



PM1200

Installation Manual
Mobile Radio



Product Safety and RF Exposure Compliance

See ["Installation Requirements for Compliance with Radio Frequency \(RF\) Energy Exposure Safety Standards,"](#) on page iii.

Manual Revisions

Changes which occur after the publication of the manual are described in PMRs (Publications Manual Revisions). These PMRs provide complete replacement pages for all added, changed, and deleted items.

To obtain PMRs, go to <https://businessonline.motorola.com>

Parts Ordering

See [Appendix A: Replacement Parts Ordering](#) for information on how to obtain replacement parts. For part numbers, refer to the PM1200 Mobile Radio Basic Service Manual (Motorola publication part number 6880309U09-A).

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Installation Requirements for Compliance with Radio Frequency (RF) Energy Exposure Safety Standards

ATTENTION!

This radio is intended for use in occupational/controlled conditions, where users have full knowledge of their exposure and can exercise control over their exposure to meet FCC limits. This radio device is NOT authorized for general population, consumer, or any other use.

To ensure compliance to RF Energy Safety Standards:

- Install only Motorola approved antennas and accessories
- Be sure that antenna installation is per "[Antenna Installation](#)," on page 2-13 of this manual
- Be sure that Product Safety and RF Safety Booklet enclosed with this radio is available to the end user upon completion of the installation of this radio

Before using this product, the operator must be familiar with the RF energy awareness information and operating instructions in the Product Safety and RF Exposure section in the user guide (Motorola Publication part number 6880309U08) to ensure compliance with Radio Frequency (RF) energy exposure limits.

For a list of Motorola-approved antennas and other accessories, visit the following web site which lists approved accessories for your radio model: <http://www.motorola.com/governmentandenterprise>

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Related Publications

PM1200 Mobile Radio Models User's Guide	6880309U08_
PM1200 Mobile Radio Basic Service Manual	6880309U09_

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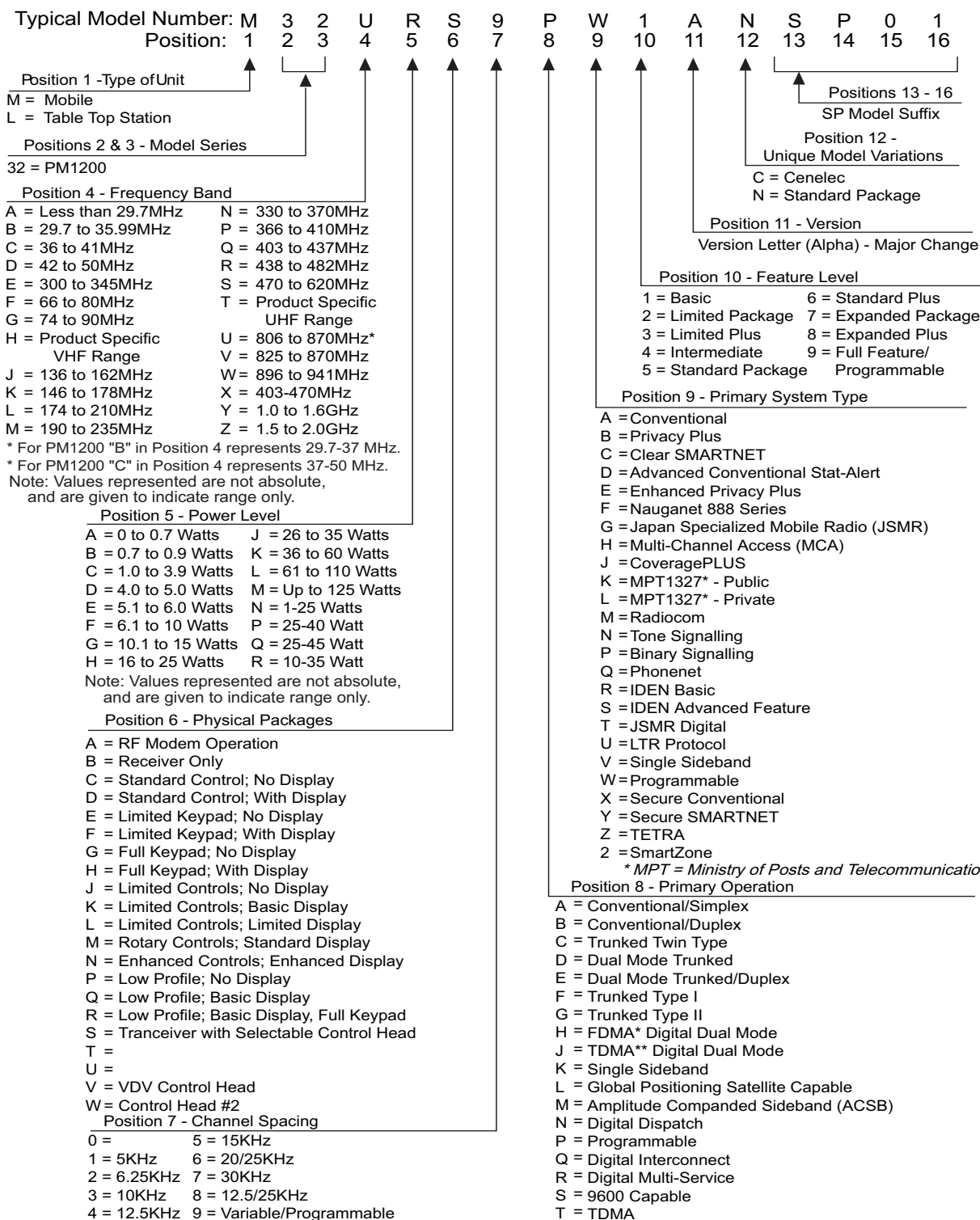
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Commercial Warranty

Limited Warranty

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I. What This Warranty Covers And For How Long

MOTOROLA INC. ("MOTOROLA") warrants the MOTOROLA manufactured Communication Products listed below ("Product") against defects in material and workmanship under normal use and service for a period of time from the date of purchase as scheduled below:

PM1200 Mobile Radio	Two (2) Year
Product Accessories	One (1) Year

Motorola, at its option, will at no charge either repair the Product (with new or reconditioned parts), replace it (with a new or reconditioned Product), or refund the purchase price of the Product during the warranty period provided it is returned in accordance with the terms of this warranty. Replaced parts or boards are warranted for the balance of the original applicable warranty period. All replaced parts of Product shall become the property of MOTOROLA.

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MOTOROLA cannot be responsible in any way for any ancillary equipment not furnished by MOTOROLA which is attached to or used in connection with the Product, or for operation of the Product with any ancillary equipment, and all such equipment is expressly excluded from this warranty. Because each system which may use the Product is unique, MOTOROLA disclaims liability for range, coverage, or operation of the system as a whole under this warranty.

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This warranty gives specific legal rights, and there may be other rights which may vary from state to state.

IV. How To Get Warranty Service

You must provide proof of purchase (bearing the date of purchase and Product item serial number) in order to receive warranty service and, also, deliver or send the Product item, transportation and insurance prepaid, to an authorized warranty service location. Warranty service will be provided by Motorola through one of its authorized warranty service locations. If you first contact the company which sold you the Product, it can facilitate your obtaining warranty service. You can also call Motorola at [1-888-567-7347](tel:1-888-567-7347) US/Canada.

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- A. Defects or damage resulting from use of the Product in other than its normal and customary manner.
- B. Defects or damage from misuse, accident, water, or neglect.
- C. Defects or damage from improper testing, operation, maintenance, installation, alteration, modification, or adjustment.
- D. Breakage or damage to antennas unless caused directly by defects in material workmanship.
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- F. Product which has had the serial number removed or made illegible.
- G. Rechargeable batteries if:
 - any of the seals on the battery enclosure or cells are broken or show evidence of tampering.
 - the damage or defect is caused by charging or using the battery in equipment or service other than the Product for which it is specified.
- H. Freight costs to the repair depot.
- I. A Product which, due to illegal or unauthorized alteration of the software/firmware in the Product, does not function in accordance with MOTOROLA's published specifications or the FCC type acceptance labeling in effect for the Product at the time the Product was initially distributed from MOTOROLA.
- J. Scratches or other cosmetic damage to Product surfaces that does not affect the operation of the Product.
- K. Normal and customary wear and tear.

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- A. that MOTOROLA will be notified promptly in writing by such purchaser of any notice of such claim;
- B. that MOTOROLA will have sole control of the defense of such suit and all negotiations for its settlement or compromise; and
- C. should the Product or parts become, or in MOTOROLA's opinion be likely to become, the subject of a claim of infringement of a United States patent, that such purchaser will permit MOTOROLA, at its option and expense, either to procure for such purchaser the right to continue using the Product or parts or to replace or modify the same so that it becomes noninfringing or to grant such purchaser a credit for the Product or parts as depreciated and accept its return. The depreciation will be an equal amount per year over the lifetime of the Product or parts as established by MOTOROLA.

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VII. Governing Law

This Warranty is governed by the laws of the State of Illinois, USA.

Notes

Chapter 1 Introduction

This manual covers the installation procedures for PM1200 mobile radios with control heads and accessories required to complete the radio system. The radio system consists of a control head, radio, antenna, microphone, speaker, cabling, and accessories.

1.1 Mobile Radio Description

1.1.1 Dimensions

Figure 1-1 and Figure 1-2 show the basic dimensions of the PM1200 remote mount control head. Figure 1-3 and Figure 1-4 show the basic dimensions of the transceiver.

When installing the radio, make sure to plan the installation carefully and leave additional room in the rear of the radio for cabling and accessory connections; in the front of the radio for access, controls, and cabling; and to the sides of the radio so that you may access and install the trunnion wing screws.

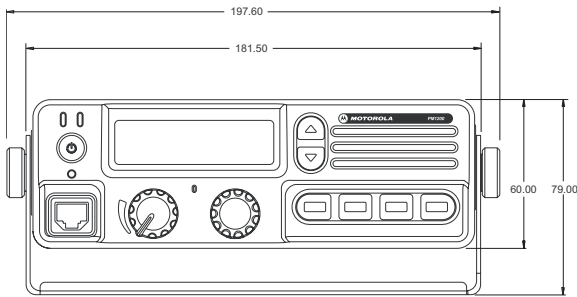


Figure 1-1. Front View of Remote Mount Control Head Trunnion

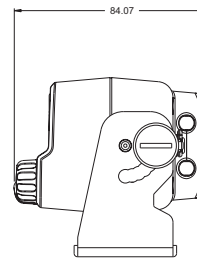


Figure 1-2. Side View of Remote Mount Control Head Trunnion

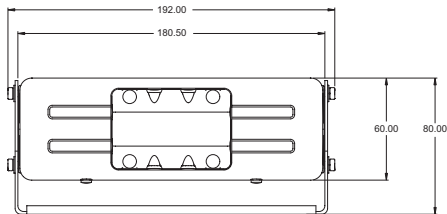


Figure 1-3. Front View of Transceiver

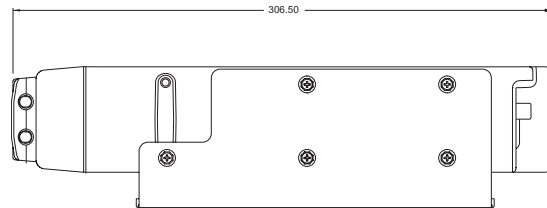


Figure 1-4. Side View of Transceiver

1.2 Standard Configurations

1.2.1 Remote Mount Configuration

In the remote mount version, the transceiver and the control head are mounted separately in the vehicle. The control head is mounted on a remote trunnion near the operator. The transceiver is mounted by means of a trunnion or other mounting hardware. If the transceiver is located in a car trunk, be sure that secure mounting and sufficient cooling are provided. Do not cover the transceiver with baggage, blankets, etc. For details on these configurations, see [Section 2.2.1 on page 2-6](#).

1.3 Tools Required for PM1200 Installations

Tool	Part Number
RF cable tool	HLN6695_
Roto-Torq adjustable torque driver	RSX4043_
7mm Hex Nut driver	-
CR-V PH1 screwdriver	-
CR-V PH2 screwdriver	-
CR-V PH2 screw bit	-

Chapter 2 Standard Configurations

2.1 Planning the Installation

The PM1200 radio operates only in negative ground electrical systems. Before starting the radio installation, make sure that the ground polarity of the vehicle is correct. Accidentally reversing the polarity will not damage the radio, but will cause the cable fuses to blow.

Planning is the key to fast, easy radio installation. Before starting the installation, inspect the vehicle and determine how and where you intend to mount the antenna, radio, and accessories. Plan wire and cable runs to provide maximum protection from inching, crushing, and overheating.

CAUTION Before installing any electrical equipment, check the vehicle manufacturer's user manual. The installation of this device should be completed by an authorized servicer or installer.

2.1.1 Installation Examples

Your mobile two-way radio offers various methods of installation for remote mount (see [Figure 2-1](#) through [Figure 2-3](#)).

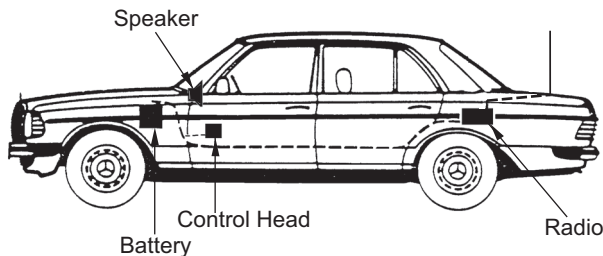


Figure 2-1. Remote Mount—Control Head in Console

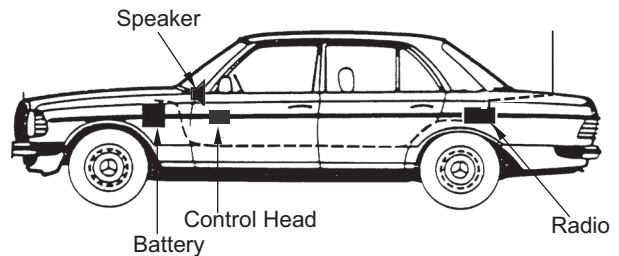


Figure 2-2. Remote Mount—Control Head in Dash

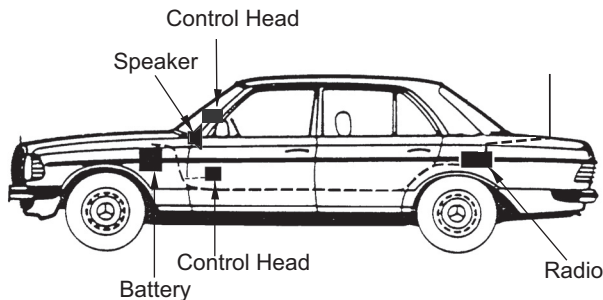


Figure 2-3. Remote Mount—Control Head on Top or Under Dash

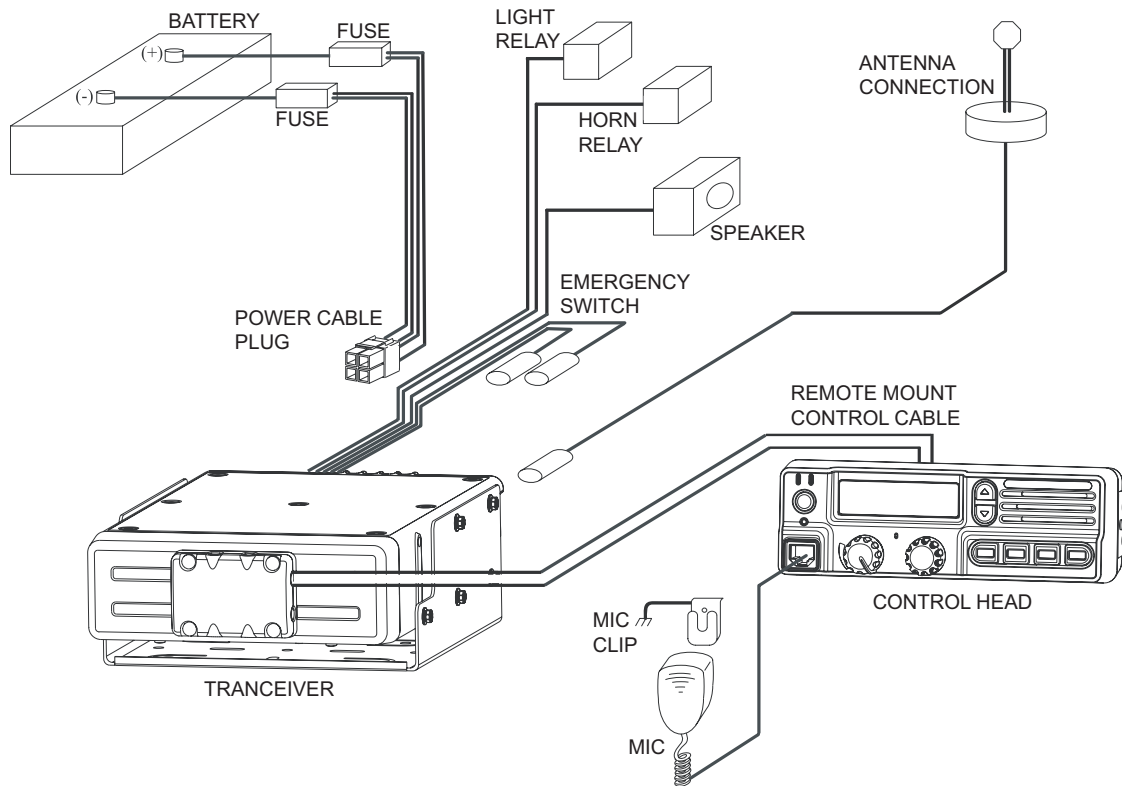


Figure 2-4. Radio Installation (120W Remote High Power with pinouts)

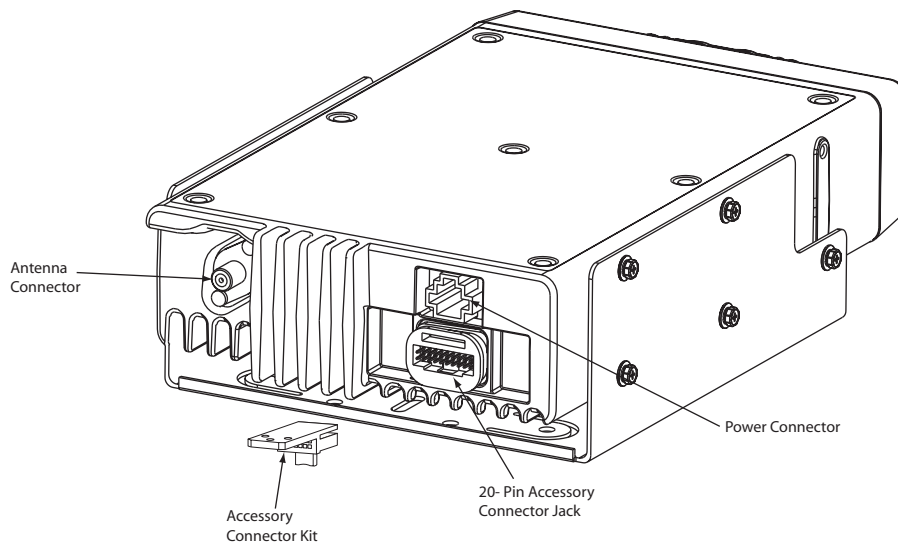


Figure 2-5. Remote Control Head Pinouts

Table 2-1. Connector Pin Functions

Pin	Function	Description
1	External Speaker-	Speaker - and Speaker + (Pin 16) are used to connect an external speaker. The audio PA is a bridge amplifier with a minimum load resistance of 3.2 Ω . The internal speaker can be disabled by removing the control head. Disconnect the internal speaker and assemble the control head back to the radio.
2	External Mic Audio	External or Emergency Mic depends on dealer programming. This microphone signal is independent of the microphone signal on the microphone connector. The nominal input level is 80mV for 60% deviation. The DC impedance is 660 Ω and the AC impedance is 560 Ω .
3	Digital In 1	This is a digital input only and the primary use for this pin is external PTT. This pin must be used if fast DATA PTT is required. (See Note 1).
4	Digital Out 2	This is a digital output only and the primary use for this pin is as an external alarm output (See Note 3).
5	Flat_TX_Audio (NPD Data Out)	This input is intended for injecting signals into the transmit path that should not be filtered; for example, the analog output of a modem. The nominal input level is 150mVrms for 60% deviation. The impedance is greater than 25k Ω .
6	Digital In 3	This is a digital input only. Function depends on dealer programming. (See Note 4).
7	Ground	Used as ground for both analog and digital signals
8	Digital In/Out 4	This is a digital input/output depending on dealer programming. (See Notes 1, 2).
9	Digital In 5 with Wakeup Emergency	This is a digital input only. Emergency can be enabled via the CPS. To activate, this line must be connected to ground; this will turn on the radio. The CPS details which functions may be assigned to this pin by the codeplug.
10	Ignition Detect	Connecting this line to the ignition line of the vehicle will automatically turn the radio on when the ignition of the vehicle is turned on.
11	Receiver Audio	There are two possible outputs: (1) Discriminator Audio; and (2) Continuous filtered RX audio. The nominal output level for Discriminator Audio is 330m Vrms at 60% deviation and for Filtered Audio 600m Vrms at 60% deviation at 1kHz. Function depends on dealer programming.
12	Digital In/Out 7	This digital input/output function depends on dealer programming.
13	Switched Battery Voltage	This voltage is available when the radio is switched on. The maximum current is 1A.
14	Digital In/Out 8	This is a digital input/output depending on dealer programming. (See Notes 1, 2).

Table 2-1. Connector Pin Functions

Pin	Function	Description
15	RSSI	This is an analog output which indicates the strength of the received signal.
16	External Speaker +	Positive output of radio's audio PA (see Pin 1).
17	Bus +	This pin is used for flashing and for programming the radio.
18	Boot Control	To enter Boot Mode this line must be connected to ground when the radio is switched on.
19	Reserved	Reserved
20	Reserved	Reserved

NOTE 1:Digital Input

4.7 k Ω Internal Pull Up Resistor to +5V.

Maximum Input Voltage accepted as Low = 0.6V

Minimum Input Voltage accepted as High = 3.0V

NOTE 2:Digital Output

4.7k Ω Internal Pull Up Resistor to +5V

Maximum Current when Output Low = 10mA

Maximum Voltage when Output Low = 0.5V @ 10mA

NOTE 3:High Current Digital Output

4.7k Ω Internal Pull Up Resistor to continuous B+

Maximum Current when Output Low = 200mA

Maximum Voltage when Output Low = 1.7V @200mA

NOTE 4:Digital Input

10k Ω Internal Pull Up Resistor to +5V

Maximum Input Voltage accepted as Low = 0.6V

Minimum Input Voltage accepted as High = 3V

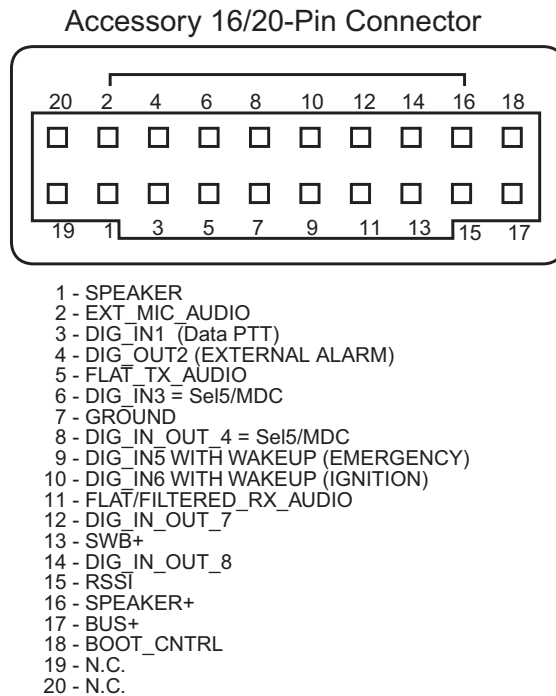


Figure 2-6. Transceiver Rear Accessory Connector Pin Configuration

2.2 Radio Mounting



Caution

CAUTION: DO NOT mount the radio on a plastic dashboard without first reinforcing the dashboard; the weight of the radio may crack or break the dashboard.

CAUTION: DO NOT mount the radio on a flat or concave surface where the radio could be partially submersed in water. This is especially important if the cab area of the vehicle is cleaned by spraying with water. If the radio sits in water for a length of time, moisture may seep inside the radio and damage the electronic components.

CAUTION: DO NOT allow water to stand in recessed areas of vertically mounted radios. Remove any moisture immediately to prevent it from seeping into the radio.

The mounting location must be accessible and visible. Select a location that will permit routing the RF antenna cable as directly as possible.

NOTE: For optimum radio performance, orient the mounting trunnion as shown in [Figure 2-7](#). For installation, use only the PM1200 trunnion, kit number HKLN4334_.

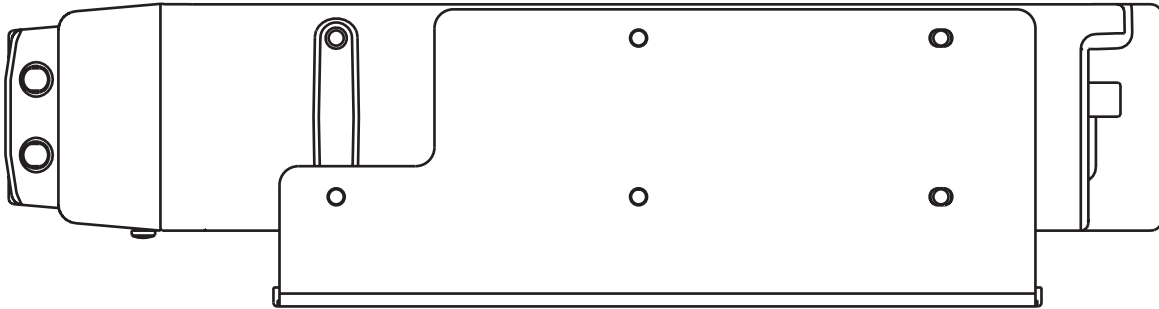


Figure 2-7. Trunnion Orientation for 120W Radios

2.2.1 Remote Mount with Trunnion

2.2.1.1 Transceiver

CAUTION Before installing any electrical equipment, check the vehicle manufacturer's user manual.
The installation of this device should be completed by an authorized servicer or installer.
Before making any holes in the trunk for radio mounting, check the vehicle manufacturer's user manual for restrictions (e.g. due to the gas tank location).

For a remote mount installation, the transceiver may be mounted anywhere in the vehicle, provided that the installation location is safe, follows the cautions mentioned at the beginning of this section, and is accessible for servicing/maintenance as well as cabling. A typical mounting location recommended by Motorola is in the vehicle's trunk. See [Figure 2-5](#) or [Figure 2-4](#) for a remote installation.

2.2.1.1.1 Transceiver Mounting

1. After selecting the mounting location, use the double-sided adhesive tape to temporarily hold the mobile transceiver trunnion in place.
2. Drill the holes you have marked for permanent installation.
3. Secure the transceiver trunnion with the self-drilling screws provided (see [Figure 2-7](#) and [Figure 2-8](#)).
4. *Transceiver trunnion (HKLN4342_)*: See [Figure 2-8](#). After mounting the trunnion to the vehicle using the screws provided, insert the radio into the trunnion. Secure the radio by firmly installing the ten HSM4x8 SUS screws and FW4 AL plain washer provided.

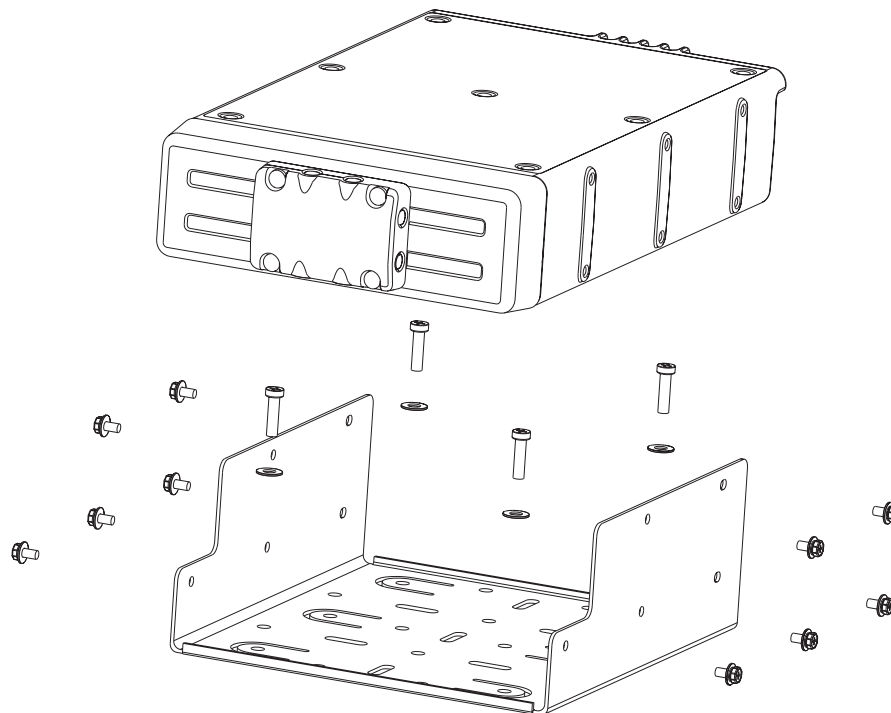


Figure 2-8. 120W Radio Mounting into Screw-Mounted Trunnion

2.2.1.2 Control Head and Remote Mount Cabling

For remote mount configuration, see [Figure 2-4](#).

Choose a mounting location for the radio, considering accessibility, and control and antenna cable lengths.

2.2.1.2.1 Remote Model Control Head Installation

[Figure 2-9](#) shows the control head model.

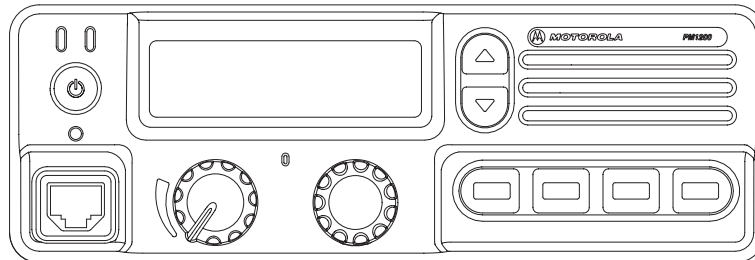


Figure 2-9. PM1200 Control Head

The recommended mounting surfaces for the control unit are under the dashboard, on the transmission hump, or on the center console. [Figure 2-10](#) shows how the trunnion, control head, and cables should be installed for the PM1200 control head.

NOTE: Connector-protective covers are provided with the radio. They should be used for added environmental robustness.

An adjustable trunnion, which allows a number of mounting positions, is supplied for mounting the control unit. The installation must not interfere with the operation of the vehicle or its accessories, nor disturb passenger seating or leg room. The control head must be within convenient reach and viewing of the user.

If the trunnion is mounted on a plastic dashboard, all four mounting screws should penetrate the dashboard's supporting metal frame. If that is not possible, use a metal backing plate (not supplied) to strengthen the installation. Install the control unit as follows:

1. Use double -sided adhesive tape provided to temporarily hold the control head trunnion (HKLN4334_) in place; drill 5/32" holes. If mounting on a plastic surface, use a metal backing plate.
2. Attach the control head trunnion using all four self-tapping screws provided.
3. Temporarily install the control head (adjusting for proper viewing angle) and fasten it to the trunnion with two knob screws. Test the installation to be sure the unit does not wobble or feel "spongy" when you press the buttons.



Caution

CAUTION: Care must be taken to shield the control head (front and back) from direct exposure to pressurized water. The pressurized water from a hose, in most cases, is more severe than the stated test and conditions in typical environments.

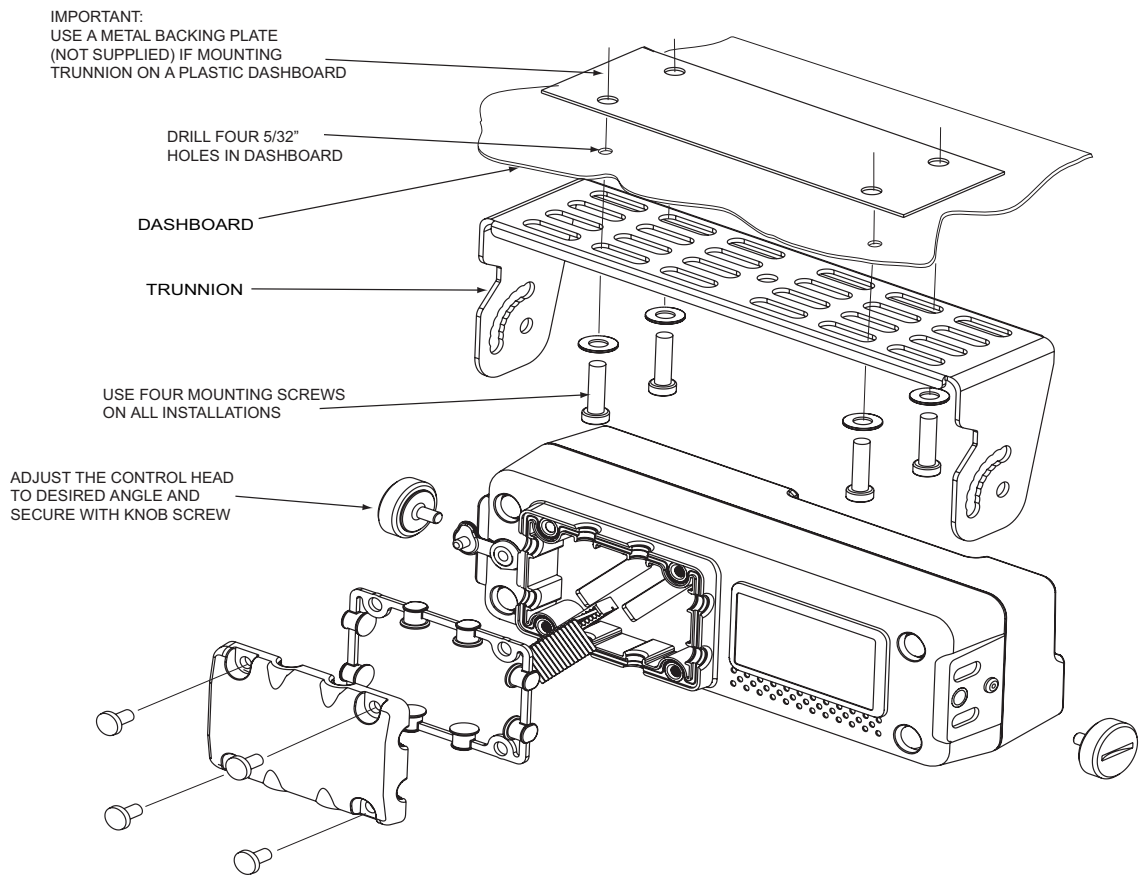


Figure 2-10. Control Head Installation Exploded View

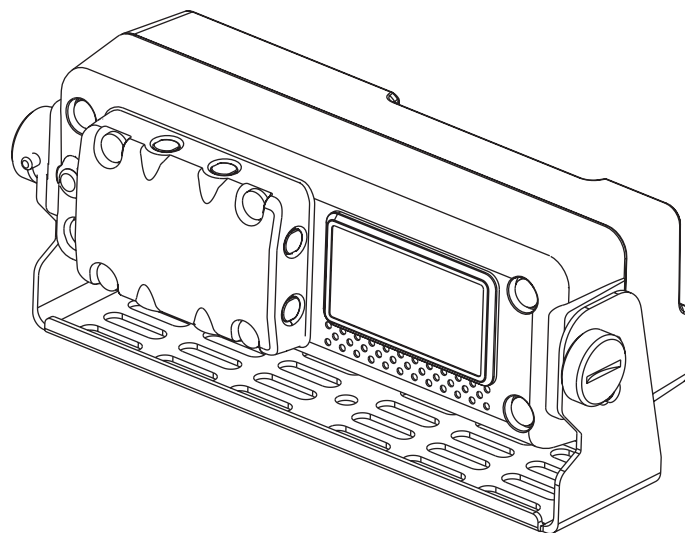


Figure 2-11. Control Head Rear View

2.2.1.2.2 Remote Radio Control Cable Installation

The radio control cable should go from the rear of the control head to the radio. Route the cables in the vehicle's wiring troughs (where available) or route the cables where they are protected from pinching, sharp edges, or crushing. One suggested route is along one side of the driveshaft hump under the carpet. Use grommets in any holes where the cable passes through metal panels.

Figure 2-14 shows how the cables and components are connected.

2.2.1.2.3 Installing the Remote Radio Control Cable to Transceiver

1. Referring to Figure 2-12, at the transceiver end, insert the remote mount cable plug into the mating connector (red color connector) on the adapter unit.

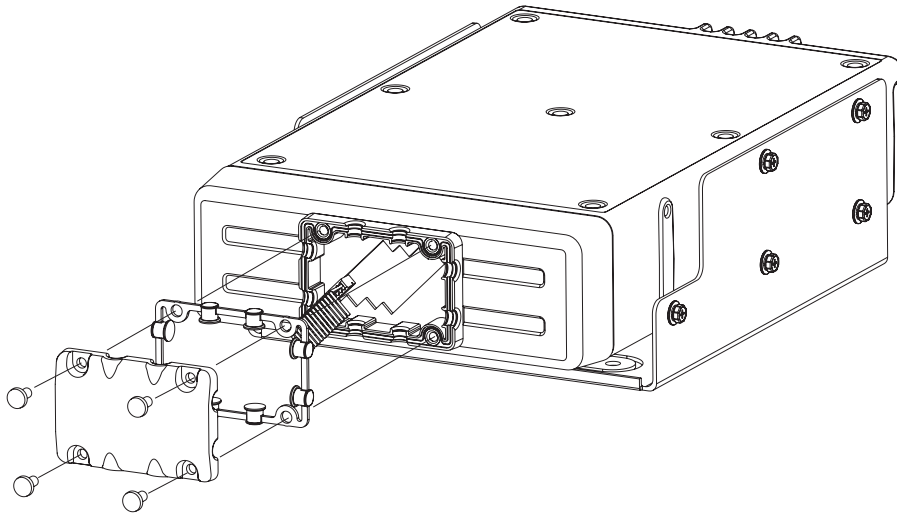


Figure 2-12. Transceiver Exploded View

2. Neatly bundle the exposed cable wiring, and then install the cable strain relief plate and gasket into place using the supplied four screws.
3. Tighten the supplied four screws with suggested torque value of 5-6 in.lbs.
4. Perform the same procedure at the control head; insert the remote mount cable plug and carefully insert the cable relief plate.

CAUTION: Make sure that no wires stray into the screw holes, or are pinched between the plate and adapter surface.

-The plate can be installed to allow the cable to exit from left, right, up or down.

-Cut out the rubber gasket at the point from which you wish the cable to exit.

Example:

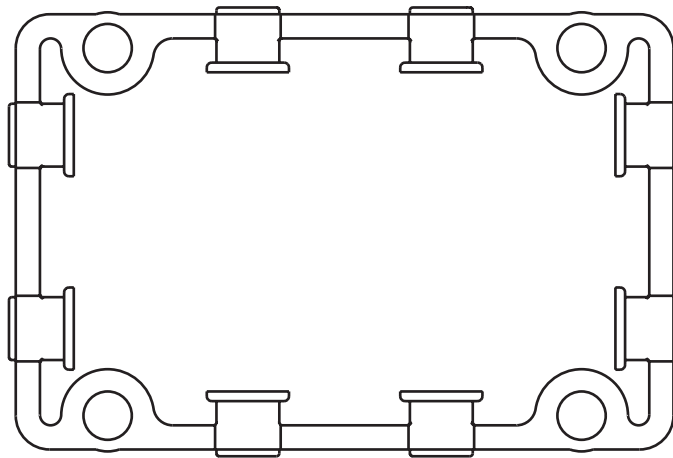


Figure 2-13. Gasket

2.3 Power Cable

Route the power cable from the radio to the vehicle's battery compartment, using accepted industry methods and standards. Be sure to grommet the firewall hole to protect the cable. Make sure the 40-amp (for 120W) fuse is attached in the fuseholder. Connect the red lead of the radio power cable to the positive battery terminal. Connect the black lead to a convenient solid chassis ground point. DO NOT connect the black lead directly to the battery's negative terminal.

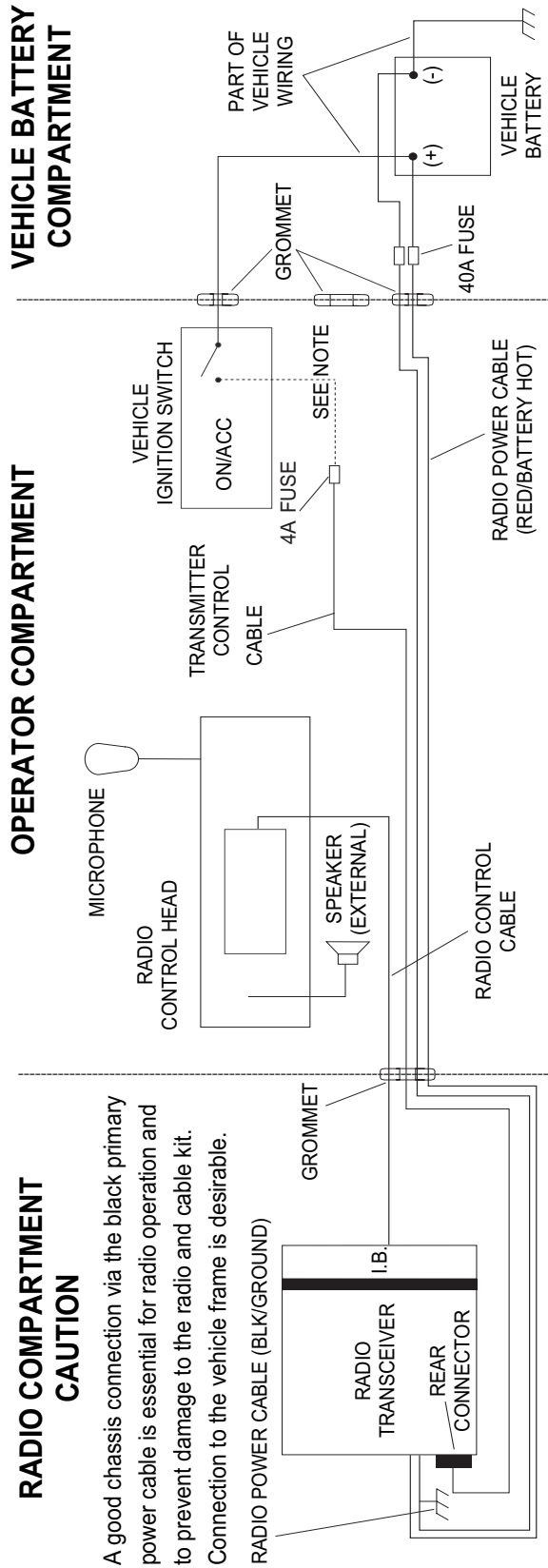


Figure 2-14. Cabling Interconnect Diagram for Remote Mount

2.4 Antenna Installation

IMPORTANT NOTE: To assure optimum performance and compliance with RF Energy Safety standards, these antenna installation guidelines and instructions are limited to metal-body vehicles with appropriate ground planes and take into account the potential exposure of back seat passengers and bystanders outside the vehicle.

NOTE: For mobile radios with rated power of 7 watts or less, the only installation restrictions are to use only Motorola approved antennas and install the antenna externally on metal body vehicles. For mobile radios with rated power greater than 7 Watts, always adhere to all the guidelines and restrictions in section 2.4.1 below.

2.4.1 Selecting an Antenna Site/Location on a Metal Body Vehicle

1. **External installation** – Check the requirements of the antenna supplier and install the vehicle antenna external to a metal body vehicle in accordance with those requirements.
2. **Mounting restrictions for certain radio models**

Motorola recommends that mobile antennas be located as follows:

Standard metal passenger vehicles	Center trunk lid
-----------------------------------	------------------

NOTE: Minimum lateral distance for people in an uncontrolled environment from the body of a vehicle with transmitting antenna should be 5.0 feet and recommended for trunk lid installation for optimum performance.

3. Ensure that the antenna cable can be easily routed to the radio. Route the antenna cable as far away as possible from any vehicle electronic control units and associated wiring.
4. Check the antenna location for any electrical interference.

NOTE: Any two metal pieces rubbing against each other (such as seat springs, shift levers, trunk and hood lids, exhaust pipes, etc.) in close proximity to the antenna can cause severe receiver interference.

5. Trunk lid - On some vehicles with clearly defined, flat trunk lids, the antennas of some models (see restrictions below) can also be mounted on the center area of the trunk lid. For vehicles without clearly defined, flat trunk lids (such as hatchback autos, sport utility vehicles, and pick-up trucks), mount the antenna in the center area of the roof.

Before installing antenna on the trunk lid, be sure that the distance from the antenna location on the trunk lid will be at least 85 cm (33 inches) from the front surface of the rear seat-back to ensure compliance with RF energy Safety standards.

Ensure that the trunk lid is grounded by connecting grounding straps between the trunk lid and the vehicle chassis.

NOTE: If these conditions cannot be satisfied, then mount the antenna on the roof top.

2.4.2 Mini-UHF Connection

To ensure a secure connection of an antenna cable's mini-UHF plug to a radio's mini-UHF jack, their interlocking features must be properly engaged. If they are not properly engaged, the system will loosen. Using a tool (pliers or wrench) is not recommended.

NOTE: Applying excessive force with a tool can cause damage to the antenna or the connector (e.g., stripping threads, deforming the collar or connector, or causing the connector to twist in the housing opening and break).

The mini-UHF connector tool (Motorola part number HLN6695_) is designed to securely tighten the antenna plug–radio jack connection without damaging either the plug or the jack.

Motorola recommends the following sequence to ensure proper attachment of the system (see [Figure 2-15](#)).

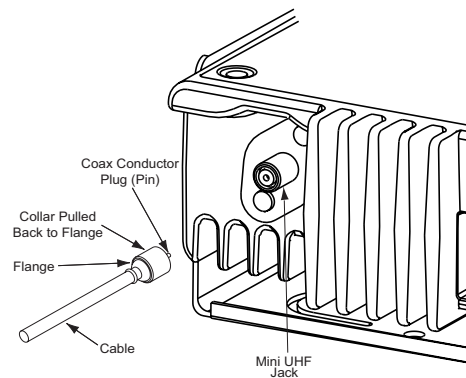


Figure 2-15. Mini-UHF Connection

1. Make sure that there is sufficient slack in the antenna cable.
2. Make sure that the collar of the antenna cable plug is loose and does not bind.
3. Make sure that the mini-UHF jack is tight in the radio housing.
4. Slide the collar back against the flange. Insert the antenna cable plug's pin fully into the radio jack, but do not engage the threads.
5. Ensure that the plug's and jack's interlocking features are fully seated. Check this by grasping the crimp on the cable jack, rotating the cable, and noting any movement. If the features are seated correctly, there should be NO movement.
6. Finger-tighten the antenna cable plug's collar onto the radio's jack.
7. Give a final tug, by hand, to the collar, and retighten by hand as firmly as possible.
8. Slip the mini-UHF connector tool over the coaxial cable, using the gap between the tool's legs. Then, slide the tool up onto the plug's knurled collar. Squeeze the two straight legs of the tool firmly together between your thumb and index finger and turn clockwise (as shown) to tighten the collar. It should take 1/4 turn or less. When you feel the tool slipping on the collar, the connection has been properly tightened. The tool can also be used to loosen a tight collar.

NOTE: DO NOT use pliers or any other device to grip the tightening tool. It has been designed to allow you to achieve the proper torque on the collar without overtightening. Overtightening the collar can damage the connector and the radio.

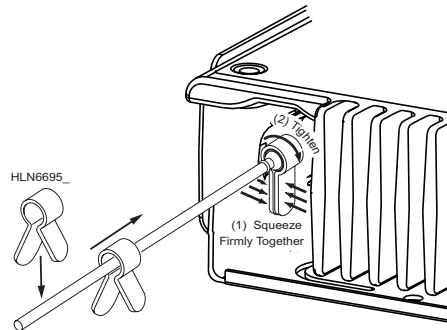


Figure 2-16. Mini-UHF Connector Tool

2.5 Completing the Installation

Complete the installation by connecting the speaker and power wires and plugging in the microphone cable/handheld control unit.

Notes

Chapter 3 Options and Accessories Installation

3.1 Emergency Pushbutton, Footswitch, Horn Relay, and Light Relay Installation

Perform the following installation procedure:

1. Select an appropriate place to mount the option or accessory hardware.
2. Route the accessory-to-control head cables under floor coverings or behind panels so that the vehicle occupants do not snag or break the wires.

3.2 Emergency Pushbutton or Footswitch Installation

Mount the switch using the hardware that comes with the kit. Connect the emergency switch wires to a ground pin and a emergency pin.

3.3 Horn (External Alarm) Relay Installation

Mount the horn relay in a suitable location (normally under the dash). Connect the relay contacts across the horn ring switch, typically found in the steering column. Connect the two control wires to a SW B+ pin and a Programmable output pin on the 20-pins accessory connector.

3.3.1 Lights (External Alarm) Relay Installation

Mount the light relay in a suitable location (normally under the dash). Connect the relay contacts across the headlamp ON/OFF switch. Connect the two control wires to a SW B+ pin and a VIP OUT pin on the 20-pins accessory connector

3.4 Speaker

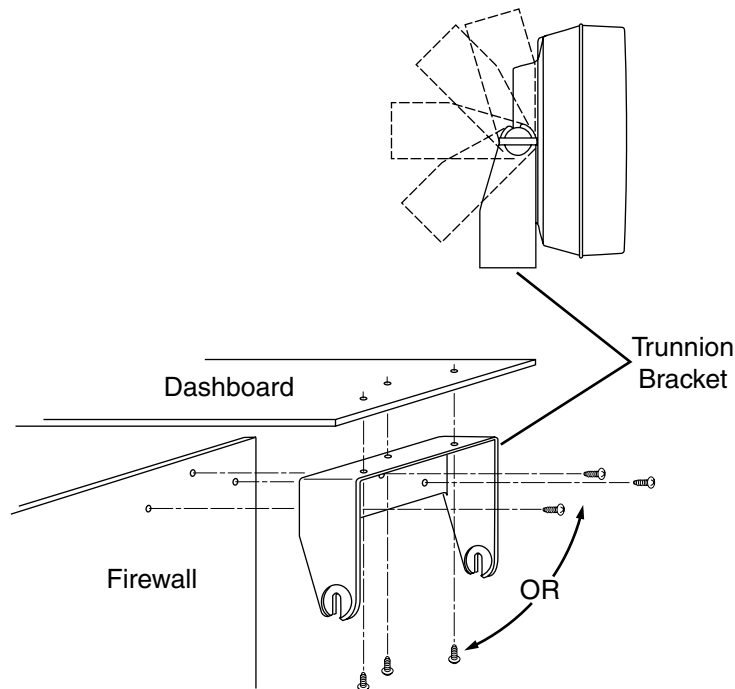


Caution

CAUTION: DO NOT ground the radio's speaker leads. This system has a floating speaker output (dc voltage on both leads); damage to the audio circuit will result if either lead is grounded or if they are shorted together.

The speaker kit includes a trunnion bracket that allows the speaker to be mounted in a variety of ways. With the trunnion bracket, the speaker can mount permanently on the dashboard or in accessible firewall areas. The trunnion allows the speaker to tilt for best operation. Mount the speaker out of the way so that it will not be kicked or knocked around by the vehicle occupants. Mount the speaker as follows:

1. Use the speaker mounting bracket as a template to mark the mounting hole locations.
2. Use the self-drilling screws provided to fasten the trunnion.
3. Attach the speaker and fasten to the trunnion with two wing screws.
4. Route the speaker wires under the carpet or floor covering, or behind the kick panels. Be sure the wires are out of the way and will not be snagged and broken by the occupants of the vehicle.



MAEPF-25764-O

Figure 3-1. Speaker Mounting

3.5 Microphone Hang-Up Clip

3.5.1 Standard Hang-Up Clip

The hang-up clip must be within reach of the operator(s). Measure this distance before actually mounting the bracket. Since the bracket has a positive-detent action, the microphone can be mounted in any position.

Use the hang-up clip as a template to locate the mounting holes. To avoid interference when removing the microphone, install the flathead screw in the top clip hole.

3.5.2 Handheld Hang-Up Box

Use the hang-up box (HUB) as a template to locate the mounting holes. Be sure the HUB will be within easy reach of the operator. Route the control wire with the male pin to the accessory cable connector at the rear of the radio or cable harness as shown in [Figure 2-4](#). Open the accessory cable connector and connect the HUB control wire to location 3 of the accessory connector. Connect the other control wire from the HUB to a convenient solid chassis ground point.

3.6 Ignition Sense Wiring

3.6.1 Ignition Sense Wiring Installation

Please refer to the figure 2-14 for the connection diagram.

Vehicle	Radio
Ignition Switch	Rear panel connector of PIN # 10
Battery minus(GND)	Rear panel connector of PIN #7

WARNING: Please ensure each line polarity and DO NOT connect reversely!

Function Setting Procedure:

Function activate (Enable)

1. Press and hold power and PF2 button simultaneously.
2. "ING ON" on LCD will be displayed in short period.

Function off (disable)

1. Press and hold power and PF2 button simultaneously.
2. "ING OFF" on LCD will be displayed in short period.

3.7 Option Board

The PM1200 Quik Call II Decoder Option Board (HKLN4346_) and the PM1200 Digital ANI Encoder Option Board ([*]HKLN4347_) are two types of option board. These option boards require an Interface Board (HKLN4345_) in order to install it to the radio.

Perform the following installation procedure:

1. Ensure all accessory connection, power, antenna and microphone are unplugged.
2. Using a CR-V PH2 screwdriver, remove 7 binding head screws M3x6 SUS B from the radio's top cover. Keep them for later use.
3. Handle the interface board and option board by the edges only, and take them out from the antistatic bag.
4. Attach the foam to the Interface Board as shown in Figure 3-2. Separate the adhesive cover from the bottom of the provided foam first. Please take note that there are two foams. The foam on the Interface Board is thinner.

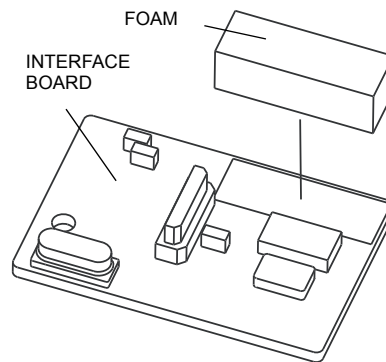


Figure 3-2. Paste Foam to Interface Board

5. Separate the adhesive cover on top of the foam, on the Interface Board.
6. Attach the Interface Board onto the Main Unit PCB. Then, using a CR-V PH2 torque driver, fasten the provided tapite screw M2.6X6 to the chassis as shown in Figure 3-3 (Torqued to 3-4 in. lbs).

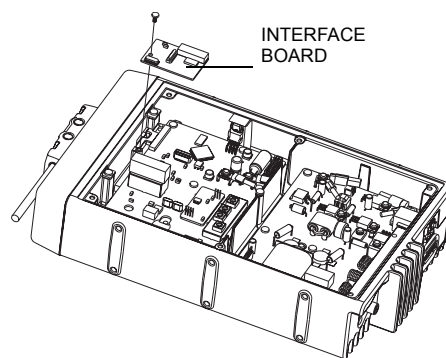


Figure 3-3. Installing Interface Board

* Subject to Availability

7. Attach the foam on top of the option board as shown in Figure 3-4. Separate the adhesive cover from the bottom of the thicker foam first. It should be behind the connector.

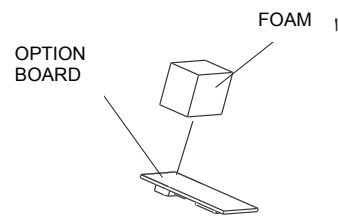


Figure 3-4. Paste Foam to Option Board

8. Attach the option board to the Interface Board as shown in Figure 3-5

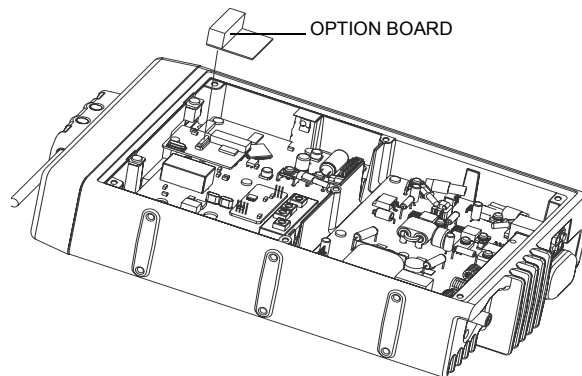


Figure 3-5. Installation Option Board to Interface Board

9. Place the top cover on the chassis and position it properly. You can compress the cover and chassis together to squeeze the foam into place and make torquing the screws easier.
10. Using a CR-V PH2 torque driver, fasten the 7 binding head screws M3X6 SUS B to the top cover. Follow the sequence as shown in Figure 3-6. (Torqued to 5-6 in. lbs)

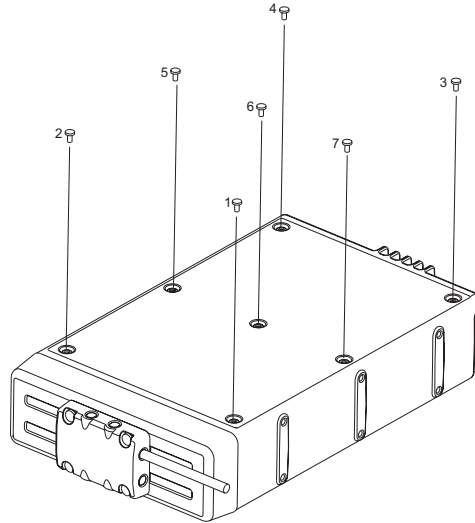


Figure 3-6. Top Cover Screws Sequence

Chapter 4 Finishing the Installation

Perform the following if it has not been previously done:

1. Turn the radio **ON** at the control head and verify proper operation of all controls and indicators. Radio operation in some installations require turning on the ignition. Perform a complete operational check of the radio.
2. Dress the control and power cables out of the way to prevent damage (pull any excess cable into the trunk area) securing with clamps and tie wraps where necessary.

Notes

Appendix A Replacement Parts Ordering

A.1 Basic Ordering Information

When ordering replacement parts or equipment information, the complete identification number should be included. This applies to all components, kits, and chassis. If the component part number is not known, the order should include the number of the chassis or kit of which it is a part, and sufficient description of the desired component to identify it.

Crystal orders should specify the crystal type number, crystal and carrier frequency, and the model number in which the part is used.

The PM1200 Mobile Radio Basic Service Manual (Motorola publication part number 6871241L01) includes complete parts lists and parts numbers.

A.2 Motorola Online

Motorola Online users can access our online catalog at

<https://businessonline.motorola.com/>

To register for online access:

- Domestic customers: please call 800-814-0601 (U.S. and Canada).
- International customers: please go to https://businessonline.motorola.com and click on “Sign Up Now.”

A.3 Mail Orders

Send written orders to the following addresses:

**Replacement Parts/
Test Equipment/Manuals/
Crystal Service Items:**

Motorola Inc.
Radio Products and Services Division*
Attention: Order Processing
2200 Galvin Drive
Elgin, IL 60123
U.S.A.

A.4 Telephone Orders

Radio Products and Services Division*
(United States and Canada)
7:00 AM to 7:00 PM (Central Standard Time)
Monday through Friday (Chicago, U.S.A.)
1-800-422-4210

A.5 Fax Orders

Radio Products and Services Division*
(United States and Canada)
1-800-622-6210

A.6 Parts Identification

Radio Products and Services Division*
(United States and Canada)
1-800-422-4210, menu 3

A.7 Product Customer Service

Customer Response Center
(Non-technical Issues)
1-800-247-2346
FAX:1-800-247-2347

*The Radio Products and Services Division (RPSD) was formerly known as the Customer Care and Services Division (CCSD) and/or the Accessories and Aftermarket Division (AAD).

Glossary

Term	Definition
A/D	<i>See analog-to-digital conversion.</i>
ADC	<i>See analog-to-digital converter.</i>
ADDAG	<i>See Analog-to-Digital, Digital-to-Analog and Glue.</i>
analog	Refers to a continuously variable signal or a circuit or device designed to handle such signals. <i>See also digital.</i>
analog-to-digital conversion	Conversion of an instantaneous dc voltage level to a corresponding digital value. <i>See also digital-to-analog conversion.</i>
analog-to-digital converter	A device that converts analog signals into digital data. <i>See also digital-to-analog converter.</i>
band	Frequencies allowed for a specific purpose.
baseband interface port	Synchronous serial interface to the transceiver board used to transfer transmit and receive audio data.
CODEC	<i>See coder/decoder.</i>
coder/decoder	A device that encodes or decodes a signal.
CPS	<i>See Customer Programming Software.</i>
Customer Programming Software	Software with a graphical user interface containing the feature set of an radio.
D/A	<i>See digital-to-analog conversion.</i>
DAC	<i>See digital-to-analog converter.</i>
default	A pre-defined set of parameters.
digital	Refers to data that is stored or transmitted as a sequence of discrete symbols from a finite set; most commonly this means binary data represented using electronic or electromagnetic signals. <i>See also analog.</i>
digital-to-analog conversion	Conversion of a digital signal to a voltage that is proportional to the input value. <i>See also analog-to-digital conversion.</i>
digital-to-analog converter	A device that converts digital data into analog signals. <i>See also analog-to-digital converter.</i>

Term	Definition
digital signal processor	A microcontroller specifically designed for performing the mathematics involved in manipulating analog information, such as sound, that has been converted into a digital form.
DSP	<i>See digital signal processor.</i>
DTMF	<i>See dual tone multi-frequency.</i>
dual tone multi-frequency	The system used by touch-tone telephones. DTMF assigns two specific frequencies, or tones, to each key so that it can easily be identified by a microprocessor.
EEPROM	<i>See Electrically Erasable Programmable Read-Only Memory.</i>
Electrically Erasable Programmable Read-Only Memory	A special type of PROM that can be erased by exposing it to an electrical charge. An EEPROM retains its contents even when the power is turned off.
FCC	Federal Communications Commission.
firmware	Code executed by an embedded processor such as the Host or DSP in a subscriber radio. This type of code is typically resident in non-volatile memory and as such is more difficult to change than code executed from RAM.
FGU	<i>See frequency generation unit.</i>
flash	A non-volatile memory device similar to an EEPROM. Flash memory must be erased and reprogrammed in blocks instead of one byte at a time.
FLASHcode	A 13-digit code which uniquely identifies the System Software Package and Software Revenue Options that are enabled in a particular subscriber radio. FLASHcodes are only applicable for radios which are upgradeable through the FLASHport process.
FLASHport	A Motorola term that describes the ability of a radio to change contents of memory. Every FLASHport radio contains a FLASHport EEPROM memory chip that can be software written and rewritten to, again and again.
frequency	Number of times a complete electromagnetic-wave cycle occurs in a fixed unit of time (usually one second).
frequency generation unit	This unit generates ultra-stable, low-phase noise master clock and other derived synchronization clocks that are distributed throughout the communication network.
IC	<i>See integrated circuit.</i>
IF	Intermediate Frequency.

Term	Definition
integrated circuit	An assembly of interconnected components on a small semiconductor chip, usually made of silicon. One chip can contain millions of microscopic components and perform many functions.
kHz	<i>See kilohertz.</i>
kilohertz	One thousand cycles per second. Used especially as a radio-frequency unit.
LCD	<i>See liquid-crystal display.</i>
LED	<i>See light emitting diode.</i>
light emitting diode	An electronic device that lights up when an electrical current is passed through it.
liquid-crystal display	An LCD uses two sheets of polarizing material with a liquid-crystal solution between them. An electric current passed through the liquid causes the crystals to align so that light cannot pass through them.
LO	Local oscillator.
Master In Slave Out	SPI data line from a peripheral to the MCU.
Master Out Slave In	SPI data line from the MCU to a peripheral.
MCU	<i>See microcontroller unit.</i>
MHz	<i>See Megahertz.</i>
Megahertz	One million cycles per second. Used especially as a radio-frequency unit.
microcontroller unit	Also written as μC . A microprocessor that contains RAM and ROM components, as well as communications and programming components and peripherals.
MISO	<i>See Master In Slave Out.</i>
MOSI	<i>See Master Out Slave In.</i>
multiplexer	An electronic device that combines several signals for transmission on some shared medium (e.g., a telephone wire).
MUX	<i>See multiplexer.</i>
oscillator	An electronic device that produces alternating electric current and commonly employs tuned circuits and amplifying components.
PA	Power amplifier.
paging	One-way communication that alerts the receiver to retrieve a message.
PC Board	Printed Circuit Board. Also referred to as a PCB.

Term	Definition
phase-locked loop	A circuit in which an oscillator is kept in phase with a reference, usually after passing through a frequency divider.
PL	<i>See private-line tone squelch.</i>
PLL	<i>See phase-locked loop.</i>
private-line tone squelch	A continuous sub-audible tone that is transmitted along with the carrier.
Programmable Read-Only Memory	A memory chip on which data can be written only once. Once data has been written onto a PROM, it remains there forever.
programming cable	A cable that allows the CPS to communicate directly with the radio.
PROM	<i>See Programmable Read-Only Memory.</i>
PTT	<i>See Push-to-Talk.</i>
Push-to-Talk	The switch or button usually located on the left side of the radio which, when pressed, causes the radio to transmit. When the PTT is released, the unit returns to receive operation.
radio frequency	The portion of the electromagnetic spectrum between audio sound and infrared light (approximately 10 kHz to 10 GHz).
radio frequency power amplifier	Amplifier having one or more active devices to amplify radio signals.
RAM	<i>See random access memory.</i>
random access memory	A type of computer memory that can be accessed randomly; that is, any byte of memory can be accessed without touching the preceding bytes.
read-only memory	A type of computer memory on which data has been prerecorded. Once data has been written onto a ROM chip, it cannot be removed and can only be read.
receiver	Electronic device that amplifies RF signals. A receiver separates the audio signal from the RF carrier, amplifies it, and converts it back to the original sound waves.
registers	Short-term data-storage circuits within the microcontroller unit or programmable logic IC.
RESET	Reset line: an input to the microcontroller that restarts execution.
RF	<i>See radio frequency.</i>
RF PA	<i>See radio frequency power amplifier.</i>
ROM	<i>See read-only memory.</i>
RX	Receive.

Term	Definition
RX DATA	Recovered digital data line.
Serial Communication Interface Input Line	A full-duplex (receiver/transmitter) asynchronous serial interface.
Serial Peripheral Interface	Interface used by the microcontroller to communicate modules and ICs.
signal	An electrically transmitted electromagnetic wave.
softpot	<i>See software potentiometer.</i>
software	Computer programs, procedures, rules, documentation, and data pertaining to the operation of a system.
software potentiometer	A computer-adjustable electronic attenuator.
spectrum	Frequency range within which radiation has specific characteristics.
SPI	<i>See Serial Peripheral Interface.</i>
squelch	Muting of audio circuits when received signal levels fall below a pre-determined value. With carrier squelch, all channel activity that exceeds the radio's preset squelch level can be heard.
SRAM	<i>See static RAM.</i>
Standby mode	An operating mode in which the radio is muted but still continues to monitor data.
static RAM	A type of memory used for volatile, program/data memory that does not need to be refreshed.
time-out timer	A timer that limits the length of a transmission.
TOT	<i>See time-out timer.</i>
transceiver	Transmitter-receiver. A device that both transmits and receives analog or digital signals. Also abbreviated as XCVR.
transmitter	Electronic equipment that generates and amplifies an RF carrier signal, modulates the signal, and then radiates it into space.
TX	Transmit.
UHF	Ultra-High Frequency.

Term	Definition
VCO	<i>See voltage-controlled oscillator.</i>
VHF	Very-High Frequency.
voltage-controlled oscillator	An oscillator in which the frequency of oscillation can be varied by changing a control voltage.
VSWR	Voltage Standing Wave Ratio.

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