emergency accessory is installed, the radio powers up incorrectly into emergency mode all the time. Refer to Figure 89: Emergency Jumper Removal in Remote Mount on page 86 for details.

The design of the control head is different compared to the radio. Therefore it is also not necessary to attach HLN6863 to J100 to prevent accidental emergency operation. The control head uses an edge-detect, not a state-detect like on the radio, so mounting of HLN6863 is not mandatory.

Table 2: Dash O2, O3, O5, O7, or O9 Radio Operations Dependent Upon A+ and Ignition Connections

Dash Mount	Transceiver Red Power Wire	HLN6863 Thin Red Wire	Transceiver Red Power Wire	HLN6863 Thin Red Wire	Transceiver Red Power Wire	HLN6863 Thin Red Wire
Connected to battery	X	X	X			X
Connected to ignition switch				X	X	X
Ignition switch controls	No ignition switch control.		Enables ignition switch functionality as programmed in the codeplug.		Illegal wiring configuration.	

Table 3: Remote O2, O3, O5, E5, O7, or O9 Radio Operations Dependent Upon A+ and Ignition Connections

Remote Mount	Control Head Red Wire	Control Head Yellow Wire	Control Head Red Wire	Control Head Yellow Wire	Control Head Red Wire	Control Head Yellow Wire
Connected to battery	X	X	X			X
Connected to ignition switch				X	X	X
Ignition switch controls	No ignition switch control.		Enables ignition switch functionality as programmed in the codeplug.		Illegal wiring configuration.	

Table 4: Remote O2, O3, O5, E5, O7, or O9 Radio Operations Dependent Upon A+ and Ignition Connections

Mid Power Dash/ Remote	Transceiver Red Power Wire	HLN6863 Thin Red Wire at J2	Transceiver Red Power Wire	HLN6863 Thin Red Wire at J2	Transceiver Red Power Wire	HLN6863 Thin Red Wire at J2
High-Power Dash/ Remote		HLN6863 Thin Red Wire at J626		HLN6863 Thin Red Wire at J626		HLN6863 Thin Red Wire at J626
Connected to battery	X	X	X			

Mid Power Dash/ Remote High-Power Dash/ Remote	Transceiver Red Power Wire	HLN6863 Thin Red Wire at J2 HLN6863 Thin Red Wire at J626	Transceiver Red Power Wire	HLN6863 Thin Red Wire at J2 HLN6863 Thin Red Wire at J626	Transceiver Red Power Wire	HLN6863 Thin Red Wire at J2 HLN6863 Thin Red Wire at J626
Connected to ignition switch				X	X	X
Ignition switch controls	No ignition switch control.		Enables ignition switch functionality as programmed in the codeplug.		Illegal wiring configuration.	

CAUTION:
DO NOT connect any wires to the battery terminals until you have finished the entire radio installation (dash or remote mount configuration) to avoid potential equipment damage.

Incorrect wiring of the radio may result in incorrect ignition sense detection, incorrect power-on state, or incorrect power-off state of the radio system.

The Control Head Power cable wire (RED) and Transceiver Power cable wire (RED) are always attached to the battery terminal and NOT to the ignition switch.

2.1.4
Ignition Sense Switch (Radio Wide Advance)

The CPS (Customer Programming Software) selectable settings is used to control the radio functionality based on the state of the vehicle Ignition status. These descriptions can be found in the CPS tool HELP Guides and are repeated here for convenience.

Table 5: Ignition Sense Switch Settings in CPS

Feature	Description
Blank	• Radio POWERS ON when the **Power** button is pressed or with the Emergency Power-up feature. • Radio POWERS OFF when the **Power** button is pressed.
TX Inhibit	• Radio POWERS ON when the **Power** button is pressed or with the Emergency Power-up feature. • Radio POWERS OFF when the **Power** button is pressed. • If IGNITION is not present, all transmissions are inhibited. • The radio does not affiliate with trunking systems and therefore cannot receive any trunking dispatch communications. • Emergency Alarm transmissions are NOT possible with the use of the Emergency Power-up feature.
PTT TX Inhibit	• Radio POWERS ON when the **Power** button is pressed or with the Emergency Power-up feature. • Radio POWERS OFF when the **Power** button is pressed.

Feature	Description
	• If IGNITION is not present, all transmissions are inhibited. • The radio is able to affiliate with trunking systems. The radio can ONLY receive trunking dispatch communications. • Emergency Alarm transmissions are possible with the use of the Emergency Power-up feature.
Required	• Radio POWERS ON when the **Power** button is pressed and Ignition is present. • Radio POWERS ON when Ignition is cycled and radio was previously turned ON. • Radio POWERS OFF when the **Power** button is pressed, or when Ignition is lost.
Soft Power-off	• Radio POWERS ON when the **Power** button is pressed, or when Ignition is detected. • Radio POWERS OFF when the **Power** button is pressed, or when Ignition is lost.
Ignition Only Power-up	• Radio POWERS ON when Ignition is present. • Radio POWERS OFF when Ignition is lost. • Control head **Power** button is ignored.

NOTICE: When either TX Inhibit, PTT TX Inhibit or Required are selected, the Emergency Power-up feature is not available.

When any other Ignition Switch setting is made, Emergency Power-up is available regardless of the current ignition state.

Any optional inactivity time-out timer setting in CPS may delay the power-off of the radio once Ignition sense is removed.

2.1.5
Siren/PA Configuration and Programming

The Siren/PA is shipped pre-wired for 100 W operation. It can be rewired for 65 W, 75 W, or 130 W power levels. Refer to this procedure if you want to change to another power level.

Procedure:

1. Open the Siren/PA connector cover to gain access to the two-connector speaker leads.

   Do not change the speaker common lead (pin 20). The other lead is connected to pin 35 (for 100 W operation).
2. Using an appropriate pin removal tool, extract pin 35 and move it to one of the following pin locations:
   - Pin location 36 for 75 W operation
   - Pin location 28 for 65 W or 130 W operation
3. Do one of the following:
   - For 65 W or 75 W operation, reassemble the connector.

- For 130 W operation, parallel the two 11 Ω speakers, each rated at 65 W minimum.

Proper phasing of the two speakers is important when connecting two speakers in parallel, wire similar speaker terminals together to ensure maximum loudness and prevent "deadspots". For example, if the terminals are marked "1" and "2", connect the terminals marked "1" together and connect those wires to one speaker lead. Connect the terminals marked "2" together and connect those wires to the other speaker lead.

CAUTION: Before continuing, remember that under a high-line supply condition (16.6 V), up to 30% more power goes to the speakers after reconfiguring for 130 W operation. Do this setting only when your PA speakers can handle the extra power.

4 When the Siren/PA is configured for dual speaker for 130 W operation, it is necessary to remove a resistor and move two jumpers to set the correct power level. Remove the Siren/PA cover, and locate resistor R219 (0 Ω). This resistor should be removed for 130 W operation. Locate jumpers JU100 and JU101. These jumpers should be installed for 130 W operation.

5 Close and reconnect the Siren/PA connector cover.

NOTICE: Jumpers JU100 and JU101 do not affect the Siren output level. JU100 and JU101 compensate for the lower speaker load and the two speakers in parallel by decreasing the gain U102-1. JU100 affects the radio PA level and JU101 affects the PA audio level.

Pin locations of various power level configurations are listed in the following table.

Table 6: Power Level Configurations

Power Level	Pin Location of Speaker Leads	R219	JU100/JU101
65 W	20, 28	IN	Across pins A and B
75 W	20, 36	IN	Across pins A and B
100 W	20, 35	IN	Across pins A and B
130 W	20, 28	OUT	Across pins B and C

2.2 Radio Mounting

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

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

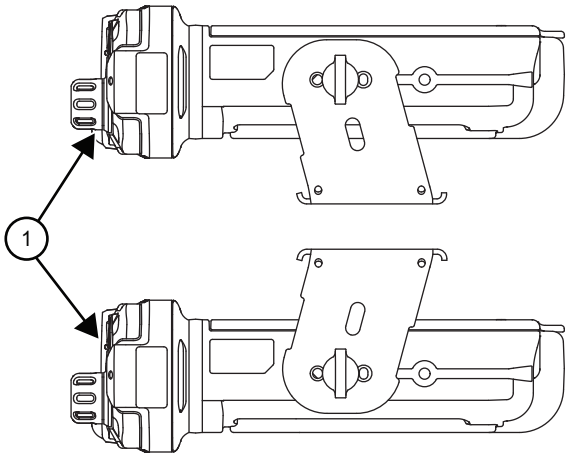
DO NOT allow water to stand in recessed areas of vertically mounted radios. Remove any moisture immediately to prevent it from seeping down into the radio.

Shield the control head (front and back) from direct exposure to pressurized water. The pressurized water from a hose usually is more severe than the stated test and conditions in typical environments.

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

NOTICE: For optimum radio performance, orient the mounting trunnion as shown in the following figures. For new or existing installations of APX 2500, APX 4500, and APX 1500, use only the APX mobile trunnion, kit number HLN6861_.

Figure 44: Enhanced Single Band Mobile Radio Trunnion Orientation



Applies to radios in dash and remote installations.

No.	Description
1	Radio Front

2.2.1
Dash Mount with Trunnion

Procedure:

1. Referring to the following table, select the suitable trunnion kit per the type of mid power radio.
2. Mount your radio on the transmission hump or under the dash.

   NOTICE:
   When mounting the trunnion on the transmission hump, ensure that the transmission housing is not affected. Plan your installation, ensuring enough room for the accessory connector and cable at the back of the radio.

   This configuration shows the O5 control head. The TIB is used for O3 control head for the same configuration.

Figure 45: Transmission Hump Trunnion Mounting

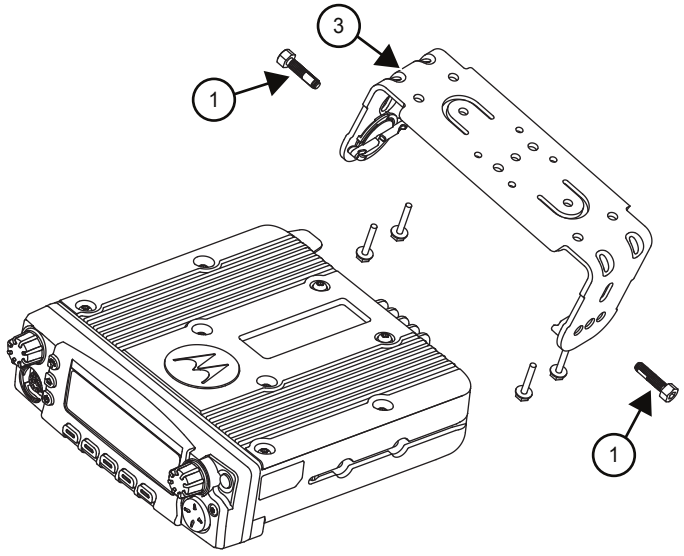


Figure 46: Below Dash Trunnion Mounting

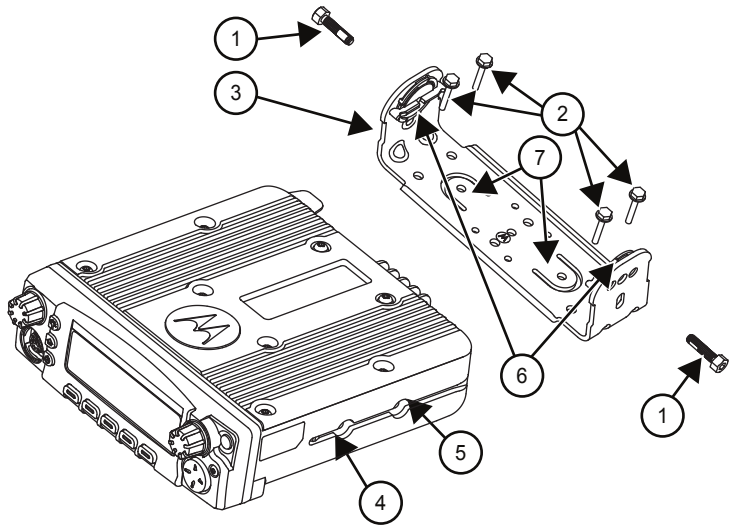


Table 7: Mid Power Trunnion Kit

Item	Part Number	Description	Mid Power Radio
1	0305760W04	Trunnion Mounting Wing Screw	Enhanced Single Band Mobile
2	0312002B14	Self-Drilling Tapping Screw	Enhanced Single Band Mobile
3	HLN6861_	ASTRO Trunnion Hardware Kit	Enhanced Single Band Mobile
4	-	Threaded Hole for Screw	-
5	-	Groove	-

Item	Part Number	Description	Mid Power Radio
6	-	Plastic Guides	-

3 Using the trunnion mounting bracket as a template, mark the positions of the holes on the mounting surface. Use the innermost four holes for a curved mounting surface such as the transmission hump, and the four outermost holes for a flat surface such as under the dash.

4 Center punch the spots you have marked and realign the trunnion in position.

5 Secure the trunnion mounting bracket with the four self-drilling screws provided.

6 Ensure that the plastic guides are aligned (horizontal) to the grooves of the trunnion. Slide the radio into the grooves until it snaps into place.

7 Secure the radio with the two screws provided (Item 1). The torque down force for 0371859H01 should be between 50 in-lbf to 52 in-lbf.

8 For screw 0305760W04, the wing screw torque tool (HLN6970_) is designed to securely tighten the trunnion wing screws while installing the radio. The tool can also be used to loosen the wing screws. Detailed instructions are included in the tool packaging.

2.2.2
Remote Mount with Trunnion

For remote mount installation, the radio may be mounted anywhere in the vehicle, as long as the installation location is safe, follows the cautions mentioned at the beginning of this section, and is accessible for servicing/maintenance and cabling. A typical mounting location recommended by Motorola Solutions is in the trunk of the vehicle. The trunnion provided may still be used to mount the transceiver, and the mounting process is the same for dash mount installation. See Figure 35: Radio Installation (O5 Remote Mount) on page 38 or Figure 37: Radio Installation (O7 Remote Mount) on page 39 for remote installation.

2.2.2.1
Remote Mount Control Head Installation

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

The recommended mounting surfaces for the control unit are under the mounting surface, on the transmission hump, or on the center console. Installing Remote Mount Control Head on page 53 shows how you should install the trunnion, control head, and cables for the O2, O3, O5, E5, O7, or O9 control head.

NOTICE:
Connector-protective covers (Dust Covers) HLN6980_ are provided with the radio.
Install the covers on exposed connectors for added environmental robustness.

An adjustable trunnion, which allows several mounting positions, is supplied to mount 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 mounting surface, all four mounting screws should penetrate the supporting metal frame of the mounting surface. If that is not possible, use a metal backing plate (not supplied) to strengthen the installation.

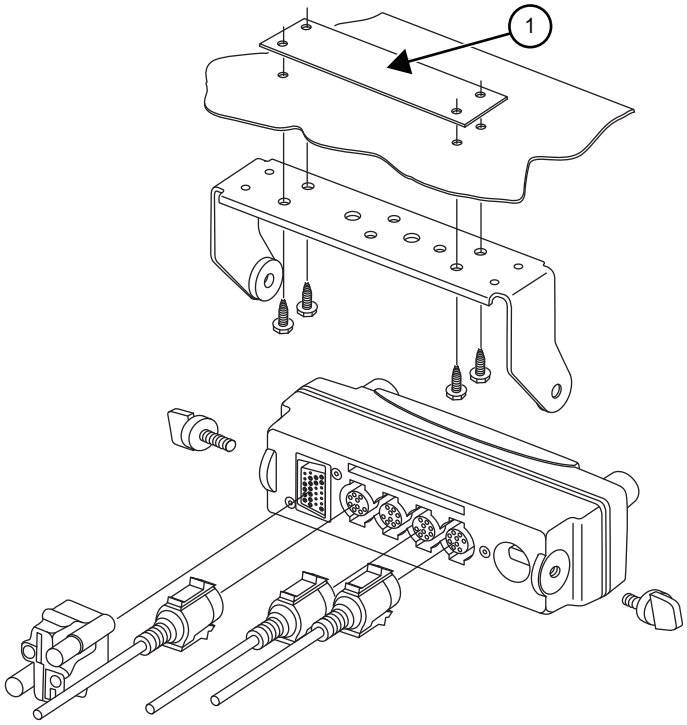
2.2.2.1.1

Installing Remote Mount Control Head

Procedure:

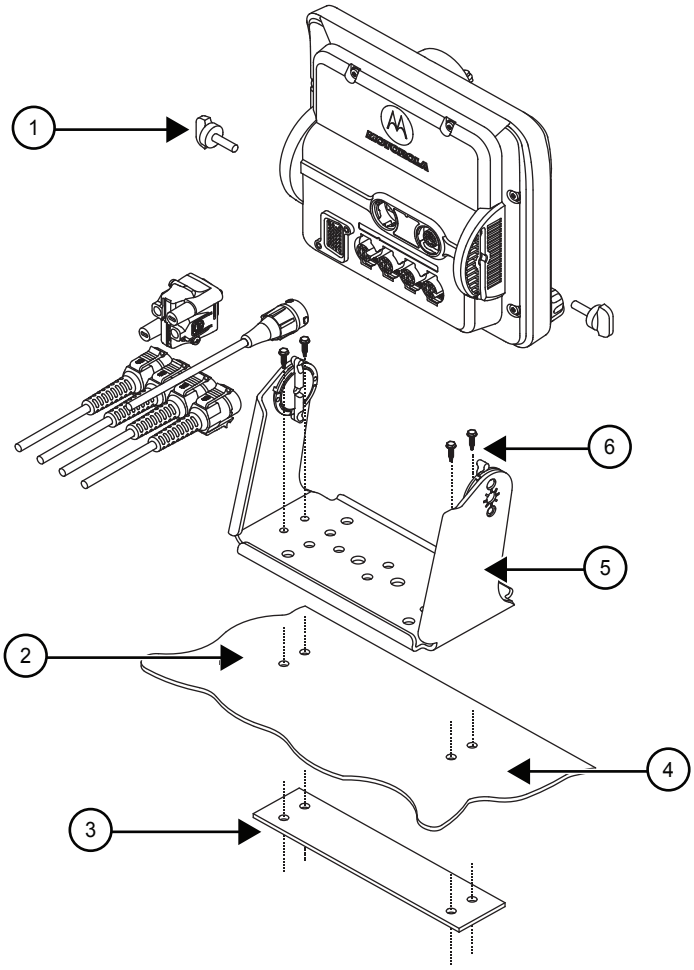
1. Use the control unit trunnion as a template to mark the mounting holes; drill 5/32" holes. If mounting on a plastic surface, use a metal backing plate.
2. Attach the trunnion bracket using all four 10-16" x 5/8" self-tapping screws provided.
3. Temporarily install the control head (adjusting for proper viewing angle) and fasten it to the trunnion with two wing screws.
4. Test the installation to ensure that the control head feels securely locked in place while you are pressing its buttons.
5. Finish the installation by fully tightening the screws.

Figure 47: O5 Control Head Installation Exploded View (Also applicable for O2, O7 and E5 Control Heads)



No.	Description
1	Metal Backing Plate (Not Supplied)

Figure 48: O9 Control Head Installation Exploded View



No.	Description
1	Adjust the control head to a desired angle and secure with wing screws
2	Mounting surface
3	**IMPORTANT:** If the trunnion is mounted on a plastic or unstable surface, use a metal backing plate (not supplied).
4	Drill four 5/32” holes in the mounting surface
5	Trunnion
6	Use four mounting screws on all installations

Figure 49: O5 Control Head Rear View (Also applicable for O2, O7 and E5 Control Heads)

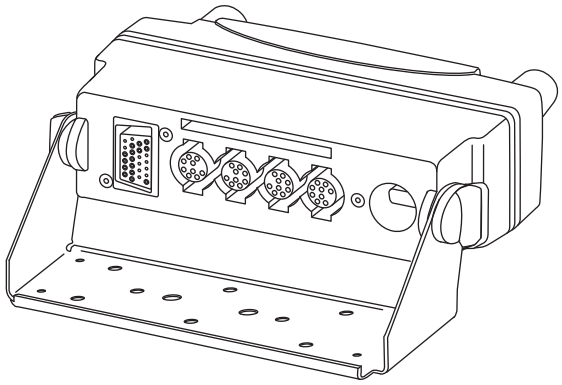
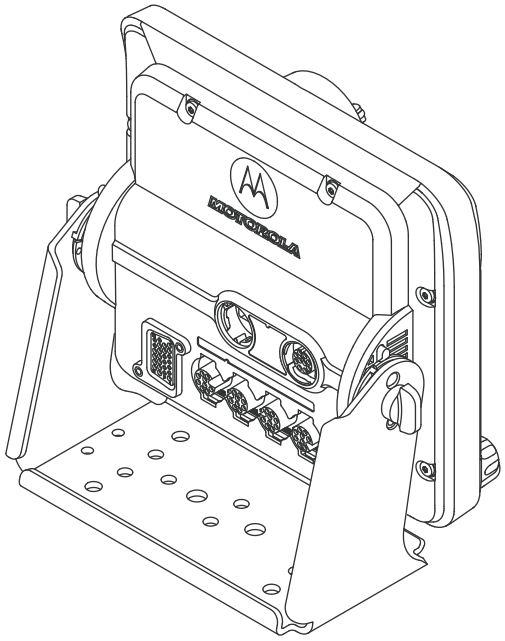


Figure 50: O9 Control Head Rear View



2.2.2.2

Multiple Control Head Installation

Install control heads in a multiple control head configuration as per the steps detailed in Installing Remote Mount Control Head on page 53. Two heads can be connected to each of the two CAN connectors on the radio, with the remaining heads connected to one or both of the first two. You can also connect control heads in a “daisy chain” configuration from the CAN connector of a single radio. See the following figures for examples.

NOTICE: The transceiver must be configured for Multiple Control Head through CPS programming. Navigate to the **Control Head** tab in the **Radio Wide** section of the CPS, and select **Help** for further information and tutorials.

NOTICE: In Multiple Control Head (MCH) installations, the yellow ignition sense wire must be connected to the head assigned ID # 1. See Setting the Initial Control Head ID on page 56 for further information.

Use the most convenient configuration for your installation, ensuring that the combined cable lengths do not exceed 131 feet (40 meters). See Table 8: Available CAN Cables on page 56 for a list of

available CAN cable lengths. Control head ground, power and ignition sense wires (black, red, and yellow respectively) may need more length (not supplied) in installations that locate the head more than 10 feet from a power source.

Table 8: Available CAN Cables

Part Number	Description
HKN6164_	Cable, Remote Mount, 40 m (131 ft)
HKN6165_	Cable, Remote Mount, 35 m (115 ft)
HKN6166_	Cable, Remote Mount, 23 m (75 ft)
HKN6167_	Cable, Remote Mount, 15 m (50 ft)
HKN6168_	Cable, Remote Mount, 9 m (30 ft)
HKN6169_	Cable, Remote Mount, 5 m (17 ft)
HKN6170_	Cable, Remote Mount, 3 m (10 ft)
PMLN4958_	Cable, O3 Extension, 5 m (17 ft)

Table 9: Ignition Interface Cables

Part Number	Description
HLN6863_	Cable, M.A.P. 26 pin with Only Ignition and SPK
PMLN4959_	Cable, Y-Splitter with DB-25 and M.A.P. Interface

2.2.2.3
Cable Installation

Route the cables where they are protected from pinching, sharp edges or crushing. Use grommets in any holes where the cable passes through metal panels.

Figure 41: Cabling Interconnect Diagram for Dash Mount on page 42 shows how the cables and components are connected. It is not recommended to route cabling or wiring inside the wheel wells of a vehicle.

2.2.2.4
Setting the Initial Control Head ID

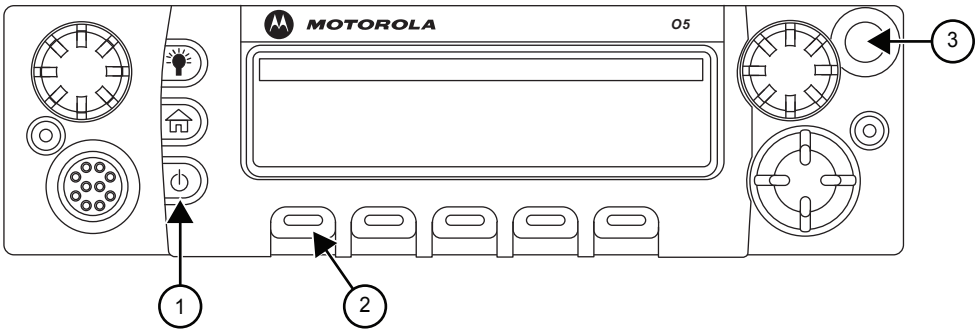
The Front Panel Programming (FPP) mode allows you to define which control head in a Multi-Control Head system becomes control head number 1–4.

Prerequisites: Set the control head ID number for each attached head the first-time Multi-Control Head is used.

Procedure:

1. Press the **Power** button to power off the radio.
2. Simultaneously press and hold the left-most **Soft Menu** key and the **Emergency** button on the control head.

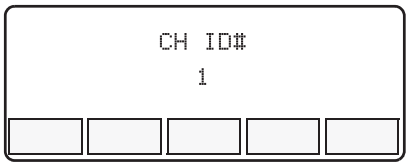
Figure 51: APX Mobile O5 Control Head Front View



No.	Description
1	Power button
2	Left-most Soft Menu key
3	Emergency button

3 Press the **Power** button to power on the control head.

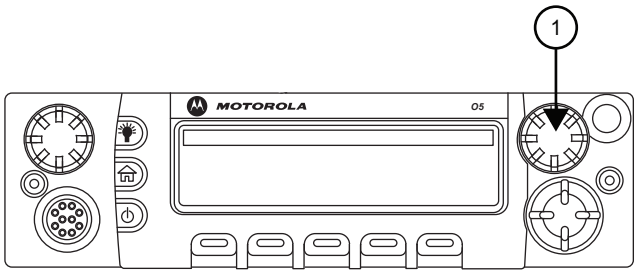
Figure 52: Radio Display with Current Control Head ID



The head is powered on into FPP mode and displays the current control head ID number.

4 Turn the **Mode** knob to change the control head ID number.

Figure 53: APX Mobile O5 Control Head Front View – Mode Knob



No.	Description
1	Mode Knob

5 Repeat step 1 through step 4 to set the ID of the remaining control heads.

NOTICE: In Multiple Control Head (MCH) installations, the yellow ignition sense wire must be connected to the head assigned ID #1.

2.2.2.5

O3 Control Head and Remote Mount Cabling

Choose a mounting location for the radio, considering accessibility, control, and antenna cable lengths. The control head extension cable and the accessories cable should be installed and routed properly to avoid complications.

Prerequisites: Route the cables in the wiring troughs (where available) of the vehicle 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 54: O3 Control Head

No.	Description
1	Top
2	Left
3	Front
4	Right
5	Back

The recommended mounting surface for the control unit is on the center console. Figure 56: Hang-Up Clip Installation Exploded View on page 59 shows how the hang-up clip control head, and cables should be installed for the O3 control head.

A mounting clip, which allows the control head to be mounted, is supplied together with the control head.

Procedure:

1. Use the provided mounting clip to determine the location of the two screw holes.
2. Drill 7/16” deep holes for the upper and lower screws.
3. Use the tapping screw provided to install the mounting clip.

CAUTION: Shield the control head (front and back) from direct exposure to pressurized water. The pressurized water from a hose is usually more severe than the stated test and conditions in typical environments.

Figure 55: O3 Control Head Rear View

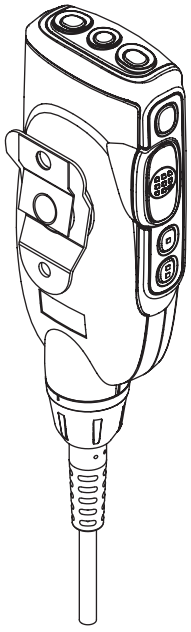
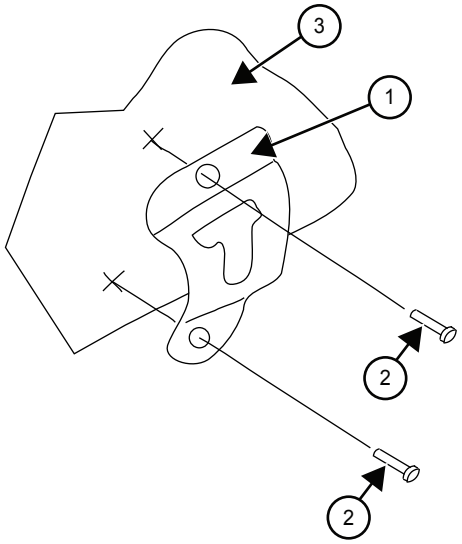


Figure 56: Hang-Up Clip Installation Exploded View



Item No.	Part Number	Description
1	01-80743T91	Mic Hang-Up Clip Assembly
2	03-07644M19	Screw, Machine, 8-32 x 7/16
3	-	Vehicle Mounting Surface

2.2.3
Radio Locking

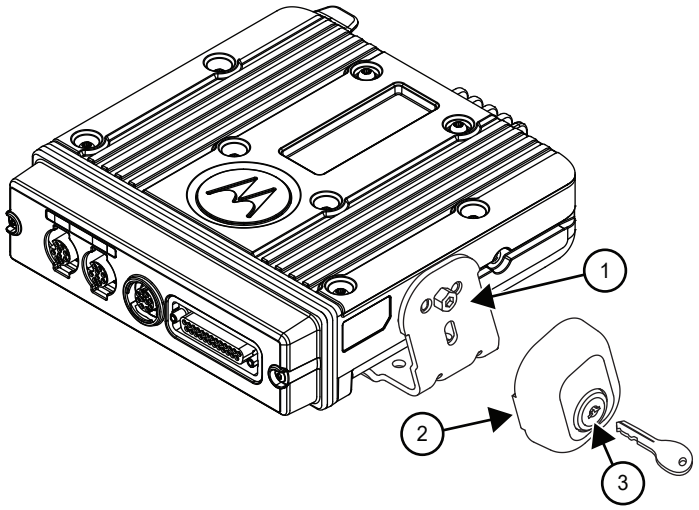
The section describes the radio locking on the trunnion.

2.2.3.1
Locking Kit

Enhanced Single Band Mobile Radio

If an optional locking kit (HLN6372_) is used, position the lock housing on the trunnion after installing the radio mounting screws. Then rotate the lock with the key in it and remove the key to lock the radio. You can install the lock on either side of the radio, and in dash and remote mount installations.

Figure 57: Locking Kit (Optional)



No.	Description
1	Wing Screw
2	Lock Housing
3	Lock

2.3

Power Cables (Transceiver and Control Head)

Route the RED power cable from both the radio and the control head to the vehicle battery compartment, using accepted industry methods and standards. Be sure to grommet the firewall hole to protect the cable.

Remove the 15 A (part number 6580283E06), 20 A (part number 6580283E07), or 30 A (part number 6580283E09) fuse from the fuseholder and connect the red lead of the radio power cable to the positive battery terminal using the hardware provided as shown in Figure 63: HKN6188_ Power Cable with External Speaker Connector on page 63 and Figure 64: HKN6187_ Power Cable with External Speaker Connector, Record Audio Output Jack (2.5 mm) and Earphone Jack (2.5 mm) on page 64. Connect the black lead to a convenient solid chassis ground point. DO NOT connect the black lead directly to the battery negative terminal.

Table 10: Power Cables

Description	Part Number
Mid Power Dash Mount	HKN4191_
Mid Power Remote Mount	HKN4192_
O5, O7, and O9 Remote Control Head Power Cable	HKN6188_

NOTICE: Remote Control Head power cable uses a 5 A Fuse (part number 6580283E03).

2.3.1

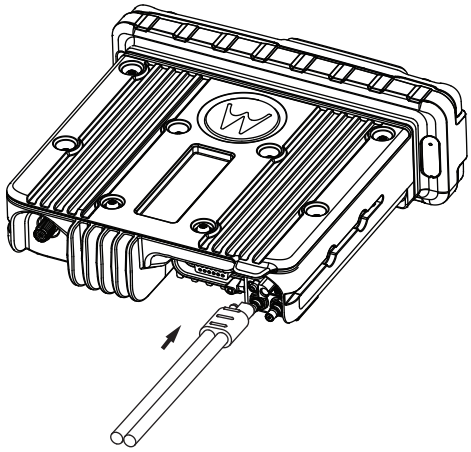
Optional Locking Feature for High-Power Chassis Power Cables

An optional clip (HLN7017_) can be used to increase DC cable retention in high-power radios.

Procedure:

1 Insert the DC cable to the radio by aligning the male and female portions of the battery side with the mating components on the radio side.

Figure 58: Inserting DC Cable to the Radio



2 Insert the locking bracket (HLN7017_) onto the DC cable.

3 Slide the bracket toward the radio until the bracket clips snap onto the radio features.

Figure 59: Installing the Locking Bracket

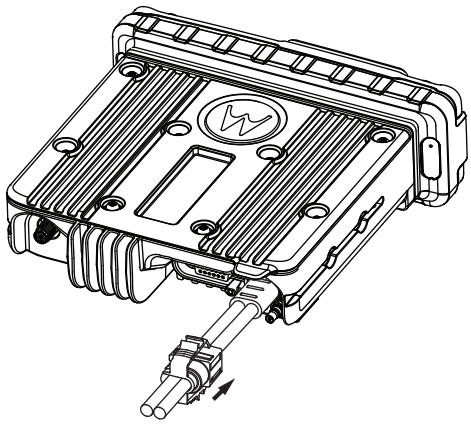
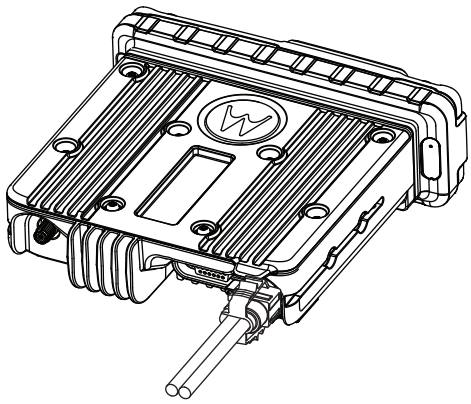


Figure 60: Bracket Installation (Assembled State)



4 To disassemble the power cable, squeeze the locking bracket clips inward and while squeezing the clips, pull the locking clip and power cable to remove the power cable.

Figure 61: Bracket Uninstallation (1 of 2)

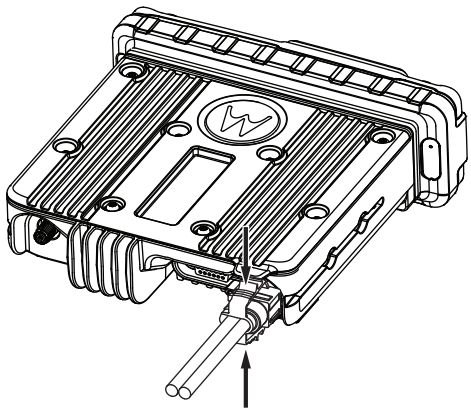
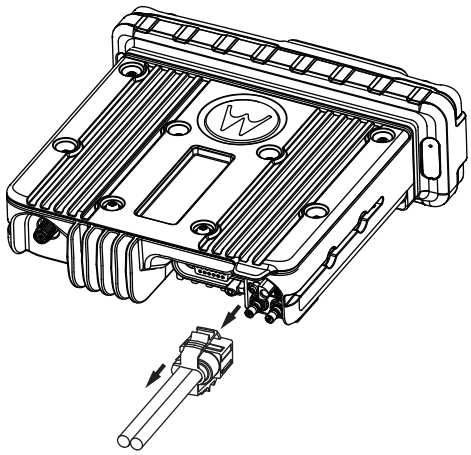


Figure 62: Bracket Uninstallation (2 of 2)



2.3.2
O2, O3, O5, O7, O9 or E5 Control Head Power Cables

Figure 63: HKN6188_ Power Cable with External Speaker Connector

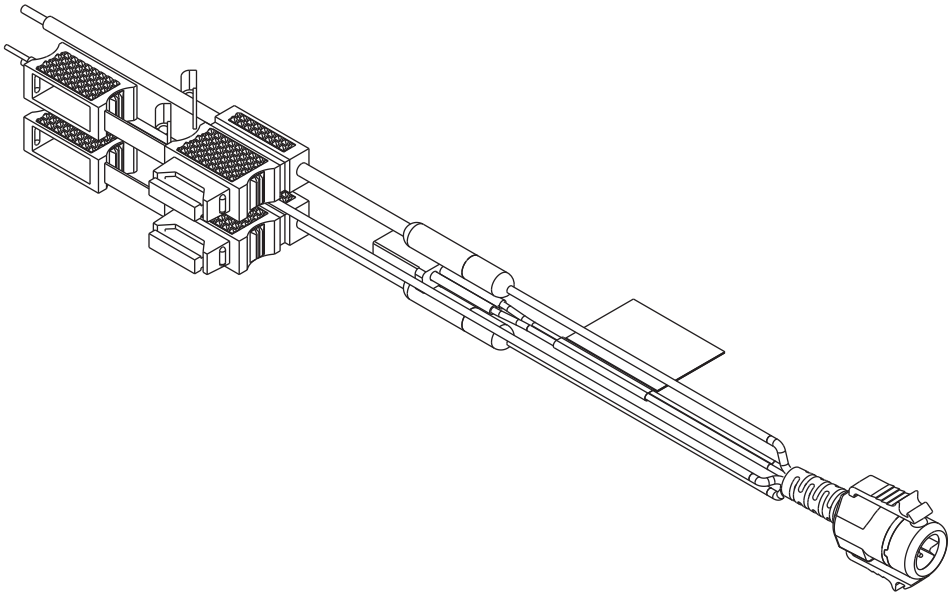
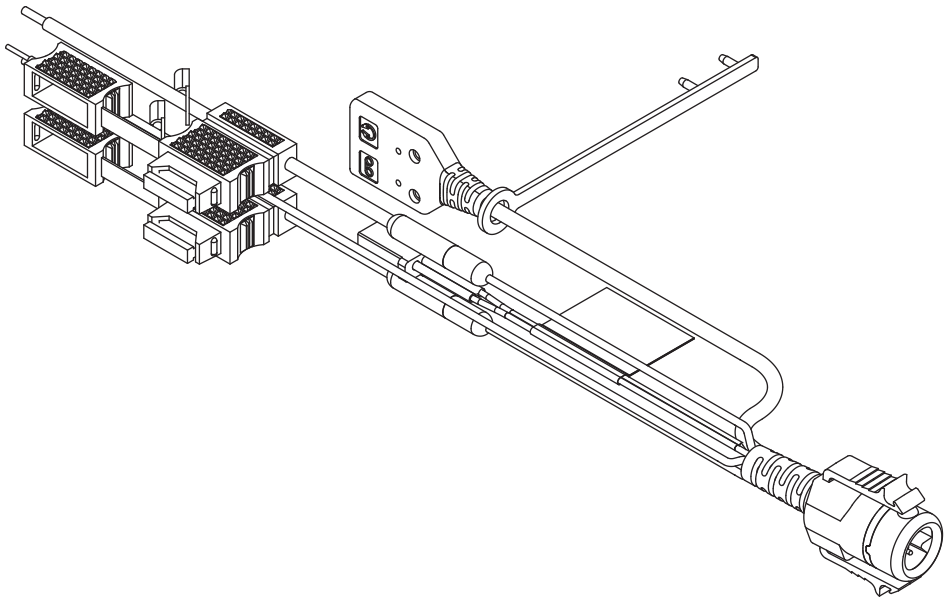


Figure 64: HKN6187_ Power Cable with External Speaker Connector, Record Audio Output Jack (2.5 mm) and Earphone Jack (2.5 mm)



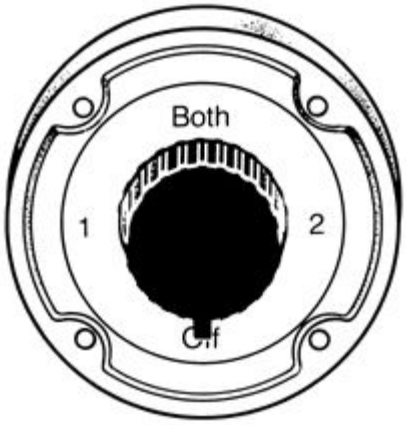
NOTICE:
Audio Out – Does not require CPS programming. Attaching a headset mutes the external speakers of the radio which are attached to the SPK jack of the control head.

Record Out – Requires CPS programming. In CPS, navigate to **Radio Wide/Advanced/Record Audio** and select **TX + RX Audio**.

2.3.3
Battery Selector Switch

In vehicles with a Battery Selector Switch, the ignition sense (yellow) wire should be the only wire connected to the Battery Selector Switch. The radio transceiver and control head power wires (red) must be connected directly to the vehicle battery. If the control head power wire and the control head ignition sense wire are both connected to a Battery Selector Switch, but the radio transceiver power lead is not, improper power-cycling and off-state battery drainage may occur. If the desired state of the radio is a total battery drain elimination, then route all power and ignition sense wires through the Battery Selector Switch, so that the control head and radio transceiver both see the loss of battery power at the same time.

Figure 65: Battery Selector Switch



2.4 Antenna Installation

IMPORTANT: To ensure 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 consider the potential exposure of back seat passengers and bystanders outside the vehicle.

NOTICE: For mobile radios with rated power of 7 W or less, the only installation restrictions are to use only Motorola Solutions approved antennas and install the antenna externally on metal body vehicles. For mobile radios with tuned power greater than 7 W, always adhere to all the guidelines and restrictions in Antenna Installation on a Metal Body Vehicle on page 65.

2.4.1 Antenna Installation on a Metal Body Vehicle

You can install the antenna at the following locations:

- 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.
- Roof top – For optimum performance and compliance with RF Energy Exposure regulations, mount the antenna at the center of the roof.
- Trunk lid – On some vehicles with clearly defined, flat trunk lids, you can mount the antennas of some radio models at the center of the trunk lid. For vehicles without clearly defined, flat trunk lids (such as hatchback autos, sports utility vehicles, and pick-up trucks), mount the antenna at the center of the roof. Ensure that the following are observed before installing an antenna on the trunk lid:
  - Ensure that the distance from the antenna location on the trunk lid is at least 85 cm (33 in.) from the rear seat head-rest to ensure compliance with RF Energy Exposure regulations.
  - Ensure that the trunk lid is grounded by connecting grounding straps between the trunk lid and the vehicle chassis.

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

NOTICE:
Do not cut the antenna cables to ensure compliance with RF Energy Exposure regulations.

To ensure compliance with RF Energy Exposure regulations, mount the 1/4 wave antenna of VHF and UHF bands only at the center of the roof, .

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.

Check the antenna location for any electrical interference.

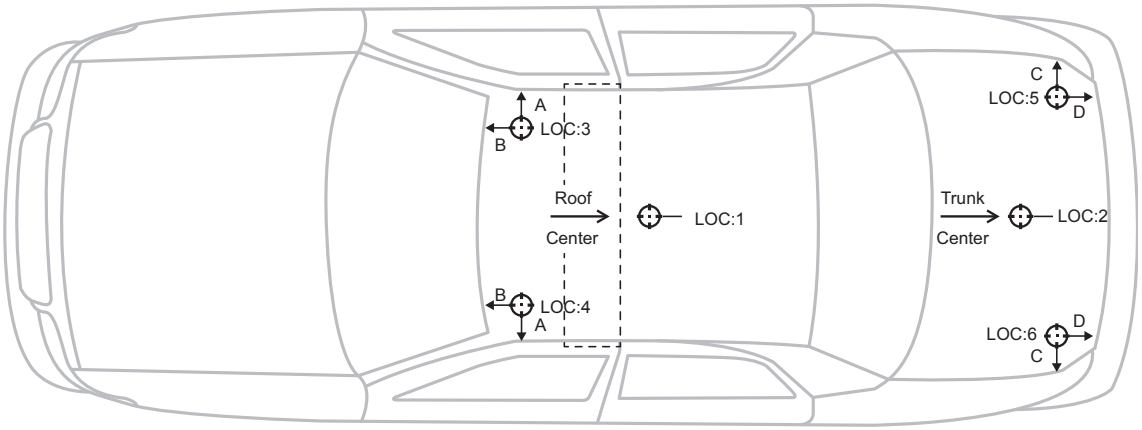
NOTICE: Any two metal pieces rubbing against each other such as seat springs, shift levers, trunk and hood lids, exhaust pipes, and others close to the antenna can cause severe receiver interference.

2.4.2
Distance Between Antennas

The following figure indicates the separation distances required for the various antennas used with all mobile radios. Each "cross-hair" symbol represents a possible location (LOC) of an antenna. The recommendation is to locate them as close to the center of the roof and/or trunk as possible, without interference with a lightbar.

NOTICE: Do not cut the antenna cable.

Figure 66: Multiple Antennas Separation for locations 1–6



Letters A, B, C, and D indicates the maximum distance of 8 inches between the edge of the ground plane and the accessory antenna location.

NOTICE:

- A minimum of 18 inches separation is required between the lightbar and any roof-mounted antennas to prevent interference with the lightbar circuitry (see lightbar manufacturers installation information).
- LMR antennas should only be placed at the center of the roof (LOC:1) or center of the trunk (LOC:2).
- To ensure compliance with RF Energy Exposure regulations, install VHF and UHF 1/4 wave antenna at LOC:1 (center of the roof only).
- The LTE antenna must be separated from any LMR antenna by at least 40 inches.
- Install the LTE Main and Diversity Antenna at LOC:5 and LOC:6 when the LMR antenna is only located at LOC:1 for a single band mobile radio (LTE opposite location from the LMR).
- Install the LTE Main and Diversity Antenna at LOC:3 and LOC:4 when the LMR antenna is only at LOC:2 for a single band mobile radio (LTE opposite location from the LMR).
- Install the Wi-Fi/Bluetooth roof mount antenna at LOC:3, LOC:4, LOC:5, or LOC:6. For the installation of glass mount Wi-Fi/Bluetooth antenna, refer to the antenna installation manual.
- In some mobile installations that include an LTE modem, external filtering on the LMR port and/or the LTE port is needed to reduce interference. Contact your local Motorola Solutions Service Center for more information and for filter kit numbers (see Replacement Parts Ordering on page 132 on page 128 for contact information).

2.4.3 Mini-UHF Connection

To help the installation of the radio antenna, there are labels indicating the frequency. The first is on the FCC label at the top of the radio which calls out the frequency with arrows indicating the location of the RF connector at the back of the radio.

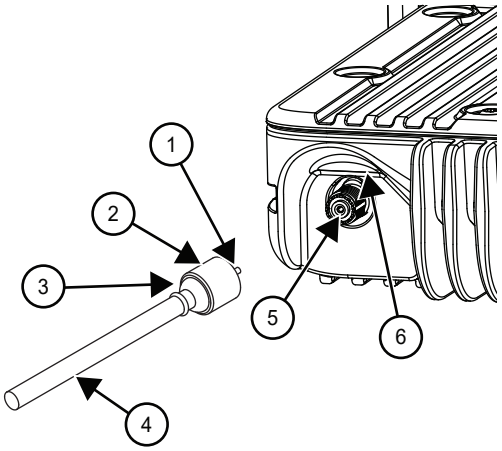
The second is at the back of the radio, next to the RF connector. To ensure a secure connection of an antenna cable mini-UHF plug to a radio mini-UHF jack, their interlocking features must be properly engaged. If they are not properly engaged, the system loosens. Do not use a tool (pliers or wrench) to overcome a poor engagement.

NOTICE: Applying excessive force with a tool such as stripping threads, deforming the collar or connector, or causing the connector to twist in the housing opening and break, can damage the antenna or the connector.

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

Motorola Solutions recommends the following sequence to ensure proper attachment of the system (see the following figures).

Figure 67: Mini-UHF Connection



No.	Description
1	Coax Conductor Plug (Pin)
2	Collar Pulled Back to Flange
3	Flange
4	Cable
5	Mini UHF Jack
6	RF Antenna Connector Label

2.4.3.1

Installing Mini-UHF Connection

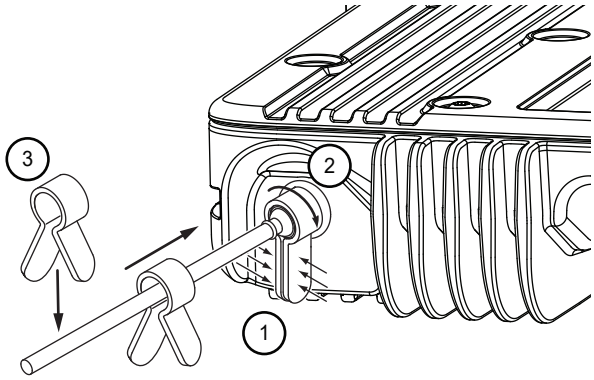
Prerequisites:

- Ensure that there is sufficient slack in the antenna cable.
- Ensure that the collar of the antenna cable plug is loose and does not bind.
- Ensure that the mini-UHF jack is tight in the radio housing.

Procedure:

1. Slide the collar back against the flange.
2. Insert the antenna cable plug pin fully into the radio jack, but do not engage the threads.
3. Ensure that the plug and jack interlocking features are fully seated. Do the check up 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.
4. Finger-tighten the antenna cable plug collar onto the radio jack.
5. Give a final tug by hand to the collar and retighten by hand as firmly as possible.
6. Slip the mini-UHF connector tool over the coaxial cable, using the gap between the tool legs.

Figure 68: Mini-UHF Connector Tool



No.	Description
1	Squeeze Firmly Together
2	Tighten
3	HLN6695_

7 Slide the tool up onto the knurled collar of the plug.

8 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.

NOTICE: 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.

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.

2.4.4
GPS Antenna Placement

Place the GPS antenna (excluding the Motorcycle GPS antenna) at least, 3 ft (0.9 m) away from any transmitting antenna, and the antenna must have a clear, unobstructed view of the sky for best performance. Consider the length of the cabling before the installation is started.

2.4.5
QMA Connection

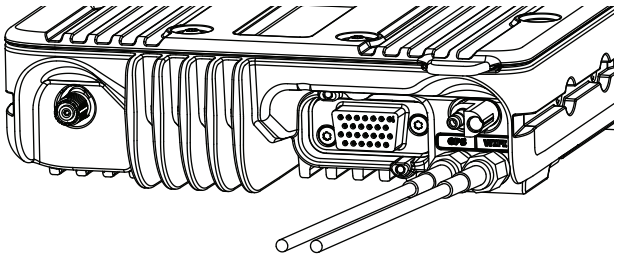
The radio uses a quick disconnect connection called QMA. This does not require any tightening.

- Ensure there is sufficient slack in the antenna cable.
- Ensure that the collar of the antenna cable plug does not bind.
- Engage the QMA cable plug onto the jack, listening for a click to ensure proper engagement.
- Gently tug on the cable to ensure that it is engaged.
- To disengage, pull back on the cable plug collar and pull the cable straight off the jack.

2.4.6
GPS/GLONASS and Wi-Fi Antenna Connection

Connect GPS and Wi-Fi antenna cable QMA plug to the radio QMA jack for GPS and Wi-Fi respectively.

Figure 69: GPS/GLONASS and Wi-Fi Antenna Connector on the radio



2.5
Installing the Speaker

The speaker kit includes a trunnion bracket that allows the speaker to be mounted in various ways. With the trunnion bracket, the speaker can mount permanently on the mounting surface or in accessible firewall areas. The trunnion allows the speaker to tilt for best operation. Mount the speaker out of the way so that the vehicle occupants cannot kick or knock around it.

Prerequisites:

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

Procedure:

1. To mark the mounting hole locations, use the speaker mounting bracket as a template.
2. Use the self-drilling screws provided to fasten the trunnion.
3. Attach the speaker and fasten it to the trunnion with two wing screws.
4. Route the speaker wires under the carpet or floor covering, or behind the kick panels. Ensure that the wires are out of the way of the occupants of the vehicle.
5. Do not submerse the 2-pin speaker connector in water nor place this connector in an area that could have standing water.