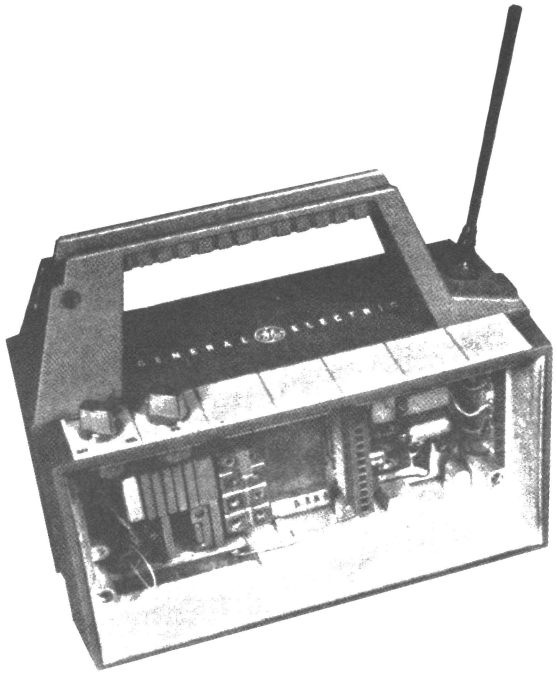
MOBILE RADIO

Porta-Mobile II™

SYSTEMS BOARD AND CASE ASSEMBLY 19D423076G2 & G4



Maintenance Manual LBI 30100 J

DATAFILE FOLDER DF4103

SYSTEM BOARD AND CASE ASSEMBLY 19D423076G2 & G4

SPECIFICATIONS *

CONTROLS:

Volume ON-OFF Switch

Squelch Control

Frequency Selector Switch (for Multi-Frequency operation)

Option Control Switch(es)

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

GENERAL ELECTRIC

TABLE OF CONTENTS

SPECIFICATIONS ..... Cover
DESCRIPTION 1
CIRCUIT ANALYSIS 1
REPEATING OSCILLATOR MODULES 2
DUAL FRONT END RECEIVERS 3
OUTLINE DIAGRAM 4
SCHEMATIC DIAGRAM 5
PARTS LIST AND PRODUCTION CHANGES 6
MULTI-FREQUENCY MODIFICATIONS 7-9
MODIFICATIONS FOR DUAL FRONT END RECEIVER APPLICATIONS 10

ILLUSTRATIONS

Figure 1 - DC Power Distribution 1
Figure 2 - Repeating Oscillator Modules 2

WARNING

Although the highest DC voltage in Porta•Mobile II™ Equipment is supplied by a portable or vehicular battery, high currents may be drawn under short circuit conditions. These currents can possible heat metal objects such as tools, rings, watchbands, etc., enough to cause burns. Be careful when working near energized circuits! High-level RF energy in the transmitter Power Amplifier assembly can cause RF burns upon contact. Keep away from these circuits when the transmitter is energized!

DESCRIPTION

Porta•Mobile II™ system board A702 is mounted in the center of a Lexan® case assembly and provides interconnections between the transmitter, receiver, audio power amplifier, tone and control options, twelve-position frequency selector switch, squelch control, volume control power OFF-ON switch, microphone or handset and a ten-volt battery pack. Mounted on the system board is a standard two-frequency or dual front end receiver, ten receiver oscillator modules, system relay and a tone disable switch.

Jacks J704 and J705 on the case assembly provide connections for an external speaker, microphone, antenna and other electrical devices.

CIRCUIT ANALYSIS

DC Switching

Rechargeable 10-Volt battery pack 19D417815 connects to J703 on the bottom of the case assembly. See Figure 1. DC voltage is applied through J703 and battery pack protection diode CR1 to the transmitter power control circuit through J708-3, receiver audio power amplifier through J706-5 and to POWER OFF-ON switch S701 through J72. When S701 is in the ON position 10 Volts is connected through J16 and fuse F1 to the transmitter power control circuit at J708-2, 7.5 Volt regulator on the receiver audio power amplifier at J706-12 and system relay K1-2. Continuous 7.5 Volts from 7.5 Volt regulator is connected through J706-15 to K1-3 and is applied to the receiver through J706-15 and P722-6. When the Push-To-Talk (PTT) switch is pushed, activating K1, regulated 7.5 Volts is applied to the transmitter exciter through K1-8 and J708-18. Regulated 7.5 Volts is also connected through R3 to LED indicator CR701 and to 5.4 Volt regulator circuit R2 and zener diode VR2. R2 and VR2 provides voltage for tone and control options. A keyed 7.5 volts is applied to the transmitter power amplifier through J706-13 and J708-4.

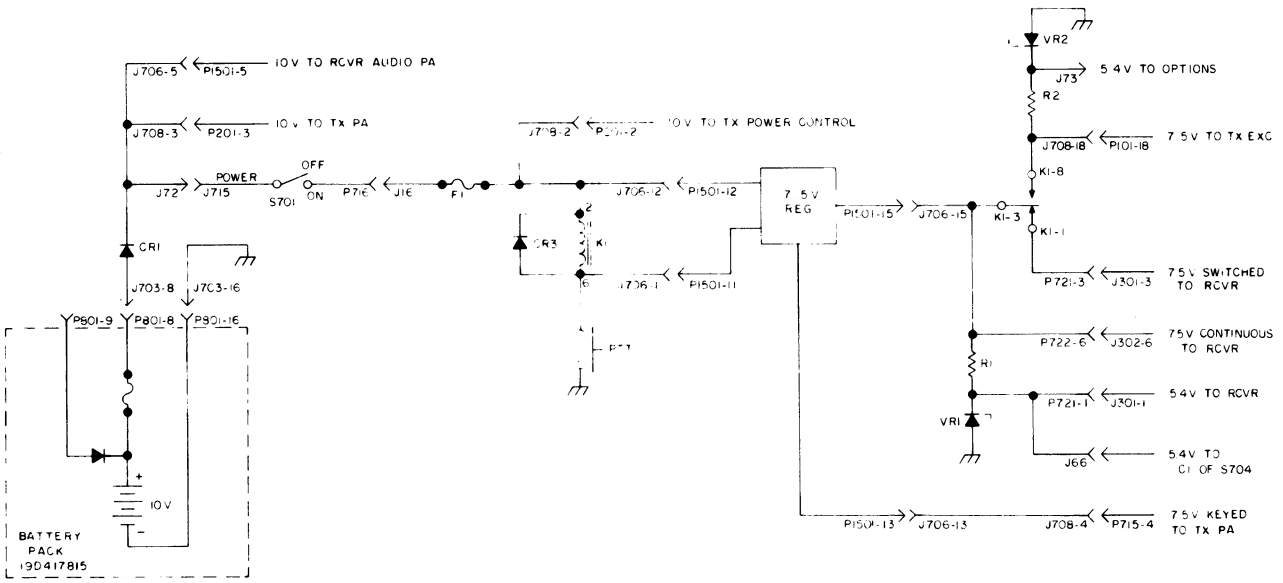
Frequency Switching

To switch from one operating frequency to another operating frequency, 5.4 Volts is switch at Pin 2 of both transmitter and receiver oscillator modules.

A continuous 7.5 Volts is applied to 5.4 Volt regulator circuit R1 and Zener diode VR1 through J706-15.

For single frequency operation the regulated 5.4 Volts is connected directly to the receiver oscillator module through P722-2 and directly to the transmitter oscillator module through J708-17.

For two frequency operation the jumper between H39 and H78 is removed and the regulated 5.4 Volts is connected to the center pole of a two position toggel switch through J66. The 5.4 Volts is switched to receiver oscillator module F1 through J31 and P722-2 and receiver oscillator module F2 through J30 and P722-3. The 5.4 Volts is switched to transmitter oscillator module F1 through J30 and



RC-2933B

Figure 1 - DC Power Distribution

J708-17 and transmitter oscillator module F2 through J31 and J708-16.

For multi-frequency operation the jumper between H39 and H78 is removed and the regulated 5.4 Volts is connected through J66 to C1 of rotary switch S704. S704 switches the 5.4 Volts to oscillator modules F1 through F12 for both the transmitter and receiver.

RF Switching

RF power is connected from the transmitter RF power amplifier to P701 of the system board. P701 is connected to K1-4. RF input to the receiver is connected from K1-5 to J709. The antenna is connected from J702 to K1-7. When the PTT is pushed, keying the transmitter and activiating K1, the antenna is switched from the receiver input to the transmitter output.

Tone Disable Switch

When in the receiver mode, regulated 7.5 Volts is applied through K1-5 and K1-1 to the emitter of tone disable transistor Q1. When a tone option control switch places a ground on the base of Q1 through J61 and R6, Q1 will conduct and 7 Volts will be on the collector. The 7 Volts on the collector of Q1 disables the tone option and any incoming signal is monitored by the receiver.

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 2.

Complete instructions for multi-frequency modifications are contained in the Multi-Frequency Modifications Diagrams (see Table of Contents).

For radios equipped with Channel Guard or Type 90 Encoders/Decoders or Type 99 Decoder, repeating Oscillator Modules also permits switching or disabling tones on the same RF frequency with the multi-frequency switch. Also, the tone and RF frequency can be changed at the same time.

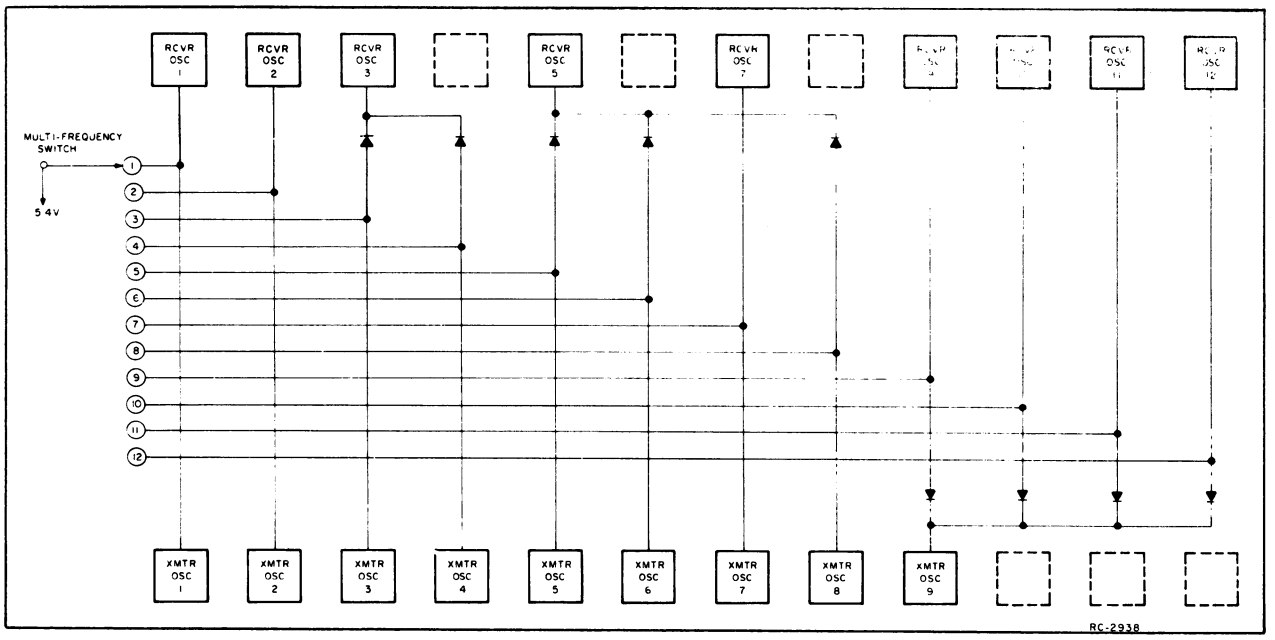


Figure 2 - Repeating Oscillator Modules

DUAL FRONT END RECEIVERS

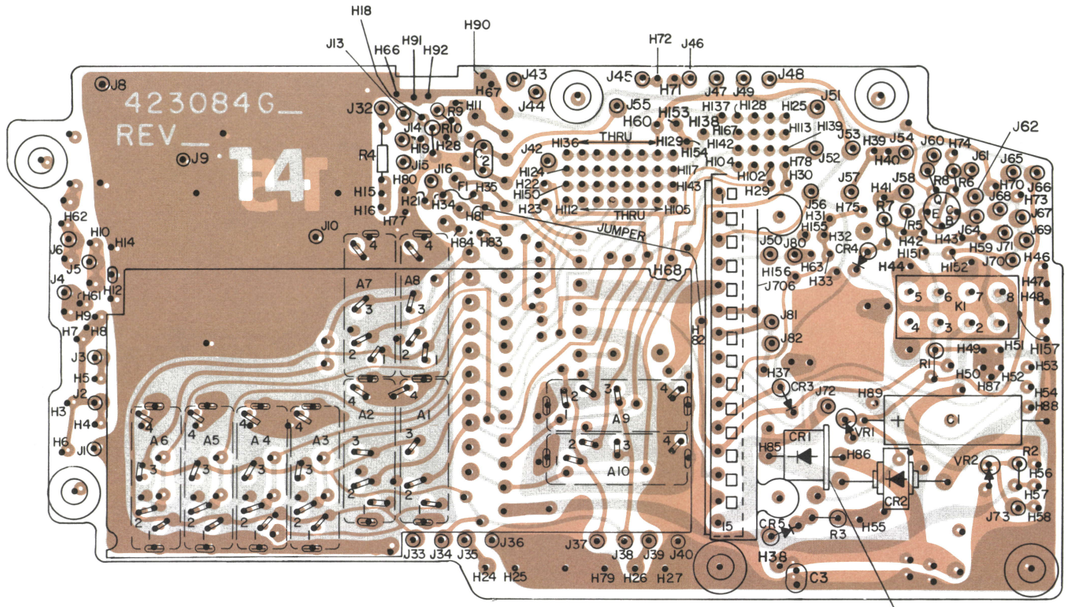
When a dual front end receiver is used in Porta•Mobile II™, modifications must be made to both the system board and the receiver board. These modifications determine positions of oscillator modules and the order they are selected by the multi-frequency switch. Modification instructions for the receiver board are found in receiver maintenance manual LBI4780.

Modification instructions for the system board are found in this publication and listed in the Table of Contents as MODIFICATIONS FOR DUAL FRONT END RECEIVER APPLICATIONS.

GENERAL ELECTRIC COMPANY• MOBILE COMMUNICATIONS DIVISION
WORLD HEADQUARTERS • LYNCHBURG, VIRGINIA 24502 U.S.A.

GENERAL ELECTRIC*
U.S.A.

COMPONENT SIDE



(19D423054, Sh. 2, Rev. 15)
(19D423054, Sh. 3, Rev. 14)

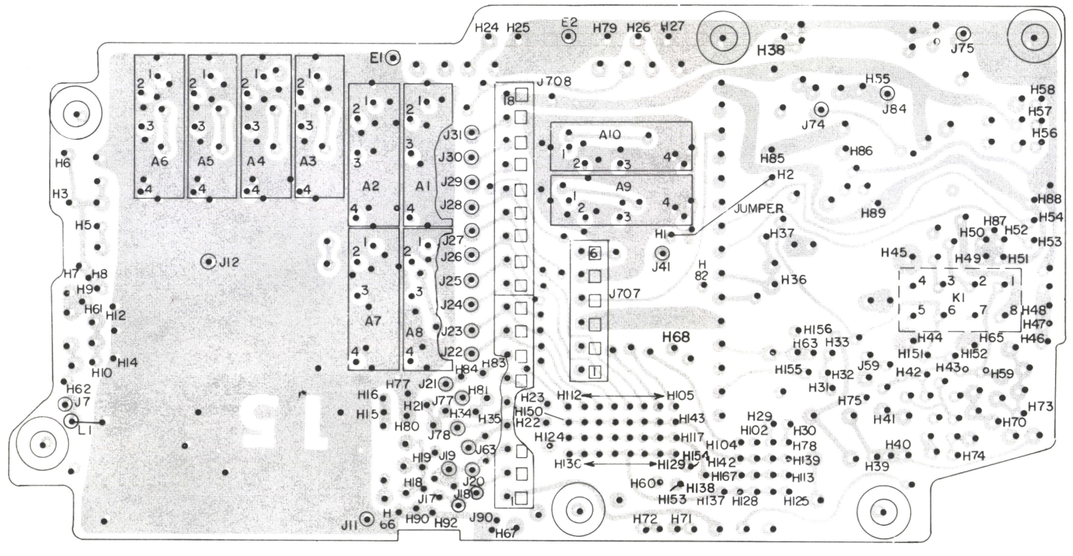
RUNS ON SOLDER SIDE
RUNS ON BOTH SIDES
RUNS ON COMPONENT SIDE

LEAD IDENTIFICATION FOR Q1

TOP VIEW

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

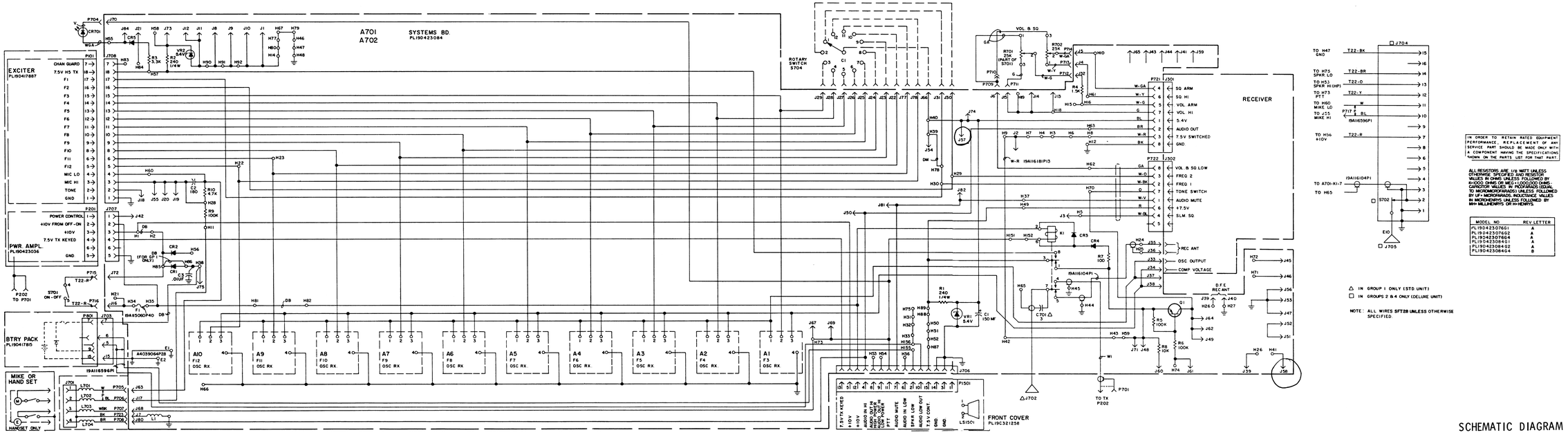
SOLDER SIDE



(19D424026, Rev. 9)

OUTLINE DIAGRAM

SYSTEM BOARD & CASE ASSEMBLY
19D423076G2 & G4



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.

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 ARE PICOFARADS (EQUAL TO MICROMICROFARADS) UNLESS FOLLOWED BY UF= MICROFARADS. INDUCTOR VALUES IN MICROHENRYS UH=1/1,000 FOLLOWED BY MH= MILLIHENRYS OR H=HENRYS.

MODEL NO.	REV LETTER
PLI90423076G1	A
PLI90423076G2	A
PLI90423076G4	A
PLI90423084G1	A
PLI90423084G2	A
PLI90423084G4	B

△ IN GROUP 1 ONLY (STD UNIT)
□ IN GROUPS 2 & 4 ONLY (DELUXE UNIT)

NOTE: ALL WIRES SFT28 UNLESS OTHERWISE SPECIFIED.

(198623154, Rev. 14)

SCHEMATIC DIAGRAM

SYSTEM BOARD & CASE ASSEMBLY
19D423076G2 & G4

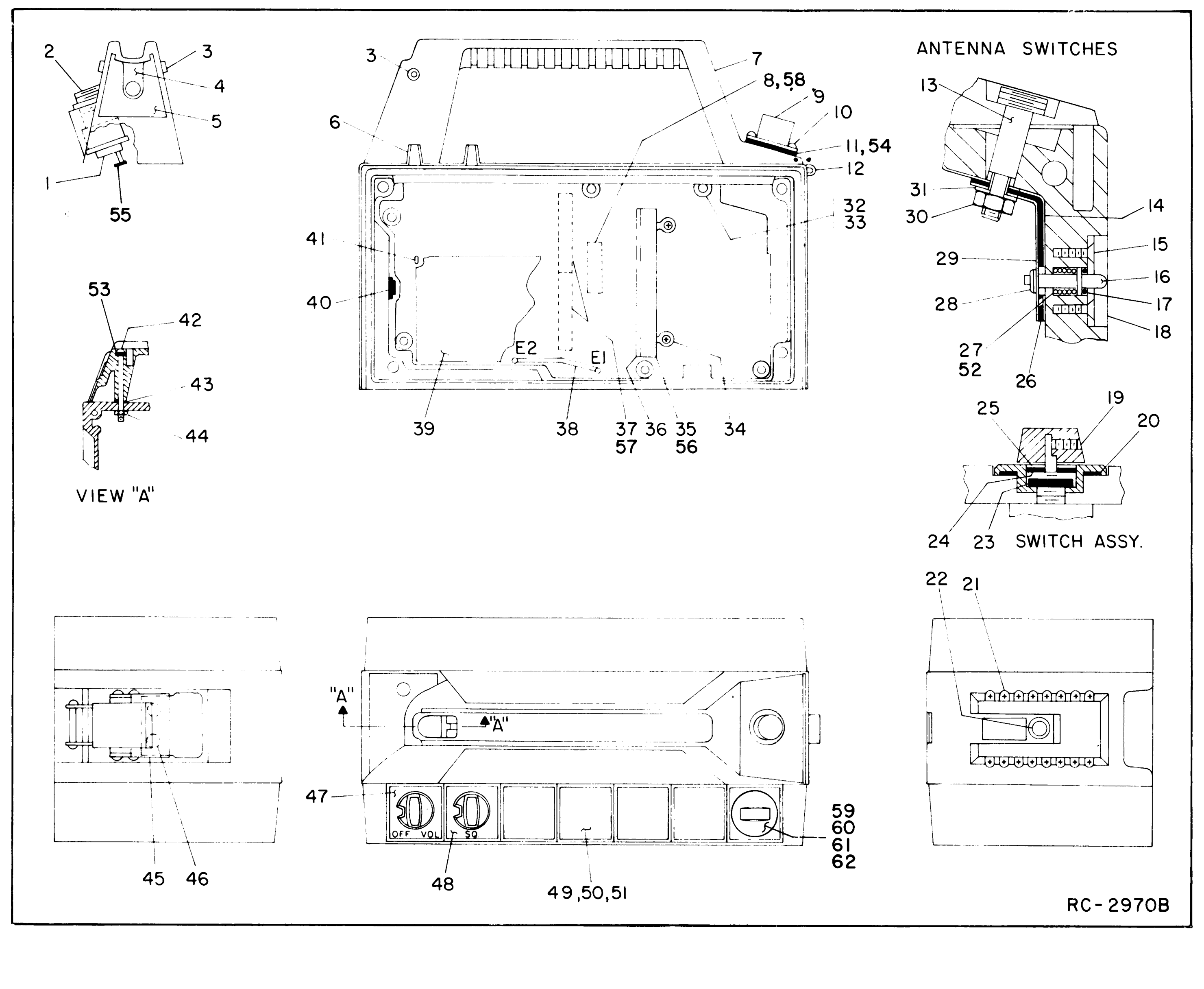
PARTS LIST

LBI30101D

SYSTEM BOARD AND CASE ASSEMBLY
19D423076G2 138-174, 406-512 MHz
19D423076G4 30-50, 66-88 MHz

SYMBOL	GE PART NO.	DESCRIPTION
A702		COMPONENT BOARD 19D423084G2
A1 thru A10		Receiver Module. (Refer to Receiver Manual for complete information).
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	5496267P12	Tantalum: 150 uF ±20%, 15 VDCW; sim to Sprague Type 150D.
C2	19A116114P10073	Ceramic: 180 pF ±10%, 100 VDCW; temp coef -3300 PPM.
C3	19A116192P1	Ceramic: 0.01 uF ±20%, 50 VDCW; sim to Erie 8121 Special.
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1	19A134134P1	Silicon, 15 amp.
CR2	19A116783P1	Rectifier, silicon: 100 VDC blocking, 6 amp; sim to MR751.
CR3 and CR4	19A115100P1	Silicon: sim to Type 1N458A.
CR5*	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV. Added by REV A.
		- - - - - - - - - - - FUSES - - - - - - - - - - -
F1	19A700134P3	Wire, solid: No. 36.
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J1 thru J75		(Part of printed board 19B226658G1).
J77 thru J82		(Part of printed board 19B226658G1)
J84		(Part of printed board 19B226658G1).
J706		Connector. Includes:
	19C321289P1	Shell.
	19A130856G3	Connector: 15 contacts.
J707	19A130856G1	Connector: 9 contacts.
J708	19A130856G2	Connector: 9 contacts. (Quantity 2).
J709 thru J716		(Part of printed board 19B226658G1).
		- - - - - - - - - - - RELAYS - - - - - - - - - - -
K1	19A700061P1	Hermetic sealed: 180 to 341 ohms coil res, 8-16.3 VDC; sim to GE 3SAV1760A2, CP Clare HFW-1201558, or Potter-Brumfield HCM6160.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L1	19B209420P114	Coil, RF: 1.2 uH ±10%, .18 ohms DC res max; sim to Jeffers 4436-1K.
		- - - - - - - - - - - PLUGS - - - - - - - - - - -
P701		(Part of W1).
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q1	19A129187P1	Silicon, PNP.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1 and R2	3R152P241J	Composition: 240 ohms ±5%, 1/4 w.
R3	3R151P332K	Composition: 3.3K ohms ±10%, 1/8 w.
R4	3R151P152J	Composition: 1.5K ohms ±5%, 1/8 w.
R5 and R6	3R151P104J	Composition: 100K ohms ±5%, 1/8 w.
R7	3R151P101J	Composition: 100 ohms ±5%, 1/8 w.
R8	3R151P103J	Composition: 10K ohms ±5%, 1/8 w.
R9	3R151P104J	Composition: 100K ohms ±5%, 1/8 w.
R10	3R151P472J	Composition: 4.7K ohms ±5%, 1/8 w.
		- - - - - - - - VOLTAGE REGULATORS - - - - - - -
VR1 and VR2	4036887P5	Zener: 500 mW, 5.4 v. nominal.
		- - - - - - - - - - - CABLES - - - - - - - - - - -
W1	19A130432G1	Cable assembly, RF: coaxial; sim to Solitron/ Microwave 8120-0003.
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR701	19A130470G1	Diode, optoelectronic: red light emitting.
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J701		JACK ASSEMBLY 19A130320G1
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L701 thru L704	19B209420P114	Coil, RF: 1.2 uH ±10%, .18 ohms DC res max; sim to Jeffers 4436-1K.
		- - - - - - - - - - - PLUGS - - - - - - - - - - -
P705 thru P708	19A115834P4	Contact, electrical: sim to AMP 2-332070-9.
P723	19B209201P1	Receptacle: 4 contacts, sim to Switchcraft 3C-1088.
J703		Connector. Includes:
	19B226392P1	Contact. (Quantity 1).
	19B226392P3	Contact. (Quantity 1).
J704		Connector. Includes:
	19B226392P1	Contact. (Quantity 15).
	19B226392P2	Contact. (Quantity 1).
J705	19A130155P1	Antenna, insert: brass.
		- - - - - - - - - - - PLUGS - - - - - - - - - - -
P704	19A115834P4	Contact, electrical: sim to AMP 2-332070-9.
P709 thru P716	19A115834P4	Contact, electrical: sim to AMP 2-332070-9.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R701	19A134073P1	Resistor/switch: Includes: Resistor, variable, 25K ohms ±20%, 1/10 w; Switch, rotary, SPST, 1 amp at 125 VAC.
R702	19A134073P2	Variable, carbon film: 25K ohms ±10%, 1/10 w.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S701		(Part of R701).
S702		Antenna switch. (See RC-2970 items 14, 26, 29).
S703	19B226809G9	Toggle: SPDT; sim to C&K Components 7101SDG. (2 FREQ).
S704	19B226809G10	Rotary: 1 pole, 1 section, 2 to 12 adjustable positions, non-shorting; sim to Grayhill 51MD30-01-1-AJN. (MULTI-FREQ).
S705	19B226809G16	Rotary: 1 pole, 1 section, 2 to 12 adjustable stop positions, non-shorting; sim to Grayhill 51MD30-01-1-AJN. (12 FREQ Rx).
S706	19B226809G17	Rotary: 1 pole, 1 section, 2 to 12 adjustable stop positions, non-shorting; sim to Grayhill 51MD30-01-1-AJN. (12 FREQ Tx).
		HARNESS ASSEMBLY 19D423076G5 (Includes P709-P716, R701, R702, S701)
		MICROPHONE MODEL 4EM33L10
		Switch: moisture proof. Shure Brothers RP33.
		Cable and plug: approx 80 inches. Shure Brothers RP35.
		Button: gray plastic. Shure Brothers RP175.
		Cartridge, magnetic controlled. Shure Brothers RP32.
		Case, mounting button and nameplate: brown plastic. Shure Brothers RP174.
		Shield. Shure Brothers RP36.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	4038831P4	Alignment tool. Fork Tip.
	19B219079G1	Alignment tool. Allen tip.
		DFE MOD KIT 19A130979G1
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1301 thru CR1312	19A115100P1	Silicon: sim to Type 1N458A.
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J85	19A116366P6	Contact, electrical: sim to Concord 10-891-1.
		- - - - - - - - - - - PLUGS - - - - - - - - - - -
P2301	19A115834P4	Contact, electrical: sim to AMP 2-332070-9.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R2302	3R151P103J	Composition: 10K ohms ±5%, 1/8 w.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19B232697G24	Cable, includes 19A115834P4 contact.
	19B232697G25	Cable, includes 19A115834P4 contact.
		CHANNEL GUARD MOD KIT 19A130977G1
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1001	5491674P1	Tantalum: 1 uF +40-20%, 10 VDCW; sim to Sprague Type 162D.
C1002	19A116192P14	Ceramic: 0.1 uF ±20%, 50 VDCW; sim to Erie USCC CW20C104-M2.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1001	19B226809G12	Toggle: SPDT; sim to C & K Components 7101SDG.
		- - - - - - - - - - - CABLES - - - - - - - - - - -
W1001		CABLE, RELAY ASSEMBLY 19B226806G7
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L1 thru L4	19B209420P114	Coil, RF: 1.2 uH ±10%, .18 ohms DC res max; sim to Jeffers 4436-1K.
		- - - - - - - - - - - PLUGS - - - - - - - - - - -
P1	19A116137P3	Socket, crystal: 8 contacts; sim to Cinch 133-98-92-061 special.
P2 thru P4	19A115834P4	Contact, electrical: sim to AMP 2-332070-9.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19C320975P1	Seal.
	19B226358G10	Decorative module.
	19B227357G1	Insulator.
	19A137431P1	Gasket.
		TYPE 90 MOD KIT 19A130969G3
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1301 thru CR1312	19A115100P1	Silicon: sim to Type 1N458A.
		- - - - - - - - - - - CABLES - - - - - - - - - - -
W1302		CABLE, RELAY ASSEMBLY 19B226806G3
		- - - - - - - - - - - PLUGS - - - - - - - - - - -
P1	19A116137P3	Socket, crystal: 8 contacts; sim to Cinch 133-98-92-061 special.
P2 and P3	19A115834P4	Contact, electrical: sim to AMP 2-332070-9.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19A130466P1	Insulator.
	19A137058P1	Clamp.
	N136P504C	Tap screw: No. 2-32 x 1/4.
		TYPE 99 MOD KIT 19A136888G1
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1401 thru CR1411	19A115100P1	Silicon: sim to Type 1N458A.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1401	3R151P203J	Composition: 20K ohms ±5%, 1/8 w.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19A702460P1	Contact, electrical.
		MECHANICAL PARTS (SEE RC-2970)
1	19B226367P1	Nut, brass: 3/4 dia.
2	19A130320G1	Connector. (J701).
3	19A130156P1	Bushing.
4	19A130157P1	Spring.
5	19B226322P1	Clip.
6	19A130426G2	Knob Assembly. (Includes insert and set screw).
7	19C321251G1	Handle assembly. (Used in 19D423076G2).
	19C321251G3	Handle assembly. (Used in 19D423076G4).
8	19A130856G1	Connector: 9 contacts. (J707).
9	19A130321G1	Connector-Cable assembly. (Used in 19D423076G4).
10	19A116773P1005	Tap screw, Phillips POZIDRIV®: No. 7-19 x 5/16.
11	19A130151P3	Gasket.
12	19A130323P1	Hook.
13	19A130155P1	Antenna Insert. (J705).
14	19B226507P1	Contact.
15	19A116869P1	Tap screw: No. 2-32 x 1/4 w.
16	19B226628P1	Button.
17	19A115983P12	Gasket. (Not Used).
18	19B226517P1	Cover.
19	N70P703C6	Set screw: No. 3-48 x 3/16.
20	19A130151P1	Gasket.
21	19B226392P2	Contact. (Part of J704).
22	19A116719P5	Insert, threaded: sim to Tridair Ind. SPB420S.
23	19A127319P1	Nut: No. thd. size 1/4-32.
24	4037064P18	Washer, non-metallic: .125 dia.
25	4035630P1	Washer: teflon, 1/4 inch.
26	199A130368P1	Insulator.
27	4035235P10	Spring, helical.
28	19C307038P7	Nut, push on: sim to Palnut PS094032.
29	19B226510P1	Contact.
30	N210P15C6	Nut, hex: No. 8-32.
31	N403P16C6	Lockwasher, internal tooth: No. 8.
32	19B201806P1	Insert, threaded.
33	19A134141P1	Rubber grommet.
34	N136P904C	Tap screw, phillips head: No. 4-24 x 1/4.
35	19C321289P1	Shell: lexan. (Part of J706).
36	19A130856G3	Connector: 15 contacts. (Part of J706).
37	19A130856G2	Connector: 9 contacts.
38	4039064P28	Strap. (Located between E1 and E2).
39	19B226716G1	Insulator.
40	19A136641P1	Group strap.
41	N503P308C13	Cotter pin. (Not Used).
42	N188P15034	Machine screw: No. 8-32, 2-1/8 inches long.
43	19A115983P2	Seal. (Not Used).
44	7878243P11	Hex nut: No. 8-32.
45	4029994P4	Catch, pull down.
46	N327P12018E	Rivet, tubular.
47	19A130780G2	Module.
48	19A130780G1	Module.
49	19C320931P1	Module.
50	19A130151P1	Gasket.
51	N509P606C	Dowel pin: 1/16 x 3/8.
52	4035306P11	Washer, fiber: 1/8 dia.
53	4036979P3	Washer, non-metallic: 1/4 dia. (Not Used).
54	19A136640G1	Insert.
55	19A115834P4	Contact, electrical: sim to AMP 2-332070-9.
56	19A136847P1	Insulator.
57	19A136847P2	Insulator.
58	19A136847P3	Insulator.
59	19A130428G1	Knob. (MULTI FREQUENCY).
60	19A130769G1	Module.
61	19A130151P1	Gasket. (Located between module and housing).
62	19A137431P1	Gasket, circular.

*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 description of parts affected by these revisions.

REV.A - System Board 19D423084G2
To prevent reverse breakdown failure of LED CR701
Added CR5

REV.A - System Board and Case Assembly 19D423076G2
To provide external test point for audio output.
Changed printed wire runs.
Added holes H153, H154 and wires to J703-5 & 6.

MULTI-FREQUENCY MODIFICATIONS

(19D423754, Sheet 1, Rev. 9) (19D423769, Sheet 1, Rev. 6)
(19D423754, Sheet 2, Rev. 3) (19D423769, Sheet 2, Rev. 1)

The multi-frequency modifications include instructions for adjusting the stop post on multi-frequency switches S704 or S705 and S706, for adding oscillator modules, for repeating frequencies.

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 holes as shown in the following chart.

NO. OF FREQ.	MOVE ADJUSTABLE STOP FROM	TO
2	H10	H2
3	H10	H3
4	H10	H4
5	H10	H5
6	H10	H6
7	H10	H7
8	H10	H8
9	H10	H9
10	H10	H10
11	H10	H11
12	H10	REMOVE, NOT USED

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

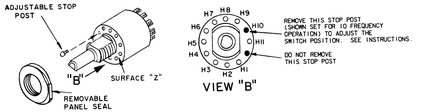


Figure 1 - Stop Post Adjustment

ADDING OSCILLATOR MODULES

1. After completing the stop post adjustment, connect the leads from multi-frequency switch S704 or S705 and S706 as shown in the following charts (see appropriate Outline Diagram). Tape back all unused leads.

PL19A130973G1

CONNECTIONS CHART

FROM	TO	WIRE - COLOR	ROUTING
S704 - P1	A701,A702,A703 - J66	T28 - W-R	THRU HOLE B
- P2	- J31	- BK	
- P3	- J30	- BR	
- P4	- J29	- R	
- P5	- J28	- O	
- P6	- J27	- Y	
- P7	- J26	- G	
- P8	- J25	- BL	
- P9	- J24	- V	
- P10	- J23	- GA	
- P11	- J22	- W	
- P12	- J77	- W-BK	
S704 - P13	A701,A702,A703 - J78	T28 - W-BR	

CONNECTIONS CHART - S705 / RX

FROM	TO	WIRE - COLOR	ROUTING
* S705 - P1	A701,A702,A703 - J66	T28 - W-R	THRU HOLE B
* - 1	- H155	- BK	
* - 2	- H68	- BR	
* - P2	- J29	- R	
* - P3	- J28	- O	
* - P4	- J27	- Y	
* - P5	- J26	- G	
* - P6	- J25	- BL	
* - P7	- J24	- V	
* - P8	- J23	- GA	
* - P9	- J22	- W	
* - 11	- H23	- W-BK	
* S705 - 12	A701,A702,A703 - H22	T28 - W-BR	

CONNECTIONS CHART - S706 / TX

FROM	TO	WIRE - COLOR	ROUTING
S706 - P1	A701,A702,A703 - J66	T28 - W-R	THRU HOLE B
- P2	- J31	- BK	
- P3	- J30	- BR	
- 3	- H99	- R	
- 4	- H20	- O	
- 5	- H93	- Y	
- 6	- H94	- G	
- 7	- H95	- BL	
- 8	- H96	- V	
- 9	- H97	- GA	
- 10	- H98	- W	
- P5	- J77	- W-BK	
S706 - P6	A701,A702,A703 - J78	T28 - W-BR	

NOTE

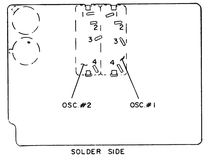
ALL WIRE AND JUMPER CONNECTION UNLESS OTHERWISE SPECIFIED SHOULD BE MADE WITH WIRE 18AI35060P30 AND SLEEVED WITH 403B99394.

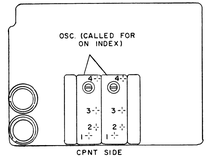
2. Place the oscillator module(s) in the proper holes (see Figure 2). Then bend over tabs on the can and tack solder to pattern.
3. Bend the leads of the oscillator module as shown in Figure 2 (or appropriate Outline Diagram) and solder to the adjacent pads.

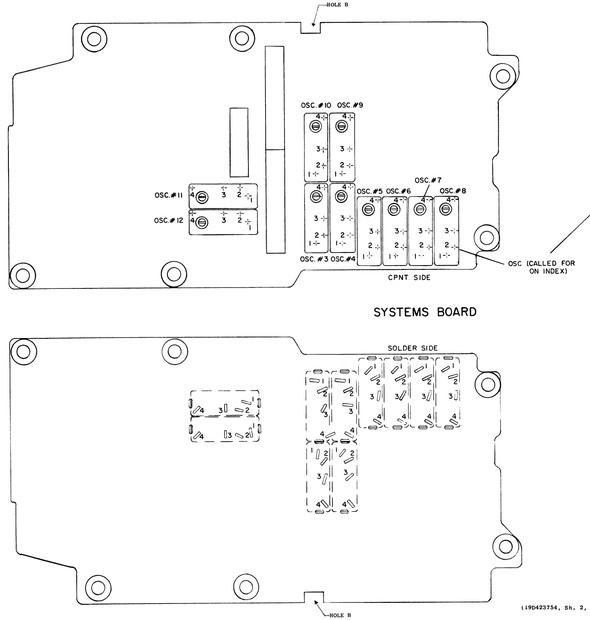
REPEATING FREQUENCIES

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 3 are to be repeated, add the jumper from S704-1 and S704-3.

RCVR. BOARD

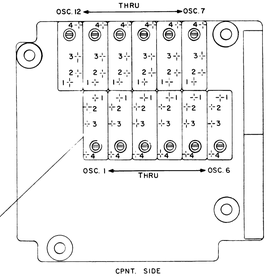




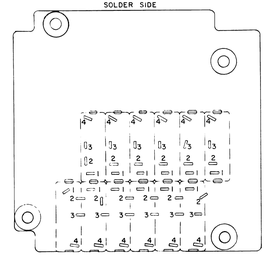


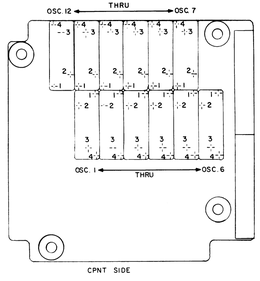
SYSTEMS BOARD

(19D423754, Sh. 2, Rev. 3)



UHF, VHF & MID BAND EXCITER BOARD





LOW BAND EXCITER BOARD

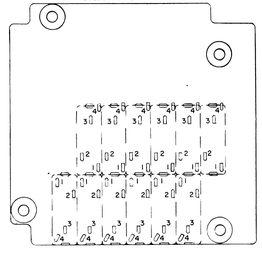


Figure 2 - Oscillator Module Installation

MULTI-FREQUENCY MODIFICATIONS
SHEET 1

REPEATING OSCILLATOR MODULES

(19D423761, Sheet 1. Rev. 4)

These instructions cover installation of options:

PL19A130980G1 TX Repeat Freq. Kit
:P19A130980G2 RX Repeat Freq. Kit

INSTRUCTIONS:

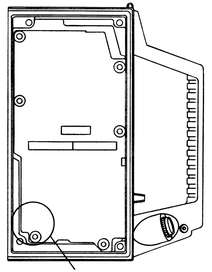
1. Remove front and rear cover if present.
2. Instructions for repeating frequencies on TX only or RX only where diodes are used in place of sicoms. Sicoms on the RX BD can not be repeated on the system board; another sicoms on the same freq has to be used. Following instructions apply to either the Group 1 or Group 2 kit.

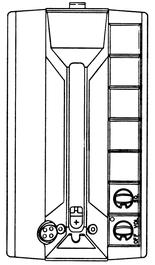
   A. For the channel that a frequency is being repeated, assemble a Diode CR1901, (part of kit) in the space normally intended for the Sicom by putting the anode lead in the number 2 hole, bending it over and soldering to where the Sicom's #2 lead would have gone. The cathode lead of the diode will be terminated later.

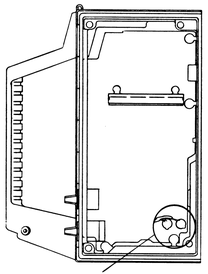
   B. Assemble a second diode CR1902, (part of kit) in the number 1 hole (anode lead) bending it over and solder it to the empty pad beside the number 2 lead, sleeve if required using sleeving (part of kit). Then run jumper from this pad to the related Sicom key pad, and the related Sicom key lead is connected to the empty pad.

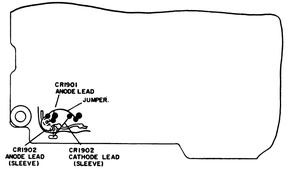
   C. The cathode end of the diodes shall be connected together using mid air connections. The connection will be made and the wire (part of kit), run down the side of the diode along the component side of the board. Sleeve lead using sleeving (part of kit) to chart 60 down column xx until all diodes are connected. This wire should be routed to give the shortest connections. Next, connect a jumper to the cathode of the diode that is closest to the repeated Sicom and run this lead down the side of the diode and through any empty hole or slot to the soldered side of board, and connect it to the empty pad with the number 2 lead of the Sicom. Sleeve the diodes with sleeving (part of kit).

3. Assemble front and back covers if required.

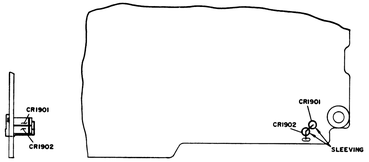








SYSTEMS BD.
CPNT. SIDE



SYSTEMS BD.
SOLDER SIDE

(19D423761, Sh.1, Rev. 4)

SELECTING CHANNEL GUARD TONE CHANNELS AND AUTOMATIC MONITOR WITH MULTI-FREQUENCY SELECTOR SWITCH

CHANNEL OSCILLATOR

PWB	OSC POS #1 H78	OSC POS #2 H102	OSC POS #3 H105	OSC POS #4 H106	OSC POS #5 H107	OSC POS #6 H108	OSC POS #7 H112	OSC POS #8 H111	OSC POS #9 H109	OSC POS #10 H110	OSC POS #11 H104	OSC POS #12 H103	
	CR1013 CR1001 CR1025	CR1014 CR1002 CR1026	CR1017 CR1005 CR1029	CR1008 CR1006 CR1030	CR1019 CR1007 CR1031	CR1020 CR1008 CR1032	CR1024 CR1012 CR1036	CR1022 CR1011 CR1035	CR1021 CR1009 CR1033	CR1022 CR1010 CR1034	CR1016 CR1004 CR1028	CR1015 CR1003 CR1027	
H113													H125
H114													H126
H117													H129
H118													H130
H119													H131
H120													H132
H124													H136
H123													H135
H121													H133
H122													H134
H116													H128
H115													H127
TONE	A M B	A M B	A M B	A M B	A M B	A M B	A M B	A M B	A M B	A M B	A M B	A M B	
	H 139	H 140	H 143	H 144	H 145	H 146	H 150	H 149	H 147	H 148	H 142	H 141	
	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	

TONE CHANNEL

A IS FIRST TONE FREQ. B IS SECOND TONE FREQ.

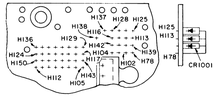
FOR INSTALLATION INSTRUCTION (3) USE COLUMN (M) TO ASSEMBLE DIODES FOR AUTO MONITOR. ASM A DIODE IN ONLY CHANNEL NO. WHICH IS SHOWN AS "OPEN" ON PRODUCTION TAG IN DECODE COLUMN. IF "OPEN" APPEARS IN ENCODE COLUMN, ASM DIODE FOR THAT CHANNEL AS SHOWN IN COLUMN "M".

FOR INSTALLATION INSTRUCTION (4) USE COLUMN A, M, B TO ASSEMBLE DIODES FOR OPERATION. USE COLUMN M WHEN "OPEN" APPEARS IN DECODE COLUMN ON PRODUCTION TAG. USE COLUMN A OR B DEPENDING ON HOW VERSATONES WERE INSERTED.

FOR INSTALLATION INSTRUCTION (6) USE COLUMN A OR B TO ASSEMBLE DIODES AS SHOWN IN ENCODE COLUMN. IF "OPEN" APPEARS IN A PARTICULAR CHANNEL, ASM DIODE AS SHOWN IN BOTH COLUMN A AND B.

FOR INSTALLATION INSTRUCTION (7) USE ONLY COLUMN B TO ASSEMBLE DIODES FOR DEFEATING ENCODE TONE. (WHEN "OPEN" APPEARS IN ENCODE COLUMN.)

NOTE: ON DUAL FRONT END UNITS, ASSURE THAT DIODES ARE ASSEMBLED SO THAT THEY CORRESPOND TO OSC. POSITIONS (NOT SWITCH POSITIONS) AS DETERMINED BY INST. 19D423760.



SYSTEMS BOARD
(TYP ASM FOR DIODES)

USE THE ABOVE CHART TO ASSEMBLE DIODES ON SYSTEM BOARD WHEN SELECTING TONE CHANNELS WITH THE SELECTOR SWITCH.

SAMPLE: IF TONE A IS TO BE USED ON OSC 4, FIND OSC 4 ON CHART. GO DOWN COLUMN UNTIL YOU FIND A DIODE. THE DIODE IN COLUMN A GIVE THE HOLE NUMBERS AND DIRECTION THE DIODE SHOULD BE ASSEMBLED. THE DIODE IN THE SAMPLE IS CONNECTED BETWEEN H106 AND H118.

H106 → H118

DIODES ARE PART OF KIT 19A130997G1 THROUGH G7

(190423758, Sh. 8, Rev. 3)

SELECTING TYPE 90 TONE CHANNELS WITH MULTI-FREQUENCY SELECTOR SWITCH

TRANSMITTER CONTROL

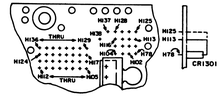
	CR1301	CR1302	CR1303	CR1304	CR1305	CR1306	CR1307	CR1308	CR1309	CR1310	CR1311	CR1312	
	OSC 1 H78	OSC 2 H102	OSC 3 H105	OSC 4 H106	OSC 5 H107	OSC 6 H108	OSC 7 H112	OSC 8 H111	OSC 9 H109	OSC 10 H110	OSC 11 H104	OSC 12 H103	
H113													H125
H114													H126
H117													H129
H118													H130
H119													H131
H120													H132
H124													H136
H123													H135
H121													H133
H122													H134
H116													H128
H115													H127
	A B	A B	A B	A B	A B	A B	A B	A B	A B	A B	A B	A B	

TONE CONTROL

USE THE ABOVE CHART FOR ASSEMBLING DIODES ('M' SYSTEMS BOARD FOR SELECTING TONE CHANNEL WITH FREQ SELECTOR SWITCH
SAMPLE: IF TONE 'B' IS TO BE USED ON OSC 3, THEN FIND OSC 3 ON CHART. GO DOWN COLUMN UNTIL YOU FIND A DIODE. THE DIODE IN COLUMN 'B' GIVES THE HOLE NUMBER & DIRECTION THE DIODE SHOULD BE ASSEMBLED. DIODE IN SAMPLE IS CONNECTED FROM H105 TO H129

H105 → H129

DIODES ARE PART OF KIT 19A130969G3



SYSTEMS BOARD
(TYP ASM FOR CR1301-CR1312)

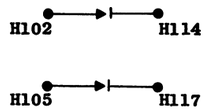
(190423750, Sh. 2, Rev. 4)

SELECTING TYPE 99 TONE AUTOMATIC MONITOR CHANNELS WITH MULTI-FREQUENCY SELECTOR SWITCH

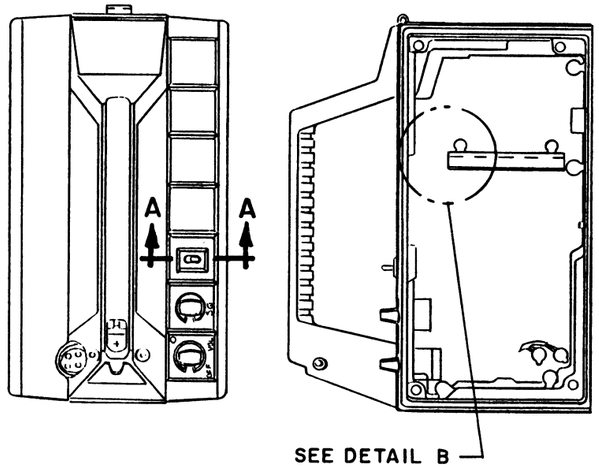
CHANNEL OSCILLATOR											
OSC 1	OSC 2	OSC 3	OSC 4	OSC 5	OSC 6	OSC 7	OSC 8	OSC 9	OSC 10	OSC 11	OSC 12
H78 CR1401 H113	H102 CR1402 H114	H105 CR1405 H117	H106 CR1406 H118	H107 CR1407 H119	H108 CR1408 H120	H112 CR1412 H124	H111 CR1411 H123	H109 CR1409 H121	H110 CR1410 H122	H104 CR1404 H116	H103 CR1403 H115
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
TYPE 99, 2 & 4 TONE											

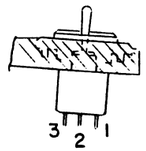
USE THE ABOVE CHART TO ASSEMBLE DIODES ON SYSTEM BOARD FOR SELECTING TYPE 99 AUTOMATIC MONITOR CHANNELS WITH MULTI-FREQUENCY SELECTOR SWITCH.

SAMPLE: IF TYPE 99 TONE IS NOT TO BE USED ON OSCILLATOR CHANNELS 2 AND 3, FIND OSC 2 ON THE CHART. IN THE COLUMN YOU WILL FIND A DIODE. THE DIODE GIVES THE HOLE NUMBERS AND THE DIRECTION THE DIODE SHOULD BE ASSEMBLED. DIODES IN SAMPLE ARE CONNECTED FROM H102 TO H114 AND H105 TO H117.

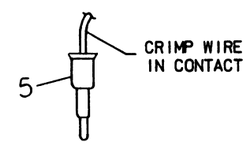


DIODES ARE PART OF KIT 19A136888G1



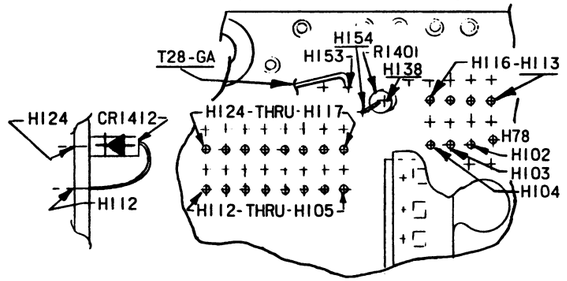


SECT A-A
(S1401)



DETAIL C

THESE INSTRUCTIONS COVER THE INSTALLATION OPTION PL19A136888G1, AUTO MONITOR FOR T99, 2 & 4 TONE.



DETAIL B
(ROTATED 90° CW)

SYSTEM BOARD
(TYP ASM FOR CR1401 - CR1403)

(19B227726, Rev. 3)

1. INSTRUCTIONS:
   1. REMOVE FRONT & BACK COVERS IF PRESENT.
   2. MAKE CONNECTIONS:

FROM	TO	WIRE/CABLE
H138	H154	R1401
H153 *	S1401-2 **	T28-GA

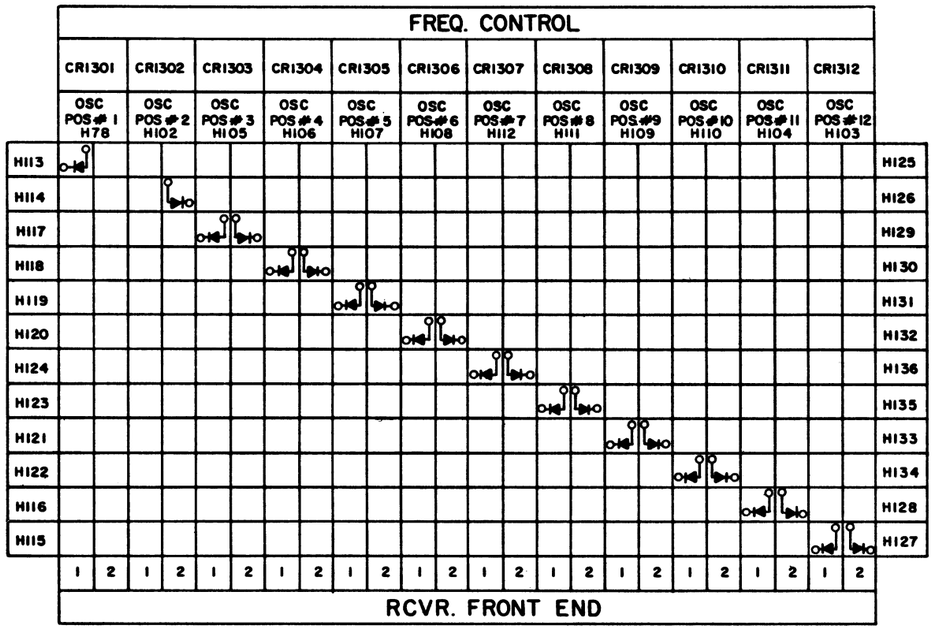
   3. SOLDER ALL ELECTRICAL CONNECTIONS.
   4. ASSEMBLE DIODES CR1401 THRU CR1412, PART OF KIT PL19A136888G1, TO SYSTEMS BOARD PER CHART.

* TERMINATE PER DETAIL C

** SLEEVE WIRE AT S1401 USING 19C301208 SLEEVING.

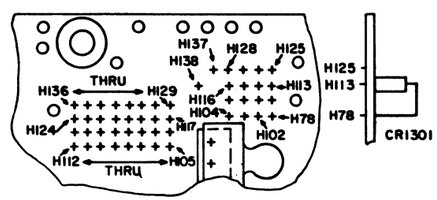
SELECTING RECEIVER FRONT ENDS WITH MULTI-FREQUENCY SELECTOR SWITCH

PL19A130979G1



USE THE ABOVE CHART FOR ASSEMBLING DIODES ON SYSTEMS BOARD FOR SELECTING RECEIVER FRONT ENDS WITH FREQ. SELECTOR SWITCH.
SAMPLE: IF OSC.1 & OSC.3 IS TO BE ON FRONT END 1 AND OSC.2 & OSC.4 ON FRONT END 2. FIND THE DIODE IN THE COLUMN FOR THE FRONT END REQUIRED.

OSC. 1 H78 — H113
OSC. 3 H105 — H117
OSC. 2 H102 — H126
OSC. 4 H106 — H130



SYSTEMS BOARD
TYP. ASM. FOR CR1301 - CR1312

(19D423760, Sh. 2, Rev. 5)

MODIFICATIONS

1. Modify the system board according to the chart labeled MODIFICATIONS FOR SYSTEMS BOARD. Also, refer to Figure 1 - Outline Diagram.

MODIFICATIONS FOR SYSTEMS BOARD			
FROM	TO	WIRE	REMARKS
H24	K1-5	COAXIAL CABLE CENTER COND.	REMOVE FROM H24
K1-5	H26	COAXIAL CABLE CENTER COND.	ADD
H25	H44	COAXIAL CABLE SHIELD	REMOVE FROM H25
H44	H27	COAXIAL CABLE SHIELD	ADD
J33		JACK	CLIP JACK FLUSH WITH SYSTEMS BD.
J34		JACK	
J35		JACK	
H138	DFE RCVR J303	T28-BL	TERMINATE WITH 19A115834P4
H137	DFE RCVR J304	T28-G	TERMINATE WITH 19A115834P4
	SYSTEMS BD	J85	ADD
H68	DFE RCVR J305	T28-BR	TERMINATE WITH 19A115834P4

2. Assemble diodes CR1301 through CR1312 according to the chart on Selecting Receiver Front Ends with Multi-Frequency Selector Switch. Refer to the Table of Contents for MULTI-FREQUENCY MODIFICATIONS.

3. Assemble oscillators #3 through #12 on the system board according to Figure 2, Oscillator Module Installation. Refer to the Table of Contents for MULTI-FREQUENCY MODIFICATIONS.

   NOTE: Oscillator #1 must go with receiver front end #1 and oscillator #2 must go with receiver front end #2. The rest of the oscillators can be divided up with either front end.

4. Figure 2 - Block Diagram shows how the oscillators are connected to the front ends. In the standard Multi-Frequency Option F1 selects oscillator #1 and F12 selects oscillator #12. F1 or any of the frequency positions can be reconnected to any of the oscillators positions by plugging the plug from the desired frequency position onto the jack of the desired oscillator position.

   Example: 3 oscillators on front end #1 and 4 on front end #2, then oscillator #1, #3 and #4 would be on front end #1 and the run on the systems board between oscillator #4 and #5 would be cut. Therefore oscillator #2, #5, #6 and #7 would be on front end #2. See Figure 3 - PW Pattern.

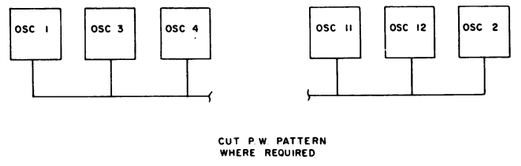


Figure 2 - Block Diagram

5. Assemble Dual Front RCVR to J36, J37, J38, J39, J40 and J85 of systems board as shown in Figure 1.

6. Solder all electrical connections.

7. Assemble Multi-Frequency Switch S704 according to the MULTI-FREQUENCY MODIFICATIONS. Refer to the Maintenance Manual Table of Contents.

8. Wires joined between each side of board A701, 702, 703 to be routed thru hole "B". Assemble pressure sensitive pad (part of kit PL-19A130979) to side of RCVR.

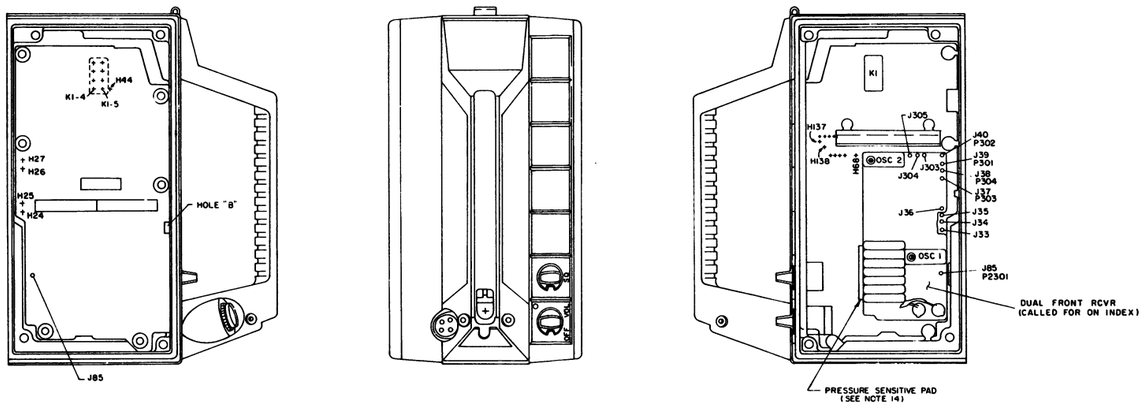


Figure 1 - Outline Diagram

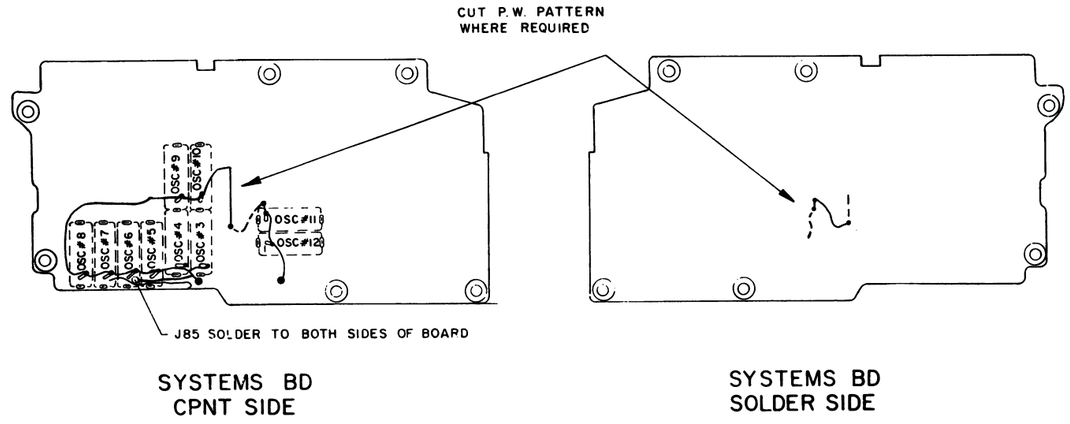


Figure 3 - PW Pattern

(19D423760, Sh. 1, Rev. 7)

MODIFICATIONS FOR DUAL FRONT END RECEIVER APPLICATIONS