MOBILE RADIO

MAINTENANCE MANUAL

MASTR® EXECUTIVE II 8-FREQUENCY OSCILLATOR BOARD 19C327565G1 AND SYSTEM CABLE ASSEMBLIES

TABLE OF CONTENTS

DESCRIPTION

In eight-frequency MASTR® Executive II radios, the multi-frequency oscillator board mounts in the same location as the four-frequency module. However, the red system metering jack (J910) is removed from the System-Audio & Squelch board (SAS). Access to the regulated 10 volts, A+, transmitter and receiver audio can be obtained at J901 on the SAS board. Refer to LBI-30043 for details of the SAS board and crystal modules.

A push-to-talk pushbutton (part of the eight-frequency cable harness assembly) is connected to the power/control connector and is mounted on the front cap of the radio. Refer to the Interconnection Diagrams as listed in the Table of Contents for details.

CIRCUIT ANALYSIS

OSCILLATOR BOARD

The eight-frequency oscillator board contains the necessary circuitry to provide up to seven additional transmit and receive frequencies. Separate transmit and receive frequency select leads are provided on the oscillator board for the F2 position. Frequency selection for the F3 through F8 positions is common between the transmit and receive oscillators.

The oscillator board plugs into J904 on the SAS board for power, control and F2 through F4 functions. Frequency select leads for F5 through F8 are connected from the oscillator board to the power/control connector (J1) through cable W2603 (see Interconnection Diagrams), and utlizes crystal modules to determine the exact operating frequencies.

For multi-frequency applications, a jumper wire connected between H12 and H31 on the SAS board is removed. This removes the fixed ground from the F1 keying lead and allows frequency selection of F1 through F8 by the frequency selector switch on the control unit.

When frequencies other than F1 are selected, A- is removed from the F1 select lead. The F1 oscillator turns off due to a rising base voltage applied through pull-up resistor R983 on the SAS board.

CAUTION

Unused frequency select leads on the multi-frequency board should not be tied together electrically (at the Control Unit). This will cause improper oscillator operation and low drive. Refer to the Control Unit Schematic Diagram (LBI-30446) for proper multi-frequency modifications.

OSCILLATOR CIRCUITS

Separate oscillator circuits are used for transmit and receive frequencies.

The transmit and receive oscillator circuits are identical, each using a single transistor in conjunction with the selected crystal module to comprise the oscillator circuit. Crystal modules are selected for operation by the frequency select lead from the control unit. PIN diodes are used to switch the output of the selected crystal module to the base of the appropriate transistor, Q2601 (transmit) or Q2602 (receive).

Since the oscillator circuits are identical, only the F2 transmit circuit is described here.

When F2 is selected on the control unit, A- is applied to the junction of R2601 and R2608 through P904-9. This forward biases PIN diode CR2601, applying the output of the crystal module (pin 1) to the base of common oscillator transistor Q2601. The selected crystal module and the transistor circuit comprise a Colpitts oscillator.

The oscillator control voltage, required for oscillator operation, is controlled by the transmit keying and delay circuits on the SAS board.

Pressing the PTT switch applies the Tx OSC Control voltage (+10 V) to the emitter/base circuit of Q2601, causing it to oscillate at the assigned F2 crystal frequency. A short plug-in coaxial cable (W2601) connects the output of the oscillator to J102 on the exciter board.

When the PTT switch is released, the transmitter oscillator control voltage is removed from Q2601 and the anode of PIN diode CR2601. Q2601 stops oscillating, and therefore does not provide an input to the exciter.

With the PTT switch released, the receiver oscillator control voltage from the transmit keying and delay circuit on the SAS board is applied to the emitter-base circuit of Q2602. Since the transmit and receive modules are selected simultaneously, (on SAS board) Q2602 now oscillates at the F2 receive crystal frequency and provides an output to J401 on the receive Osc-Mult board through cable W2602.

When a different frequency is selected, A- is removed from the junction of pull-up resistors R2601 and R2608. This reverse biases PIN diode CR2601 and removes the crystal module from the base circuit of Q2601.

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

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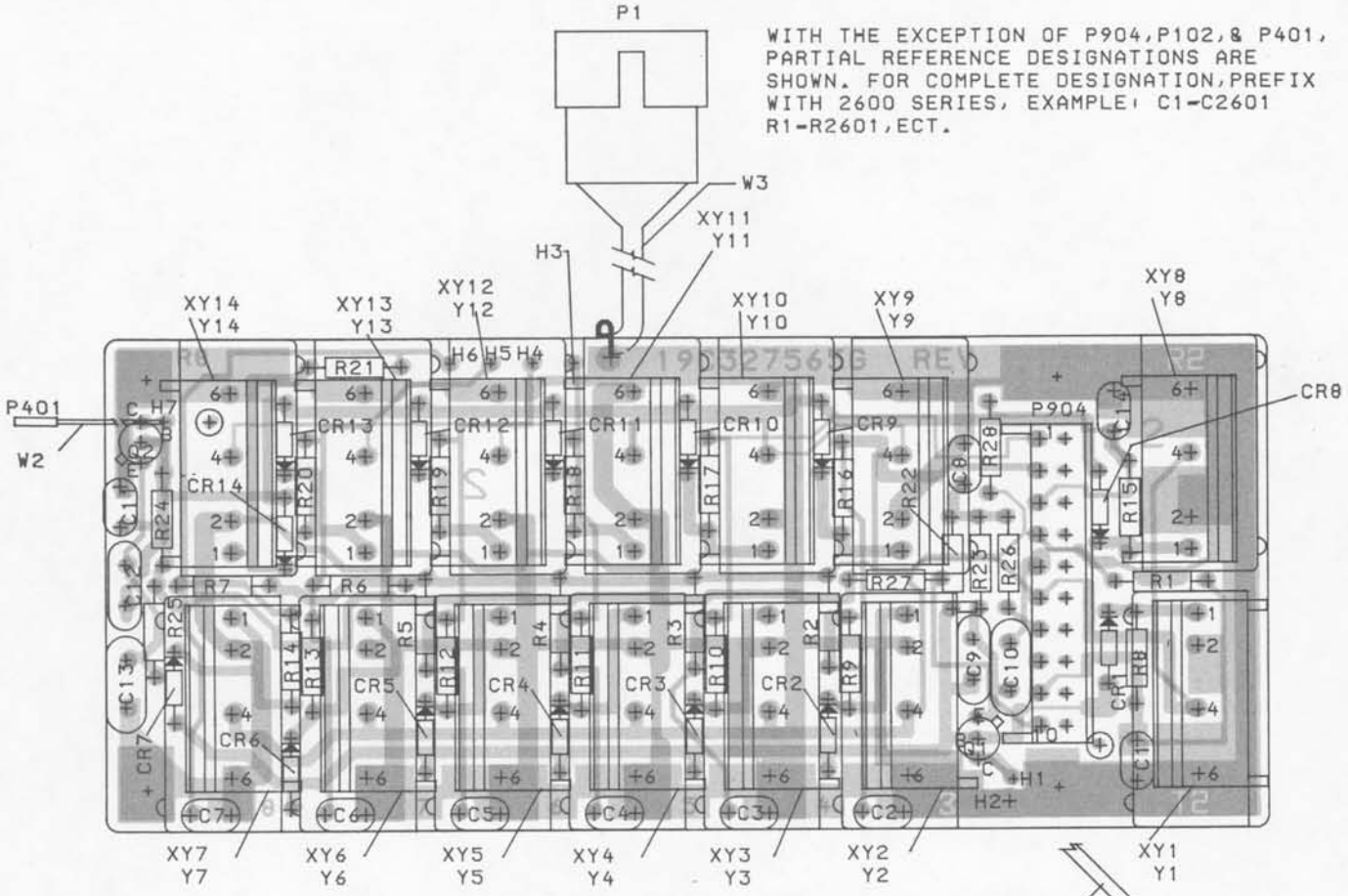
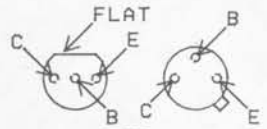


LEAD IDENTIFICATION
FOR Q1 & Q2

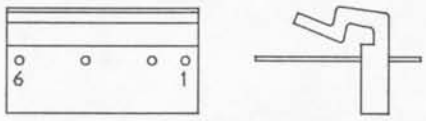


OR

IN-LINE TRIANGULAR

TOP VIEW

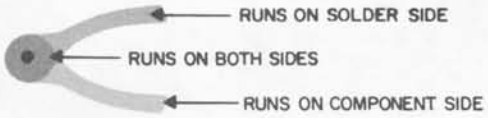
CONNECTIONS CHART	
FROM	TO
W3-BR	H3
W3-O	H4
W3-R	H5
W3-G	H6



PIN ORIENTATION
FOR XY1-XY14

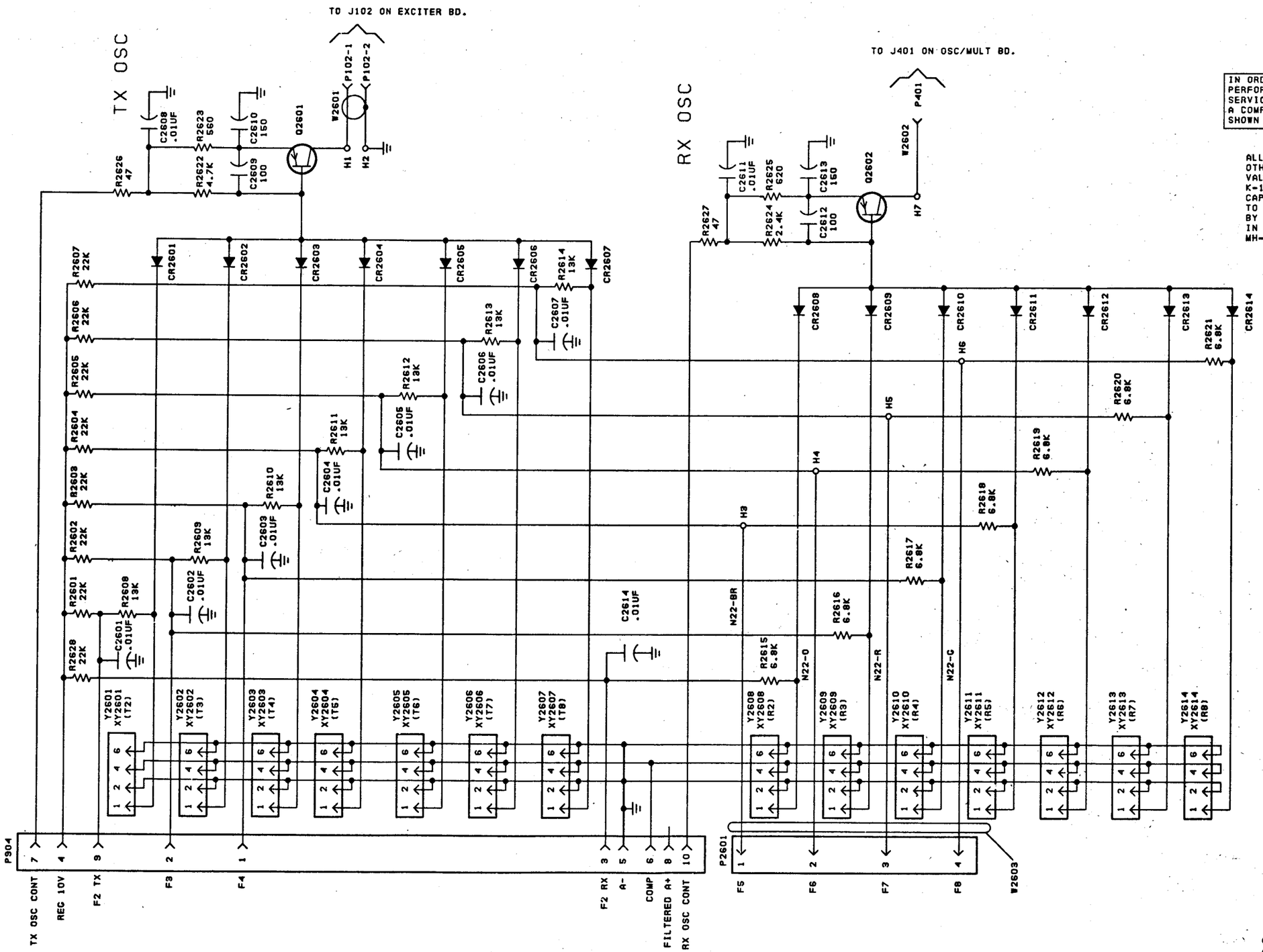
NOTE: LEAD ARRANGEMENT, AND NOT CASE SHAPE, IS DETERMINING FACTOR FOR LEAD IDENTIFICATION.

(19C327568, Rev. 3)
(19C327567, Sh. 1, Rev. 2)
(19C327567, Sh. 2, Rev. 2)



OUTLINE DIAGRAM

8-FREQUENCY OSCILLATOR BOARD



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 1/4 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.

MODEL NO	REV LETTER
PL19C327565G1	

(19D424527, Rev. 3)

SCHEMATIC DIAGRAM

8-FREQUENCY OSCILLATOR BOARD

Issue 1

PARTS LIST

LBI-30453D

MASTR EXECUTIVE II
8 FREQUENCY OSCILLATOR BOARD
AND
SYSTEM ASSEMBLIES

SYMBOL	GE PART NO.	DESCRIPTION
		8 FREQUENCY OSCILLATOR BOARD 19C327565G1
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C2601 thru C2608	T644ACP310K	Polyester: .010 uF ±10%, 50 VDCW.
C2609	19A143491P100J7	Ceramic: 100 pF ±5%, temp coef -750 PPM.
C2610	19A700105P38	Mica: 150 pF ±5%, 500 VDCW.
C2611	19A700234P7	Polyester: 0.01 uF ±10%, 50 VDCW.
C2612	19A143491P100J4	Ceramic disc: 100 pF ±5%, 500 VDCW, temp coef -750 PPM.
C2613	19A700105P38	Mica: 150 pF ±5%, 500 VDCW.
C2614	T644ACP310K	Polyester: .010 uF ±10%, 50 VDCW.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - - - -
CR2601 thru CR2614	19A116925P4	Silicon, pin: 50 volt Reverse Breakdown, 400 mW.
		- - - - - - - - - - - - PLUGS - - - - - - - - - - - -
P1		(Part of W2603).
P102		(Part of W2601).
P401		(Part of W2602).
P904	19A116659P2	Connector, printed wiring: 10 contacts rated at 5 amps; sim to Molex 09-52-3102.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q2601 and Q2602	19A700022P1	Silicon, PNP; sim to Type 2N3906.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R2601 thru R2607	19A700106P95	Composition: 22K ohms ±5%, 1/4 w.
R2608 thru R2614	3R152P133J	Composition: 13K ohms ±5%, 1/4 w.
R2615 thru R2621	19A700106P83	Composition: 6.8K ohms ±5%, 1/4 w.
R2622	19A700106P79	Composition: 4.7K ohms ±5%, 1/4 w.
R2623	19A700106P57	Composition: 560 ohms ±5%, 1/4 w.
R2624	3R152P242J	Composition: 2.4K ohms ±5%, 1/4 w.
R2625	3R152P621J	Composition: 620 ohms ±5%, 1/4 w.
R2626 and R2627	19A700106P31	Composition: 47 ohms ±5%, 1/4 w.
R2628	19A700106P95	Composition: 22K ohms ±5%, 1/4 w.
		- - - - - - - - - - - - CABLES - - - - - - - - - - - -
W2601	19A130744G1	2 Conductor: approx 5 inches long.
W2602	19A129947G2	Single conductor: approx 3 inches long.
W2603	19B227851G1	Cable: 4 conductors; approx 4 inches long. Includes (P1) & (4) 19B209505P20 contacts.
		- - - - - - - - - - - - SOCKETS - - - - - - - - - - - -
XY2601 thru XY2614	19A130958G1	Connector, printed wiring: 6 conducts; sim to Molex 09-65-1061.

SYMBOL	GE PART NO.	DESCRIPTION
		ASSOCIATED ASSEMBLIES
		- - - - - - - - - - CRYSTAL MODULES - - - - - - - - - -
		NOTE: When reordering, give GE Part Number and specify exact transmitter or receiver frequency needed.
Y2601 thru Y2614	19B226962G1	Tx. 5 PPM (30-36 MHz).
	19B226962G2	Tx. 5 PPM (36-42 MHz).
	19B226962G3	Tx. 5 PPM (42-50 MHz).
	19B226962G4	Tx. 5 PPM (138-155 MHz).
	19B226962G5	Tx. 5 PPM (150.8-174 MHz).
	19B226962G6	Tx. 5 PPM (406-420 MHz).
	19B226962G7	Tx. 5 PPM (450-470 MHz).
	19B226962G8	Tx. 5 PPM (470-494 MHz).
	19B226962G9	Tx. 5 PPM (494-512 MHz).
	19B226962G10	Rx. 5 PPM (30-36 MHz).
	19B226962G11	Rx. 5 PPM (36-42 MHz).
	19B226962G12	Rx. 5 PPM (42-50 MHz).
	19B226962G13	Rx. 5 PPM (138-155 MHz).
	19B226962G14	Rx. 5 PPM (150.8-174 MHz).
	19B226962G15	Rx. 5 PPM (406-420 MHz).
	19B226962G16	Rx. 5 PPM (450-470 MHz).
	19B226962G17	Rx. 5 PPM (470-494 MHz).
	19B226962G18	Rx. 5 PPM (494-512 MHz).
		8 FREQUENCY "R" SERIES CONTROL CABLE 19B226860G6 8 FREQUENCY "S" SERIES CONTROL CABLE 19B226860G9
		- - - - - - - - JACKS AND RECEPTACLES - - - - - - - -
J1	19C303775P1	Connector, plug: 28 terminals.
J2601		Connector. Includes:
	19B209505P204	Shell.
	19B209505P21	Contact, electrical: female, wire size No. 18-24.
		- - - - - - - - - - - - PLUGS - - - - - - - - - - - -
P203	19A134281P1	Shell.
	19A134282P2	Contact, electrical: wire No. 14-10, sim to AMP 350200-2.
P901A		Connector. Includes:
	19A116659P125	Shell.
	19A116781P5	Contact, electrical: wire range No. 18-24 AWG; sim to Molex 08-50-0106. (P901A-1,2,3,4,5,7,13).
	19A116781P6	Contact, electrical: wire range No. 22-26 AWG; sim to Molex 08-50-0108. (P901A-6,8,9,10,11,12, 14).
P901B		Connector. Includes:
	19A116659P20	Printed Board.
	19A116781P5	Contact, electrical: wire range No. 18-24 AWG; sim to Molex 08-50-0106. (P901B-2).
	19A134282P2	Contact, electrical: wire range No. 14-10 AWG; sim to AMP 350200-2. (P901B1, 3 thru 8).
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1	7481654P6	Pushbutton: single pole, normally open, 1/10 amp at 115 VAC or 1/2 amp at 115 VAC; sim to Grayhill 30-1.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19B201074P606	Tap screw, Phillips POZIDRIV®: No. 4-40 x 3/8. (Secures J1).
	19B226892P1	Support. (J1).
	19J706152P5	Retainer strap: sim to Panduit Corp. SST-1.

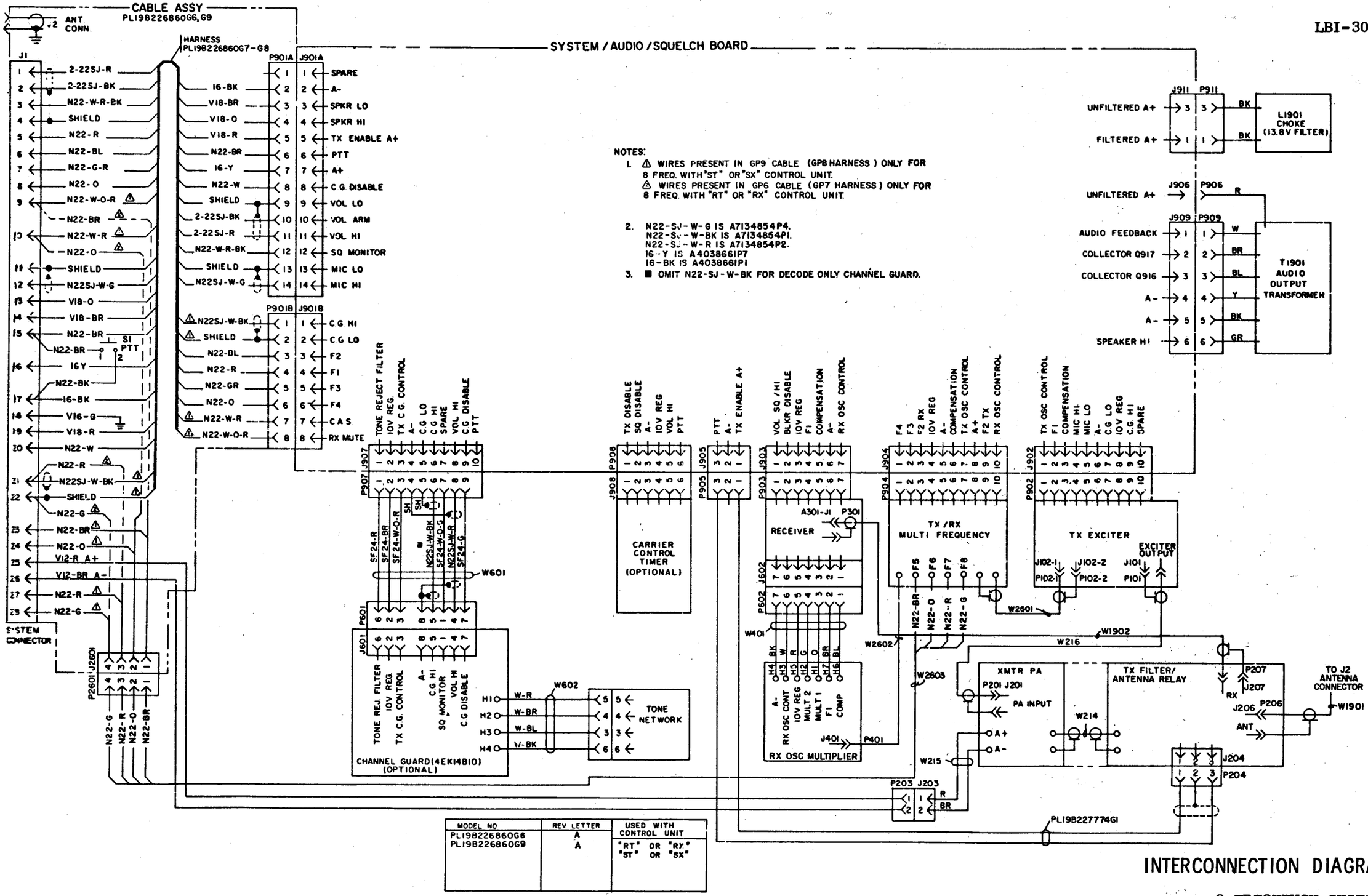
PRODUCTION CHANGES

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 - Cable Assembly 19B226860G6, G9

To improve selectivity and intermodulation performance by reducing ICOM select line noise.
Connect J1-18 to ground.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.



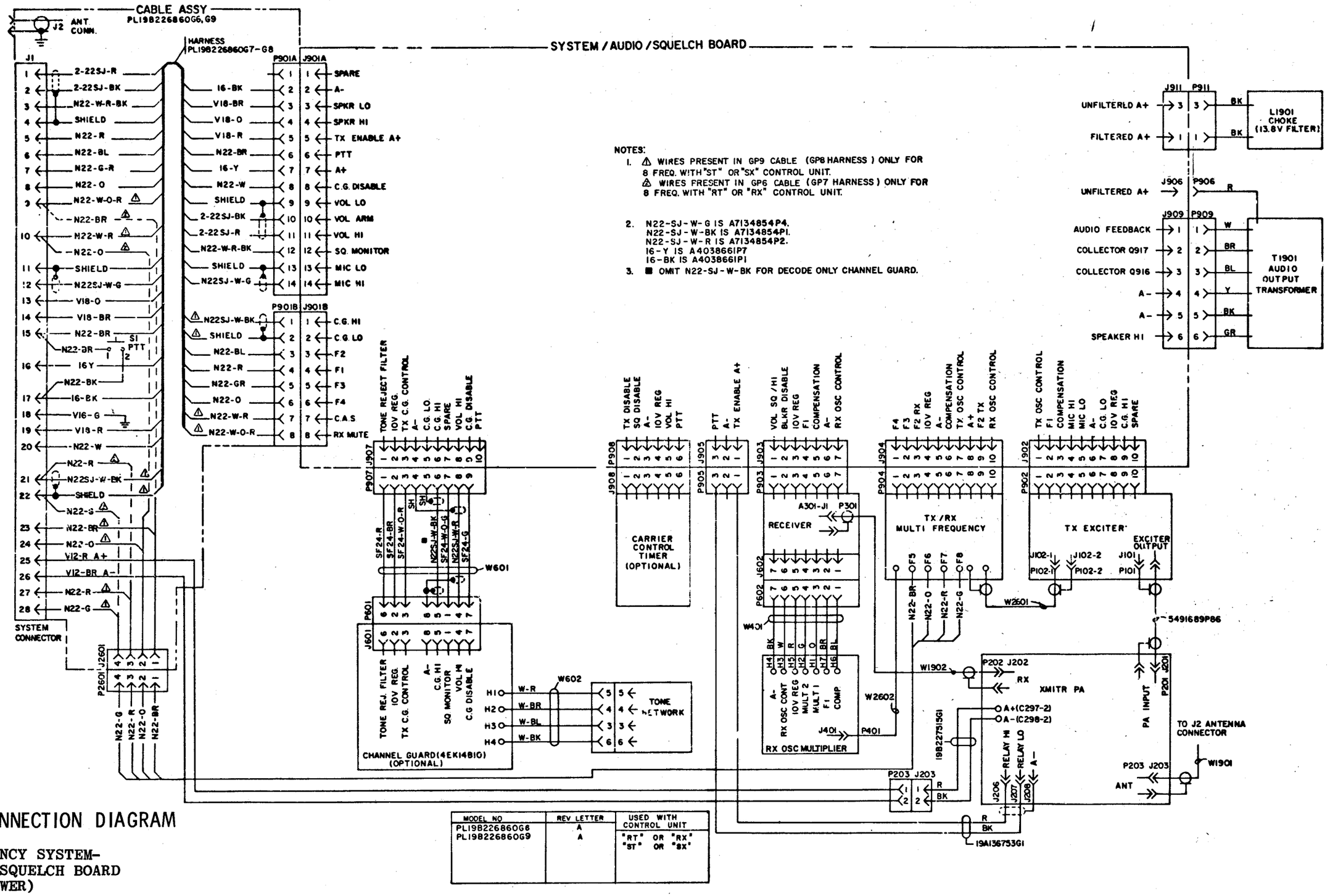
NOTES:

1. ⚠ WIRES PRESENT IN GP9 CABLE (GP8 HARNESS) ONLY FOR 8 FREQ. WITH "ST" OR "SX" CONTROL UNIT.
   ⚠ WIRES PRESENT IN GP6 CABLE (GP7 HARNESS) ONLY FOR 8 FREQ. WITH "RT" OR "RX" CONTROL UNIT.
2. N22-SJ-W-G IS A7134854P4.
   N22-SJ-W-BK IS A7134854P1.
   N22-SJ-W-R IS A7134854P2.
   I6-Y IS A4038661P7
   I6-BK IS A4038661P1
3. ■ OMIT N22-SJ-W-BK FOR DECODE ONLY CHANNEL GUARD.

MODEL NO	REV LETTER	USED WITH CONTROL UNIT
PLI9B226860G6	A	"RT" OR "RX"
PLI9B226860G9	A	"ST" OR "SX"

INTERCONNECTION DIAGRAM

8-FREQUENCY SYSTEM-
AUDIO & SQUELCH BOARD
(MEDIUM POWER)



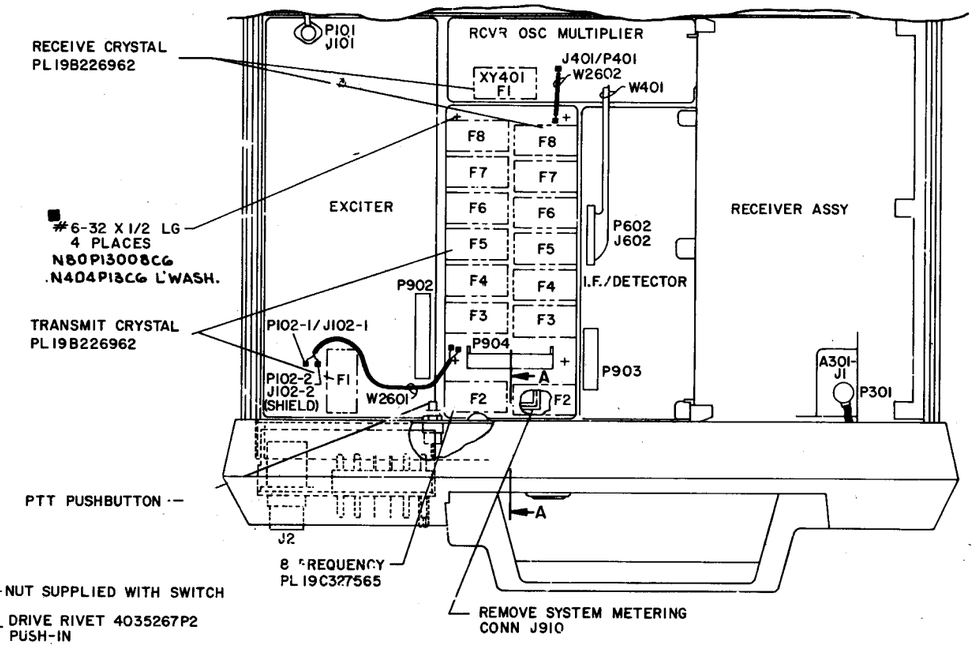
MODEL NO	REV LETTER	USED WITH CONTROL UNIT
PLI9822686OG6	A	"RT" OR "RX"
PLI9822686OG9	A	"ST" OR "SX"

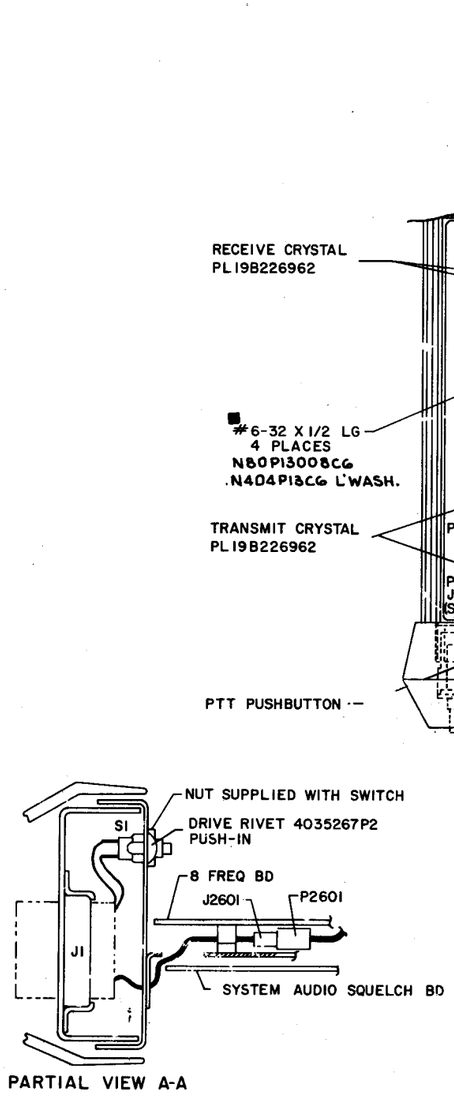
INTERCONNECTION DIAGRAM

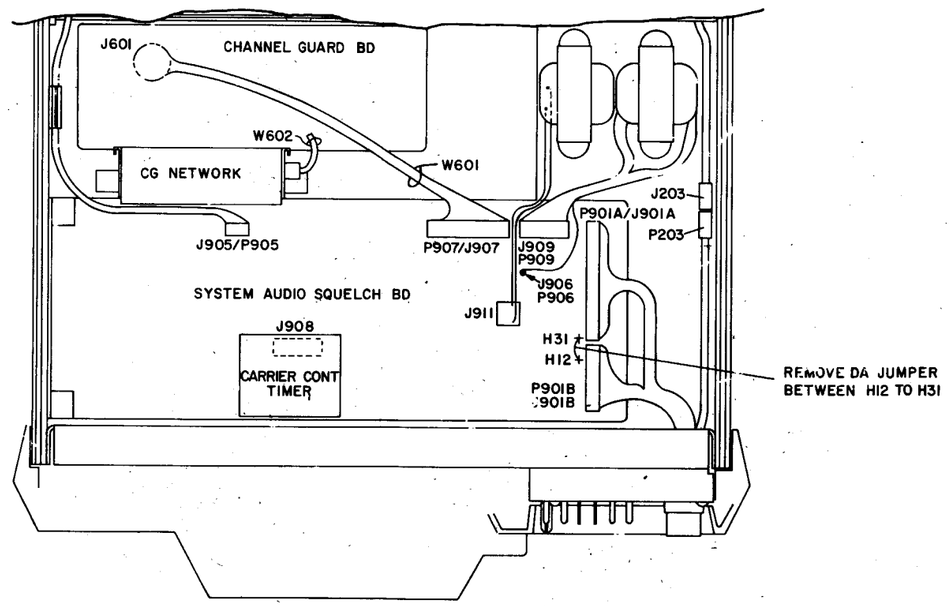
8-FREQUENCY SYSTEM-
AUDIO & SQUELCH BOARD
(HIGH POWER)

(19D424692, Rev. 2)

PT. NO.	DESCRIPTION
8	ADDITION OF 8 FREQUENCY







NOTE: 1. ■ PART OF HARDWARE LIST PL19A130750G1,G3 CALLED FOR ON INDEX.

(19D423470, Sh. 3, Rev. 3)