MOBILE RADIO

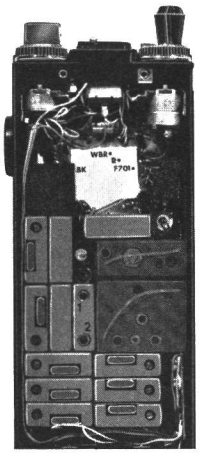
MASTR® Personal Series

PROGRESS LINE

PE MODELS

SYSTEMS BOARD AND CASE ASSEMBLY 19D413548G3

Maintenance Manual LBI 4662E
DATAFILE FOLDER DF 4097



SPECIFICATIONS *

MODEL NUMBERS	
19D413548G3	138-174 MHz
CONTROLS	Volume ON-OFF Switch Squelch Control Eight-Frequency Selector Switch PTT Switch Tone Option Switch Antenna Accessory

SYSTEM BOARD AND CASE ASSEMBLY 19D413548G3

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

GENERAL ELECTRIC

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 A703 provides system interconnections for the transmitter, receiver, tone options and operating controls. In addition to the transmitter 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.

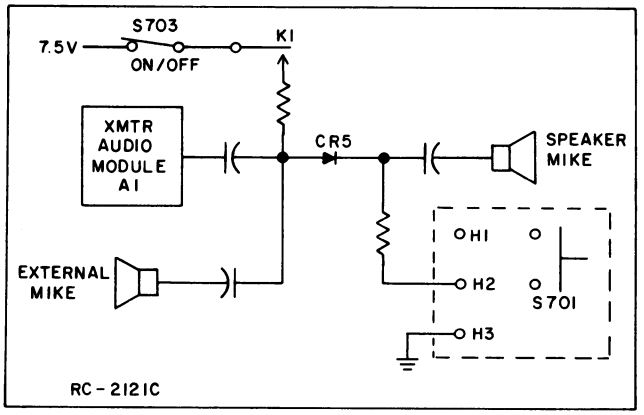


Figure 1 - Audio Switching Circuit

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).

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.

PTT SWITCH (A719)

Solid State PTT switch S701 forward biases diode CR2 to energize relay K1 and

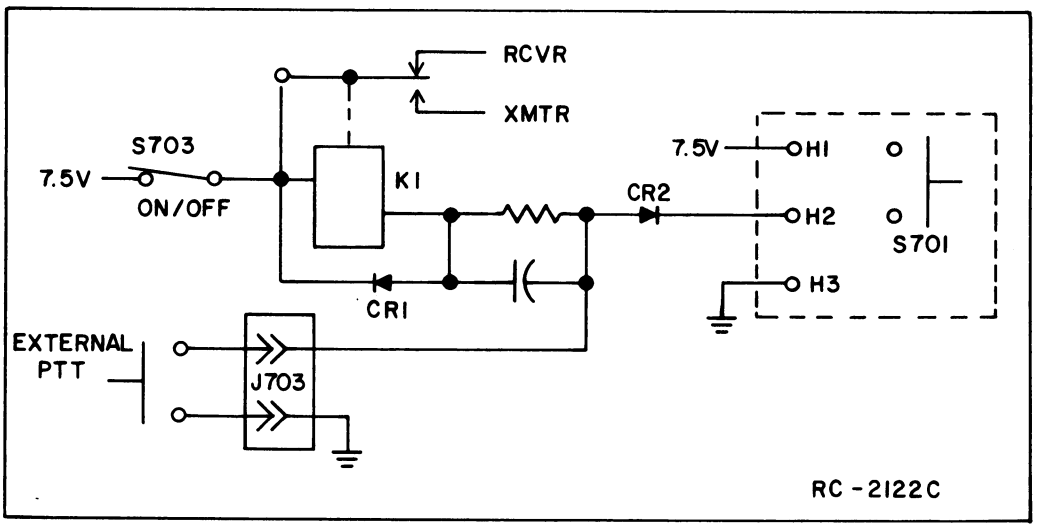


Figure 2 - DC Switching Circuit

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 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 or Type 90 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.

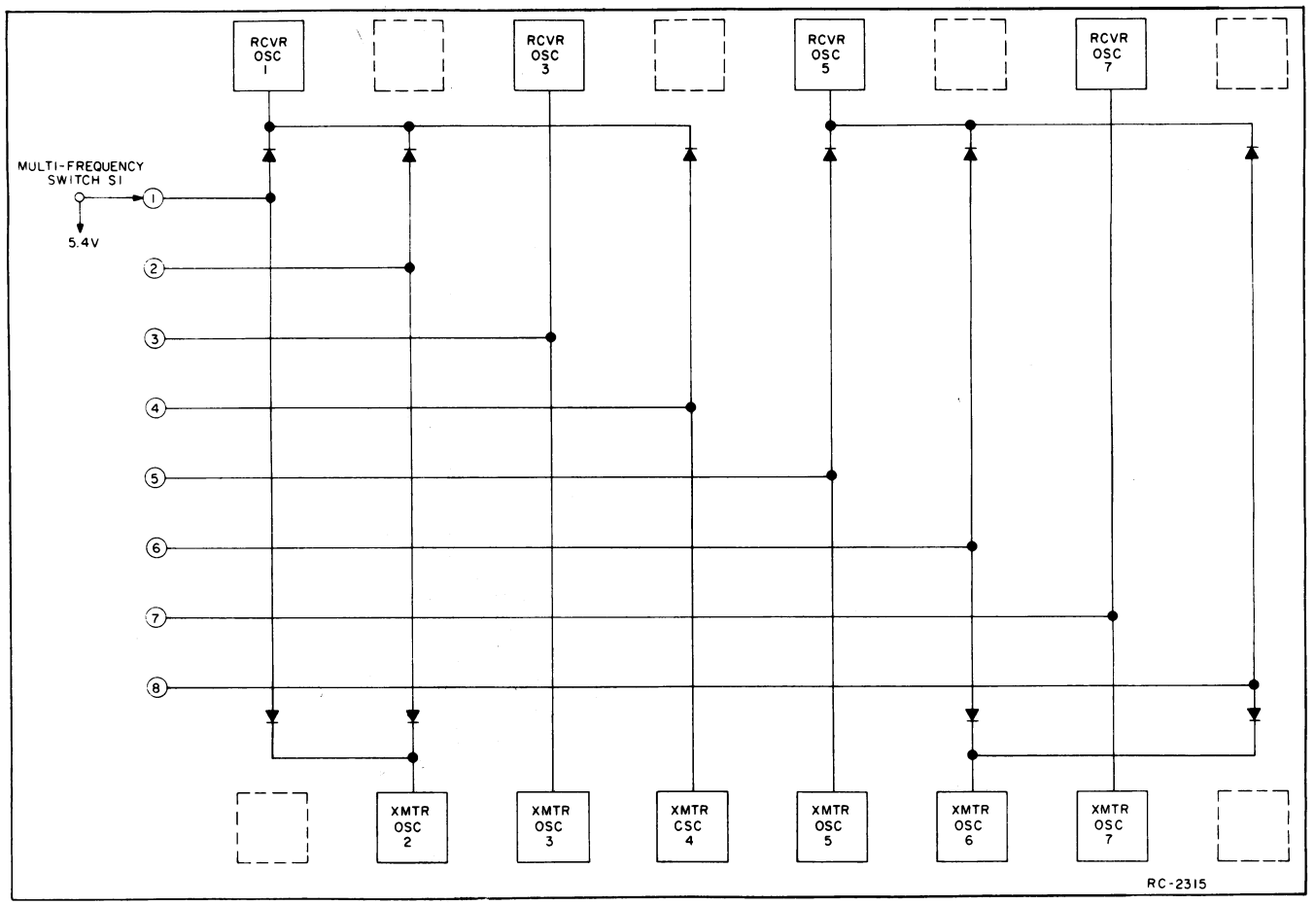
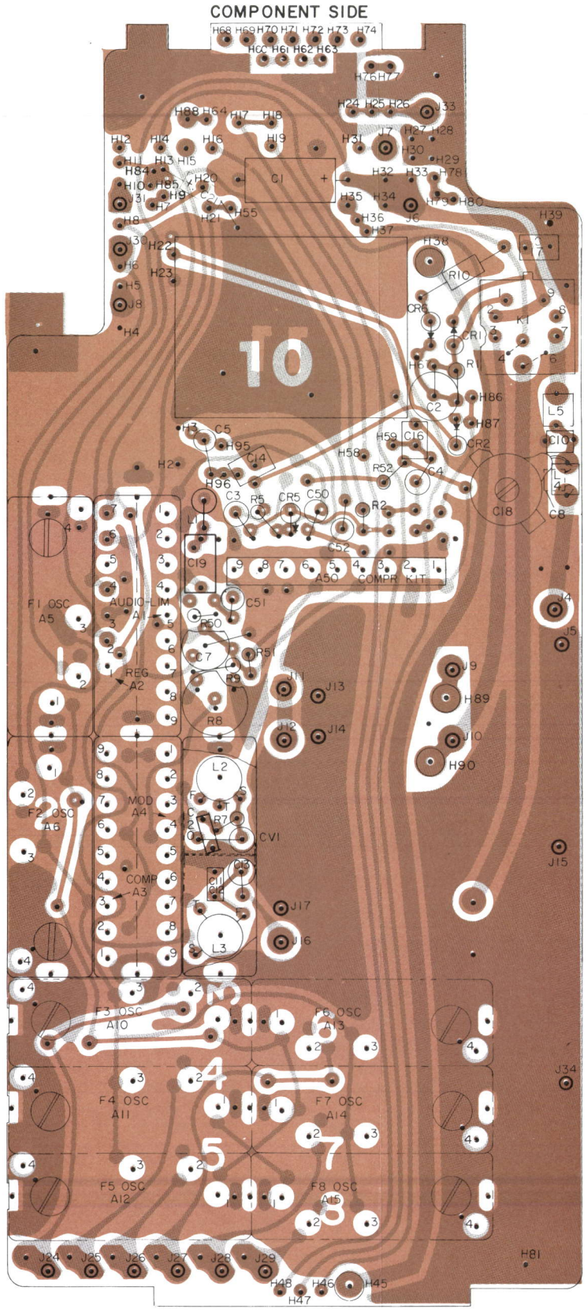


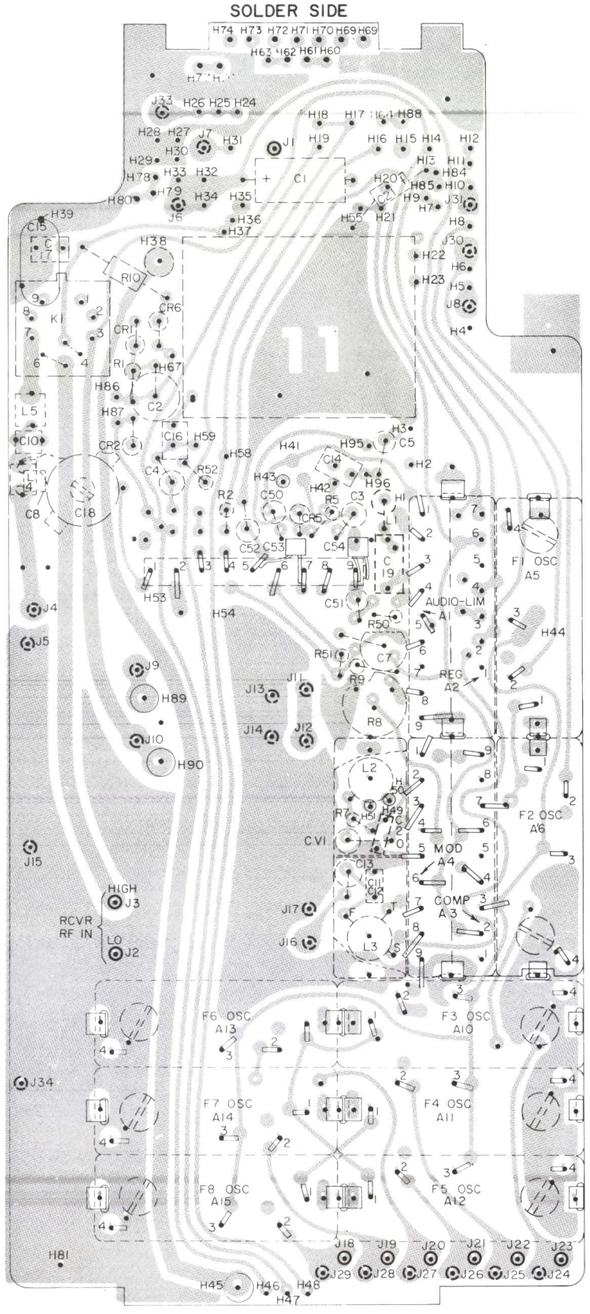
Figure 3 - Repeating Oscillator Modules

COMPONENT SIDE



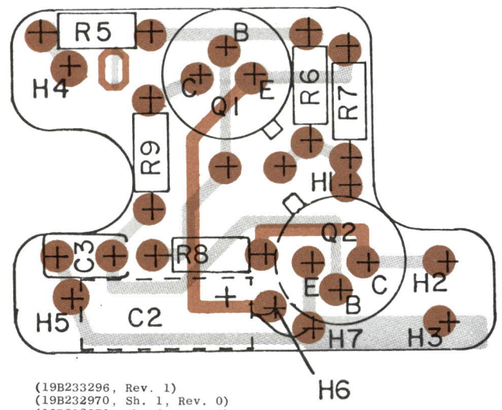
(19D416845, Rev. 11)
(19D416505, Sh. 1, Rev. 10)
(19D416505, Sh. 2, Rev. 11)

SOLDER SIDE



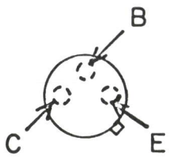
(19D416845, Rev. 11)
(19D416505, Sh. 2, Rev. 11)

A719



(19B233296, Rev. 1)
(19B232970, Sh. 1, Rev. 0)
(19B232970, Sh. 2, Rev. 1)

LEAD IDENTIFICATION FOR Q1 AND Q2

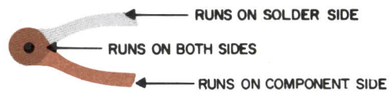


OR

IN-LINE TRIANGULAR

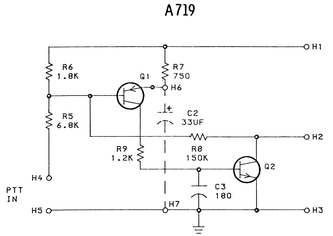
TOP VIEW

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



OUTLINE DIAGRAM

138—174 MHz SYSTEM BOARD

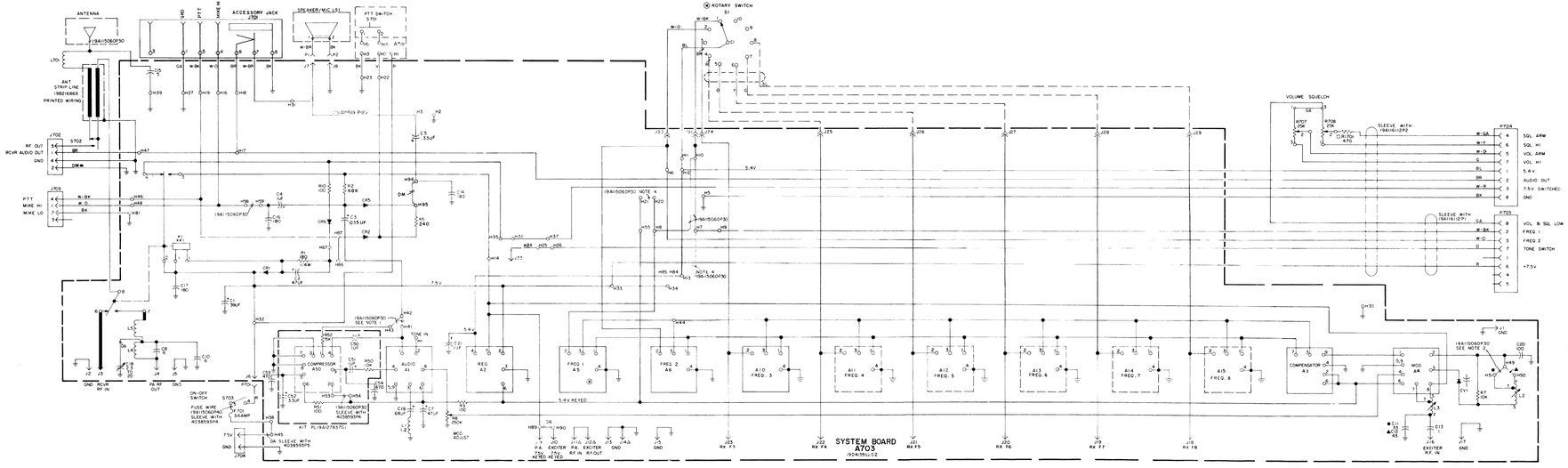


MODEL NO	REV LETTER
PL19B232586G2	A

NOTE:
C2 IS PART OF KIT 19A136579

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.

(19B239959, Rev. 3)



SCHEMATIC DIAGRAM

138—174 MHz SYSTEM BOARD

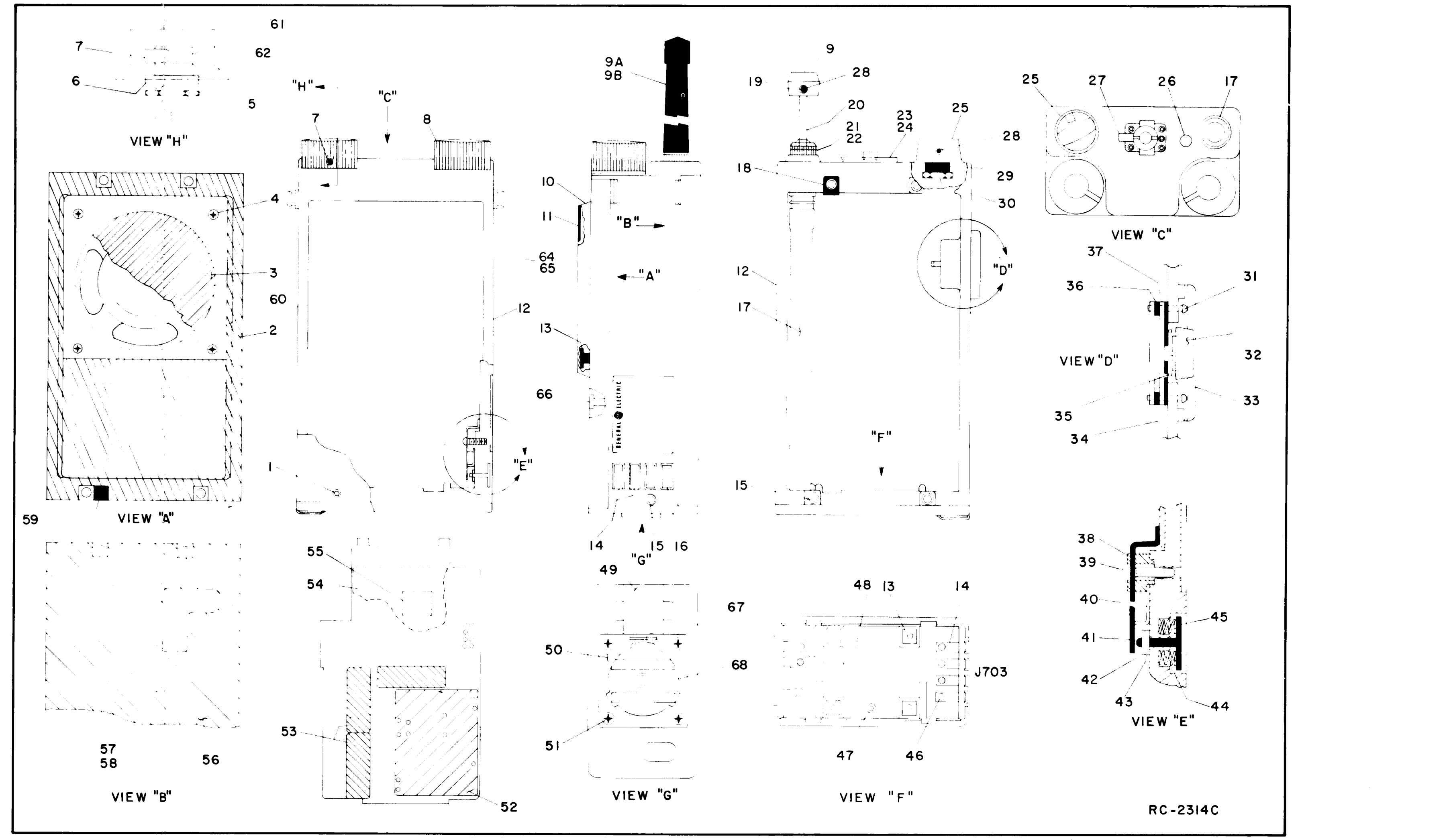
PARTS LIST

LBI4369F

SYSTEM BOARD/CASE ASSEMBLY
19D413548G3
AND
ASSOCIATED ASSEMBLIES

SYMBOL	GE PART NO.	DESCRIPTION
A703		SYSTEM BOARD 19D413552G2
A1	19C320062G1	Transmitter Audio Module.
A2*	19C328070G1	5.4 Volt Regulator Module.
		In REV G & earlier:
	19C311905G2	5.4 Volt Regulator Module.
A3	19C320060G1	Oscillator Compensator Module.
A4	19C320084G1	Modulator Module.
		NOTE: When reordering A5, A6, A10-A15 g GE Part Number and exact crystal frequency. Crystal Freq = Operating Freq / 12
A5 and A6	4EG27A10	Transmitter Oscillator.
A10 thru A15	4EG27A10	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: 0.033 µf ±10%, 35 VDCW; sim to Sprague Type 162D.
		In REV F:
	5491674P49	Tantalum: 0.068 µf ±10%, 20 VDCW; sim to Sprague Type 162D.
		In REV E & 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 F:
	5491674P48	Tantalum: 0.68 µf ±10%, 10 VDCW; sim to Sprague Type 162D.
		In REV A-E:
	19A116244P2	Ceramic: 0.022 µf ±20%, 50 VDCW.
		Earlier than REV A:
	5491674P1	Tantalum: 1.0 µf +40-20%, 10 VDCW; sim to Sprague Type 162D.
C7	5491674P42	Tantalum: 47 µf ±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.
C13	5491601P120	Phenolic: 1.0 pf ±5%, 500 VDCW.
C14	19A116114P10073	Ceramic: 180 pf ±5%, 100 VDCW; temp coef -3300 PPM.
C15	5496218P36	Ceramic disc: 5.0 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C16 and C17	19A116114P10073	Ceramic: 180 pf ±5%, 100 VDCW; temp coef -3300 PPM.
C18	19B209351P2	Variable: 2.5 to 20 pf, 200 VDCW, temp coef -250 +700 PPM/°C; sim to Matshushita ECV-1ZW20P32.
C19	19C307102P19	Tantalum: 68 µf ±20%, 4 VDCW.
C20	19A116114P8065	Ceramic: 100 pf ±5%, 100 VDCW; temp coef -1500 PPM.
C21*	5491674P1	Tantalum: 1.0 µf +40-20%, 10 VDCW; sim to Sprague Type 162D. Added by REV H.
		- - - - - - - DIODES AND RECTIFIERS - - - - -
CR1 and CR2	19A115100P1	Silicon: sim to Type 1N458A.
CR3* and CR4*	5494922P1	Silicon; sim to Hughes 1N456. Deleted by REV C.
CR5	19A115100P1	Silicon: sim to Type 1N458A.
CR6	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
CV1	5495769P9	Diode, silicon.
		- - - - - - - JACKS AND RECEPTACLES - - - - - -
J1* thru J5*	19A116366P4	Contact, electrical: sim to Concord 10-891-1.
		In REV C & earlier:
	19A116366P1	Contact, electrical: sim to Cambion 3232-1.
J6 thru J8	19A116366P2	Contact, electrical: sim to Cambion 3233-1.
J9* thru J31*	19A116366P4	Contact, electrical: sim to Concord 10-891-1.
		In REV C & earlier:
	19A116366P1	Contact, electrical: sim to Cambion 3232-1.
J32*	19A116366P2	Contact, electrical: sim to Cambion 3233-1. Deleted by REV D.
J33 and J34	19A116366P2	Contact, electrical: sim to Cambion 3233-1.
		- - - - - - - - - - - RELAYS - - - - - - - - - -
K1*	19B209562P2	Relay, hermetic sealed: between 45 and 100 ohms, 2 form C contacts, 5.0 VDC nominal, 1.0 w max operating; sim to GE 3SCS1002A2.
		In REV D:
	19B209562P1	Hermetic sealed: 98 ohms ±10%, 2 form C contacts, 6.0 VDC nominal, 1.0 w max operating; sim to GE 3SCS1001A2. Added by REV D.
		- - - - - - - - - - - INDUCTORS - - - - - - - -
L1	19B209420P114	Coil, RF: 1.20 µh ±10%, 0.18 ohms DC res max; sim to Jeffers 4436-1K.
L2	19A127798G1	Coil: 6.05-6.50 µh.
L3	19B216910G1	Coil.
L4 and L5	19B216320P3	Coil.
		- - - - - - - - - MICROPHONES - - - - - - - -
MK1*	19B201559P1	Cartridge, controlled magnetic: used with 2000 ohms res load; sim to Shure Bros. MC 30. Deleted by REV A.
		- - - - - - - - - - RESISTORS - - - - - - - - -
R1*	3R152P181J	Composition: 180 ohms ±5%, 1/4 w.
		In REV D:
	3R152P221J	Composition: 220 ohms ±5%, 1/4 w.
		In REV C & earlier:
	3R151P391J	Composition: 390 ohms ±5%, 1/8 w.
R2*	3R151P683J	Composition: 68K ohms ±5%, 1/8 w.
		In REV E & earlier:
	3R151P913J	Composition: 91K ohms ±5%, 1/8 w.
R3*	3R151P103J	Composition: 10K ohms ±5%, 1/8 w. Deleted by REV C.
R5*	3R151P241J	Composition: 240 ohms ±5%, 1/8 w.
		In REV E & earlier:
	3R151P103J	Composition: 10K ohms ±5%, 1/8 w.
R6*	3R151P222J	Composition: 2.2K ohms ±5%, 1/8 w. Deleted by REV F.
R7	3R151P103J	Composition: 10K ohms ±5%, 1/8 w.
R8	19A116412P4	Variable, cermet: 250K ohms ±10%, 0.16 w; sim to Helipot Model 62 PF.
R9 and R10	3R151P101K	Composition: 100 ohms ±10%, 1/8 w.
		- - - - - - - - - - - SOCKETS - - - - - - - - - -
XK1*	19A115834P5	Contact, electrical: sim to AMP 3-331272-5. (Quantity 7). Deleted by REV D.
A719*		PUSH TO TALK SWITCH BOARD 19B232586G2 (Added by REV H)
		- - - - - - - - - - CAPACITORS - - - - - - - -
C1*	19A116114P10073	Ceramic: 180 pf ±10%, 100 VDCW; temp coef -3300 PPM. Deleted by REV A.
C3	19A116114P10073	Ceramic: 180 pf ±10%, 100 VDCW; temp coef -3300 PPM.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A129187P1	Silicon, PNP.
Q2	19A116201P3	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - - -
R5	3R151P682J	Composition: 6.8K ohms ±5%, 1/8 w.
R6	3R151P182J	Composition: 1.8K ohms ±5%, 1/8 w.
R7*	3R151P751J	Composition: 750 ohms ±5%, 1/8 w.
		Earlier than REV A:
	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.
A719*		PUSH TO TALK SWITCH BOARD 19B232586G1 (Added by REV G) (Deleted by REV H)
		- - - - - - - - - - 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.
C4*	19A116114P10073	Ceramic: 180 pf ±10%, 100 VDCW; temp coef -3300 PPM. Added by REV A.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A129187P1	Silicon, PNP.
Q2	19A116201P3	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - - -
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.
		- - - - - - - - - - - FUSES - - - - - - - - - -
F701	19A127884G1	Fuse Kit.
		- - - - - - - JACKS AND RECEPTACLES - - - - - -
J701	19B216594G2	Connector, female: 6 contacts.
J702		See Mechanical Parts RC2314, items 14, 16, 46.
J703		See Mechanical Parts RC2314, items 14, 46.
J704		See Mechanical Parts RC2314, items 49-51, 67, 68.
		- - - - - - - - - - - RELAYS - - - - - - - - - -
K1*	19A127836G1	Sensitive: 95 ohms ±10%, 2 form C contacts, 5.5 to 9.0 VDC (over the temp range indicated); sim to C.P. Clare MF1401G01. Deleted by REV D.
		- - - - - - - - - - - INDUCTORS - - - - - - - - -
L701	19A127815P1	Coil.
		- - - - - - - - - - - PLUGS - - - - - - - - - -
P701	19A115834P4	Contact, electrical: sim to AMP 2-332070-9.
P704 and P705	19A127569G1	Plug: 8 contacts.
		- - - - - - - - - - - RESISTORS - - - - - - - - -
R707	19A116227P1	Resistor/Switch: variable, carbon film, 25K ohms ±20%, 1/8 w, (Includes S703), SPST, 3 amps at 125 VAC.
R708	19A116227P2	Variable, carbon film: 25K ohms ±20%, 1/8 w.
		- - - - - - - - - - - SWITCHES - - - - - - - - -
S701		See Mechanical Parts RC2314, items 31-37.
S702		See Mechanical Parts RC2314, items 38-45.
S703		(Part of R707).
		ASSOCIATED ASSEMBLIES
		FRONT COVER ASSEMBLY 19C317416G2 STANDARD 19C317416G6 HI POWER
		- - - - - - - - - - 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.
		HI/LOW SPLIT MODIFICATION KIT 19A127838G1 HI SPLIT 19A127838G2 LOW SPLIT
		- - - - - - - - - - CAPACITORS - - - - - - - - -
C11	19A116114P2047	Ceramic: 33 pf ±5%, 100 VDCW; temp coef -80 PPM.
C12	19A116114P2051	Ceramic: 43 pf ±5%, 100 VDCW; temp coef -80 PPM.
		MULTI-FREQUENCY MODIFICATION KIT 19A129268G1
		- - - - - - - - - - - SWITCHES - - - - - - - - -
S1	19B219515G1	Switch, rotary: 1 section, 1 pole, 10 positions (adjustable stop), non-shorting contacts; sim to Grayhill Co. 50M-36-01-1-8N.
		COMPRESSOR KIT 19A127837G1
A50	19C311907G2	Audio Compressor Board.
		- - - - - - - - - - CAPACITORS - - - - - - - - -
C50 and C51	5491674P1	Tantalum: 1.0 µf +40 -20%, 10 VDCW; sim to Sprague Type 162D.
C52	5491674P36	Tantalum: 3.3 µf ±20%, 10 VDCW; sim to Sprague Type 162D.
C53* and C54*	19A116192P2	Ceramic: 470 pf ±20%, 50 VDCW; sim to Erie 8111-050-W5R. Added by REV A.
		- - - - - - - - - - - RESISTORS - - - - - - - - -
R50	3R151P103J	Composition: 10K ohms ±5%, 1/8 w.
R51	3R151P101J	Composition: 100 ohms ±5%, 1/8 w.
R52	3R151P153J	Composition: 15K ohms ±5%, 1/8 w.
R53	3R151P433J	Composition: 43K ohms ±5%, 1/8 w.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - -
	19B216897G3	Rear Cover Assembly. (See RC2314, items 56, 57).
	19B216897G4	Rear Cover Assembly. Clip type. (See RC2314, items 56, 58).
	19B219953G3	Antenna Assembly. (See RC2314, items 19-22, 28).
	19D413522G4	Battery, rechargeable. Nickel Cadmium.
	4038381P4	Alignment tool. Fork tip.
	19B219079G1	Alignment tool. Allen tip.
	19C320017P1	Antenna strip line. In REV C & earlier.
	19C320191P1	Antenna strip line. In REV D & earlier.
		MECHANICAL PARTS (SEE RC2314)
1	19A134425P1	Machine screw, hex head, steel: thd. size 2-56 -2 or 3A.
2	19C317394P5	Gasket.
3	19B204527P2	Diaphragm: No. 2 inches 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: .125 inch dia.
7	N70BP703C6	Set screw: No. 3-48 x 3/16.
8	19B232784G1	Knob assembly. (SQUELCH, ON-OFF-VOLUME).
9	19B219953G3	Antenna assembly. (Includes items 19-22, 28).
9A	19B219955G1	Antenna, flexible wire.
9B	19B219888P1	Antenna, insulated spring whip.
10	19D413531P2	Frame. (STD).
	19B226502P2	Frame. (HI POWER).
11	NP270290P2	Grille. (GE monogram STD).
	NP270290P3	Grille. (GE monogram, HI POWER).
12	19D413542G12	Case assembly. (Includes items 14, 15, 18, 26, 31-37, 46, 47).
13	19B216858P1	Insert.
14	19A127753P1	Contact. (Part of J702 & J703).
15	19A134548P1	Insert, screw thread: No. 2-56.
16	19B216862P2	Contact. (Part of J702).
17	19A127779G8	Antenna tube.
18	19B217875P1	Support.
19	19A129649P1	Antenna Cap. (Part of item 9).
20	19C320383P2	Antenna rod. (Part of item 9).
21	19A129652P1	Nut, knurled: thd size 7/16-40. (Part of item 9).
22	19C320352P1	Bushing (Part of item 9).
23	19C317050P1	Protective Cover.
24	19A129390P1	Disc.
25	19A130426G2	Knob.
26	19A129723P1	Rivet.
27	19B219540P1	Catch.
28	N70P703C6	Set screw: No. 3-48 x 3/16.
29	19B216520P4	Washer, nylon: 1/4 inch.
30	19A127319P2	Nut: No. 14-28.
31	N41P1006	Screw, slotted, steel: No. 0-80 x 3/8. (Part of S701).
32	19C328416G1	Button. (Part of S701).
33	19C328407P1	Collar. (Part of S701).
34	19A137621P1	Plate. (Part of S701).
35	19A137620P1	Spring.
36	N207P1C6	Hex nut, thd size No. 0-80. (Part of S701).
37	19B209643P2	Switch. (Part of S701).
38	19B216865P1	Insulator. (Part of S701).
39	N647P5004C	Cap screw: No. 2-56 x 1/4. (Part of S702).
40	19B216864P1	Contact. (Part of S702).
41	19B216863P1	Spring contact. (Part of S702).
42	N910P6C6	Retaining ring. (Part of S702).
43	19A127754P1	Gasket. (Part of S702).
44	19A127755P1	Spring. (Part of S702).
45	19B216862P1	Contact. (Part of S702).
46	N330P605F22	Eyelet, brass: 1/16 x 5/32.
47	N330P602F22	Eyelet, brass: 1/16 x 1/16. (Not Used).
48	19A127762P1	Strap.
49	19B216891G1	Spring assembly. (Part of J704).
50	19D413467P1	Fastener (Part of J704).
51	19A115794P3	Flat head screw: steel, 2-56 x 5/16. (Part of J704).
52	19B216847P1	Insulator, pressure sensitive.
53	19C311491P3	Can. (Used with Regulator, Oscillator Compensator, and Compressor Circuits).
54	19B219510P1	Insulator. (Located between System and Receiver Boards).
55	19A116270P1	Tape, pressure sensitive. (Specify length).
56	19C317394P6	Gasket.
57	19B216897G3	Rear Cover Assembly. (without clip).
58	19B216897G4	Rear Cover Assembly. (with clip).
59	19A130397P1	Strap.
60	19A130993P1	Gasket.
61	19A137254P1	Insert, tapped.
62	4035630P1	Washer: teflon.
63	N513P604C	Pin, grooved. (Not Used).
64	19A127802P1	Rivet, shoulder.
65	19A116773P805	Tap screw, Phillips POZIDRIV®: No. 4-24 x 5/16.
66	N170P9004P2	Cap screw: No. 4-40 x 1/4.
67	19B232109P1	Button plug.
68	19A130586P1	Insulator.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES



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.

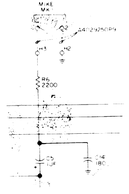
REV. A & B - CASE Assembly 19D413548G3

Incorporated in initial shipment.

REV. A - Systems Board 19D413552G2

To increase mike sensitivity. Deleted MK1 and Changed C5.

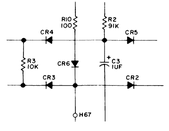
Schematic Diagram was:



REV. B - To improve manufacture.
Added callouts for Holes H16, H64 and H67 thru H81.

REV. C - To improve transmitter FM hum and noise.
Deleted CR3, CR4 and R3.

Schematic Diagram was:



REV. A - Compressor Kit (19A127837G1)

To reduce audio distortion. Added C53 and C54.

REV. C - CASE Assembly 19D413548G3

To incorporate a vendor change of accessory jack. Changed J701 on outline diagram.

REV. D - To make compatible with more options.
Deleted K1 and changed antenna strip line printed wire board.

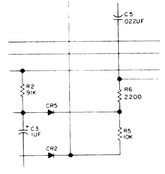
REV. D - System Board 19D413552G2

To make compatible with more Options.
Added K1. Changed R1.

REV. E - To improve PTT relay pick-up.
Changed K1 and R1.

REV. F - To improve frequency response.
Changed C3, C5. R2, R5.
Deleted R6.

Schematic Diagram was:



REV. E - Case Assembly 19D413548G3

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

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

REV. G - SYSTEM BOARD 19D413552G2

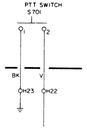
To improve frequency response.
Changed C3 and C5.

REV. H - To incorporate a new 5.4v regulator module.
Changed A2. Added C21.

REV. G - Case Assembly 19D413548G3

To improve reliability of PTT circuit.
Changed J701 and added A719.
Also changed knobs.

Schematic Diagram was:



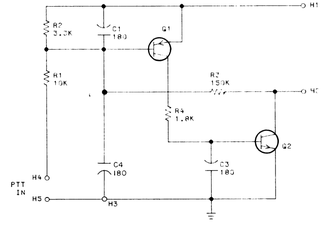
REV. A - PTT Switch 19B232586G1

To improve RF filtering.
Added C4.

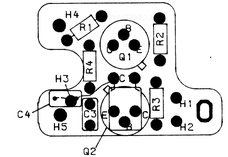
REV. H - Case Assembly 19D413548G3

To optimize performance.
Changed A719.

Schematic Diagram was:



Outline /Diagram was:



REV. A - PTT Switch 19B232586G2

To improve RF filtering.
Added C1 and added R7.

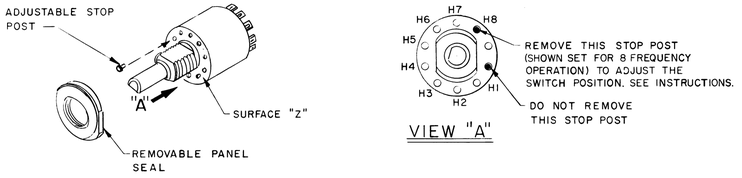


Figure 1 - Stop Post Adjustment

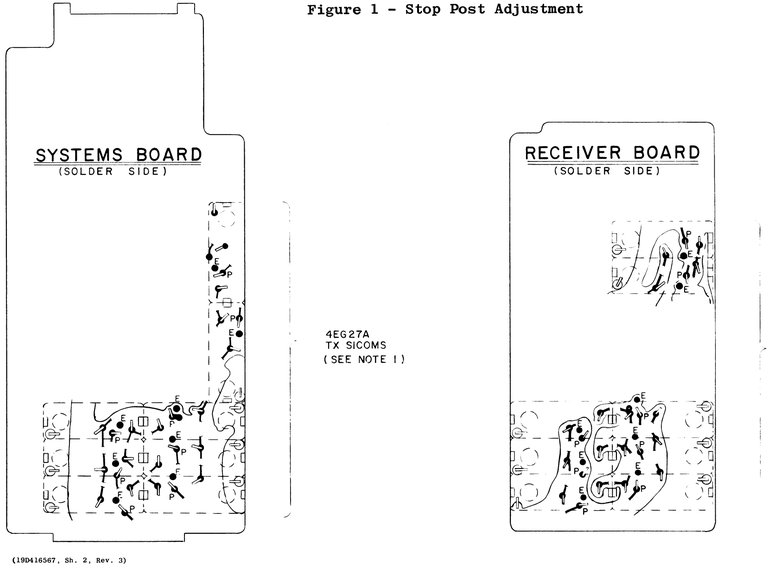


Figure 2 - Oscillator Module and Diode Installation

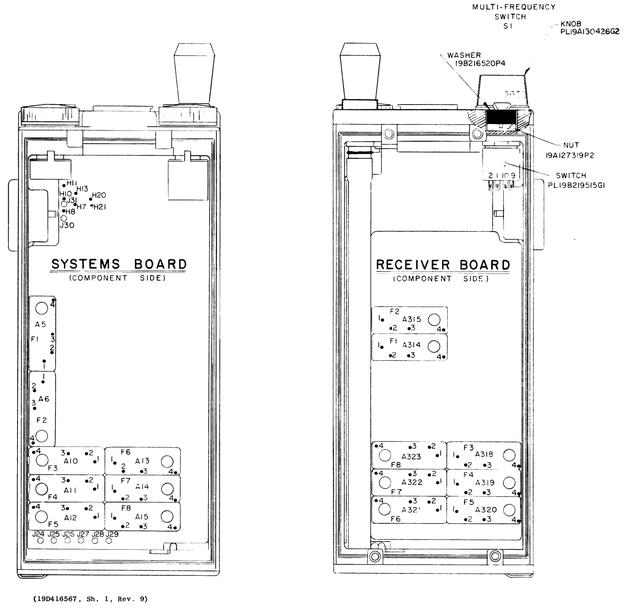


Figure 3 - Oscillator Mounting Positions & S1 Connection Points

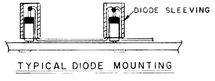


Figure 4 - Typical Diode Mounting

MULTI-FREQUENCY MODIFICATIONS

(19D416567, Sh. 1, Rev. 9 & 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)	BL	
S1-1	J31	W-BK	1
S1-2	J30	W-O	2
S1-3	J24	B	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).
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 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 (5494922P1) 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.