MOBILE RADIO

MASTR® Personal Series

PROGRESS LINE

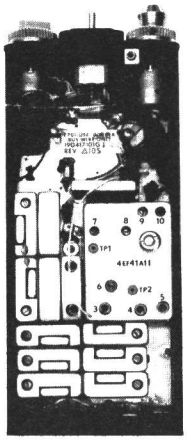
PE MODELS

SYSTEMS BOARD AND CASE ASSEMBLY 19D417330G1

FOR RECEIVERS WITH DUAL FRONT END

Maintenance Manual LBI-4762E

DATAFILE FOLDER - DF4097



SYSTEM BOARD AND CASE ASSEMBLY 19D417330G1

SPECIFICATIONS *

MODEL NUMBERS

19D417330G1	150.8 - 174 MHz
CONTROLS:	Volume ON-OFF Switch
	Squelch Control
	Multi-Frequency Switch
	PTT Switch
	Tone Option Switch
	Accessory Jack
	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

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

Dual Front End (DFE) system board A701 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, 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.

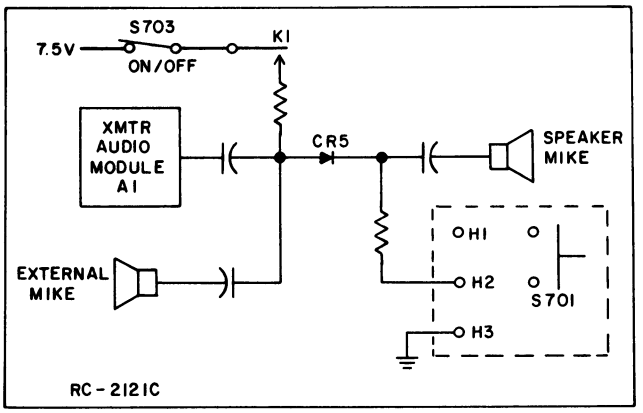


Figure 1 - Audio Switching Circuit

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

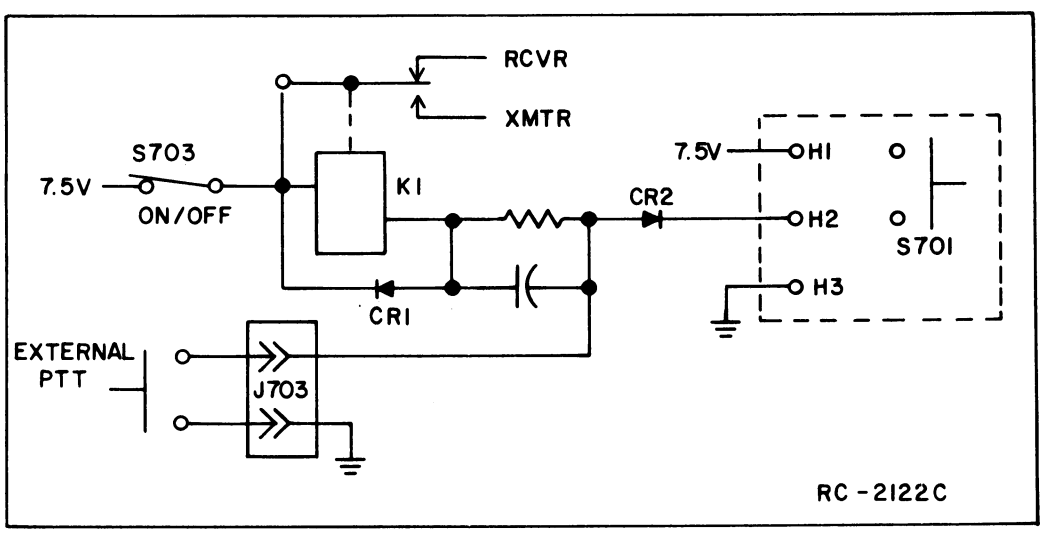


Figure 2 - DC Switching Circuit

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 (A705)

Solid State PTT switch S701 forward biases diode CR2 to energize relay K1 and key the radio. When S701 is pressed PNP, transistor Q1 conducts. Transistor Q1 conducting applies a positive voltage to the base of NPN transistor Q2, causing Q2 to also conduct. Transistor Q2 conducting, provides a conduction path to ground for diode CR2. Relay K1 is 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 multi-frequency 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 search Lock Monitor (SLM) receive oscillator modules F1 and F2 may be repeated and receive oscillator modules F3, F4 and F5 may be repeated.

When SLM is provided receive oscillator modules 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.

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 J18 and J19.

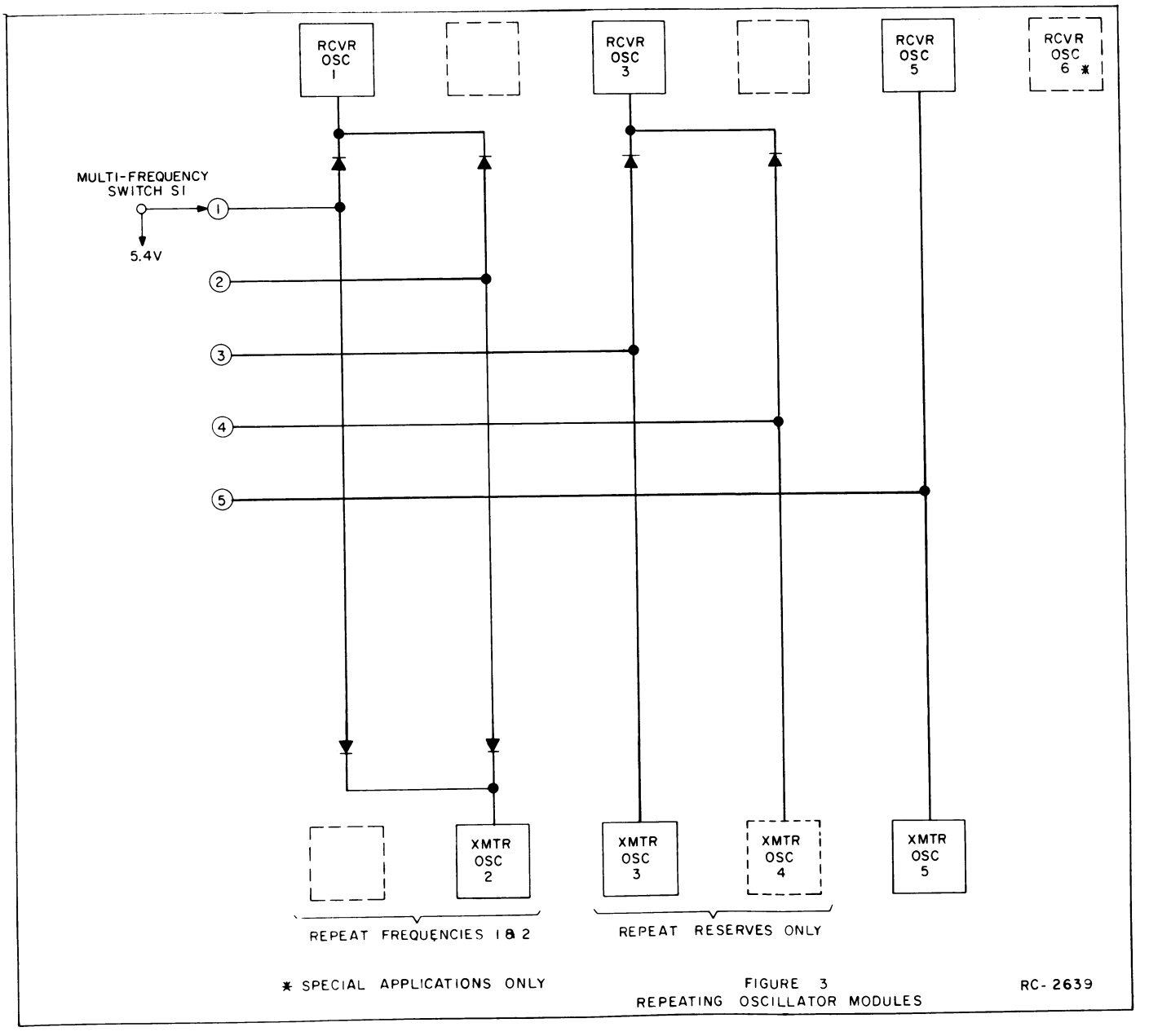
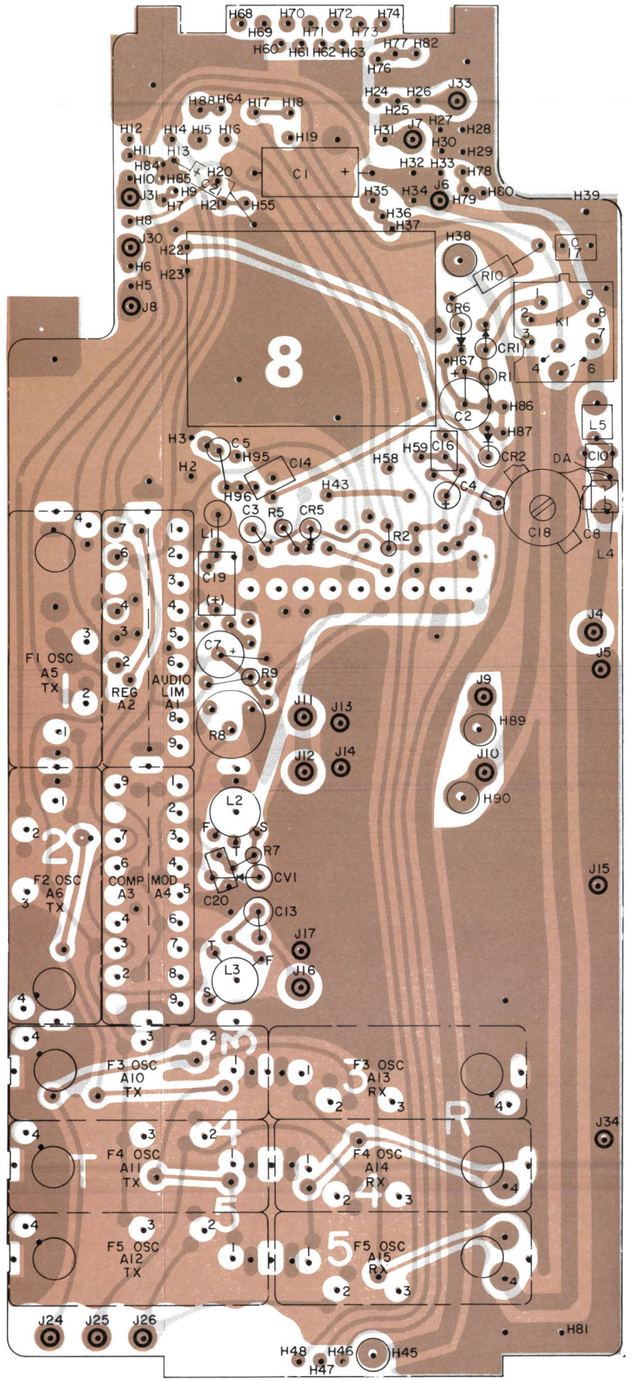
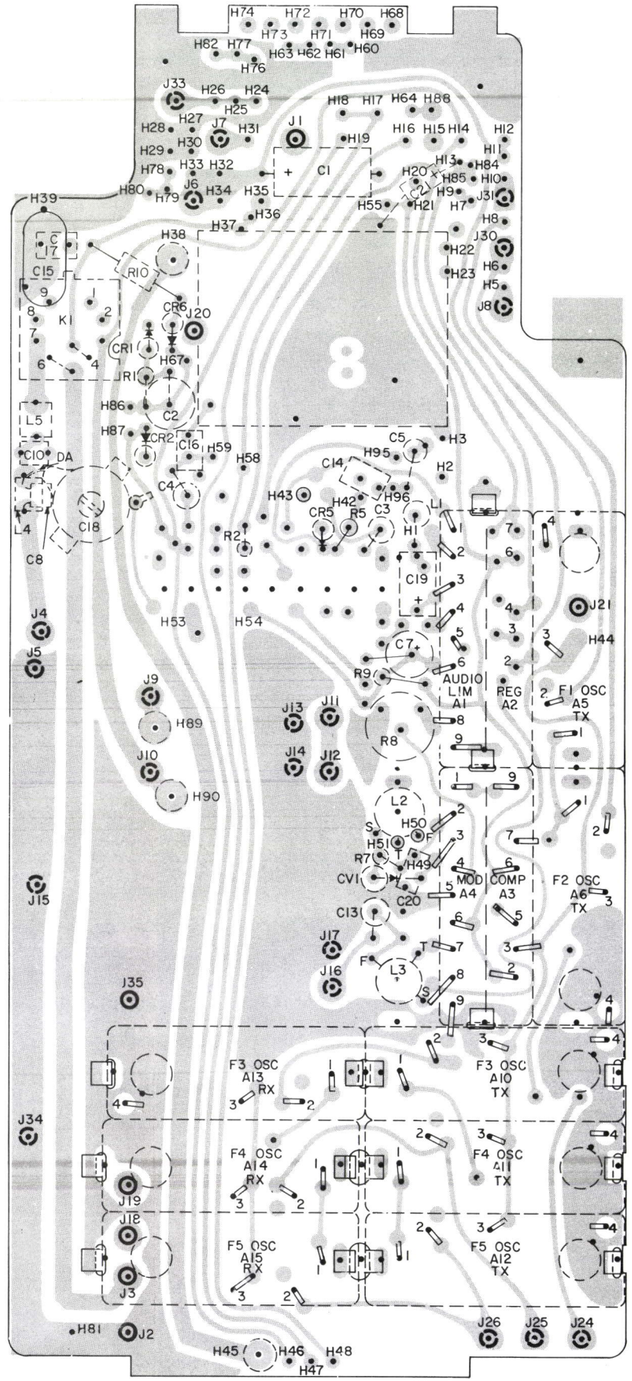


Figure 3 - Repeating Oscillator Modules

COMPONENT SIDE



SOLDER SIDE



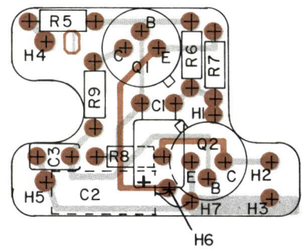
RUNS ON SOLDER SIDE
RUNS ON BOTH SIDES
RUNS ON COMPONENT SIDE

(19D416976, Sh. 2, Rev. 8)
(19D416976, Sh. 3, Rev. 8)

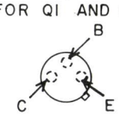
(19D416976, Sh. 2, Rev. 8)

(19D417963, Rev. 6)

A705

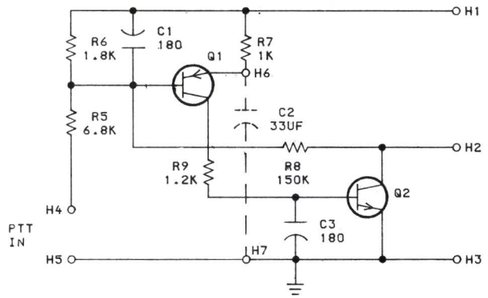


LEAD IDENTIFICATION FOR Q1 AND Q2



IN-LINE OR TRIANGULAR
TOP VIEW
NOTE, LEAD ARRANGEMENT, AND NOT CASE SHAPE, IS DETERMINING FACTOR FOR LEAD IDENTIFICATION

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



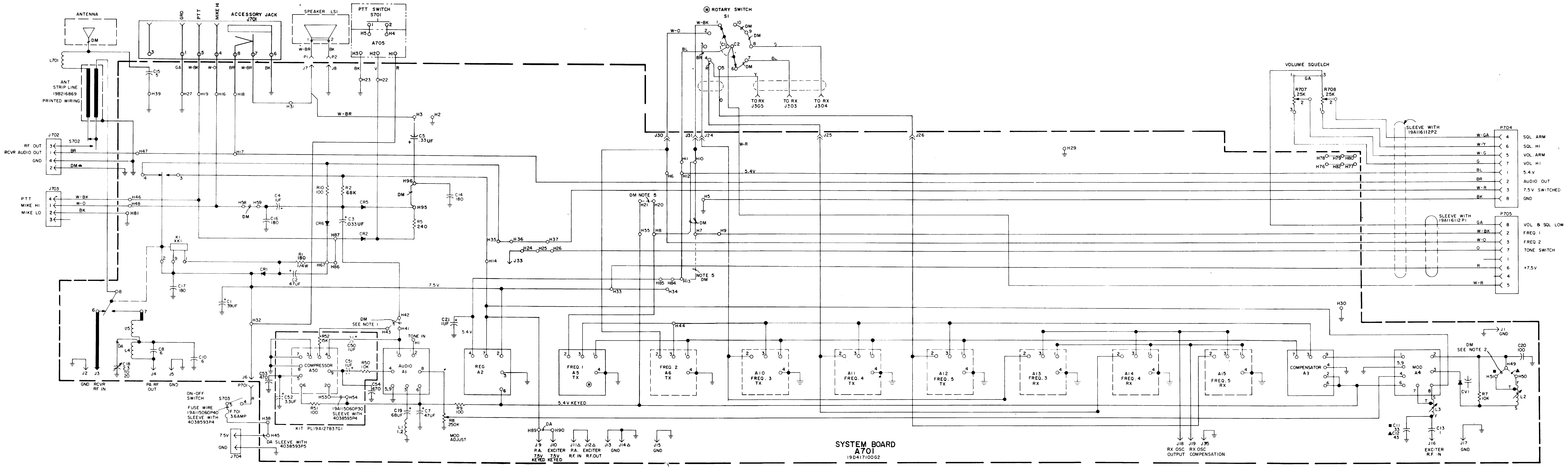
NOTE:
C2 IS PART OF KIT 19A136579

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.

(19B232959, Rev. 1)

OUTLINE DIAGRAM

150.8—174 MHz SYSTEM BOARD



(19B622003, Rev. 12)

SEE APPLICABLE PRODUCTION CHANGE SHEETS IN INSTRUCTION BOOK SECTION DEALING WITH THIS UNIT, FOR DESCRIPTION OF CHANGES UNDER EACH REVISION LETTER.	
THIS ELEM DIAG APPLIES TO	
MODEL NO	REV LETTER
PL19D417100G2	E
PL19D417330G1	E
PL19A127837G1	A

ALL WIRE SFT #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.

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

(*) THESE ITEMS ARE PART OF SWITCH KIT PL19A129890G1

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. ▲USED IN LO SPLIT (132-150.8 MHZ)
   ■USED IN HI SPLIT (150.8-174MHZ)
   ●PRESENT IN HI POWER UNITS
   △NOT PRESENT IN HI POWER UNITS
3. DA=#22 AWG
4. GND MAY BE MADE THROUGH CAN ONLY ON SICOM'S.
5. 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.
6. DM=#26 AWG.

SCHEMATIC DIAGRAM

150.8—174 MHz SYSTEM BOARD

PARTS LIST

LBI4763D

SYSTEM BOARD/CASE ASSEMBLY
19D417330G1
AND
ASSOCIATED ASSEMBLIES

SYMBOL	GE PART NO.	DESCRIPTION
A701		SYSTEM BOARD 19D417100G2
A1	19C320062G1	Transmitter Audio Module.
A2*	19C328070G1	5.4 volt Regulator Module.
		In REV D & earlier:
	19C311905G2	Regulator Module.
A3	19C320060G1	Oscillator Compensator Module.
A4	19C320084G1	Modulator Module.
		NOTE: When reordering A5, A6, A10-A12 give GE Part Number and exact crystal frequency. Crystal Freq = $\frac{\text{Operating Freq}}{12}$
A5 and A6	4EG27A10	Transmitter Oscillator.
A10 thru A12	4EG27A10	Transmitter Oscillator.
		NOTE: When reordering A13-A15, give GE Part Number and exact crystal frequency.
		Crystal Freq. (150.8-174 MHz) = $\frac{Fo - 20}{9}$
A13 thru A15	4EG28A11	Receiver/DFE Oscillator. (150.8-174 MHz).
		- - - - - - - - - - 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%, 20 VDCW; sim to Kemet T376P33K.
		In REV C:
C3*	5491674P49	Tantalum: 0.068 µf ±10%, 20 VDCW; sim to Sprague Type 162D.
		In REV B and 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 Kemet T376B334K020AS.
		In REV C:
	5491674P48	Tantalum: 0.68 µf ±10%, 10 VDCW; sim to Sprague Type 162D.
		In REV B and earlier:
	19A116244P2	Ceramic: 0.022 µf ±20%, 50 VDCW.
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 ±10%, 100 VDCW; temp coef -3300 PPM.
C15	5496218P36	Ceramic disc: 5.0 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
	19A116114P10073	

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

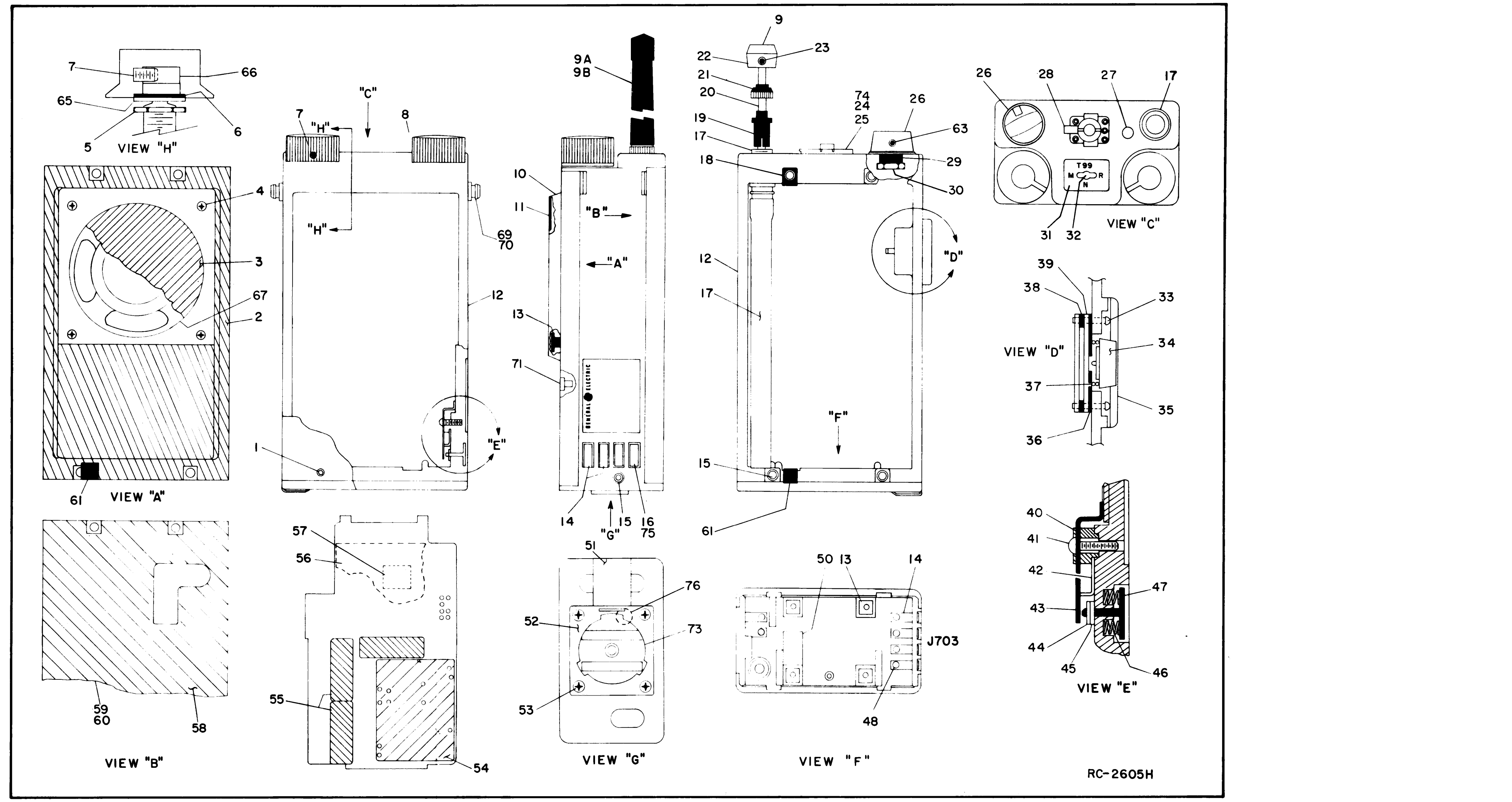
SYMBOL	GE PART NO.	DESCRIPTION
C16 and C17	19A116114P10073	Ceramic: 180 pf ±10%, 100 VDCW; temp coef -3300 PPM.
C18	19B209351P2	Variable: 2.5 to 20 pf, 200 VDCW; sim to Matshushita ECV-1Z-W20P32.
C19	19C307102P19	Tantalum: 68 µf ±20%, 4 VDCW.
C20	19A116114P8065	Ceramic: 100 pf ±5%, 100 VDCW; temp coef -1500 PPM.
C21*	5491674P1	Tantalum: 1.0 µf +40-20%, 10 VDCW; sim to Sprague Type 162D. Added by REV E.
		- - - - - - - - - DIODES AND RECTIFIERS - - - - -
CR1	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
CR2	5494922P1	Silicon; sim to Type 1N456.
CR5	5494922P1	Silicon; sim to Type 1N456.
CR6	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
CV1	5495769P9	Silicon, capacitive.
		- - - - - - - - - JACKS AND RECEPTACLES - - - - -
J1 thru J5	19A116366P4	Contact, electrical: sim to Concord 10-891-1.
J6 thru J8	19A116366P2	Contact, electrical: sim to Cambion 323301-03.
J9 thru J19	19A116366P4	Contact, electrical: sim to Concord 10-891-1.
J24 thru J26	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 3233-01-03.
J35	19A116366P4	Contact, electrical: sim to Concord 10-891-1.
		- - - - - - - - - - - RELAYS - - - - - - - - - -
K1*	19B209562P2	Hermetic sealed: between 45 to 100 ohms, 2 form C contacts, 5.0 VDC nominal, 1.0 w max operating; sim to GE 3SCS1002A2.
		In REV A and earlier:
	19B209562P1	Hermetic sealed: 98 ohms ±10%, 2 form C contacts, 6.0 VDC nominal, 1.0 w max operating; sim to GE 3SCS1001A2.
		- - - - - - - - - - INDUCTORS - - - - - - - -
L1	19B209420P114	Coil, RF: 1.20 µh ±10%, 0.18 ohms DC res max; sim to Jeffers 4436-1K.
L2	19A127798G1	Coil: 6.05-6.9 µh. Includes:
	19B209436P1	Tuning slug.
L3	19B216910G1	Coil. Includes:
	19B209436P1	Tuning slug.
L4 and L5	19B216320P3	Coil.
		- - - - - - - - - - RESISTORS - - - - - - - - -
R1*	3R152P181J	Composition: 180 ohms ±5%, 1/4 w.
		In REV A and earlier:
	3R152P221J	Composition: 220 ohms ±5%, 1/4 w.
R2*	3R151P683J	Composition: 68K ohms ±5%, 1/8 w.
		In REV B and earlier:
	3R151P913J	Composition: 91K ohms ±5%, 1/8 w.
R5*	3R151P241J	Composition: 240 ohms ±5%, 1/8 w.
		In REV B and earlier:
	3R151P103J	Composition: 10K ohms ±5%, 1/8 w.
R6*	3R151P222J	Composition: 2.2K ohms ±5%, 1/8 w. Deleted by REV C.
R7	3R151P103J	Composition: 10K ohms ±5%, 1/8 w.
R8	19A116412P4	Variable, cermet: 250K ohms ±10%, 1/2 w; sim to Helipot Model 62 PF.

SYMBOL	GE PART NO.	DESCRIPTION
R9 and R10	3R151P101K	Composition: 100 ohms ±10%, 1/8 w.
A705*		PUSH TO TALK SWITCH BOARD 19B232586G2 (Added by REV E)
		- - - - - - - - - - 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 - - - - - - - - -
R5	3R151P103J	Composition: 10K ohms ±5%, 1/8 w.
R6	3R151P182J	Composition: 1.8K ohms ±5%, 1/8 w.
R7	3R151P102J	Composition: 1K ohms ±5%, 1/8 w.
R8	3R151P154J	Composition: 150K ohms ±5%, 1/8 w.
R9	3R151P122J	Composition: 1.2K ohms ±5%, 1/8 w.
A705*		PUSH TO TALK SWITCH BOARD 19B232586G1 (Added by REV D) (Deleted by REV E)
		- - - - - - - - - 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 RC-2605 items 14, 16, 75.
J703		See Mechanical Parts RC-2605 items 14, 48.
J704		See Mechanical Parts RC-2605 items 51-53, 73,76.
		- - - - - - - - - - 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, 25,000 ohms ±20%, 1/8 w, (Includes S703), rotary, SPST, 3 amps at 125 VAC; sim to Mallory Type MZC.
R708	19A116227P2	Variable, carbon film: 25,000 ohms ±20%, 1/8 w; sim to Mallory Type MZC.

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - SWITCHES - - - - - - - - -
S701		See Mechanical Parts RC-2605, items 33-39.
S702		See Mechanical Parts RC-2605, items 40-47.
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.
		COMPRESSOR KIT 19A127837G1
A50	19C311907G2	Audio Compressor Module.
		- - - - - - - - - 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%, 4 VDCW; sim to Sprague Type 162D.
C53 and C54	19A116192P2	Ceramic: 470 pf ±20%, 50 VDCW; sim to Erie 8111-A050-W5R-471M.
		- - - - - - - - - - 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.
		MULTI-FREQUENCY MODIFICATION KIT 19A129890G1 STD 19A129890G2 SLM 19A129890G3 1 RX FREQ on RX BOARD
		- - - - - - - - - - SWITCHES - - - - - - - - -
S1	19B226086G1	Switch Assembly. STD
S1	19B226086G2	Switch Assembly. SLM
S1	19B226086G3	Switch Assembly. 1 RX FREQ on RX BOARD
		MISCELLANEOUS
	19B216897G3	Rear Cover Assembly. (See RC-2605, items 58, 59).
	19B216897G4	Rear Cover Assembly. Clip type. (See RC-2605, items 58, 60).
	19D413522G4	Battery, rechargeable. Nickel Cadmium.
	19A127884G1	Fuse Kit.
	4038381P4	Alignment tool. Fork tip.
	19B219079G1	Alignment tool. Allen tip.
		MECHANICAL PARTS (SEE RC2605)
1	19A134425P1	Machine screw, hex head: thd. size No. 2-56-2 or 3A.
2	19C317394P4	Gasket.
3	19B204527P2	Diaphragm: No. 2 inches dia.

SYMBOL	GE PART NO.	DESCRIPTION
4	N681P5002C6	Screw, phillips head: No. 2-56 x 1/8.
5	19A127319P1	Nut: No. 1/4-32.
6	4037064P18	Washer, non-metallic.
7	N70BP703C6	Set screw: No. 3-48 x 3/16.
8	19B232784G1	Knob assembly. (SQUELCH, ON-OFF-VOLUME).
9	19B219953G3	Antenna assembly. (Includes items 19-23).
9A	19B219955G1	Antenna, flexible wire.
9B	19B219888P1	Antenna, insulated spring whip.
10	19D413531P2	Grille. (STANDARD)
	19B226502P2	Grille. (HIGH POWER)
11	NP270290P2	Nameplate. (STD GE monogram).
	NP270290P3	Nameplate. (HI POWER GE monogram).
12	19D413542G12	Case assembly. (Includes items 14, 15, 18, 27, 33-39, 48, 49).
13	19B216858P1	Insert.
14	19A127753P1	Contact. (Part of J702 and J703).
15	19A134548P1	Insert, screw thread: No. 2-56.
16	19B216862P2	Contact. (Part of J702).
17	19A127779G8	Antenna tube.
18	19B216875P1	Support.
19	19C320352P1	Bushing. (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	19A129649P1	Antenna Cap. (Part of item 9).
23	N70P703C6	Set screw: No. 3-48 x 3/16. (Part of item 9).
24	19C317050P1	Protective Cover.
25	19A129390P1	Disc.
26	19A130426G2	Knob assembly.
27	19A129723P1	Rivet.
28	19B219540P1	Catch.
29	19B216520P4	Washer, nylon: 1/4 inch.
30	19A127319P2	Nut: No. 1/4-28.
31	19B216926P8	Decorative cap. (TYPE 99).
32	19C320721P1	Seal. (Used with TYPE 99 Switch).
33	N41P1006	Screw, slotted, steel: No. 0-80 x 3/8. (Part of S701).
34	19C328416G1	Button assembly. (Part of S701).
35	19C328407P1	Collar. (Part of S701).
36	19A137621P1	Plate. (Part of S701).
37	19A137620P1	Spring. (Part of S701).
38	N207P1C6	Nut, hex, thd. size No. 0-80. (Part of S701).
39	19B209643P2	Spring. (Part of S701).
40	19B216865P1	Insulator (Part of S702).
41	N647P5004C	Cap screw: 2-56 x 1/4. (Part of S702).
42	19B216864P1	Contact (Part of S702).
43	19B216863P1	Spring contact. (Part of S702).
44	N910P6C6	Retaining ring. (Part of S702).
45	19A127754P1	Gasket (Part of S702).
46	19A127755P1	Spring (Part of S702).
47	19B216862P1	Contact (Part of S702).
48	N330P605F22	Eyelet, brass: 1/16 x 5/32.
49	N330P602F22	(Not Used).
50	19A127762P1	Strap.
51	19B216891G1	Spring assembly. (Part of J704).

SYMBOL	GE PART NO.	DESCRIPTION
52	19D413467P1	Fastener. (Part of J704).
53	19A115794P3	Screw, self-locking, flat head: steel, 2-56 x 5/16. (Part of J704).
54	19B216847P1	Insulator, pressure sensitive.
55	19C311491P3	Can. (Used with Regulator, Oscillator Compensator, and Compressor Circuits).
56	19B219510P1	Insulator. (Located between System & Receiver Boards).
57	19A116270P1	Tape, pressure sensitive. (Specify length).
58	19C317394P6	Gasket.
59	19B216897G3	Rear Cover Assembly (without clip).
60	19B216897G4	Rear Cover Assembly (with clip).
61	19A130397P1	Strap.
62		(Not Used).
63	N70P703C6	Set screw: No. 3-48 x 3/16.
64		(Not Used).
65	4035630P1	Washer: teflon.
66	19A137254P1	Insert, tapped.
67	19A130993P1	Gasket.
68		(Not Used).
69	19A127802P1	Rivit, shield.
70	19A116773P805	Tap screw, Phillips POZIDRIV®: No. 4-24 x 5/16.
71	N170P9004P2	Cap screw: No. 4-40 x 1/4.
72		(Not Used).
73	19A130586P1	Insulator.
74	NP243580-L	Nameplate. (Numbers 0-9, code numbers).
75	4033198P18	Metallic eyelet.
76	19B232109P1	Button plug.



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 - Compressor Kit 19A127837G1

REV. A - System Board and Case Assembly 19D417330G1

REV. A - System Board 19D417100G2
Incorporated in initial shipment.

REV. B - System Board and Case Assembly 19D417330G1
To prevent accidental shorts of battery pack to ground. Added insulator to battery pack connector J704.

REV. C - To incorporate metal nuts to PTT switch mounting screw. Added nuts.

REV. B - System Board 19D417100G2
To improve PTT relay pick-up. Changed K1 and R1.

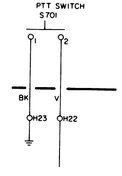
REV. C - To improve frequency response. Changed C3, C5, R2, and R5. Deleted R6.

REV. D - To improve frequency response.
Changed C3 and C5.

REV. E - To incorporate a new 5.4 volt regulator module. Changed A2 and added C18.

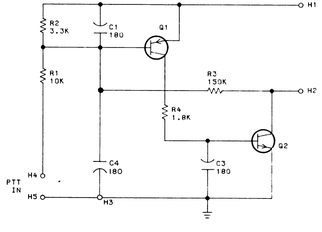
REV. D - System Board & Case Assembly 19D417330G1
To incorporate a new PTT circuit. Changed S701 and added A705.

Schematic Diagram was:

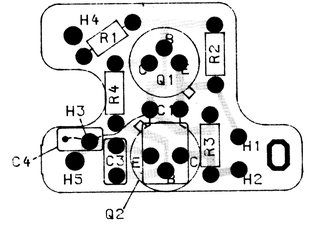


REV. E - To optimize performace of PTT circuit. Changed A705.

Schematic Diagram was:



Outline Diagram was:



REV. A - PTT Switch 19B232586G1
To improve RF filtering. Added C4.

REV. A - PTT Switch 19B232586G2
To improve RF filtering. Added C4.

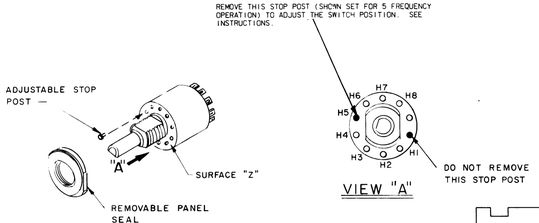
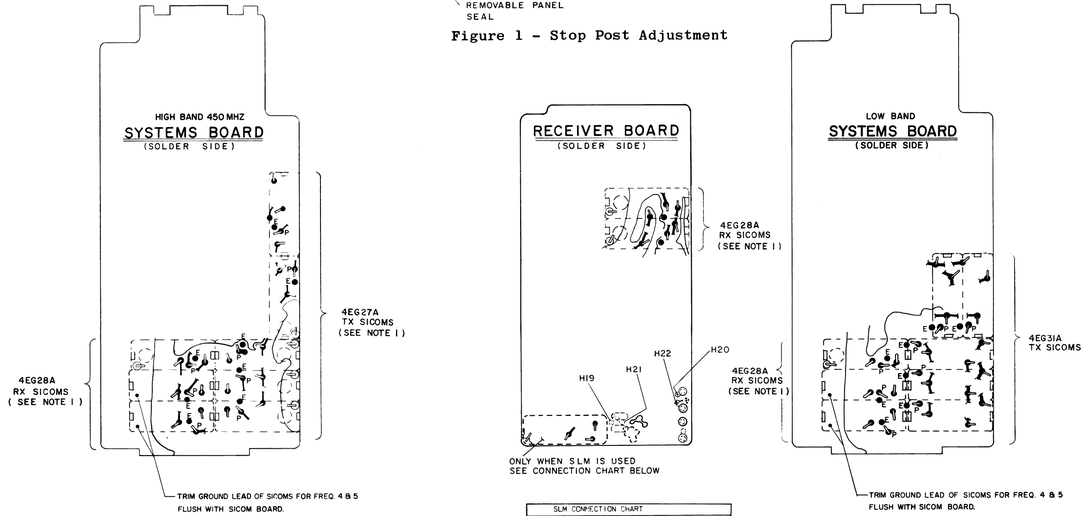


Figure 1 - Stop Post Adjustment



SLM CONNECTION CHART			
FROM	TO	WIRE	COMMENTS
H19	H20	DM	SLEEVE WITH A4038593P4
H21	H22	DM	SLEEVE WITH A4038593P4

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

Figure 2 - Oscillator Module and Diode Installation

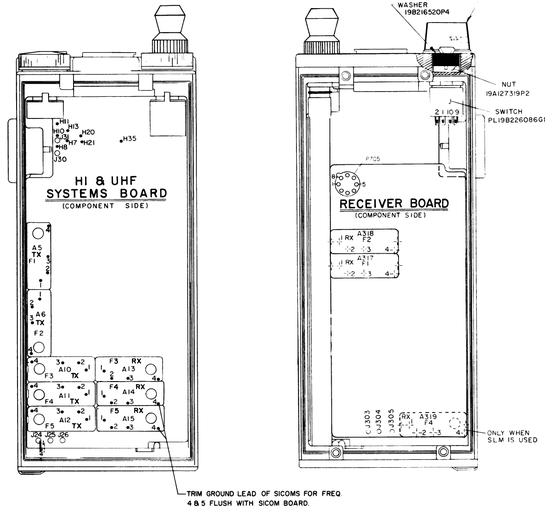


Figure 3 - Oscillator Mounting Positions & S1 Connection Points

(19D417349, Sh. 1, Rev. 8)

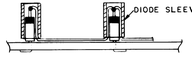


Figure 4 - Typical Diode Mounting

MULTI-FREQUENCY MODIFICATIONS

(19D417349, Sh. 1, Rev. 8 & Sh. 2, Rev. 2)

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. (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 FREQ.	MOVE ADJUSTABLE STOP	
	FROM	TO
2		
3	H5	H2
4	H5	H3
	H5	H4

5. Replace the panel seal with the side marked "Bottom" against surface "Z".
6. Re-install the Multi-frequency 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 2 for connection points). Tape back all unused leads.

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-C2*	P705-5	SPT-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 OTHERWISE 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 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.

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 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 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 2 hole, bending it over and soldering to the "P" pad. The cathode lead will be terminated later.
3. 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 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.

1. 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 2 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 dioles will be required, one in the Number 1 hole of Channel 3 and the other in the Number 1 hole of Channel 5 anode end 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 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.

(19D417349, Sh.2, Rev. 2)