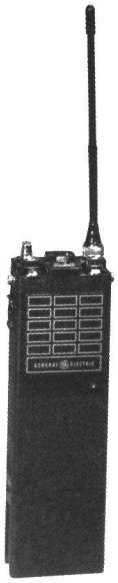
MOBILE RADIO

MASTR® Personal Series
PROGRESS LINE

MPE MODELS
SYSTEMS BOARD AND CASE ASSEMBLY 19D433412G4, G6 & G10 (8-FREQUENCY)



Maintenance Manual LBI31222

SYSTEM BOARD AND CASE ASSEMBLY 19D433412G4, G6 & G10

SPECIFICATIONS *

MODEL NUMBERS

19D433412G4	406-420 MHz
19D433412G6	450-512 MHz
19D433412G10	420-450 MHz

CONTROLS

Volume ON-OFF Switch
Squelch Control
Multi-Frequency Selector Switch
PTT Switch
Tone Option Switch
Collapsible Antenna
Accessory Jack

*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 A704/A706/A721 provides sytem interconnections for the transmitter, receiver, tone options and operating controls. In addition to the regulator and compensator modules, the system board also contains the transmitter audio and modulator modules, system relay 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 CIRCUITS

Audio from internal microphone MK1 is coupled through C3 and R3 directly to audio module A1.

An optional external microphone can be connected to external microphone jack J703.

Keying the external microphone permits audio to be applied directly to the transmitter audio module.

DC SWITCHING

Operation of system relay K1 is controlled by diode CR2 (see Figure 1).

Pressing S701 forward biases CR2, completing the relay path to ground. This energized relay K1, and switches the battery voltage to the transmitter audio and regulator modules. Energizing K1 also connects the transmitter output to the antenna.

PTT SWITCH (A719)

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 provides a conduction path to ground for diode CR2. Relay K1 is energized and the radio is keyed.

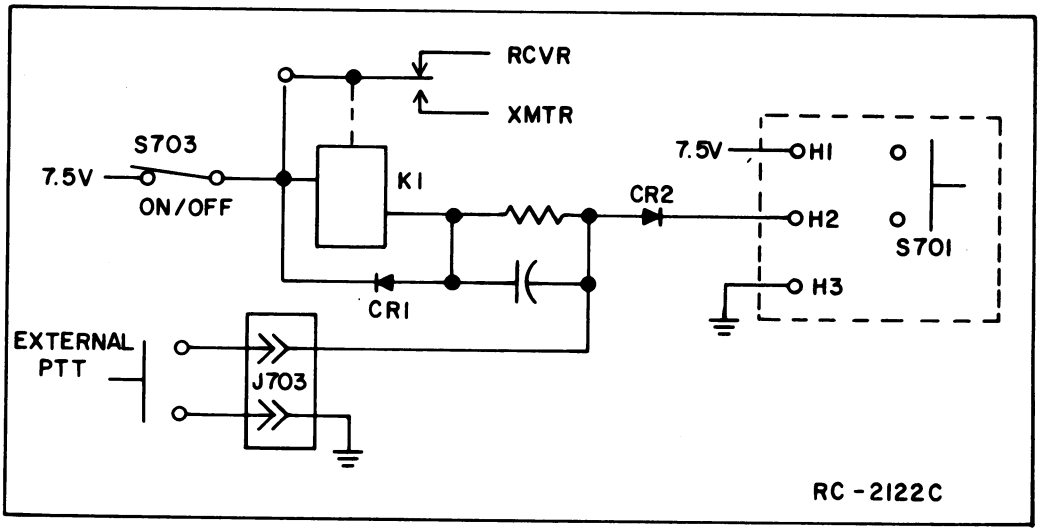


Figure 1 - DC Switching Circuit

REPEATING OSCILLATOR MODULES

Both the transmitter and receiver can be adapted to repeat the use of the same frequency without the use of additional Oscillator Modules. The Oscillator Module is replaced by a diode, allowing the frequency selector switch to have the same frequency on one or more switch positions even through only one Oscillator Module is used for each of the repeated channels. A typical diagram with repeated Oscillator Modules is shown in Figure 2.

Complete instructions for multi-frequency modifications are contained in the Multi-Frequency Modification Diagram (see Table of Contents).

For radios equipped with Channel Guard or Type 90 Encoders/Decoders, repeating Oscillator Modules also permits switching or disabling tones on the same RF frequency with the multi-frequency switch. Also, the tone and RF frequency can be changed at the same time.

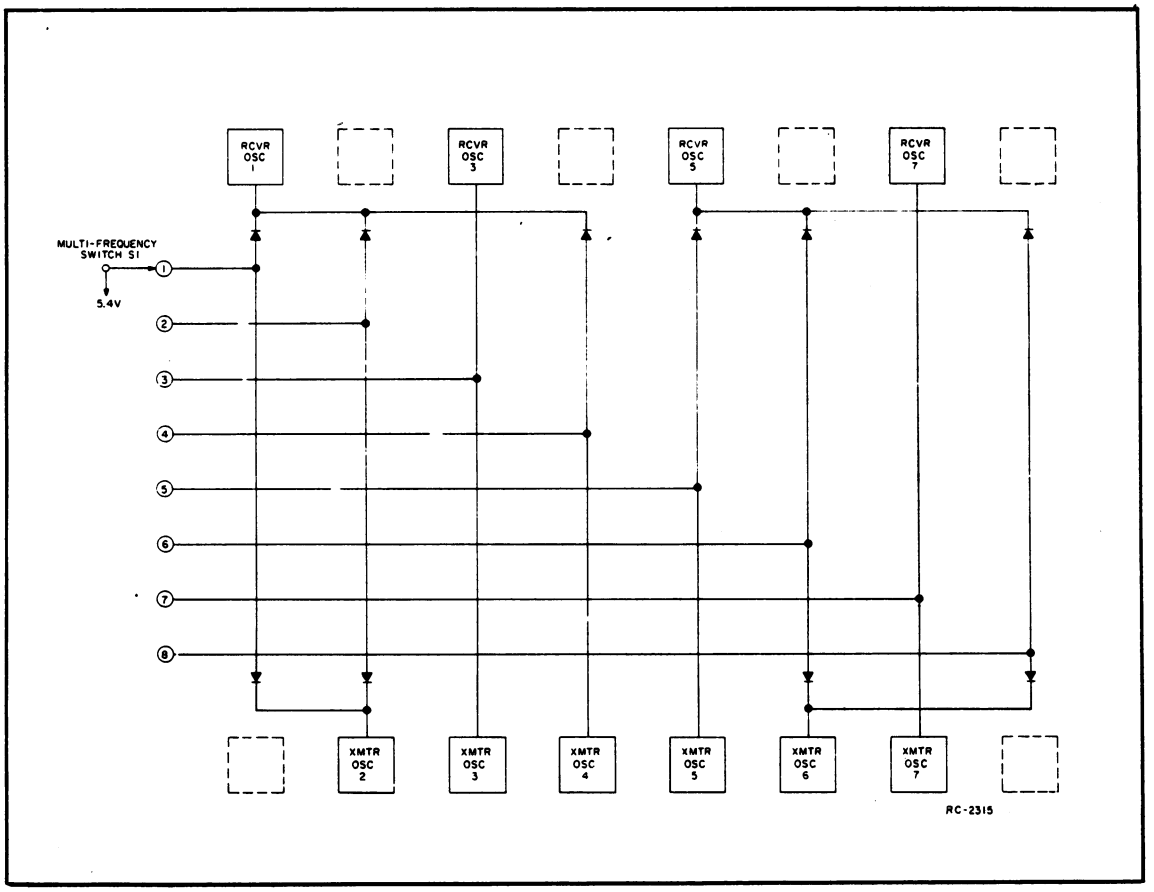


Figure 2 - Repeating Oscillator Modules

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WORLD HEADQUARTERS • LYNCHBURG, VIRGINIA 24502 U.S.A.

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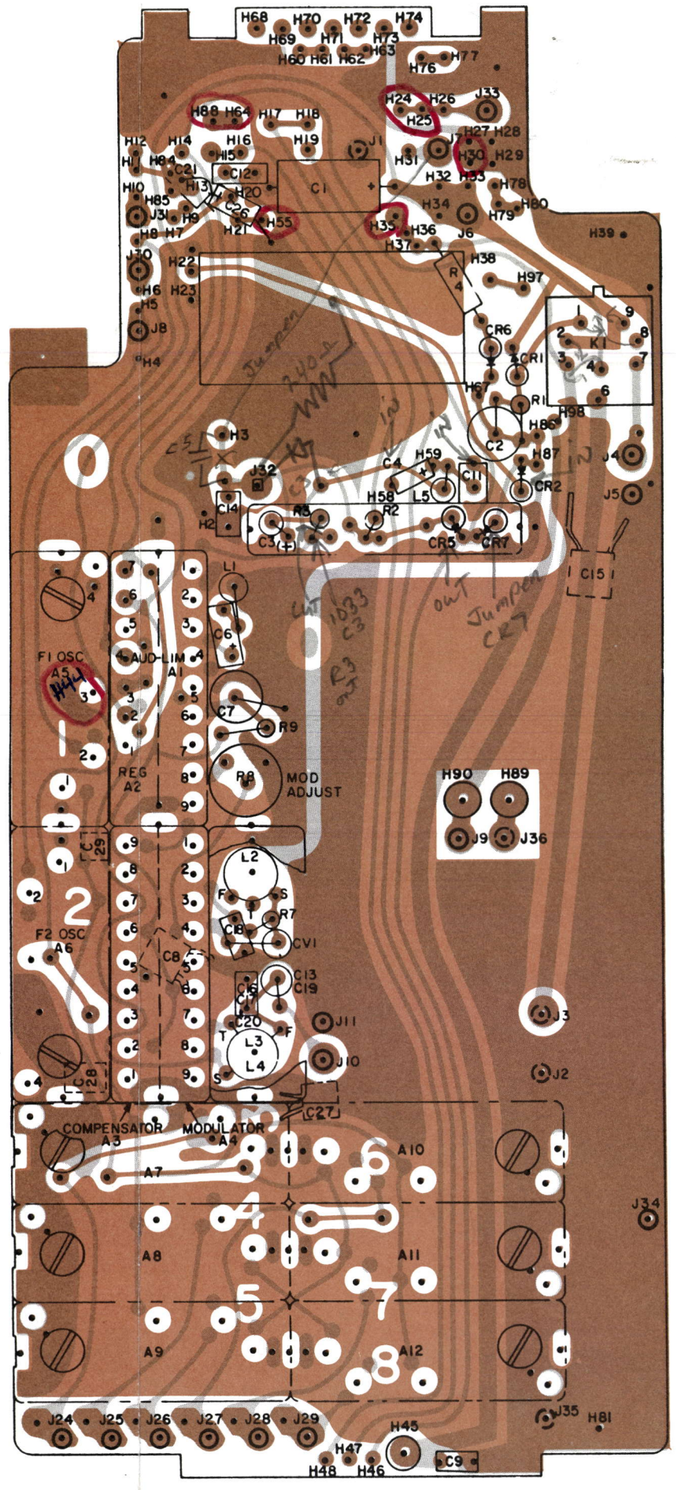
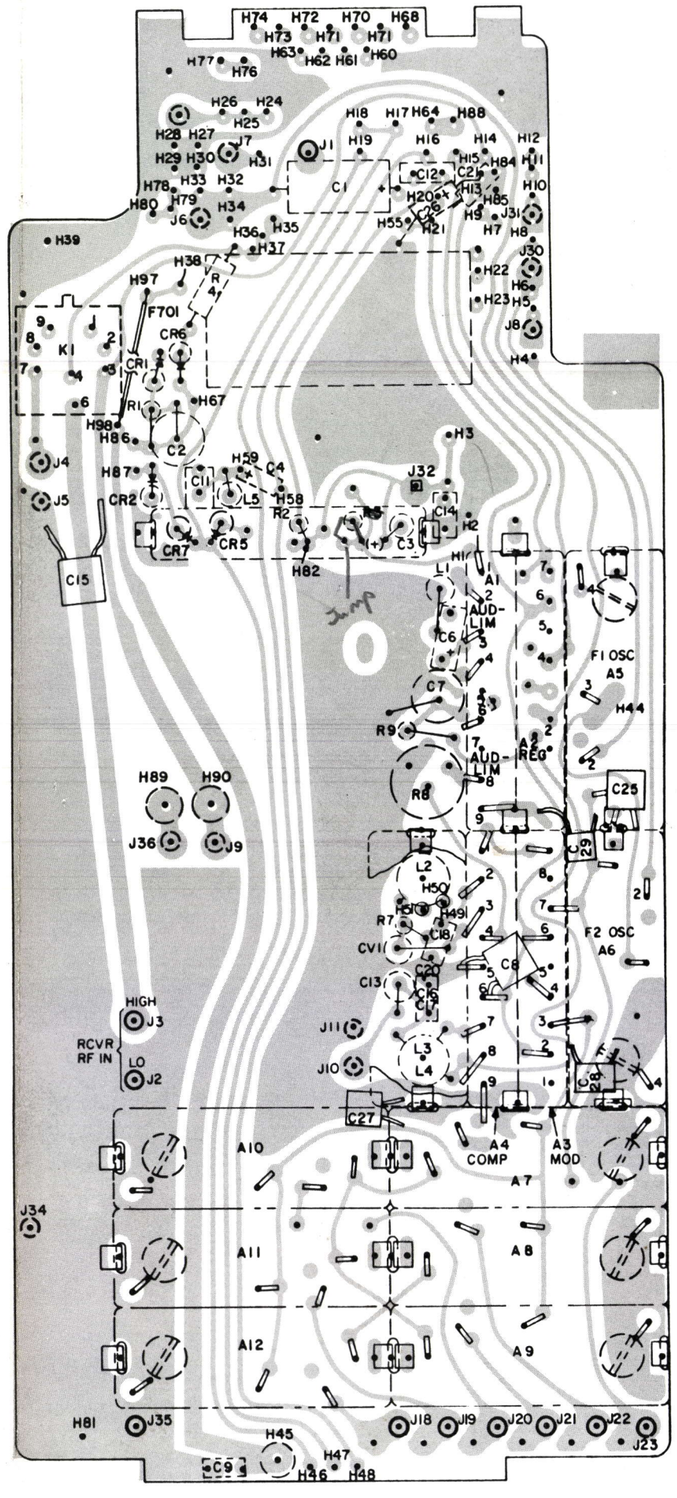
LBI31222

COMPONENT SIDE



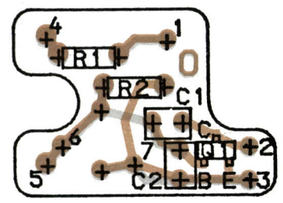
(19D433398, Sh. 1, Rev. 0)
(19D433398, Sh. 2, Rev. 0)

SOLDER SIDE



(19D433398, Sh. 2, Rev. 0)

A719



LEAD IDENTIFICATION FOR Q1

(19B233822, Rev. 0)
(19A143811, Sh. 1, Rev. 0)
(19A143811, Sh. 2, Rev. 0)

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.

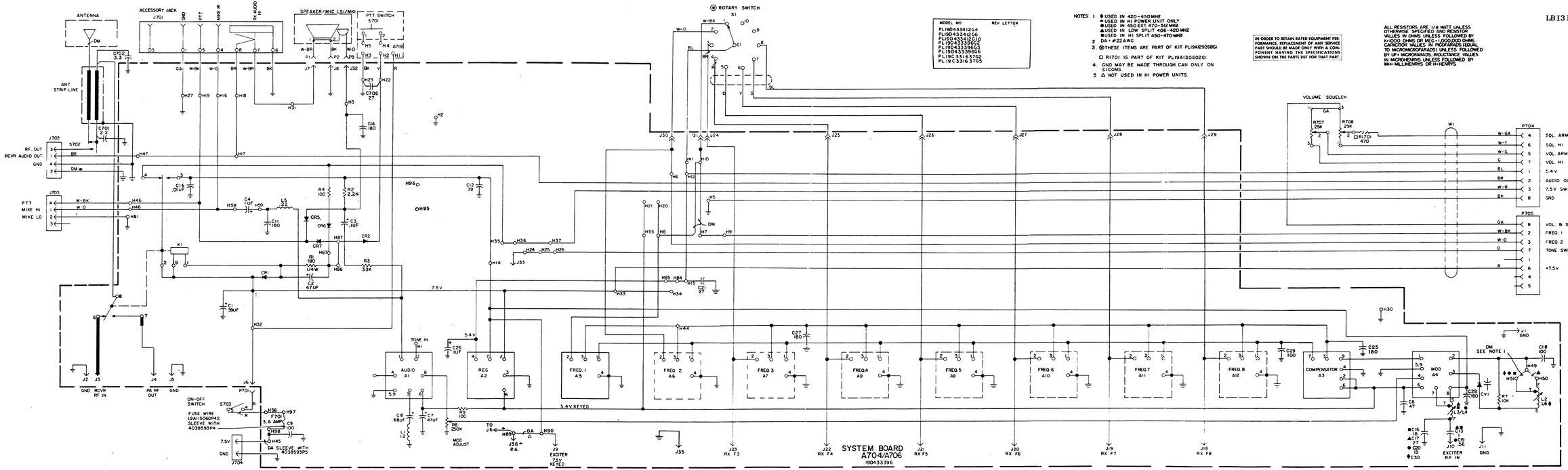
(19B233837, Rev. 1)

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

OUTLINE DIAGRAM

406—512 MHz SYSTEM BOARD

(19D433399, Rev. 0)



MODEL NO	REV LETTER
PLI904334I2G4	
PLI9D4334I2G6	
PLI9D4334I2G10	
PLI9D433396G2	
PLI9D433396G3	
PLI9D433396G6	
PLI9C331637G2	
PLI9C331637G5	

NOTES:
1. ◆ USED IN 420-450MHZ
   ■ USED IN HI POWER UNIT ONLY
   ● USED IN 450 EXT-470-512 MHZ
   ▲ USED IN LOW SPLIT-406-420 MHZ
   ■ USED IN HI SPLIT 450-470 MHZ
2. DA = #22 AWG
3. Ⓜ THESE ITEMS ARE PART OF KIT PLI9A129268G1
   □ R1701 IS PART OF KIT PLI9A130602G1
4. GND MAY BE MADE THROUGH CAN ONLY ON S1 COMS
5. △ NOT USED IN HI POWER UNITS.

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.

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.

SYSTEM BOARD
A704/A706
19D433396

(198622S00, Rev. 1)

SCHEMATIC DIAGRAM

406—512 MHz SYSTEM BOARD

Issue 1

PARTS LIST

SYSTEM BOARD/CASE ASSEMBLY
19D433412G2 450-470 MHz - 2 FREQUENCY
19D433412G4 450-470 MHz - 8 FREQUENCY
19D433412G6 470-512 MHz - 8 FREQ EXT
19D433412G7 470-512 MHz - 2 FREQ EXT
19D433412G9 406-450 MHz - 2 FREQUENCY
19D433412G10 406-450 MHz - 8 FREQUENCY
ISSUE 1

SYMBOL	GE PART NO.	DESCRIPTION
A702, A704, A706, A707, A720, A721		SYSTEM BOARD A702 19D433396G1 A704 19D433396G2 A706 19D433396G3 A707 19D433396G4 A720 19D433396G5 A721 19D433396G6
A1	19C320062G1	Transmitter Audio Module.
A2	19C328070G1	Regulator Module.
A3	19C320060G1	Oscillator Compensator Module.
A4	19C320084G1	Modulator Module.
		- - - - - - - - - - - CAPACITORS - - - - - - - - -
C1	5491674P30	Tantalum: 39 uF ±20%, 10 VDCW; sim to Sprague Type 162D.
C2	5491674P42	Tantalum: 47 uF ±20%, 6 VDCW; sim to Sprague Type 162D.
C3	5491674P43	Tantalum: 0.1 uF ±20%, 35 VDCW; sim to Sprague Type 162D.
C4	5491674P1	Tantalum: 1 uF +40-20%, 10 VDCW; sim to Sprague Type 162D.
C6	19C307102P19	Tantalum: 68 uF ±20%, 4 VDCW.
C7	5491674P42	Tantalum: 47 uF ±20%, 6 VDCW; sim to Sprague Type 162D.
C8	19A700226P53	Ceramic: 47 pF ±5%, 100 VDCW, temp coef -750 PPM.
C9	19A700226P65	Ceramic: 100 pF ±5%, 100 VDCW, temp coef -750 PPM.
C11	19A700229P73	Ceramic: 180 pF ±10%, 100 VDCW, temp coef -3300 PPM.
C12	19A700221P49	Ceramic: 39 pF ±10%, 100 VDCW, temp coef -80 PPM.
C13	19A700013P13	Phenolic: 1.00 pF ±5%, 500 VDCW.
C14	19A700229P73	Ceramic: 180 pF ±10%, 100 VDCW, temp coef -3300 PPM.
C15	19A116192P1	Ceramic: 0.01 uF ±20%, 50 VDCW; sim to Erie 8121 Special.
C18	19A700227P65	Ceramic: 100 pF ±5%, 100 VDCW, temp coef -1500 PPM.
C19	19A700013P10	Phenolic: 0.56 pF ±5%, 500 VDCW.
C20	19A700221P32	Ceramic: 13 pF ±5%, 100 VDCW, temp coef -80 PPM.
C21	19A700221P44	Ceramic: 27 pF ±5%, 100 VDCW, temp coef -80 PPM.
C25	19A700229P73	Ceramic: 180 pF ±10%, 100 VDCW, temp coef -3300 PPM.
C26	5491674P1	Tantalum: 1 uF +40-20%, 10 VDCW; sim to Sprague Type 162D.
C27 and C28	19A700229P73	Ceramic: 180 pF ±10%, 100 VDCW, temp coef -3300 PPM.
C29	19A700229P65	Ceramic: 100 pF ±5%, 100 VDCW, temp coef -3300 PPM.
C30	19A700221P41	Ceramic: 22 pF ±5%, 100 VDCW, temp coef -80 PPM.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - - - -
CR1 and CR2	19A115100P1	Silicon: sim to Type 1N458A.
CR5	19A115100P1	Silicon: sim to Type 1N458A.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

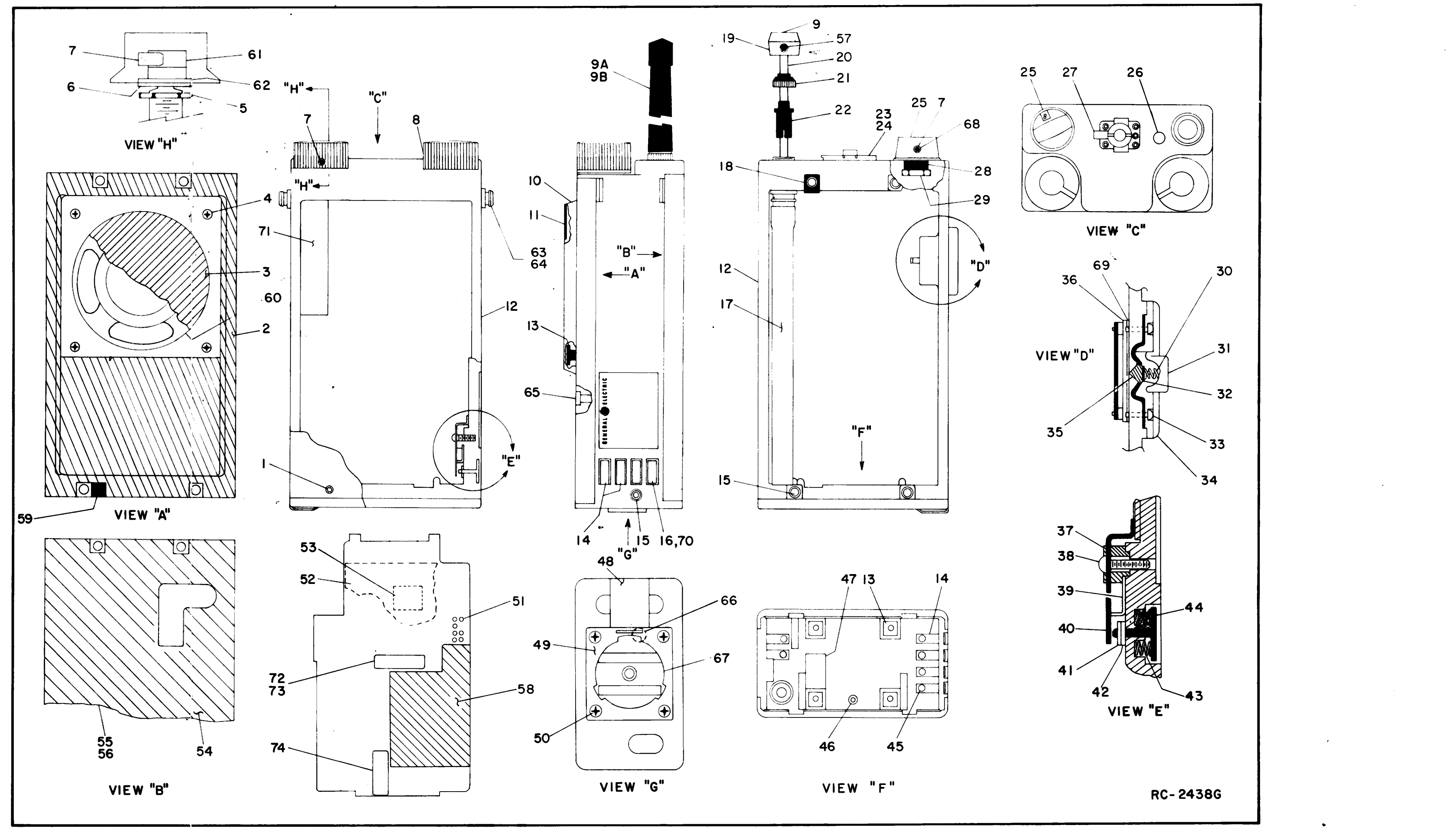
SYMBOL	GE PART NO.	DESCRIPTION
CR6	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
CR7	19A115100P1	Silicon: sim to Type 1N458A.
CV1	5495769P9	Silicon, capacitive.
		- - - - - - - - - - - - FUSES - - - - - - - - - - - -
F701	19A127884G1	Fuse Kit.
		- - - - - - - - JACKS AND RECEPTACLES - - - - - - - -
J1 thru J5	19A116366P4	Contact, electrical: sim to Concord 10-891-1.
J6 thru J8	19A116366P2	Contact, electrical: sim to Cambion 460-3233-01-03.
J9 thru J11	19A116366P4	Contact, electrical: sim to Concord 10-891-1.
J18 thru J31	19A116366P4	Contact, electrical: sim to Concord 10-891-1.
J32	19A701329P1	Contact, electrical.
J33 and J34	19A116366P2	Contact, electrical: sim to Cambion 460-3233-01-03.
J35	19A116366P4	Contact, electrical: sim to Concord 10-891-1.
		- - - - - - - - - - - - RELAYS - - - - - - - - - - -
K1	19B209562P2	Relay, hermetic sealed: 45 to 110 ohms coil res, 5 VDC nominal, 1 w max, 2 form C contacts; sim to Teledyne 732-244.
		- - - - - - - - - - - INDUCTORS - - - - - - - - - - -
L1	19B209420P114	Coil, RF: 1.2 uH ±10%, .18 ohms DC res max; sim to Jeffers 4436-1K.
L2	19A127798G2	Coil. Includes:
	19B209436P1	Tuning slug.
L3	19B219527G1	Coil.
L4	19B219527G3	Coil.
L5	19B209420P105	Coil, RF: .22 uH ±10%, .14 ohms DC res max; sim to Jeffers 4416-5K.
L6	19A138433G1	Coil.
		- - - - - - - - - - - RESISTORS - - - - - - - - - - -
R1	19A700106P45	Composition: 180 ohms ±5%, 1/4 w.
R2	3R151P222J	Composition: 2.2K ohms ±5%, 1/8 w.
R3	3R151P333J	Composition: 33K ohms ±5%, 1/8 w.
R4	3R151P101J	Composition: 100 ohms ±5%, 1/8 w.
R7	3R151P103J	Composition: 10K ohms ±5%, 1/8 w.
R8	19A116412P4	Variable, cermet: 250K ohms ±10%, 1/2 w; sim to Helipot Model 62 PR.
R9	3R151P101J	Composition: 100 ohms ±5%, 1/8 w.
A719		PUSH TO TALK SWITCH BOARD 19B233821G1
		- - - - - - - - - - - CAPACITORS - - - - - - - - - -
C1 and C2	19A700221P44	Ceramic: 27 pF ±5%, 100 VDCW, temp coef -80 PPM.
		- - - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q1	19A134739P1	Silicon, NPN.
		- - - - - - - - - - - RESISTORS - - - - - - - - - - -
R1	3R151P471J	Composition: 470 ohms ±5%, 1/8 w.
R2	3R151P101J	Composition: 100 ohms ±5%, 1/8 w.

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - - CAPACITORS - - - - - - - - - -
C701	19A700221P9	Ceramic: 2.2 pF ±10%, 100 VDCW, temp coef -80 PPM.
C702	19A700219P14	Ceramic: 3.3 pF ±5%, 100 VDCW, temp coef 0 PPM.
C704	19A700221P6	Ceramic: 1.5 pF ±5%, 100 VDCW, temp coef -80 PPM.
C705	19A700221P10	Ceramic: 2.2 pF ±5%, 100 VDCW, temp coef -80 PPM.
C706	19A700221P44	Ceramic: 27 pF ±5%, 100 VDCW, temp coef -80 PPM.
		- - - - - - - - JACKS AND RECEPTACLES - - - - - - - -
J701	19B216594G2	Connector, female: 6 contacts.
J702		(See Mechanical Parts RC2438, items 14 & 16).
J703		(See Mechanical Parts RC2438, item 14).
J704		(See Mechanical Parts RC2438, items 48-50, 66,67)
		- - - - - - - - - - - - PLUGS - - - - - - - - - - - -
P701	19A115834P4	Contact, electrical: sim to AMP 2-332070-9.
		- - - - - - - - - - - RESISTORS - - - - - - - - - - -
R707	19A116227P1	Resistor/Switch: variable, carbon film, 25K ohms ±20%, 1/8 w, (Includes S703), SPST, 3 amps at 125 VAC; sim to Mallory Type MZC.
R708	19A116227P2	Variable, carbon film: 25K ohms ±10%, 1/8 w; sim to Mallory Type MZC.
		- - - - - - - - - - - SWITCHES - - - - - - - - - - -
S701		(See Mechanical Parts RC2438, items 30-36).
S702		(See Mechanical Parts RC2438, items 37-44).
S703		(Part of R707).
		- - - - - - - - - - - - CABLES - - - - - - - - - - -
W1		CABLE ASSEMBLY 19C330826G1
		- - - - - - - - - - - - PLUGS - - - - - - - - - - - -
P704 and P705	19A116137P3	Socket, crystal: 8 contacts; sim to Cinch 133-98-92-061 special.
		ASSOCIATED ASSEMBLIES
		NOTE: When reordering A5-A12, give GE Part Number and exact crystal frequency.
		Crystal Freq = Operating Freq / 24
A5 thru A12	4EG27A11	Transmitter Oscillator Module.
		FRONT COVER ASSEMBLY 19C331637G1 LOW POWER - 2 FREQ 19C331637G2 LOW POWER - 8 FREQ 19C331637G3 HI POWER - 2 FREQ 19C331637G5 HI POWER - 8 FREQ
		- - - - - - - - - - - LOUDSPEAKERS - - - - - - - - -
LS1	19A134949P2	Permanent magnet: 8 ohms ±15% voice coil imp, 500 Hz ±50 Hz resonant, 500 mW; sim to Oaktron Sample P-7410.
		- - - - - - - - - - - MICROPHONES - - - - - - - - - -
MK1	19A701301P1	Microphone cartridge: 2000 ±30% ohms imp, 1-1/2 - 10 VDC; sim to Primo EM-76.
		- - - - - - - - - - - - PLUGS - - - - - - - - - - - -
P1 and P2	19A115834P4	Contact, electrical: sim to AMP 2-332070-9.
P3	19A134825P3	Receptacle: contact rated @ 3 amps; sim to Berg 47650.

SYMBOL	GE PART NO.	DESCRIPTION
		HI/LOW SPLIT MODIFICATION KIT 19A127838G3 HI SPLIT 19A127838G4 LOW SPLIT
		- - - - - - - - - - - CAPACITORS - - - - - - - - - -
C16	19A700221P38	Ceramic: 18 pF ±5%, 100 VDCW, temp coef -80 PPM.
C17	19A700221P44	Ceramic: 27 pF ±5%, 100 VDCW, temp coef -80 PPM.
		MULTI-FREQUENCY MODIFICATION KIT 19A129268G1
		- - - - - - - - - - - SWITCHES - - - - - - - - - - -
S1	19B219515G1	Rotary: 1 section, 1 pole, (adj. 2-10 position) non-shorting; sim to Grayhill 50MY23155-1-8N.
		RECEIVER KIT 19A130042G2 STD 19A130042G4 EXT
		- - - - - - - - - - - CAPACITORS - - - - - - - - - -
C310	5495323P12	Ceramic: 0.001 uF +100% -20%, 75 VDCW.
C317	19A700226P45	Ceramic: 30 pF ±5%, 100 VDCW, temp coef -750 PPM.
C318	19A116192P1	Ceramic: 0.01 uF ±20%, 50 VDCW; sim to Erie 8121 Special.
C320	19A116192P1	Ceramic: 0.01 uF ±20%, 50 VDCW; sim to Erie 8121 Special.
C321 and C322	5495323P12	Ceramic: 0.001 uF +100% -20%, 75 VDCW.
C323	19A700227P53	Ceramic: 47 pF ±5%, 100 VDCW, temp coef -1500 PPM.
C324 and C325	19A700221P42	Ceramic: 24 pF ±5%, 100 VDCW, temp coef -80 PPM.
C326	5495323P12	Ceramic: 0.001 uF +100% -20%, 75 VDCW.
C329	5495323P12	Ceramic: 0.001 uF +100% -20%, 75 VDCW.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19B216897G1	Rear Cover Assembly.
	19B216897G2	Rear Cover Assembly, clip type.
	19B216897G3	Rear Cover Assembly. (See RC2438, items 54, 55).
	19B216897G4	Rear Cover Assembly, clip type. (See RC2438, items 54, 56).
	19B219953G4	Antenna Assembly. (See RC2438, items 19-22, 57(,
	19D413522G4	Battery, rechargeable. Nickel Cadmium.
	19B219079G1	Alignment tool. Allen tip.
	19B209548P1	Antenna Assembly.
	19B219887P1	Insulated spring whip antenna.
	7150729P4	Key, socket head. (Removes front cover).
		MECHANICAL PARTS (SEE RC2438)
1	19A134425P1	Machine screw, Hex head: No. 2-56 x 3/16.
2	19C317394P4	Gasket. (8 FREQ).
	19C317394P3	Gasket. (2 FREQ).
3	19A143483P2	Diaphragm: No. 2 inch dia.
4	N681P5002C6	Screw, phillips head: No. 2-56 x 1/8.
5	19A127319P1	Nut: No. thd. size 1/4-32.
6	4037064P18	Washer, non-metallic.
7	19A143453P2	Set screw, self locking: 3-48 x 3/16.
8	19B232784G1	Knob Assembly. (SQUELCH, ON-OFF-VOLUME).
9	19B219953G4	Antenna Assembly, Telescopic. (Includes items 19-22, 57).

SYMBOL	GE PART NO.	DESCRIPTION
9A	19B209548P1	Antenna, flexible wire.
9B	19B219887P1	Insulated spring whip antenna.
10	19D413531P2	Grille. (STD).
	19D417807P3	Grille. (HI POWER).
11	19B234256P1	Nameplate. (GE monogram).
12	19D413542G8	Case assembly. 8 FREQ. (Includes items 14, 15, 18, 26, 45, & 63, 64).
	19D413542G7	Case assembly. 2 FREQ. (Includes items 14, 15, 18, 26, 45, & 63, 64).
13	19B216858P1	Insert.
14	19A127753P1	Contact. (Part of J702 & J703).
15		NOT USED.
16	19B216862P2	Contact.
17	19A127779G8	Antenna tube. 8 FREQ.
	19A127779G6	Antenna tube. 2 FREQ.
18	19B216875P1	Support.
19	19A129649P1	Antenna Cap. (Part of item 9).
20	19B219650P1	Antenna rod. (Part of item 9).
21	19C320352P1	Bushing. (Part of item 9).
22	19A129652P1	Nut, knurled: thd size 7/16-40. (Part of item 9).
23	19C317050P1	Protective cover.
24	19A129390P1	Disc. (Located in item 23).
25	19A130426G2	Knob Assembly.
26	19A129723P1	Rivet.
27	19B219540P1	Support.
28	19A143880P1	Washer, non metal.
29	19A127319P2	Nut: No. thd. size 1/4-28.
30	19A137625P2	Spring. (Part of S701).
31	19C328406P1	Button assembly.
32	4035306P71	Fiber washer.
33	N55P1006	Machine screw, steel: No. 0-80 x 3/8. (Part of S701).
34	19C328407P1	Collar. (Part of S701).
35	19C331441P1	Plate. (Part of S701).
36	19A144358G1	Switch, push. (Part of S702).
37	19B216865P1	Insulator. (Part of S702).
38	N647P5004C	Cap screw: 2-56 x 1/4. (Part of S702).
39	19B216864P1	Contact. (Part of S702).
40	19B216863P1	Spring contact. (Part of S702).
41	N910P6C6	Retaining ring. (Part of S702).
42	19A127754P1	Gasket. (Part of S702).
43	19A127755P1	Spring. (Part of S702).
44	19B216862P1	Contact. (Part of S702).
45	N330P605F22	Eyelet, brass: 1/16 x 5/32.
46	N330P602F22	Eyelet, brass: 1/16 x 1/16. (NOT USED).
47	19A127762P1	Strap.
48	19B216891G1	Spring assembly. (Part of S704).
49	19D413467P1	Fastener. (Part of S704).
50	19A115794P3	Flat head screw: 2-56 x 5/16. (Part of S704).
51	19A115834P5	(NOT USED).
52	19B219510P1	Insulator. EXT. (Located between System & Receiver Boards).
	19B216912P1	Insulator. STD. (Located between System & Receiver Boards).
53	19A116270P1	Tape, pressure sensitive. (Specify length).

SYMBOL	GE PART NO.	DESCRIPTION
54	19C317394P6	Gasket. (8 FREQ).
	19C317394P5	Gasket. (2 FREQ).
55	19B216897G3	Rear Cover Assembly. 8 FREQ. (without clip).
	19B216897G1	Rear Cover Assembly. 2 FREQ. (without clip).
56	19B216897G4	Rear Cover Assembly. 8 FREQ. (with clip).
	19B216897G2	Rear Cover Assembly. 2 FREQ. (with clip).
57	N70P703C6	Set screw: No. 3-48 x 3/16. (HI BAND ANTENNA).
58	19B219443P1	Insulator. (NOT USED).
59	19A130397P1	Strap.
60	19A130993P1	Gasket. (NOT USED).
61	19A137254P1	Insert, tap: No. 3-48.
62	4035630P1	Washer: teflon, 1/4 inch.
63	19A127802P1	Rivet, shield.
64	19A116773P805	Tap screw, Phillips POZIDRIV®: No. 4-24 x 5/16.
65	N170P9004C17	Cap screw: No. 4-40 x 1/4.
66	19B232109P1	Button plug.
67	19A130586P1	Insulator.
68	19A130517P1	Insert, threaded: No. 3-48. (Part of 19A130426G2 knob assembly).
69	19B232081P1	Spacer. (Part of S701).
70	19B219442P1	Printed Board.
71	19A137844G1	Shield, insulator.
72	19C311761P8	Can.
73	19A121175P43	Insulator.
74	19B216866G1	Can.



3. Bend the leads of the oscillator module as shown in Figure 2 (or appropriate Outline Diagram) and solder to the adjacent pads.

4. For two or more transmitter frequencies and one receiver frequency, remove the jumper from H7 to H10 and add a sleeved jumper (#26 AWG) from H7 to H13 on the Systems Board.

5. For two or more receiver frequencies and one transmitter frequency, remove the jumper from H8 to H10 and add a sleeved jumper (#26 AWG) from H20 and H21 on the Systems Board.

3- REPEATING FREQUENCIES

For repeating both transmitter and receiver frequencies without adding additional oscillator modules, add a sleeved jumper (#26 AWG) between the frequencies to be repeated. For example, if transmitter and receiver channels 1 and 5 are to be repeated, add the jumper from S1-1 to S1-5.

4- REPEATING OSCILLATOR MODULES

To repeat frequencies for the transmitter only or the receiver only, diodes can be used in place of oscillator modules.

1. Set the stop on S1 and install the oscillator modules whose frequencies are not to be repeated as directed in Section I and II.

2. Install the oscillator(s) whose frequencies are to be repeated as directed above except solder the Number 2 pin to the "E" pad instead of the "P" pad (see Figure 2).

3. For every channel that a frequency is being repeated, assemble a diode (5494922P1) in the space normally intended for the oscillator module by putting the annode lead in the Number 2 hole, bending it over and soldering to the "P" pad. The cathode lead will be terminated later.

4. For each different frequency that is repeated, an additional diode (5494922P1) is to be assembled in respective channel closest to the oscillator module being repeated. Assemble the diode in the Number 1 hole, annode lead down and sleeved, and connect to the associated "E" pad. Then run the jumper from this pad to the "P" pad of related oscillator module.

The cathode end of the diodes should be connected together using mid air connections. Make the connection and run the wire down the side of the diode along the component side of the board to the next diode, and so on until all the diode's cathodes are connected together. Route these wires to give the shortest connections. Now connect a lead to the cathode of the diode that is closest to the repeated oscillator module and run this lead down the side of the diode and through any empty hole or slot to the solder side of the board, and connect the lead to the "E" pad of the oscillator module. Next sleeve the diodes as shown in Figure 4.

Example: Channel 3 and 4 to be same as Channel 1.
Channel 5 and 6 to be same as Channel 2.

1. Assemble the oscillator module in Channels 1 and 2 as normal except connect the Number 2 lead to the "E" pad instead of "P" pad.

2. Assemble (1) diode in the Number 2 hole, anode lead down, in each of Channels 3, 4, 5, & 6 and solder to "P" pads.

3. Since two frequencies are being repeated, two additional diodes will be required, one in the Number 1 hole of Channel 3 and the other in the Number 1 hole of Channel 5. Sleeve, bend, and solder leads to the "E" pad. Connect jumper between the "E" pad of the Number 3 Channel and "P" pad of oscillator module Number 1. Connect a jumper between the "E" pad of Number 5 Channel and "P" pad of oscillator module Number 2.

4. Connect the top lead (cathode) of diodes (3) in Channel 3 and 4 to each other by soldering jumper wire to leads, dressing the wire down the side of the diodes and along the board. Connect a jumper from the top of diode in the Number 1 hole of Channel 3 to the "E" pad of oscillator module Number 1. Run the wire down through the board using any available hole or slot to the solder side. Connect the jumper from the diode in Channel Number 5 to oscillator module Number 2 in the same manner.

MULTI-FREQUENCY MODIFICATIONS

(19D416567, Sh. 1, Rev. 10 & Sh. 2, Rev. 3)

The multi-frequency modifications include instructions for adjusting the stop post on multi-frequency switch S1, for adding oscillator modules, for repeating frequencies, and repeating oscillator modules.

1- STOP POST ADJUSTMENT

CAUTION

Due to the small size of the stop posts, be very careful when making adjustments to avoid losing the stops.

1. Remove the multi-frequency switch as directed in the Disassembly Procedure (see Table of Contents).

2. Turn the shaft fully counterclockwise as viewed from the knob end.

3. Unscrew the panel seal to gain access to the stop post (see Figure 1).

4. Install the stop post in the appropriate hole as shown in the following chart.

STOP POST ADJUSTMENTS	
NO. OF FREQS	MOVE ADJUSTMENT STOP TO:
2	H2
3	H3
4	H4
5	H5
6	H6
7	H7
8	H8

5. Replace the panel seal with the side marked "Bottom" against surface "Z".

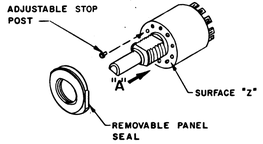
6. Re-install the Multifrequency Switch.

2- ADDING OSCILLATOR MODULES

1. After completing the stop post adjustment, connect the leads from multi-frequency switch S1 as shown in the following chart (see Figure 3 for connection points). Tape back all unused leads.

CONNECTION CHART			
FROM	TO	WIRE COLOR	S1 POSITION
S1-C1	H11 (solder)	SFT-BL	
S1-1	J31	SFT-W-BK	1
S1-2	J30	SFT-W-O	2
S1-3	J24	BR	3
S1-4	J25	R	4
S1-5	J26	O	5
S1-6	J27	Y	6
S1-7	J28	G	7
S1-8	J29	BL	8

2. Place the oscillator module(s) in the proper holes (see Figure 3). Then bend over tabs on the can and solder to the adjacent pads (see Figure 2).



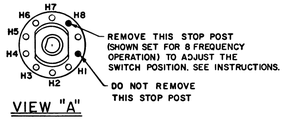


Figure 1 - Stop Post Adjustment

INSTRUCTIONS FOR STOP INSTALLATION ON MULTI-FREQUENCY SWITCH

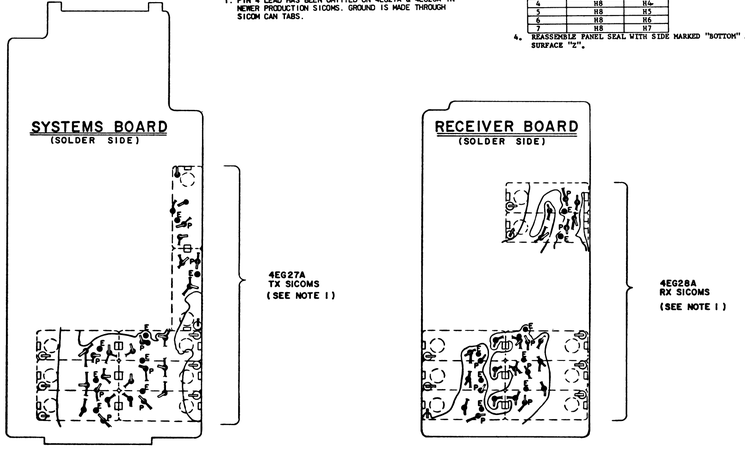
1. SHAFT MUST BE FULL COUNTER CLOCKWISE AS VIEWED FROM KNOB END.
2. REMOVE PANEL SEAL FOR ADJUSTMENT OF STOPS, SEE VIEW "A".
3. INSTALL ADJUSTABLE STOPS PER CHART BELOW:

NO. OF FREQS.	MOVE ADJUSTABLE STOP	
	FROM	TO
2	H8	H2
3	H8	H3
4	H8	H4
5	H8	H5
6	H8	H6
7	H8	H7

4. REASSEMBLE PANEL SEAL WITH SIDE MARKED "BOTTOM" AGAINST SURFACE "Z".

NOTES:

1. PIN 4 LEAD HAS BEEN OMITTED ON 4EG27A & 4EG28A IN NEWER PRODUCTION SICOMS. GROUND IS MADE THROUGH SICOM CAN TABS.



(19D416567, Sh. 2, Rev. 3)

Figure 2 - Oscillator Module and Diode Installation

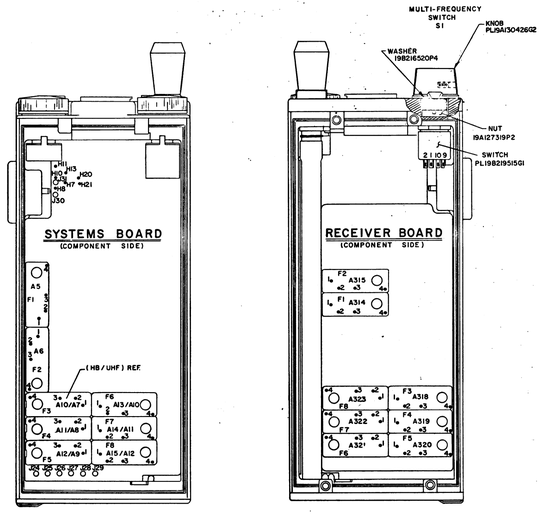


Figure 3 - Oscillator Mounting Positions & S1 Connection Points

(19D416567,Sh. 1, Rev. 10)

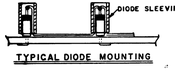


Figure 4 - Typical Diode Mounting