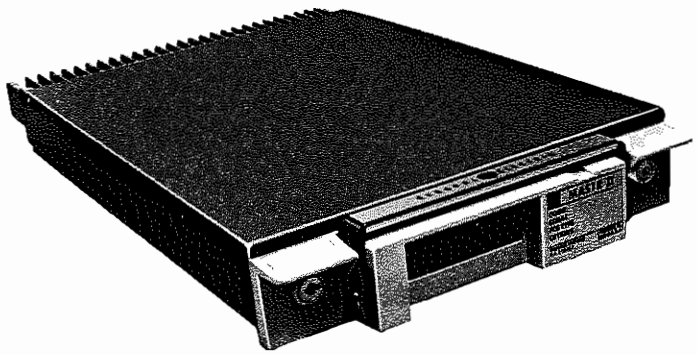
INSTALLATION MANUAL FOR MASTR® II MOBILE COMBINATIONS

LBI4444F (DF9031)

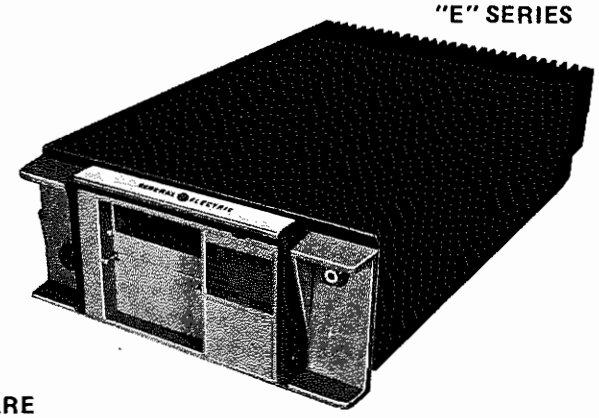
MASTR II Mobile Combinations feature ruggedly constructed Two-Way Mobile Radios with unusually flexible mounting possibilities. The Two-Way Radio locks into a steel mounting frame to provide an exceptionally stable mobile installation. Safety Release mounting brackets for the Control Unit and Speaker are provided for the safety of the occupants.

TWO-WAY RADIO

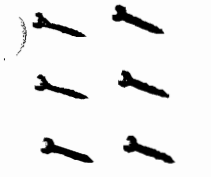
"M" SERIES



"E" SERIES



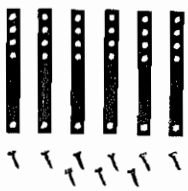
MOUNTING HARDWARE



1/4" x 1"

1/4" x 5/8"

FRAME MOUNTING SCREWS



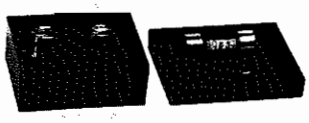
CABLE STRAPS & 6 x 1/2" MOUNTING SCREWS

RETAINING STRAP

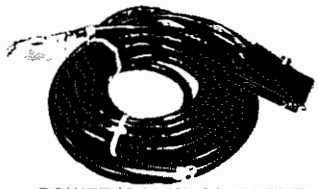
GROMMET

SPACERS & 1/4" WASHERS

ACCESSORIES



FUSE ASSEMBLY

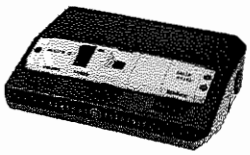


POWER/CONTROL CABLE

EXTRACTION TOOL

KEY

IGNITION SWITCH ASSEMBLY

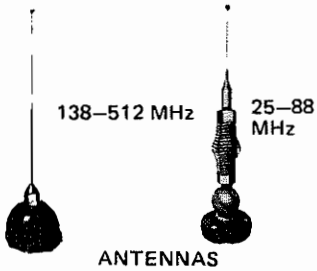


CONTROL UNIT

SPEAKER

MICROPHONE

HANDSET & HOOKSWITCH



ANTENNAS

GENERAL ELECTRIC

UNPACKING AND CHECKING EQUIPMENT

The Two-Way Radio is packed to permit performance tests without being removed from the packing case. Refer to the Maintenance Manual for instructions. When ready for installation, carefully unpack the 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 ☐
- Control Unit ☐
- Speaker 19C320302G1 ☐
- Microphone 19C320270G1 ☐
- Antenna, Cable and RF Connector ☐
  (25–50 MHz
  antenna whip shipped
  in separate carton)
- Fuse Assembly (12-Volt) ☐
  High Power (30 Amp Fuse)
  (66 to 110 Watts)
  19B216021G3

  Medium Power (20 Amp Fuse)
  (35 to 65 Watts)
  19B216021G6

  Low Power (15 Amp Fuse)
  (to 35 Watts)
  19B216021G1
- Mounting Frame 19D416309P1 ☐
- Mounting Hardware 19A129474G1 ☐
- Power/Control Cables ☐
  20-Foot, 18 Conductor 19D423424G2
  20-Foot, 30 Conductor 19D423424G8
  20-Foot, 38 Conductor 19D423424G14

EQUIPMENT

- Ignition Switch Cable Assembly ☐
  ±12 Volts 19B219537G4
  DC Converter 19B219537G3
- Extractor Tool Kit 19B227456G1 ☐
- Microphone Hanger ☐
  Standard Bracket 7141414G2
  Channel Guard Hookswitch 19C320318G1
- Duplex Handset 19C320478G1 ☐
  With Hookswitch 19B219846G3
- Key: 5491682P8 (BF-10A) ☐
- Alignment Tools (2) ☐
  19B219676G1
  19B219678P1

OPTIONAL EQUIPMENT

Power/Control Cables

9-Foot, 18 Conductor	19D423424G1
9-Foot, 30 Conductor	19D423424G7
9-Foot, 38 Conductor	19D423424G13
27-Foot, 18 Conductor	19D423424G3
27-Foot, 30 Conductor	19D423424G9
27-Foot, 38 Conductor	19D423424G15

Handset 19C320478G1 with Hookswitch 19B219846G1

±12-Volt, 3-Wire Ignition Switch Cable Assembly 19B219537G1

PLANNING THE INSTALLATION

The accompanying photographs of typical MASTR II installations 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:

- Safe for the operator and passengers in the vehicle
- 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

It is suggested that you take advantage of the experiences 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.*

TYPICAL INSTALLATION

MASTR II Combinations are designed so that the Two-Way Radio can be mounted up to 20 feet from the operator (9 or 27 feet with option cables), such as in the trunk compartment or under the seat of a vehicle. The Control Unit mounts on the instrument panel (or the transmission hump) of the vehicle, along with the microphone and speaker. A typical installation is shown in Figures 1 and 2.

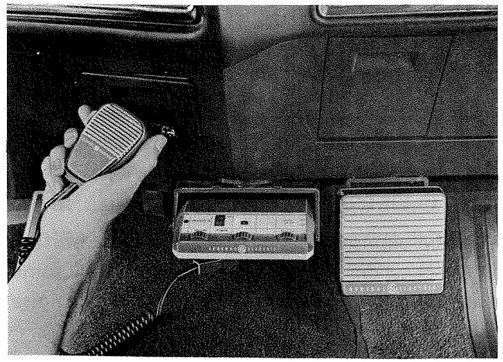


Figure 1 – Control Unit Mounting

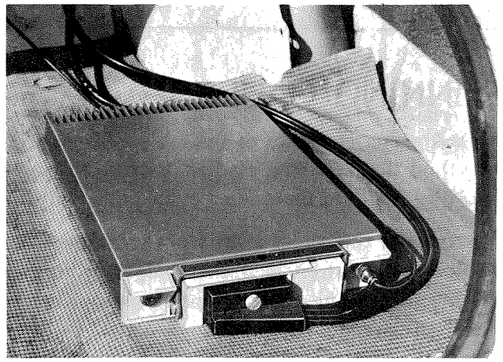


Figure 2 – Two-Way Radio Mounting

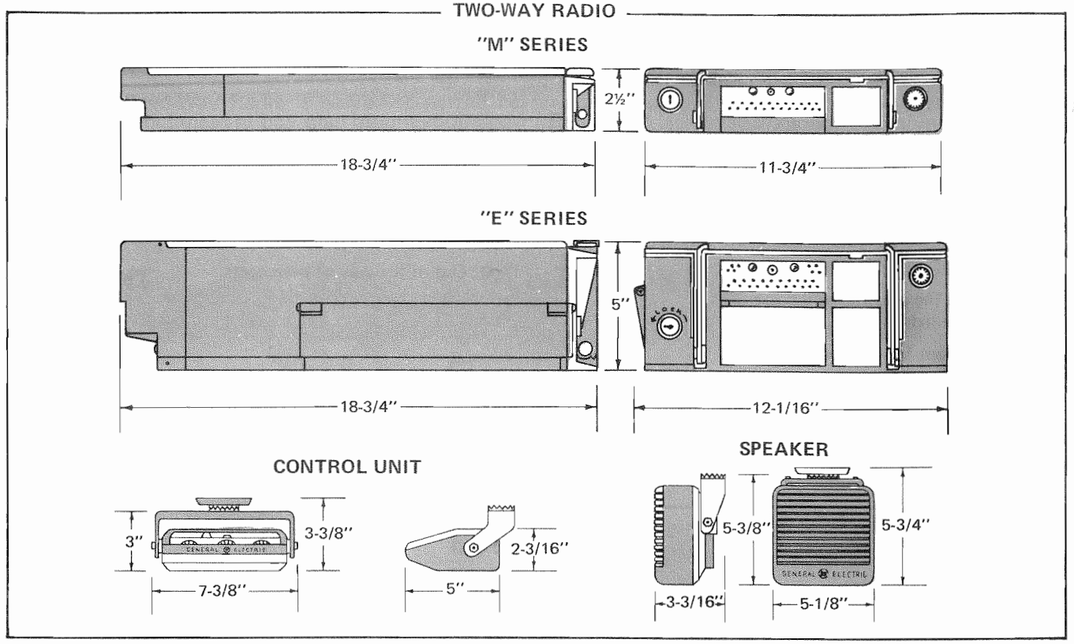


Figure 3. Mounting Dimensions

EQUIPMENT REQUIRED

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

Electric drill for drilling mounting holes.

Drills and circle cutters (see sizes in box at right)

Soldering iron for 138 to 512 MHz antenna

Phillips and flat-blade screwdrivers, 1/4-inch and 5/16-inch hex-head drivers for mounting screws.

DRILL SIZES

- No. 36 (7/64-inch) Drill for No. 6 Self-Tapping Screws
- No. 31 (1/8-inch) Drill for No. 8 Self-Tapping Screws
- No. 27 (9/64-inch) Drill for No. 10 Self-Tapping Screws
- No. 9 (3/16-inch) Drill for 1/4-inch or No. 14 Self-Tapping Screws
- 9/32-inch Drill for Low-Band Antenna and 1/4-inch Bolt
- 3/4-inch Drill for High-Band Antenna
- 1-3/8-inch Circle Cutter, Holesaw or Socket Punch for Low-Band Antenna
- 1-1/8-inch Circle Cutter, Holesaw or Socket Punch for Rubber Grommet

RUNNING CABLES

To assure the feasibility of the cable routings you plan to use, it is suggested that you run the cables before mounting the Two-Way Radio. Be sure to leave some slack in each cable going to the Control Unit and Two-Way Radio so that they may be pulled out for servicing with the power applied.

Try to route the cables away from locations where they will be exposed to heat (exhaust pipes, mufflers, tailpipes, etc.), battery acid, sharp edges, or mechanical damage or where they will be a nuisance to automobile mechanics, the driver, or passengers. Keep wiring away from ignition circuits to help prevent noise pickup in the radio equipment.

In addition, try to utilize existing holes in the firewall and trunk wall and the channels above or beneath the doors. You may also use the channels through door and window columns, where they are convenient for running cables, unless you plan to install rigid or flexible conduit in which to run the cables.

If an existing hole is not conveniently located for the passage of the Power Cable through the firewall, drill a 1-1/8-inch hole and insert the rubber grommet provided. Leave at least 18 inches of slack in the plug end of the cables at the location for the Two-Way Radio. Refer to the Cable Routing Diagram (Figure 4) for additional information.

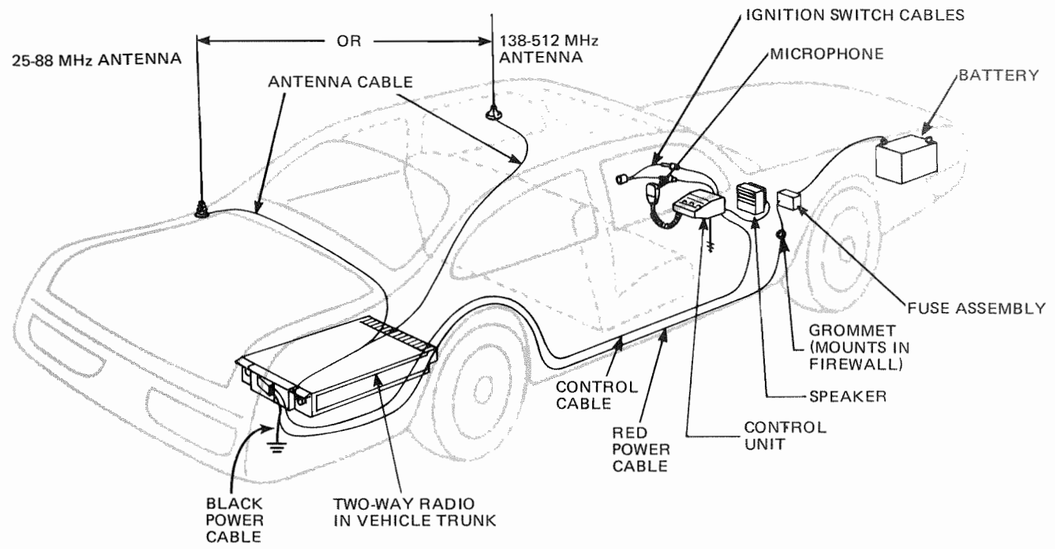


Figure 4. Cable Routing

POWER AND CONTROL CABLES

NOTE

A terminal (19A115799P15) is secured to the power cable for use with batteries that have side terminals. To use the terminal, trim off 1/2 inch of the ridge on the plastic corrosion shield on the battery to allow the terminal to lie flat. Remove the screw in the battery terminal and slide the power cable terminal on the screw. Then replace the screw. Do Not strap the power cable within one foot of the battery terminal.

NEGATIVE GROUND SYSTEMS

1. The Power/Control Cable plug assembly is supplied connected for negative ground systems. Starting with the plug end of the Power/Control Cable, run the black control cable to the control unit location and the red power cable to the vicinity of the battery. Drill a No. 9 (3/16-inch) pilot hole and connect the short black power cable to a good vehicle ground with the 1/4 x 5/8-inch hex-head self-tapping screw and the two external tooth lock washers. The external tooth lock washers are placed on each side of the black power cable ring terminal. Refer to the Cabling Routing Diagram (Figure 4).

POSITIVE GROUND SYSTEMS

2. For positive ground systems, the red and the black power cable terminals must be reversed at the Power/Control Cable plug assembly. Refer to the connector housing and Terminal Identification Diagram (Figure 5) and proceed as follows:

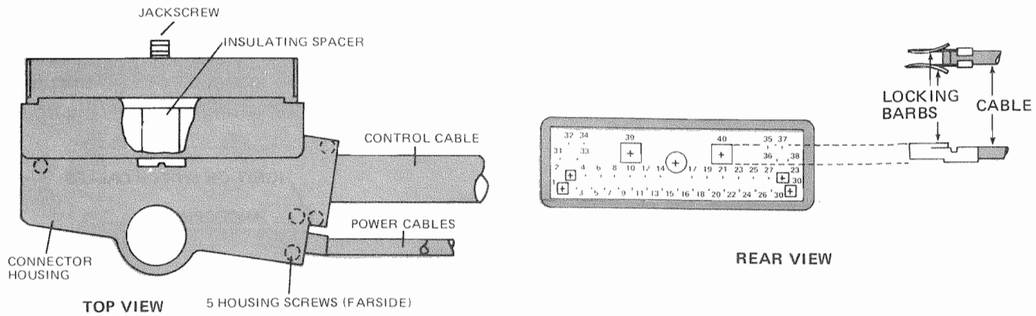


Figure 5. Connector Housing & Terminal Identification

A. Remove the jackscrew and five housing screws from the connector housing.

B. Open the connector housing and remove the insulating spacer.

C. Insert the terminal extractor tool (19B233320G2) in the front of terminal cavity 39 and remove from the rear the red power cable terminal. Remove the black power cable terminal in terminal cavity 40 in the same manner.

D. Insert the red power cable terminal in the rear of terminal cavity 40 and the black power cable terminal in terminal cavity 39. Make sure the terminals are fully seated and locked into the terminal cavity.

E. Partially insert the jackscrew; position the insulating spacer over the jackscrew, and complete the insertion of the jackscrew.

F. Dress the cables into the proper exit locations; close the housing, and replace the five housing screws.

After the terminals are reversed for positive ground systems, run the cables in the same manner as for negative ground systems.

3. Tape the plug(s) and retaining hook and run the Control Cable to the vicinity of the Control Unit. If it is necessary to disassemble the 19-pin plug(s) to run the cable, use the extractor tool as shown in Figure 6. Mark the plugs for identification, and write down the wire colors and hole numbers as the wires are removed from the plug(s).

4. Use the 3-inch cable straps and No. 6 self-tapping screws provided in the Basic Mounting Hardware to secure the cables neatly in place (See Figure 7).

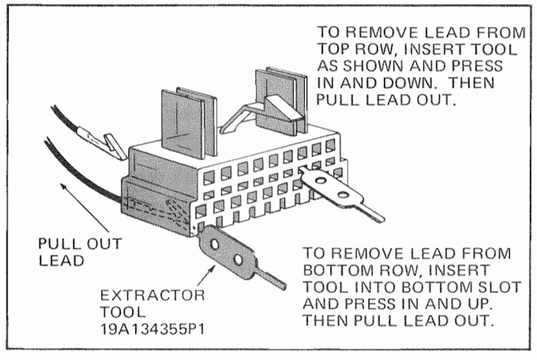


Figure 6. Using Extraction Tool

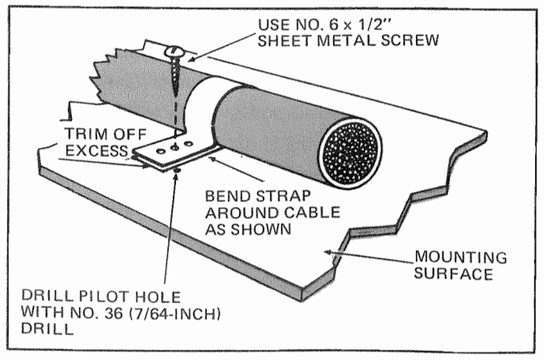


Figure 7. Installing Cable Straps

FUSE ASSEMBLY

The fuse assembly is mounted near the battery. (See Figure 8). Cut the red power cable and connect to the fuse assembly with the ring terminals and lockwashers provided. Assemble one lockwasher between each terminal and head of each screw. Refer to the Power Cable Connection to Fuse Assembly Diagram (See Figure 9).

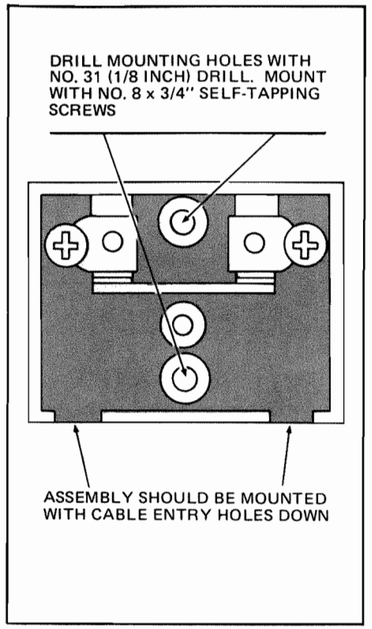


Figure 8. Installation of 12-Volt Fuse Assembly

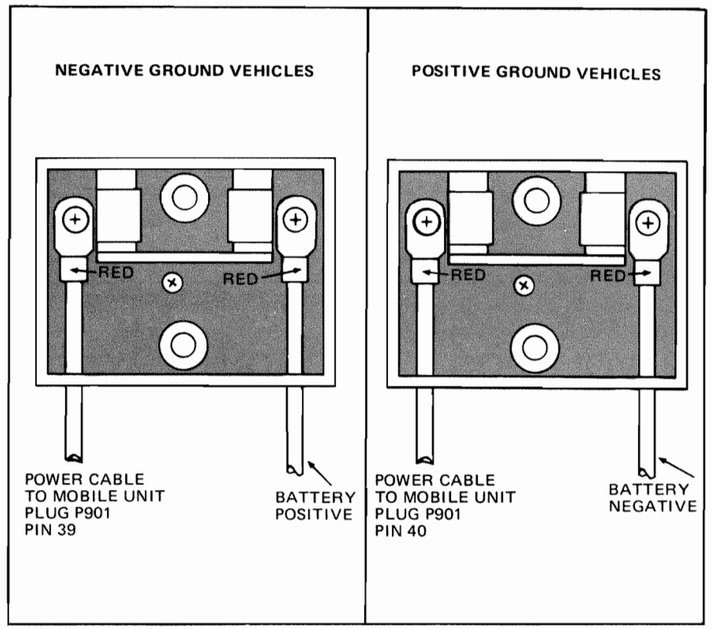


Figure 9. Power Cable Connections to Fuse Assembly

IGNITION SWITCH CABLE ASSEMBLY

In 12-volt vehicle systems, the Ignition Switch Assembly consists of a Yellow "Y" fused lead, a black "Y" lead, and a 19-pin Vehicle Systems Plug. For 12-volt ignition switch connections, refer to Figure 13. In 12-volt vehicles using the optional 3-wire ignition switch cable assembly, refer to pages 14 and 15.

For radios using the DC Converter, the Ignition Switch Assembly consists of a Red fused lead, a jumper and a 19-pin Vehicle Systems Plug. The Red fused lead *always* connects to battery positive in either positive or negative ground systems.

In-line connectors are provided for shortening the fused leads, if desired. If the in-line connectors are used, install the connectors between the fuse and the Vehicle Systems Plug.

NOTE

The speaker connections and other option connections (hookswitches, etc.) are also made to the Systems Plug. Do not connect the Systems Plug to the Control Unit until all connections have been made.

12-VOLT NEGATIVE GROUND SYSTEMS

The Ignition Switch Assembly is shipped from the factory connected for negative ground systems as shown in Figure 10.

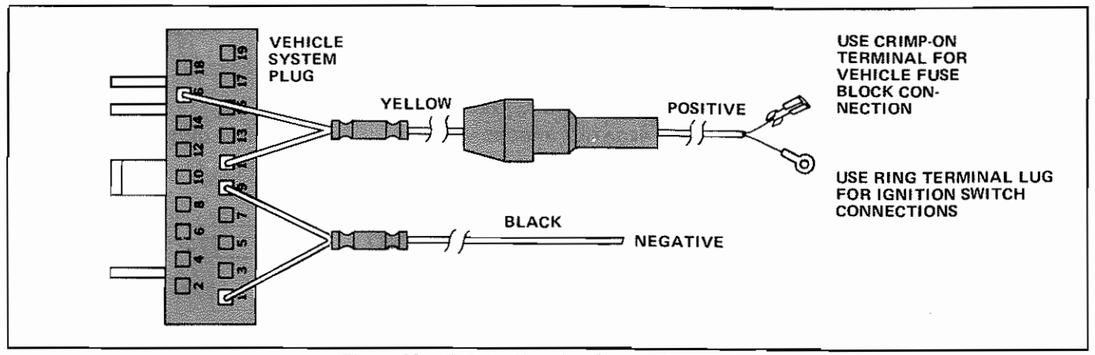


Figure 10. 12-Volt, Negative Ground Connections

12-VOLT POSITIVE GROUND SYSTEMS

For 12-volt, positive ground systems, the connections to the Vehicle Systems Plug must be changed as shown in Figure 11. Use the extractor tool for changing the connections.

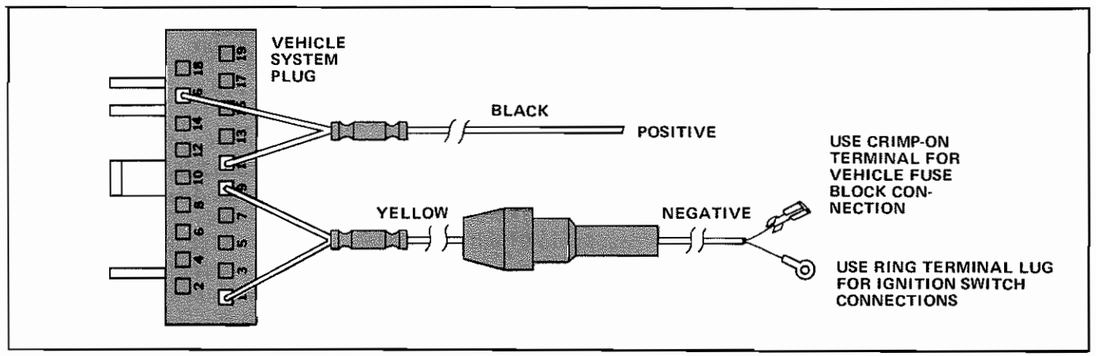


Figure 11. 12-Volt, Positive Ground Connections

DC CONVERTER SYSTEMS (+OR-GROUND)

For radios equipped with the DC converter, connections to the Vehicle Systems Plug are shown in Figure 12.

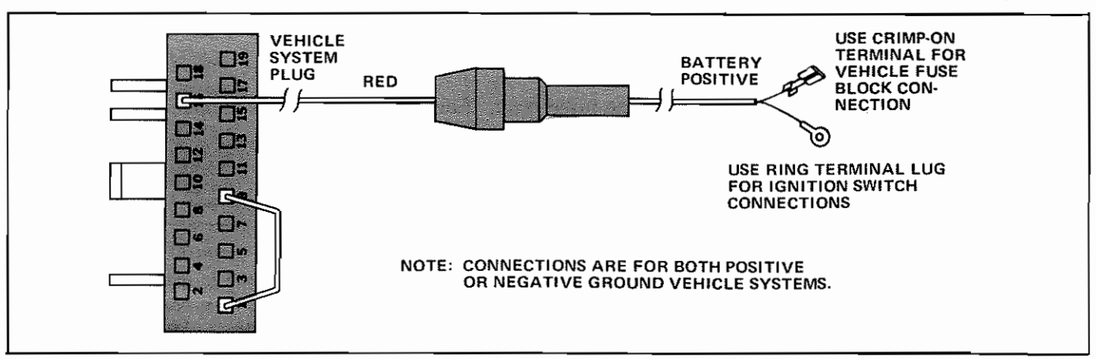
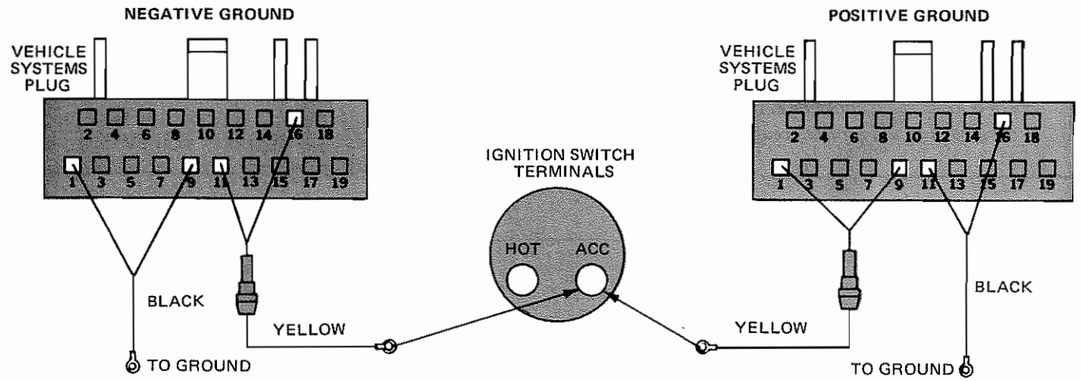


Figure 12. ±Ground DC Converter Connections

Power to the radio can be controlled by one of two methods shown here. Select the type of control desired, and connect the Ignition Switch cables as directed.

1	**IGNITION SWITCH CONTROL**	Transmitter and receiver will operate only with ignition switch in ACCESSORY or ON position. Turning ignition switch OFF removes all power to the radio.



2	**IGNITION SWITCH BYPASS**	Transmitter and receiver operate independently of ignition switch. Unit can be turned ON and OFF only by Control Unit switch.

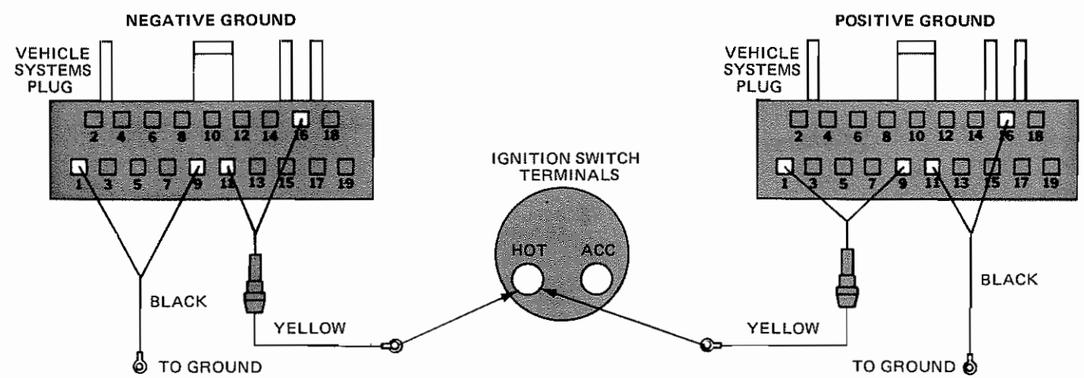


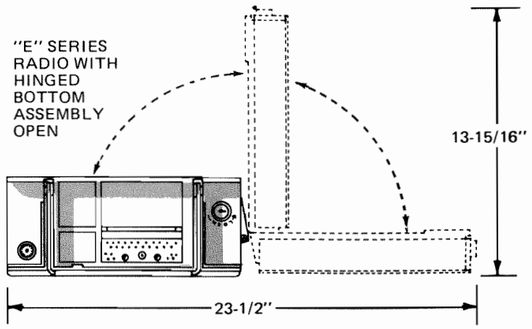
Figure 13. Connections for 12-Volt Ignition Switch Cables

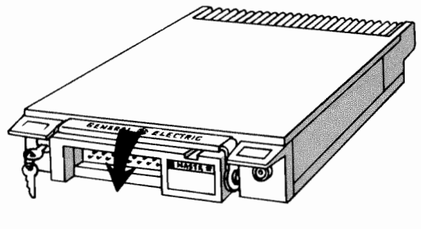
TWO-WAY RADIO

The Two-Way Radio may be mounted horizontally, vertically or on its side. Select a mounting location with sufficient room for the radio to be pulled out of the mounting frame for servicing. Mount the Two-Way Radio as shown in Figure 14.

WARNING

For passenger safety, mount the radio securely so that the unit will not break loose in the event of a collision. This is especially important in station wagons, vans and similar type installations where a loose radio could be extremely dangerous to the vehicle occupants.



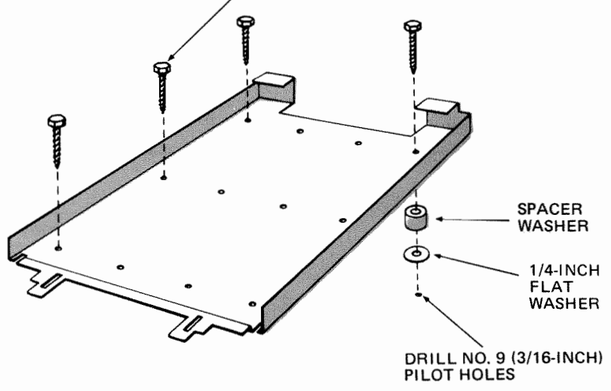


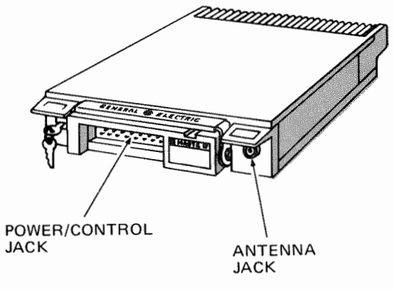
① TO REMOVE RADIO FROM MOUNTING FRAME, UNLOCK RADIO AND PULL HANDLE DOWN AS SHOWN. THEN PULL RADIO FORWARD OUT OF FRAME.

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.

② MOUNT FRAME WITH NO. 14 x 5/8-INCH HEX-HEAD SELF-TAPPING SCREWS. (USE 1-INCH SCREWS IF NEEDED).
USE 1/4-INCH FLAT WASHERS (AND SPACER WASHERS IF REQUIRED) TO LEVEL RADIO. WHEN NECESSARY, USE SPACER WASHERS TO PREVENT MOUNTING SCREWS FROM PENETRATING GAS TANK, GAS LINES, ETC.





③ REPLACE RADIO IN MOUNTING BRACKET. PUSH UP HANDLE TO SECURE IN FRAME AND LOCK RADIO.

④ CONNECT THE POWER/CONTROL CABLE AND ANTENNA CABLE TO THE JACKS

Figure 14. Installing the Two-Way Radio

CONTROL UNIT

The Control Unit should be mounted within convenient reach of the operator, and where it will not interfere with the safe operation of the vehicle of provide a hazard to the vehicle passengers in case of an accident. *Use the Safety Release mounting brackets for passenger safety whenever the mounting location requires, or where the swivel action is desired.*

Use the mounting bracket as a template for locating the mounting holes, and mount the Control Unit as shown in Figure 15. After mounting the unit, connect the control cable plug(s). Do not attach the Vehicle Systems Plug until the speaker connections and other optional connections (hookswitches, etc.) have been made.

After making all connections to the Vehicle Systems Plug, connect the Control Cable and the Vehicle Systems Plug to the control unit as shown in Figure 16. Attach the retaining strap as shown to provide strain relief for connections to the Vehicle Systems Plug.

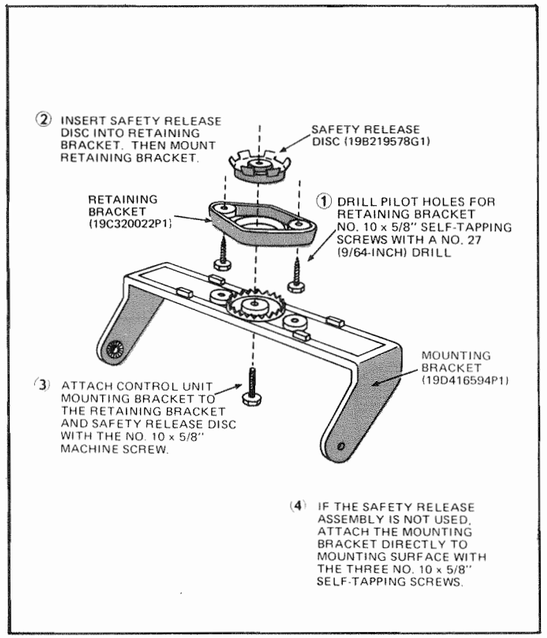


Figure 15. Mounting the Control Unit

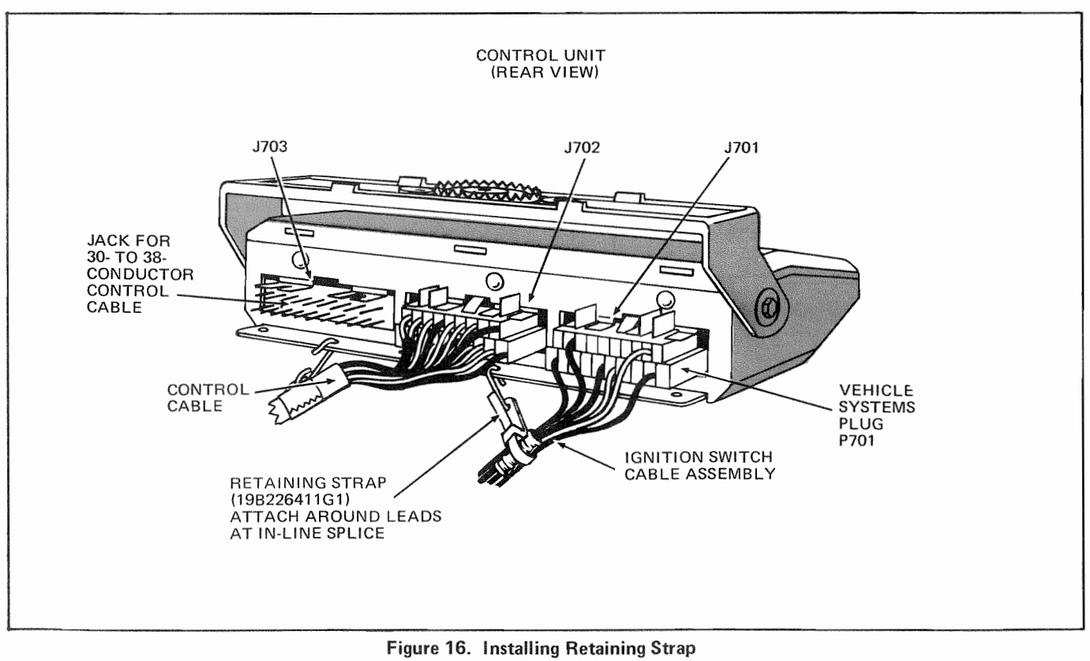


Figure 16. Installing Retaining Strap

MICROPHONE

Mount the microphone where it will be within easy reach of the operator, but will not interfere with safe operation of the vehicle. Two mounting holes are provided in the bottom of the Control Unit for mounting the standard microphone bracket if desired. After the microphone bracket is mounted, connect the microphone plug into the microphone jack on the bottom of the Control Unit, and tighten the retaining screw in the plug.

If the bracket is not mounted on the Control Unit, refer to Figure 17 for mounting instructions.

Two bosses are provided on the inside of the top cover of the Control Unit that can be drilled out (No. 31 drill) for mounting the standard bracket on the top. To remove the Control Unit cover, remove the two screws on the bottom of the front edge. Use the two No. 7 x 5/16-inch screws for mounting the microphone bracket on the Control Unit.

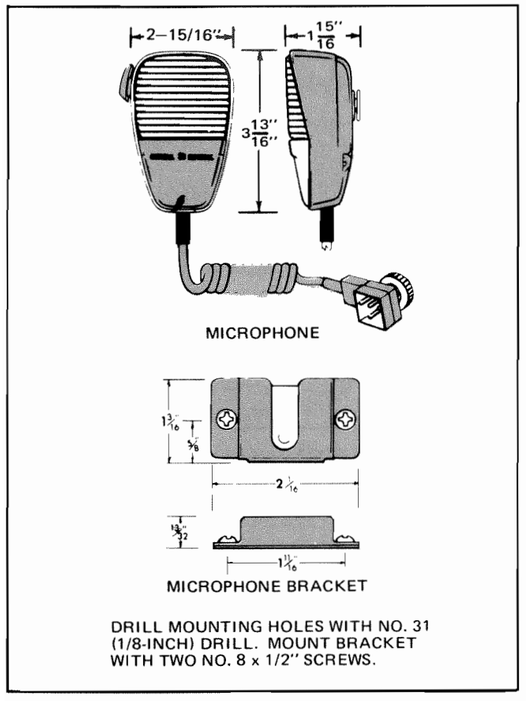


Figure 17. Microphone Bracket Mounting

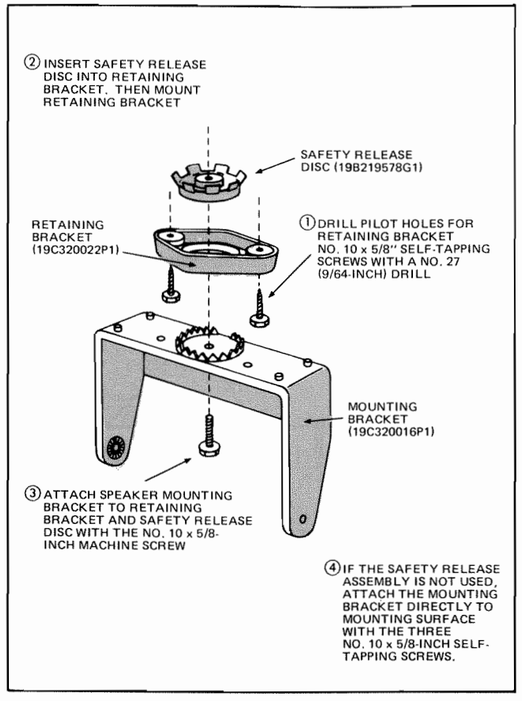


Figure 18. Mounting the Speaker

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. *Use the Safety Release mounting brackets for passenger safety whenever the mounting location requires, or where the swivel action is desired.*

The speaker may be mounted on the lower edge of the instrument plane, 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 18. If the speaker has been disconnected, connect the two pins to holes 4 and 17 on the Vehicle Systems Plug.

CHANNEL GUARD HOOKSWITCH

For Channel Guard with Automatic Monitoring applications, a hookswitch is used in place of the microphone bracket. Mount the hookswitch as shown in Figure 19. After mounting the hookswitch, connect the two pins to holes 10 and 14 on the Vehicle Systems Plug if the hookswitch has been disconnected.

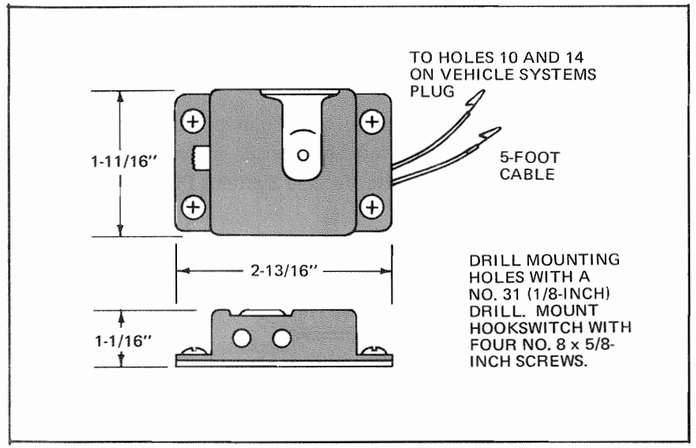


Figure 19. Hookswitch Mounting

NOTE

The Channel Guard Microphone hookswitch cannot be mounted in the holes provided on the Control Unit.

HANDSET AND HANDSET HOOKSWITCH (OPTIONAL)

Mount the handset hookswitch as shown in Figure 20. After mounting the handset hookswitch, connect the handset plug to the microphone jack on the bottom of the Control Unit. If the hookswitch has been disconnected, connect the hookswitch cable to the Vehicle Systems Plug as shown in Figure 20.

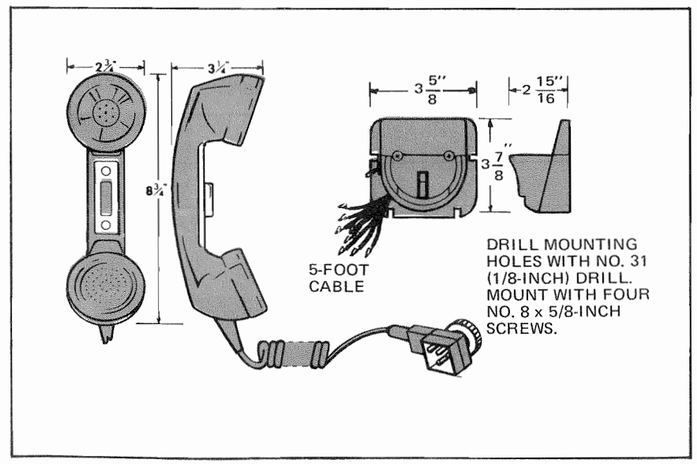


Figure 20. Handset Hookswitch Mounting

WIRE COLOR	CONNECT TO SYSTEMS PLUG
Blue	J701 - 13
Green	J701 - 2
Orange	J701 - 15
Black	J701 - 14
Brown	J701 - 18
Red	J701 - 10

Figure 21. Connections for Handset Hookswitch

3-WIRE IGNITION SWITCH CABLE ASSEMBLY (OPTIONAL)

The optional ±12-Volt, 3-Wire Ignition Switch Assembly consists of a Red and a Yellow fused lead, a "Y" black ground lead, and a 19-pin Vehicle Systems Plug. For ignition switch connections, refer to Figure 24.

12-VOLT NEGATIVE GROUND SYSTEMS

The Ignition Switch Assembly is shipped from the factory connected for negative ground systems as shown in Figure 22. In-line connectors are provided for shortening the fused leads, if desired. If the in-line connectors are used, install the connectors between the fuse and the Vehicle Systems Plug.

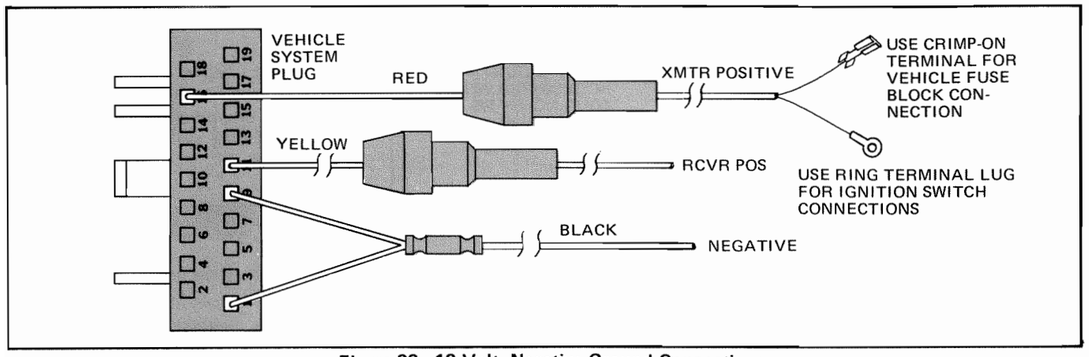


Figure 22. 12-Volt, Negative Ground Connections

12-VOLT POSITIVE GROUND SYSTEMS

For 12-volt, positive ground systems, the connections to the vehicle Systems Plug must be changed as shown in Figure 23. Use the extractor tool for changing the connections. In-line connectors are provided for shortening the fused leads, if desired. If the in-line connectors are used, install the connectors between the fuse and the Vehicle Systems Plug.

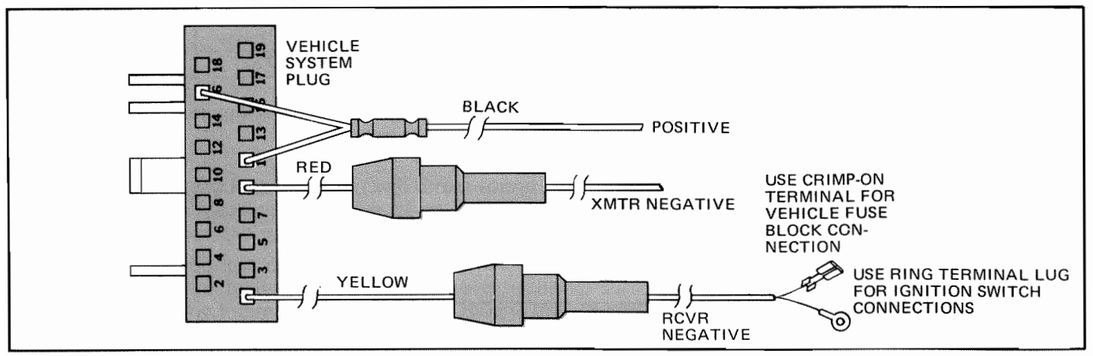
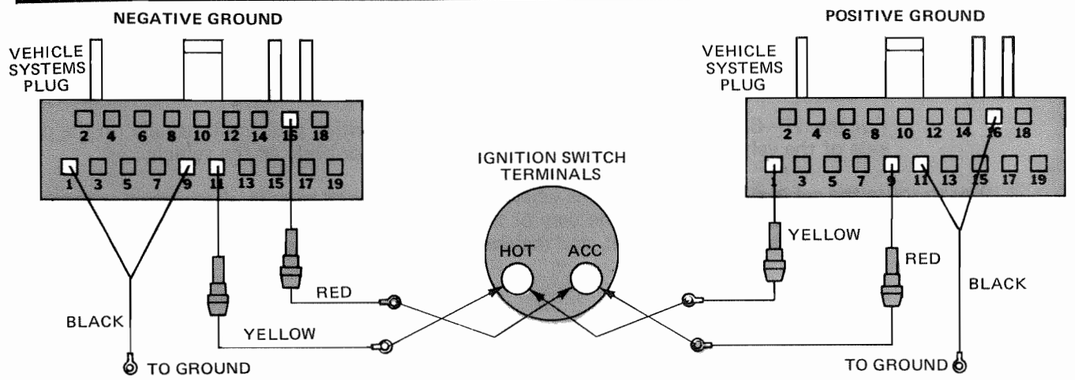


Figure 23. 12-Volt, Positive Ground Connections

Power to the radio can be controlled by one of the three methods described below. Select the type of control desired, and connect the Ignition Switch cables as directed.

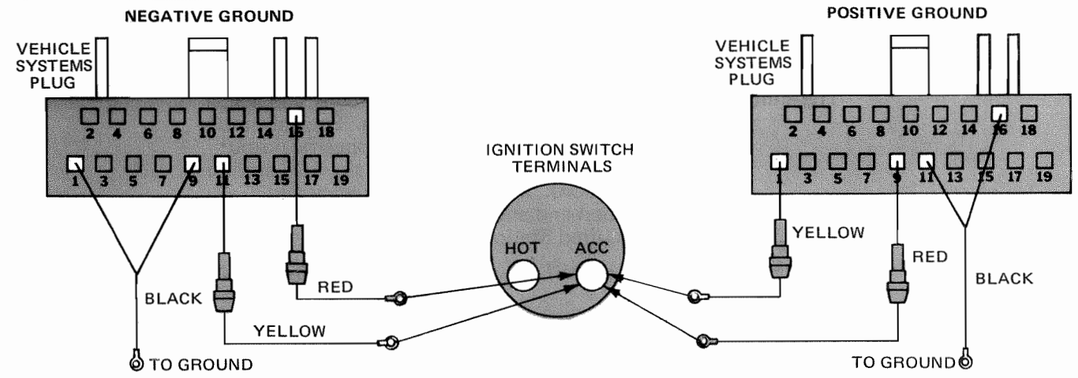
1 **IGNITION SWITCH STANDBY**

Receiver will operate independently of ignition switch. Transmitter will operate only with ignition switch in ACCESSORY or ON position.



2 **IGNITION SWITCH CONTROL**

Transmitter and receiver will operate only with ignition switch in ACCESSORY or ON position. Turning ignition switch OFF removes all power to the radio.



3 **IGNITION SWITCH BYPASS**

Transmitter and receiver operate independently of ignition switch. Unit can be turned ON and OFF only by Control Unit switch.

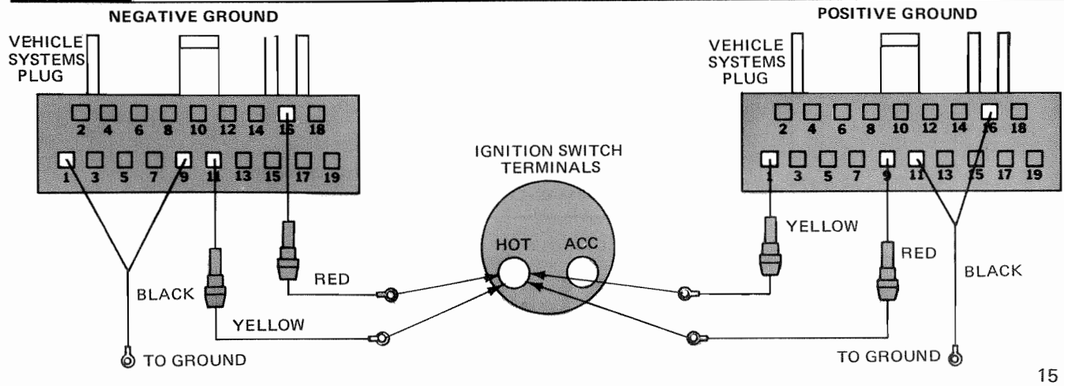


Figure 24. Connections for 12-Volt Ignition Switch Cables

ANTENNA

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 25–88 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. Give the alignment tools (packed with the unit) to the technician.

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

Give the Operator's 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.

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