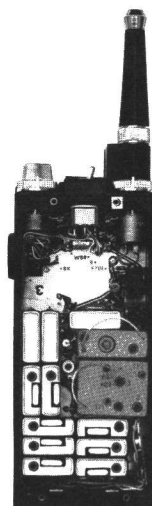


 **MOBILE RADIO**

MASTR® *Personal Series* **PROGRESS LINE**

PE MODELS SYSTEMS BOARD AND CASE ASSEMBLY 19D417330G4
FOR LOW BAND RECEIVERS WITH DUAL FRONT END



SPECIFICATIONS *

MODEL NUMBERS

19D417330G4

30-50 MHz

CONTROLS:

Volume ON-OFF Switch

Squelch Control

Multi-Frequency (5 positions standard,
6 positions special) Switch

PTT Switch

Tone Option Switch

Collapsible Antenna
Accessory Jack

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

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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 A704 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, 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).

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.

Keying the external microphone directly energizes relay K1.

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 SLM receive oscillators F1 and F2 may be repeated and receive oscillators F3, F4 and F5 may be repeated.

When SLM is provided receive oscillators 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.

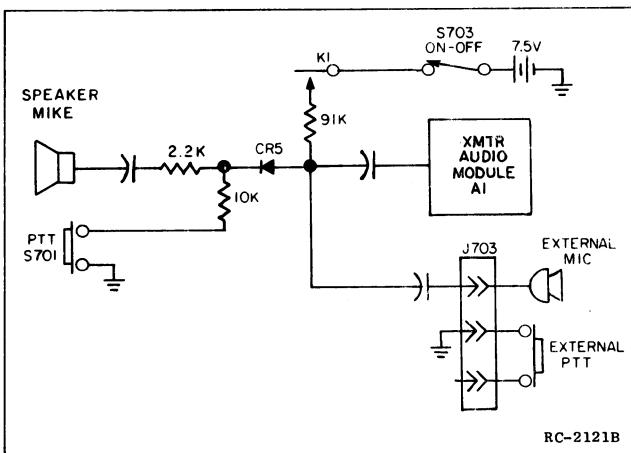


Figure 1 - Audio Switching Circuit

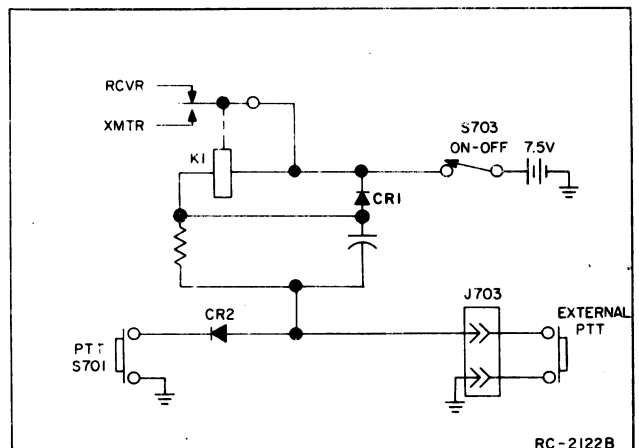
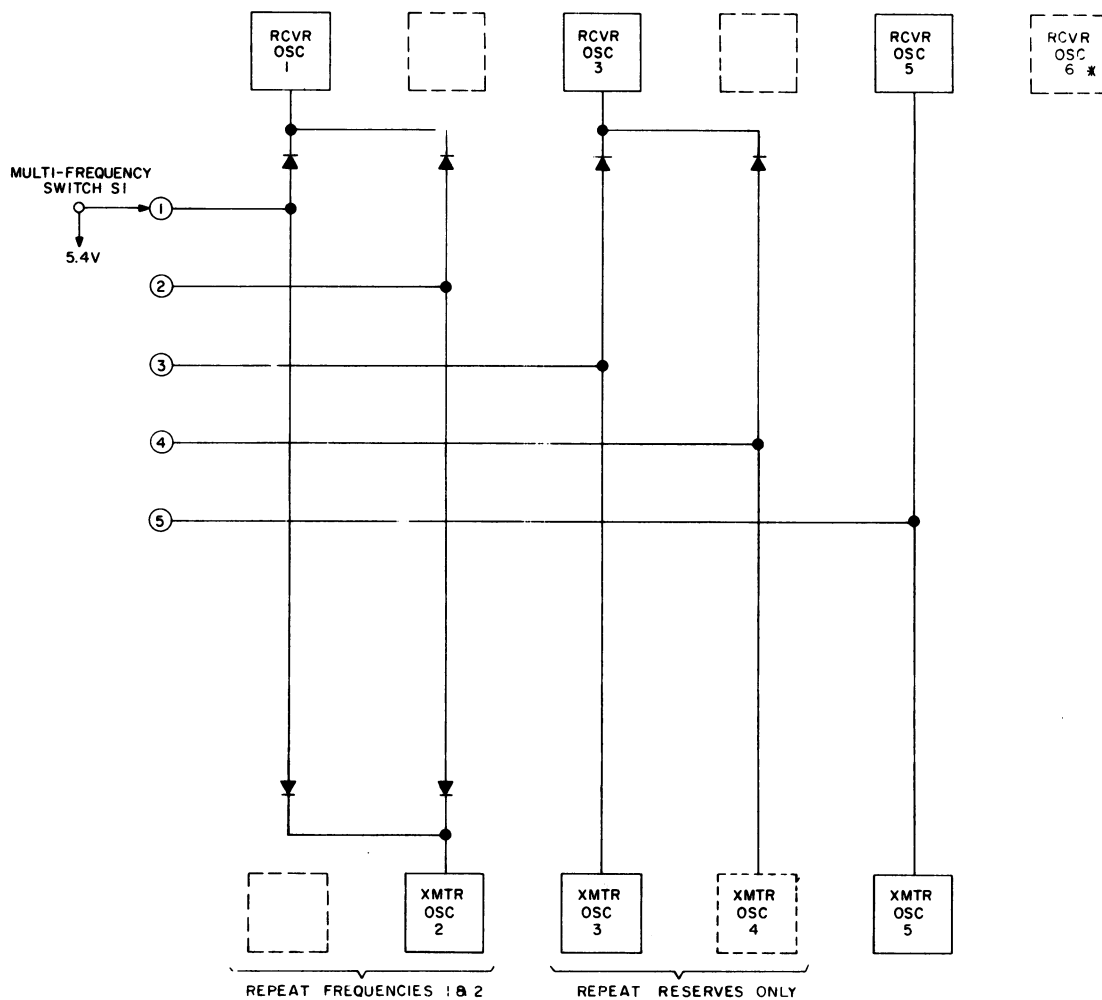


Figure 2 - DC Switching Circuit



* SPECIAL APPLICATIONS ONLY

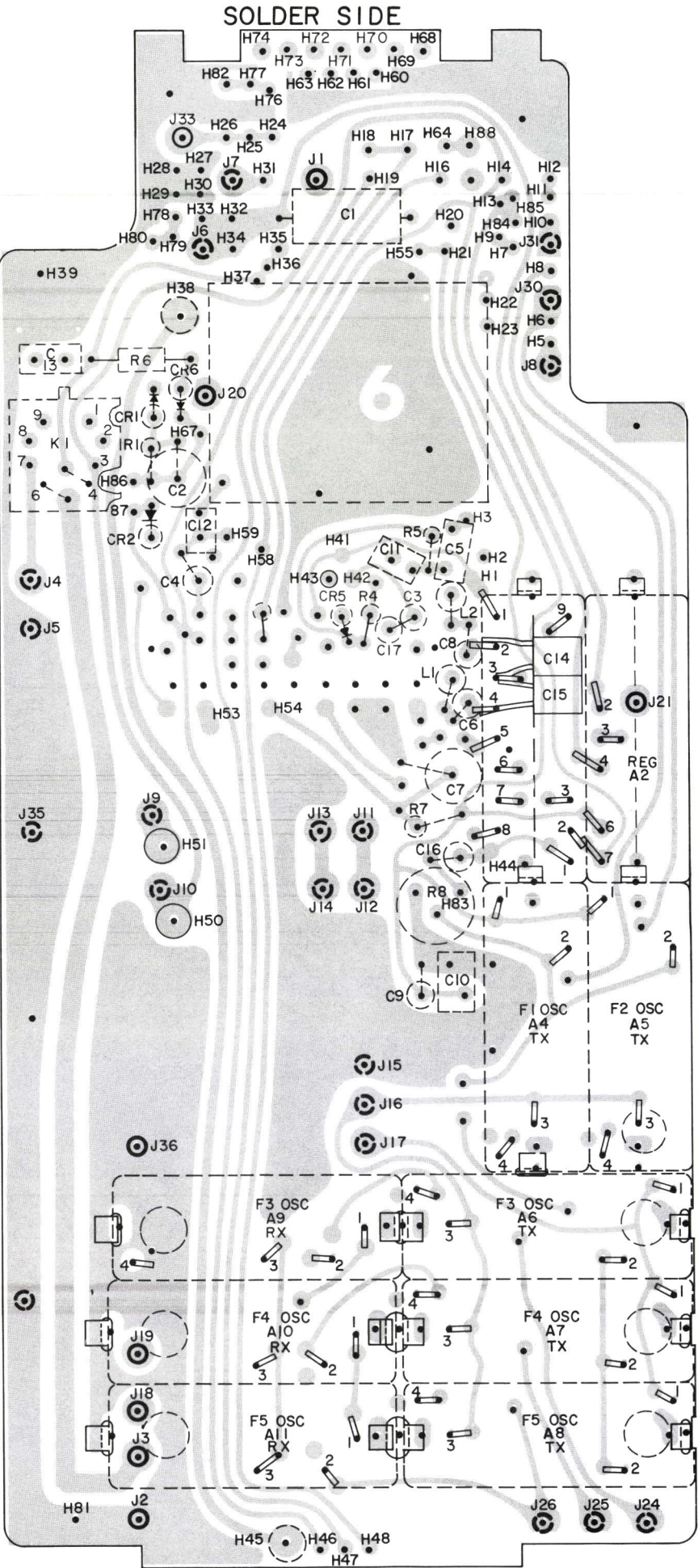
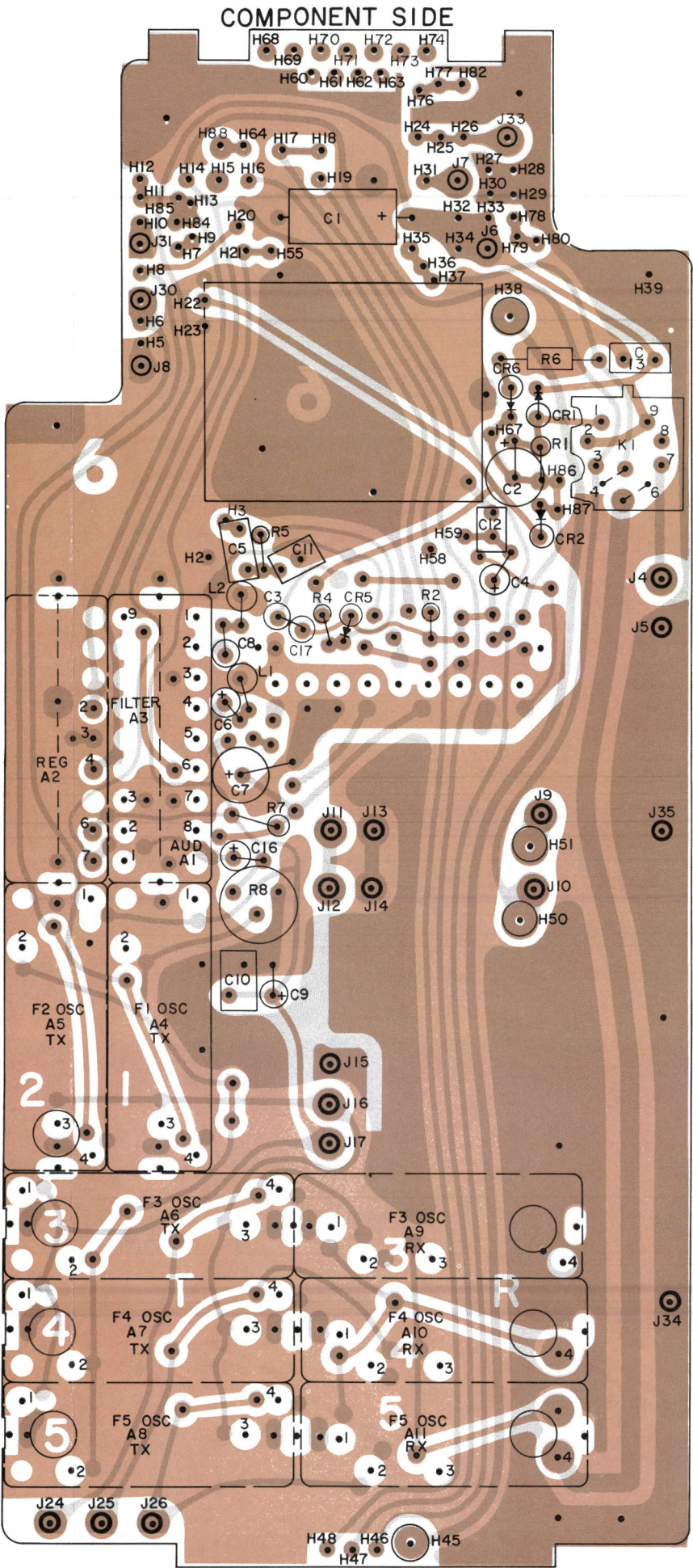
FIGURE 3
REPEATING OSCILLATOR MODULES

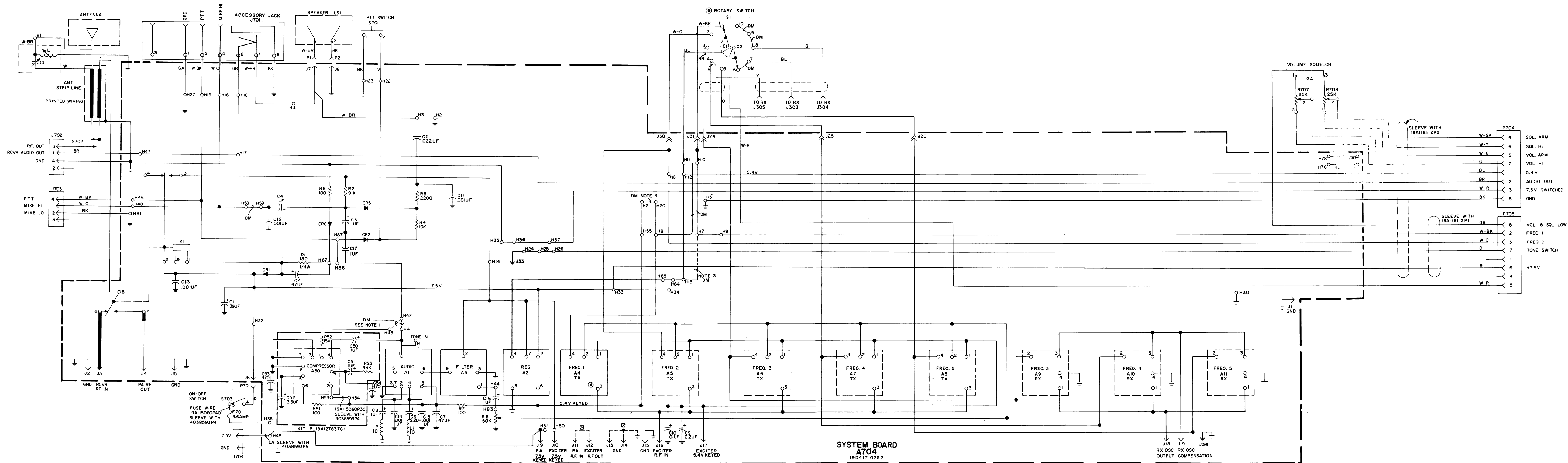
RC-2633

Figure 3 - Repeating Oscillator Modules**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 J19.





SEE APPLICABLE PRODUCTION CHANGE SHEETS IN INSTRUCTION BOOK SECTION DEALING WITH THIS UNIT, FOR DESCRIPTION OF CHANGES UNDER EACH REVISION LETTER.

MODEL NO	REV LETTER
PL19D417102G2	B
PL19D417330G4	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 MICROFARADS (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:**
- CONNECT HOLE 42 TO HOLE 41 WHEN COMPRESSOR A50 IS NOT USED. CONNECT HOLE 42 TO HOLE 43 WHEN COMPRESSOR A50 IS USED.
 - DA = #22AWG
 - 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.
 - THESE ITEMS ARE PART OF SWITCH KIT 19A129890G1
 - DM = #26 AWG
 - J11, J12, J13, J14 ARE PART OF LOW POWER MOD KIT PL19A136967G3.

SCHEMATIC DIAGRAM

30—50 MHz SYSTEM BOARD

MULTI-FREQUENCY MODIFICATIONS

(19D417349, Sh. 1, Rev. 7 & Sh. 2, Rev. 1)

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.

- Remove the multi-frequency switch as directed in the Disassembly Procedure. (Refer to combination manual).
- Turn the shaft fully counterclockwise as viewed from the knob end.
- Unscrew the panel seal to gain access to the stop post (see Figure 1).
- Install the stop post in the appropriate hole as shown in the following chart.

NO. OF FREQ.	MOVE ADJUSTABLE STOP	
	FROM	TO
2	H5	H2
3	H5	H3
4	H5	H4

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

2- ADDING OSCILLATOR MODULES

- 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	SFT-BL
S1-1	J31	SFT-W-BK
S1-2	J30	SFT-W-O
S1-3	J24	BR
S1-4	J25	R
S1-5	J26	O
S1-C2	P705-5	SFT-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.

- 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).
- Bend the leads of the oscillator module as shown in Figure 3 (or appropriate Outline Diagram) and solder to the adjacent pads.
- 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.
- 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. Receiver oscillators 4 and 5 on system board are replaced by SLM module.

- Set the stop on S1 and install the oscillator modules whose frequencies are not to be repeated as directed in Section I and II.
- Install the oscillator(s) whose frequencies are to be repeated as directed above except solder the Number 4 pin to the "E" pad instead of the "P" pad (see Figure 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 4 hole, bending it over and soldering to the "E" pad. The cathode lead will be terminated later.
- 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 3 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.

- 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.
- Assemble (1) diode in the Number 4 hole, anode lead down, in each of Channels 1, 3, 4, 5, and solder to "P" pads.
- Since two frequencies are being repeated, two additional diodes will be required, one in the Number 3 hole of Channel 3 and the other in the Number 3 hole of Channel 5, anode and 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.
- Connect the top lead (cathode) of diodes (3) in Channel 3 and 4 to each other by soldering jumper wire to leads, dressing the wire down the side of the diodes and along the board. Connect a jumper from the top of diode in the Number 1 hole of Channel 3 to the "E" pad of oscillator module Number 1. Run the wire down through the board using any available hole or slot to the solder side. Connect the jumper from the diode in Channel Number 5 to oscillator module Number 2 in the same manner.

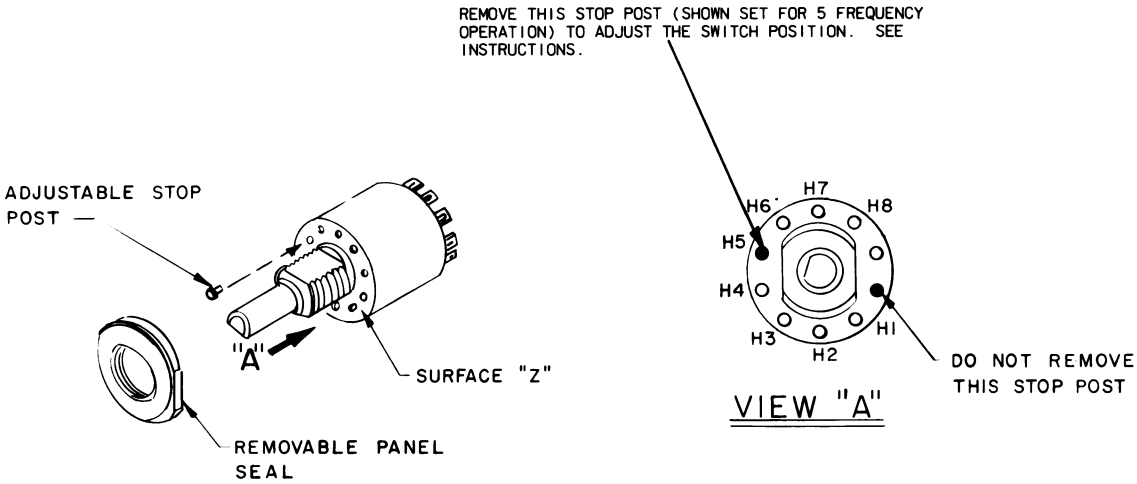


Figure 1 - Stop Post Adjustment

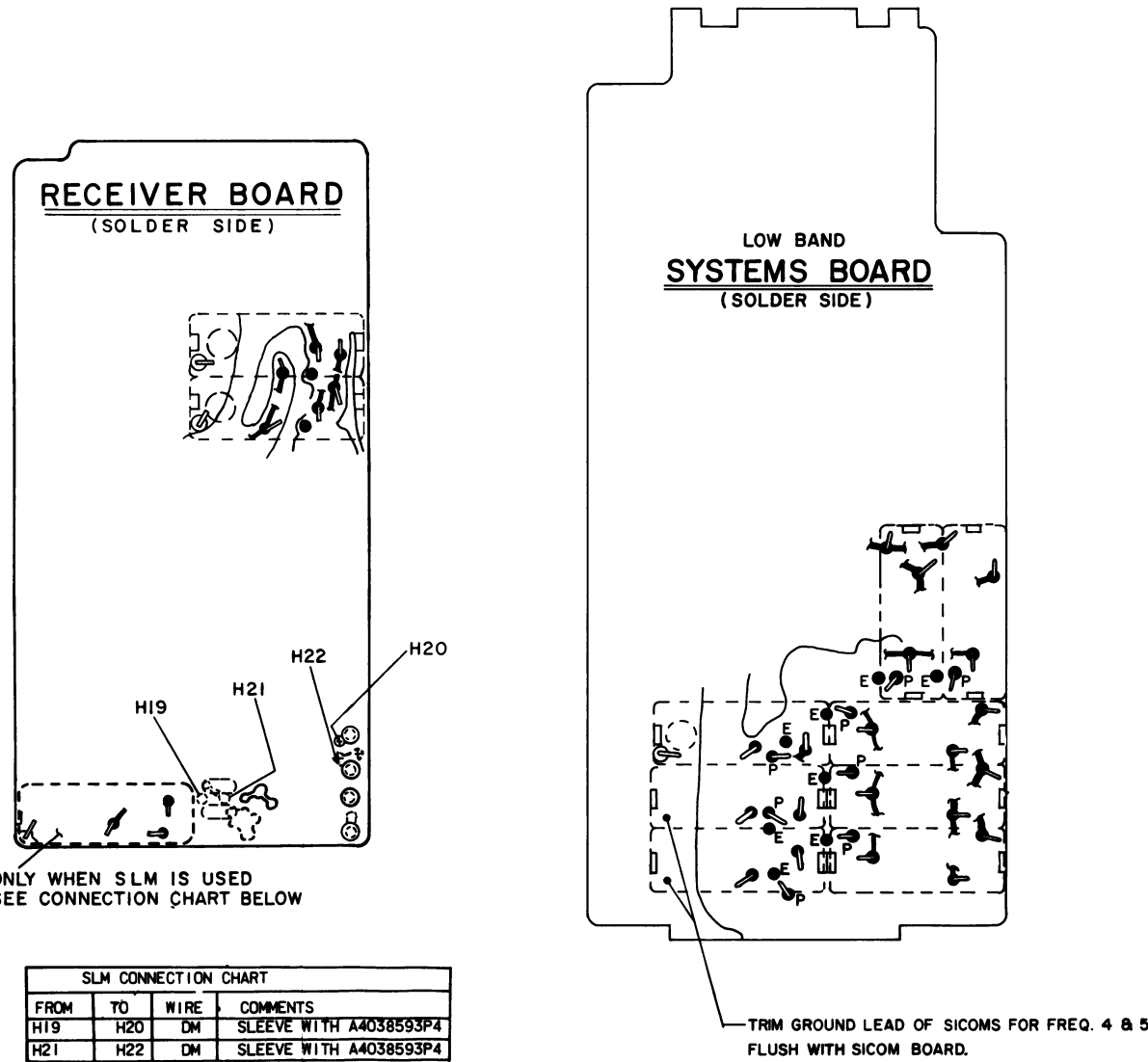


Figure 3 - Oscillator Module and Diode Installation

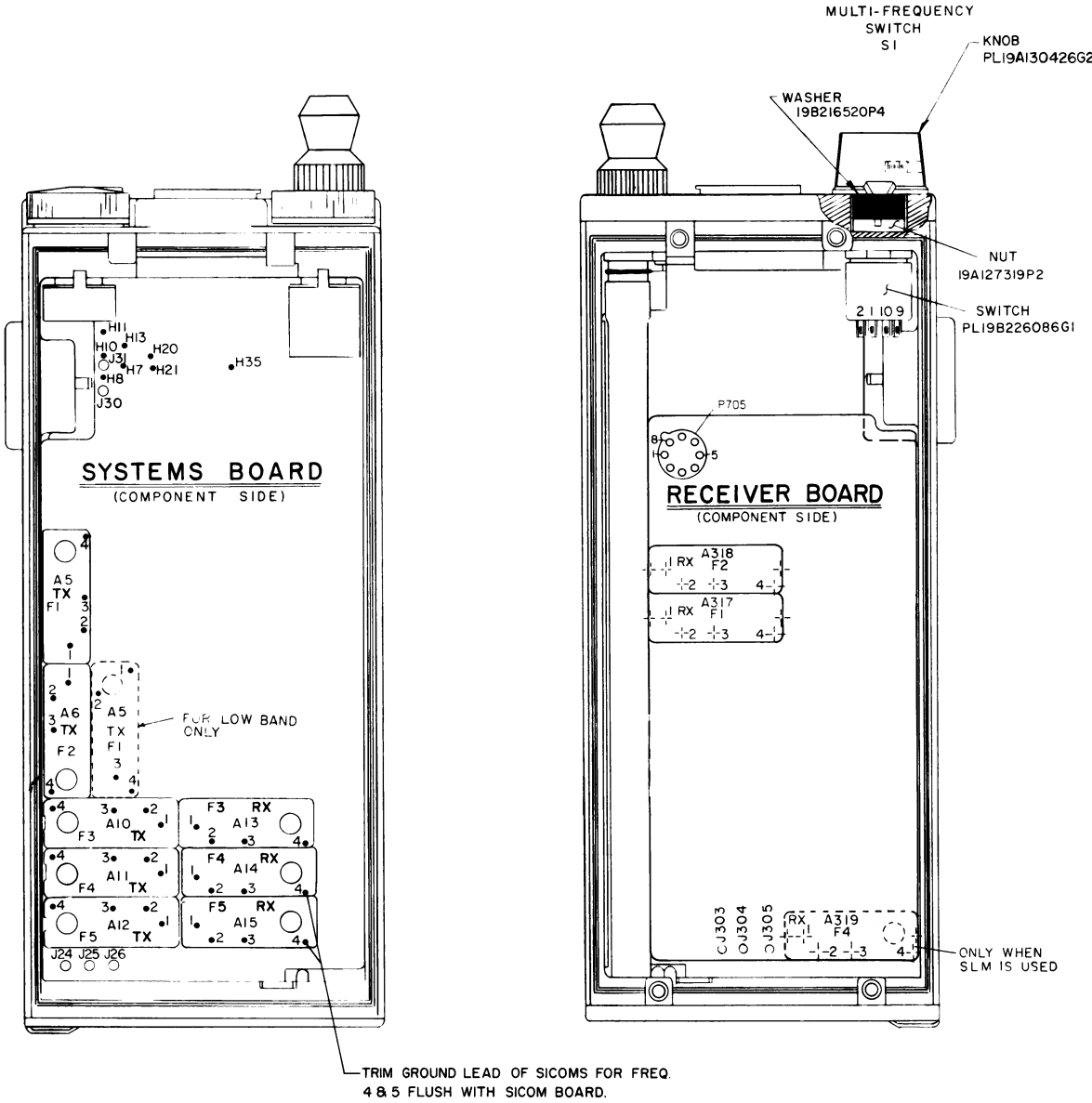


Figure 2 - Oscillator Mounting Positions & S1 Connection Points

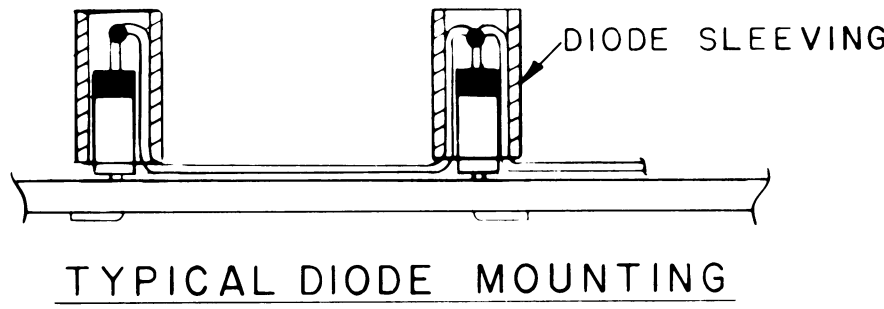


Figure 4 - Typical Diode Mounting

MULTI-FREQUENCY MODIFICATIONS