# MASTR Personal Series PROGRESS LINE

PE MODELS SYSTEMS BOARD AND CASE ASSEMBLY 19D417330G4 FOR LOW BAND RECEIVERS WITH DUAL FRONT END



# **SPECIFICATIONS** \*

MODEL NUMBERS

19D417330G4

CONTROLS:

30-50 MHz

Volume ON-OFF Switch

Squelch Control

Multi-Frequency (5 positions standard, 6 positions special) 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.

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--- 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**

Dual Front End (DFE) system board A704 provides system interconnections for the transmitter, receiver, tone options and operating controls. In addition to the transmit and receive oscillator modules, the system board contains the system relay, and the 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 the Speaker/Microphone LS1 is controlled by diode CR5 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 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 2).

Figure 1 - Audio Switching Circuit

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

Keying the external microphone directly energizes relay K1.

## 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 multifrequency switch to have the same frequency on one or more switch positions even though only one oscillator module is used for each of the repeated channels. A typical diagram with repeated oscillator modules is shown in Figure 3.

Complete instructions for multi-frequency modifications are contained in the Multi-Frequency Modification diagram (see Table of Contents). Transmit oscillator modules may be repeated exclusively. Unless the radio is equipped with SLM receive oscillators F1 and F2 may be repeated and receive oscillators F3, F4 and F5 may be repeated.

When SLM is provided receive oscillators F1, F2 and F4 may be repeated. The maximum number of receive frequencies is four.

For radios equipped with Channel Guard and Type 90 or Type 99 Encoders/Decoders, repeating oscillator modules also permit 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.

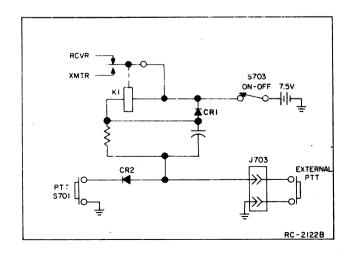


Figure 2 - DC Switching Circuit

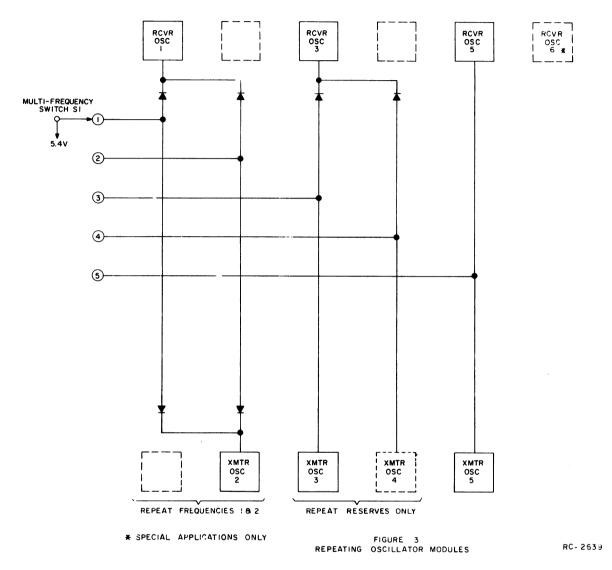
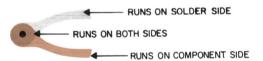


Figure 3 - Repeating Oscillator Modules

## MULTI-FREQUENCY SWITCH

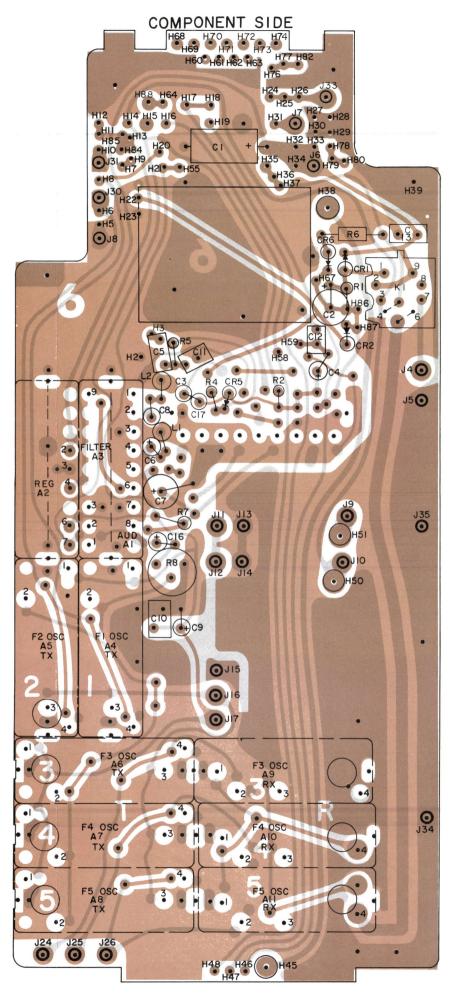
Multi-frequency switch S1 simultaneously selects the transmit/receive oscillator modules and the correct receiver front end. A maximum of five transmit and receive frequencies may be provided. (A sixth receive frequency can be provided as a special option.) Five transmit oscillators and three receive oscillator modules are located on the systems board; the remaining two receive oscillators are located on the receiver and interconnected to the systems board via P705 and J19.

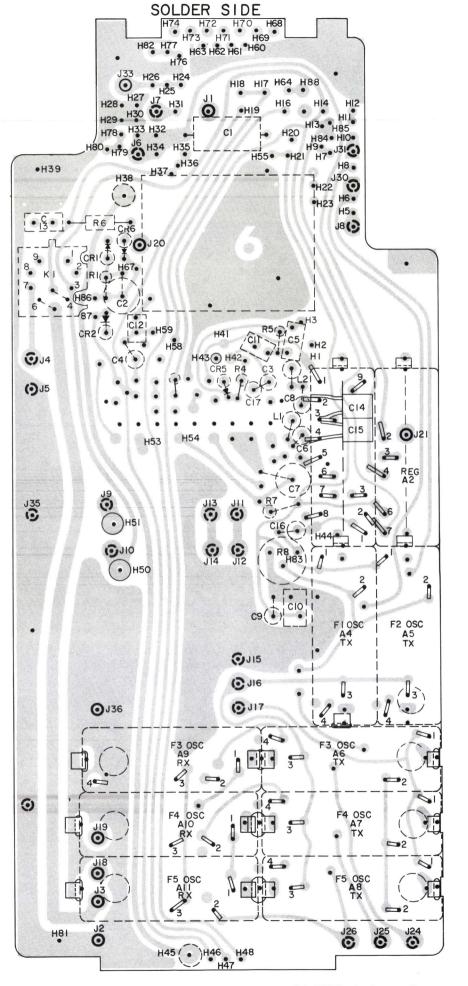


# **OUTLINE DIAGRAM**

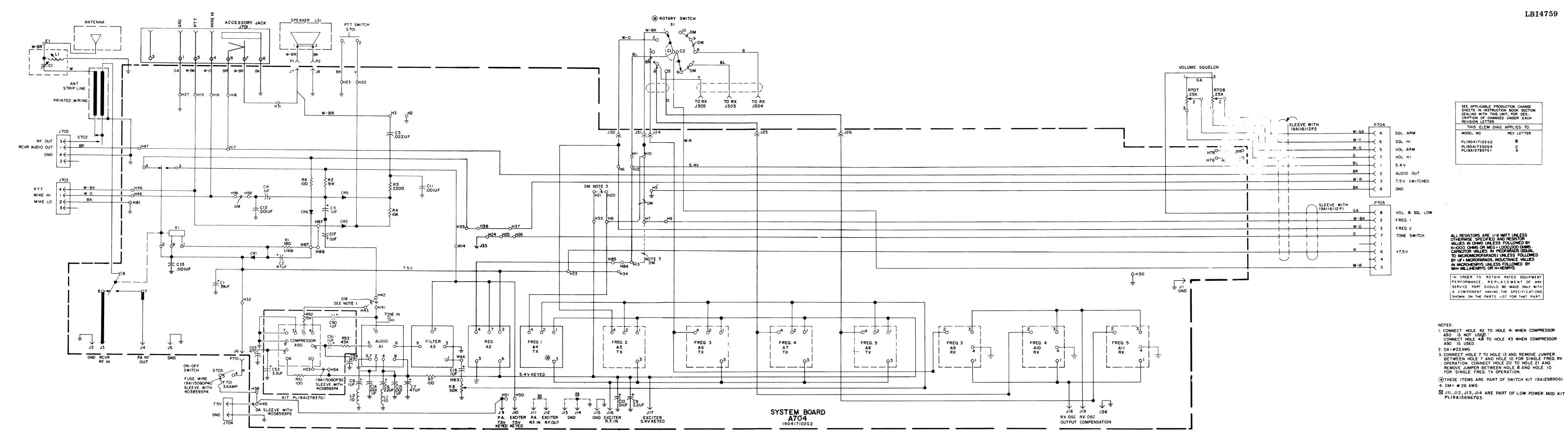
30-50 MHz SYSTEM BOARD

Issue 3





(19D417964, Rev. 3)



# SCHEMATIC DIAGRAM

30-50 MHz SYSTEM BOARD

LBI-4759

PARTS LIST

LBI-4761A SYSTEM BOARD/CASE ASSEMBLY 19D417330G4 AND ASSOCIATED ASSEMBLIES

A704		
		SYSTEM BOARD
	10000005401	19D417102G2
Al	19C320354G1	Transmitter Audio Module.
A2	19C311905G2	5.4 Volt Regulator Module.
АЗ	19C320345G1	Post Limiter Filter.
		NOIE: When reordering A4-A8, give GE Part Numb and exact crystal frequency. Crystal Freq = Operating Freq 3
A4 and A8	4EG31A10	Transmitter Oscillator.
		NOTE: When reordering A9-All, give GE Part Number exact crystal frequency.
		Crystal Freq. $(30-36 \text{ MHz}) = \frac{F_0 + 20}{3}$
		Crystal Freq. $(36-42 \text{ MHz}) = \frac{F_0 + 23}{3}$
		Crystal Freq. (42-50 MHz) = $\frac{F_0 + 20}{3}$
A9 thru	4EG28A17	Receiver/DFE Oscillator. (30-36 MHz, 42-50 MHz)
All	4EG28A18	Receiver/DFE Oscillator, (36-42 MHz)
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 and C4	5491674P1	Tantalum: 1.0 µf +40-20%, 10 VDCW; sim to Sprague Type 162D.
C5	19A116244P2	Ceramic: 0.022 µf ±20%, 50 VDCW.
C6	5491674P8	Tantalum; 2.2 μf +40-20%, 10 VDCW; sim to Sprague Type 162D.
C7	5491674P42	Tantalum: 47 µf ±20%, 6 VDCW; sim to Sprague Type 162D.
С8	5491674P1	Tantalum: 1.0 µf +40-20%, 10 VDCW; sim to Sprague Type 162D.
C9	5491674P8	Tantalum: 2.2 μf +40-20%, 10 VDCW; sim to
C10	19A116192P1	Sprague Type 162D.  Ceramic: 0.01 µf ±20%, 50 VDCW; sim to Erie 8121 SPECIAL.
Cll thru Cl5	5495323P12	Ceramic: .001 µf +100% -20%, 75 VDCW.
C16	549167 <b>4P28</b>	Tantalum: 1.0 µf +20%, 25 VDCW; sim to Sprague Type 162D.
C17	5491674P1	Tantalum: 1.0 µf +40-20%, 10 YDCW; sim to Sprague Type 162D.
		DIODES AND RECTIFIERS
CR1	19A115250P1	Silicon.
CR2	5495922P1	Silicon; sim to Type 1N1200A.
CR5	5495922P1	Silicon; sim to Type 1N1200A.
CR6	19A115250P1	Silicon.

SYMBOL	GE PART NO.	DESCRIPTION	SYMBOL	GE PART NO.	DESCRIPTION
		Jacks and receptacles			RESISTORS
Jl thru J5	19A116366P4	Contact, electrical: sim to Concord 10-891-1.	R707	19A116227P1	Resistor/Switch: variable, carbon film, 25,000 ohms ±20%, 1/8 w, (Includes S703), SPST, 3 amps at 125 VAC; sim to Mallory Type MZC.
J6 thru J8	19A116366P2	Contact, electrical: sim to Cambion 3233-1.	R708	19A116227P2	Variable, carbon film: 25,000 ohms ±10%, 1/8 w; sim to Mallory Type MZC.
J9 thru J19	19A116366P4	Contact, electrical: sim to Concord 10-891-1.	8701		See Mechanical Parts RC-2623, items 36-42.
J24 thru J26	19A116366P4	Contact, electrical: sim to Concord 10-891-1.	S702 S703		See Mechanical Parts RC-2623, items 43-50. (Part of R707).
J30 and J31	19A116366P4	Contact, electrical: sim to Concord 10-891-1.			FRONT END 19D417149C4 30-36 MHz
J33 and J34	19A116366P2	Contact, electrical: sim to Cambion 3233-1.			19D417149G5 36-42 MHz 19D417149G6 42-50 MHz
J35 and J36	19A116366P4	Contact, electrical: sim to Concord 10-891-1.	C1	19A116114P2063	
			C2	19A116114P2059	Ceramic: 68 pf ±5%, 100 VDCW; temp coef -80 PPM.
K1*	19B209562P2	Relay, hermetic sealed: between 45 and 100 ohms,	C3	19A116114P2056	Ceramic: 56 pf ±5%, 100 VDCW; temp coef -80 PPM.
		2 form C contacts, 5.0 VDC nominal, 1.0 w max operating; sim to GE 3SCS1002A2.	C4	5491601P126	Phenolic: 2.2 pf ±5%, 500 VDCW.
		In REV A:	C5	5491601P123	Phenolic: 1.5 pf ±5%, 500 VDCW.
	19B209562P1	Relay, hermetic sealed: 98 ohms ±10%, 2 form C	C6 C7	5491601P122	Phenolic: 1.2 pf ±5%, 500 VDCW.
1		contacts, 6.0 VDC nominal, 1.0 w max operating; sim to GE 3SCS1001A2. Added by REV A.	C8	19A116114P2063 19A116114P2059	Ceramic: 91 pf ±5%, 100 VDCW; temp coef -80 PPM.
		inductors	C9	19A116114P2056	Ceramic: 68 pf ±5%, 100 VDCW; temp coef -80 PPM.  Ceramic: 56 pf ±5%, 100 VDCW; temp coef -80 PPM.
Li	19B209420P125	Coil, RF: 10.0 µh ±10%, 3.10 ohms DC res max;	C10	5495323P12	Ceramic: .001 µf +100% -20%, 75 VDCW.
and L2	1352034207120	sim to Jeffers 4446-4.	C11 and C12	19A116192P1	Ceramic: 0.01 µf ±20%, 50 VDCW; sim to Erie 8121 SPECIAL.
		RESISTORS	C13	19A116114P2063	Ceramic: 91 pf ±5%, 100 VDCW; temp coef -80 PPM.
R1*	3R152P181J	Composition: 180 ohms ±5%, 1/4 w.	C14	19A116114P2059	Ceramic: 68 pf ±5%, 100 VDCW; temp coef -80 PPM.
		In REV A:	C15	19A116114P2056	Ceramic: 56 pf ±5%, 100 VDCW; temp coef -80 PPM.
	3R152P221J	Composition: 220 ohms ±5%, 1/4 w.	C16	5491601P123	Phenolic: 1.5 pf ±5%, 500 VDCW.
		Earlier than REV A:	C17	5491601P122	Phenolic: 1.2 pf ±5%, 500 VDCW.
	3R151P220J	Composition: 22 ohms ±5%, 1/8 w.	C18	5491601P119	Phenolic: 0.82 pf ±5%, 500 VDCW.
R2	3R151P913J	Composition: 91,000 ohms ±5%, 1/8 w.	C19	19A116114P2063	Ceramic: 91 pf ±5%, 100 VDCW; temp coef -80 PPM.
R4 R5	3R151P103J 3R151P222J	Composition: 10,000 ohms ±5%, 1/8 w.	C20	19A116114P2059	Ceramic: 68 pf ±5%, 100 VDCW temp coef -80 PPM.
R6 and	3R151P222J 3R151P101K	Composition: 2200 ohms ±5%, 1/8 w.  Composition: 100 ohms ±10%, 1/8 w.	C21 and C22	19A116114P2056	Ceramic: 56 pf ±5%, 100 VDCW; temp coef -80 PPM.
R7 R8	19A116412P9	Variable, cermet: 500 ohms ±10%, 1/2 w; sim to Helipot Model 62 PF.	C23 and C24	19A116192P1	Ceramic: 0.01 µf ±20%, 50 VDCW; sim to Erie 8121 SPECIAL.
			C25	19A116114P4059	Ceramic: 68 pf ±5%, 100 VDCW; temp coef -220 PPM.
XK1*	19A115834P5	Contact, electrical: sim to AMP 4-331272-3. (Quantity 7). Deleted by REV A.	C26	19A116192P1	Ceramic: 0.01 µf ±20%, 50 VDCW; sim to Erie 8121 SPECIAL.
		TERM INALS	C27	5491674P28	Tantalum: 1.0 µf ±20%, 25 VDCW; sim to Sprague Type 162D.
El	19A116854P1	Terminal, solderless.	C32	19A116114P2047	Ceramic: 33 pf ±5%, 100 VDCW; temp coef -80 PPM.
			C33	19A116114P2044	Ceramic: 27 pf ±5%, 100 VDCW; temp coef -80 PPM.
F701	19A127884G1		C34	19A116114P2012	Ceramic: 3.3 pf ±5%, 100 VDCW; temp coef -80 PPM.
		JACKS AND RECEPTACLES	1		DIODES AND RECEPTACLES
J701	T9B216594G2	Connector, female: 6 contacts.	CR1	19A115250P1	Silicon.
J702		See Mechanical Parts RC-2623 items 14, 16.	CR2	19A116925P1	Silicon.
J703		See Mechanical Parts RC-2623 items 14, 51.			
J704		See Mechanical Parts RC-2623 items 54-56.	L1	19C320379G12	Coil. Includes:
				19B209436P1	Tuning slug.
P701	19A115834P4	Contact, electrical: sim to AMP 2-332070-9.	L2	19C320379G13	Coil. Includes:
P704 and P705	19A127569P1	Plug: 8 contacts.		19B209436P1	Tuning slug.
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	SYMBO	. GE PART NO.	DESCRIPTION	SYMBOL	GE PART NO.	DESCRIPTION	SYMBOL	┰
	L3	19C320379G14	Coil. Includes:			DIODES AND RECTIFIERS	32	
rbon film, 25,000 03), SPST, 3 amps		19B209436P1	Tuning slug.		5494922P1	Diode, silicon; sim to Hughes lN456. (Used for repeated frequencies only).	33	
e MZC.	1.4	19C320379G15	Coil. Includes:			LOADING COIL ASSEMBLY	34	۱
ohms ±10%, 1/8 w;	L5	19B209436P1 19C320379G5	Tuning slug. Coil. Includes:			19C320365G1	36	١
	~	19B209436P1	Tuning slug.				37	١
items 36-42.	L6	19C320379G6	Coil. Includes:	C1	19A116462P3	Variable: less than 2 pf to more than 20 pf, 100 VDCW, -320 PPM/°C.	38	ļ
items 43-50.		19B209436P1	Tuning slug.			INDUCTORS	39	
	L7	19C320379G5 19B209436P1	Coil. Includes: Tuning slug.	Li	19B219759G1	Coil. Includes:	40	
6 MHz	L8	19C320379G6	Coil. Includes:		19B209436P1	Tuning slug.	41 42	
2 MHz 0 MHz		19B209436P1	Tuning slug.			MISCELLANEOUS	43	
	L9	19C320379G9	Coil. Includes:		19B216897G3	Rear Cover Assembly. (See RC-2623, items 61, 62).	44	
temp coef -80 PPM.		19B209436P1	Tuning slug.		19B216897G4	Rear Cover Assembly. Clip type. (See RC-2623, items 61, 63).	45	
temp coef -80 PPM.	L10	19C320379G10	Coil. Includes:		19B219768G1	Antenna Assembly. (See RC-2623, items 20-24).	46	
temp coef -80 PPM.	LII	19B209436P1 19C320379G11	Tuning slug.  Coil. Includes:		19D413522G1	Battery, rechargeable. Nickel Cadmium.	47	
		19B209436P1	Tuning slug.		19A127884G1	Fuse Kit.	48 49	
CW.			TRANSISTORS		4038381P4	Alignment tool. Fork tip.	50	
temp coef -80 PPM.	Q1	19A116818P2	N Channel, field effect.		19B219079G1	Alignment tool. Allen tip.	51	
temp coef -80 PPM.	and Q2					MECHANICAL PARTS (SEE RC-2623)	52	
temp coef -80 PPM.			RESISTORS	,	19A116543P1	0 0	53	
75 VDCW.	R1	3R151P273J	Composition: 27,000 ohms ±5%, 1/8 w.	1 2	19C317394P4	Cap screw, socket head: No. 2-56 x 1/4.  Gasket.	54 55	
CW; sim to Erie	R2*	3R151P273J	Composition: 27,000 ohms ±5%, 1/8 w. Earlier than REV A:	3	19B204527P2	Diaphragm: No. 2 inches dia.	56	
temp coef -80 PPM.		3R151P104J	Composition: 0.10 megohm ±5%, 1/8 w.	4	N681P5002C13	Screw, phillips head: No. 2-56 x 1/8.	1	
temp coef -80 PPM.	R3	3R151P391J	Composition: 390 ohms ±5%, 1/8 w.	5	19A127319P1	Nut: No. 1/4-32.	57 58	
; temp coef -80 PPM.	R4	3R151P472J	Composition: 4700 ohms ±5%, 1/8 w.	6	4037064P18	Washer, non-metallic.		
cw.	R5	3R151P243J	Composition: 24,000 ohms ±5%, 1/8 w.	7	N70P703C13 19B227042G2	Set screw: No. 3-48 x 3/16.  Knob assembly. (Includes items 7 and 68).	59	
CW.	R6	3R151P511J	Composition: 510 ohms ±5%, 1/8 w.	9	19B219768G1	Antenna assembly. (Includes items 7, 20, 21, 23).	60	
temp coef -80 PPM.	R7	3R151P273J	Composition: 27,000 ohms ±5%, 1/8 w.	10	19D413531P2	Grille.	61	
temp coef -80 PPM.			MISCELLANEOUS	11	NP270290P2	Nameplate. (GE monogram).	62 63	
; temp coef -80 PPM.		4035306P11	Washer, fiber. (Used with Q1 and Q2).	12	19D413542G4	Case assembly. (Includes items 14, 15, 18, 33-39, 48, 49).	64	
CW; sim to Erie	<b> </b>		ASSOCIATED ASSEMBLIES	13	19B216858P1 19A127753P1	Insert. Contact. (Part of J702 and J703).	65 66	
			TRANS COURS ASSEMBLY	15	19A116719P1	Insert, screw thread: No. 2-56.	67	
; temp coef -220			FRONT COVER ASSEMBLY 19C317416G2	16	19B216862P2	Contact. (Part of J702).	68	
CW; sim to Erie				17	19A127779G5	Antenna tube.	69	
CW: sim to	LS1	19A116090P1	Permanent magnet: 2.00 inch, 8 ohms ±10% voice coil imp, 450 Hz ±112 Hz resonant; freq range	18	19A116854P1	Terminal, solderless.	70	
			400 to 3000 Hz.	19 20	19B216875P1 19C320383P3	Support, Antenna rod. (Part of item 9).	71 72	
; temp coef -80 PPM.; temp coef -80 PPM.				21	19C320352P1	Bushing (Part of item 9).	73	
W; temp coef	Pl and	19A115834P4	Contact, electrical: sim to AMP 2-332070-9.	22	N70P702C13	Set screw: No. 3-48 x 1/8.	74	
	P2			23	19A129649P1	Antenna Cap. (Part of item 9).		
PTACLES			MULTI-FREQUENCY MODIFICATION KIT 19A129890G1 STD	24	19B219770G1	Spacer Assembly, (Part of item 9).		
			19A129890G2 SIM 19A129890G3 1 RX FREQ on RX BOARD	25 26	19A116869P1 19C320359P1	Tap screw: No. 2-32 x 1/4.  Cover.		
			an income	27	19A129559P1	Gasket.		
	S1	19B226086G1		28	19C317050P1	Protective Cover.		
	S1	19B226086G2	Switch Assembly. SLM	29	19A129390P1	Disc.		
	<b>S</b> 1	19B226086G3	Switch Assembly. 1 RX FREQ on RX BOARD	30	19A130426G2	Knob.		
				31	19B219540P1	Catch.		
	1	1		I I	1	i	I .	

Washer, nylon: 1/4 inch.	PRODUCTION CHANGE
Nut: No. 1/4-28.	
Decorative cap. (TYPE 99).	Changes in the equipment to improve performance

DESCRIPTION

Seal. (Used with TYPE 99 Switch).

Screw, slotted, steel: No. 0-80 x 1/4. (Part of S701).

Cap screw: 2-56 x 1/4. (Part of \$702).

Collar. (Part of S701).

Button. (Part of S701).

Diaphragm. (Part of S701).

Contact plate. (Part of S701).

Contact. (Part of S701).

Spring. (Part of S701).

Insulator (Part of S702).

Contact (Part of S702).

Gasket (Part of S702). Spring (Part of S702).

Contact (Part of S702).

Fastener (Part of J704).

NOT USED.

Eyelet, brass: 1/16 x 5/32.

Spring assembly. (Part of J704).

Insulator, pressure sensitive.

Flat head screw: brass, 2-56 x 5/16. (Part of

Insulator. (Located between System and Receiver

Tape, pressure sensitive. (Specify length).

Rear Cover Assembly (without clip).

Plate nut. (Used with item 39 on S701).

Rear Cover Assembly (with clip).

Washer: teflon.

Rivet, shield.

Spring contact. (Part of S702).

Retaining ring, (Part of S702).

GE PART NO.

19B216520P4

19A127319P2

19C320721P1

19C320559P1

19C320560P1

9A129733P1

19A129734P1

19B216865P1

1647**P5004**C

19B216864P1

19B216863P1

19A127754Pl

19A127755P1

9B216862P1

N330P605F22

N330P602F22

19A127762P1

19B216891G1

19D413467P1

N83P5005E

19B219799**P**1

19C311491P3

19B219510P1

19A116270P1

19C317394P6

9B216897G3

19B216897G4

19A130397P1 9A130586P1

19A115983P10 1033198P18

19A130517P1 4035630P1

N513P604C 19A130926P1

19A127802P1

19A116773P805

19A130993P1

N41P1004

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 19D417102G2

Incorporated into initial shipment.

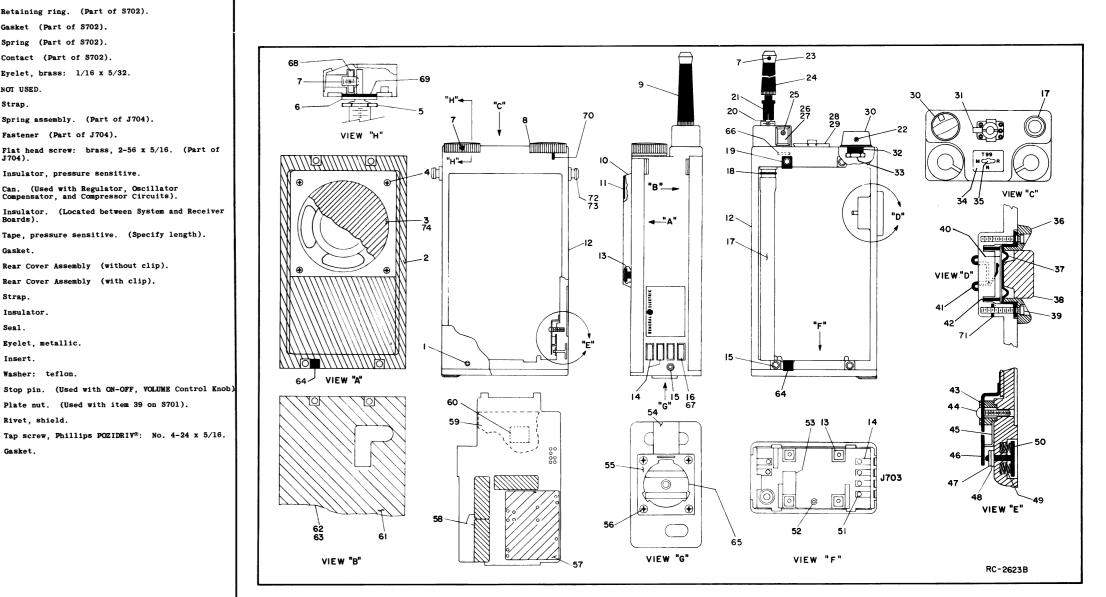
REV. B - To improve relay pick-up performance. Changed K1 and R1.

### REV. A - Case Assembly 19D417330G4

To make compatible with more options. Changed K1, increased size of runs on printed wire board and changed mounting

REV. B - To prevent accidental shorts of battery pack to ground. Added insulator to battery connector J704.

REV. C - To incorporate metal nuts for PTT mounting screws. Changed nuts.



\*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

## MULTI-FREQUENCY MODIFICATIONS

(19D417349, Sh. 1, Rev. 7 & Sh. 2, Rev. 1)

The multi-frequency modifications include instructions for adjusting the stop post on multi-frequency switch Sl, 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.

- . Remove the multi-frequency switch as directed in the Disassembly Procedure. (Refer to combination manual).
- 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.

NO. OF	MOVE ADJUST	TABLE STOP
FREQ.	FROM	TO
2	Н5	Н2
3	Н5	Н3
4	Н5	H4

- Replace the panel seal with the side marked "Bottom" against surface "Z".
- 6. Re-install the Multi-frequency Switch.

## 2-ADDING OSCILLATOR MODULES

 After completing the stop post adjustment, connect the leads from multi-frequency switch S1 as shown in the following chart (see Figure 2 for connection points). Tape back all unused leads.

CONNECTION CHART			
FROM	то	WIRE COLOR	
S1-C1	н11	SFT-BL	
S1-1	J31	SFT-W-BK	
S1-2	J30	SFT-W-O	
S1-3	J24	BR	
S1-4	J25	R	
S1-5	J26	0	
S1-C2	P705-5	SFT-W-R	
S1-7	J303	BL	
S1-8	J304	G	
S1-4	J305	Y	

\* These connections not made in radios equipped with SLM.

NOTE -

ALL WIRE AND JUMPER CONNECTION UNLESS OTHER-WISE SPECIFIED SHOULD BE MADE WITH WIRE 19A115060P30 AND SLEEVED WITH 4038993P4.

- 2. Place the oscillator module(s) in the proper holes (see Figure 2). Then bend over tabs on the can in direction shown and solder to the adjacent pads (see Figure 3).
- 3. Bend the leads of the oscillator module as shown in Figure 3 (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
- 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 <u>and</u> 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.

----- NOTE -

Transmitters may share oscillators exclusively. Receiver oscillators are restricted as follows: receiver oscillators 1 and 2 (on Rx board) may share oscillators and receiver oscillators 3, 4 and 5 (on system board) may share oscillators.

In radios equipped with SLM receiver oscillators 1, 2 and 4 (on receiver board) may share oscillators. Receive oscillators 4 and 5 on system board are replaced by SLM module.

- 1. Set the stop on S1 and install the oscillator modules whose frequencies are  $\underline{\rm not}$  to be repeated as directed in Section I and II.
- Install the oscillator(s) whose frequencies are to be repeated as directed above except solder the Number 4 pin to the "E" pad instead of the "P" pad (see Figure 3).
- 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 anode lead in the Number 4 hole, bending it over and soldering to the "E" 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 3 hole, ande 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 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 to be same as Channel 2.

NOTE -

This example applies to transmitter frequencies only.

- Assemble the oscillator module in Channels 1 and 2 as normal except connect the Number 4 lead to the "E" pad instead of "P" pad.
- 2. Assemble (1) diode in the Number 4 hole, anode lead down, in each of Channels 1, 3, 4, 5, and solder to "P" pads.
- 3. Since two frequencies are being repeated, two additional diodes will be required, one in the Number 3 hole of Channel 3 and the other in the Number 3 hole of Channel 5, anode and down. 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 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.

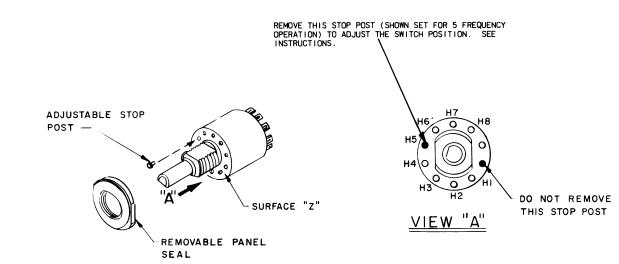


Figure 1 - Stop Post Adjustment

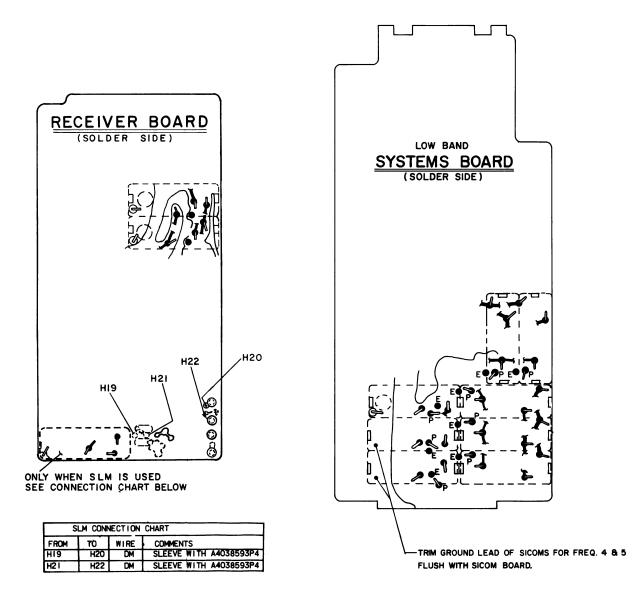
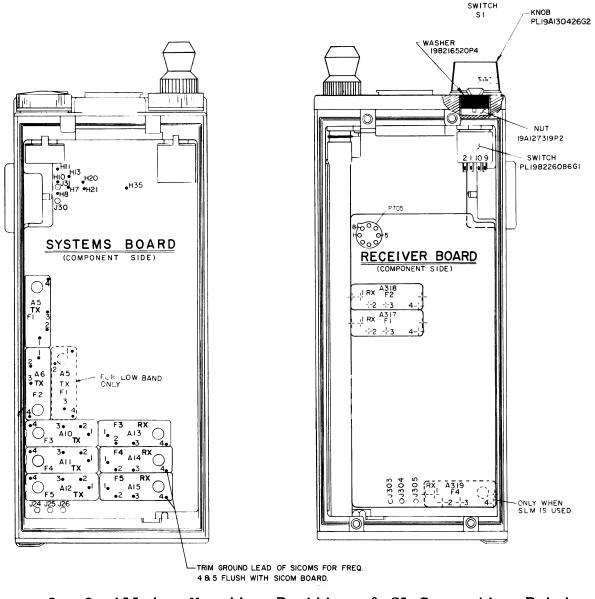


Figure 3 - Oscillator Module and Diode Installation



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Figure 2 - Oscillator Mounting Positions & S1 Connection Points

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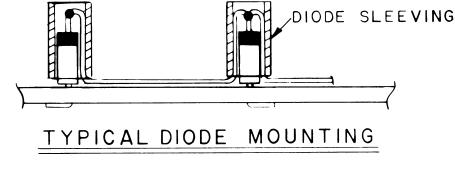


Figure 4 - Typical Diode Mounting

MULTI-FREQUENCY MODIFICATIONS

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