MOBILE RADIO

MASTR® Personal Series

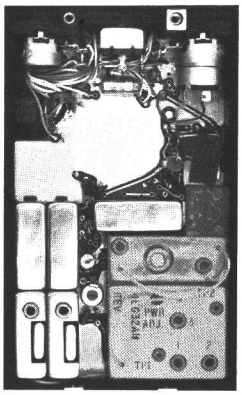
PROGRESS LINE

PE MODELS

SYSTEMS BOARD AND CASE ASSEMBLY 19D413548G5

Maintenance Manual LBI 4612E

DATAFILE FOLDER DF4097



SPECIFICATIONS *

MODEL NUMBERS	
19D413548G5	30-50 MHz
CONTROLS:	Volume ON-OFF Switch
	Squelch Control
	Two-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.

SYSTEM BOARD AND CASE ASSEMBLY 19D413548G5

GENERAL ELECTRIC

TABLE OF CONTENTS

ILLUSTRATIONS

DESCRIPTION

System Board A705 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.

CIRCUIT ANALYSIS

AUDIO SWITCHING

Audio switching for the Speaker/ Microphone LS1 is controlled by diode CR5 as shown in Figure 1.

Pressing PTT switch S701 forward biases diode CR5, permitting audio from LS1 to be applied to transmitter audio module A1.

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

DC SWITCHING

Operation of system relay K1 is controlled by diode CR2 (see Figure 2).

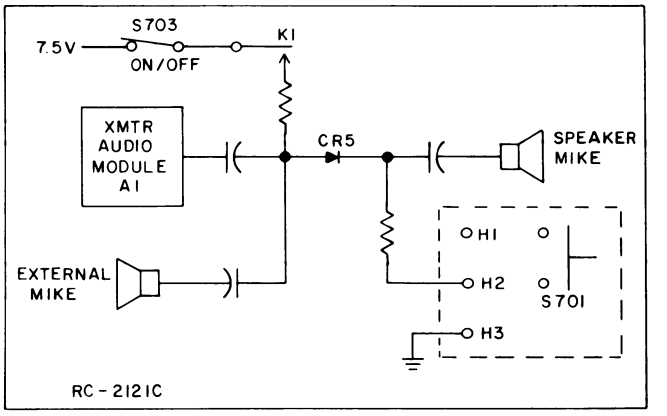


Figure 1 - Audio Switching Circuit

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

PTT SWITCH (A719)

Solid State PTT switch S701 forward biases diode CR2 to energize relay K1 and key the radio. When S701 is pressed PNP, transistor Q1 conducts. Transistor Q1 conducting 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.

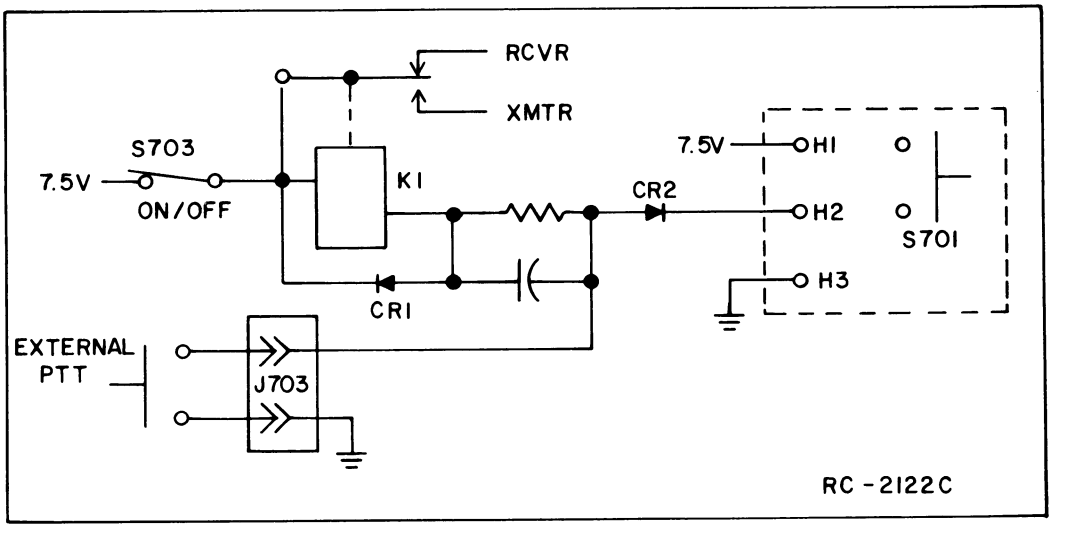


Figure 2 - DC Switching Circuit

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

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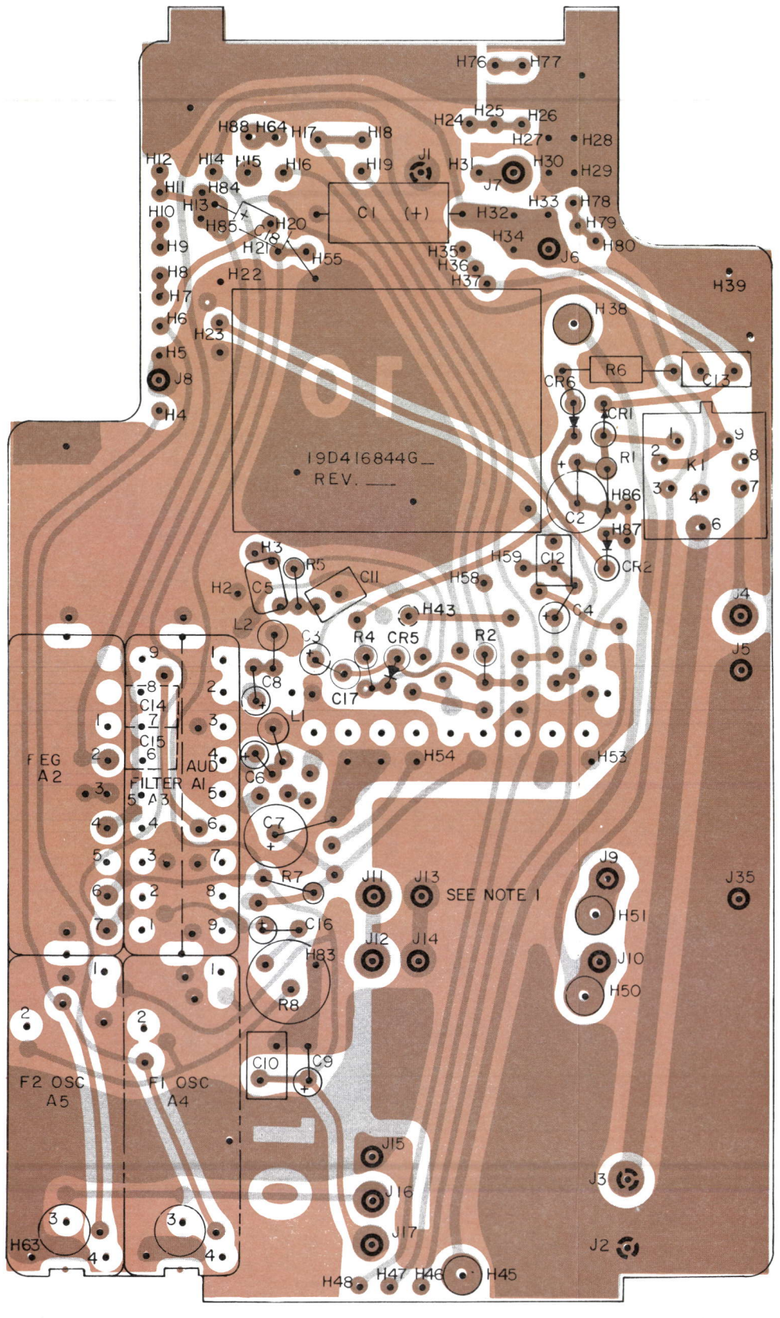
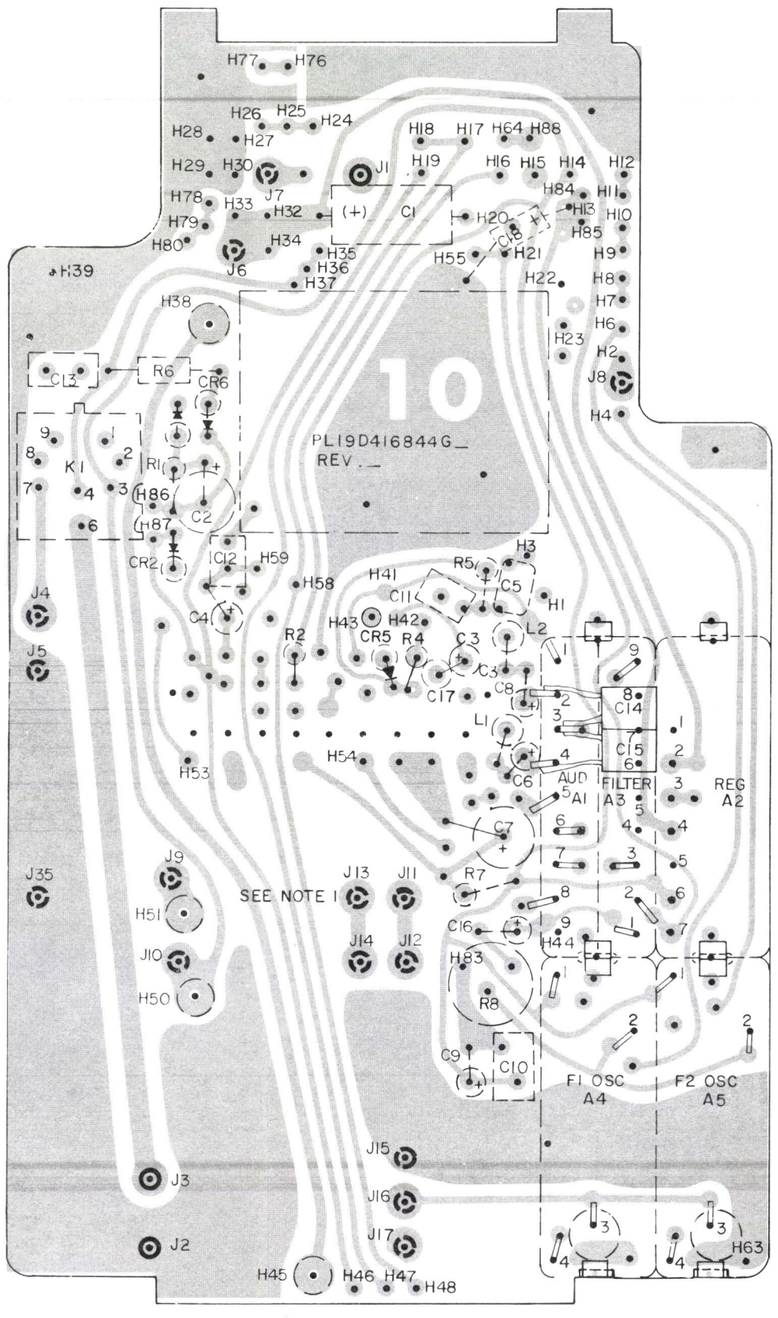
COMPONENT SIDE



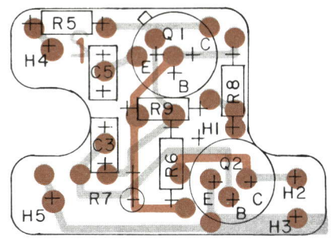
(19D417695, Rev. 8)
(19D416837, Sh. 2, Rev. 10)
(19D416837, Sh. 3, Rev. 10)

SOLDER SIDE

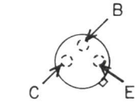


(19D417695, Rev. 8)
(19D416837, Sh. 2, Rev. 10)

A719

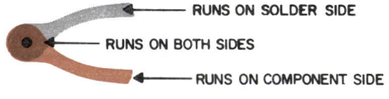


LEAD IDENTIFICATION FOR Q1 AND Q2



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

(19B233296, Rev. 3)
(19B232970, Sh. 1, Rev. 1)
(19B233970, Sh. 2, Rev. 2)

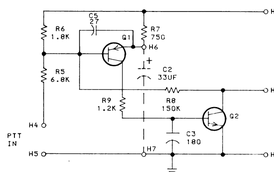


OUTLINE DIAGRAM

30—50 MHz SYSTEM BOARD

NOTE:
1. JACKS J11 THRU J14 ARE NOT PRESENT IN HIGH POWER APPLICATIONS.

A719

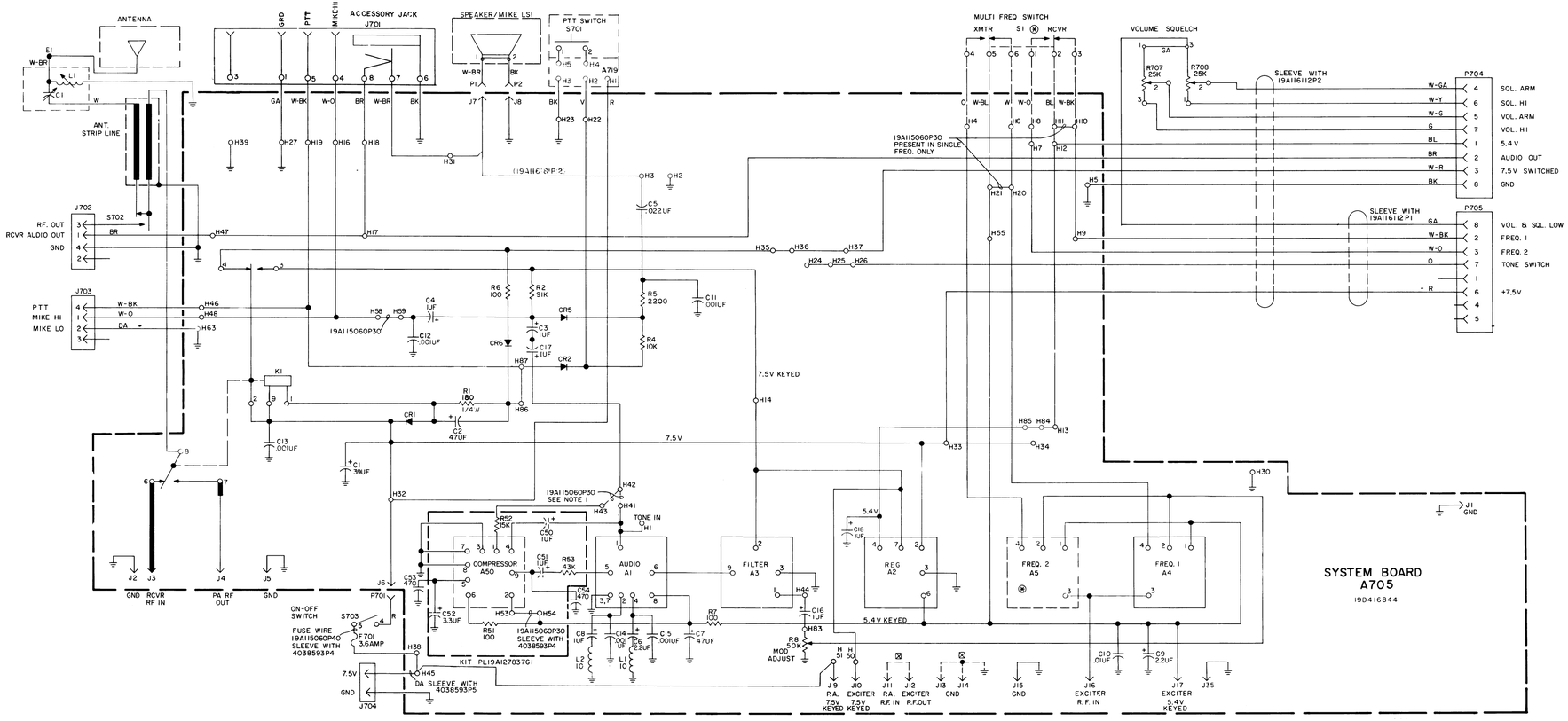


MODEL NO	REV LETTER
PL19B232858G2	C

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. 4)



(19B621901, Rev. 17)

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
PL19D413548G5	G
PL19D416844G1	C
PL19A127837G1	A

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.

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.

Ⓧ THESE ITEMS ARE PART OF KIT PL19A127828.

☒ J11, J12, J13, J14, ARE PART OF LOW POWER MOD KIT PL19A135686G2.

SCHEMATIC DIAGRAM

30—50 MHz SYSTEM BOARD

PARTS LIST

LBI4596C

SYSTEM BOARD/CASE ASSEMBLY
19D413548G5
AND
ASSOCIATED ASSEMBLIES

SYMBOL	GE PART NO.	DESCRIPTION
A705		SYSTEM BOARD 19D416844G1 30-50 MHz
A1	19C320354G1	Audio Amplifier & Limiter.
A2*	19C338070G1	Regulator Module.
		In REV B & earlier:
	19C311905G2	Regulator Module.
A3	19C320345G1	Active Post Limiter Filter.
		- - - - - - - - - - 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 and C4	5491674P1	Tantalum: 1.0 µf +40-20%, 10 VDCW; sim to Sprague Type 162D.
C5	19A116244P2	Ceramic: 0.022 µf ±20%, 50 VDCW.
C6	5491674P8	Tantalum: 2.2 µf +40-20%, 10 VDCW; sim to Sprague Type 162D.
C7	5491674P42	Tantalum: 47 µf ±20%, 6 VDCW; sim to Sprague Type 162D.
C8	5491674P1	Tantalum: 1.0 µf +40-20%, 10 VDCW; sim to Sprague Type 162D.
C9	5491674P8	Tantalum: 2.2 µf +40-20%, 10 VDCW; sim to Sprague Type 162D.
C10	19A116192P1	Ceramic: 0.01 µf ±20%, 50 VDCW; sim to Erie 8121-050-W5R.
C11 thru C15	5495323P12	Ceramic: .001 µf +100% -20%, 75 VDCW.
C16	5491674P28	Tantalum: 1.0 µf ±20%, 25 VDCW; sim to Sprague Type 162D.
C17	5491674P1	Tantalum: 1.0 µf +40-20%, 10 VDCW; sim to Sprague Type 162D.
C18*	5491674P1	Tantalum: 1.0 µf +40-20%, 10 VDCW; sim to Sprague Type 162D. Added by REV C.
		- - - - - - - - DIODES and RECTIFIERS - - - - -
CR1 and CR2	19A115100P1	Silicon; sim to Type 1N458A.
CR5	19A115100P1	Silicon; sim to Type 1N458A.
CR6	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
		- - - - - - - - JACKS AND RECEPTACLES - - - - -
J1* thru J5*	19A116366P4	Contact, electrical: sim to Concord 10-891-1.
		In REV B & earlier:
	19A116366P1	Contact, electrical: sim to Cambion 3232-1.
J6 thru J8	19A116366P2	Contact, electrical: sim to Cambion 3233-1.
J9* thru J17*	19A116366P4	Contact, electrical: sim to Concord 10-891-1.
		In REV B & earlier:
	19A116366P1	Contact, electrical: sim to Cambion 3232-1.
J35*	19A116366P4	Contact, electrical: sim to Concord 10-891-1.
		In REV B & earlier:
	19A116366P1	Contact, electrical: sim to Cambion 3232-1.

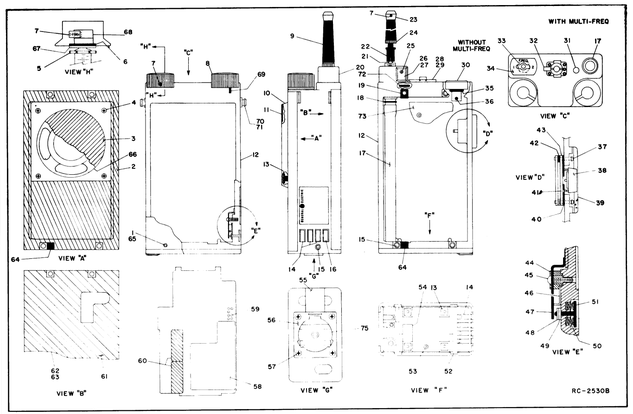
*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - RELAYS - - - - - - - - - -
K1*	19B209562P2	Relay, hermetic sealed: between 45-100 ohms, 2 form C contacts, 5.0 VDC nominal, 1.0 w max operating; sim to GE 3SCS1002A2.
		In REV A:
	19B209562P1	Relay, 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 A.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L1 and L2	19B209420P125	Coil, RF: 10.0 µh ±10%, 3.10 ohms DC res max; sim to Jeffers 4446-4K.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1*	3R152P181J	Composition: 180 ohms ±5%, 1/4 w.
		In REV A:
	3R152P221J	Composition: 220 ohms ±5%, 1/4 w.
		Earlier than REV A:
	3R151P391J	Composition: 390 ohms ±5%, 1/8 w.
R2	3R151P913J	Composition: 91K ohms ±5%, 1/8 w.
R4	3R151P103J	Composition: 10K ohms ±5%, 1/8 w.
R5	3R151P222J	Composition: 2.2K ohms ±5%, 1/8 w.
R6 and R7	3R151P101K	Composition: 100 ohms ±10%, 1/8 w.
R8	19A116412P9	Variable, cermet: 500 ohms ±10%, 1/2 w; sim to Helipot Model 62 PF.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XK1*	19A115834P5	Contact, electrical: sim to AMP 4-331272-3. (Quantity 7). Deleted by REV C.
A719A*		PUSH TO TALK SWITCH BOARD 19B232586G2 (Added by REV G)
		- - - - - - - - - - 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.
C5*	19A116114P2044	Ceramic: 27 pf ±5%, 100 VDCW; temp coef -80 PPM. Added by REV B.
		- - - - - - - - - - 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 (Deleted by REV G)
		- - - - - - - - - - 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.

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - 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 RC2530 items 14, 16.
J703		See Mechanical Parts RC2530 item 14.
J704		See Mechanical Parts RC2530 items 55-57, 75.
		- - - - - - - - - - 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 C.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P701	19A115834P4	Contact, electrical: sim to AMP 2-332070-9.
P704 and P705	19A116137P3	Socket, crystal: 8 contacts; sim to Cinch 133-98-92-001 SPECIAL.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R707	19A116227P1	Resistor/Switch: variable, carbon film, 25K ohms ±20%, 1/8 w, (includes S705), SPST, 3 amp at 125 VAC.
R708	19A116227P2	Variable, carbon film: 25K ohms ±20%, 1/8 w.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S701		See Mechanical Parts RC2530, items 37-43.
S702		See Mechanical Parts RC2530, items 44-51.
S703		(Part of R707).
		ASSOCIATED ASSEMBLIES
		NOTE: When reordering A4, A5 give GE Part No. and exact crystal frequency. Crystal Freq = Operating Freq / 3
A4 and A5	4EG31A10	Transmitter Oscillator.
		FRONT COVER ASSEMBLY 19C317416G1
		- - - - - - - - - - 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.

SYMBOL	GE PART NO.	DESCRIPTION
		MULTI-FREQUENCY MODIFICATION KIT 19A127828G1
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1	19A127824G1	Toggle: DPDT, 100 µa at 5 VDC, mounting hardware; sim to Arrow-Hart and Hegeman 78-6.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	19B216897G1	Rear Cover Assembly. (See RC2530, items 61, 62).
	19B216897G2	Rear Cover Assembly. Clip type. (See RC2530, items 61, 63).
	19B219768G1	Antenna Assembly. (See RC2530, items 7, 21-24).
	19D413522G1	Battery, rechargeable. Nickel Cadmium.
	19A127884G1	Fuse Kit.
	4038381P4	Alignment tool. Fork tip.
	19B219079G1	Alignment tool. Allen tip.
	19B216869P1	Antenna strip line. In REV B & earlier.
	19B219442P1	Antenna strip line. In REV C & later.
		LOADING COIL ASSEMBLY 19C320365G1
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1	19A116462P3	Variable: less than 2 pf to more than 20 pf, 100 VDCW, -320 PPM/°C.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L1	19B219759G1	Coil. Includes:
	19B209436P1	Tuning slug.
		MECHANICAL PARTS (SEE RC2530)
1	19A116543P1	Cap screw, socket head: No. 2-56 x 1/4.
2	19C317394P3	Gasket.
3	19B204527P2	Diaphragm: No. 2 inches dia.
4	MS81P5002C6	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.
9	19B219768G1	Antenna assembly. (includes items 7, 21-24).
10	19D413531P2	Grille.
11	NP270290P2	Nameplate (GE monogram).
12	19D413542G13	Case assembly. (includes items 14, 15, 19, 37-43, 52, 53).
13	19B216858P1	Insert.
14	19A127753P1	Contact (Part of J702 and J703).
15	19A116719P1	Insert, screw thread: 2-56; sim to Tridair Ind. SP0256BSS-SX.
16	19B216862P2	Contact (Part of J702).
17	19A127779G4	Antenna tube and insert.
18	19A116854P1	Solderless terminal.
19	19B216875P1	Support.
20	19C320365G1	Loading Coil Assembly. (Includes items 25-27).
21	19C320383P3	Antenna rod. (Part of item 9).
22	19C320352P1	Bushing. (Part of item 9).
23	19A129649P1	Antenna Cap. (Part of item 9).
24	19B219770G1	Nut, spacer: thd size No. 7/16 x 40. (Part of item 9).
25	19A116869P1	Tap screw, phillips: No. 2-32 x 1/4.
26	19C320359P1	Cover.

SYMBOL	GE PART NO.	DESCRIPTION
27	19A129559P1	Gasket.
28	19C317050P1	Protective Cover.
29	19A129390P1	Disc. (Located inside item 28).
30	19C317383P1	Dummy plug.
31		(Not Used).
32	19B219540P1	Support.
33	19C320721P1	Boot, moisture seal.
34	19B216926G5	Decorative cap.
35	19A115983P3	Seal, "O" ring: sim to Parker Seal 2-10.
36	NS09P606C	Dowel pin: 1/16 x 3/8.
37	NS5P1006	Machine screw: No. 0-80 x 3/8. (Part of S701).
38	19C328416G1	Button assembly. (Part of S701).
39	19C328407P1	Collar. (Part of S701).
40	19A137621P1	Plate. (Part of S701).
41	19A137620P1	Spring. (Part of S701).
42	N207P1C6	Nut, hex: thd. size 0-80. (Part of S701).
43	19B209643P2	Switch. (Part of S701).
44	19B216865P1	Insulator. (Part of S702).
45	N647P5004C	Cap screw: 2-56 x 1/4. (Part of S702).
46	19B216864P1	Contact. (Part of S702).
47	19B216863P1	Spring contact. (Part of S702).
48	N910P6C6	Retaining ring. (Part of S702).
49	19A127754P1	Gasket. (Part of S702).
50	19A127755P1	Spring. (Part of S702).
51	19B216862P1	Contact. (Part of S702).
52	N330P605F22	Eyelet, brass: 1/16 x 5/32.
53	N330P602F22	(Not Used).
54	19A127762P1	Contact.
55	19B216891G1	Spring assembly. (Part of J704).
56	19D413467P1	Fastener. (Part of J704).
57	19A115794P3	Flat head screw: steel, 2-56 x 5/16. (Part of J704).
58	19B219799P1	Insulator.
59	19A115834P5	Contact, electrical. (Not Used).
60	19C311491P3	Can. (Used with A1-A3).
61	19C317394P5	Gasket.
62	19B216897G1	Rear Cover Assembly (without clip).
63	19B216897G2	Rear Cover Assembly (with clip).
64	19A130397P1	Strap.
65	N404P8P	Lockwasher, internal tooth: No. 2.
66	19A130993P1	Gasket.
67	4035630P1	Washer, fiber.
68	19A137254P1	Tapped insert.
69	NS13P604C	Pin, grooved. (Not Used).
70	19A127802P1	Rivet, shield.
71	19A116773P805	Tap screw, Phillips POZIDRIV®: No. 4-24 x 5/16.
72	19A115983P10	Packing.
73	19B216912P1	Insulator. (Located between Receiver & System board).
74	19A130926P1	Plate nut. (Not Used).
75	19A130586P1	Insulator.



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 - Case Assembly 19D413548G5

Incorporated into initial shipment.

REV. B - To incorporate a vendor change on accessory jack. Changed J701 on outline diagram.

REV. C - To make compatible with more options. Changed Ant Strip line printed wire board and deleted K1.

REV. A - System Board 19D416844G1

To make compatible with more option. Deleted XK1. Changed R1. Added K1.

REV. A - Compressor 19A127837G1

To improve audio. Added C53 and C54

REV. D - Case Assembly 19D413548G5

To prevent battery from shorting to ground. Added insulator to battery connector J704.

REV. E - To incorporate metal nuts to screws securing PTT switch. Added nuts.

REV. B - System Board 19D416844G1

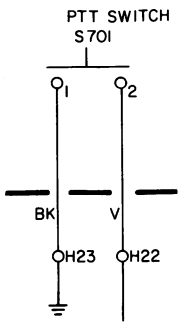
To improve relay pick-up. Changed K1 and R1.

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

REV. F - Case Assembly 19D413548G5

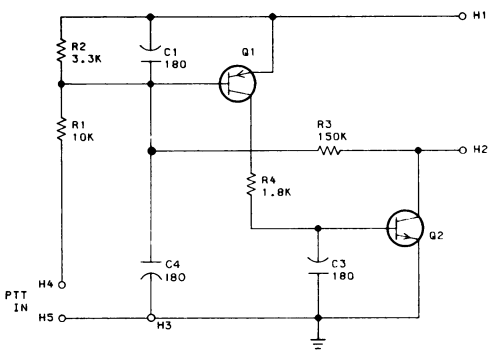
To incorporate a new solid state PTT Circuit. Changed S701 and added A719. Also, changed Knobs.

Schematic Diagram was:

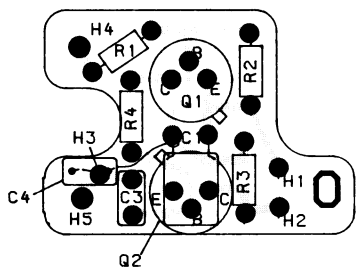


REV. G - To make compatible with GE-STAR option. Changed A719.

Schematic diagram was:



Outline Diagram was:



REV. A - PTT Circuit 19B232586G1

To improve RF filtering. Added C4.

REV. A - PTT Circuit 19B232586G2

To improve performance. Deleted C1 and Changed R7.

REV. B - To improve performance. Added C5.

REV. C - To make compatible with GE-STAR option. Changed printed wire pattern on circuit board and location of components.

Outline Diagram was: