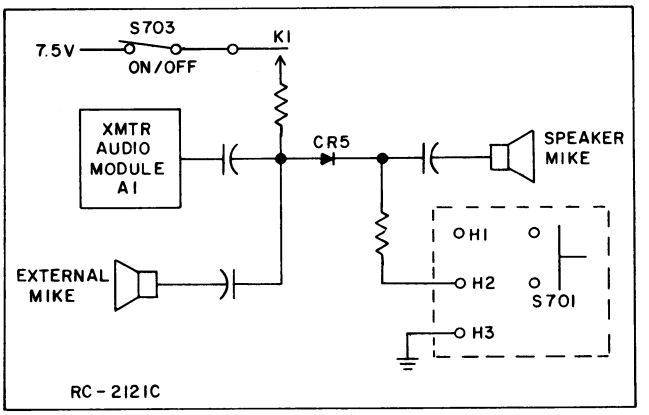


Figure 1 - Audio Switching Circuit

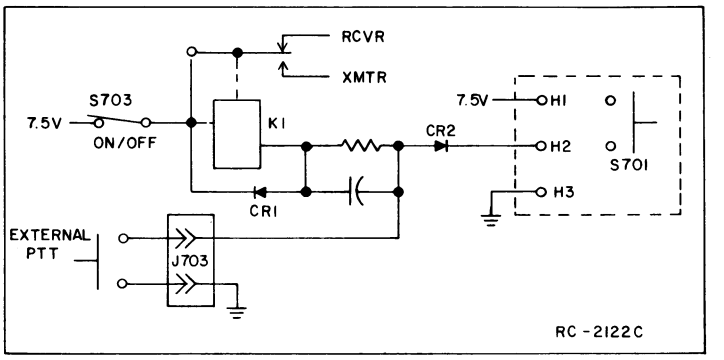
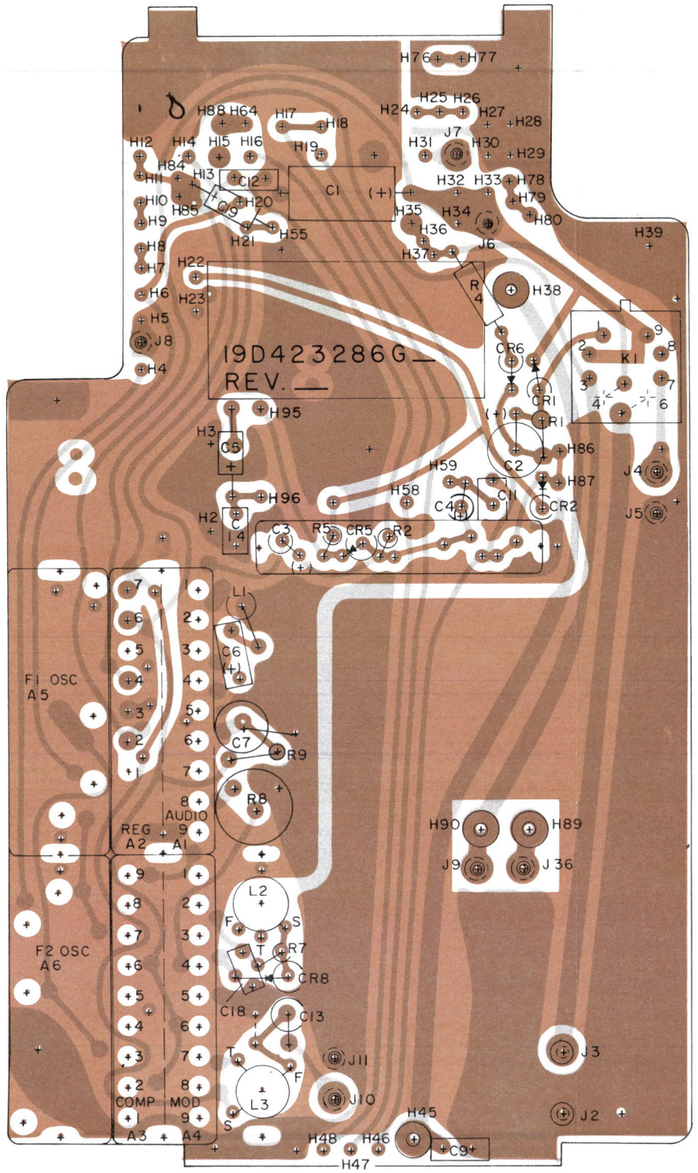
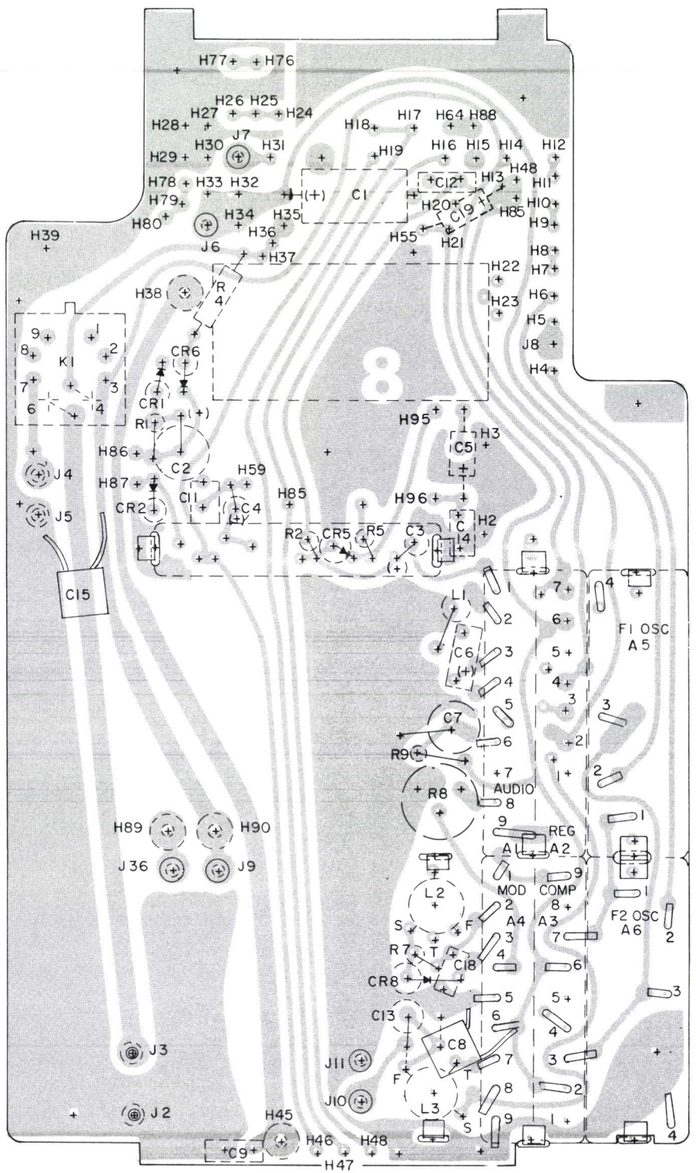


Figure 2 - DC Switching Circuit



CPNT. SIDE

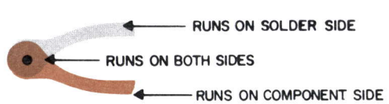
(19D424124, Rev. 4)

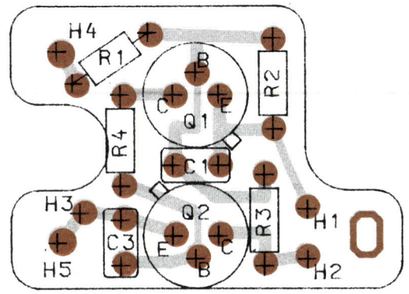


SOLDER SIDE

(19D416440, Sh. 1, Rev. 8)
(19D416440, Sh. 2, Rev. 8)

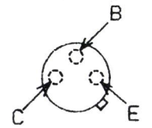
(19D416440, Sh. 2, Rev. 8)





(19B233083, Rev, 0)
(19B232585, Sh. 1, Rev. 0)
(19B232585, Sh. 2, Rev. 0)

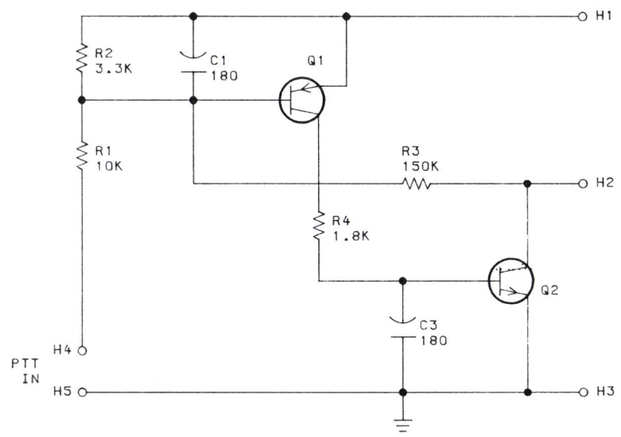
LEAD IDENTIFICATION
FOR Q1 AND Q2



OR

IN-LINE TRIANGULAR
TOP VIEW

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



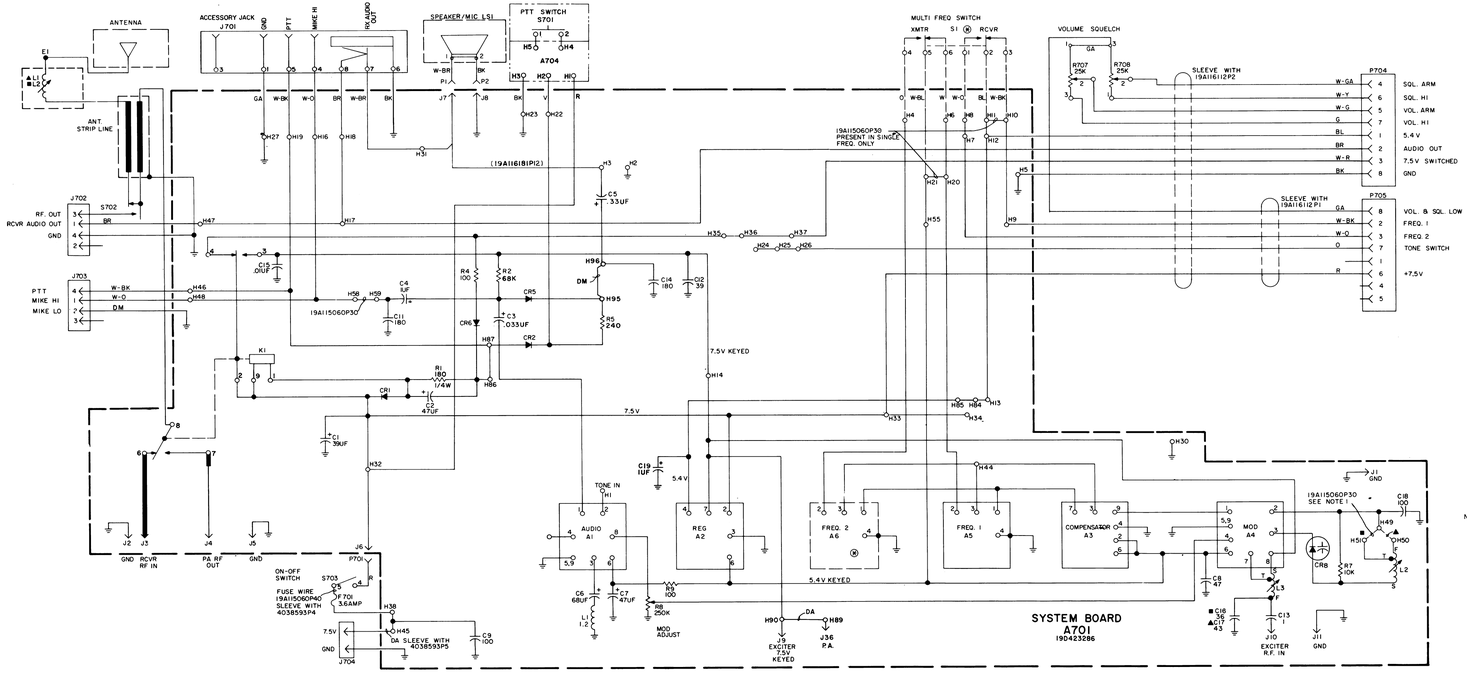
ALL RESISTORS ARE 1/8 WATT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K-1000 OHMS OR MEG-1,000,000 OHMS. CAPACITOR VALUES IN PICOFARADS (EQUAL TO MICROMICROFARADS) UNLESS FOLLOWED BY UF-MICROFARADS. INDUCTANCE VALUES IN MICROHENRYS UNLESS FOLLOWED BY MH-MILLIHENRYS OR H-HENRYS.

(19B232770, Rev. 2)

OUTLINE DIAGRAM

66—88 MHz SYSTEM BOARD

2 Issue 2



SEE APPLICABLE PRODUCTION CHANGE SHEETS IN INSTRUCTION BOOK SECTION DEALING WITH THIS UNIT, FOR DESCRIPTION OF CHANGES UNDER EACH REVISION LETTER.

THIS ELEM DIAG APPLIES TO

MODEL NO	REV LETTER
PL19D423286G1	E
PL19D423294G1	B

ALL RESISTORS ARE 1/8 WATT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K=1000 OHMS OR MEG=1,000,000 OHMS. CAPACITOR VALUES IN MICROFARADS (EQUAL TO MICROMICROFARADS) UNLESS FOLLOWED BY UF=MICROFARADS. INDUCTANCE VALUES IN MICROHENRYS UNLESS FOLLOWED BY MH=MILLIHENRYS OR H=HENRYS.

IN ORDER TO RETAIN RATED EQUIPMENT PERFORMANCE, REPLACEMENT OF ANY SERVICE PART SHOULD BE MADE ONLY WITH A COMPONENT HAVING THE SPECIFICATIONS SHOWN ON THE PARTS LIST FOR THAT PART.

NOTES:

1. ▲USED IN LO SPLIT 66-75 MHz
   ■USED IN MID SPLIT 75-87 MHz
2. DA - #22 AWG
3. @ THESE ITEMS ARE PART OF SWITCH KIT 19A127828G1
4. ALL WIRES TO BE T28 UNLESS OTHERWISE SPECIFIED.
5. GROUND MAY BE MADE THROUGH CAN ONLY ON SICOM'S.

(19B622175, Rev. 11)

SCHEMATIC DIAGRAM

66—88 MHz SYSTEM BOARD

Issue 2

PARTS LIST

LBI30187A

SYSTEM BOARD/CASE ASSEMBLY
19D423294G1
AND
ASSOCIATED ASSEMBLIES

SYMBOL	GE PART NO.	DESCRIPTION
A701		SYSTEM BOARD 19D423286G1
A1	19C320062G1	Transmitter Audio Module.
A2*	19C328070G1	Regulator Module. In REV D & earlier:
	19C311905G2	Regulator Module.
A3	19C320060G1	Oscillator Compensator Module.
A4	19C320084G1	Modulator Module. NOTE: When reordering A5 and A6, give GE Part Number and exact crystal frequency. Crystal Freq = Operating Freq.
A5 and A6	4E627A13	Transmitter Oscillator.
		- - - - - - - - - - CAPACITORS - - - - - - - - -
C1	5491674P30	Tantalum: 39 µF ±20%, 10 VDCW; sim to Sprague Type 162D.
C2	5491674P42	Tantalum: 47 µF ±20%, 6 VDCW; sim to Sprague Type 162D.
C3*	5491674P51	Tantalum: .033 µF ±10%, 35 VDCW; sim to Sprague Type 162D. In REV B:
	5491674P49	Tantalum: 0.068 µF ±10%, 20 VDCW; sim to Sprague Type 162D. In REV A & earlier:
	5491674P1	Tantalum: 1.0 µF +40-20%, 10 VDCW; sim to Sprague Type 162D.
C4	5491674P1	Tantalum: 1.0 µF +40-20%, 10 VDCW; sim to Sprague Type 162D.
C5*	5491674P52	Tantalum: 0.33 µF ±10%, 20 VDCW; sim to Sprague Type 162D. In REV B:
	5491674P48	Tantalum: 0.68 µF ±10%, 10 VDCW; sim to Sprague Type 162D. In REV A & earlier:
	19A116264P2	Ceramic: 0.022 µF ±20%, 50 VDCW.
C6	19C307102P19	Tantalum: 68 µF ±20%, 4 VDCW.
C7	5491674P42	Tantalum: 47 µF ±20%, 6 VDCW; sim to Sprague Type 162D.
C8	19A116114P753	Ceramic: 47 pF ±5%, 100 VDCW; temp coef -750 PPM.
C9	19A116114P765	Ceramic: 100 pF ±5%, 100 VDCW; temp coef -750 PPM.
C11	19A116114P10073	Ceramic: 180 pF ±10%, 100 VDCW; temp coef -3300 PPM.
C12	19A116114P2049	Ceramic: 39 pF ±10%, 100 VDCW; temp coef -80 PPM.
C13	5491601P120	Phenolic: 1.0 pF ±5%, 500 VDCW.
C14	19A116114P10073	Ceramic: 180 pF ±10%, 100 VDCW; temp coef -3300 PPM.
C15	19A116192P1	Ceramic: 0.01 µF ±20%, 50 VDCW; sim to Erie 8121 SPECIAL.
C18	19A116114P8065	Ceramic: 100 pF ±5%, 100 VDCW; temp coef -1500 PPM.
C19*	5491674P1	Tantalum: 1.0 µF +40-20%, 10 VDCW; sim to Sprague Type 162D. Added by REV E.

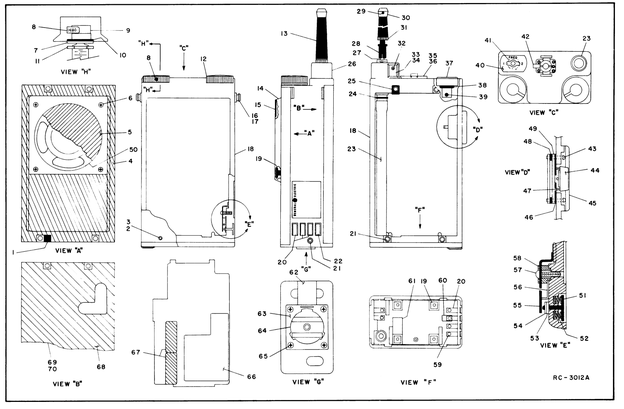
*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
CR2	5494922P1	Silicon; sim to Type 1N456.
CR5	5494922P1	Silicon; sim to Type 1N456.
CR6	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
CR8	5495769P9	Diode, silicon.
		- - - - - - - - JACKS AND RECEPTACLES - - - - - -
J1 thru J5	19A116368P2	Contact, electrical: sim to Concord 10-891-1.
J6 thru J8	19A116368P2	Contact, electrical: sim to Cambion 3233-01-03.
J9 thru J11	19A116368P4	Contact, electrical: sim to Concord 10-891-1.
J33	19A116368P4	Contact, electrical: sim to Concord 10-891-1.
		- - - - - - - - - - RELAYS - - - - - - - - - -
K1	19B209562P2	Hermetic sealed: between 45-100 ohms 2 form C contacts, 5.0 VDC nominal, 1.0 w max operating; sim to GE 3SC5100ZA2.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L1*	19B209420P114	Coil, RF, 1.20 µh ±10%, 0.18 ohms DC res max; sim to Jeffers 4434-1K. In REV C & earlier:
	19B209420P125	Coil, RF, 10.0 µh ±10%, 3.10 ohms DC res max; sim to Jeffers 4446-4K.
L2	19A127788G1	Coil. Includes:
	19B209436P1	Tuning slug.
L3	19B216910G1	Coil. Includes:
	19B209436P1	Tuning slug.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R152P181J	Composition: 180 ohms ±5%, 1/4 w.
R2*	3R151P683J	Composition: 68K ohms ±5%, 1/8 w. In REV A & earlier:
	3R151P913J	Composition: 91K ohms ±5%, 1/8 w.
R4	3R151P101K	Composition: 100 ohms ±10%, 1/8 w.
R5*	3R151P241J	Composition: 240 ohms ±5%, 1/8 w. In REV A & earlier:
	3R151P103J	Composition: 10K ohms ±5%, 1/8 w.
R6*	3R151P222J	Composition: 2.2K ohms ±5%, 1/8 w. Deleted by REV B.
R7	3R151P103J	Composition: 10K ohms ±5%, 1/8 w.
R8	19A116412P4	Variable, cermet: 2.5K ohms ±10%; sim to Helipot Model 62 PR250K.
R9	3R151P101K	Composition: 100 ohms ±10%, 1/8 w.
A704*		PUSH TO TALK SWITCH BOARD 19B232586G1 (Added by REV B)
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1	19A116114P10073	Ceramic: 180 pF ±10%, 100 VDCW; temp coef -3300 PPM.
C3	19A116114P10073	Ceramic: 180 pF ±10%, 100 VDCW; temp coef -3300 PPM.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A129187P1	Silicon, PNP.
Q2	19A116201P3	Silicon, NPN.

SYMBOL	GE PART NO.	DESCRIPTION
R1	3R151P103J	Composition: 10K ohms ±5%, 1/8 w.
R2	3R151P332J	Composition: 3.3K ohms ±5%, 1/8 w.
R3	3R151P154J	Composition: 150K ohms ±5%, 1/8 w.
R4	3R151P182J	Composition: 1.8K ohms ±5%, 1/8 w.
R5	3R151P682J	Composition: 6.8K ohms ±5%, 1/8 w.
R6	3R151P182J	Composition: 1.8K ohms ±5%, 1/8 w.
R7	3R151P102J	Composition: 1K ohms ±5%, 1/8 w.
R8	3R151P154J	Composition: 150K ohms ±5%, 1/8 w.
R9	3R151P122J	Composition: 1.2K ohms ±5%, 1/8 w.
		- - - - - - - - - - FUSES - - - - - - - - - -
F701	19A127884G1	Fuse Kit.
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J101	19B216594G2	Connector, female: 6 contacts. See Mechanical Parts RC3012 items 20, 22.
J702		See Mechanical Parts RC3012 items 20, 59, 60.
J703		See Mechanical Parts RC3012 items 62-65.
J704		
		- - - - - - - - - - PLUGS - - - - - - - - - -
P701	19A115834P4	Contact, electrical: sim to AMP 2-332070-9.
P704 and P705	19A127569P1	Plug: 8 contacts.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R707	19A116227P1	Resistor/switch: includes Resistor, variable, 25K ohms ±20%, 1/8 w, (Includes S703), SPST, 3 amp at 125 VAC; sim to Mallory Type RDC.
R708	19A116227P2	Variable, carbon film: 25K ohms ±20%, 1/8 w.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S701		See Mechanical Parts RC3012 items 43-49.
S702		See Mechanical Parts RC3012 items 51-58.
S703		(Part of R707).
		ASSOCIATED ASSEMBLIES
		FRONT COVER ASSEMBLY 19C317416G1
		- - - - - - - - - - LOUDSPEAKERS - - - - - - - - - -
LS1	19A116090P1	Permanent magnet: 2.00 inch, 8 ohms ±10% voice coil imp, 450 Hz ±112 Hz resonant; freq range 400 to 3000 Hz.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P1 and P2	19A115834P4	Contact, electrical: sim to AMP 2-332070-9.
		MULTI-FREQUENCY KIT 19A127828G1
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1	19A127824G1	Toggle: DPDT, 100 µa at 5 VDC, 5 amps at 29 VDC, 5 amps at 115 VAC; sim to Arrow-Hart & Hegeman 7S-d.
		HI/LOW SPLIT MODIFICATION KIT 19A130904G1 66-76 MHz 19A130904G2 75-88 MHz
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C16	19A116114P2048	Ceramic: 36 pF ±5%, 100 VDCW; temp coef -80 PPM.
C17	19A116114P2051	Ceramic: 43 pF ±5%, 100 VDCW; temp coef -80 PPM.

SYMBOL	GE PART NO.	DESCRIPTION
		ANTENNA LOADING COIL KIT 19A130904G1 LOW SPLIT 19A130904G2 HIGH SP.LIT
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L1	19B227191G1	Coil. Includes:
	19B209436P1	Tuning slug.
L2	19B227191G2	Coil. Includes:
	19B209436P1	Tuning slug.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	19B219768G1	Antenna Assembly. (Includes items 27-31).
	19041352D64	Battery, rechargeable. Nickel Cadmium.
	19A127884G1	Fuse Kit.
	4035B3124	Alignment Tool. Fork tip.
	19B219079G1	Alignment Tool. Allen tip.
	19B219442P1	Antenna Strip Line.
		MECHANICAL PARTS (SEE RC3012)
1	19A130397P1	Ground Strap. (Used on front and rear covers).
2	3404P8P	Lockwasher, internal tooth: No. 2. (Not Used).
3	19A134425P1	Machine, screw, hex head: steel, No. 2-56 x 3/16.
4	19C317394P3	Gasket.
5	19B204527P2	Diaphragm: No. 2 inches dia.
6	3681P5003C6	Screw, phillips head: No. 2-56 x 1/8.
7	4037064P18	Washer, non-metallic.
8	NT0BP703C6	Set screw: No. 3-48 x 3/16.
9	19A137254P1	Insert, tapped.
10	4035630P1	Washer: teflon.
11	19A127319P1	Nut: No. 1/4-32.
12	19B227784G1	Knob assembly. (Includes items 8 & 9).
13	19B219768G1	Antenna assembly. (Includes items 27-31).
14	19D413531P2	Grille.
15	NP27029G9P2	Nameplate (GE monogram).
16	19A127802P1	Rivet.
17	19A116773P805	Tap screw, Phillips POZIDRIV®: No. 4-24 x 5/16.
18	19D413542G13	Case assembly. (Includes items 20, 21, 25, 43-50, 59).
19	19B216858P1	Insert.
20	19A127753P1	Contact (Part of J702 and J703).
21	19A134544P1	Insert, screw thread: No. 2-56; sim to IN-K 860256.
22	19B216862P2	Contact (Part of J702).
23	19A127779G4	Antenna tube and insert. (Not Used).
24	19A116834P1	Solderless terminal.
25	19B216875P1	Support.
26	19A130904G1	Loading Coil Assembly, Low-Split. (Includes items 32-34).
	19A130904G2	Loading Coil Assembly, Mid-Split. (Includes items 32-34).
27	19C320383P3	Antenna rod (Part of item 13).
28	19C320353P1	Bushing (Part of item 13).
29	NT0FY03C6	Set screw: No. 3-48 x 3/16. (Part of item 13).
30	19A129649P1	Antenna Cap (Part of item 13).
31	19B219770G1	Nut, spacer: thd. size No. 7/16 x 40. (Part of item 9).
32	19A116869P1	Tap screw, phillips: No. 2-32 x 1/4.
33	19C320359P1	Cover.
34	19A129559P1	Gasket.

SYMBOL	GE PART NO.	DESCRIPTION
35	19C317050P1	Protective Cover.
36	19A129390P1	Disc. (Located inside item 28).
37	19C317383P1	Dummy plug.
38	19A115983P3	Seal, "O" ring: sim to Parker Seal 2-10.
39	N509P606C	Dowel pin: No. 1/16 x 3/8.
40	19B216920G5	Decorative cap.
41	19C320721P1	Boot, moisture seal.
42	19B219540P1	Support.
43	N419P006	Screw, slotted, steel: No. 0-80 x 3/8. (Part of ST01).
44	19C328416G1	Button assembly. (Part of ST01).
45	19C328407P1	Collar. (Part of ST01).
46	19A137621P1	Plate. (Part of ST01).
47	19A137620P1	Spring. (Part of ST01).
48	N207P1C6	Hex nut. (Part of ST01).
49	19B209643P2	Switch, push. (Part of ST01).
50	19A130993P1	Gasket.
51	19B216882P1	Contact (Part of ST02).
52	19A127755P1	Spring (Part of ST02).
53	19A127754P1	Gasket (Part of ST02).
54	N910P6C6	Retaining ring. (Part of ST02).
55	19B216863P1	Spring contact. (Part of ST02).
56	19B216864P1	Contact (Part of ST02).
57	N647P5004C	Cap screw: No. 2-56 x 1/4. (Part of ST02).
58	19B216865P1	Insulator (Part of ST02).
59	R330P605P22	Eyelet, brass: 1/16 x 5/32.
60	19A127760P1	Contact.
61	19A127762P1	Strap.
62	19B216891G1	Spring assembly. (Part of J704).
63	19B413467P1	Fastener (Part of J704).
64	19A130868P1	Insulator.
65	19A115794P3	Flat head screw: steel, 2-56 x 5/16. (Part of J704).
66	19B219443P1	Insulator.
67	19C314491P3	Can. (Used with A1-A4).
68	19C311394P5	Gasket.
69	19B216897G1	Rear Cover Assembly (without clip).
70	19B216897G2	Rear Cover Assembly (with clip).



REV. B - System Board 19D423286G1
To increase modulation level and improve frequency response.
Changed C3, C5, R2 and R5.
Deleted R8.

REV. C - To optimize frequency response.
Changed C3 and C5.

REV. D - To increase transmit audio sensitivity.
Changed L1.

REV. E - To incorporate a new 5.4V regulator.
Changed A2.
Added C19.

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 - System Board 19D423286G1

REV. A- Case Assembly 19D423294G1
INCORPORATED INTO INITIAL shipment.

REV. B - Case Assembly 19D423294G1
To improve reliability and change knobs.
Added PTT switch A704 and knobs.

Schematic was: