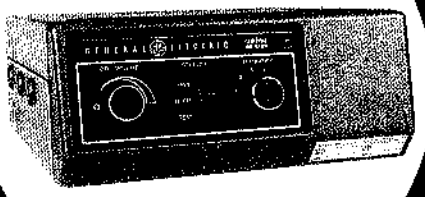
MOBILE RADIO

CUSTOM MVP

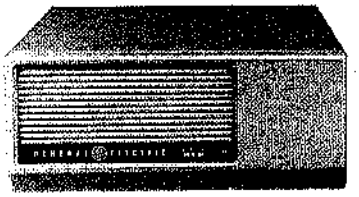
TWO-WAY FM RADIO COMBINATIONS

MAINTENANCE MANUAL LBI 30163K

DATAFILE FOLDER DF 9041



MOBILE RADIO



AC POWER SUPPLY OPTION

GENERAL ELECTRIC

TABLE OF CONTENTS

ILLUSTRATIONS

WARNING

Although the highest DC voltage in Custom MVP 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!

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

GENERAL ELECTRIC*
U.S.A.

SYSTEM SPECIFICATIONS*

BATTERY DRAIN

Receiver	
Squelched	0.25 Amperes
Unsquelched	0.70 Amperes
Transmitter	
KT-133-A, KT-134-A	5.8 Amperes @ 13.8 VDC
KT-135-A, KT-136-A	
KT-142-A, C	2.0 Amperes @ 13.8 VDC
KT-151-A	3.5 Amperes @ 13.8 VDC
KT-160-A	5.9 Amperes @ 13.8 VDC
KT-161-A, C	10.5 Amperes @ 13.6 VDC

DIMENSIONS (H X W X D)

Two-Way Radio	3.5" x 8.4" x 10.6"
AC Power Supply Option	3.5" x 8.4" x 10.6"
Mobile Speaker (less bracket)	5.1" x 5.1" x 2.8"

WEIGHT

Two-Way Radio	8.0 Pounds
AC Power Supply Option	13.0 Pounds
Speaker	1.0 Pound, 8 ounces

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 appropriate Specification Sheet for the complete specifications.

FCC FILING NUMBERS

TRANSMITTER	FREQUENCY RANGE (MHz)	FREQUENCY STABILITY	POWER OUTPUT
KT-133-A	29.7 - 50	5 PPM	25-Watt
KT-134-A	138 - 174	5 PPM	25-Watt
KT-135-A	406 - 420	5 PPM	20-Watt
	450 - 494	5 PPM	20-Watt
	420 - 450	5 PPM	20-Watt
	494 - 572	5 PPM	15-Watt
KT-136-C	406 - 420	2 PPM	20-Watt
	450 - 494	2 PPM	20-Watt
	420 - 450	2 PPM	15-Watt
	494 - 512	2 PPM	15-Watt
KT-142-A	450 - 512	5 PPM	5-Watt
KT-142-C	450 - 512	2 PPM	5-Watt
KT-151-A	138 - 174	5 PPM	10-Watt
KT-161-A	406 - 512	5 PPM	35-Watt
KT-161-C	406 - 512	2 PPM	35-Watt
KT-160-A	72 - 76*	5 PPM	25-Watt

* 66-88 MHz when operated outside United States.

COMBINATION NOMENCLATURE (MEDIUM POWER)

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	Frequency Capacity	Number of Freq.	Options	Frequency Range	Oscillator Stability
C Front Mount	**T** +12 VDC (Negative Ground Only)	**4** 8-20 Watts	**4** 20 kHz	**A** Single Freq.	**A** 1 Freq. Tx 1 Freq. Rx	**S** Standard	**13** 29.7-36 MHz	**A** ±5 PPM
		5 21-40 Watts	**5** 25 kHz	**F** Multi-Freq.	**C** 2 Freq. Tx 2 Freq. Rx	**G** Channel Guard & UHS Receiver	**23** 36-42 MHz	**B** ±2 PPM
			6 30 kHz		**E** 3 Freq. Tx 3 Freq. Rx	**N** Noise Blanker	**33** 42-50 MHz	
					F 4 Freq. Tx 4 Freq. Rx	**P** UHS Receiver	**44** 66-78 MHz	
						U Channel Guard	**45** 77-88 MHz	
						W Channel Guard & Noise Blanker	**56** 138-155 MHz	
							66 150.8-174 MHz	
							77 406-420 MHz	
							78 420-450 MHz	
							88 450-470 MHz	
							89 470-494 MHz	
							91 494-512 MHz	

COMBINATION NOMENCLATURE (LOW POWER)

1st Digit	2nd Digit	3rd Digit	4th Digit	5th Digit	6th Digit	7th Digit	8th & 9th Digits	10th Digit	11th Digit
Mechanical Package	System Voltage	Power Output	Channel Spacing	Frequency Capacity	Number of Freq.	Options	Frequency Range	Oscillator Stability	PA Type
C Front Mount	**T** +12 VDC (Negative Ground Only)	**3** 1-7 Watts	**5** 25 kHz	**A** Single Freq.	**A** 1 Freq. Tx 1 Freq. Rx	**S** Standard	**88** 450-470 MHz	**A** ±5 PPM	**L** Low Power
						U Channel Guard	**89** 470-494 MHz	**B** ±2 PPM	
						P UHS Receiver	**91** 494-512 MHz		
						G Channel Guard & UHS Receiver			

DESCRIPTION

The General Electric Custom MVP radio combinations are fully transistorized-utilizing both discrete components and integrated circuits (IC's) for high reliability. The standard combinations may be equipped with the following:

- One through four frequencies (low power combinations are single frequency only)
- Plug-in crystal oscillator modules for ±0.0005% oscillator stability. (±0.0002%* stability is available for special UHF transmit single frequency applications).
- Channel Guard (tone squelch)
- Noise Blanker* (not available at UHF)
- Ultra High Sensitivity Receiver* (not available at low band)

The combination consists of a front cap attached to a module mounting frame which slides into a box-type cover. The frame is retained in the cover by one wing nut at the rear of the unit. Threaded nut fasteners are provided in the sides of the cover to secure the mounting bracket. The radio is designed for front-mount installations in mobile applications.

The control panel located on the front cap of the radio contains an ON/OFF-VOLUME control, Squelch and Channel Guard monitor slide switch, an optional 4-frequency control switch and a red transmit Light Emitting Diode (LED) indicator.

No power supply is required since the highest supply voltage used in the radio is provided by the vehicle battery. The radio is designed for operation only in 12-Volt, negative ground vehicle systems.

The radio is of modular construction. All major modules and tuning adjustments are easily accessible. Removal of one wing nut at the rear allows the radio to be removed from the cover. (See Figure 1) The transmitter PA and filter boards, RF Assembly and Mixer-IF Board are accessible from the top of the radio. The exciter, receiver oscillator/multiplier, IF/Detector and multi-frequency* boards are accessible when the radio is turned over.

Removing two screws at each side of the front cap allows the front cap to be removed, exposing the radio System-Audio-Squelch (SAS) board and Channel Guard Board (when used). The fixed squelch control and Channel Guard modulation control are accessible through slots in the top edge of the front cap without removing the cap. Centralized metering jacks for the transmitter and receiver are provided for simplified alignment and troubleshooting.

TRANSMITTER

The transmitter consists of an exciter board and a power amplifier assembly. The power amplifier assembly is composed of the PA and low-pass filter. The antenna relay is mounted on the filter module.

RECEIVER

The receiver consists of an RF assembly, an Oscillator/multiplier assembly (Osc/Mult), mixer/IF assembly (MIF) and IF-Detector assembly (IFD). The audio and squelch circuitry for the receiver is located on the SAS board. In receivers with noise blankers, the noise blanker circuit replaces the standard MIF board. In UHS receivers, the pre-amplifier mounts in the area near the antenna input board.

SYSTEM-AUDIO-SQUELCH BOARD

The System-Audio-Squelch (SAS) board mounts on the front of the radio frame behind the front control panel. The board contains the 10-Volt regulator, transmitter and receiver control circuits and the receiver audio and squelch circuits. The optional Channel Guard board or Carrier Defeat Timer mounts along-side and connects to the SAS board by means of a harness. The optional Carrier Control Timer mounts directly to the SAS board.

AC POWER SUPPLY OPTION

To use the radio as a base station, an optional AC power supply is required. This supply is housed similar to the radio. The radio and power supply may be stacked or located side-by-side. A 15-inch 6-conductor cable connects between the power supply and the radio. A speaker and green POWER ON LED are provided with the supply.

INITIAL ADJUSTMENT

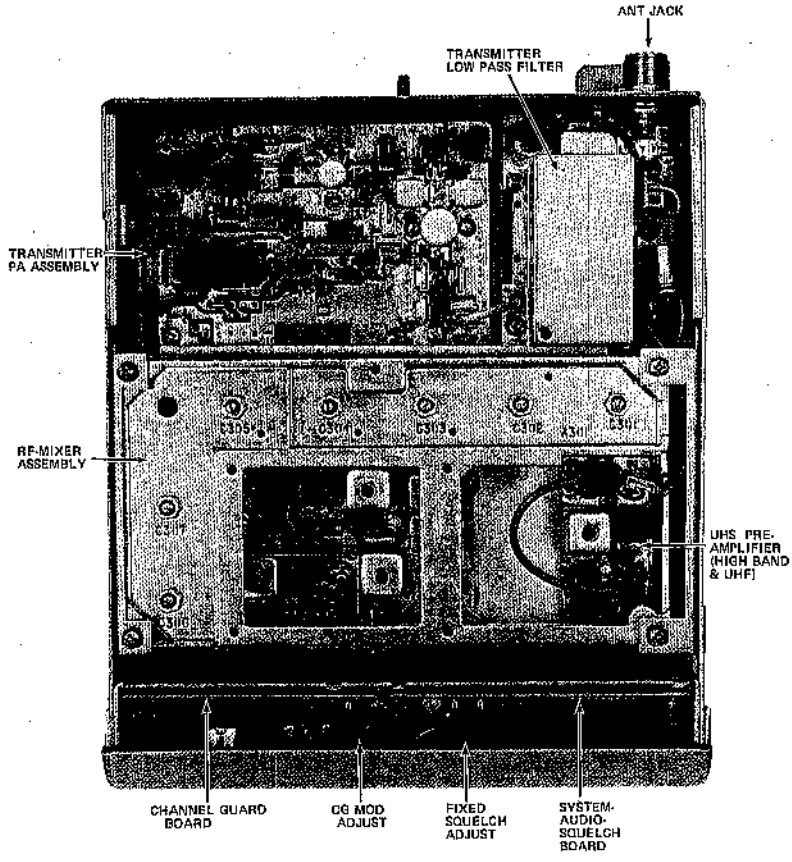
After the Custom MVP radio has been installed (as described in the Installation Manual), the following adjustments should be made by electronics technician. Make sure that a RADIO TRANSMITTER IDENTIFICATION FORM (General Electric Form NP270303) has been filled out and attached to the transmitter.

CAUTION

Before bench testing the Custom MVP Mobile Radio, be sure of the output voltage characteristic of your bench power supply.

* Does not apply to Combinations with 11th Digit "L" (low power)

TOP VIEW



BOTTOM VIEW

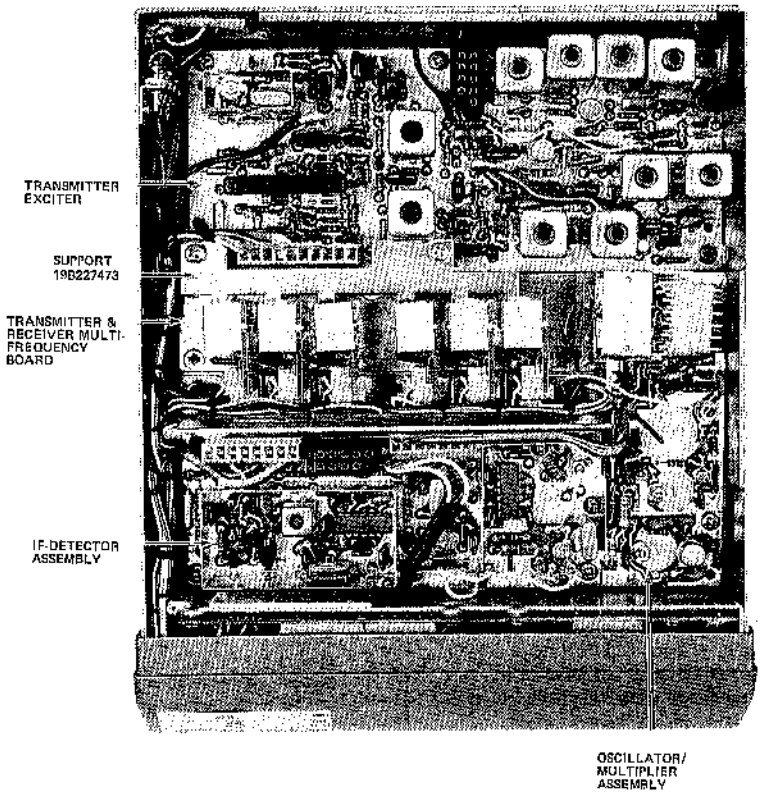


Figure 1 - Typical Custom MVP Module Layout

To protect the transmitter power output transistors from possible instant descruction, 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 (13.8 VDC for loads up to 6 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. It is recommended that the AC Power Supply (Option 1901) be used for bench testing the Custom MVP.

TRANSMITTER ADJUSTMENT

The adjustment for the transmitter includes measuring the forward and reflected power and adjusting the antenna length for optimum radio, then setting the transmitter to rated power output. Next, measure the frequency and modulation and record these measurements for future reference. 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 follows:

TO RECEIVE A MESSAGE

1. Turn the radio on by turning the OFF-VOLUME control halfway to the right.

2. Slide the Squelch Switch on the Control panel to the TEST position 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 indicator light on the control panel 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 (and all other soldered-in components) can be easily accomplished by using a vacuum de-soldering tool. To romove 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 procedure should include the checks 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.

RE-INSTALLATION

If the mobile combination is moved to a different vehicle, always check the battery polarity of the new system.

NOISE SUPPRESSION

After completing the initial adjustment of the transmitter and receiver, the serviceman should determine whether additional noise suppression is required. The following information should assist the serviceman in identifying and eliminating undesirable noise interference.

DISASSEMBLY

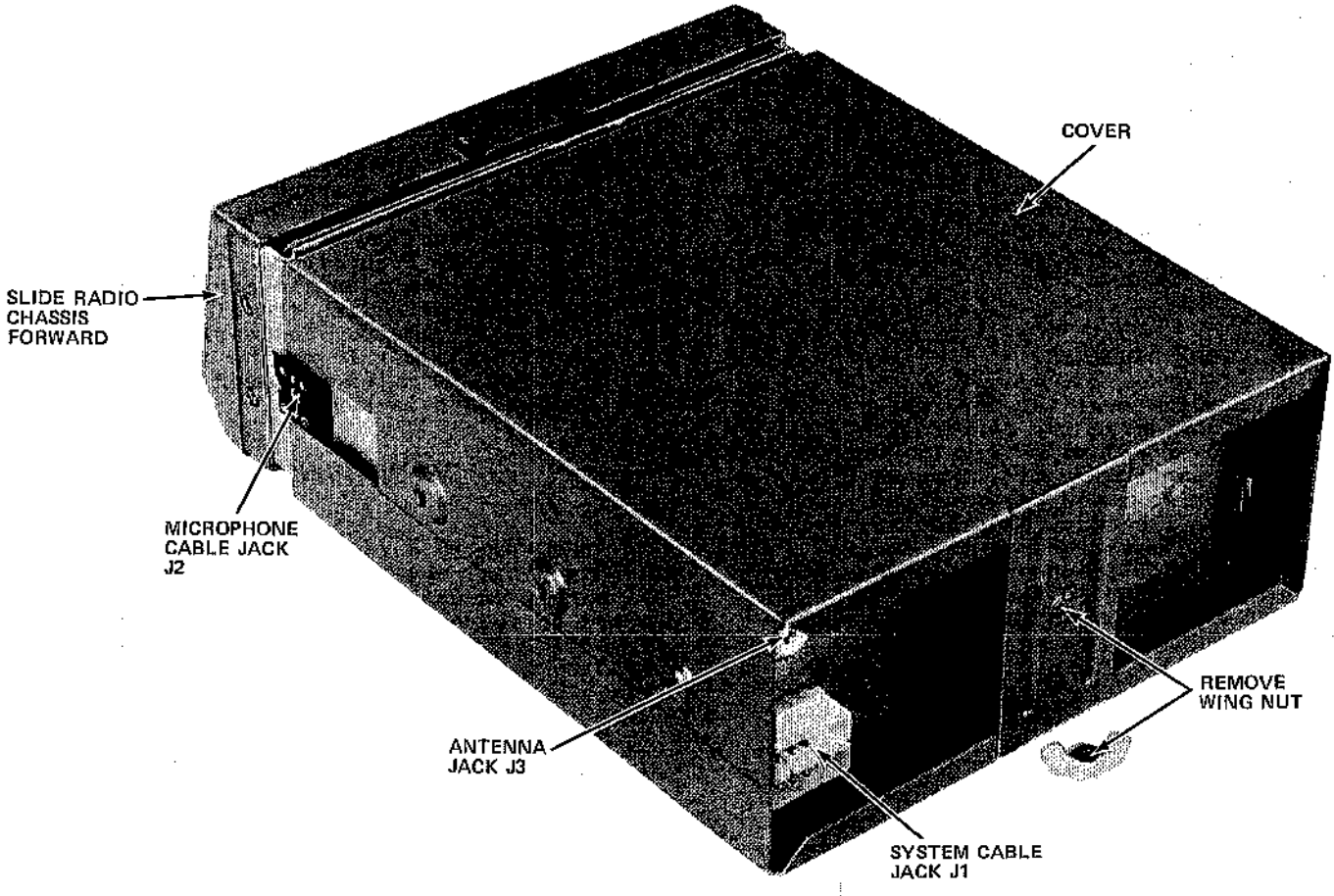


Figure 2 - Disassembly Procedure

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 drop 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. Normally, these checks are made when the unit is first put into operation, after the first six months and once a year therafter.		X

Ignition Noise

Ignition noise sounds like a "popping" sound in the speaker, whose frequency varies with engine speed while a weak signal is being received. This type of interference is generated by the spark plugs, distributor and any poor connections in the high-voltage system which might cause arcing. Ignition noise may be identified by noting that the noise disappears as soon as the ignition switch is turned off.

1. If the vehicle does not have a resistance lead from the coil to the center of the distributor cap, disconnect the lead at the distributor and cut the lead so that a Cable-Type Suppressor may be inserted in it close to the distributor. Screw the cut ends of the lead into the suppressor.

NOTE

A resistance lead operates as a very effective noise suppressor as long as there are no breaks anywhere along its length. Never cut a resistance lead to insert a suppressor. A loose knot is often tied in the lead to prevent excess flexing, which might break the conductor.

2. Check to see that:

   -- the distributor points and condenser are in good condition.

   -- the high-voltage leads from the distributor are not broken and are making good contact at each end.

   -- the spark plugs have clean, dry insulators and their electrodes are clean and properly adjusted.

   -- the timing has been properly adjusted.

3. Use a 0.5-mFd by-pass capacitor to by-pass the battery lead to the ignition coil. Mount the capacitor under a screw which will provide a good ground and connect the capacitor lead to the terminal of the coil which is connected to the ignition.

4. Remove the ignition coil and its mounting bracket. Clean paint from coil (where the bracket mounts), from the bracket and from the engine block. Remount the coil so as to obtain a good ground for the coil case.

5. If the vehicle has been driven 30,000 or 40,000 miles or more, the cap and rotor of the distributor will probably need replacing. This will not only reduce ignition noise, but also improve the overall performance of the engine.

6. High-voltage ignition wires can become capacitively coupled to the low-voltage systems, causing ignition noise to appear in the low-voltage system. This coupling can be minimized by separating the high- and low-voltage leads, or if necessary, separately shielding the leads.

7. If one of the ignition leads happens to have the critical length for radiating at the receiver's frequency, the noise can be reduced by changing the length of the lead. A noise source of this type is not common and can only be found by using a noise meter or by trial and error.

8. If the preceding steps fail to reduce ignition noise to a satisfactory level, it may be necessary to install resistance-type spark plugs, individual suppressors on each spark plug, or a shielded ignition wire harness.

Alternator Noise

Alternator noise shows up as a high-pitched "whine", whose pitch varies with engine speed. To check for this type of noise, run the engine at a moderate speed and then shut off the engine, while listening to the noise on the receiver. Alternator noise will continue as long as the engine turns, lowering in pitch as the engine slows down.

It may be necessary to install a coaxial type, 0.5 mFd filter capacitor from the ungrounded alternator terminal to ground.

CAUTION

Do not install this capacitor on alternators that are equipped with a factory-supplied capacitor for protecting the rectifiers and suppressing noise.

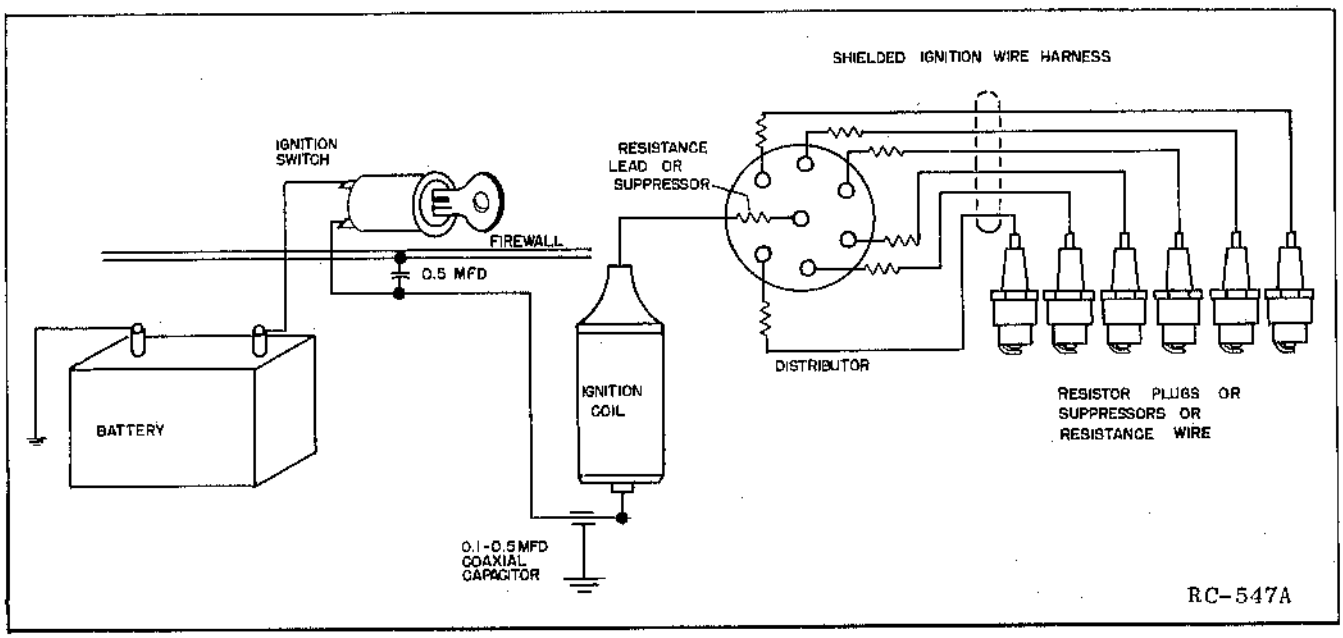


Figure 3 - Ignition Circuit with Noise Suppression Components

NOTE

It is recommended that the radio power leads be connected directly to the battery, since alternator noise levels are lowest at the battery. If ignition switch control is required, a special lead is required (refer to Installation Instructions). The high current transmitter should always be connected to the battery.

Generator Noise

Generator noise shows up as a high-pitched "whine", whose pitch varies with engine speed. To check for this type of noise, run the engine at a moderate speed and then shut off the engine, while listening to the noise on the receiver. Generator noise will continue as long as the engine turns, lowering in pitch as the engine slows down.

By-pass the armature terminal on the generator to ground with a 0.5 mFd, 40 or 50-amp coaxial capacitor. Be sure to scrape the area where the capacitor is to be mounted, so that its case will be well grounded.

CAUTION

Do not by-pass the field terminal (F), as this will damage the voltage regulator contacts.

Generator Regulator Noise

Generator regulator noise shows up as a "raspy" sound which is generated by the contacts in the regulator and radiated by the leads coming out to the regulator. If suppression of regulator noise is necessary, connect a 5-ohm resistor in series with a .002-mFd capacitor from the field terminal (F) of the regulator to ground. If possible, these components should be mounted inside regulator case. The battery terminal (BAT) and armature terminal (ARM) can be by-passed to ground with 0.5-mFd capacitors.

CAUTION

If the regulator is opened to install the capacitor or resistor, remember that one wrong connection or shorted wire can damage the regulator or generator.

Gauge noise produces a "hissing" or "crackling" sound. Tapping the face of each gauge while the engine is running usually shows up which gauge is at fault. By-pass the gauge lead to ground with a 0.5-mFd capacitor, connected close to the sensing element.

Static and Arcing Noise

The following suggestions may help to cure other unusual types of interference:

1. Use bonding braid to electrically bond the hood and each corner of the engine block to the vehicle's frame. Scrape paint and dirt from bonding points to obtain a good ground.
2. Treat noisy tires with anti-static powder.
3. Use front-wheel static collectors for irregulator "popping" noise which disappears when the brakes are applied.
4. Use heavily graphited penetrating oil on the exhaust pipe and muffler supports if they are producing noise.

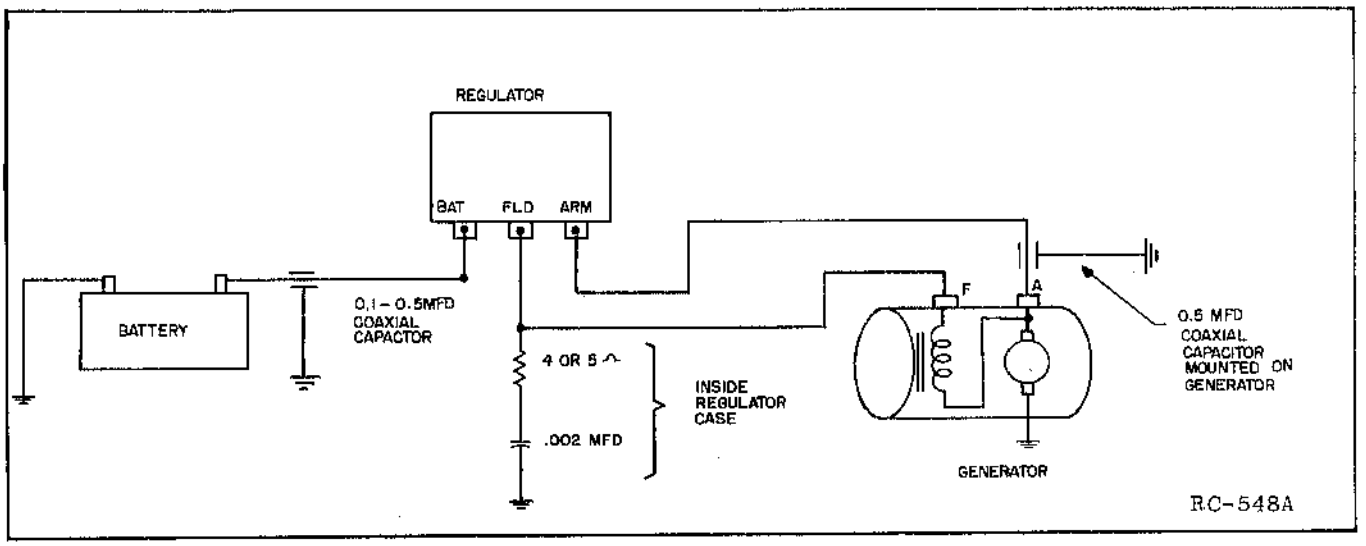
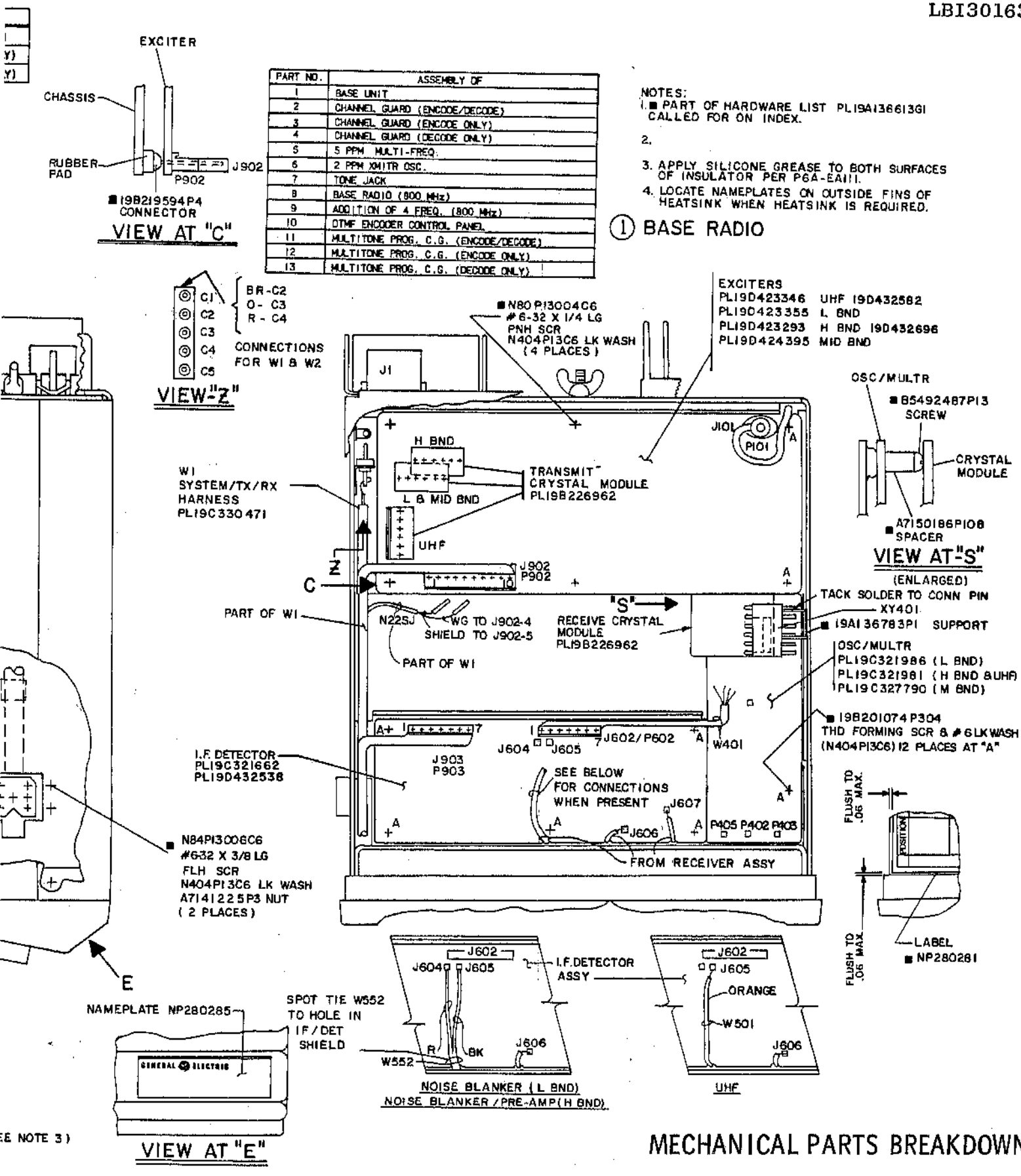


Figure 4 - Generator Circuit with Noise Suppression Components



PART NO.	ASSEMBLY OF
1	BASE UNIT
2	CHANNEL GUARD (ENCODE/DECODE)
3	CHANNEL GUARD (ENCODE ONLY)
4	CHANNEL GUARD (DECODE ONLY)
5	5 PPM MULTI-FREQ.
6	2 PPM XMITR OSC.
7	TONE JACK
8	BASE RADIO (800 MHz)
9	ADDITION OF 4 FREQ. (800 MHz)
10	DTMF ENCODER CONTROL PANEL
11	MULTITONE PROG. C.G. (ENCODE/DECODE)
12	MULTITONE PROG. C.G. (ENCODE ONLY)
13	MULTITONE PROG. C.G. (DECODE ONLY)

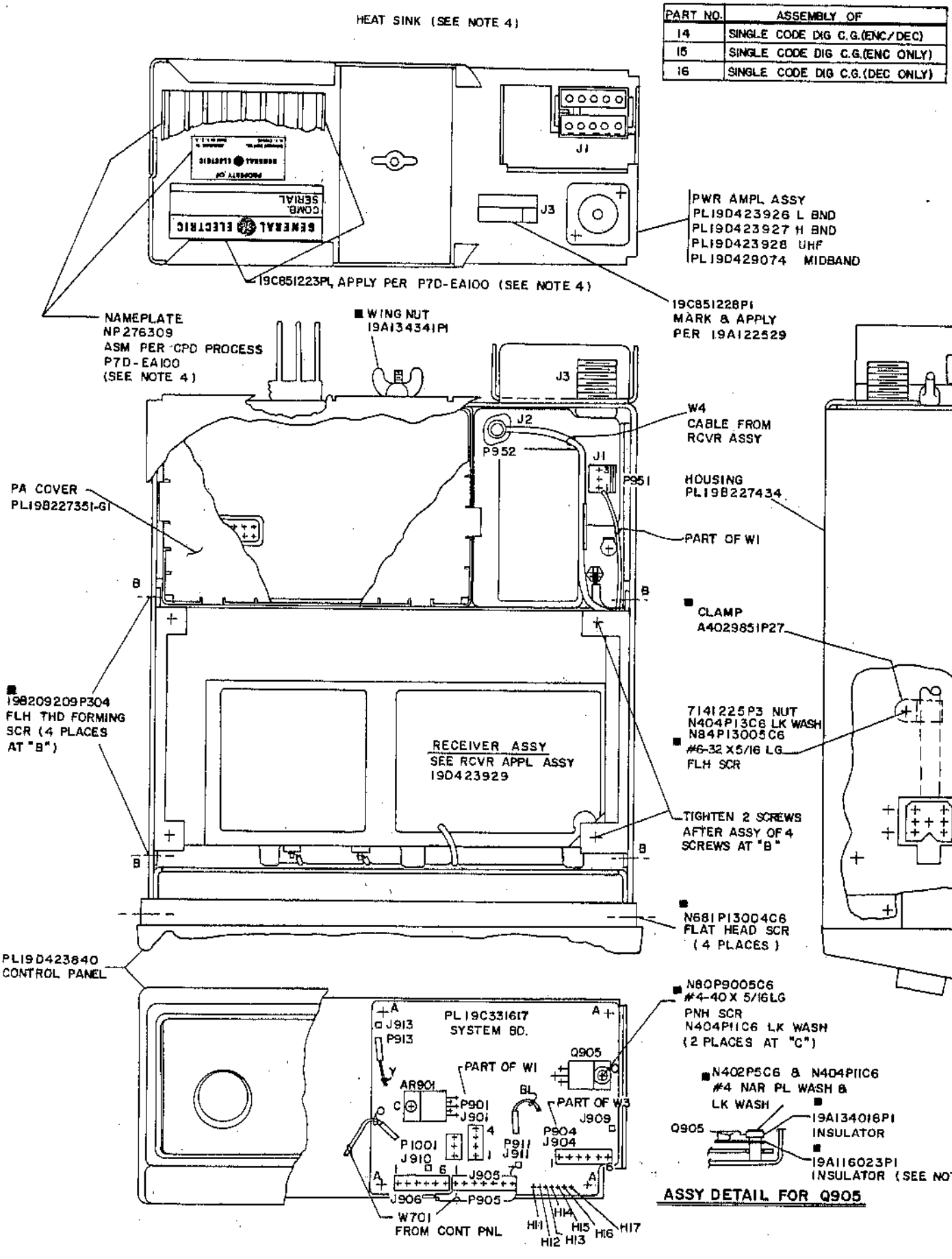
NOTES:
1. ■ PART OF HARDWARE LIST PL19A136613G1 CALLED FOR ON INDEX.
2.
3. APPLY SILICONE GREASE TO BOTH SURFACES OF INSULATOR PER P6A-EA111.
4. LOCATE NAMEPLATES ON OUTSIDE FINS OF HEATSINK WHEN HEATSINK IS REQUIRED.

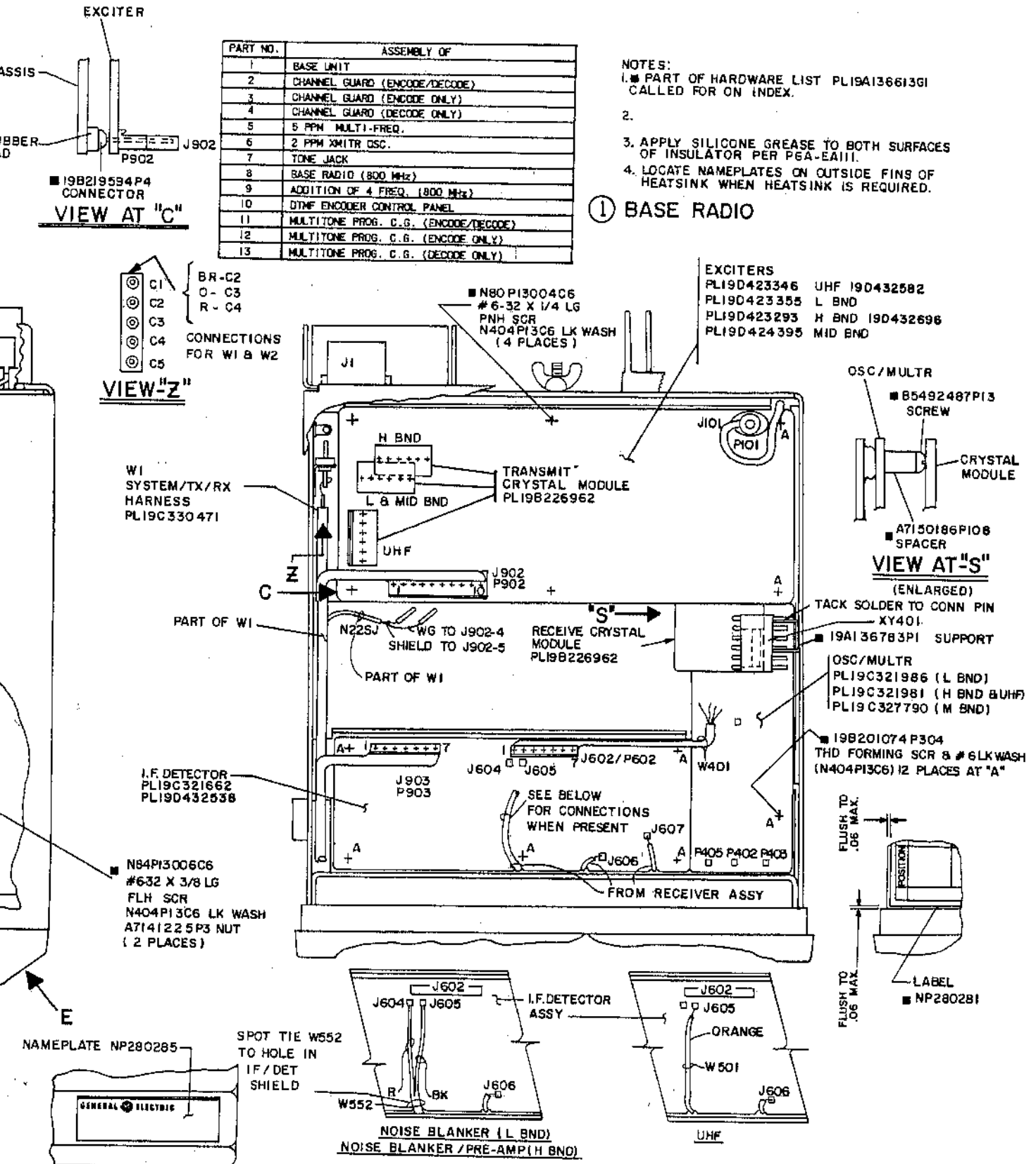
① BASE RADIO

EE NOTE 3)

MECHANICAL PARTS BREAKDOWN

CUSTOM MVP RADIO CHASSIS


HEAT SINK (SEE NOTE 4)
PART NO. | ASSEMBLY OF
14 | SINGLE CODE DIG C.G.(ENC/DEC)
15 | SINGLE CODE DIG C.G.(ENC ONLY)
16 | SINGLE CODE DIG C.G.(DEC ONLY)
J1
J3
PWR AMPL ASSY
PL19D423926 L BND
PL19D423927 H BND
PL19D423928 UHF
PL19D429074 MIDBAND
19C851223P1, APPLY PER P7D-EA100 (SEE NOTE 4)
19C851228P1
MARK & APPLY
PER 19A122529
NAMEPLATE
NP276309
ASM PER CPD PROCESS
P7D-EA100
(SEE NOTE 4)
WING NUT
19A134341P1
J3
J2
W4
CABLE FROM
RCVR ASSY
P952
J1
P951
HOUSING
PL19B227434
PA COVER
PL19B227351-G1
PART OF W1
B
CLAMP
A4029851P27
19B209209P304
FLH THD FORMING
SCR (4 PLACES
AT "B")
RECEIVER ASSY
SEE RCVR APPL ASSY
19D423929
7141225P3 NUT
N404P13C6 LK WASH
N84P13005C6
#6-32 X 5/16 LG
FLH SCR
TIGHTEN 2 SCREWS
AFTER ASSY OF 4
SCREWS AT "B"
N681P13004C6
FLAT HEAD SCR
(4 PLACES)
PL19D423840
CONTROL PANEL
PL19C331617
SYSTEM 80.
J913
P913
N80P9005C6
#4-40 X 5/16LG
PNH SCR
N404P11C6 LK WASH
(2 PLACES AT "C")
Q905
PART OF W1
AR901
P901
J901
PART OF W3
J909
P904
J904
P911
J911
P1001
J910
J905
J906
P905
W701
FROM CONT PNL
HI1
HI2
HI3
HI4
HI5
HI6
HI7
N402P5C6 & N404P11C6
#4 NAR PL WASH &
LK WASH
19A134016P1
INSULATOR
19A116023P1
INSULATOR (SEE NO
ASSY DETAIL FOR Q905



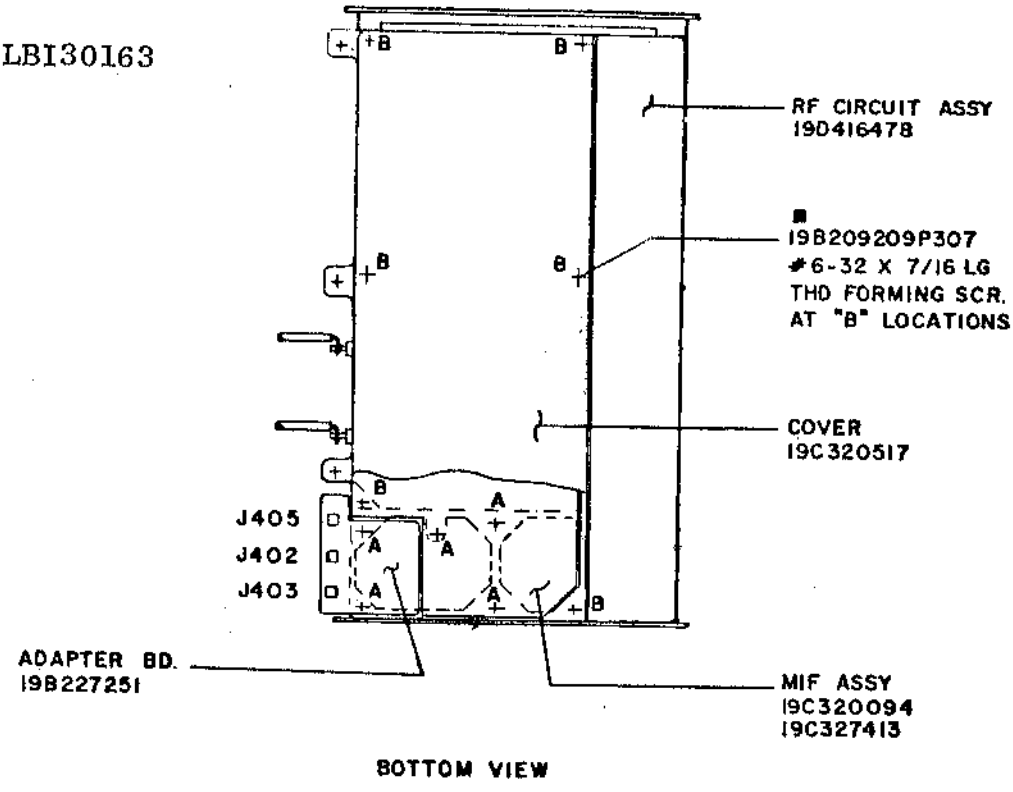
PART NO.	ASSEMBLY OF
1	BASE UNIT
2	CHANNEL GUARD (ENCODE/DECODE)
3	CHANNEL GUARD (ENCODE ONLY)
4	CHANNEL GUARD (DECODE ONLY)
5	5 PPM MULTI-FREQ.
6	2 PPM XMITR OSC.
7	TONE JACK
8	BASE RADIO (800 MHz)
9	ADDITION OF 4 FREQ. (800 MHz)
10	DTMF ENCODER CONTROL PANEL
11	MULTITONE PROG. C.G. (ENCODE/DECODE)
12	MULTITONE PROG. C.G. (ENCODE ONLY)
13	MULTITONE PROG. C.G. (DECODE ONLY)

NOTES:
1. ■ PART OF HARDWARE LIST PLI9A136613G1 CALLED FOR ON INDEX.
2.
3. APPLY SILICONE GREASE TO BOTH SURFACES OF INSULATOR PER P6A-EA111.
4. LOCATE NAMEPLATES ON OUTSIDE FINS OF HEATSINK WHEN HEATSINK IS REQUIRED.

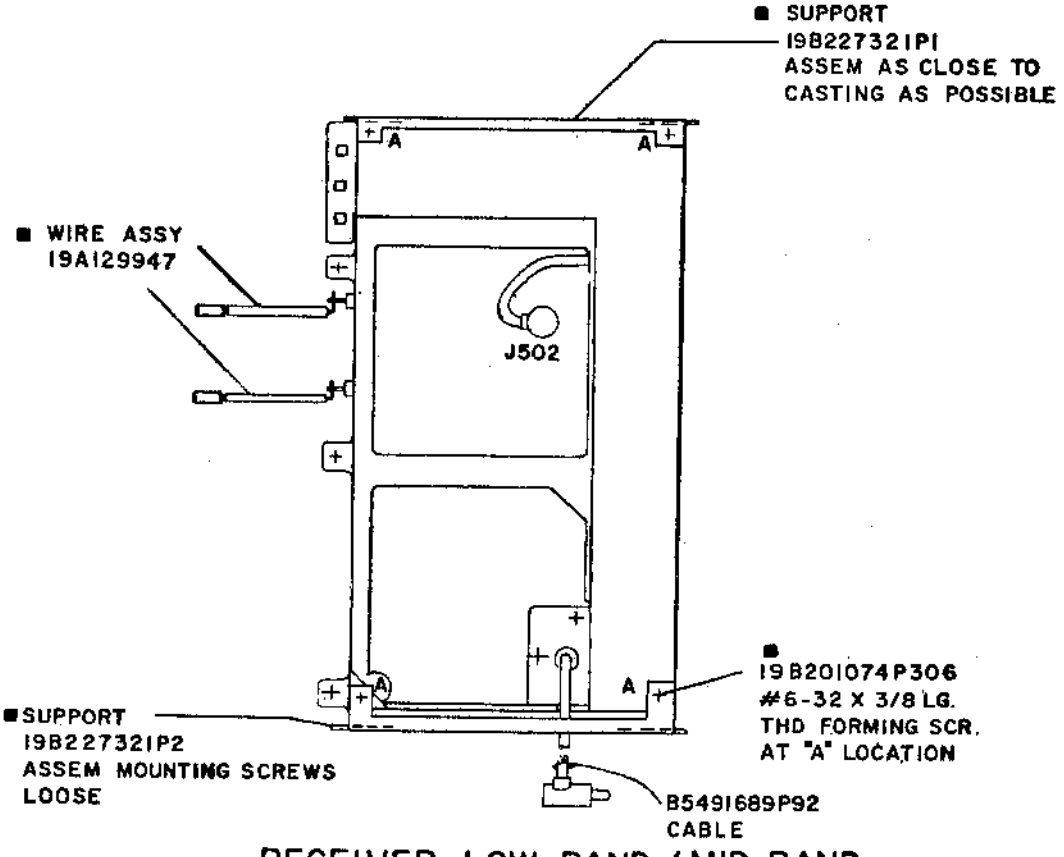
① BASE RADIO

MECHANICAL PARTS BREAKDOWN

CUSTOM MVP RADIO CHASSIS



BOTTOM VIEW



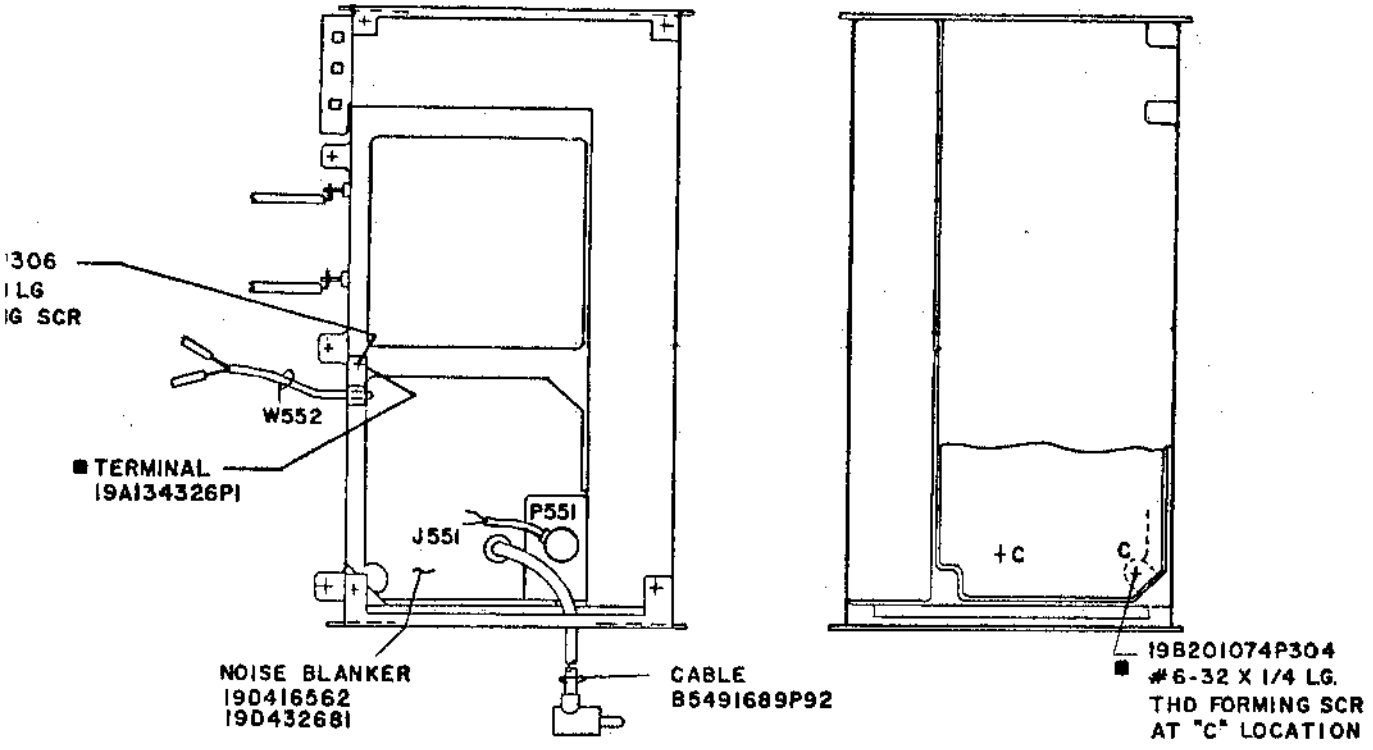
RECEIVER LOW BAND / MID BAND

TOP VIEW

MECHANICAL PARTS BREAKDOWN

(19D423929, Sh. 1, Rev. 9)

29.7—50 MHz RECEIVER



NOISE BLANKER FOR LOW BAND

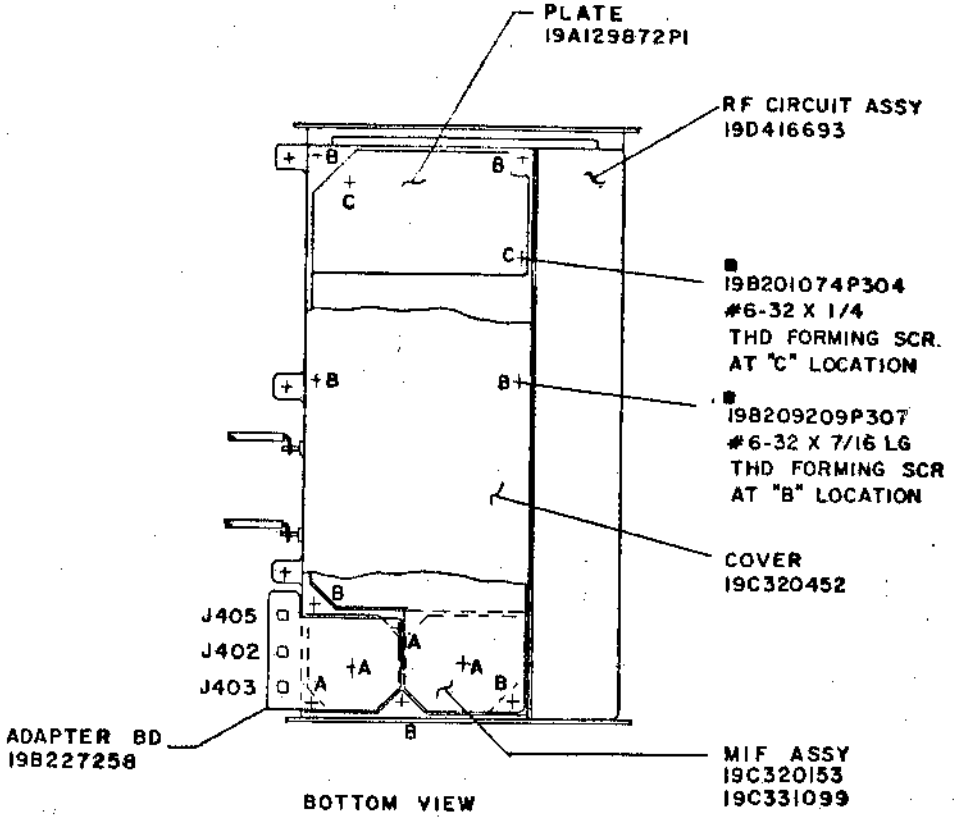
NOTES:

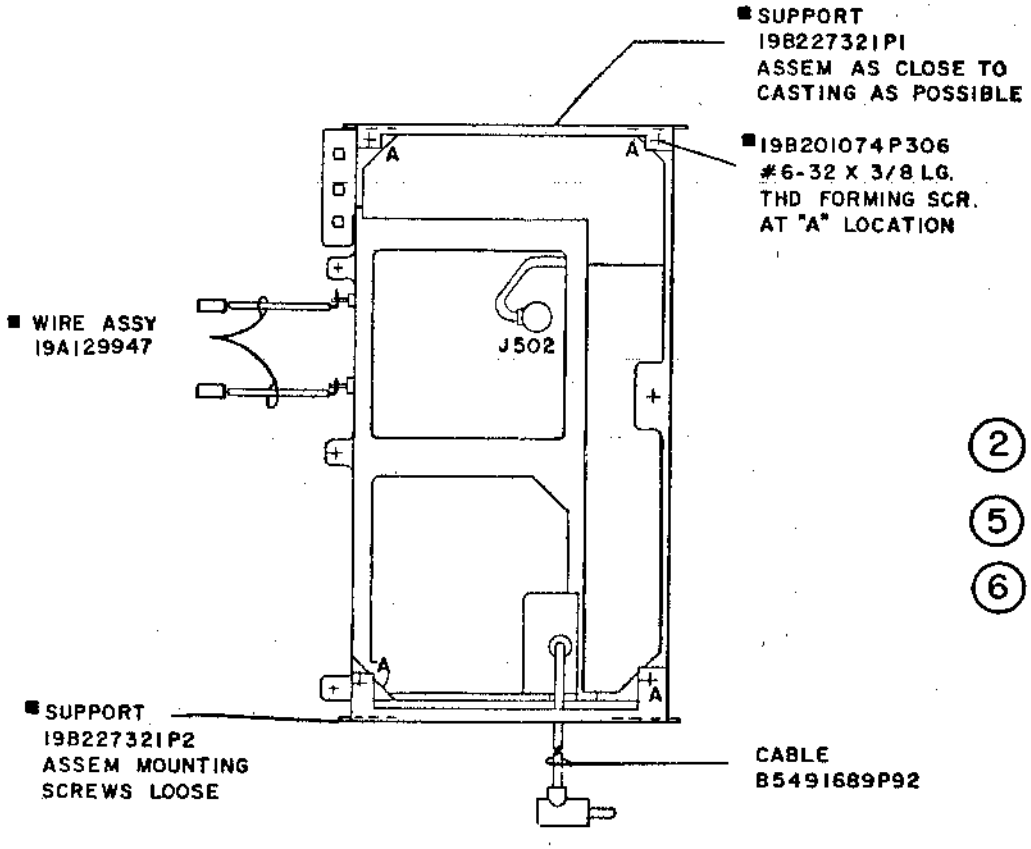
1. ■ PART OF HARDWARE LIST PL19A136613G2 CALLED FOR ON INDEX.
2. ▲ PART OF HARDWARE LIST PL19A136613G3 CALLED FOR ON INDEX.

(1) ASSEMBLY OF LOW OR MID BAND RECEIVER

(4) ASSEMBLY OF LOW BAND NOISE BLANKER

9)





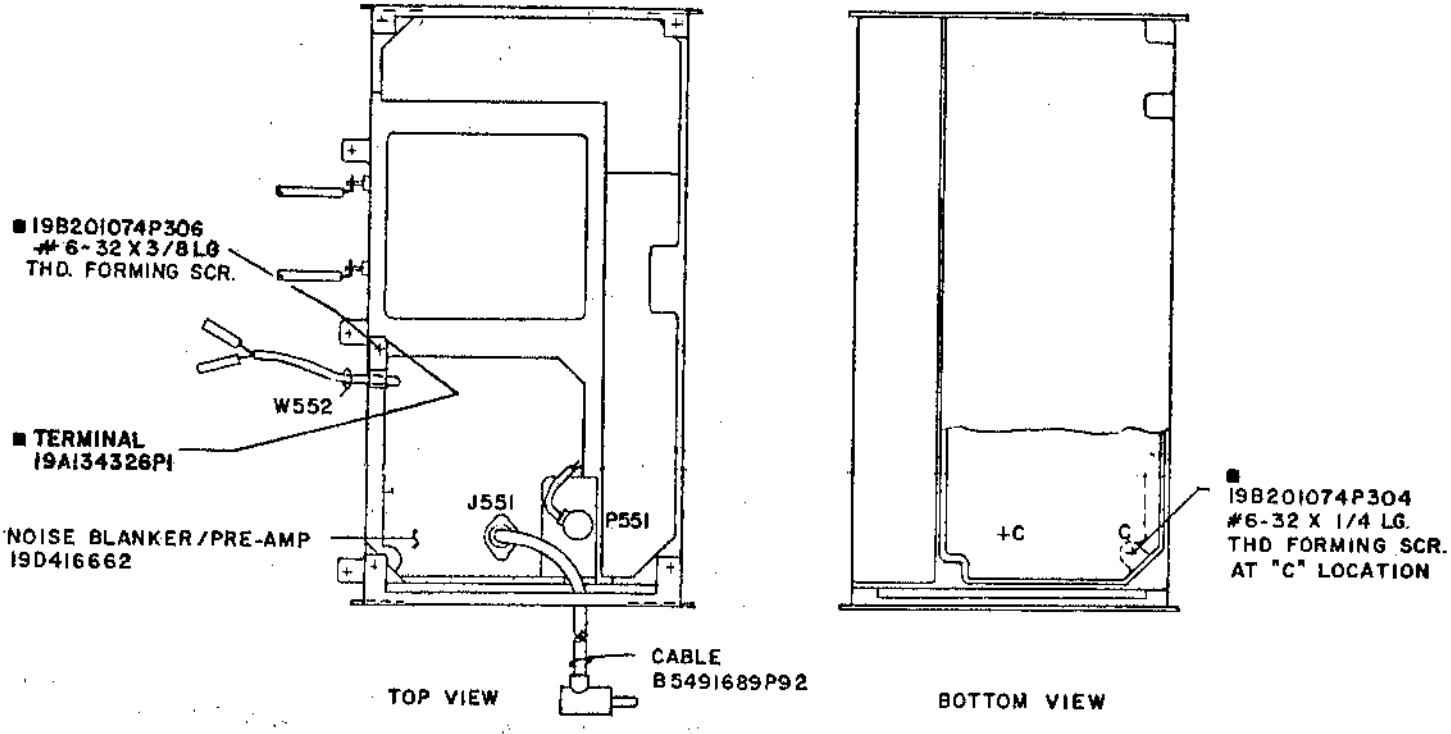
(2) ASSEMBLY OF HIGH BAND RE

(5) ASSEMBLY OF HIGH BAND NOISE BLANKER

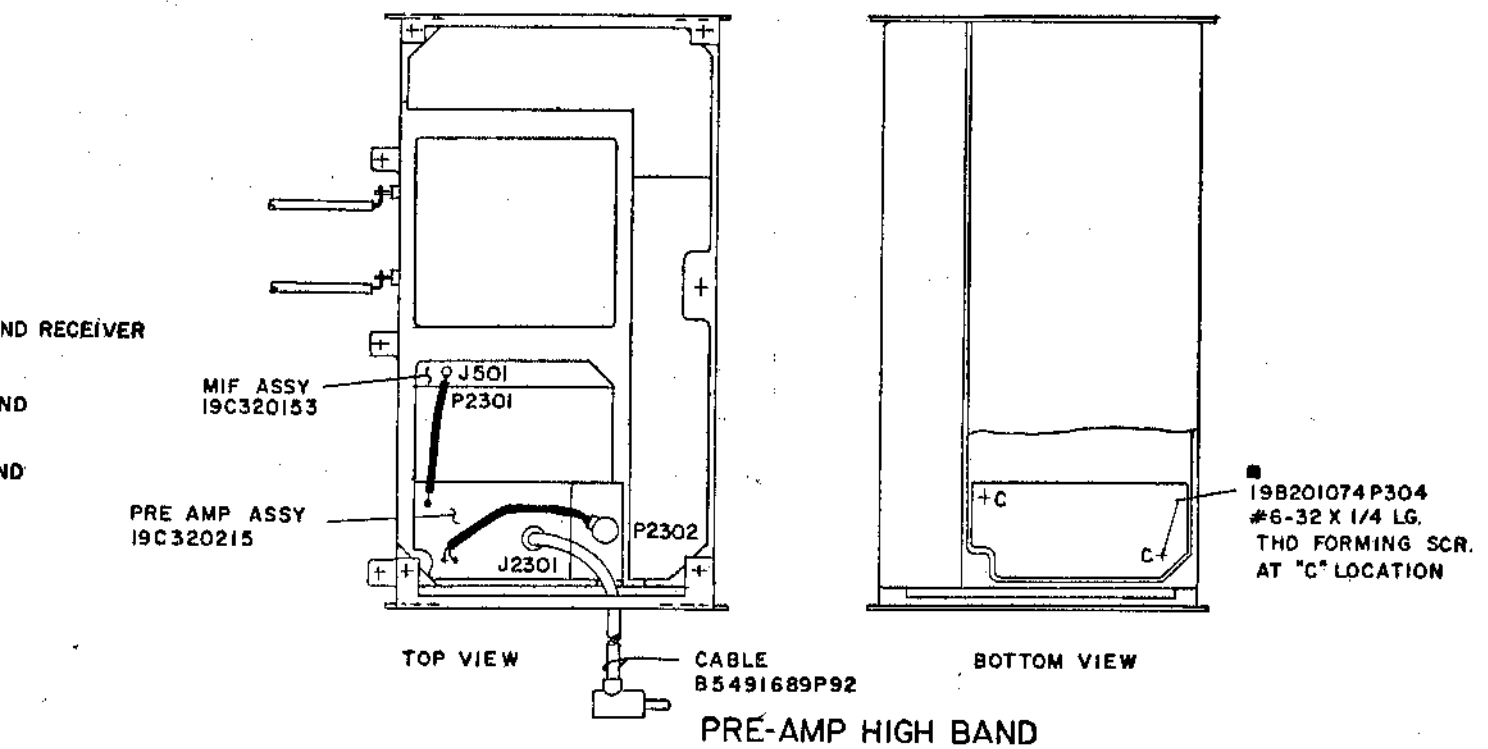
(6) ASSEMBLY OF HIGH BAND PRE-AMP

RECEIVER HIGH BAND

TOP VIEW



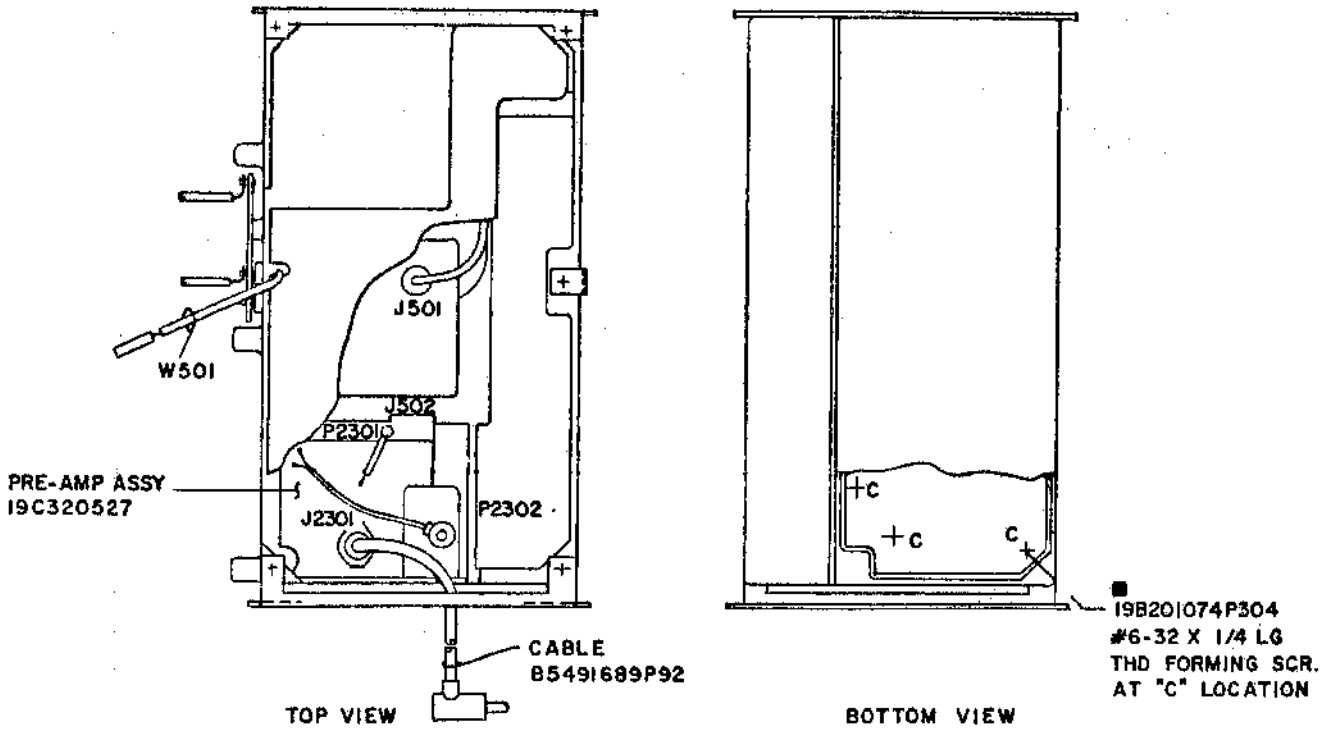
NOISE BLANKER-PRE AMP HIGH BAND



PRE-AMP HIGH BAND

MECHANICAL PARTS BREAKDOWN

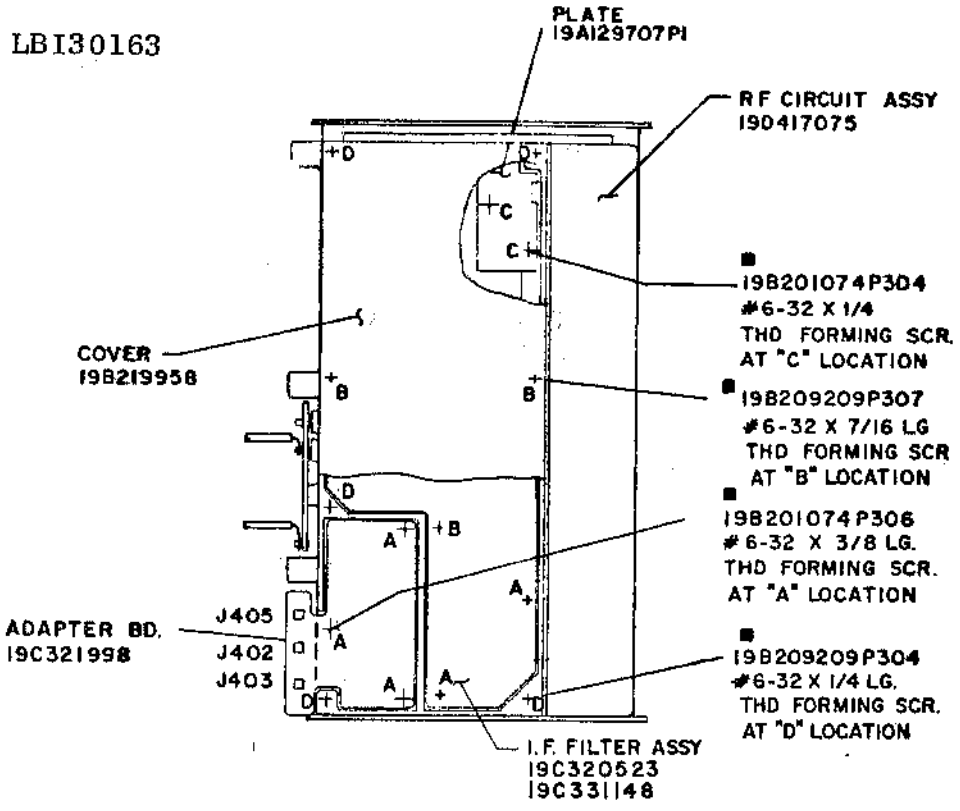
138—174 MHz RECEIVER



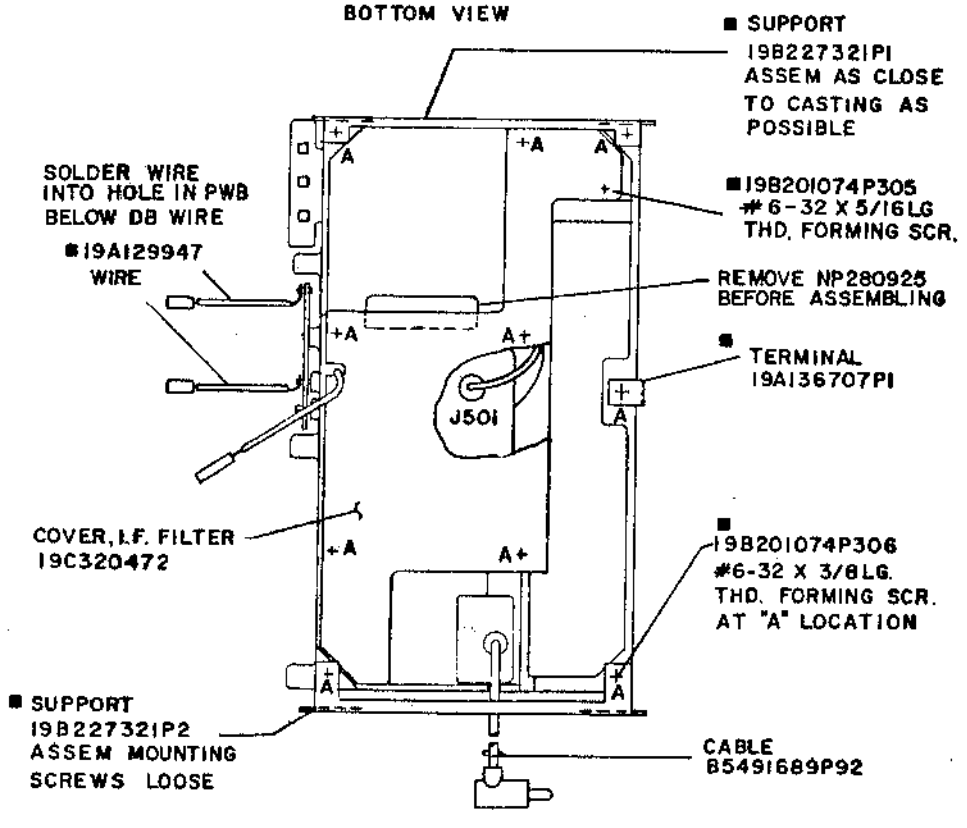
PRE AMP UHF

UHF RECEIVER

UHF PRE- AMP



BOTTOM VIEW



RECEIVER UHF I.F. FILTER

TOP VIEW

PRE-A
19C32

(3) ASSEMBLY OF UHF RECEIVER

(7) ASSEMBLY OF UHF PRE-AM

(19D423929, Sh. 3, Rev

LDI-501045
(DF9041)

INSTALLATION MANUAL FOR

CUSTOM MVP

MOBILE COMBINATIONS

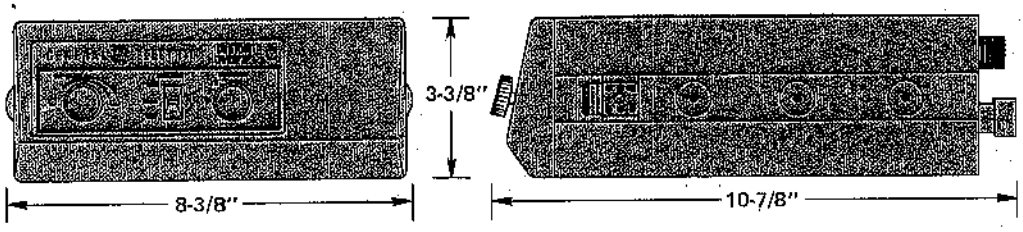


Figure 1 – Mounting Dimensions

INSTALLATION EQUIPMENT

The equipment required for installing the Two-Way Radio includes:

- An electric drill for drilling mounting holes
- Drills and circle cutters (see sizes in box below)
- A soldering iron for the antenna cable
- Phillips and flat-blade screwdrivers and a 5/16-inch hex head driver for mounting screws.

DRILL SIZES

No. 31 (1/8-inch) Drill for No. 8 Self-Tapping Screws
No. 27 (9/64-inch) for No. 10 Self-Tapping Screws
9/32-Inch Drill for 30–50 MHz Antenna and 1/4-Inch Bolt (optional)
3/4-Inch Punch or Holesaw for 132–512 MHz Antenna (optional)
1 3/8-Inch Circle Cutter, Holesaw and Socket Punch for 30–50 MHz Antenna (optional)
No. 9 (3/16-Inch) Drill for 25–50 MHz Antenna Ground Screw (optional)
1-1/8-Inch Circle Cutter, Holesaw and Socket Punch for rubber grommet.

GENERAL ELECTRIC

UNPACKING AND CHECKING EQUIPMENT

Carefully unpack the Two-Way Radio. It is recommended that you identify the items in the packing case and check them off in the appropriate column below before discarding the packing material. If any damage has occurred to the equipment during shipment, file a claim with the carrier immediately.

EQUIPMENT

Two-Way Radio ..... ☐

Speaker 19C320302G7 ..... ☐

Microphone 19C320270G1 ..... ☐

Microphone Bracket 7141414G2 ..... ☐

Power Cable with System Plug 19B227333G1 . ☐

Mounting Bracket 19C327087P1 ..... ☐

Mounting Hardware Kit 19A136606G1 ..... ☐

OPTIONAL EQUIPMENT

Ignition Switch Control Cable 19A136581G2 . . ☐

Channel Guard Hookswitch 19C327091G1 .... ☐

Adaptor Plates 19B227635P1 ..... ☐

Antenna Cable and RF Connector ..... ☐
(25–50 MHz antenna whip shipped in separate carton)

PLANNING THE INSTALLATION

The accompanying photograph of a typical Custom MVP installation should help you in planning your installation. Suggestions for locating and installing the units are given with the following installation instructions:

Before starting, plan your installation carefully—so that it will be:

- Convenient for the operator to use
- Neat
- Protected from damage from water
- Easy for the serviceman to service
- Out of the way of auto mechanics
- Out of the way of passengers

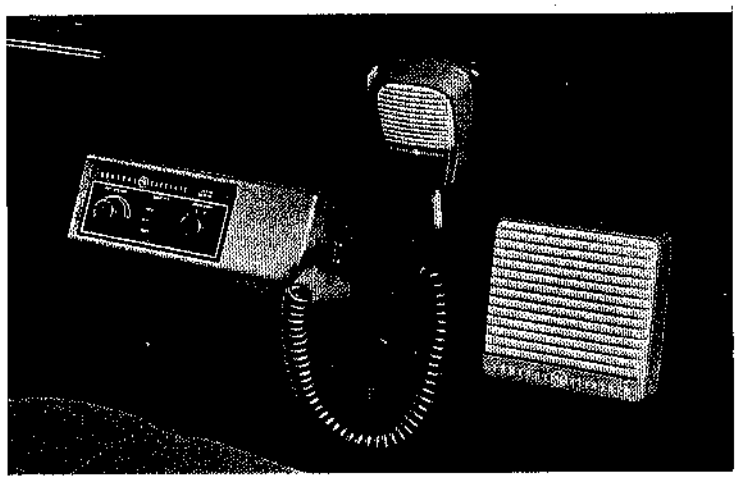


Figure 1 — Typical Installation

It is suggested that you take advantage of the experience of one of the many authorized General Electric Service Stations located throughout the United States by having them install your Two-Way Radio and make the final adjustments.

WARNING

Interference with Vehicular Electronics – *Electronic fuel injection systems, electronic anti-skid braking systems, electronic cruise control systems, etc., are typical of the types of electronic devices which may be prone to malfunction due to the lack of protection from radio frequency energy present when transmitting. If the vehicle contains such equipment, consult the dealer for the make of vehicle and enlist his aid in determining if such electronic circuits will perform normally when the radio is transmitting.*

POWER CABLE

The Power Cable consists of a fused yellow lead, a black lead, and a 10-pin systems plug (see Figure 2). To install the Power Cable, start with the plug end of the Cable at the location of the radio and run the two leads to the vehicle battery. Connect the yellow fused lead to the positive (+) battery terminal, and the black lead to the negative (–) battery terminal. Always locate the fuse as close to the battery as possible. Coil up the surplus cable and secure it out of the way. Be sure to leave some slack in the cables going to the radio so that it may be pulled out for servicing with the power applied.

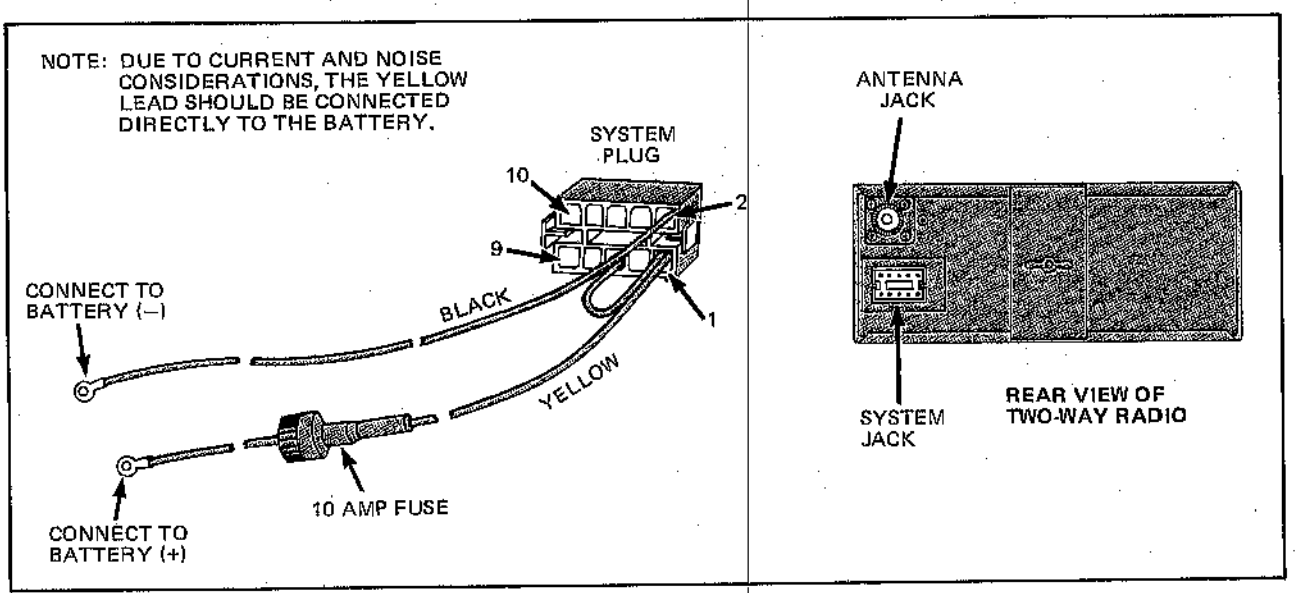


Figure 2 – Power Cable and Systems Plug

NOTE

The Custom MVP mobile combination operates in 12-volt negative ground systems *only!* Always check the battery polarity and voltage of the vehicle before installing the radio.

INSTALLING THE RADIO

Mount the Two-Way Radio so that the controls are within reach of the operator. Use the mounting bracket as a template to locate the holes, and mount the radio as shown in Figure 3. Be sure to leave enough room at the rear of radio for cable connections. Before attaching the radio in the mounting brackets, connect the antenna plug and systems plug.

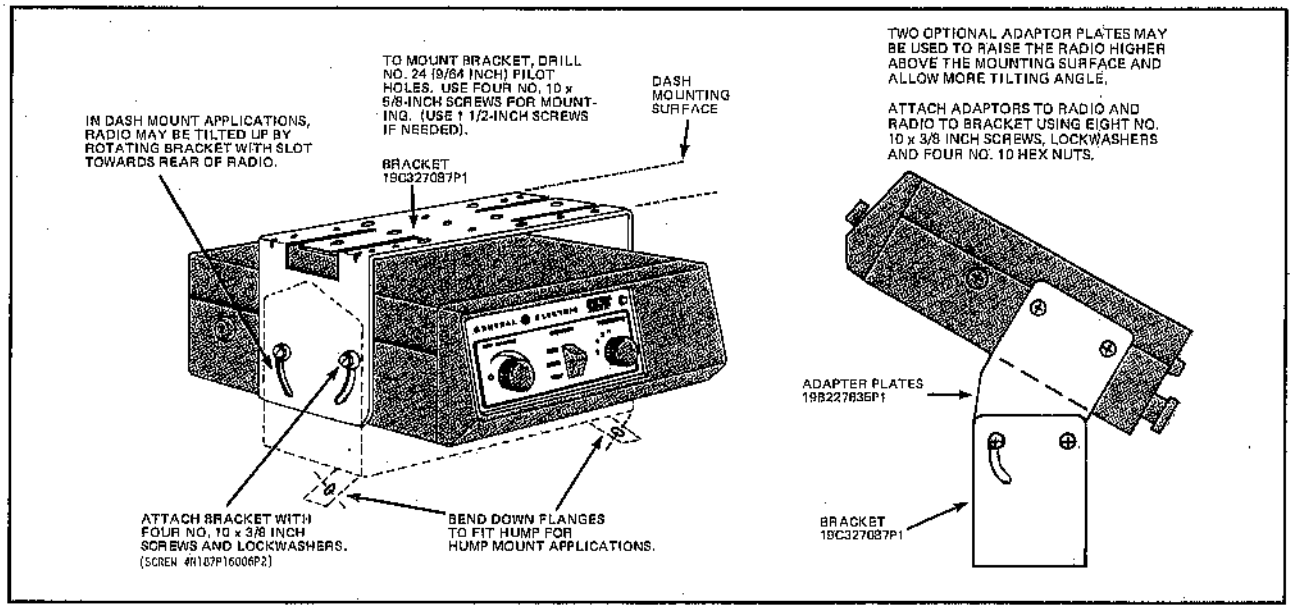


Figure 3 — Installing Mounting Bracket

CAUTION

Be careful to avoid damaging some vital part of the vehicle when drilling mounting holes. Always check to see how far the mounting screws will extend below the mounting surface before installing.

MICROPHONE

Mount the microphone where it will be within easy reach of the operator, but will not interfere with safe operation of the vehicle. After the microphone bracket is mounted, connect the microphone plug into the microphone jack on the side of the radio and tighten the retaining screw in the plug. If the bracket is not mounted on the Control Panel, refer to Figure 4 for mounting instructions. For mounting the bracket on the Control Panel, two bosses are provided on the inside of the Control Panel that can be drilled out (No. 31 drill) for mounting the standard bracket.

To gain access to the inside of the Control Panel, remove the wing nut on the rear of the radio and slide the radio out to expose the four retaining screws (two each side). Remove these screws and tilt the Control Panel forward. Use the two No. 7 x 5/16-inch screws to mount the microphone bracket to the control panel.

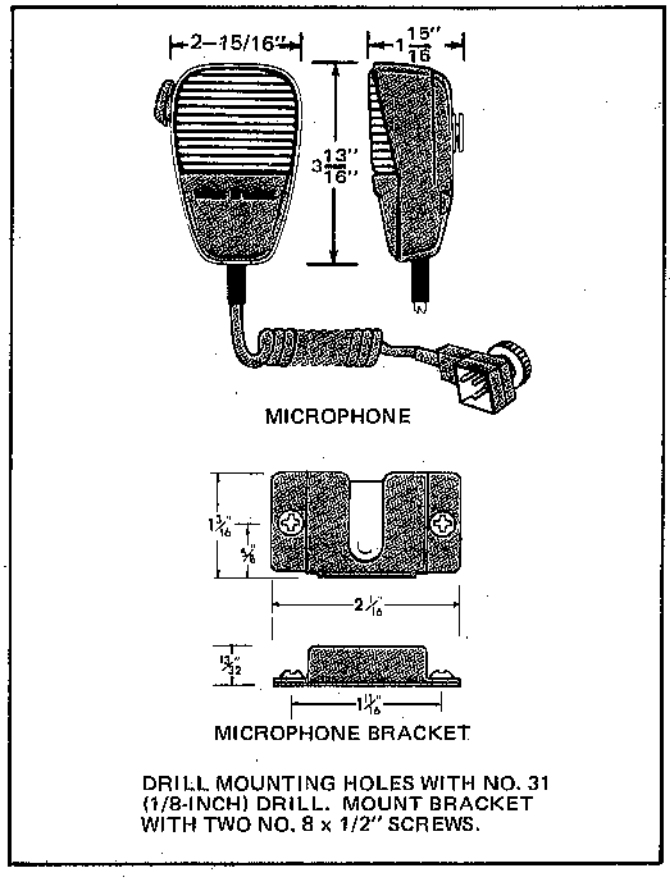


Figure 4 — Microphone Bracket Mounting

CHANNEL GUARD AUTOMATIC MONITORING HOOKSWITCH (OPTIONAL)

For Channel Guard with Automatic Monitoring applications, a hookswitch is used in place of the microphone bracket. Mount the hookswitch as shown in Figure 5. After mounting the hookswitch, insert the two pins in holes 6 and 8 on the Systems Plug.

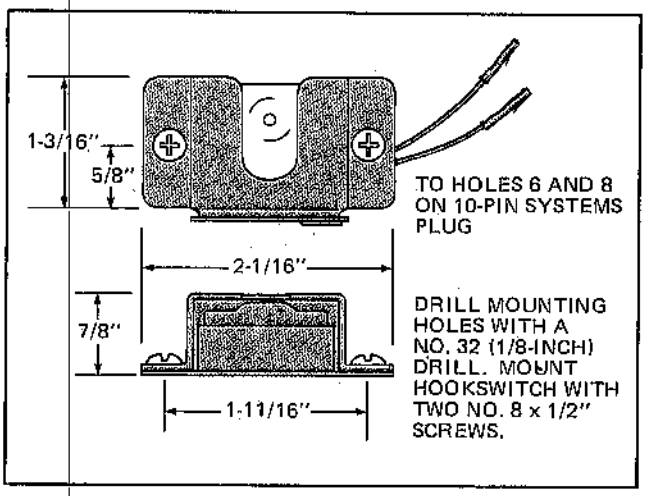


Figure 5 — Hookswitch Mounting

SPEAKER

The speaker should be mounted where it will direct sound to the operator, but not interfere with his vision or provide a hazard to passengers in case of an accident. The speaker may be mounted on the lower edge of the instrument panel, on the firewall, above the windshield in some trucks, or behind the built-in speaker grille in some vehicles. Use the mounting bracket as a template for locating the mounting holes, and mount the speaker as shown in Figure 6. Then connect the speaker leads to pin 3 (speaker hi) and pin 4 (speaker low) on the system plug.

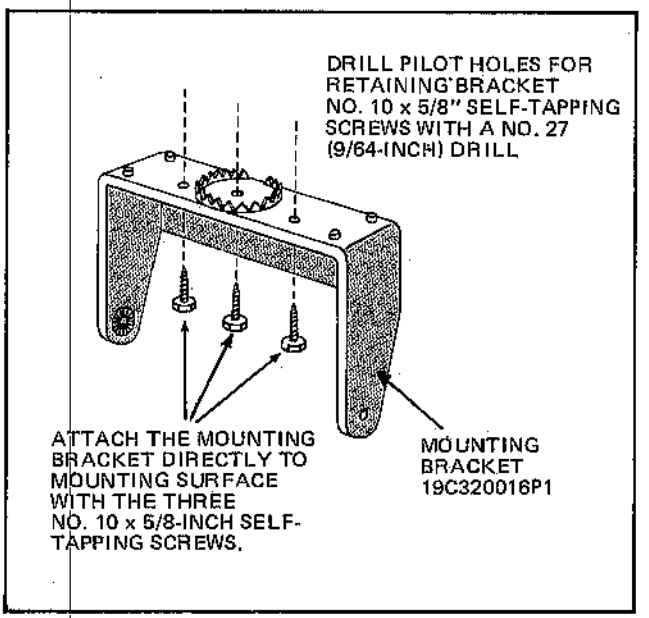


Figure 6 — Mounting the Speaker

IGNITION SWITCH CONTROL CABLE (OPTIONAL)

With ignition switch control, the transmitter and receiver operate only with the ignition switch in the Accessory or On position. To install the cable, cut the red jumper between systems plug P1-1 and P1-5 (See Figure 7). Strip the clipped red jumper lead and insert into the splice connector on the optional fused red lead and crimp the splice connector. Connect the red fused lead to the ignition switch terminal. Use the crimp-on terminal for vehicle fuse block connection, or the ring terminal lug for ignition switch connection.

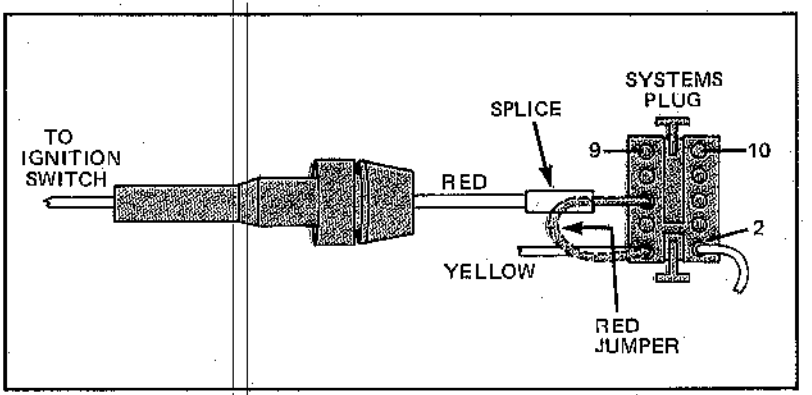


Figure 7 — Ignition Switch Control Cable Connections

HANDSET HOOKSWITCH (OPTIONAL)

For applications using a handset hookswitch, make the following connections to Systems Plug (P1). NOTE: The speaker is normally connected to P1-3 and P1-4.

First, cut the speaker cable approximately 3 inches from P1. Separate the bonded wires from the speaker and P1 about 2 inches and strip ends of the wires 1/3 of an inch. Splice the wire from P1-3 to the brown wire from the handset hookswitch (See Figure 8), and splice (1) wire from the speaker to the green wire from the handset hookswitch. Next, splice the wire from P1-4 and the other wire from the speaker to the white wire from the handset hookswitch. Then connect the orange wire from the handset hookswitch to P1-8.

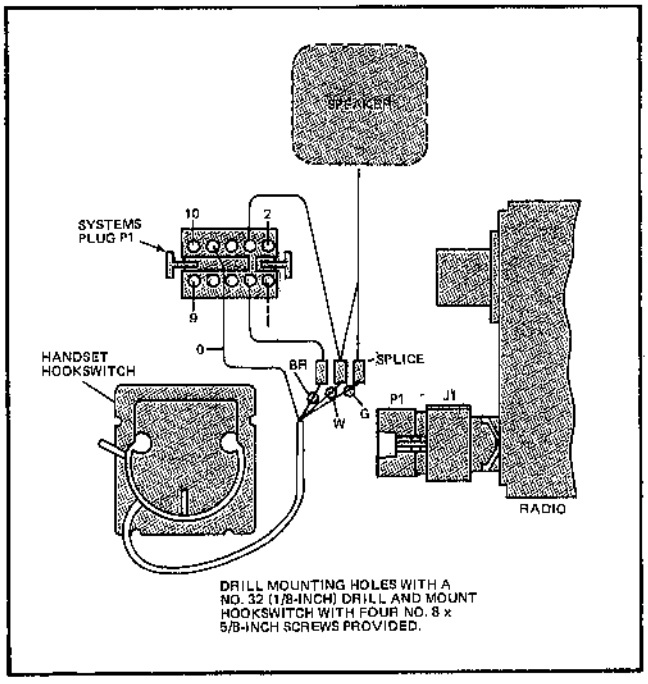


Figure 8 — Handset Hookswitch

TAMPER PROOF SCREWS

Two tamperproof Holt Head screws are included in the mounting hardware kit. One screw secures the microphone plug and the other screw secures the radio in the mounting bracket. Holt Head bits for installing the screws are available by ordering Option 1909. Install the screws as shown in Figure 9.

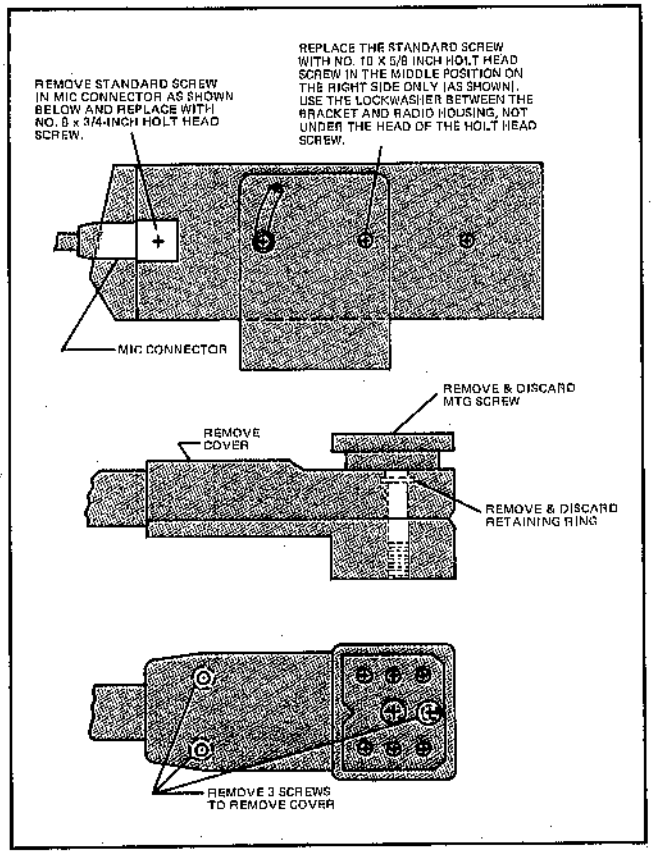


Figure 9 — Installing Tamperproof Screws

AC POWER SUPPLY (OPTIONAL)

The rubber feet supplied with the AC power supply should be applied to the bottom of the supply and radio cases. These feet protect the surface on which the units are located, and prevent heat and transformer hum from being conducted from power supply to radio when the units are stacked.

To install the feet, remove the backing strip and apply the adhesive side of the feet to the bottom corners of the radio and power supply. The feet should be approximately one-half inch from the edge.

After positioning the radio and power supply, install the terminal, washer and ground wire as shown in Figure 10. This grounding will help protect operators and equipment from injury or damage during lightning storms. Then connect the power supply jack and AC line cord as shown.

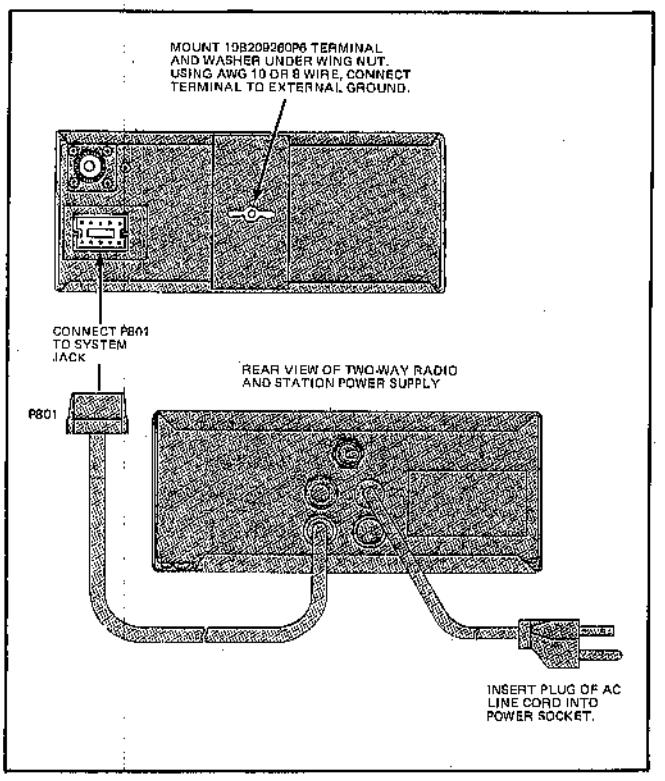


Figure 10 – Installing Power Supply

ANTENNA (OPTIONAL)

Installation instructions for the antenna are packaged with the antenna. The antenna must be installed in accordance with good engineering practice for optimum results.

For the 138–512 MHz antenna, the most effective mounting position is usually in the center of the roof of the vehicle. The antenna cable will normally run from the front of the Two-Way Radio, behind sections of the interior trim to a door or window post, and then up between the roof and headliner in the passenger compartment to the antenna base.

For the 25–50 MHz antenna, the most effective mounting position is usually on the driver's side of the vehicle near the top of the left rear fender or body of the vehicle.

Try to route the cable away from locations where it will be exposed to heat, sharp edges or mechanical damage, and where it will be out of the way of the driver, passengers or vehicle mechanics. Wherever possible, existing holes in the trunk wall, and the channels above or beneath doors and window columns should be utilized.

PLACING THE TWO-WAY RADIO IN OPERATION

After completing the installation of the Two-Way Radio, the following final operations should be performed:

Have an electronics technician who holds a 1st or 2nd Class FCC Radiotelephone license make the final adjustments.
These include:

Transmitter:	Measure Forward and Reflected Power and adjust antenna length for optimum ratio. Set transmitter to rated power output (or to the specific output or input that may be required by the FCC station authorization). Measure the frequency and modulation and enter these measurements on the FCC-required Station Records.
Vehicle:	Check to see if any electrical noise suppression is needed.

Instructions for making these adjustments are included in the Maintenance Manual for the Two-Way Radio.

Fill out and mail the "ON ARRIVAL" Information Card.

Give the Operating Manual for the Two-Way Radio to the person who is going to operate it, or place the Manual in the vehicle where he will find it.

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

GENERAL ELECTRIC*
U.S.A.