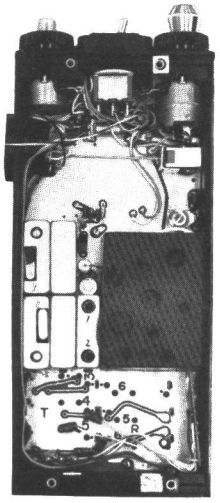
MOBILE RADIO

MASTR®

MVP Personal

SYSTEMS BOARD AND CASE ASSEMBLY 19D417330G5



SPECIFICATIONS *

MODEL NUMBERS	
19D417330G5	150.8-174 MHz
CONTROLS	Volume ON-OFF Switch
	Squelch Control
	Six-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

Maintenance Manual LBI30695D
DATAFILE FOLDER - DF4100

SYSTEMS BOARD AND CASE ASSEMBLY 19D417330G5

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DESCRIPTION

System Board A706 provides system interfacing between the transmitter, receiver, tone options and operating controls in the 150.8 to 174 MHz, six-frequency, local/remote operated MVP, PY Series. The system board contains transmitter oscillator modules A5, A6 and A10 through A13. Other modules on the system board are receiver oscillator modules A14 and A15, audio amplifier module A1, 5.4 Volt regulator module A2, compensator module A3, modulator module A4 and optional compressor module A50. The system board also contains system relay K1 and audio and DC switching circuits.

Accessory jack J701 and jacks J702 and J703, on the case assembly, provide connections for an external speaker, microphone and antenna. Accessory jack J701 provides connections for a remote speaker/microphone. Jack J702 connects an external speaker and antenna. Jack J703 connects an external microphone. Jacks J702 and J703 are used when the PY radio is plugged into either a vehicular or desk charger.

CIRCUIT ANALYSIS

AUDIO SWITCHING

Audio switching for local speaker/microphone LS1 is controlled by forward biasing diode CR5 (See Figure 1). Pressing PTT switch S701 causes the PTT circuit to complete the conduction path of CR5 to system ground. Pressing S701 also causes system relay K1 to apply bias voltage to the anode of CR5. Audio from the local speaker/microphone is then applied through CR5 to the input of transmitter audio module A1. Audio from an external or remote speaker/microphone is applied directly to the input of the transmitter audio module.

Receiver audio is connected directly to all speakers, external, local or remote.

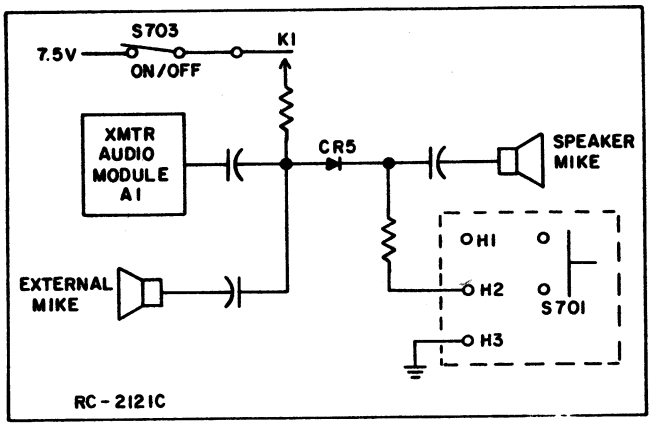

Figure 1 - Audio Switching

DC SWITCHING

Operation of the system relay, keyed locally, is controlled by diode CR2 and PTT circuit A705 (See Figure 2). Pressing PTT switch S701 causes the PTT circuit to complete the conduction path of K1 through CR2 to system ground. Completing the conduction path energizes K1 to switch the battery voltage to the transmitter audio and regulator module. Energizing K1 also connects the transmitter output to the antenna. Keying the radio with an external or remote PTT switch directly energizes the system relay.

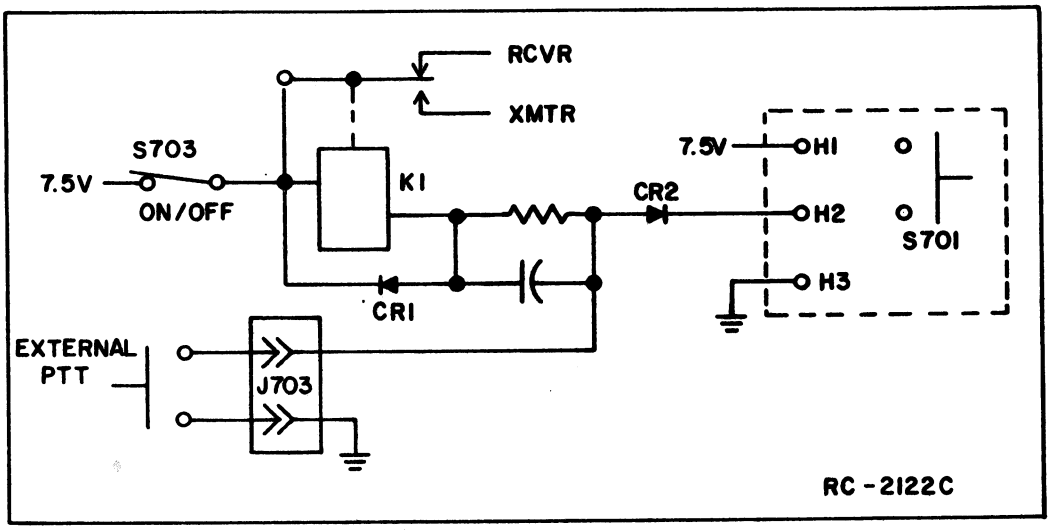

Figure 2 - DC Switching

PTT Switch (A706)

Solid state PTT switch S701 forward biases diodes CR2 and CR5 to energize relay K1, keying the radio and applying audio from the local speaker/microphone to the input of the transmitter audio module.

When S701 is pressed, PNP transistor Q1 of A706 conducts. Transistor Q1 conducting, provides a conduction path to ground for diode CR2. Relay K1 is energized and the radio is keyed.

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 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).

For radios equipped with Channel Guard, Type 90 Encoders/Decoders or Type 99 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.

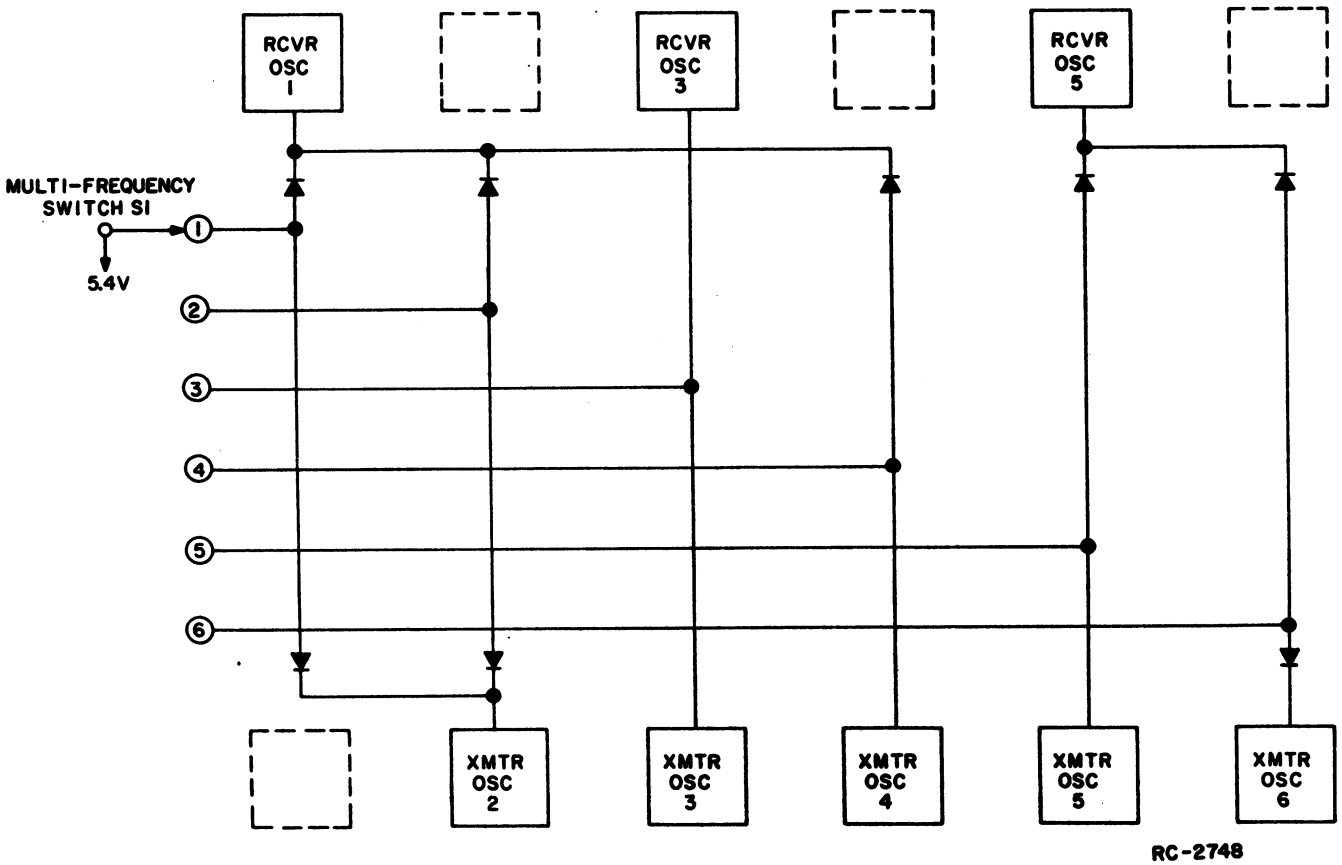

Figure 3 - Repeating Oscillator Modules

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

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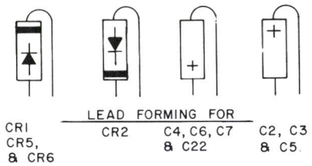
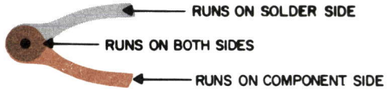
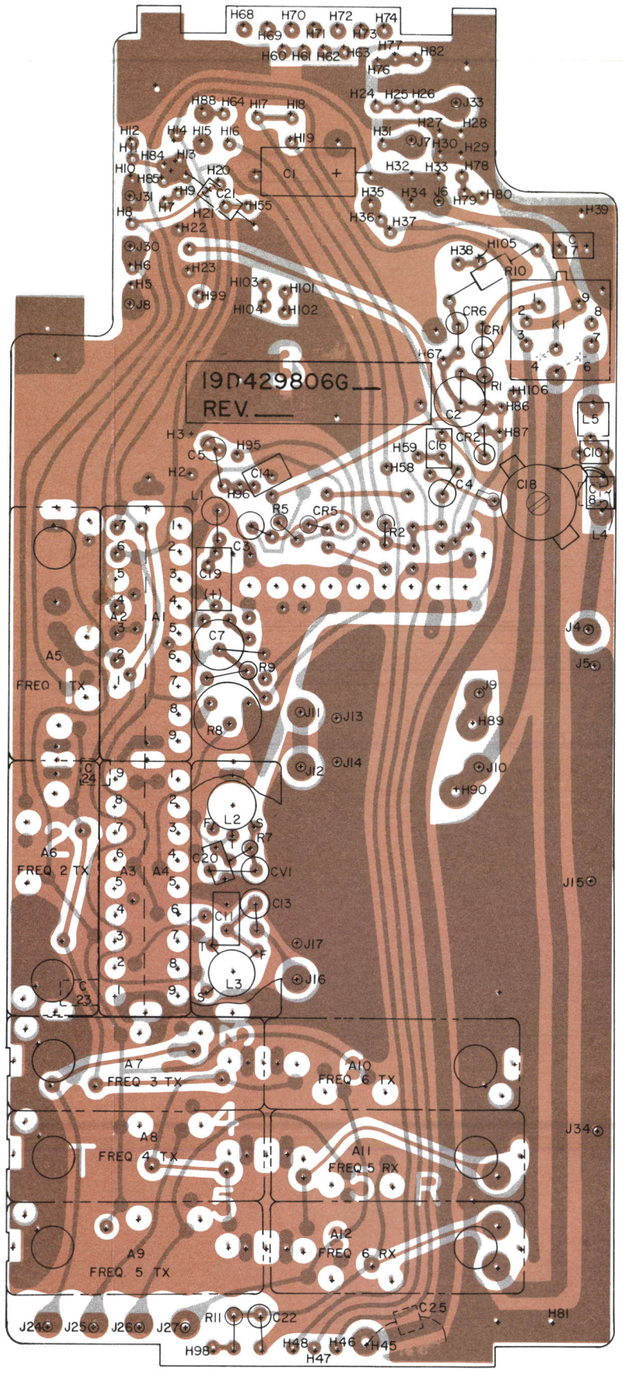
U.S.A.



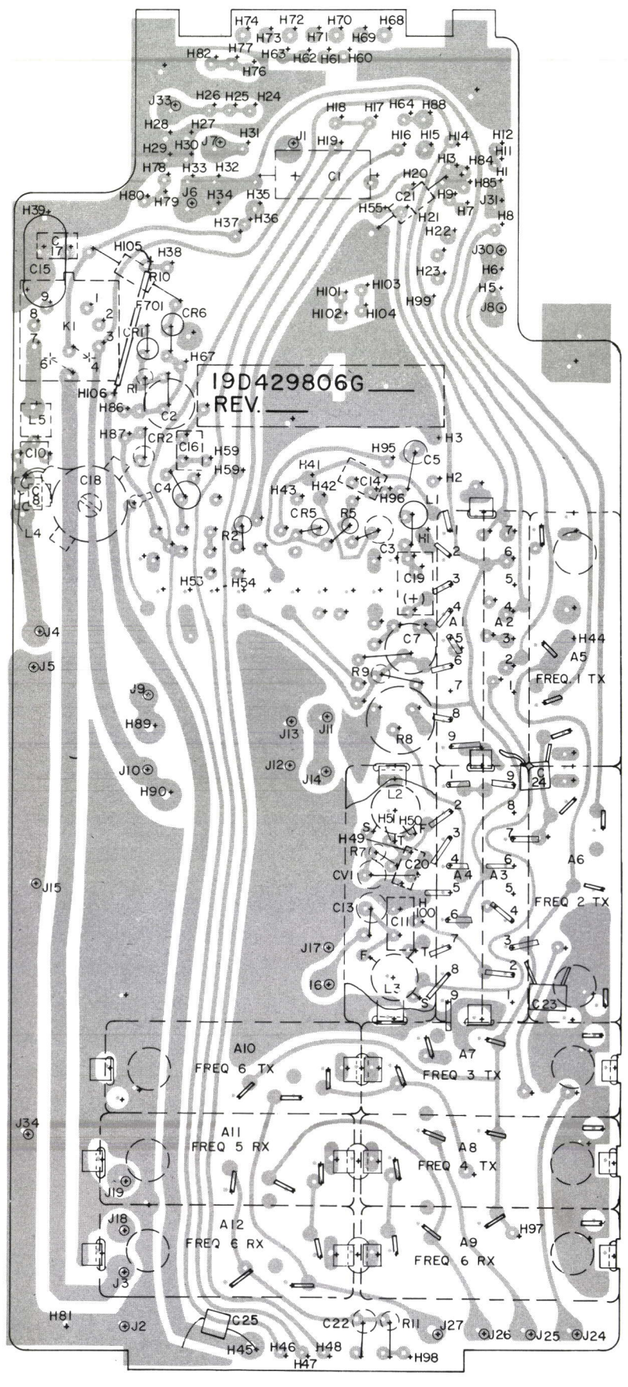


COMPONENT SIDE



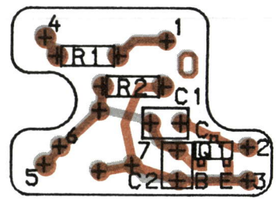
(19D429805, Sh. 2, Rev. 4)
(19D429805, Sh. 3, Rev. 3)

SOLDER SIDE

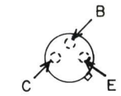


(19D429805, Sh. 2, Rev. 4)

A705



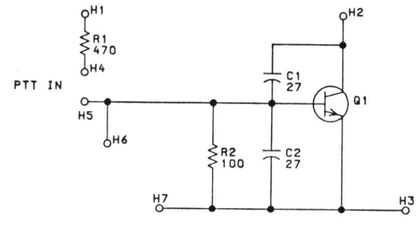
LEAD IDENTIFICATION
FOR Q1 AND Q2



IN-LINE OR TRIANGULAR
TOP VIEW

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

(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)

OUTLINE DIAGRAM

150.8—174 MHz SYSTEM BOARD

(19B430208, Rev. 4)

MODEL NO	REV LETTER
PL19D429806G1	F
PL19D417330G5	D

ALL WIRE T#28 UNLESS OTHERWISE SPECIFIED

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.

□ R1701 IS PART OF KIT PL19A130602G1

NOTES:

1. CONNECT HOLE 42 TO HOLE 41 WHEN COMPRESSOR A50 IS NOT USED.
   CONNECT HOLE 42 TO HOLE 43 WHEN COMPRESSOR A50 IS USED.
2. ● PRESENT IN HI POWER UNITS
   △ NOT PRESENT IN HI POWER UNITS
3. DA=#22 AWG
   ⊛ THESE ITEMS ARE PART OF SWITCH KIT
4. CONNECT HOLE 7 TO HOLE 13 AND REMOVE JUMPER BETWEEN HOLE 7 AND HOLE 10 FOR SINGLE FREQ. RX OPERATION. CONNECT HOLE 20 TO HOLE 21 AND REMOVE JUMPER BETWEEN HOLE 8 AND HOLE 10 FOR SINGLE FREQ. TX OPERATION.
5. GROUND MAY BE MADE THROUGH CAN ONLY ON SICOMS.

(19R622366, Rev. 15)

SCHEMATIC DIAGRAM

150.8—174 MHz SYSTEM BOARD

Issue 5

PARTS LIST

SYSTEM BOARD/CASE ASSEMBLY
19D417733G3 + REV C
ISSUE 5

SYMBOL	GE PART NO.	DESCRIPTION
A705		PTT SWITCH BOARD 19B238281G1
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1 and C2	19A700221P44	Ceramic: 27 pF ±5%, 100 VDCW, temp coef -80 PPM.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q1	19A13473P91	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R151P471J	Composition: 470 ohms ±5%, 1/8 w.
R2	3R151P101J	Composition: 100 ohms ±5%, 1/8 w.
A706		SYSTEM BOARD 19D419806G1
A1	19C320062G1	Transmitter Audio Module.
A2	19C328070G1	Regulator Module.
A3	19C320061G3	Oscillator Compensator.
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*	5491674P1	Tantalum: 1 uF +40-20%, 10 VDCW; sim to Sprague Type 162D. In REV C & earlier:
	5491674P51	Tantalum: 0.033 uF ±10%, 35 VDCW; sim to Sprague Type 162D.
C4*	5491674P51	Tantalum: 0.033 uF ±10%, 35 VDCW; sim to Sprague Type 162D. In REV C & earlier:
	5491674P1	Tantalum: 1 uF +40-20%, 10 VDCW; sim to Sprague Type 162D.
C5	5491674P52	Tantalum: 0.33 uF ±10%, 20 VDCW; sim to Sprague Type 162D.
C7	5491674P42	Tantalum: 47 uF ±20%, 6 VDCW; sim to Sprague Type 162D.
C8	19A116114P20	Ceramic: 6 pF ±5%, 100 VDCW; temp coef 0 PPM.
C10	19A116114P20	Ceramic: 6 pF ±5%, 100 VDCW; temp coef 0 PPM.
C11	19A700221P47	Ceramic: 33 pF ±5%, 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	5496218P36	Ceramic disc: 5.0 pF ±5%, 500 VDCW, temp coef 0 PPM.
C16 and C17	19A700229P73	Ceramic: 180 pF ±10%, 100 VDCW, temp coef -3300 PPM.
C18	19A700012P2	Variable, ceramic: 2.5 to 20 pF 200 VDCW, temp coef -250 -700 PPM; sim to Panasonic ECU1M20X32.
C19	19C307102P19	Tantalum: 68 uF ±20%, 4 VDCW.
C20	19A700227P65	Ceramic: 100 pF ±5%, 100 VDCW, -1500 PPM temp coef.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

SYMBOL	GE PART NO.	DESCRIPTION
C21 and C22	5491674P1	Tantalum: 1 uF +40-20%, 10 VDCW; sim to Sprague Type 162D.
C23*	19A700229P73	Ceramic: 180 pF ±10%, 100 VDCW, temp coef -3300 PPM. Added by REV C.
C24*	19A700229P65	Ceramic: 100 pF ±5%, 100 VDCW, temp coef -2300 PPM. Added by REV C.
C25*	19A700229P73	Ceramic: 180 pF ±10%, 100 VDCW, temp coef -3300 PPM. Added by REV C.
CR1	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
CR2*	19A115100P1	Silicon: sim to Type 1N458A. In REV D & earlier:
	5494922P1	Silicon: sim to Type 1N456.
CR5*	19A115100P1	Silicon: sim to Type 1N458A. In REV D & earlier:
	5494922P1	Silicon: sim to Type 1N456.
CR6	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
CV1	5495769P9	Silicon, capacitive.
F701*	19A127884G1	Fuse Kit. Added by REV B.
J1 thru J5	19A116366P4	Contact, electrical: sim to Concord 10-891-1.
J6 thru J8	19A116366P2	Contact, electrical: sim to Cambion 460-3233-01-05.
J9 thru J19	19A116366P4	Contact, electrical: sim to Concord 10-891-1.
J26 thru J27	19A116366P4	Contact, electrical: sim to Concord 10-891-1.
J30 and J31	19A116366P4	Contact, electrical: sim to Concord 10-891-1.
J33 and J34	19A116366P2	Contact, electrical: sim to Cambion 460-3233-01-05.
K1	19B209562P3	Hermetic sealed: between 45-100 ohms, 2 form C contacts, 5.0 VDC nominal, 1 w max operating; sim to GE 3SB116042.
L1	19B209420P114	Coil, RF: 1.2 uH ±10%, .18 ohms DC res max; sim to Jeffers 4434-1K.
L2	19A127798G1	Coil: 6.05-6.50 uH. Includes:
	19B209436P1	Tuning slug.
L3	19B216910G1	Coil: Includes:
	19B209436P1	Tuning slug.
L4 and L5	19B216320P3	Coil.
R1	19A700106P45	Composition: 180 ohms ±5%, 1/4 w.
R2	3R151P683J	Composition: 68K ohms ±5%, 1/8 w.
R5	3R151P241J	Composition: 240 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 PK.
R9 and R10	3R151P101J	Composition: 100 ohms ±5%, 1/8 w.

SYMBOL	GE PART NO.	DESCRIPTION
R11*	3R151P223J	Composition: 22K ohms ±5%, 1/8 w. Earlier than REV A:
	3R151P103J	Composition: 10K ohms ±5%, 1/8 w.
J701	19B216594G2	- - - - - - - - JACKS AND RECEPTACLES - - - - - - - - Connector, female: 6 contacts.
J702		See Mechanical Parts.
J703		See Mechanical Parts.
J704		See Mechanical Parts RC3744 items 57-61.
L701	19A127815P1	- - - - - - - - - - INDUCTORS - - - - - - - - - - Coil.
P701	19A115834P4	- - - - - - - - - - PLUGS - - - - - - - - - - Contact, electrical: sim to AMP 2-332070-9.
P704 and P705	19A116137P3	Socket, crystal: 8 contacts; sim to Cinch 133-98-90-081 Special. (Part of W1A).
R707	19A116227P1	- - - - - - - - - - RESISTORS - - - - - - - - - - Resistor/Switch: variable, carbon film, 25K ohms ±20%, 1/8 w, SPST, 3 amps at 125 VAC; sim to Mallory Type M3C. (Includes S703).
R708	19A116227P2	Variable, carbon film: 25K ohms ±10%, 1/8 w; sim to Mallory Type M3C.
R709	3R151P152J	Composition: 1.5K ohms ±5%, 1/8 w.
R1701	3R152P471J	Composition: 470 ohms ±5%, 1/4 w. (Part of Intrinsically Safe Kit 19A130602G1).
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S701		See Mechanical Parts RC3744 items 36-42, & 74.
S702		See Mechanical Parts RC3744 items 46-53.
S703		(Part of R707).
W1A	19C330826G2	- - - - - - - - - - CABLES - - - - - - - - - - Cable. (Includes P704 & 705).
		ASSOCIATED PARTS
		- - - - - - - - - - OSCILLATORS - - - - - - - - - -
		NOTE: When reordering, give GE Part Number and specify exact frequency needed.
A5, thru A10	4EG27A10	Oscillator Module. Fx = $\frac{Fo}{72}$
A11 and A12	4EG36A10	Oscillator Module. Fx = $\frac{Fo - 20\ MHz}{9}$
		FRONT COVER ASSEMBLY 19C317416G8 LOW POWER 19C317416G11 HIGH POWER
LS1	19A134949P1	- - - - - - - - - - LOUDSPEAKERS - - - - - - - Permanent magnet: 2.00 inch, 8 ohms ±15% voice coil imp, 500 Hz ±50 Hz resonant, 1/2 w; sim to Oaktron 76703.
P1 and P2	19A115834P1	- - - - - - - - - - PLUGS - - - - - - - - - - Contact, electrical: sim to AMP 2-330808-8.
		MULTI-FREQUENCY KIT 19A129792G2
S1	19B219976G2	- - - - - - - - - - SWITCHES - - - - - - - - - - Switch Assembly.

SYMBOL	GE PART NO.	DESCRIPTION
	19B216897G3	- - - - - - - - - - MISCELLANEOUS - - - - - - - - - - Rear Cover. (Without clip).
	19B216897G4	Rear Cover. (With clip).
	19B219888P1	Antenna Assembly.
	19D413522G4	Battery, rechargeable. Nickel Cadmium.
	4038831P5	Alignment tool, fork tip.
	19B219079G1	Alignment tool. Allen tip.
	715072P94	Allen wrench. (Used with No. 10 set screw or No. 5-40 socket head cap screws).
	19A124457P1	Tuning tool, variable capacitor. (0.029 inch square metal tip).
		MECHANICAL PARTS (SEE RC3744)
1	19A127319P1	Hex nut: No. thd. size 1/4-32.
2	4037064P18	Washer, non-metallic: 1/4 inch.
3	403563G91	Washer: teflon, 1/4 inch.
4	19B232784G2	Knob Assembly. (Includes items 5 & 6).
5	19A143453P2	Set screw, self locking: 3-48 x 3/16. (Part of item 4).
6	19A137254P1	Insert, tapered. (Part of item 4).
7	19A127802P1	Rivet, shield.
8	19A116773P805	Tap screw, Phillips POZIDRIV®: No. 4-24 x 5/16.
9	19B227270G1	Grille. (Used in low power only).
10	19B227270G2	Grille. (Used in high power only).
11	19D413543G12	Case. (Includes items 7, 17, 22, 54, 65 & 62).
12	9P280150P1	Nameplate. (GE Monogram).
13	9P280150P2	Nameplate. (GE Monogram - HI POWER).
14	19B216858P1	Insert.
15	9681P5003C6	Screw, phillips head: No. 2-56 x 1/8.
16	9P270687	Nameplate. (Property of General Electric).
17	19A134548P1	Insert, screw thread: No. 2-56; sim to IN-3880256.
18		(Not used).
19	M170P08006C17	Cap screw: No. 4-40 x 1/4.
20	19A127779G8	Antenna tube. (Includes item 21, teflon insert).
21	19A129651P1	Teflon insert.
22	19B216875P1	Support.
23	19B219888P1	Antenna Assembly. (Includes item 24 cap).
24	19B219888P4	Antenna Assembly.
25	19C317383P1	Dummy plug.
26	19A115983P3	Seal, "O" ring: sim to Parker Seal 2-10.
27	R509P606C	Dowel pin: 1/16 x 3/8.
28	19B219510P1	Insulator.
29	19A130397P1	Strap.
30	19C317394P4	Gasket.
31	19A130993P1	Gasket. (Not Used).
32	19A143483P1	Diaphragm: No. 2 inch dia.
33	19A116270P1	Tape, pressure sensitive. (Specify length).
34	9330P603P22	Eyelet, metallic: 1/16 x 1/16.
35	19C331491P3	Strap.
36	19A137825P2	Spring. (Part of S7010.
37	19C328460P1	Button assembly. (Part of S701).
38	4035306P71	Fiber washer. (Part of S701).
39	R55P1006	Machine screw, slotted steel: No. 0-80 x 3/8. (Part of S701).

SYMBOL	GE PART NO.	DESCRIPTION
40	19C328407P1	Collar. (Part of S701).
41	19C331441P1	Boot, silicon rubber. (Part of S701).
42	19A144358G1	Switch, push. (Part of S701).
43	19B216897G3	Rear Cover Assembly. (without clip).
44	19B216897G4	Rear Cover Assembly. (with clip).
45	19C317394P6	Gasket.
46	19B216865P1	Insulator. (Part of S702).
47	R647P5006C	Cap screw: 2-56 x 1/4. (Part of S702).
48	19B216864P1	Contact. (Part of S702).
49	19B216863P1	Spring contact. (Part of S702).
50	R910P6C6	Retaining ring. (Part of S702).
51	19A127754P1	Gasket. (Part of S702).
52	19A127755P1	Spring. (Part of S702).
53	19B216862P1	Contact. (Part of S702).
54	19A127753P1	Contact.
55	19A127762P1	Strap.
56	9330P605P22	Eyelet, metallic: 1/16 x 5/32.
57	19B232109P1	Button plug.
58	19A130586P1	Insulator.
59	19A115794P3	Flat head screw: 2-56 x 5/16.
60	19D413467P1	Fastener.
61	19B216891G1	Spring assembly.
62	19A129723P1	Rivet.
63	19C317050P1	Protective cover.
64	19B219540P1	Catch.
65	19A129399P1	Disc.
66	19A130426G2	Knob Assembly. (Includes items 67 & 68).
67	19A130517P1	Insert. (Part of item 66).
68	19A143453P2	Set screw, self locking: 3-48 x 3/16. (Part of item 66).
69	19A143680P1	Washer, non metal. (Located against hex nut, item 1).
70	19A134425P1	Machine screw, Hex head: No. 2-56 x 3/16.
71	19C317383P1	Dummy plug.
72	403398P18	Metallic eyelet.
73	19A129723P2	Hex nut: No. thd. size 1/4-28.
74	19B234081P1	Spacer. (Part of S701).

PRODUCTION CHANGES

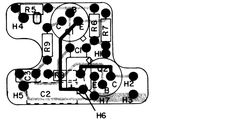
Changes in the equipment to improve performance or to simplify circuits are identified by a "Revision Letter," which is stamped after the model number of the unit. The revision stamped on the unit includes all previous revisions. Refer to the Parts List for descriptions of parts affected by these revisions.

REV. A - PTT Switch Board 19B238281G1
To improve performance of PTT in RF environment and low voltage condition.
Deleted C1 and changed R7.

REV. B - To improve performance of PTT switch in UHF RF environment. Added C5.

REV. C - To make compatible with other options.
Reissd out circuit board.

Outline Diagram was:



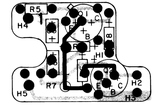
REV. A - System Board 19D429806G1
To improve Channel Guard operations.
Co-spot #11.

REV. B - To reduce size of fuse wire to insure more reliability if a short circuit occurs.

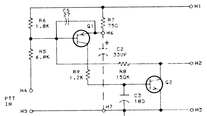
REV. C - To improve operation of modulation circuit.
Added C23 and C24.

REV. A - System Board and Case Assembly 19D417330G5
To incorporate a new design PTT switch.
Changed A705 from 19B232586G2 to 19B233821G1.

Outline Diagram was:

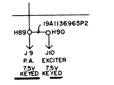


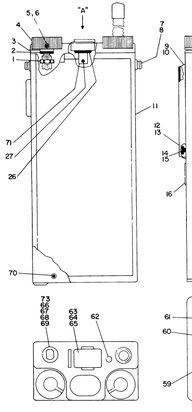
Schematic Diagram was

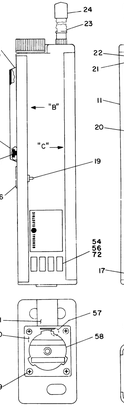


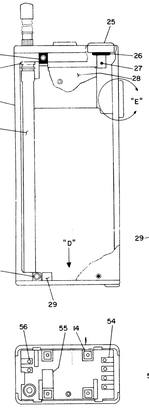
REV. B - To improve relay operations . Removed PA output translator from keyed 7.5vdc and connected it to continuious 7.5 vdc.

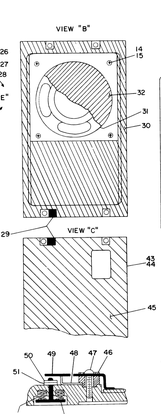
Schematic Diagram

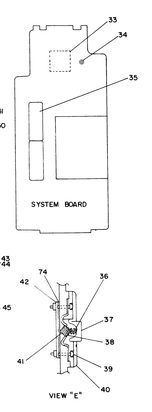












RC-3744B

PRODUCTION CHANGES

(Cont'd from page 6)

REV. C - System Board/ Case Assembly 19D417330G5

REV. F - System Board 19D429804G1

To prevent the 5 - Watt PA from oscillating when the radio is unkeyed, and to incorporate a more rugged relay. Changed K1.

K1 was:
19B209562P2 Hermetic sealed: between 45-100 ohms, 2 form C contacts, 5.0 VDC nominal, 1.0 w max operating; sim to GE 3SC5100A2.

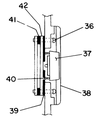
REV. D - System Board/ Case Assembly 19D417330G5

To incorporate a new PTT switch.

Parts List was:

36	X5SP1006	Machine screw, slotted steel: No.0-80 x 3/8. (Part of S701).
37	19C328416G1	Button assembly. (Part of S701).
38	19C328407P1	Collar. (Part of S701).
39	19A137421P1	Plate. (Part of S701).
40	19A137620P1	Spring. (Part of S701).
41	X207F1C6	Hex nut. (Part of S701).
42	19B209643P2	Switch, push. (Part of S701).

Mechanical Breakdown was:



VIEW "E"

LBI30695 (19D429830, Sh. 1, Rev. 2 & Sh. 2, Rev. 0)

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 LBI-4993).
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 Freq.	Move Adjustment Stop To:
2	H2
3	H3
4	H4
5	H5
6	H6

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)	BL	
S1-1	J31	W-BK	1
S1-2	J30	W-O	2
S1-3	J24	BR	3
S1-4	J25	R	4
S1-5	J26	O	5
S1-6	J27	Y	6
S1-3	H104	W-R	3
S1-4	H102	W-Y	4

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).
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 1 and 2.
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 19A115100P1 in the space normally intended for the oscillator module by putting the anode 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 (19A115100P1) is to be assembled in respective channel closest to the oscillator module being repeated. Assemble the diode in the Number 1 hole, anode 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.

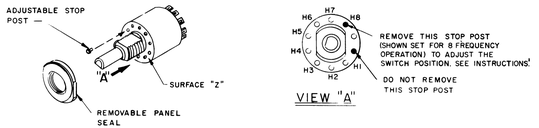


Figure 1 - Stop Post Adjusment

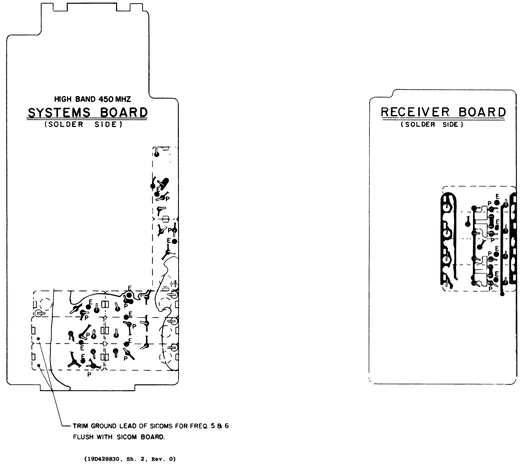


Figure 2 - Oscillator Module and Diode Installation

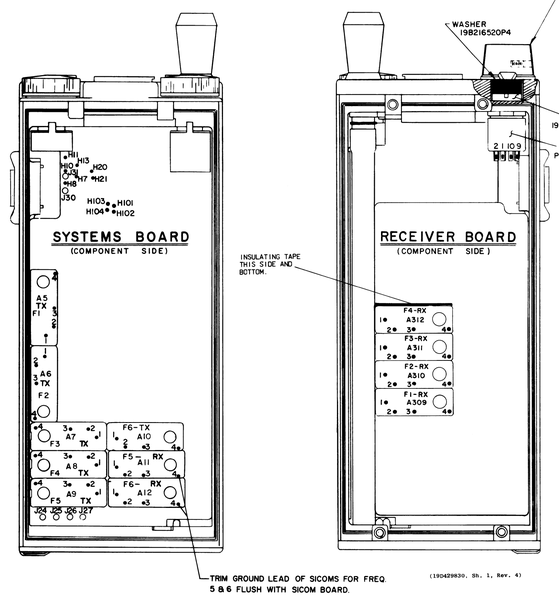


Figure 3 - Oscillator Mounting Positions & S1 Connection Points

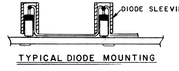


Figure 4 - Typical Diode Mounting

THESE INSTRUCTIONS COVER THE INSTALLATION OF MODIFICATION KIT PL19A129762G1 FOR APPLICATION OF MULTI FREQUENCY TO G FREQUENCY PV

CONNECTION CHART		
FROM	TO	WIRE COLOR
S1-C1	H11	SPT-BL
S1-1	J31	SPT-W-BK
S1-2	J30	SPT-W-O
S1-3	J24	BR
S1-4	J25	R
S1-5	J26	O
S1-6	J27	Y
S1-3	H104	W-R
S1-4	H102	W-Y

INSTRUCTIONS FOR ONE OR MORE TX AND ONE OR MORE RX.

1. SOLDER ALL ELECTRICAL CONNECTIONS.
2. SET STOP PER INSTRUCTION AND ASSEMBLE THE MULTI-FREQUENCY SWITCH (S1) PER INSTRUCTION ON SETTING STOPS.
3. MAKE ELECTRICAL CONNECTIONS FROM S1 TO COMPONENT SIDE OF SYSTEM BOARD PER "CONNECTION CHART" SHOWN ABOVE.
4. ALL WIRE AND JUMPER CONNECTION UNLESS OTHERWISE SPECIFIED SHOULD BE MADE WITH WIRE 19A115049P30 AND SLEEVED WITH 4038591P4.
5. TABS ON CANS OF SICOM(S) A5 - A10 ON TX AND A11, A12 - A309-A312 ARE TO BE BENT OVER IN DIRECTION SHOWN AND SOLDERED TO ADJACENT PADS.
6. LEADS OF SICOM(S) A5 - A10 ON TX AND A309 - A312, A11, A12 FOR RX ARE TO BE BENT OVER IN DIRECTION SHOWN AND SOLDERED TO ADJACENT PADS.

INSTRUCTIONS FOR 1 FREQ RX AND 1 FREQ TX

6.1 SAME AS ABOVE # 1, 4, 5, 6

6.2 REMOVE JUMPER FROM H7 TO H10 AND ADD JUMPER BETWEEN H7 TO H13 FOR RX OPERATION

6.3 REMOVE JUMPER BETWEEN H8 TO H10 AND ADD JUMPER BETWEEN H20 TO H21 FOR TX OPERATION.

INSTRUCTIONS FOR 2 OR MORE FREQUENCY TX AND 1 FREQUENCY RX.

7. SAME AS 1 THRU 6 PLUS REMOVE JUMPER FROM H7 TO H10 AND ADD JUMPER FROM H7 TO H13.

INSTRUCTIONS FOR 2 OR MORE FREQUENCY RX AND 1 FREQUENCY TX.

8. SAME AS 1 THRU 6 PLUS REMOVE JUMPER FROM H8 TO H10 AND ADD JUMPER BETWEEN H20 AND H21.
9. WHEN RX A312 IS INSTALLED APPLY INSULATING TAPE TO ONE SIDE AND BOTTOM TC ELIMINATE POTENTIAL SHORTS.

NOTE. WHEN OPTION(S) 4478 AND/OR 4479 ARE SPECIFIED, OMIT THE APPROPRIATE SICOM(S).

1. ASM OF MULTI FREQ SWITCH KIT
2. ASM OF 1 TX SICOM & 1 RX SICOM
3. ASM OF 2 TX SICOMS & 2 RX SICOMS
4. ASM OF 3 TX SICOMS & 3 RX SICOMS
5. ASM OF 4 TX SICOMS & 4 RX SICOMS
6. ASM OF 5 TX SICOMS & 5 RX SICOMS
7. ASM OF 6 TX SICOMS & 6 RX SICOMS