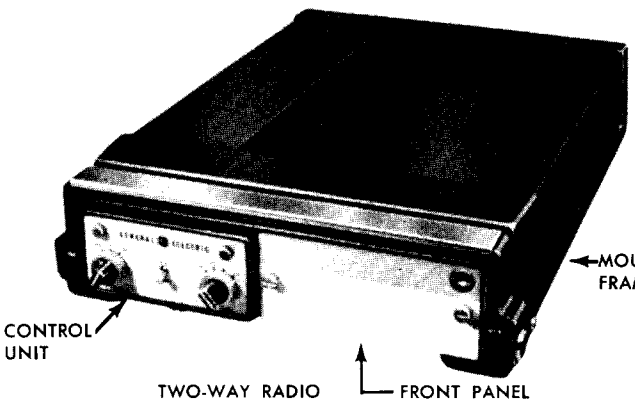
INSTALLATION OF MASTR PROGRESS LINE

Professional Series

MOBILE COMBINATIONS

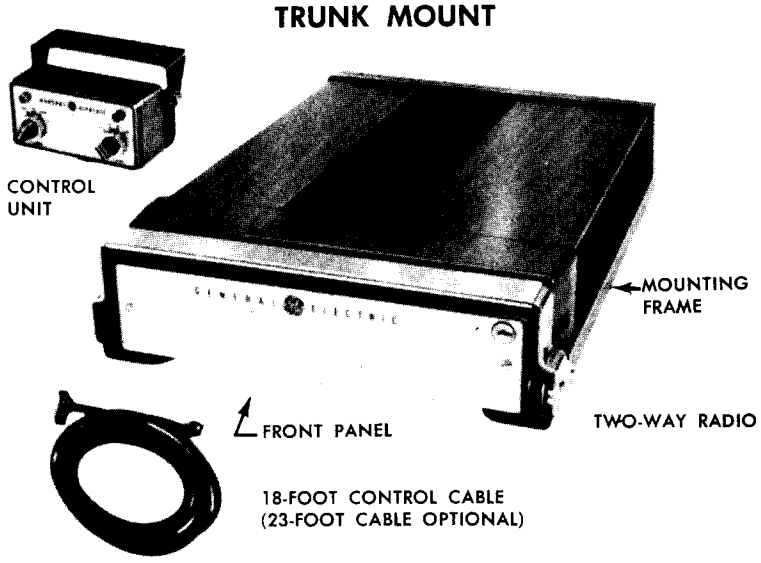
The MASTR Progress Line Professional Series features ruggedly constructed Two-Way Mobile Radios with unusually flexible mounting possibilities. The Two-Way Radio locks into a steel mounting frame to provide an exceptionally stable mobile installation. The accessories furnished with the Radio determine whether the unit can be installed as a Front Mount or Trunk Mount combination.

FRONT MOUNT



FRONT-MOUNTING HARDWARE

TRUNK MOUNT

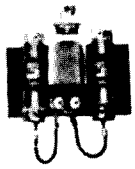


TRUNK-MOUNTING HARDWARE

ACCESSORIES

FUSE ASSEMBLIES

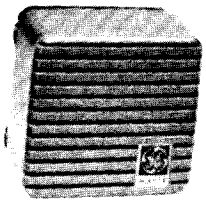
12-Volt



6-Volt

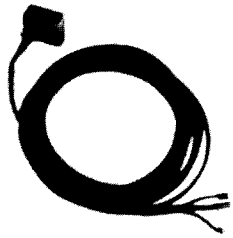
28-Volt

SPEAKER



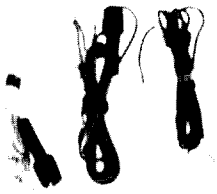
KEY

CABLES



Power Cable

6-FOOT (FRONT MOUNT)
18-FOOT (TRUNK MOUNT)
23-FOOT (OPTIONAL)

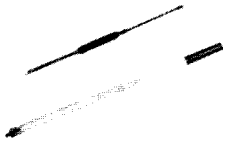


Ignition Switch Cables

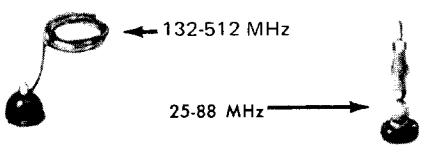
Vehicle Systems Plug

3-Foot Battery Cables

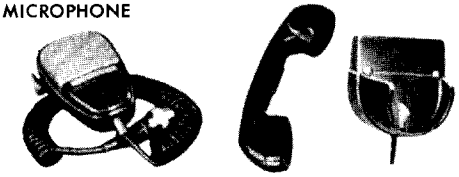
ALIGNMENT TOOLS



ANTENNAS



MICROPHONE



HANDSET AND HOOKSWITCH

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	TRUNK MOUNT	FRONT MOUNT
Two-Way Radio	☐	☐
Control Unit Model 4EC59A10-133	☐	☐
Speaker Model 4EZ20A10	☐	☐
Microphone 19B209102P1	☐	☐
Antenna, Cable and RF Connector (28-88 MHz antenna whip shipped in separate carton)	☐	☐
Fuse Assembly (6/28-Volt) 6-Volt Relay & Fuse Assembly 7487952-G20 28-Volt Relay & Fuse Assembly 7487952-G19	☐	☐
Fuse Assembly (12-Volt) Medium Power 19B216021-G2 High Power 19B216021-G3	☐	☐
Mounting Frame 19C303430-G1	☐	☐
Trunk Mounting Hardware 19A121626-G2	☐	
Front Mounting Hardware 19A121626-G1		☐
Trunk Mount Spacer Kit (6-Volt only) 19A121884-G1	☐	
Battery Cables (2) 12- or 28-Volt 7147499G9 (Red) 7147499-G6 (Black) 6-Volt 7147499-G5	☐	☐
Trunk Mount Power Cable 12-Volt 19C303601-G2 6-Volt 19C303606-G1 28-Volt 19C303603-G2	☐	
Front Mount Power Cable 12-Volt 19C303601-G1 6-Volt 19C303607-G1 28-Volt 19C303603-G1		☐
18-Foot Control Cable One-Frequency 19C303626-G1 Two, Three, or Four-Frequency 19C303626-G3	☐	

EQUIPMENT	TRUNK MOUNT	FRONT MOUNT
Ignition Switch Cables and Vehicle Systems Plug 12-Volt 19A121454-G1 6- or 28-Volt 19A121454-G2	☐	☐
Front Panel		
Trunk Mount 19B205195-G1	☐	
Front Mount 19B204446-G2		☐
Microphone Bracket 7141414-G2	☐	☐
Key 5491682-P8	☐	☐
Alignment Tools (2)	☐	☐

OPTIONAL EQUIPMENT	OPTION NUMBER	
23-Foot Control Cable		
One-Frequency 19C303626-G2	7084	
Multi-Frequency 19C303626-G4	7085	
23-Foot, 12-Volt Power Cable 19C303601-G3	7083	
Ledge-Mounting Hardware Kit	7002	
Handset Model 4EM26A10 with Hookswitch 19B204867-G1	7021	7021
Channel Guard Hookswitch 19C303571-G2	7091	7091
Trunk Mount Spacer Kit 19A121884-G1	7082	
Window Mounting Kit for 5-Watt Speaker 19A121879-G2	7011	7011

PLANNING THE INSTALLATION

The accompanying photographs of typical MASTR professional series 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:

- 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 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.

TRUNK-MOUNT INSTALLATION

Trunk-Mount Combinations are designed so that the Two-Way Radio can be mounted up to 18 feet from the operator (23 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 of the vehicle, along with the microphone and speaker.

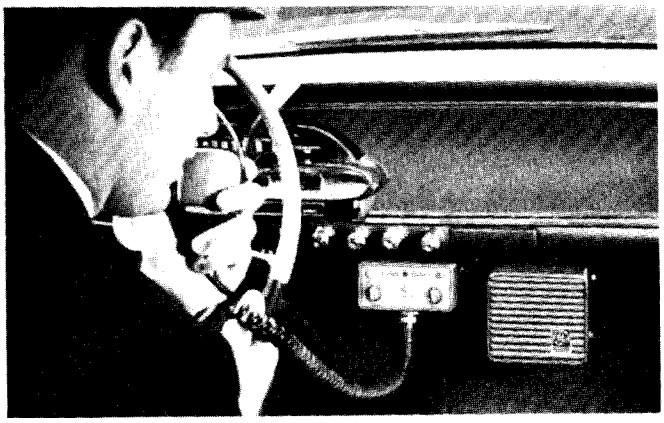


Fig. 1—Control Unit Mounting

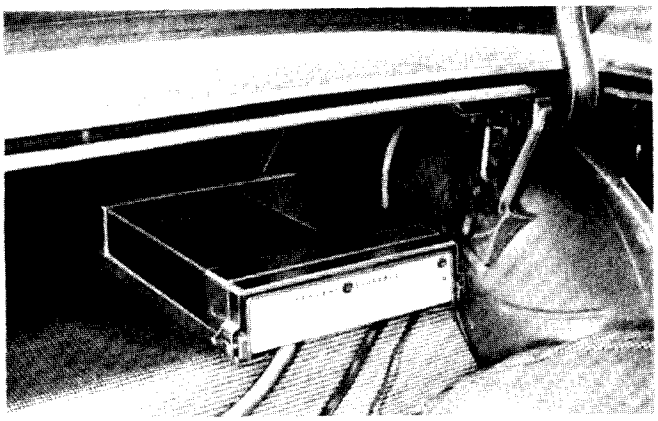


Fig. 2—Two-Way Radio Mounting

FRONT-MOUNT INSTALLATION

Front-Mount Combinations are designed for mounting under the vehicle instrument panel, near the operator. The Control Unit is attached to the front of the Two-Way Radio, and the microphone and speaker are normally mounted under the vehicle instrument panel.

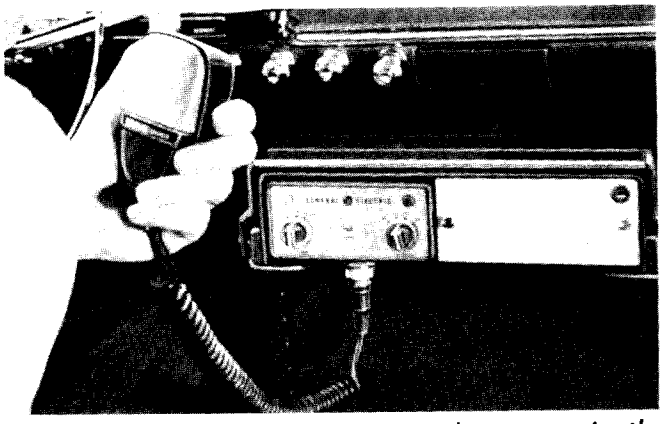


Fig. 3—Complete Two-Way Radio conveniently mounted near operator

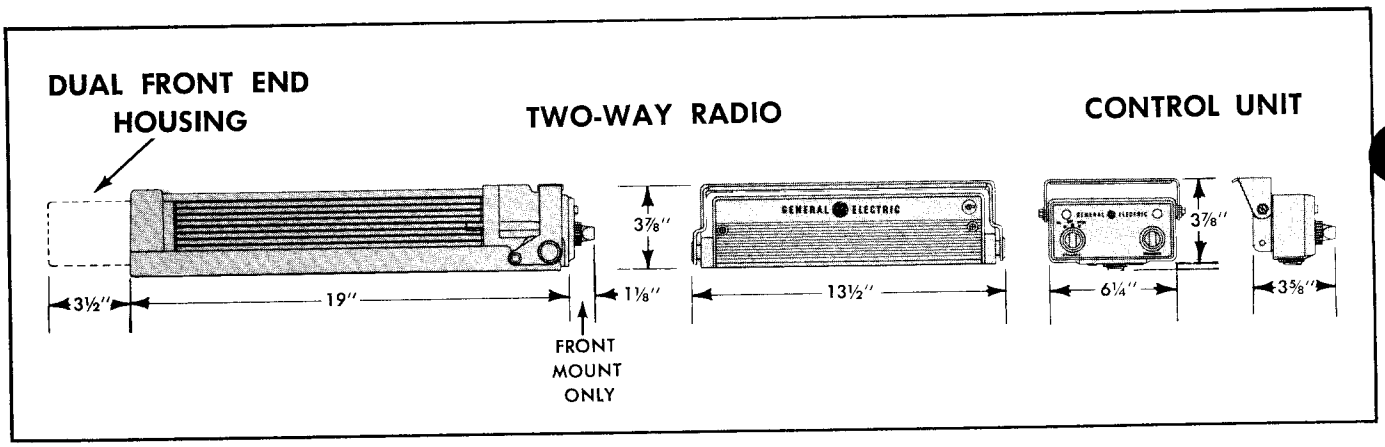


Fig. 4—Mounting Dimensions

EQUIPMENT REQUIRED

The equipment required for installing the MASTR Two-Way Radio are

- Electric drill for drilling mounting holes
- Drills and circle cutters (see sizes in box below)
- Soldering iron for systems connector and antenna
- Phillips and flat-blade screwdrivers, and ⅜-inch hex head driver for mounting screws.

DRILL SIZES

#36 (7/64-inch) Drill for #6 Self-Tapping Screws.
#32 (⅛-inch) Drill for #8 Self-Tapping Screws.
#29 (9/64-inch) Drill for #10 Self-Tapping Screws.
#9 (3/16-inch) Drill for #14 Self-Tapping Screws.
9/32-Inch Drill for Lo-Band Antenna and ¼-inch bolt.
⅜-Inch Drill for Hi-Band Antenna.
1⅜-Inch Circle Cutter, Holesaw or Socket Punch for Lo-Band Antenna.
⅞-Inch Circle Cutter, Holesaw or Socket Punch for Rubber Grommet.

RUNNING CABLES

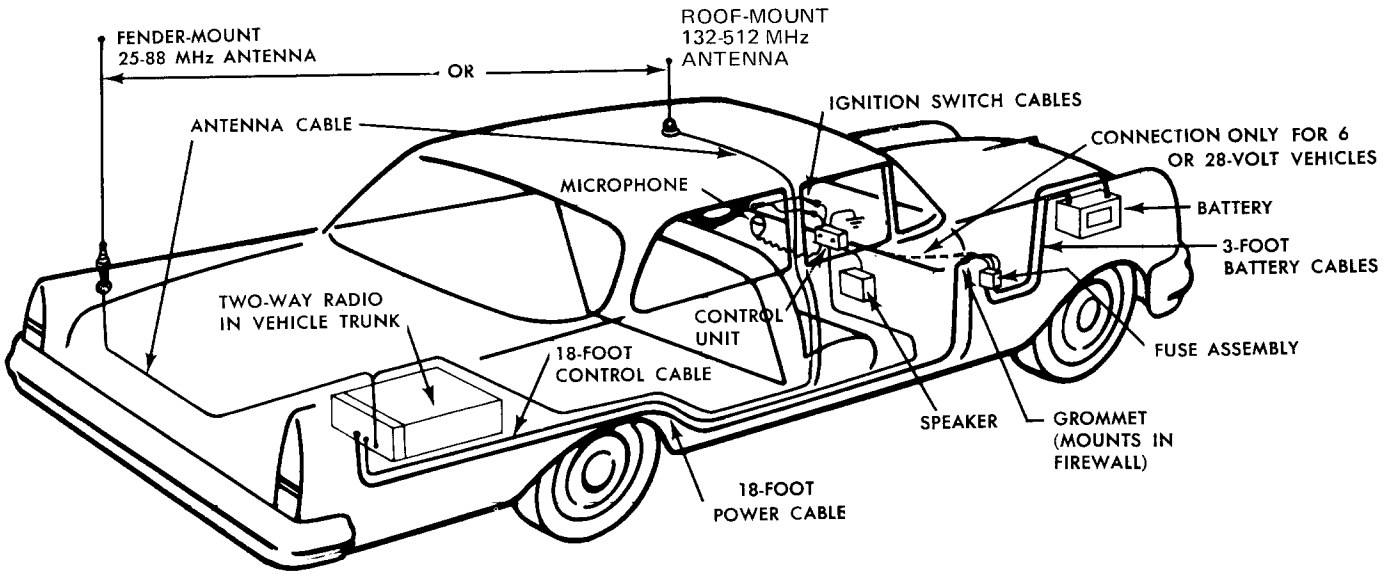
To assure the feasibility of the cable routings you plan to use, it is suggested that you run the cables before mounting the Two-Way Radio. Be sure to leave some slack in each cable going to the Control Unit and Trunk Mount Unit so that they may be pulled out for servicing with the power applied.

Try to route the cables away from locations where they will be exposed to heat, 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.

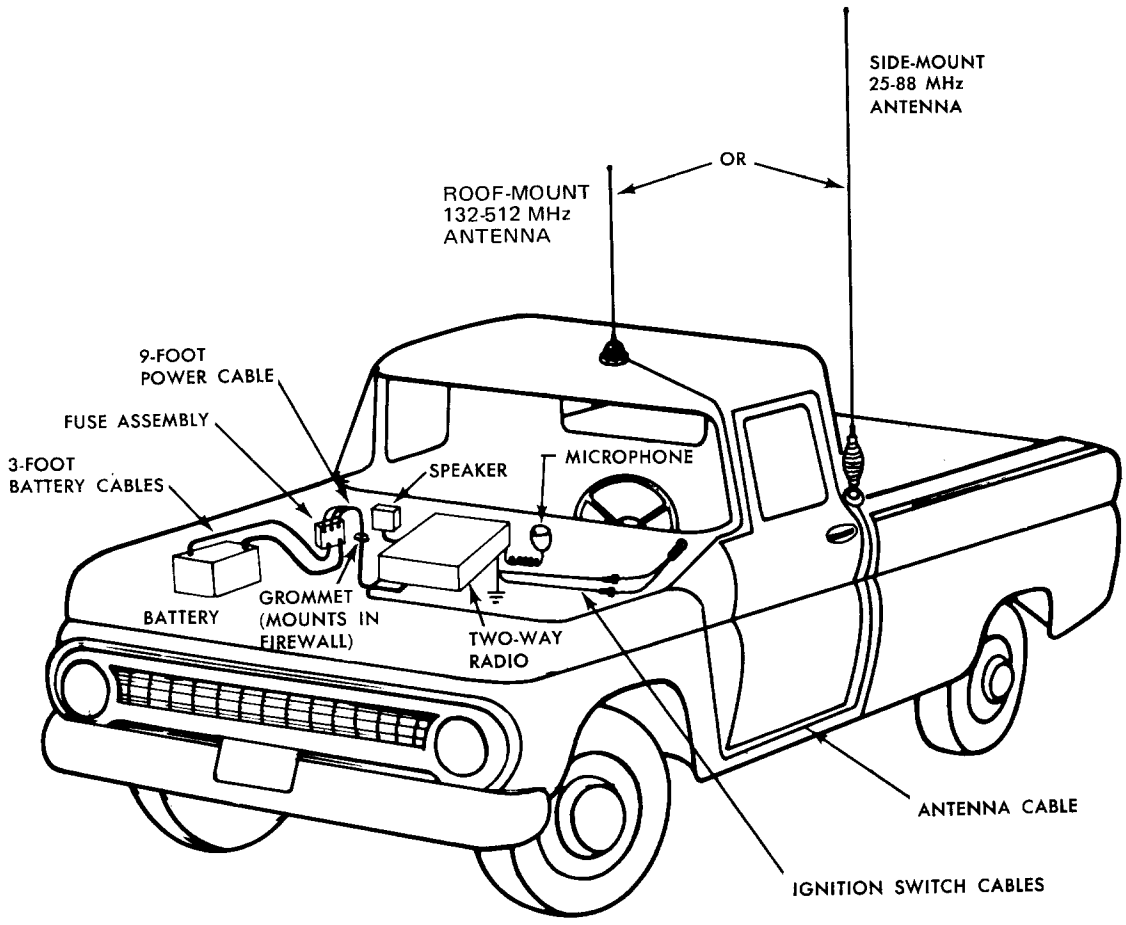
In addition, try to utilize existing holes in the firewall and trunk wall and the channels above or beneath the doors. You may also use the channels through door and window columns, where they are convenient for running cables, unless you plan to install rigid or flexible conduit in which to run the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

If an existing hole is not conveniently located for the passage of the Power Cable through the firewall, drill a ⅞-inch hole and insert the rubber grommet provided. Refer to Figure 5 and to the CABLING DIAGRAMS (Figures 20 and 21) for additional information.

Fig. 5—Cable Routing



TRUNK MOUNT



FRONT MOUNT

POWER AND CONTROL CABLES (TRUNK MOUNT ONLY)

It is preferable to run the Power and Control Cables on opposite sides of the vehicle to minimize noise coupling. Leave at least 18 inches of slack in the female-plug ends of the cables at the location for the Two-Way Radio.

1. Run the ring-terminal end of the Power Cable to the vicinity of the battery.

2. Run the Control Cable to the vicinity of the Control Unit. If it is necessary to disassemble the 26-pin plug to run the cable, refer to Figure 6. Replace the leads starting at the center of the plug and working to each end.

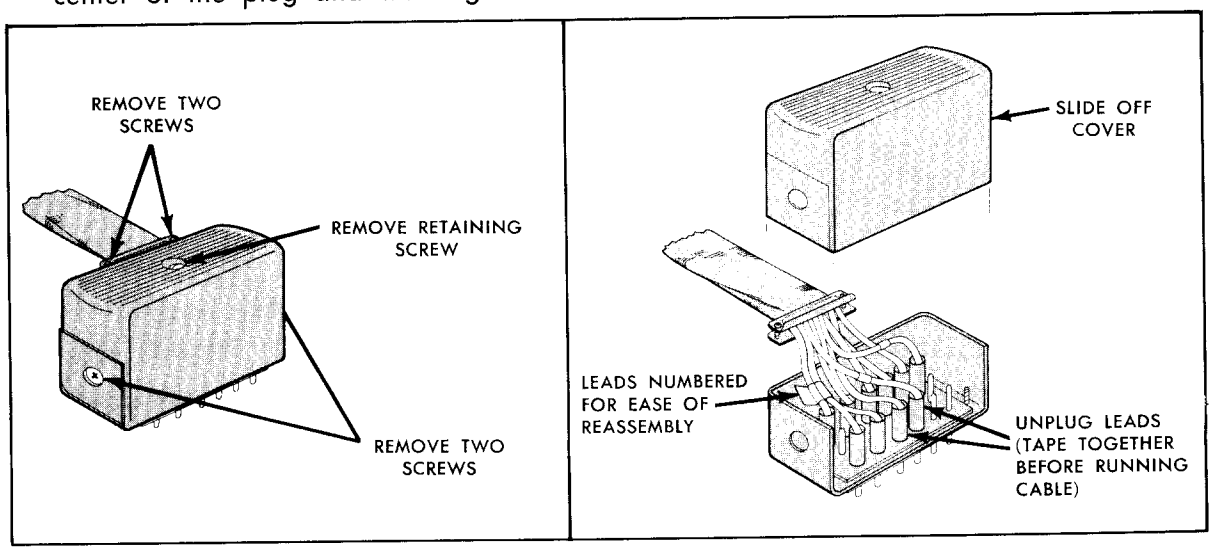


Figure 6—Disassembly of 26-Pin Control Cable Plug

NOTE

The plug is assembled so that the cable comes out of the top of the plug when connected to the Control Unit. To have the cable come out of the bottom of the plug, remove the remaining screws and rotate metal frame 180°.

3. Use the 3-inch cable straps and #6 self-tapping screws provided in the Basic Mounting Hardware to secure the cables neatly in place. Fee Figure 7.

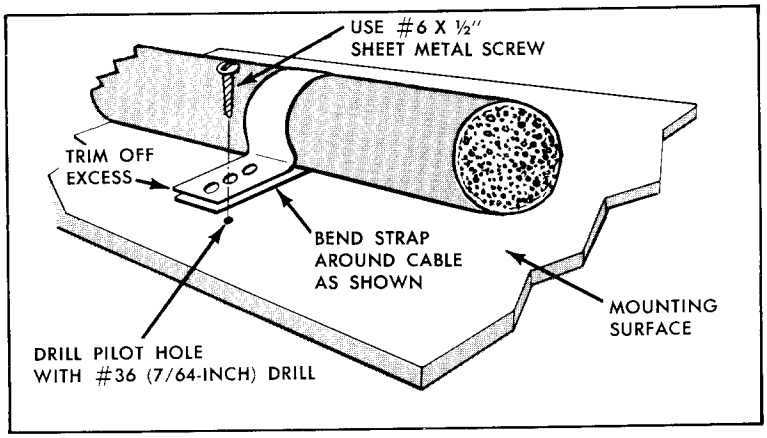


Figure 7—Installing Cable Straps

POWER CABLE (FRONT MOUNT ONLY)

Leave at least 18 inches of slack cable at the location of the Two-Way Radio and run the terminal end of the Power Cable to the vicinity of the Fuse Assembly. Power leads connect to the Fuse Assembly as shown in Figure 8C. Secure the cable by means of cable straps as shown in Figure 7.

FUSE ASSEMBLY

Mount the Fuse Assembly in the engine compartment of the vehicle, within reach of the 3-foot Battery Cables (see Figures 8A and 8B). Connect the Battery Cables and Power Cables as shown in Figure 8C.

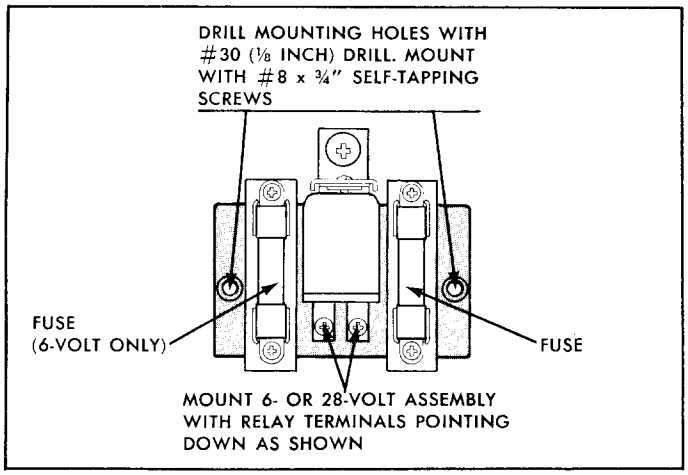


Fig. 8A—Installation of 6/28-Volt Fuse Assembly

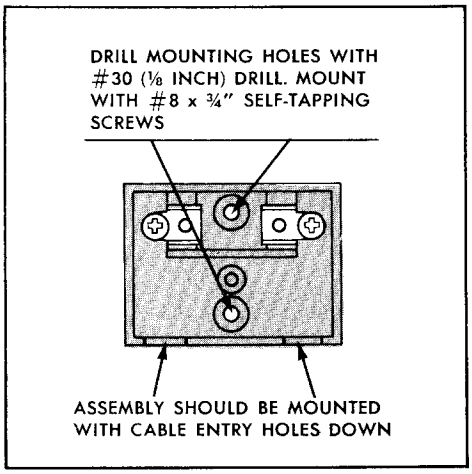
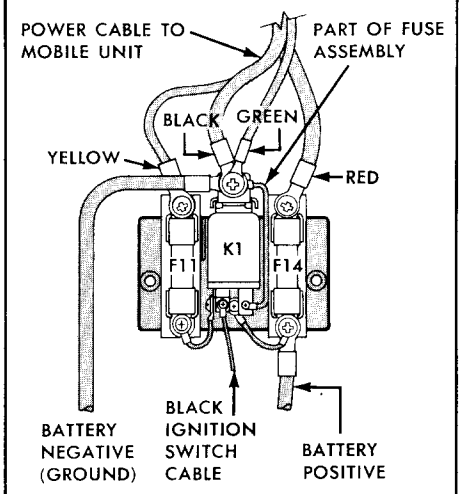


Fig. 8B—Installation of 12-Volt Fuse Assembly

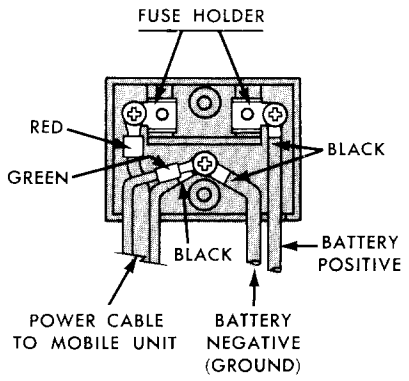
Fig. 8C—Battery and Power Cable Connections to Fuse Assembly

NEGATIVE GROUND VEHICLES

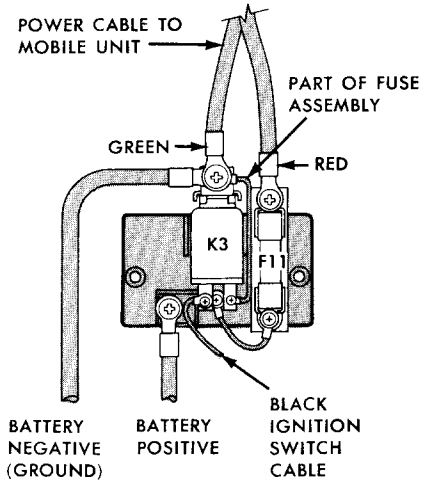
6-Volt



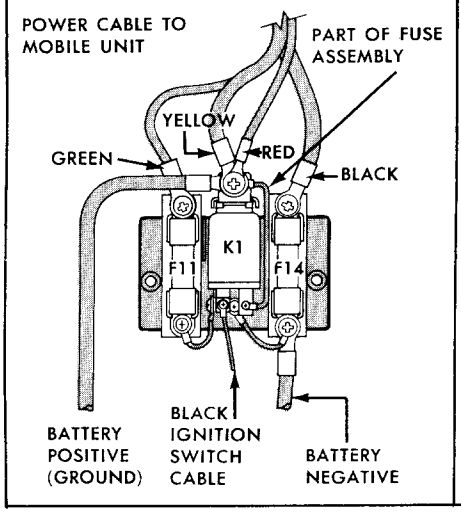
12-Volt

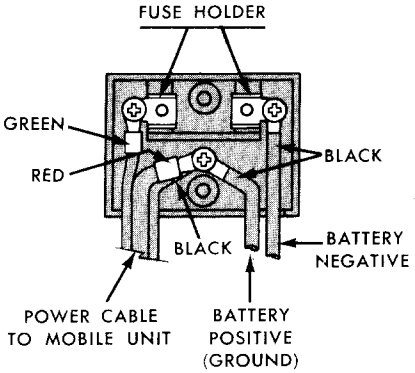


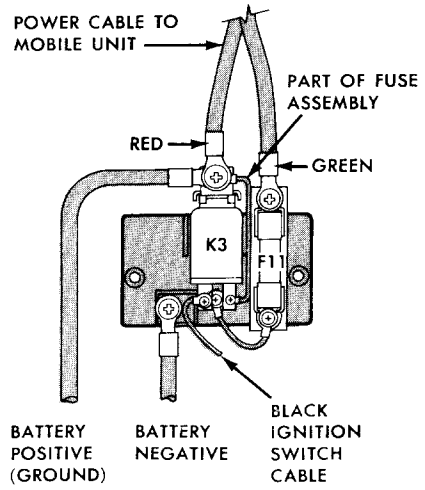
28-Volt



POSITIVE GROUND VEHICLES







12-VOLT IGNITION SWITCH CABLE

The Ignition Switch Cable (consisting of two fused leads, one ground lead, and a 13-pin Vehicle Systems plug) connects the Control Unit to the vehicle ignition switch. Adhesive-backed foam rubber pads are provided with the 13-pin Vehicles System Plug. Assemble the plug as shown in Figure 9 and make the connections as shown in Figure 11.

NOTE

Since speaker connections and hookswitch connections (optional) are also made in the 13-pin Vehicle Systems Plug, do not secure the lid at this time. Dress leads straight out of Vehicle Systems Plug as shown on page 9.

If a Power Call unit is used with the mobile, connect an insulated jumper wire between pins 3 and 12 of the 13-pin Vehicle Systems Plug.

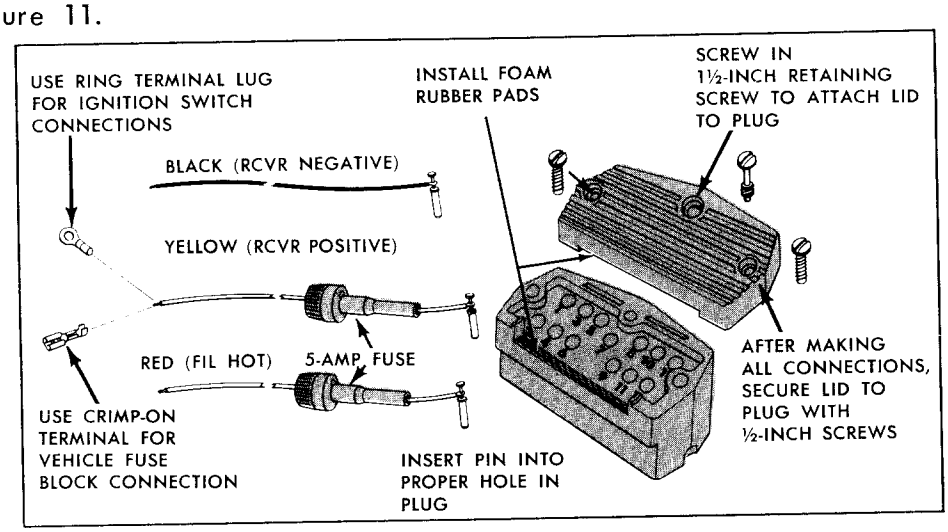


Figure 9—Assembly of Vehicle Systems Plug

6- OR 28-VOLT IGNITION SWITCH CABLES

The 6- or 28-Volt Ignition Switch Cables include a fused yellow lead (connects to ignition switch), a black lead (connects to the relay), and a 13-pin Vehicle Systems Plug. Adhesive-backed foam rubber pads are provided with the 13-pin Vehicle System Plug. Assemble the plug as shown in Figure 10 and connect the cable as shown in Figure 11.

NOTE

Since speaker connections and hookswitch connections (optional) are also made in the 13-pin Vehicle Systems Plug, do not secure the lid at this time. Dress leads straight out of Vehicle Systems Plug as shown on page 9.

If a Power Call unit is used with the mobile, connect an insulated jumper wire between pins 3 and 12 of the 13-pin Vehicle Systems Plug.

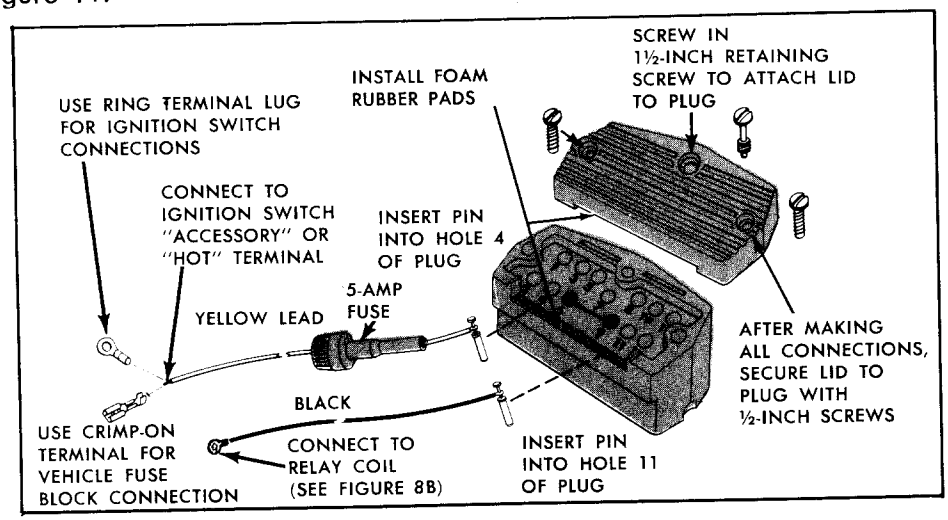


Figure 10—Connections for 6- or 28-Volt Ignition Switch Cables

VERTICAL OR SIDE MOUNTING

If the Two-Way Radio is equipped with Channel Guard and is to be mounted at an angle of over 45° from a horizontal plane or on its side, either the encoder or decoder reed must be rotated 90° for proper operation of the reed. Instructions for positioning the reeds are contained in the Maintenance Manual.

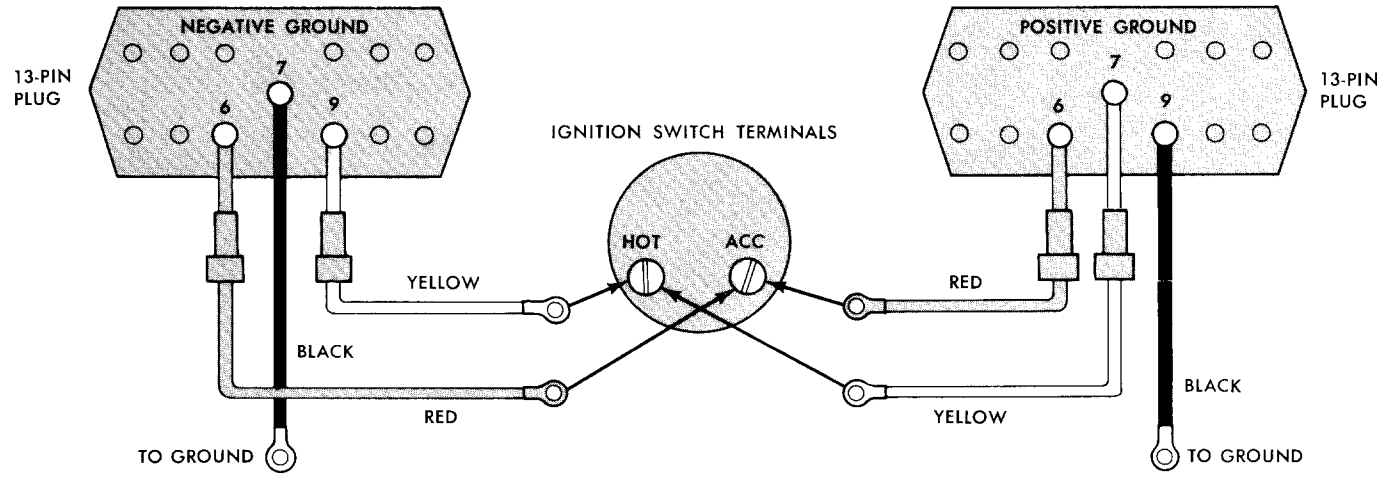
The unit is equipped with Channel Guard when the 7th digit of the EU number on the combination nameplate (on the top of the front casting) is U, V, W or X.

Figure 11—Connections for 12-Volt Ignition Switch Cables

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**

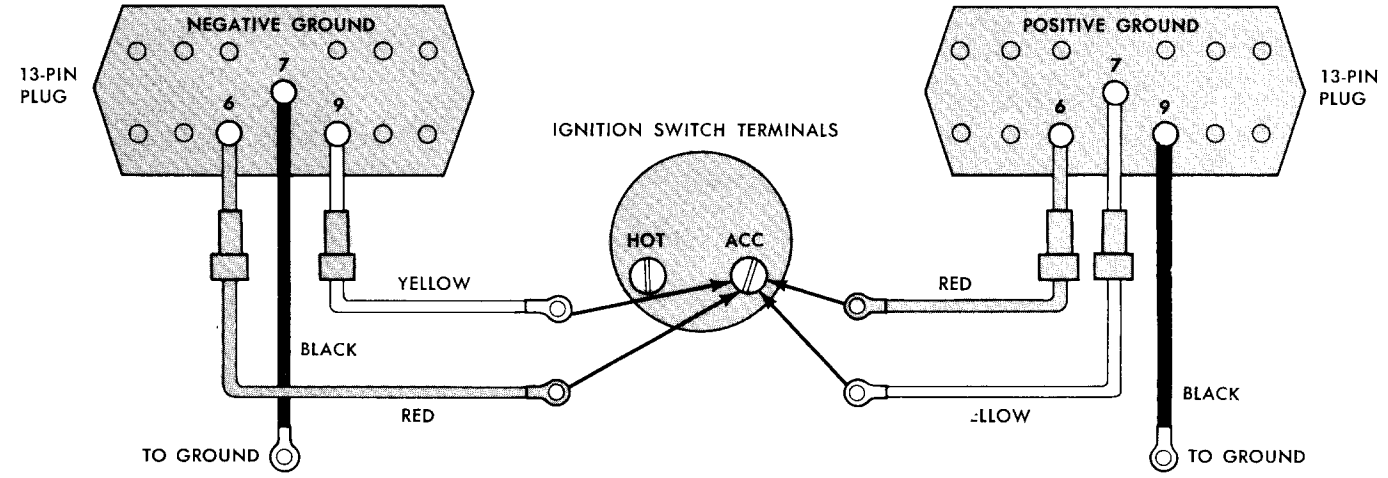
Receiver will operate independently of ignition switch. Transmitter will operate only with ignition switch in ACCESSORY or ON position.



2 **IGNITION SWITCH CONTROL**

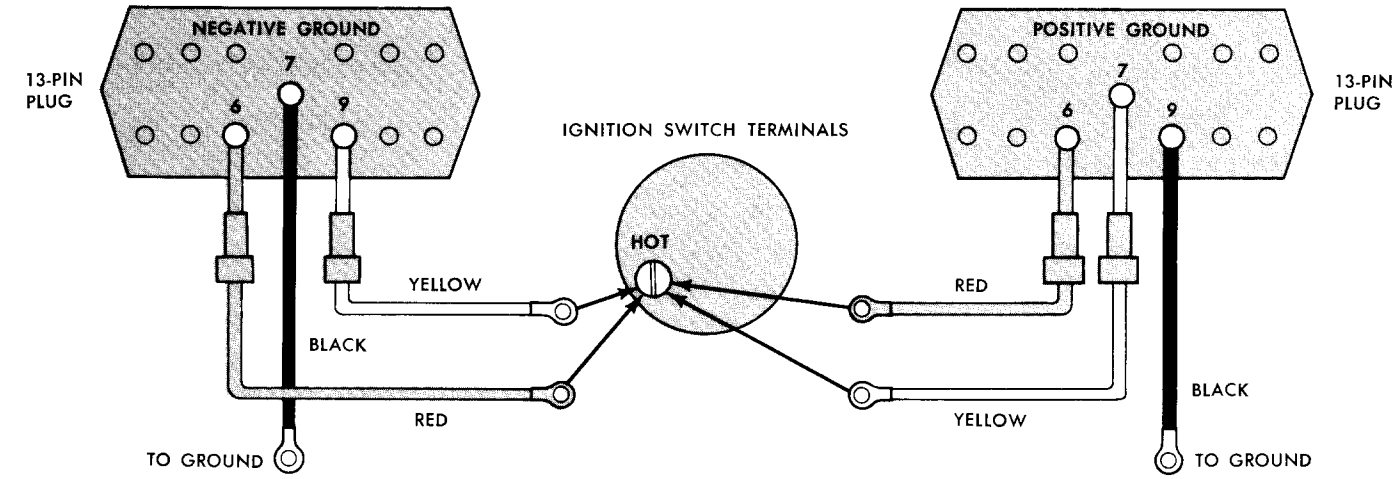
Transmitter and receiver will operate only with ignition switch in ACCESSORY or ON position.

Turning ignition switch OFF removes all power to the radio.



3 **IGNITION SWITCH BYPASS**

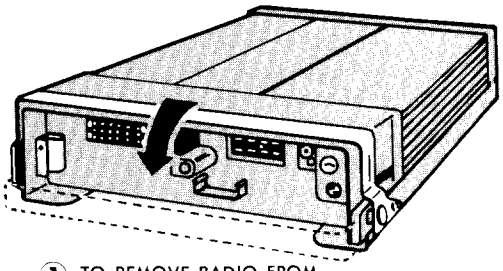
Transmitter and receiver operate independently of ignition switch. Unit can be turned ON and OFF only by Control Unit switch.



TRUNK-MOUNT 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 12. If the unit is to be mounted vertically (over 45°) or on its side, refer to the Vertical or Side Mounting Section on Page 8.

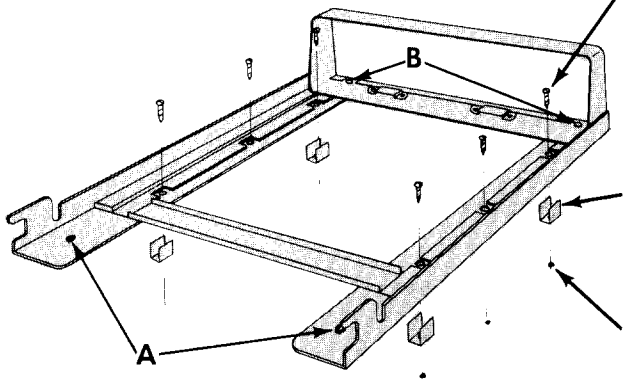
Figure 12—Installing the Trunk-Mount Radio.



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

CAUTION

BE CAREFUL TO AVOID DAMAGING SOME VITAL PART OF THE VEHICLE WHEN DRILLING MOUNTING HOLES.



(2) MOUNT FRAME WITH #14 x ¾-INCH HEX-HEAD SELF-TAPPING SCREWS. (USE 1-INCH SCREWS IF NEEDED).

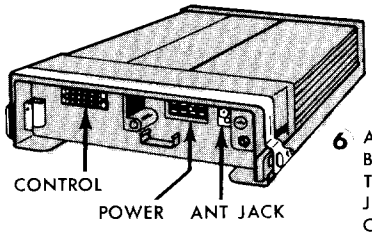
IF SPACER KIT IS USED, USE 2-INCH SHEET METAL SCREWS.

DRILL #9 (3/16") PILOT HOLES.

(3) IF MOBILE UNIT WILL BE SUBJECTED TO HEAVY SHOCK OR VIBRATION, USE TWO #14 x ¾-INCH PAN-HEAD SCREWS IN MOUNTING HOLES "A". LOOSEN SCREWS AT "B" AND ADJUST BACK RING FOR TIGHTER FIT.

(4) REPLACE RADIO IN MOUNTING BRACKET. PUSH UP HANDLE TO SECURE IN FRAME.

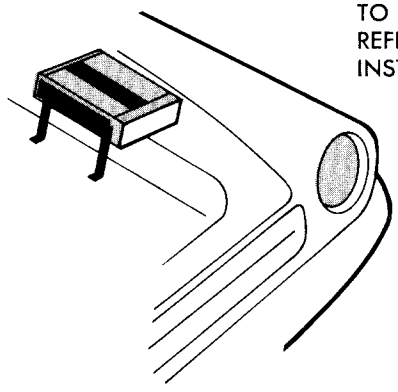
(5) PLUG IN POWER AND CONTROL CABLES. LEAVE FRONT PANEL OFF UNTIL ANTENNA IS INSTALLED AND ALL CONNECTIONS ARE MADE TO THE VEHICLE SYSTEMS PLUG. THEN CONNECT ANTENNA AND SYSTEMS PLUG AND ATTACH FRONT PANEL WITH TWO KNURLED SCREWS.

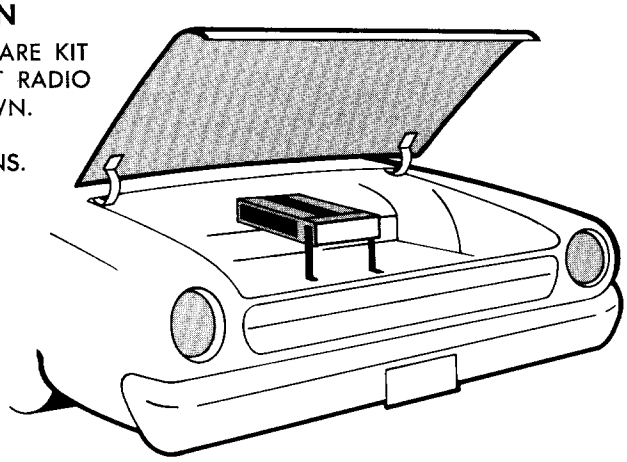


(6) ANT JACK CAN BE TILTED TOWARD POWER JACK FOR EASIER CONNECTION.

LEDGE MOUNT OPTION

THE LEDGE-MOUNT HARDWARE KIT PERMITS THE TRUNK-MOUNT RADIO TO BE MOUNTED AS SHOWN. REFER TO FIGURE 13 FOR INSTALLATION INSTRUCTIONS.

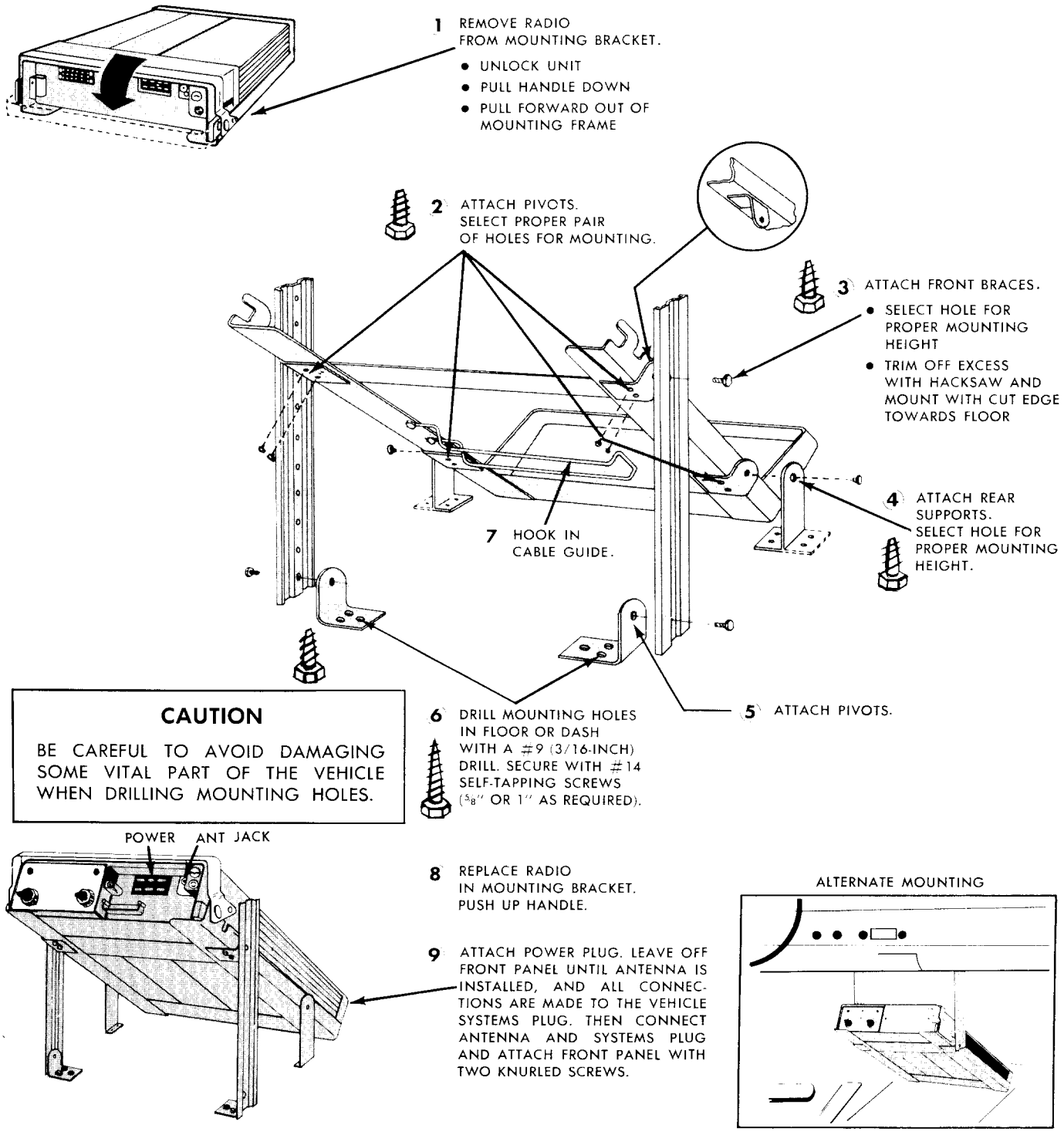




FRONT-MOUNT TWO-WAY RADIO

In Front-Mount installations, mount the Two-Way Radio so that the controls are within reach of the operator. The mounting hardware kit contains =14 thread-rolling screws for attaching the braces, pivots and rear supports to the mounting frame. Use a hex-head driver to install these screws. Mount the Two-Way Radio as shown in Figure 13. If the radio is to be mounted vertically (over 45) or on its side, refer to the Vertical or Side Mounting section on Page 8.

Figure 13—Installing the Front-Mount Radio.



CAUTION

BE CAREFUL TO AVOID DAMAGING SOME VITAL PART OF THE VEHICLE WHEN DRILLING MOUNTING HOLES.

CONTROL UNIT (TRUNK MOUNT ONLY)

In Trunk-Mount installations, the Control Unit should be mounted within convenient reach of the operator, and located so that it will not interfere with safe operation of the vehicle. Normally, the Control Unit is mounted on the underside and in the middle of the instrument panel. Use the swivel bracket from the Control Unit as a template for locating two mounting holes. Mount the Control Unit as shown in Figure 14. After mounting the unit, plug in the Control Cable and tighten the retaining screw in the plug. Do not attach the Vehicle Systems plug until the speaker connections and hookswitch connections (optional) have been made.

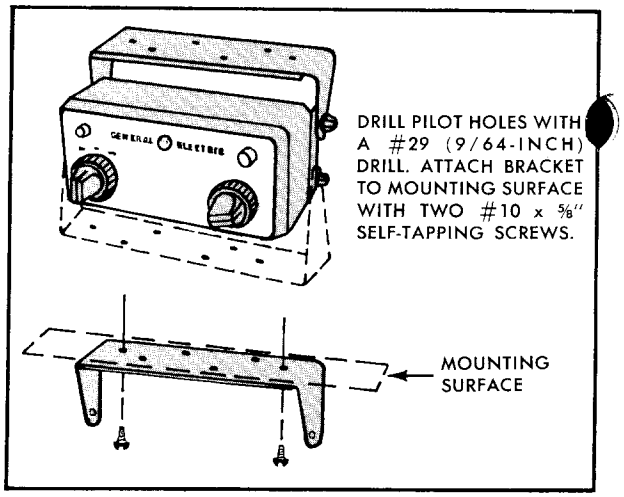


Figure 14—Mounting the Control Unit

SPEAKER

The speaker should be mounted where it will direct sound to the operator, but not interfere with his vision. The speaker may be mounted on the lower edge of the instrument panel, on the firewall, above the windshield in trucks, or behind the built-in speaker grille of some vehicles. Use the swivel bracket from the speaker as a template for locating three mounting holes, and mount the speaker as shown in Figure 15.

CONNECTIONS FOR FIVE-WATT SPEAKER MODEL 4EZ20A10

The two pins on the Five-Watt Speaker cable plug into holes 2 and 13 of the 13-pin Vehicle Systems Plug.

CONNECTIONS FOR 10-WATT SPEAKER MODEL 4EZ18A10

Connect the speaker leads as shown in Figure 16. The fused brown lead is used *only* in 12-volt vehicles.

CAUTION

THE 10-WATT SPEAKER IS NORMALLY SHIPPED WITH THREE INTERNAL JUMPERS CONNECTED FOR 12-VOLT VEHICLE SYSTEMS. FOR 6- OR 28-VOLT SYSTEMS, REMOVE THE TWO SCREWS IN EACH SIDE OF THE SPEAKER AND LIFT OFF FRONT OF SPEAKER HOUSING. MOVE THE THREE JUMPERS TO THE "6-V" OR "28-V" PINS SHOWN AT THE RIGHT.

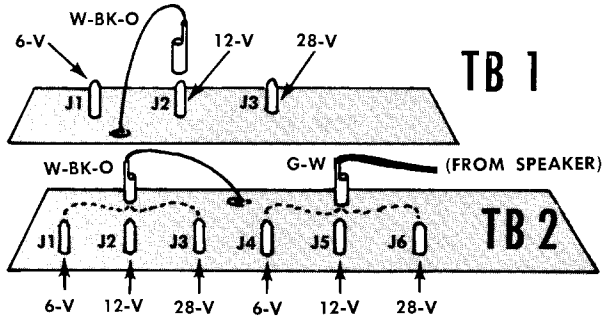


Figure 15—Mounting the Speaker

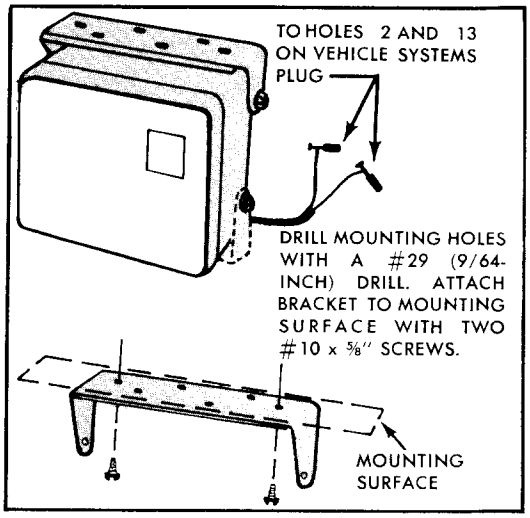


Figure 16—10-Watt Speaker Connections

WIRE COLOR	CONNECT FROM	CONNECT TO VEHICLE SYSTEMS PLUG	
		NEGATIVE GROUND	POSITIVE GROUND
Brown	Speaker	Hole 2	Hole 2
White	Speaker	Hole 13	Hole 13
Red	Speaker	Hole 11	Hole 10
Black	Speaker	Hole 10	Hole 11
White-Brown	Ground	Hole 10†	Hole 10†
12-VOLT ONLY			
Brown (fused)	Battery "HOT"	Hole 4	Hole 4
6- OR 28-VOLT ONLY			
Discard fused brown wire.			

†Indicates a solder connection. Keep wire and solder build-up to a minimum to prevent short circuits between pins.

MICROPHONE

Mount the microphone near the Control Unit 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 (Figure 17), screw the microphone connector into the microphone jack on the bottom of the Control Unit.

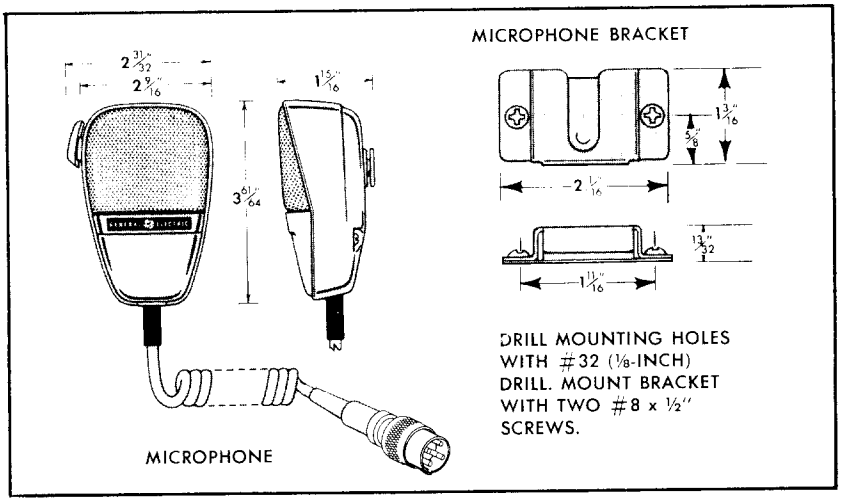


Fig. 17—Microphone Bracket Mounting

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 18. After mounting the hookswitch, connect the two pins to holes 5 and 8 on the Vehicle Systems Plug.

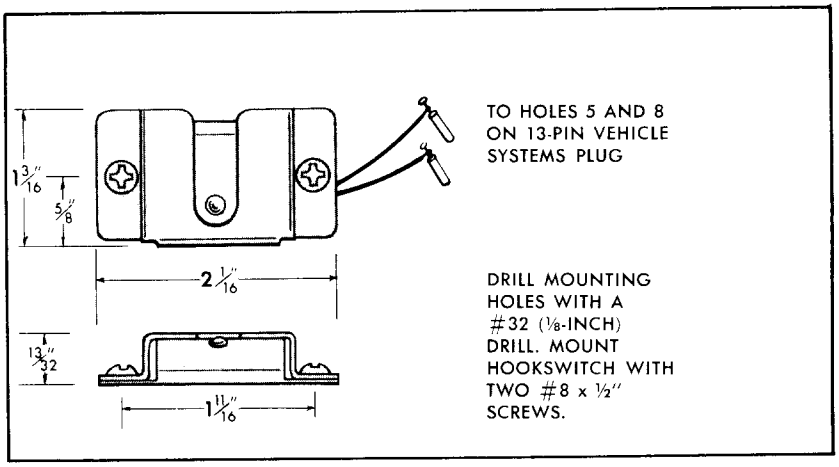


Fig. 18—Hookswitch Mounting

HANDSET & HANDSET HOLDER (OPTIONAL)

Mount the handset holder as shown in Figure 19A. After mounting the handset holder, connect the handset jack to the microphone jack on the bottom of the Control Unit, and connect the handset cable as shown in Figure 19B.

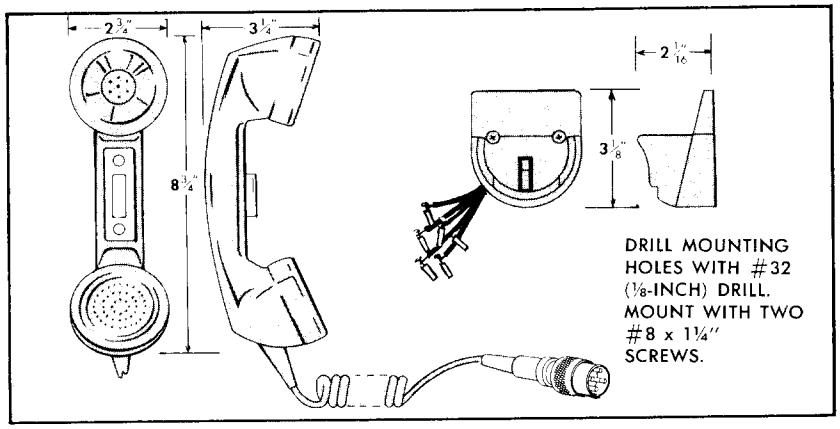


Fig. 19A—Handset Holder Mounting

WIRE COLOR	CONNECT TO 13-PIN PLUG
White-Blue-Red	Hole 1
Green-White	Hole 3
White-Black-Orange	Hole 5*
White-Violet	Hole 8*
Brown-Green	Hole 12
White-Red-Brown	Hole 13†

Fig. 19B—Connections for Handset Holder

*Do not make these connections if Control Unit has a CG-OFF Switch.

† This is a solder connection. Keep wire and solder build-up to a minimum to prevent short circuits between pins.

ANTENNA

Installation instructions for the High-Band and Low-Band Antennas are packaged with the antenna. The antenna must be installed in accordance with good engineering practice for optimum results.

- For the 132-512 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 header 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:	Tuning the output circuits to match the antenna. Measure the frequency and modulation and enter these measurements on the FCC-required Station Records.
Receiver:	Tuning the input circuit to match the antenna.
Vehicle:	Checking 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.

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

- 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.

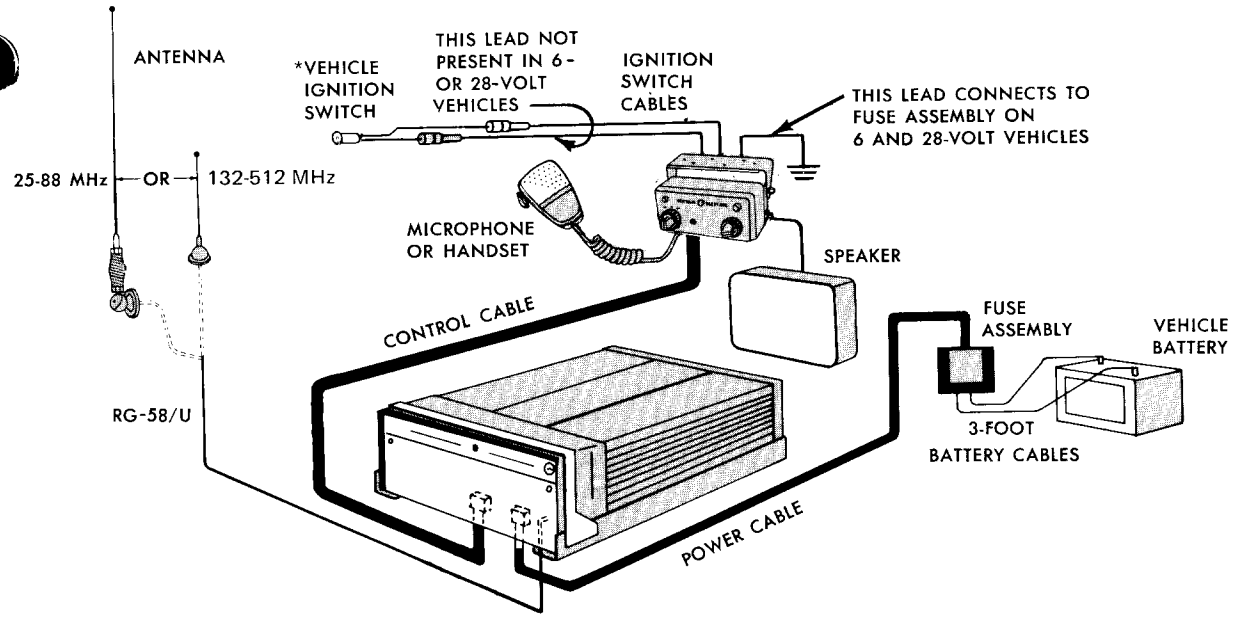


Figure 20—Trunk-Mount Cabling Diagram

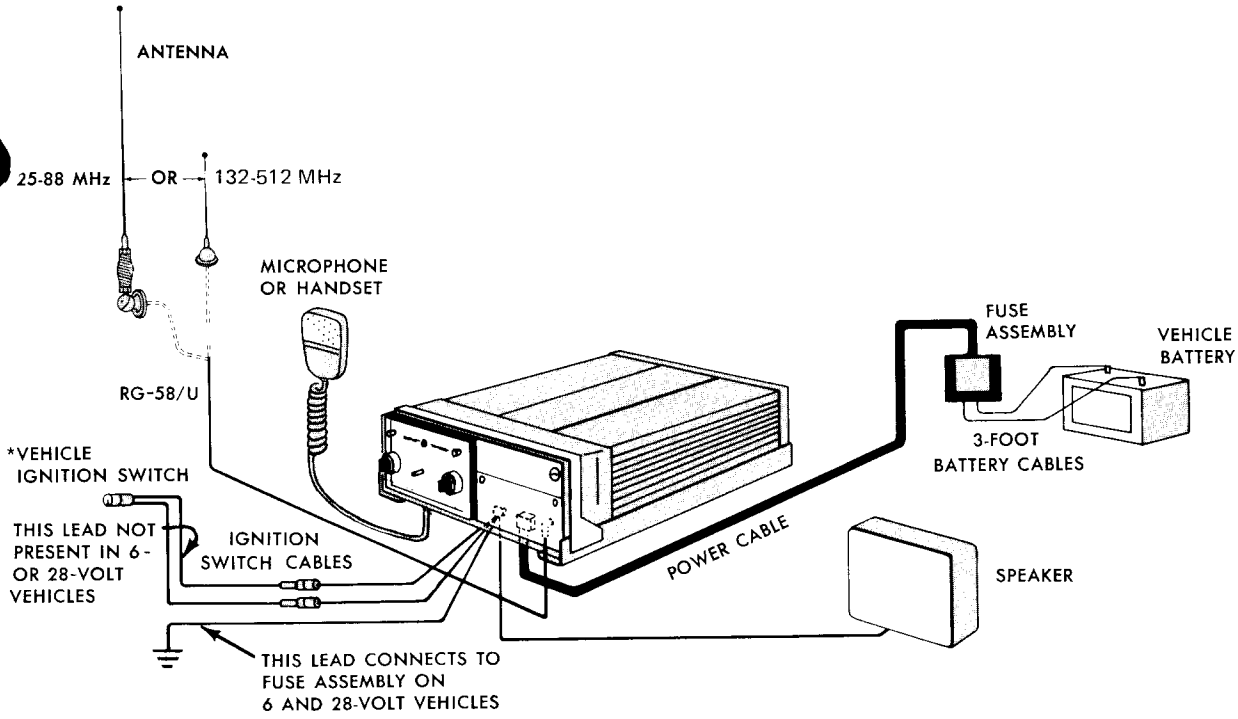


Figure 21—Front-Mount Cabling Diagram

*IF IGNITION SWITCH CONTROL IS NOT DESIRED, IGNITION SWITCH CABLES MAY BE CONNECTED TO THE VEHICLE TERMINAL BLOCK.

MOBILE RADIO DEPARTMENT
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