MOBILE RADIO

MASTR® *Executive II*

MAINTENANCE MANUAL LBI30461C

DATAFILE FOLDER – DF9040

Mobile Radio

Control Unit

806–870 MHz

TWO-WAY FM
RADIO
MOBILE COMBINATIONS

Speaker

GENERAL ELECTRIC

TABLE OF CONTENTS

COMBINATION NOMENCLATURE

1st Digit	2nd Digit	3rd Digit	4th Digit	5th Digit	6th Digit	7th Digit	8th & 9th Digits	10th Digit
Mechanical Package	System Voltage	Power Output	Channel Spacing	Freq. Capacity	Number of Freq.	Options	Frequency Range	Oscillator Stability
R Executive II Standard Control	**T** +12 Volts with Accessories	**4** 8-20 Watts	**5** 25 kHz	**A** 1 Freq.	**A** 1-Freq TX 1-Freq RX	**S** Standard	**92** 806-870 MHz	**B** ±2 PPM
S Executive II Optional Control	**X** +12 Volts less Accessories	**5** 21-40 Watts		**F** 4 Freq.	**B** 2-Freq TX 1-Freq RX	**U** Channel Guard		
					C 2-Freq TX 2-Freq RX			
					D 1-Freq TX 2-Freq RX			
					E 3-Freq TX 3-Freq RX			
					F 4-Freq TX 4-Freq RX			

WARNING

Although the highest DC voltage in MASTR Executive II Mobile Equipment is supplied by the vehicle battery, high currents may be drawn under short circuit conditions. These currents can possibly 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!

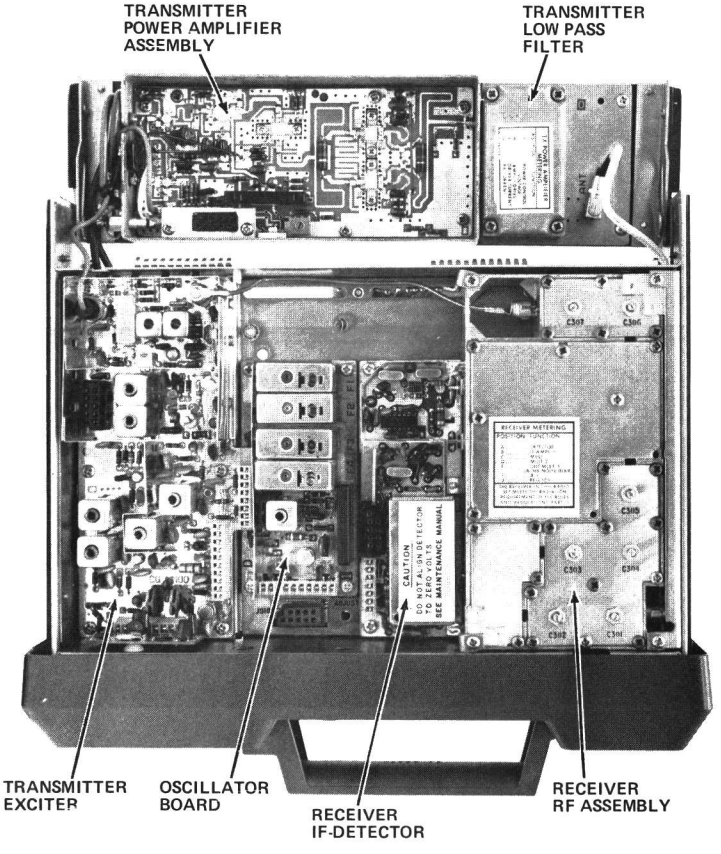
SYSTEM SPECIFICATIONS*

FREQUENCY RANGE	
Transmit	806-825 MHz
Receive	851-870 MHz
BATTERY DRAIN	
Receiver	
Squelched	0.5 Amperes
Unsquelched	1.75 Amperes
Transmitter	13 Amperes at 13.6 VDC (35 Watts)
	5 Amperes at 13.8 VDC (10 Watts)
DIMENSIONS (H X W X D)	
Two-Way Radio	3.9" x 13.5" x 13.4" (9.9 x 34.3 x 34 cm)
Control Unit (C-300)	3.1" x 5.5" x 4.3" (7.8 x 14 x 10.9 cm)
Speaker (less bracket)	5.1" x 5.5" x 3.5" (13 x 14 x 8.9 cm)
WEIGHT	
Radio and Accessories (average)	29 pounds (13.2 kg)
TEMPERATURE RANGE	-30°C to +60°C (-22°F to +140°F)
DUTY CAPABILITY	
Intermittent	20% transmit, 100% receive

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

TRANSMITTER FCC FILING NUMBER	POWER OUTPUT
KT-147-C, D (Mobile)	35 Watts
KT-154-C, D	10 Watts

TOP VIEW



BOTTOM VIEW

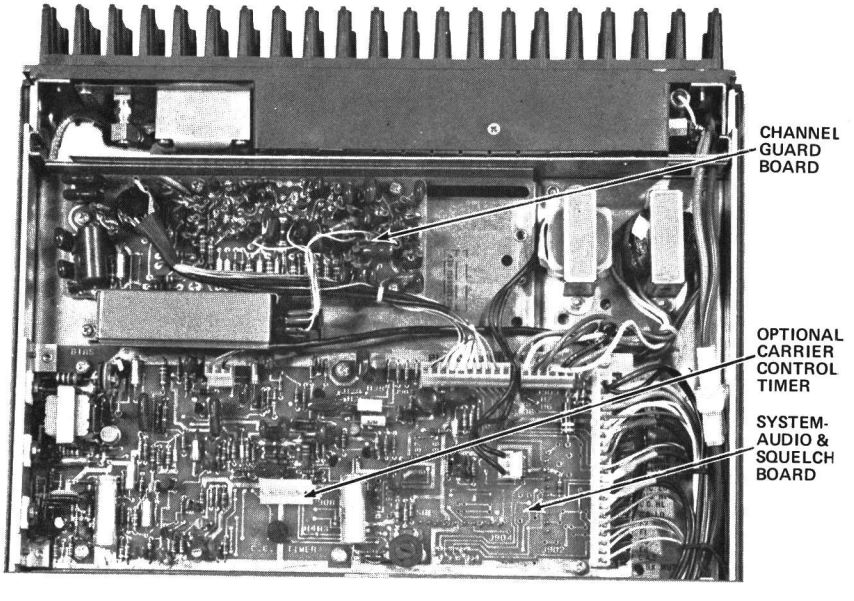


Figure 1 - MASTR Executive II Module Layout (Typical)

DESCRIPTION

MASTR® Exectutive II mobile radio combinations are compact, highly reliable and ruggedly-constructed units that are designed to meet the most stringent requirements in the two-way radio field.

The radios are fully transistorized -- utilizing both discrete components and integrated circuits (IC's) for highest reliability. Since no tubes are used, the radio is ready to use the instant it is turned on. The standard combination may be equipped with the following:

- One through four frequencies
- Plug-in FM ICOMs for ±0.0002% oscillator stability
- Channel Guard (tone squelch)

The combination is contained in a "slide-rail" mounting frame and is designed for trunk-mount installations. The radio is tamperproof when locked in the mounting frame. When unlocked, the unit can be easily pulled out of its frame for servicing.

No power supply is required since the highest supply voltage used in the radio is supplied by the vehicle battery. The radio will operate in 12-Volt, negative ground vehicle systems only.

The radio is of modular construction. All major modules and tuning adjustments except for the system board, Channel Guard and Carrier Control Timer option are easily accessible from the top of the radio (see Figure 1).

Centralized metering jacks for the transmitter, receiver and system board are provided for simplified alignment and troubleshooting.

TRANSMITTER

The transmitter consists of an exciter and oscillator board, and a power amplifier assembly. The PA assembly mounts on a hinged heatsink casting that swings down for easy access. A low-pass filter mounts on the heatsink next to the PA assembly.

In the receive mode, the exciter also serves as the receiver first oscillator.

RECEIVER

The receiver consists of an RF assembly and IF-detector assembly (IFD). The audio and squelch circuitry for the receiver is located on the system board.

SYSTEM-AUDIO & SQUELCH BOARD

The system-audio and squelch board is mounted on the underside of the radio chassis. The board contains the 10-Volt regulator, transmitter and receiver system control circuits, and the receiver audio and squelch circuitry. The system board contains jacks to provide plug-in interface for the transmitter and receiver modules. The board also has jacks for Channel Guard, multi-frequency board and Carrier Control Timer option.

CONTROL UNITS

In "R" Series Combinations, the control unit contains the OFF-ON Volume control, pushbutton MONITOR switch, a frequency selector switch in multi-frequency models, and a red transmit indicator light.

In "S" Series Combinations, other types of control units can be used with the radio. For these applications, refer to the appropriate control unit Maintenance and Operator's Manual.

INITIAL ADJUSTMENT

After the MASTR Executive II radio has been installed (as described in the INSTALLATION Manual), the following adjustments should be made by an electronics technician who holds a 1st or 2nd Class FCC Radio-telephone license.

Make sure that a RADIO TRANSMITTER IDENTIFICATION form (FCC Form 452-C or General Electric Form NP270303) has been filled out and attached to the transmitter.

CAUTION

Before bench testing the MASTR Executive II Mobile Radio, be sure of the output voltage characteristics of your bench power supply.

To protect the transmitter power output transistors from possible instant destruction, the following input voltages must not be exceeded:

Transmitter unkeyed: 20 Volts

Transmitter keyed
(50 ohm resistive load): 18 Volts

Transmitter keyed
(no load or non-resistive load):
15.5 Volts

These voltages are specified at the normal vehicle battery terminals of the radio and take the voltage drop of standard cables

into account. The voltage limit shown for a non-optimum load is for "worst case" conditions. For antenna mismatches likely to be encountered in practice, the actual limit will approach the 18 Volt figure.

Routine transmitter tests should be performed at EIA Standard Test Voltages (13.6 VDC for loads of 6 to 16 amperes; 13.4 VDC for loads of 16 to 36 amperes). Input voltages must not exceed the limits shown, even for transient peaks of short duration.

Many commonly used bench power supplies cannot meet these requirements for load regulation and transient voltage suppression. Bench supplies which employ "brute force" regulation and filtering (such as Lapp Model 73) may be usable when operated in parallel with a 12-Volt automotive storage battery.

TRANSMITTER ADJUSTMENT

The adjustment for the transmitter includes measuring the forward and reflected power and adjusting the antenna length for optimum ratio, then setting the transmitter to rated power output (or to the specific output or input which may be required by the FCC station authorization). Next, measuring the frequency and modulation and entering these measurements on the FCC-required station records. For the complete transmitter adjustment, refer to the ALIGNMENT PROCEDURE in the MAINTENANCE MANUAL for the transmitter.

RECEIVER ADJUSTMENT

The initial adjustment for the receiver includes tuning the input circuit to match the antenna. For the receiver initial adjustment procedure, refer to the FRONT END ALIGNMENT PROCEDURES in the MAINTENANCE MANUAL for the receiver.

OPERATION

Complete operating instructions for the two-way radio are provided in the separate OPERATOR'S MANUAL. The basic procedures for receiving and transmitting messages in "R" Series Combinations is as follows:

TO RECEIVE A MESSAGE

1. Turn the radio on by turning the OFF-VOLUME control halfway to the right.
2. Press in the MONITOR button and adjust the VOLUME control for a comfortable listening level.

The radio is now ready to receive messages from other radios in the system.

TO TRANSMIT A MESSAGE

1. Turn the radio on as directed in the "To Receive a Message" section.
2. Press the push-to-talk button on the microphone and speak across the face of the microphone in a normal voice. Release the button as soon as the message has been given. The red GE indicator light on the control unit will glow each time the microphone button is pressed, indicating that the transmitter is on the air. The receiver is muted whenever the transmitter is keyed.

MAINTENANCE

REMOVING IC'S

REMOVING IC's (and all other soldered-in components) can be easily accomplished by using a de-soldering tool such as a SOLDA-PULLT® or equivalent. To remove an IC, heat each lead separately on the solder side and remove the old solder with the de-soldering tool.

An alternate method is to use a special soldering tip that heats all of the pins simultaneously.

PREVENTIVE MAINTENANCE

To insure high operating efficiency and to prevent mechanical and electrical failures from interrupting system operations, routine checks should be made of all mechanical and electrical parts at regular intervals. This preventive maintenance should include the checks as listed in the table of Maintenance Checks.

TEST AND TROUBLESHOOTING PROCEDURES

The individual Maintenance Manual for the transmitter and receiver describe standard test procedures which the serviceman can use to compare the actual performance of the transmitter or receiver against the specifications of the unit when shipped from the factory. In addition, specific troubleshooting procedures are available to assist the serviceman in troubleshooting the transmitter and receiver.

DISASSEMBLY

To gain access to the unit for servicing:

1. Unlock the radio (see Figure 2).
2. Loosen the two captive screws shown in Figure 2.
3. Pull the radio forward about two inches

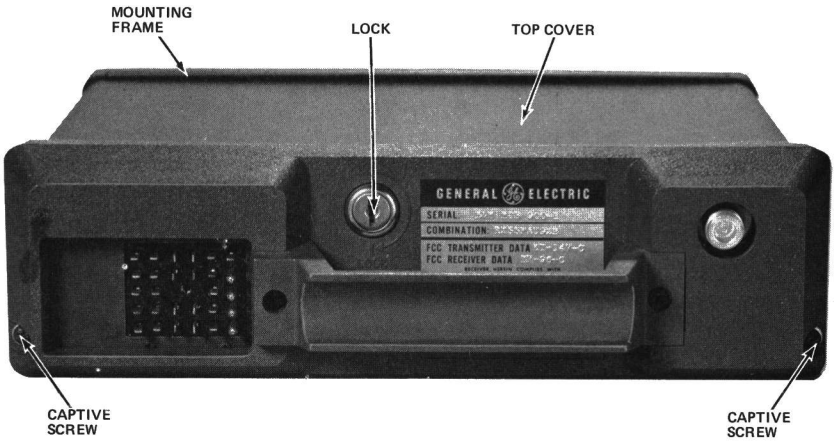


Figure 2 - Disassembly

out of the mounting frame, and lift off top cover.

4. To gain access to the bottom side, pull the radio all the way out of mounting frame.

MECHANICAL PARTS BREAKDOWN

A mechanical parts breakdown diagram of the two-way radio is provided in this manual. The diagram shown the placement and GE Part Number of mechanical items on the two-way radio set (see Table of Contents).

RE-INSTALLATION

If the mobile combination is ever moved to a different vehicle, always check the battery polarity of the new system. Always install the radio in a negative ground vehicle only.

MAINTENANCE CHECKS	INTERVAL	
	6 Months	As Required
CONNECTIONS - Ground connections and connections to the voltage source should be periodically checked for tightness. Loose or poor connections to the power source will cause excessive voltage drops and faulty operation. When ground connections are not made directly to the battery, the connection from the battery to vehicle chassis must be checked for low impedance. A high impedance may cause excessive voltage drops and alternator noise problems.	x	
ELECTRICAL SYSTEM - Check the voltage regulator and alternator or generator periodically to keep the electrical system within safe and economical operating limits. Over-voltage is indicated when the battery loses water rapidly. Usage of 1 or 2 ounces of water per cell per week is acceptable for batteries in continuous operation. A weak battery will often cause excessive noise or faulty operation.		x
MECHANICAL INSPECTION - Since mobile units are subject to constant shock and vibration, check for loose plugs, nuts, screws and parts to make sure that nothing is working loose.	x	
ANTENNA - The antenna, antenna base and all contacts should be kept clean and free from dirt or corrosion. If the antenna or its base should become coated or poorly grounded, loss of radiation and a weak signal will result.	x	
ALIGNMENT - The transmitter and receiver meter readings should be checked periodically, and the alignment "touched up" when necessary. Refer to the applicable ALIGNMENT PROCEDURE and troubleshooting sheet for typical voltage readings.		x
FREQUENCY CHECK - Check transmitter frequency and deviation as required by FCC. Normally, these checks are made when the unit is first put into operation, after the first six months and once a year thereafter.		x

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

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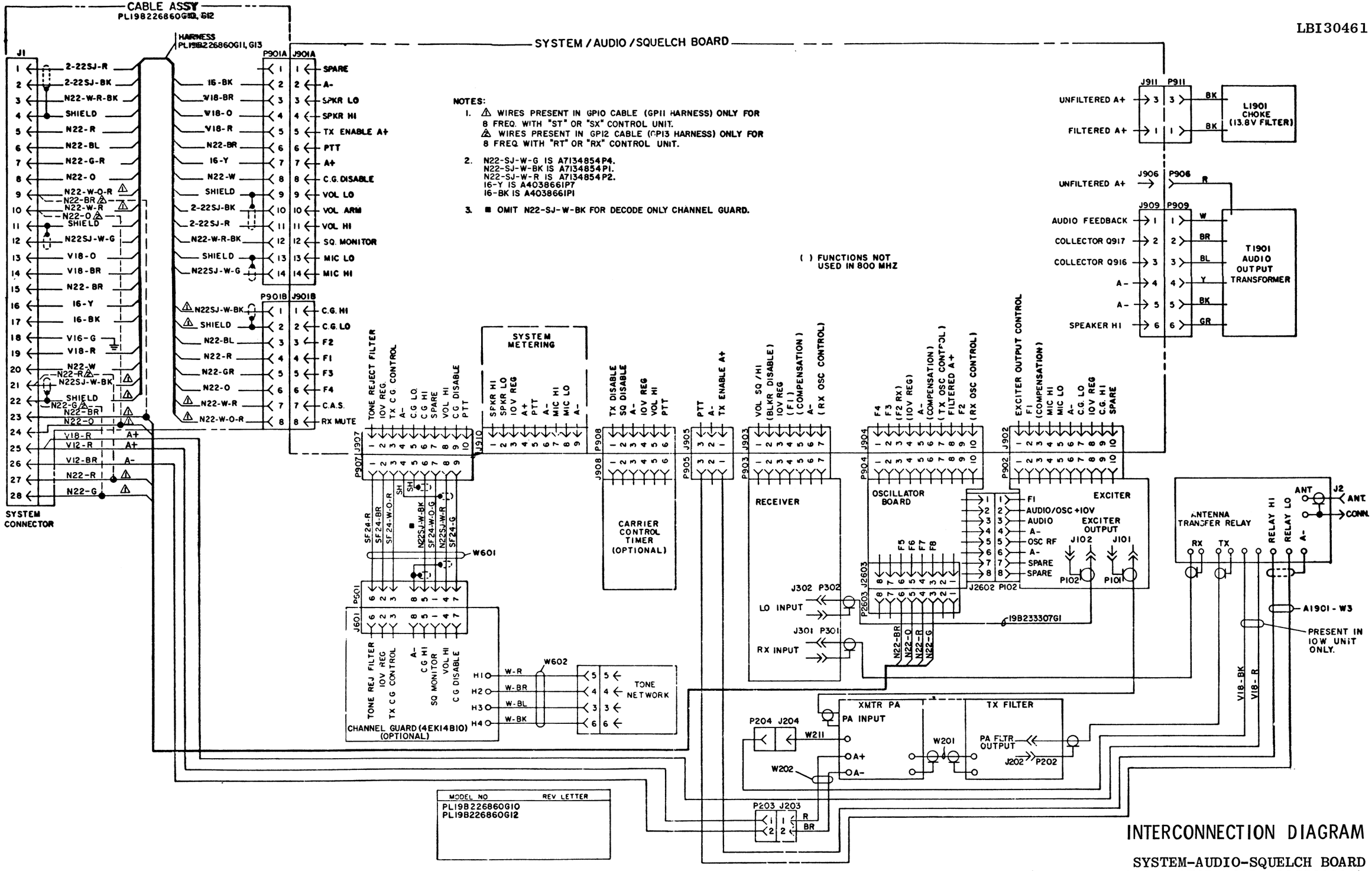
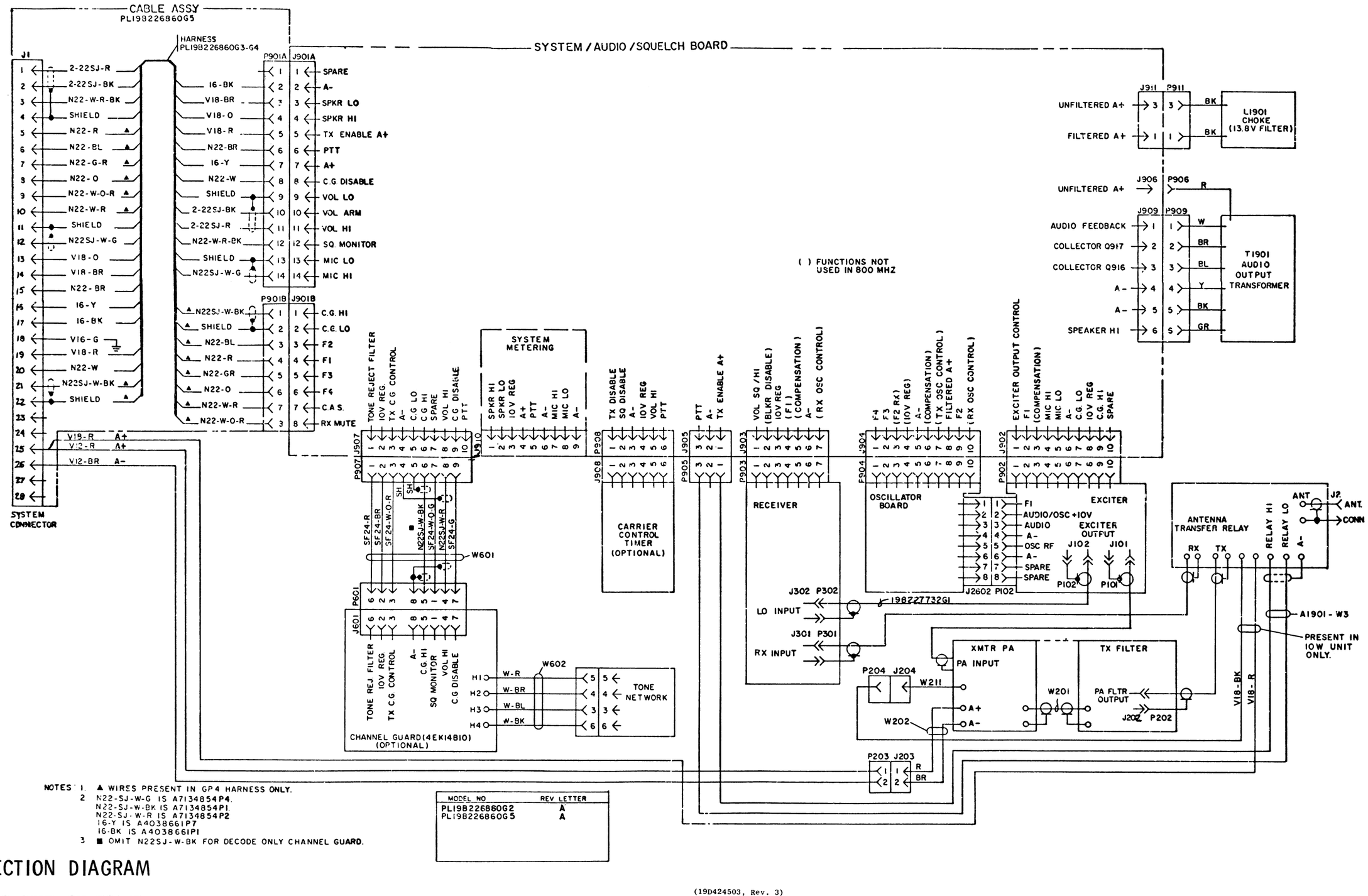
U.S.A.



INTERCONNECTION DIAGRAM

SYSTEM-AUDIO-SQUELCH BOARD
(USED WITH OSCILLATOR BOARD 19C328081)



NOTES: 1. ▲ WIRES PRESENT IN GP4 HARNESS ONLY.
2. N22-SJ-W-G IS A7134854P4.
N22-SJ-W-BK IS A7134854P1.
N22-SJ-W-R IS A7134854P2
16-Y IS A4038661P7
16-BK IS A4038661P1
3. ■ OMIT N22SJ-W-BK FOR DECODE ONLY CHANNEL GUARD.

MODEL NO	REV LETTER
PL19822686OG2	A
PL19822686OG5	A

INTERCONNECTION DIAGRAM

SYSTEM-AUDIO-SQUELCH BOARD
(USED WITH OSCILLATOR BOARD 19C327269)

(19D424503, Rev. 3)

PARTS LIST

LBI-30468

MISCELLANEOUS HARDWARE
FOR
806-870 MHz MASTR EXECUTIVE II MOBILE

SYMBOL	GE PART NO.	DESCRIPTION
		CONNECTOR PANEL 19B226860G5
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J1	19C303775P1	Connector, plug: 28 terminals.
J2601		Connector. Includes:
	19B209505P204	Shell.
	19B209505P21	Contact, electrical: female, wire size 18-24 AWG.
P203		Connector. Includes:
	19A134281P1	Shell.
	19A134282P2	Contact, electrical: wire size 14-10; sim to AMP 350200-2.
P901A		Connector. Includes:
	19A130712G1	Shell.
	19A116781P5	Contact, electrical: wire range No. 16-20 AWG; sim to Molex 08-50-0106. (P901A-2 thru 5,7,13).
	19A116781P6	Contact, electrical: wire range No. 22-26 AWG; sim to Molex 08-50-0108. P901A-6,8, thru 12,14).
P901B		Connector. Includes:
	19A116659P2	Printed board.
	19A116781P5	Contact, electrical: wire range No. 16-20 AWG; sim to Molex 08-50-0106. (P901B-2).
	19A116781P6	Contact, electrical: wire range No. 22-26 AWG; sim to Molex 08-50-0108. (P901B-1, 3 thru 8).
	19B201074P606	Tap screw, Phillips POZIDRIV®: No. 4-40 x 3/8. (Secures J1).
	7141225P2	Hex nut: No. 4-40. (Secures J1).
	N404P11C6	Lockwasher: No. 4. (Secures J1).
	19A115185P5	Retainer strap: sim to Panduit Corp. SST-1. (Used with P901 cable).
	19B226892P2	Connector support. (J1).
	19D402629P2	Top cover.
	19C303911G4	Bottom cover.
	19C321683G1	System Frame Assembly. (Includes 19C321670G2 Left Side Rail).
	19C321670G1	Right Side Rail.
	19D423302G2	Front Cap Assembly.
	19D423284P1	Handle. (Part of Front Cap Assembly).
	5491682P20	Rim Lock Plug. (Part of Front Cap Assembly).
	5491682P21	Rim Lock Cyclinder. (Part of Front Cap Assembly).
	5491682P8	Key. (Used with Rim Lock Plug 5491682P20).
	19A134222P1	Washer, spring tension. (Used with Rim Lock- Part of Front Cap Assembly).
	19A130614G1	Latch. (Used with Rim Lock- Part of Front Cap Assembly).
	19A122242P1	Screw, pan head: No. 8-32 x 1. (Secures Front Cap and Handle).
	19A116772P1	Lockwasher: No. 8. (Secures Front Cap and Handle).

*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 descriptions of parts affected by these revisions.

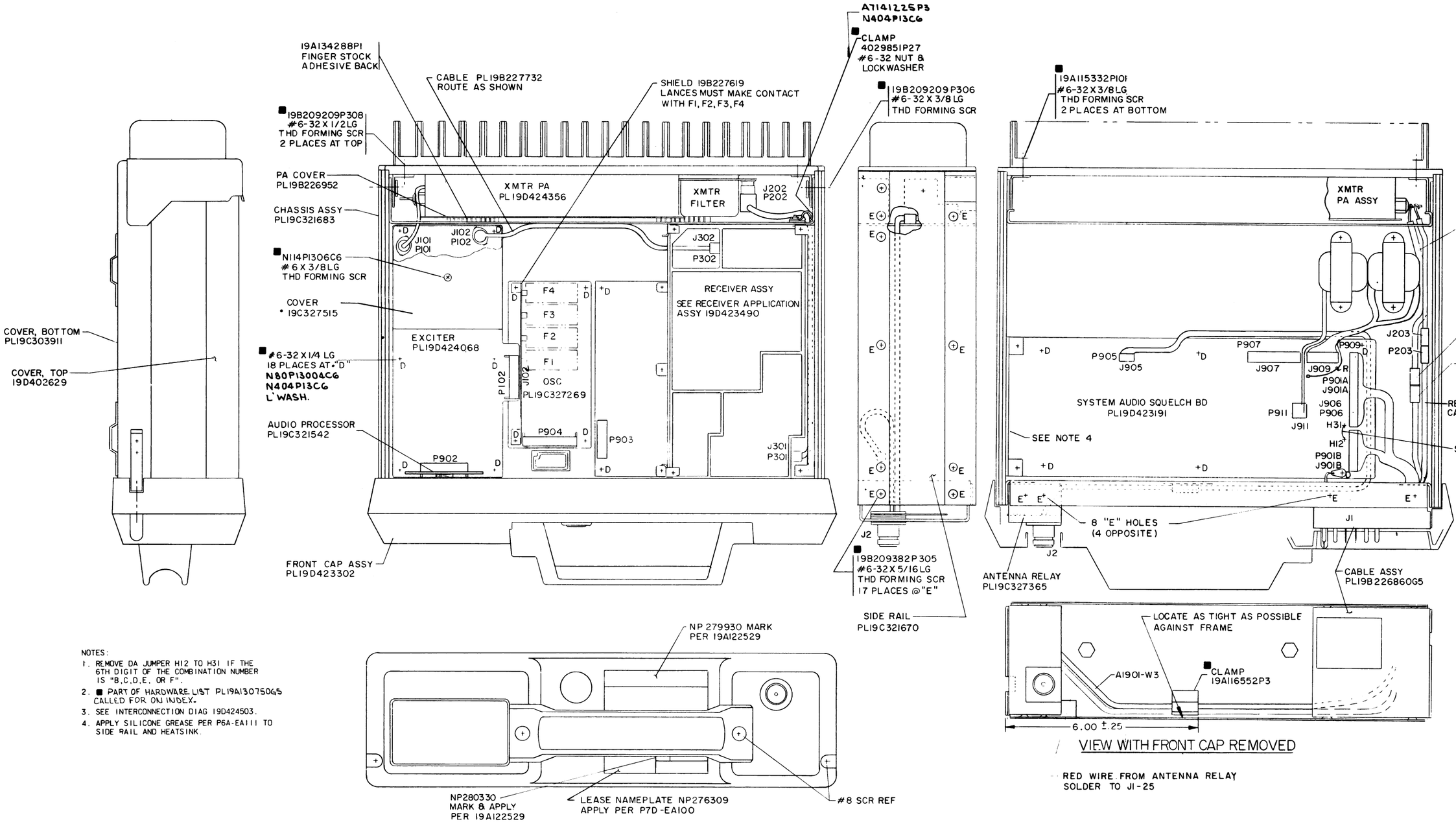
REV. A - To improve selectivity and intermodulation performance by reducing ICOM select line noise. Connect J1-18 to ground.

PARTS LIST

MISCELLANEOUS HARDWARE
FOR
806-870 MHz MASTR EXECUTIVE II MOBILE
ISSUE 1

SYMBOL	GE PART NO.	DESCRIPTION
		CONNECTOR PANEL 19B226860G10 CABLE ST OR SX 19B226860G12 CABLE RT OR RX
		- - - - - - - - JACKS AND RECEPTACLES - - - - - - - -
J1	19C303775P1	Connector, plug: 28 terminals.
J2601		Connector. Includes:
	19B209505P204	Shell.
	19B209505P21	Contact, electrical: female, wire size 18-24 AWG.
P203		Connector. Includes:
	19A134281P1	Shell.
	19A134282P2	Contact, electrical: wire size 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-2 thru 5,7,13).
	19A116781P6	Contact, electrical: wire range No. 22-26 AWG; sim to Molex 08-50-0108. (P901A-6,8, thru 12,14).
P901B		Connector. Includes:
	19A116659P20	Printed board.
	19A116781P5	CtacContact, electrical: wire range No. 18-24 AWG; sim to Molex 08-50-0106. (P901B-2).
	19A116781P6	Contact, electrical: wire range No. 22-26 AWG; sim to Molex 08-50-0108. (P901B-1, 3 thru 8).
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	19B226860G11	Harness. ST OR SX.
	19B226860G13	Harness. RT OR RX.
	19B201074P606	Tap screw, Phillips POZIDRIV®: No. 4-40 x 3/8. (Secures J1).
	7141225P2	Hex nut: No. 4-40. (Secures J1).
	N404P11C6	Lockwasher: No. 4. (Secures J1).
	19A115185P5	Retainer strap: sim to Panduit Corp. SST-1. (Used with P901 cable).
	19B226892P2	Connector support. (J1).
		ASSOCIATED ITEMS
	19D402629P2	Top cover.
	19C303911G4	Bottom cover.
	19C321683G1	System Frame Assembly. (Includes 19C321670G2 Left Side Rail).
	19C321670G1	Right Side Rail.
	19D423302G2	Front Cap Assembly.
	19D423284P1	Handle. (Part of Front Cap Assembly).
	5491682P20	Rim Lock Plug. (Part of Front Cap Assembly).
	5491682P21	Rim Lock Cyclinder. (Part of Front Cap Assembly).
	5491682P8	Key. (Used with Rim Lock Plug 5491682P20).
	19A134222P1	Washer, spring tension. (Used with Rim Lock- Part of Front Cap Assembly).
	19A130614G1	Latch. (Used with Rim Lock- Part of Front Cap Assembly).
	19A122242P1	Machine screw, pan head: No. 8-32 x 1. (Secures Front Cap & Handle).
	19A116772P1	Lockwasher: No. 8. (Secures Front Cap & Handle).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES



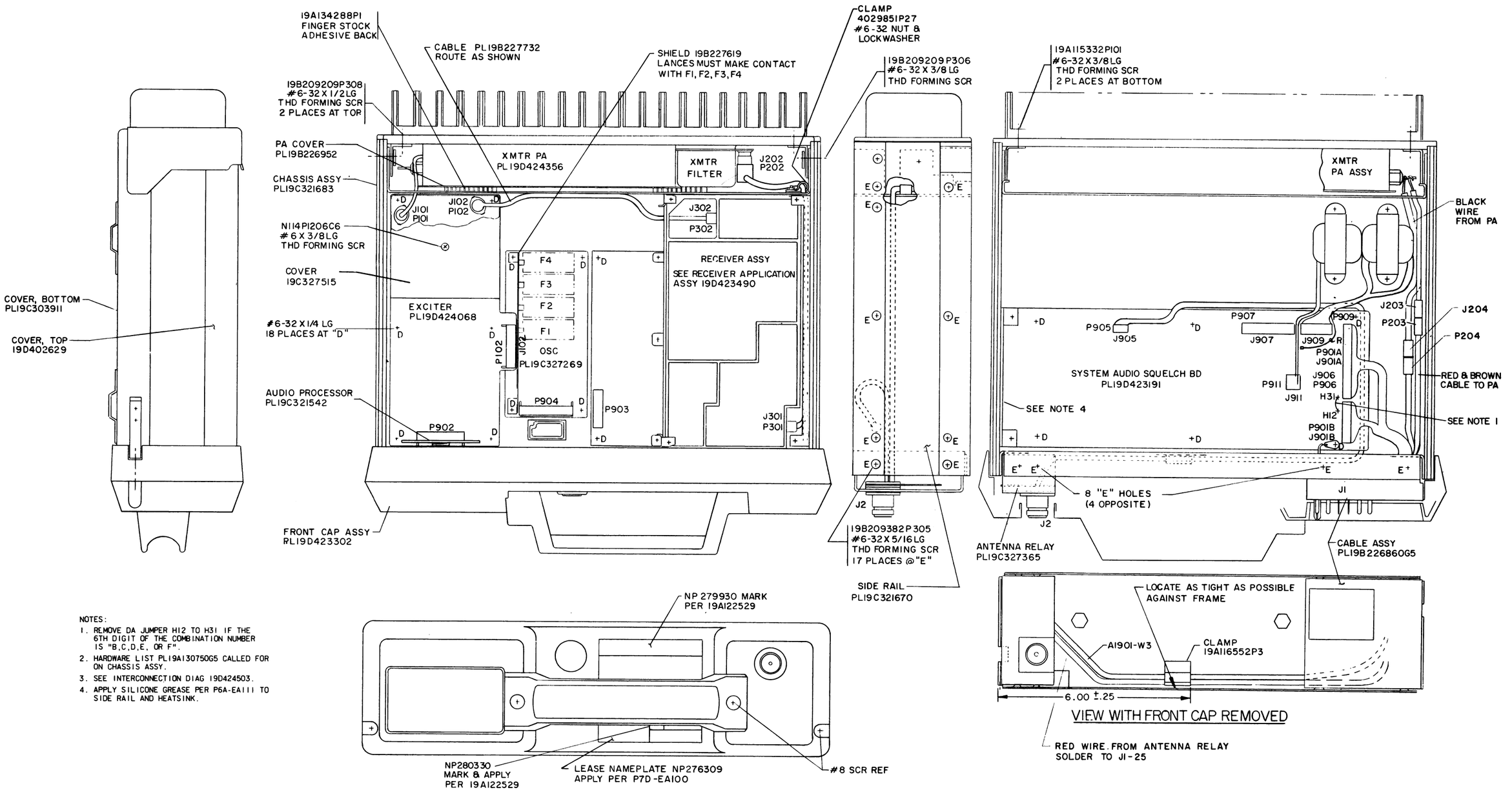
NOTES:

1. REMOVE DA JUMPER H12 TO H31 IF THE 6TH DIGIT OF THE COMBINATION NUMBER IS "B,C,D,E, OR F".
2. ■ PART OF HARDWARE LIST PL19A1307505 CALLED FOR ON INDEX.
3. SEE INTERCONNECTION DIAG 19D424503.
4. APPLY SILICONE GREASE PER P6A-EA111 TO SIDE RAIL AND HEATSINK.

(19D423470, Sh. 2, Rev. 10)

MECHANICAL PARTS BREAKDOWN

MAIN CHASSIS



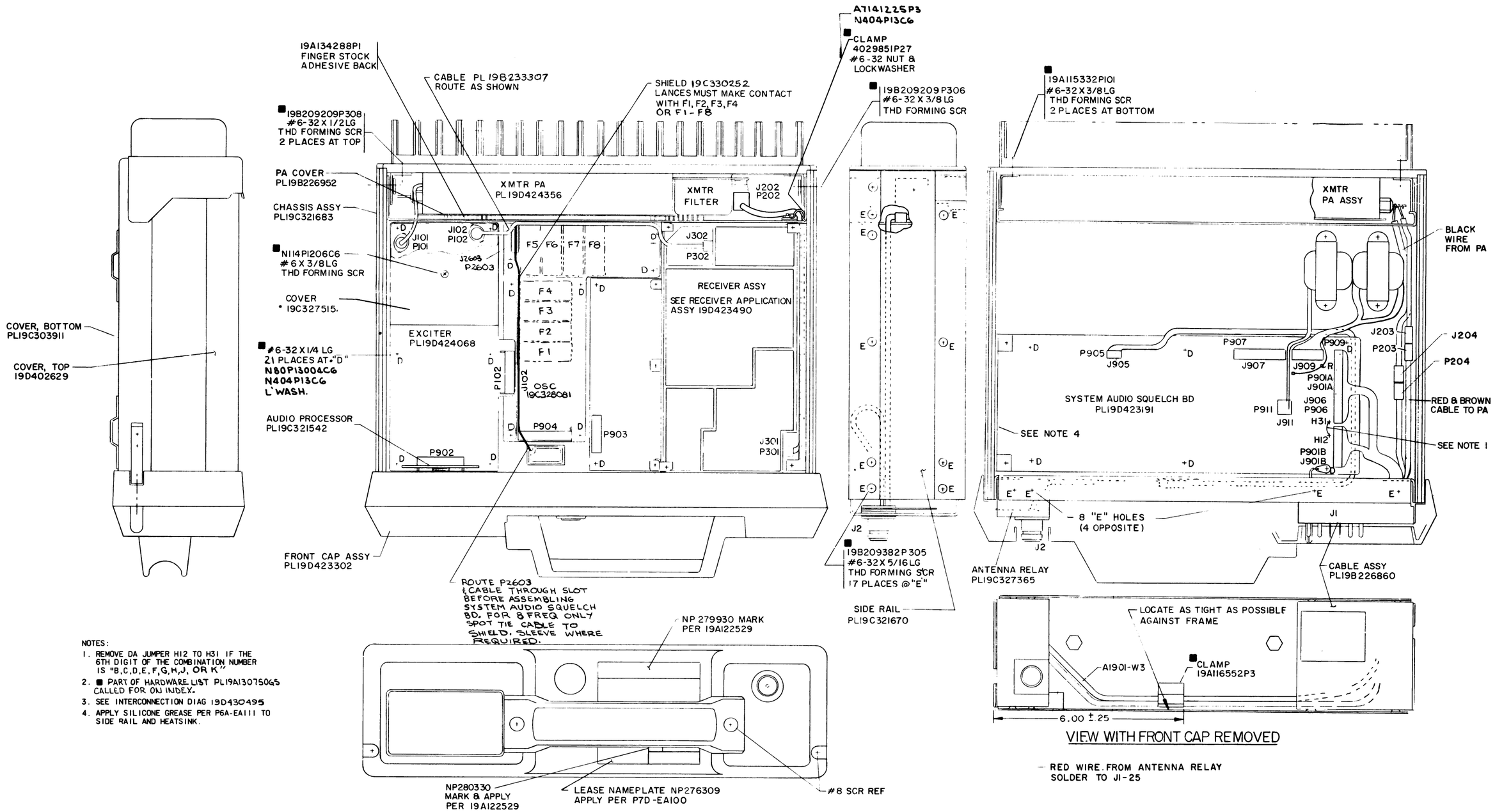
NOTES:

1. REMOVE DA JUMPER H12 TO H31 IF THE 6TH DIGIT OF THE COMBINATION NUMBER IS "B,C,D,E, OR F".
2. HARDWARE LIST PL19A130750G5 CALLED FOR ON CHASSIS ASSY.
3. SEE INTERCONNECTION DIAG 19D424503.
4. APPLY SILICONE GREASE PER P6A-EA111 TO SIDE RAIL AND HEATSINK.

MECHANICAL PARTS BREAKDOWN

MAIN CHASSIS

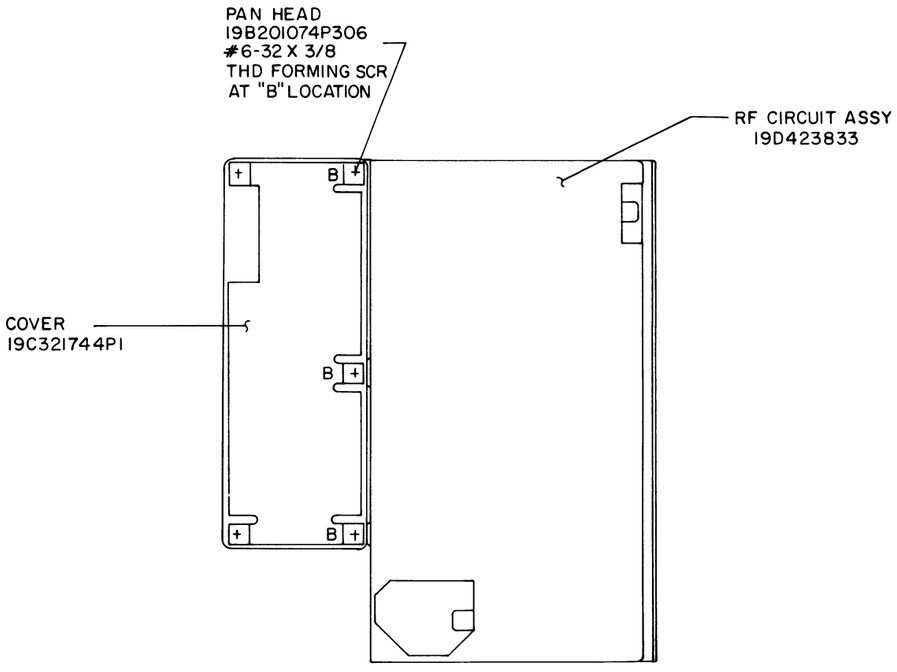
(19D423470, Sh. 2, Rev. 7)

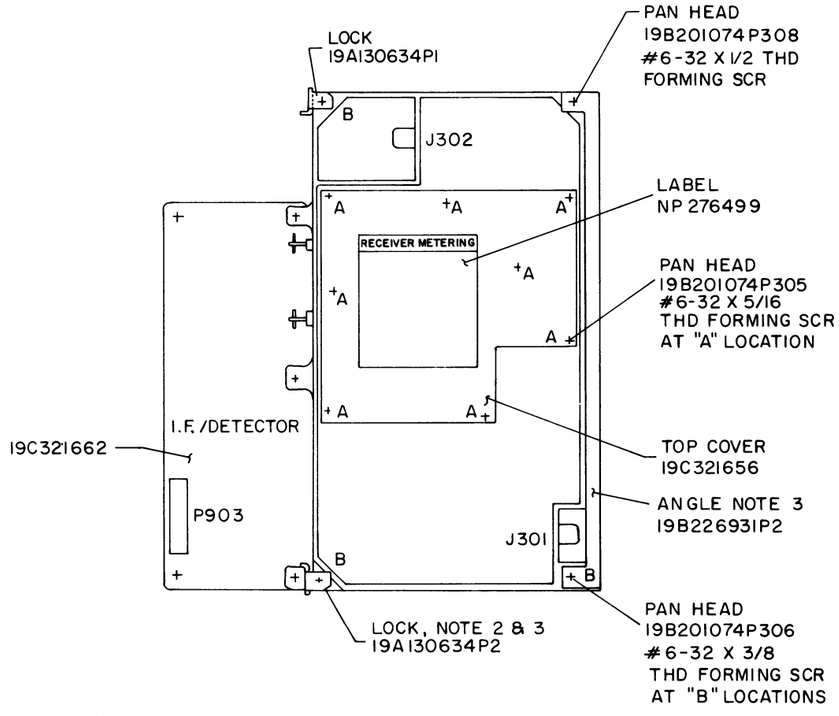


NOTES:

1. REMOVE DA JUMPER H12 TO H31 IF THE 6TH DIGIT OF THE COMBINATION NUMBER IS "B,C,D,E,F,G,H,J, OR K"
2. ■ PART OF HARDWARE LIST PL19A130750G5 CALLED FOR ON INDEX.
3. SEE INTERCONNECTION DIAG 19D430495
4. APPLY SILICONE GREASE PER P6A-EA111 TO SIDE RAIL AND HEATSINK.

(19D423470, Sh. 4, Rev. 0)





NOTES:
1. HARDWARE LIST PL19A130750G6.
2. ASSEMBLE WITH SCREWS LOOSE.
3. PART OF HARDWARE LIST PL19A130750G6.

(19D423490, Sh. 5, Rev. 1)

MECHANICAL PARTS BREAKDOWN

806—870 MHz RECEIVER ASSEMBLY