

2.1.3.2 Remote Mount: Power, Ignition, and Emergency Cable Installation

The single control head O2, O5, O7 or O9 remote mount configurations receive power from the J200 connector's red and black wires. The yellow wire at J200 is one ignition sense wire. On mid power radios, the J2 connector can also be used for ignition sense. If the HLN6863 is attached at J100 of the O2, O5, O7 or O9 control head, the "thin red" wire will NOT function as an ignition sense wire, since the J100 connector has no ignition sense electrical connection.

NOTE: It is incorrect for installation to attach ignition sense at more than one wire or connector. Refer to [Table 2-1](#) or [Table 2-2](#) for its correct wiring configurations.

The O3 control head receives its power down the CAN cable, and detects the ignition state by the ignition sense pin at J2. On mid power radios, the J2 connector can also be used for ignition sense.

In Multi-Control Head installations, the yellow ignition wire must be connected to the head assigned ID # 1. [Section 2.2.2.4: "Setting the Initial Control Head ID"](#) for further information.

The design of the control head is different compared to the transceiver, therefore it is also **NOT** necessary to attach HLN6863 at J100 to prevent accidental emergency operation. The control head can have an emergency accessory attached at connector J100 instead of at the transceiver connector J2. Wherever the emergency accessory is placed, it is recommended to only attach at one location rather than multiple emergency accessories attached at different points of the radio.

Table 2-1. Dash and Remote O2, O3, O5, O7 or O9 Radio Power ON @ J2


Dash/Remote Mount	Transceiver Red Power Wire	HLN6863 Thin Red Wire @ J2	Transceiver Red Power Wire	HLN6863 Thin Red Wire @ J2	Transceiver Red Power Wire	HLN6863 Thin Red Wire @ J2
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. See CAUTION note.	

Table 2-2. Remote O2, O5, O7 or O9 Radio Power ON @ J200

Remote	Control Head Red Wire @J200	Control Head Yellow Wire @J200	Control Head Red Wire @J200	Control Head Yellow Wire @J200	Control Head Red Wire @J200	Control Head Yellow Wire @J200
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. See CAUTION note.	

Table 2-3. Ignition Interface Cables

Part Number	Description
HLN6863_	Cable, M.A.P. 26pin with Only Ignition and SPK
KT000274A01	Y-Cable, M.A.P to M.A.P. and DB 25



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)

CPS selectable settings to control the radio's functionality based on the state of the vehicle's Ignition status. These descriptions can be found in the CPS (customer programming software) tool HELP Guides and are repeated here for convenience.

Table 2-4. Ignition Sense Switch Settings in CPS

Feature	Description
Blank	<ul style="list-style-type: none"> 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	<p>(Available only when: the radio is model/option capable)</p> <ul style="list-style-type: none"> Radio POWERS ON with a radio Power On button / knob selection. Radio POWERS OFF with a radio Power Off button / knob selection, or when the Inactivity Auto Power Off timer expires. While "IGNITION" is not present, certain communications are not possible: <ol style="list-style-type: none"> The radio does not register with ASTRO 25 (APCO) - Trunking Systems and therefore cannot receive this type of Trunking communications (see the System Type field), however, Type II Trunking Systems can receive dispatch without being registered. Also, the radio cannot be powered-on with the Emergency Power UP feature, and Emergency Alarm transmissions using the Emergency Power UP footswitch are not possible.
PTT TX Inhibit	<p>(Available only when: the radio is model/option capable)</p> <ul style="list-style-type: none"> Radio POWERS ON with a radio Power On button / knob selection. Radio POWERS OFF with a radio Power Off button / knob selection, or when the Inactivity Auto Power Off timer expires. While "IGNITION" is not present, all PTT button transmissions are inhibited: <ol style="list-style-type: none"> The radio does not register with ASTRO 25 (APCO) - Trunking Systems and therefore cannot receive this type of Trunking communications (see the System Type field), however, Type II Trunking Systems can receive dispatch without being registered. Also, the radio cannot be powered-on with the an Emergency Power UP footswitch-press; however, the footswitch can be used to initiate Emergency Alarm transmissions if the radio is already on.
Required	<ul style="list-style-type: none"> Radio POWERS ON when the Power Button is pressed and Ignition is present. Radio POWERS ON when Ignition is cycled and radio was previously ON. Radio POWERS OFF when the Power Button is pressed, or when Ignition is lost.
Soft Power Off	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Radio POWERS ON when Ignition is present. Radio POWERS OFF when Ignition is lost. Control head power button is ignored.

NOTE: When either TX Inhibit, PTT TX Inhibit or Required are selected, the Emergency Power Up feature will not be available to the radio-user.

When any other Ignition Switch setting is made, Emergency Power Up is available to the radio-user, regardless of 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.

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2.1.5 Motorola Branded SB9600 Siren/PA Configuration/Programming

The Siren/PA is shipped pre-wired for 100W operation. It can be rewired for 65W, 75W, or 130W power levels.

To change to another power level, perform the following:

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 100W 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 75W operation
 - pin location 28 for 65W or 130W operation
3. For 65W or 75W operation, no further changes are required. Reassemble the connector.
4. For 130W operation, you must parallel two 11 Ω speakers, each rated at 65W 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 (16.6V), up to 30% more power will go to the speaker(s) after reconfiguring for 130W operation. Do this only when your PA speakers are capable of handling the extra power.

5. When the Siren/PA is configured for dual speaker, 130W 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 ohm). This resistor should be removed for 130W operation. Locate jumpers JU100 and JU101. These jumpers should be installed for 130W operation.
6. Close and reconnect the Siren/PA connector cover.

NOTE: 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 [Table 2-5](#)

Table 2-5. Power Level Configurations

	Pin location of speaker leads	R219	JU100/JU101
65W	20,28	IN	Across pins A and B
75W	20,36	IN	Across pins A and B
100W	20,35	IN	Across pins A and B
130W	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 any surface where the radio could be partially submerged 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.

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.

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.

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 2-18](#) for mid power. For new or existing installations of all use only the APX mobile trunnion, kit number HLN7002_.

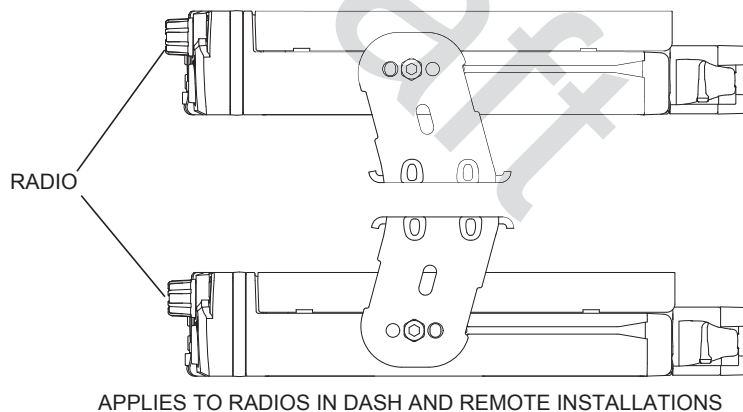


Figure 2-18. APX8500 Mid Power Trunnion Orientation

2.2.1 Dash Mount with Trunnion

1. Select the location to mount your radio on the transmission hump (see [Figure 2-19](#)) or under the dash (see [Figure 2-20](#))

NOTE: When mounting the trunnion on the transmission hump take care that the transmission housing is not affected. Plan your installation ensuring enough room for the Accessory connector and cable in the back of the radio.

2. 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 outmost holes for a flat surface such as under the dash.
3. Center punch the spots you have marked and realign the trunnion in position.
4. Secure the trunnion mounting bracket with the four self-drilling screws provided (see [Figure 2-19](#) and [Figure 2-20](#)).
5. 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 (see [Figure 2-20](#)).

Table 2-6. Mid Power Trunnion Kit

Item	Part Number	Description	Mid Power Transceiver
1	0371859H01	Trunnion Mounting Screw	APX 8500
2	0312002B14	Self-Drilling Tapping Screw	APX 8500
3	HLN7002_	Mackinaw Trunnion Hardware Kit	APX 8500

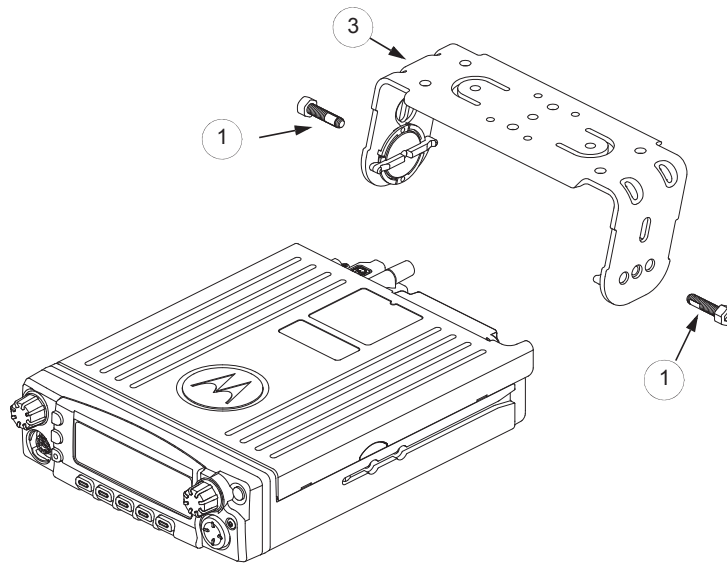


Figure 2-19. Transmission Hump Trunion Mounting

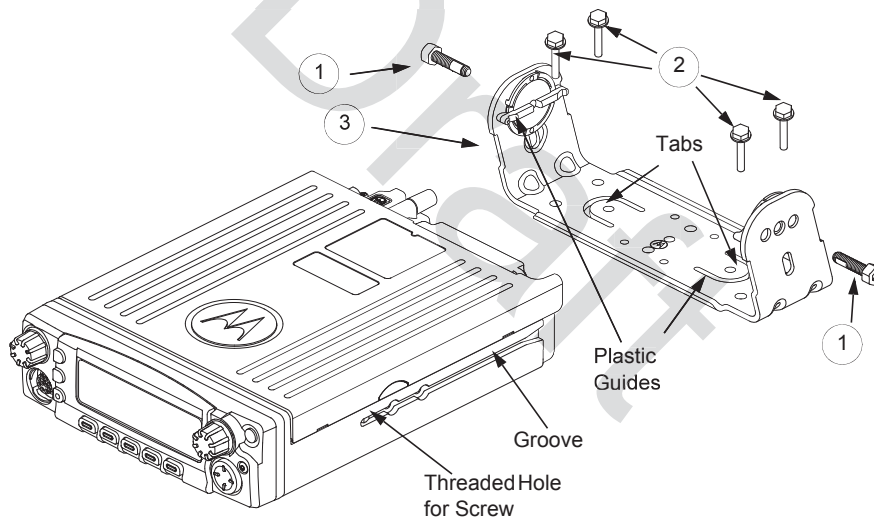


Figure 2-20. Below Dash Trunion Mounting

6. Secure the radio with two screws provided (Item 1 in [Table 2-6](#)). The torque down force for 0371859H01 should be between 50in-lbf to 52in-lbf.

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

2.2.2 Remote Mount with Trunnion

**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. The trunnion provided may still be used to mount the transceiver, and the mounting process is the same as for the dash mount installation (Section 2.2.1). See [Figure 2-10](#) or [Figure 2-11](#) for a 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. [Figure 2-21](#) and [Figure 2-22](#) shows how the trunnion, control head, and cables should be installed for the O2, O3, O5, O7 or O9 control head.

NOTE: Connector-protective covers (Remote Mount Dust Cover kit) KT000246A01 are provided with the radio.

They should be installed on exposed connectors 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 mounting surface, all four mounting screws should penetrate the mounting surface's supporting metal frame. If that is not possible, use a metal backing plate (not supplied) to strengthen the installation. Install the control follows:

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. Test the installation to be sure the control head feels securely locked in place while you are pressing its buttons.
4. Finish installation by fully tightening screws.

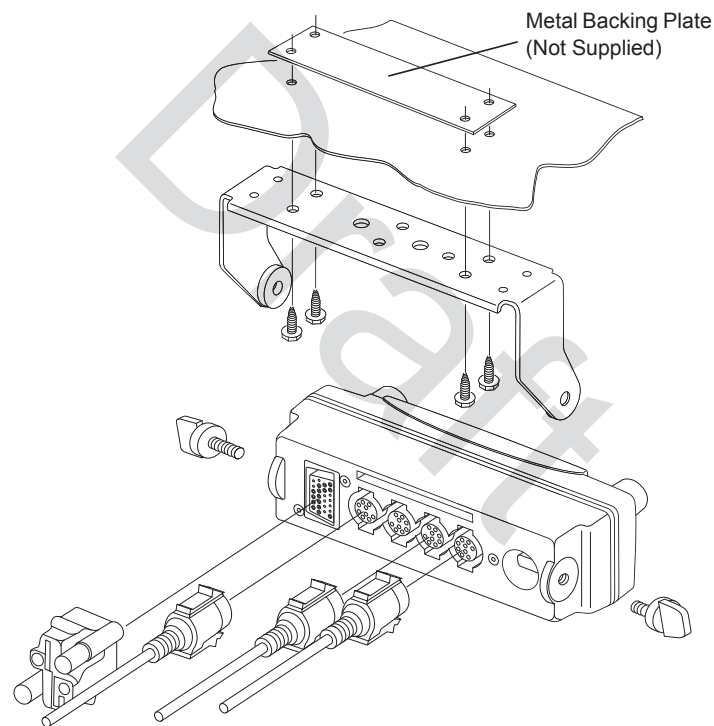


Figure 2-21. O5 Control Head Installation Exploded View (Also applicable for O2 and O7 Control Heads)

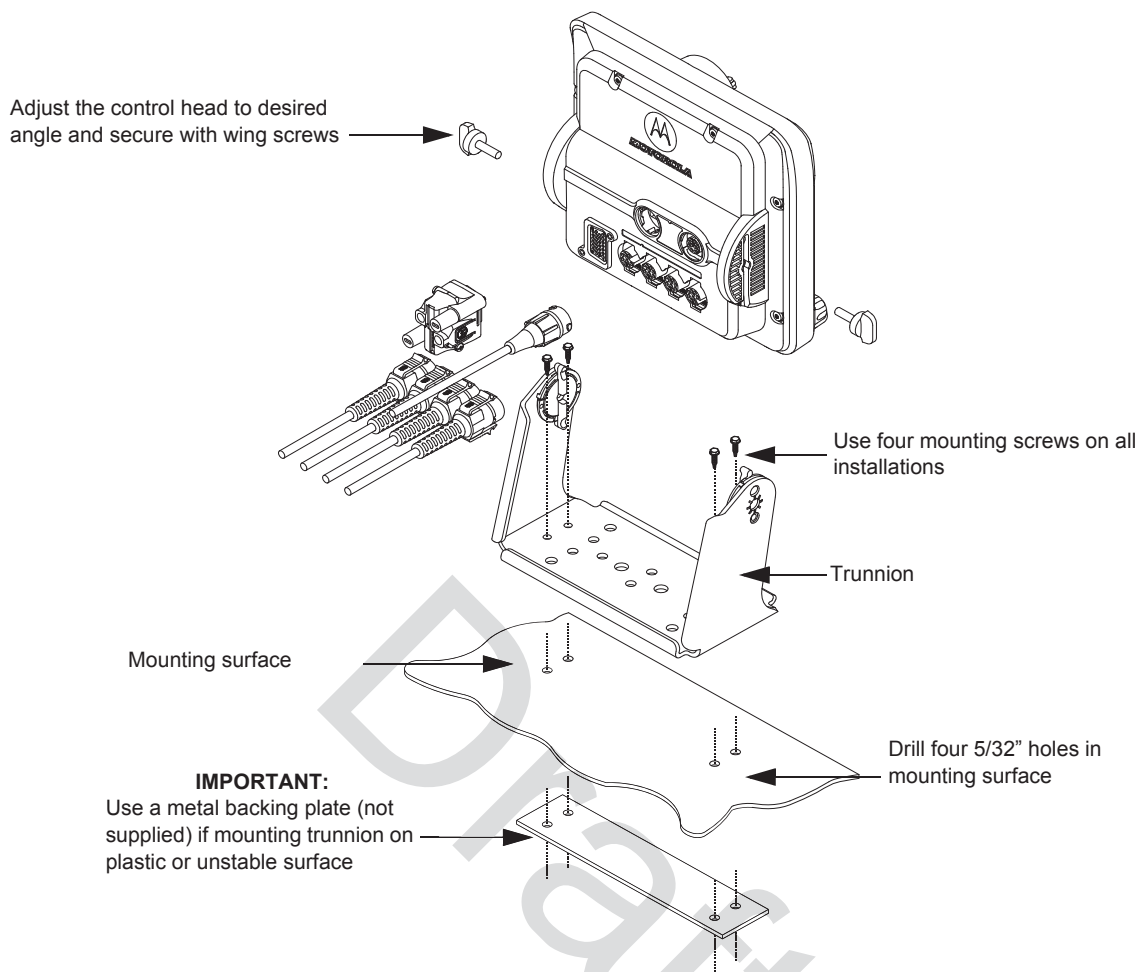


Figure 2-22. O9 Control Head Installation Exploded View

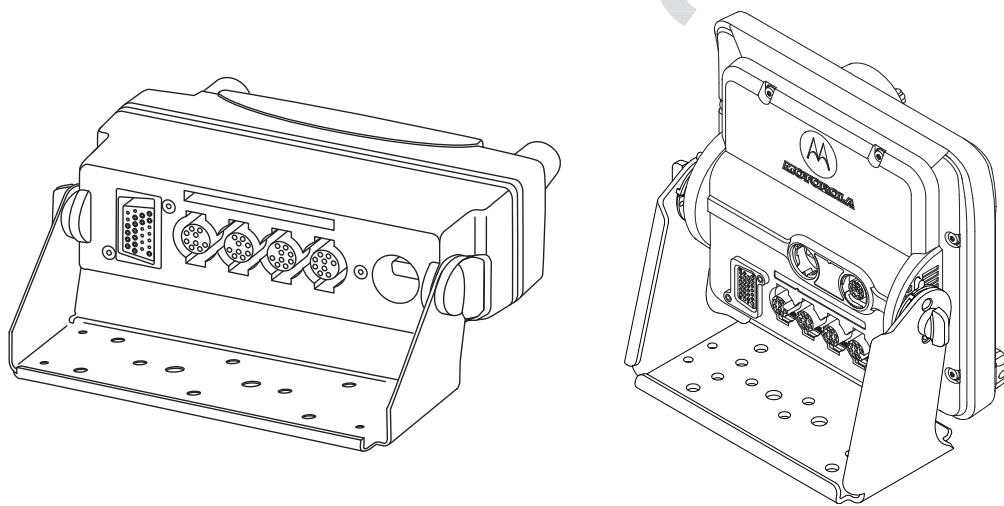


Figure 2-23. O5 and O9 Control Head Rear View

2.2.2.2 Multiple Control Head Installation

Control heads in a multiple control head configuration should be installed per the steps detailed in [Section 2.2.2.1: “Remote Mount Control Head Installation”](#). Two heads can be connected to each of the two CAN connectors on the transceiver, see [Figure 2-24](#). Control heads can also be connected a “daisy chain” configuration from a single transceiver CAN connector. See [Figure 2-25](#) for examples.

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

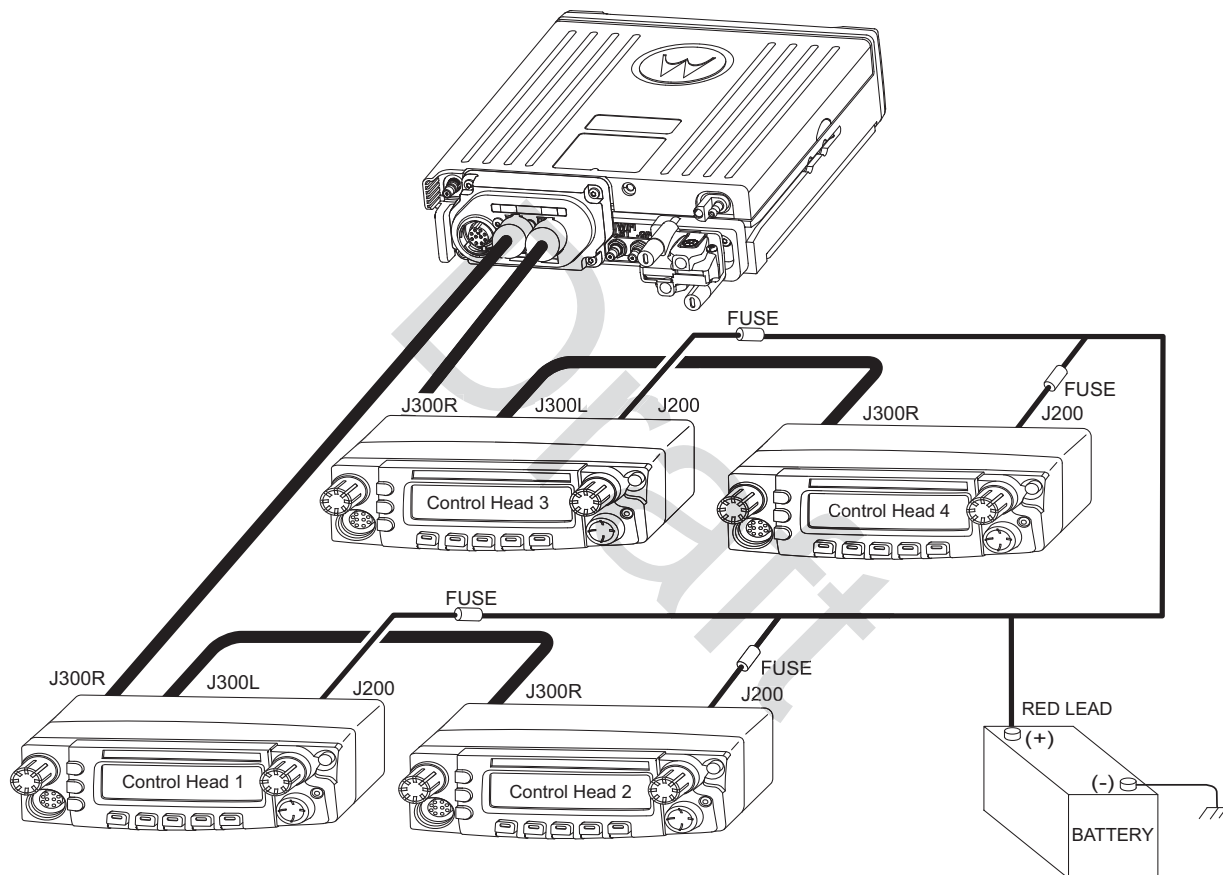


Figure 2-24. Multiple Control Heads Parallel Configurations

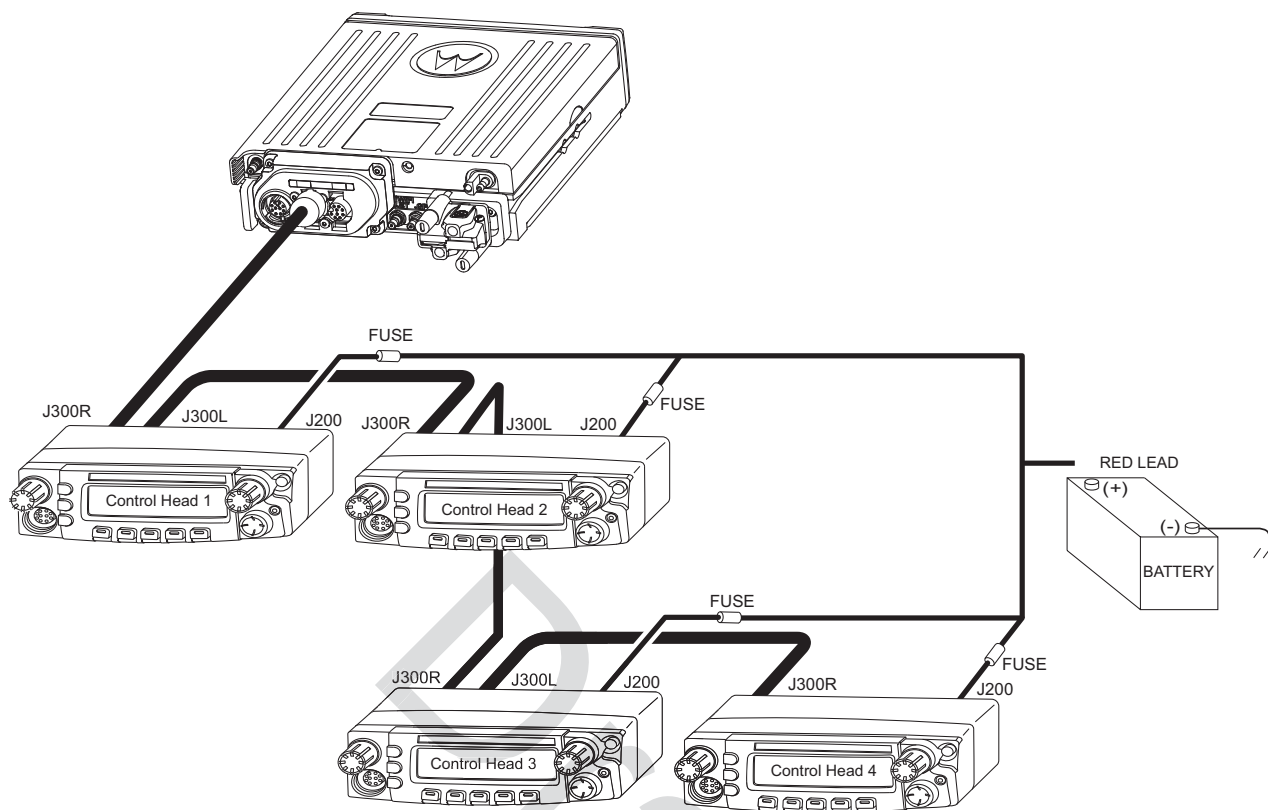


Figure 2-25. Multiple Control Heads Series Configurations

NOTE: In Multiple Control Head (MCH) installations, the yellow ignition sense wire must be connected to the head assigned ID # 1. [Section 2.2.2.4: “Setting the Initial Control Head ID”](#) 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 2-7](#) for a list of available CAN cable lengths. Control head ground, power and ignition sense wires (black, red, and yellow respectively) may need additional length (not supplied) in installations that locate the head more than 10 feet from a power source.

Table 2-7. Available CAN Cables

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

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 2-15](#) 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.

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

1. Press the power button to power off the radio.
2. Press and hold left-most menu and the orange button on the control head simultaneously.

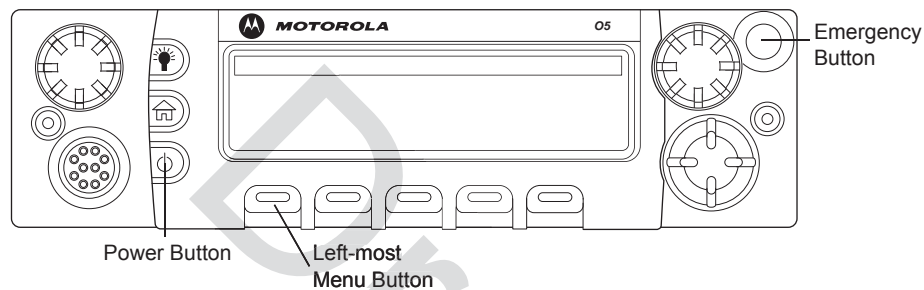


Figure 2-26. APX Mobile O5 Control Head Front View

3. Press the power button to power on the control head. The head will power on into FPP mode and display the current control head ID number:

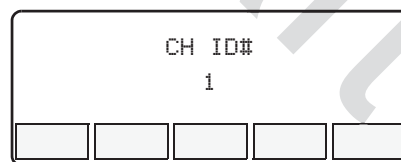


Figure 2-27. Radio Display with Current Control Head ID

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

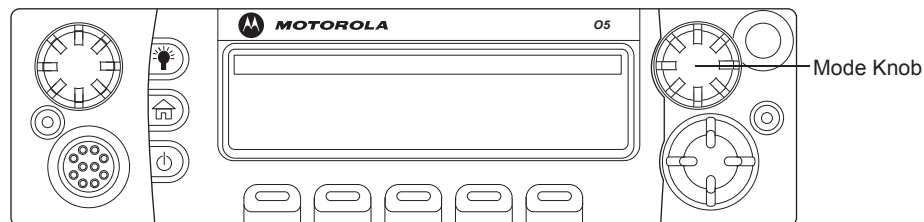


Figure 2-28. APX Mobile O5 Control Head Front View – Mode Knob

5. Repeat steps 1 to 4 above to set the ID of the remaining control heads.

NOTE: 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, and control and antenna cable lengths. The control head extension cable and the accessories cable should be installed and routed properly to avoid complications. 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 2-29. O3 Control Head

The recommended mounting surface for the control unit is on the center console. [Figure 2-31](#) shows how the hang-up clip control head, and cables should be installed for the O3 control head.

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

A mounting clip, which allows the control head to be mounted, is supplied together with the control head. The installation must not interfere with the operation of the vehicle or its accessories, nor disturb the passenger seating. The control head must be within convenient reach and viewing of the user.

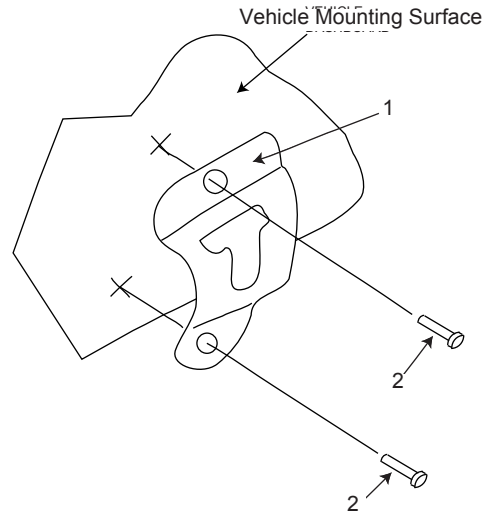
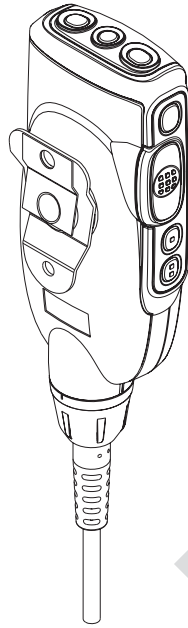
Install the mounting clip as follows:

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



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.



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

Figure 2-30. O3 Control Head Rear View

Figure 2-31. Hang-Up Clip Installation Exploded View

2.2.3 Locking Kit (Optional)

2.2.3.1 All Radios

If an optional locking kit (HLN6372_) is used (shown in [Figure 2-32](#)), 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.

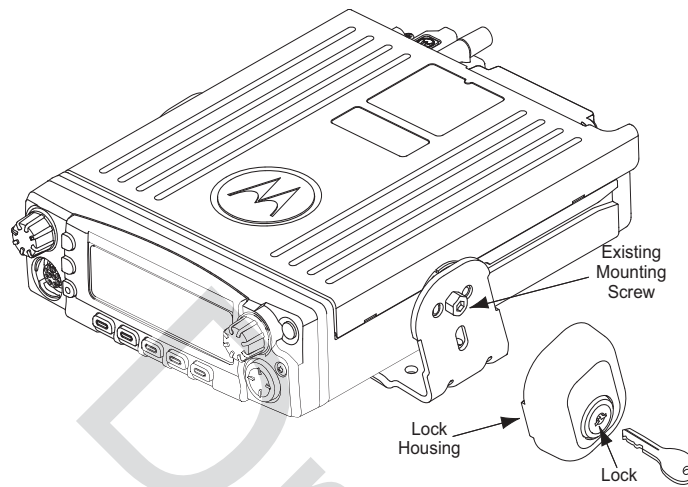


Figure 2-32. Locking Kit (Optional)

2.3 Power Cables (Transceiver and Control Head)

Route the RED power cable from both the radio and the control head to the vehicle's battery compartment, using accepted industry methods and standards. Be sure to grommet the firewall hole to protect the cable. Remove the 15-amp (part number 6580283E06), 20-amp (part number 6580283E07) or 30-amp (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 2-33](#) and [Figure 2-34](#). Connect the black lead to a convenient solid chassis ground point. DO NOT connect the black lead directly to the battery's negative terminal.

Table 2-8. 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_

2.3.1 O2, O5, O7 or O9 Control Head Power Cables

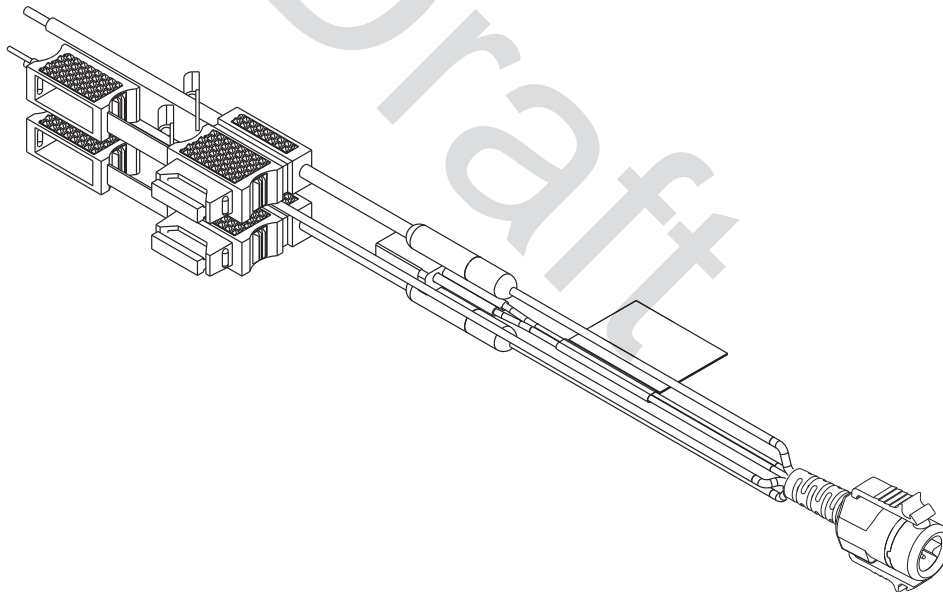


Figure 2-33. HKN6188_ Power Cable with External Speaker Connector

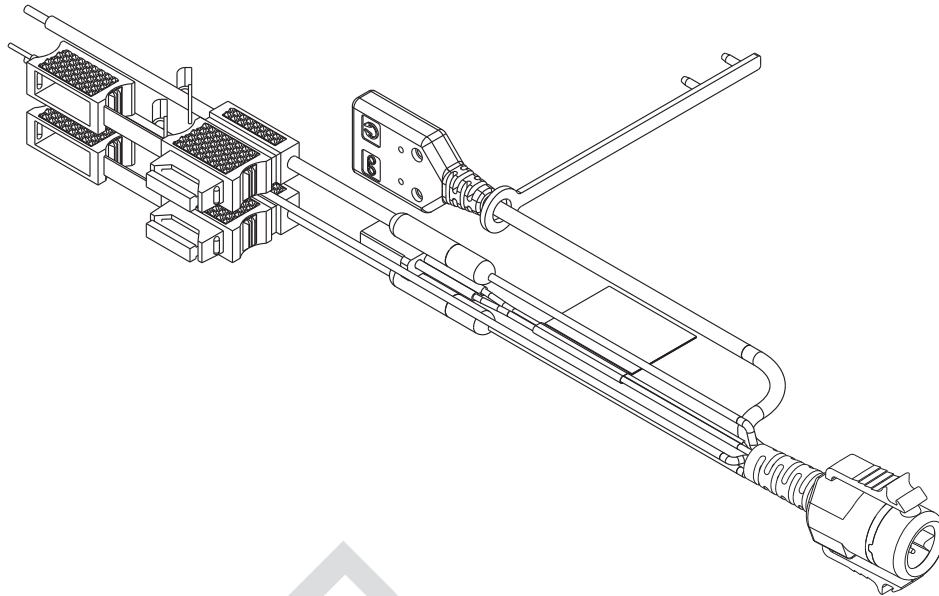


Figure 2-34. HKN6187_ Power Cable with External Speaker Connector, Record Audio Output Jack (2.5 mm) and Earphone Jack (2.5 mm)

NOTE: Audio Out – Does not require CPS programming. Attaching a headset will mute the external speakers of the radio which are attached at 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.

2.3.2 Battery Selector Switch

In vehicles which have installed a Battery Selector Switch, the ignition sense (yellow) wire should be the only wire connected to the battery selector switch (see Figure 2-35). 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 all power and ignition sense wires must be routed through the battery selector switch, so that the control head and radio transceiver both see the loss of battery power at the same time.

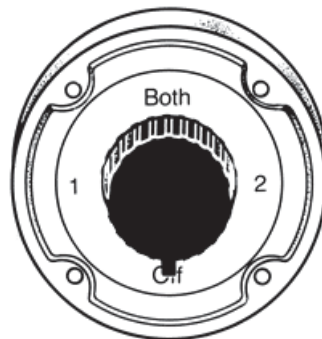


Figure 2-35. Battery Selector Switch

2.4 Antenna Installation

IMPORTANT: To assure optimum performance and compliance with RF Energy Exposure regulations, 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.

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. **Roof top** – For optimum performance and compliance with RF Energy Exposure regulations, mount the antenna in the center area of the roof.
3. **Trunk lid** – On some vehicles with clearly defined, flat trunk lids, the antennas of some radio 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, sports utility vehicles, and pick-up trucks), mount the antenna in the center area of the roof.

Before installing an 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 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.

4. Mounting restrictions for certain radio models.

NOTE: Do not cut antenna cables to ensure compliance with RF Energy Exposure regulations

NOTE: *VHF and UHF 1/4 wave antenna* should be mounted **only in the center area of the roof**, not on the trunk lid, to ensure compliance with RF Energy Exposure regulations.

5. 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.
6. 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.

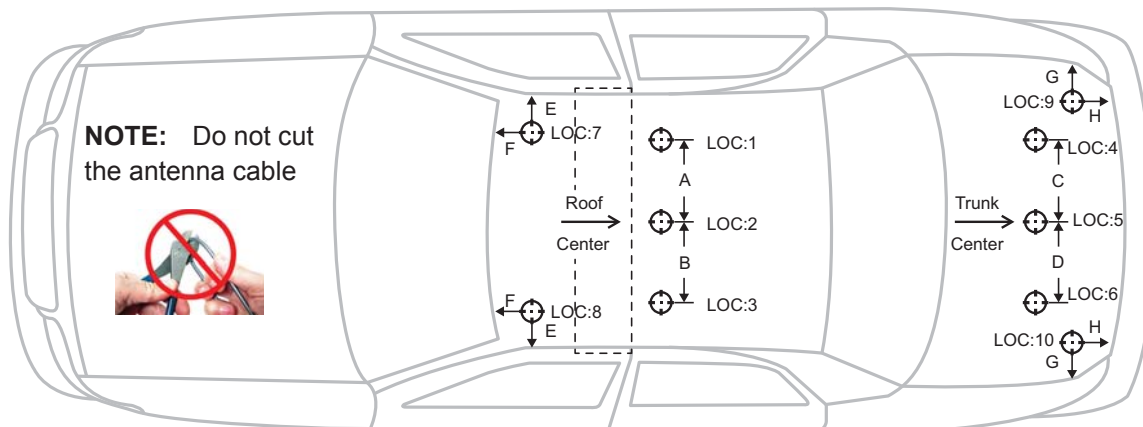


Figure 2-36. Multiple Antennas Separation for locations 1-10

Figure 2-36 indicates the separation distances required for the various antennas used with an APX 8500 midpower radio. Each "cross-hair" symbol represents a possible location (i.e. 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. This picture is not drawn to scale.

For letters A, B, C, and D, the table indicates the EXACT distance for separation of the LMR antennas.

For letters E, F, G, and H, the table indicates the maximum distance between the edge of the ground plane and the accessory antenna location.

Table 2-1 Distance Between Antenna

Characters	Distance	Characters	Distance
A	8 inches	E	8 inches
B	8 inches	F	8 inches
C	8 inches	G	8 inches
D	8 inches	H	8 inches

NOTE:

- A minimum of 18 inch separation is required between lightbar and any roof mounted antennas, to prevent interference with the lightbar circuitry (see lightbar manufacturers installation information).
- The LMR 700/800 antennas should only be placed at LOC:2 or LOC:5.
- Standard LMR VHF and UHF antennas should only be placed at LOC:1, LOC:3, LOC:4 and LOC:6.
- 1/4 wave LMR VHF and UHF antennas should only be placed at LOC:1 and LOC:3 (i.e. roof only) to ensure compliance with RF Energy Exposure regulations.
- The VML antenna must be separated from any LMR antenna by at least 40 inches.
- The LTE Main and Diversity Antenna locations should be at LOC:9 and LOC:10 when the LMR All-Band or LMR 700/800 narrow band antennas are at LOC:2 (i.e LTE opposite location from the LMR).
- The LTE Main and Diversity Antenna locations should be at LOC:7 and LOC:8 when the LMR All-Band or LMR 700/800 narrow band antennas are at LOC:5 (i.e LTE opposite location from the LMR).
- In some mobile installations that include an LTE modem, external filtering on the LMR port and/or the LTE port may be needed to reduce interference. Contact your local Motorola Solutions Service Center for more information and for filter kit numbers (See Appendix for contact info).

2.4.2 Multiplexers and Vehicle Installation

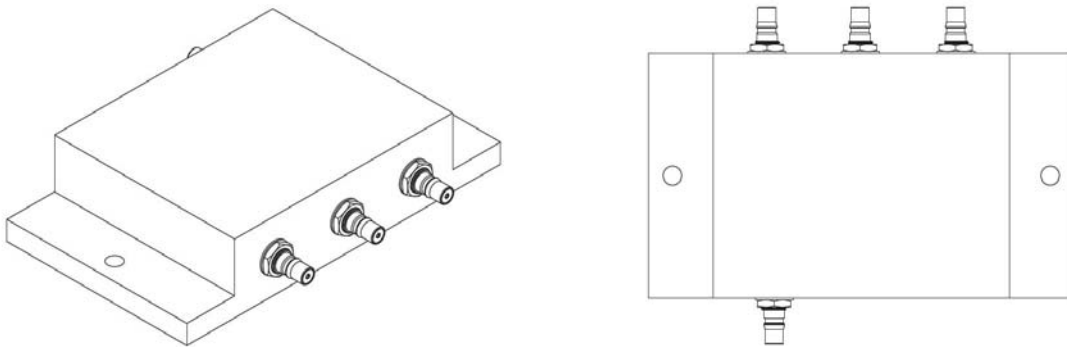


Figure 2-37. Multiplexer Views

2.4.3 QMA Connection (APX8500 Only)

APX8500 is using 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's collar and pull the cable straight off the jack.

2.4.4 GPS/GLONASS/Wi-Fi/Antenna Placement (APX8500 Only)

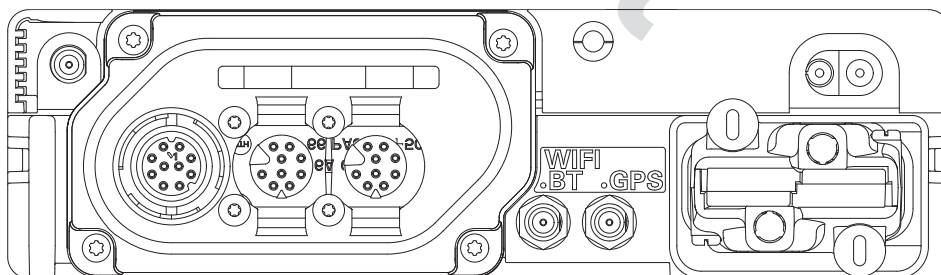


Figure 2-38. GPS/GLONASS and Wi-Fi Antenna Connector on the Back of the Mid Power Radio

2.5 Speaker



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 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 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.
5. Do not submerge the 2-pin speaker connector in water nor place this connector in an area that could have standing water.

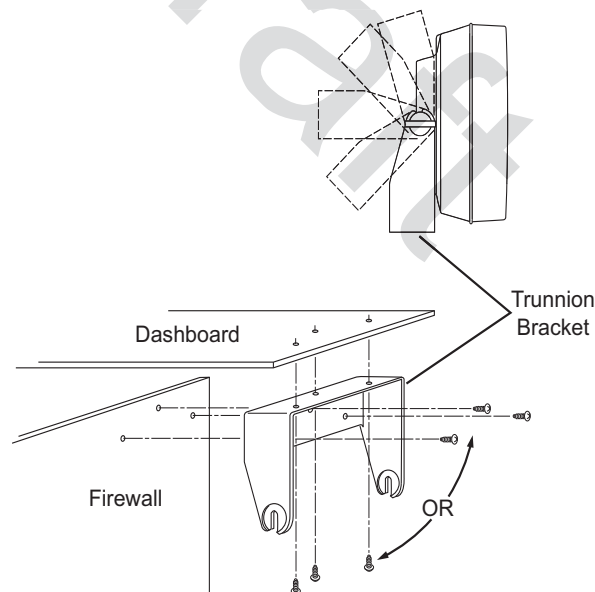


Figure 2-39. Speaker Mounting

2.5.1 Internal Speaker Disassembly

NOTE: This configuration is only applicable for O2 Control Heads.

You can disable the internal speaker of your radio by following the instructions below.

Use the following procedure to disassemble your radio:

1. Unplug power, antenna, microphone and all accessories connections. If the radio is a remote-mount radio, disconnect the remote-mount control cable from the front of the transceiver.
2. Remove the four screws found on the control head with a Torx T-20 bit as shown in [Figure 2-40](#). Discard the screws.

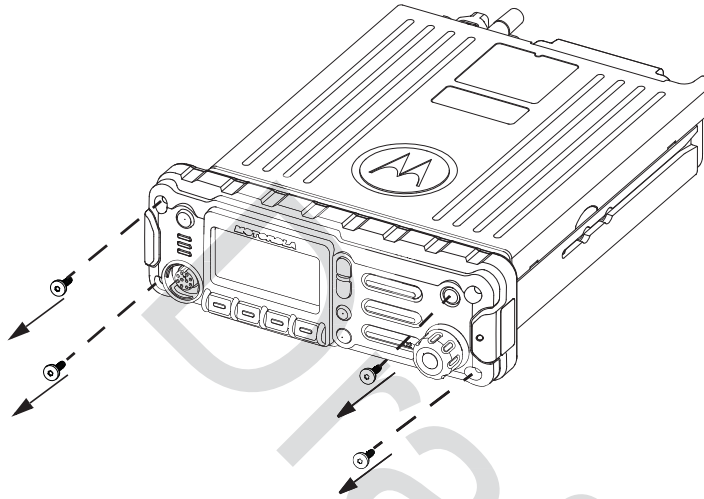


Figure 2-40. Removing the screws on the Control Head

3. Firmly grasp the front panel of the control head. Carefully remove the front housing assembly from the back housing assembly as shown in [Figure 2-41](#). Note the position of the attached flex and do not pull on it excessively.

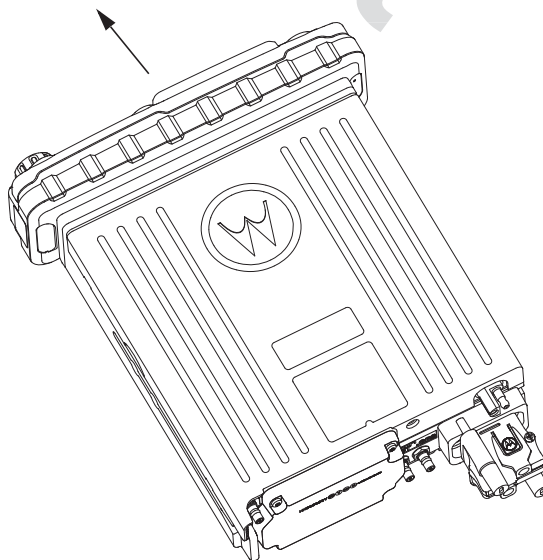


Figure 2-41. Removing the Control Head

- Put the control head face down on a clean, flat surface to avoid damaging it. Do not touch the o-ring on the back housing.
- Carefully disconnect the speaker connector from the circuit board as shown in [Figure 2-42](#).

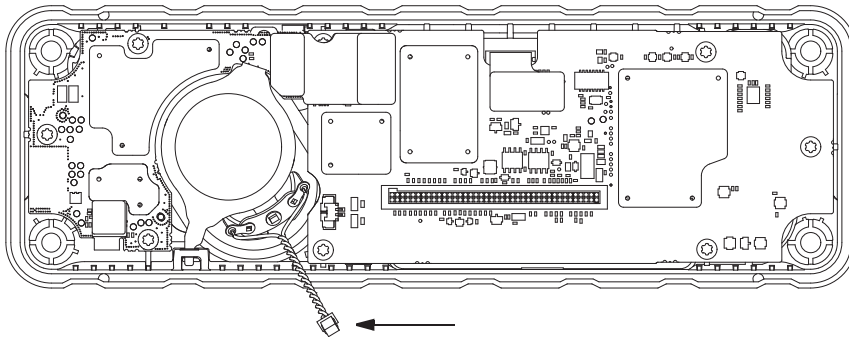


Figure 2-42. Disconnecting the Speaker Connector

- Reattach the front housing assembly to the back housing assembly as shown in [Figure 2-43](#). Make sure that the flex is returned to its original position and that the o-ring on the back housing assembly is not pinched.

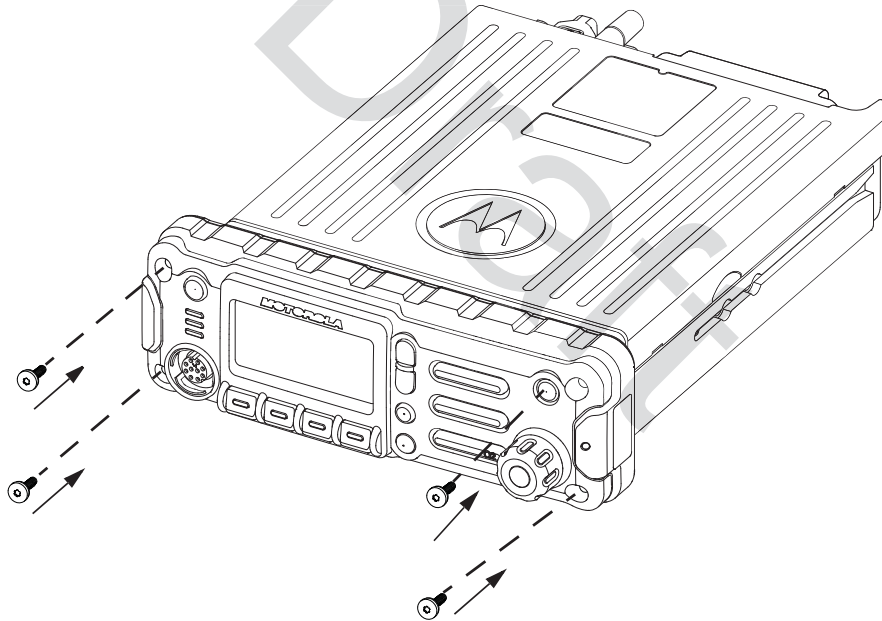


Figure 2-43. Reattaching the Control Head

- Secure the front housing assembly back to the back housing assembly with four new screws using the Torx T-20 bit as shown in [Figure 2-43](#). Apply 9 in. lbs. torque for each screw.

2.6 Microphone Hang-Up Clip

2.6.1 Standard or O3 Control Head Hang-Up Clip

The hang-up clip must be within reach of the operator(s) and close enough to the control head to prevent cable strain. 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.

Some microphone models require the grounding of the microphone clip in order for HUB operation to work correctly. Refer to the documentation that comes with your Motorola microphone model.

NOTE: For multi-control head configuration where only one of the control heads has a microphone, the control heads without a microphone attached must have their HUB or Monitor pin (J100-22) jumpered by a wire to GND (J100-1 or J100-14) for HUB operation to work.

2.7 RFID (Option)

An APX mobile radio equipped with an RFID tag allows an alternate option for tracking the radio asset. Each RFID equipped radio has an RFID tag preprogrammed with the individual radio's serial number (also found on the FCC label) as well as band and radio model information (see below for further information).

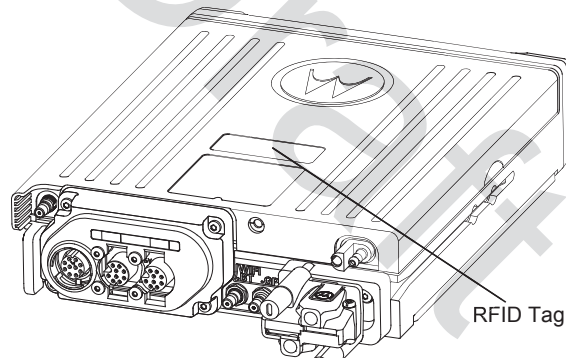


Figure 2-44. RFID Location on Mid Power Radio

2.7.1 RFID Reading

To read an RFID tag using a UHF Gen 2 RFID reader (e.g. Motorola's MC9090-G), open an appropriate RFID read application, point the RFID reader at the tag and activate the reader's RFID antenna (e.g. pull Motorola's MC9090-G scanning trigger). RFID reader must be within 1 foot from tag in order to read.

Two variables, Read Angle and Reader Orientation, aid in the distance needed to read and write to the RFID Tag. Read distance is independent of Tag Angle, but the reader should be as close to perpendicular to the tag as possible (Read Angle).

As Read Angle increases past 60 degrees, read distance will begin to decrease; tag will become unreadable once Read Angle exceeds 90 degrees (see [Figure 2-45](#)). RFID tag cannot be read through metal. The orientation of the reader (Reader Orientation) and the tag must be aligned to improve read and writability (see [Figure 2-47](#)).

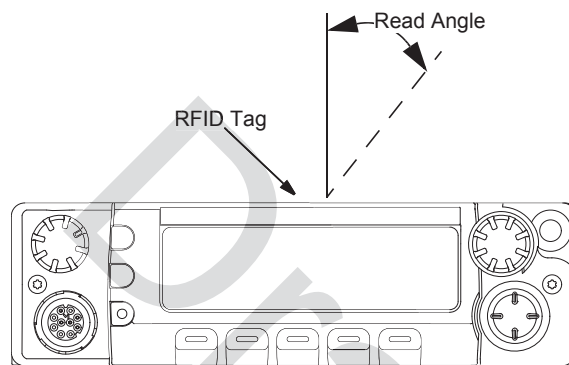


Figure 2-45. Read Angle for Mid Power Radio

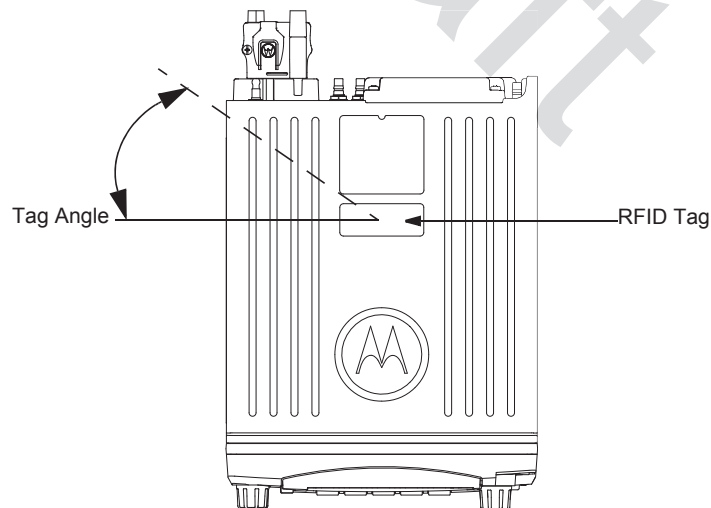


Figure 2-46. Tag Angle for Mid Power Radio

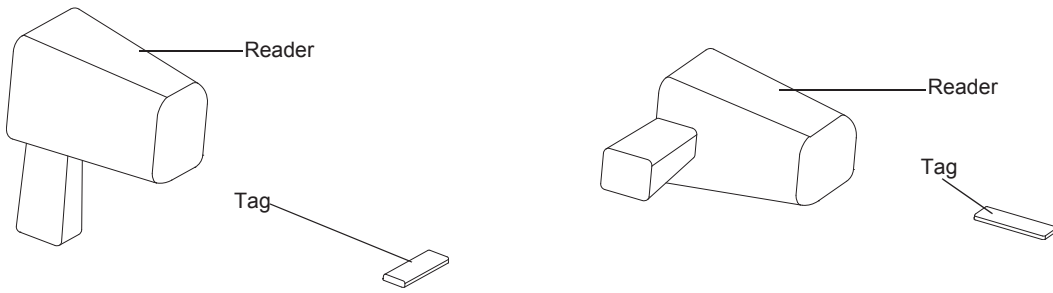


Figure 2-47. Examples of Reader and Tag Aligned (Reader Orientation)

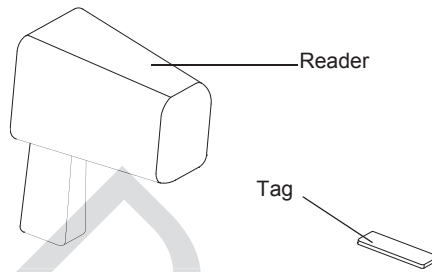


Figure 2-48. Example of Reader and Tag Misaligned (Reader Orientation)

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2.7.2 Programming RFID (If Equipped)

The user can reprogram the tag (up to 12 ASCII characters when encoded to hexadecimal format) using any UHF Gen 2 capable RFID writer (e.g. Motorola's MC9090-G).

NOTE: Follow read direction in [Section 2.7.1](#) to optimized reprogramming.

Table 2-1. Model Number Chart in 12-Digit ASCII Format

Model Number	Radio Tier/Band/Output Level	Last Two Digits
M37TSS9PW1AN	APX Mobile 700/800 VHF UHF-MP	T0
M30KSS9PW1AN	APX Mobile SB-MP VHF	D2
M24KSS9PW1AN	APX Low Tier Mobile-MP VHF	D8
M22KSS9PW1AN		
M36KSS9PW1AN	APX Lowest Tier Mobile-MP VHF	D9
M30KTS9PW1AN	APX Mobile SB-HP VHF	D3
M30QSS9PW1AN	APX Mobile SB-MP UHF1	E2
M30QTS9PW1AN	APX Mobile SB-HP UHF1	E3
M30SSS9PW1AN	APX Mobile SB-MP UHF2	D2
M20TSS9PW1AN	APX Mobile DB-MP 700/800-MP VHF	R2
M30TXS9PW1AN	APX Mobile DB-MP 700/800-HP VHF	R3
M30URS9PW1AN	APX Mobile SB-MP 700/800	F2
M22URS9PW1AN	APX Low Tier Mobile-MP 700/800	F8
M24URS9PW1AN		
M36URS9PW1AN	APX Lowest Tier Mobile-MP 700/800	F9
M24QSS9PW1AN	APX Low Tier Mobile-MP UHF1	E8
M22QSS9PW1AN		
M36QSS9PW1AN	APX Lowest Tier Mobile-MP UHF1	E9
M24SSS9PW1AN	APX Low Tier Mobile-MP UHF2	E8
M22SSS9PW1AN		
M36SSS9PW1AN	APX Lowest Tier Mobile-MP UHF2	E9
M22WRS9PW1AN	APX Low Tier Mobile-MP 900	F8

Table 2-2. Serial Number with Radio Band/Tier/Power

Characters	Radio Band/Tier/Power
F	700/800 and 900
D	VHF

Table 2-2. Serial Number with Radio Band/Tier/Power

E	UHF
R	700/800 and VHF
T	Multi-Band
E	UHF1 and UHF2
S	700/800 and UHF
0	APX 8500
1	APX 7000
2	APX 7500 Mid Power
3	APX 7500 High Power
4	APX 6000
5	APX 6500 Mid Power
6	APX 6500 High Power
7	APX Low Tier Portable
8	APX Low Tier Mobile MP/APX 4500 MP/APX 2500 MP
9	APX Lowest Tier Mobile MP/APX 1500 MP

2.8 Completing the Installation

Complete the installation by connecting the speaker to the accessory cable; verify the ignition sense wire is attached according to planned ignition sense; verify the control head is attached to either the TIB or the CAN extension cable; and then attach the power cable to the back of the transceiver.

Chapter 3 Universal Relay Controller Installation

The Universal Relay Controller (URC) is an extension of and an orderable accessory for O7 or O9 control head. URC is used to control high power switching peripherals, e.g. lightbar. URC works on all lightbars which can be controlled by power application. URC is connected to the transceiver's MMP port.

The URC design consists of a microcontroller and uses 10 relays to control the switching device. A separate ground for isolation exists between the relay and MCU sections, which is provided by the use of iCoupler from Analog Devices. Each relay is connected to an output with 15 A fuse. The maximum load allowed on each output is 12 A. Two cables, each with the maximum of 60 A, can be used to connect to the input connector at the bus bar. Each cable is connected with a 60 A circuit breaker. One-wire EEPROM is employed to enable MMP to recognize the URC accessory ID. CPS can be used to program the relay patterns.

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

The recommended mounting location for URC is in the car trunk, either next to the transceiver or within the area not further than 4.5 m away from the transceiver. Ensure that sufficient cooling is provided. Do not cover URC with baggage, blankets, etc.



Caution

Do not backfeed power into URC.

3.1 Universal Relay Controller Mounting

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

NOTE: For optimum URC performance, orient the mounting trunnion as shown in [Figure 3-1](#).

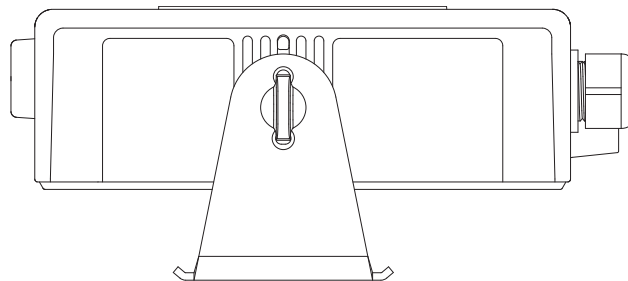


Figure 3-1. Universal Relay Controller Orientation

An adjustable trunnion, which allows a number of mounting positions, is supplied for mounting the URC. The installation must not interfere with the operation of the vehicle or its accessories.

Install the URC as follows:

1. Use the URC 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 URC (adjust for proper viewing angle) and fasten it to the trunnion with two wing screws. Test the installation to ensure that the unit is securely locked in place.

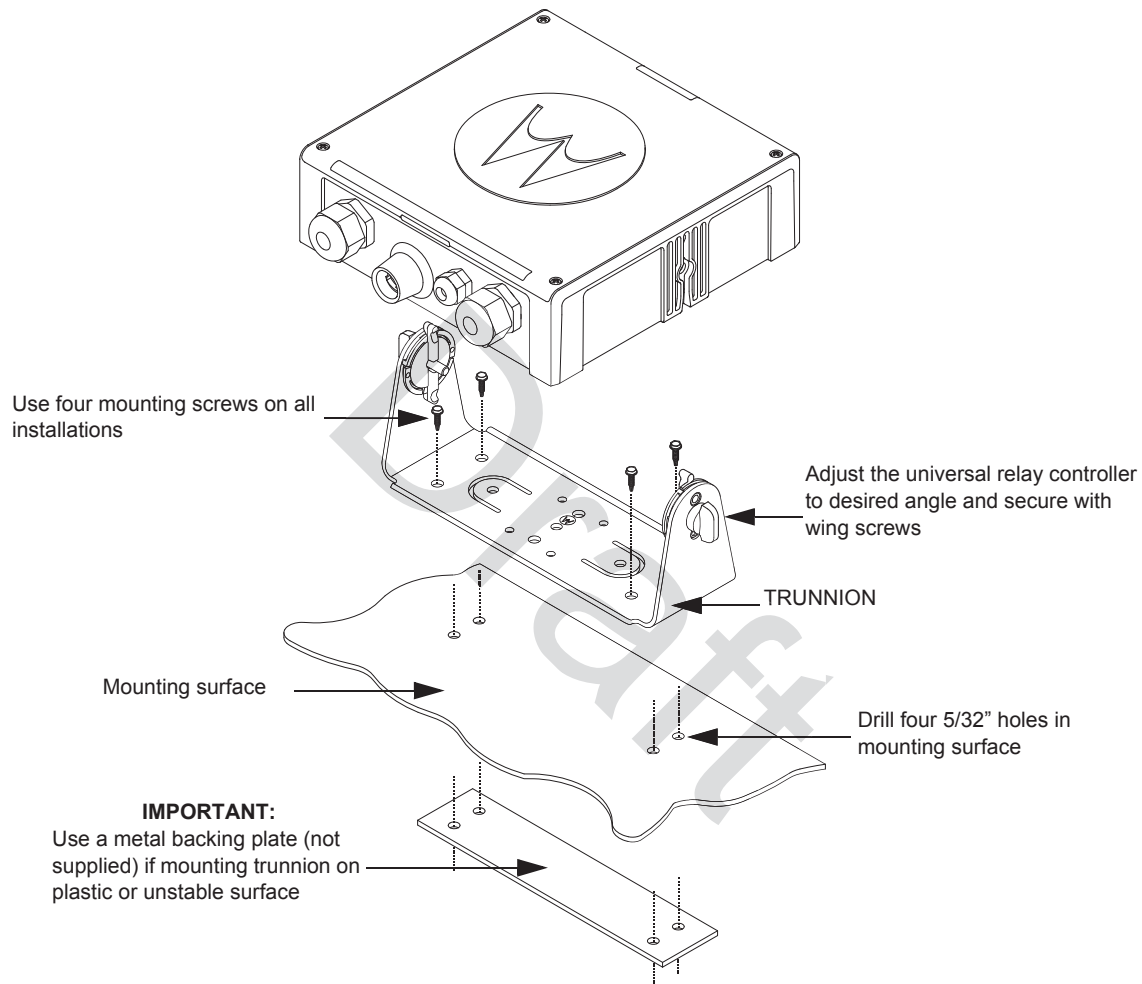


Figure 3-2. Universal Relay Controller Installation Exploded View

3.2 07/09 Universal Relay Controller Cable Assembly

3.2.1 Power Cable

1. Remove the cap nut of power cable gland assembly, and insert the power cable through the cap nut and neoprene seal in the cable gland body. Use power cable with either AWG 6 or AWG 8 only (recommended OD range of cable is 5.5 mm to 9 mm) that is able to withstand 80 A and 50 A respectively, to ensure water sealing of the controller. User can decide to install one or two power cables based on the requirements. The power cables (A+) are not supplied.
2. The loose end of the power cable with cable strip length 7.94 mm (5/16") is then placed on the power lug and secured down by a set screw. The cap nut is then reassembled with tightening torque 18 lb-in.
3. The other end of the power cable should be connected to circuit breaker (Motorola part number 40012006001) end which indicates "AUX" and then, to power supply on the other end which indicates "BAT", instead of connecting to power supply directly.
4. Repeat steps 1 to 3 to install the second power cable, if required.
5. If only one power cable is installed, it is recommended to cover the other side of the power cable gland with power cable gland seal with tightening torque 18 lb-in.

3.2.2 Ground Cable

1. Remove the cap nut of ground cable gland assembly, insert the ground cable through the cap nut and then reassemble the cap nut. Use ground cable with AWG 14 only (recommended OD range of cable is 2 mm to 4 mm) that is able to withstand 5 A. The ground cables (A+) are not supplied.

NOTE: The ground is used to switch the relays, and not act as a ground to the actual device being controlled.

2. The loose end of the ground cable with cable strip length 7.94 mm (5/16") is then connected to a two-pin terminal block. Both pins on the terminal block are inter-connected and either pin can be used. The cap nut is then reassembled with tightening torque 7 lb-in.

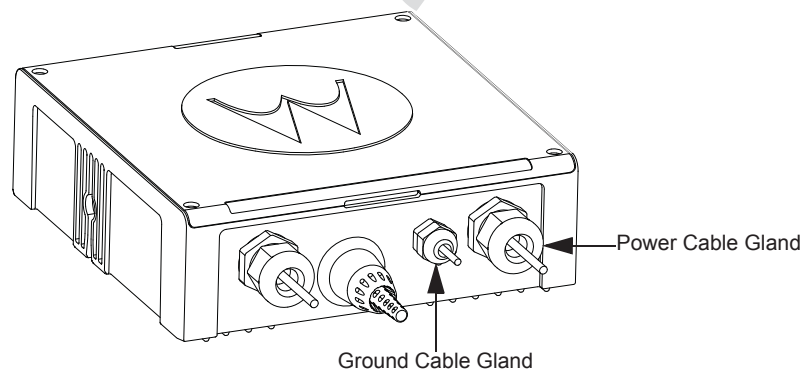


Figure 3-3. Power and Ground Cable Glands

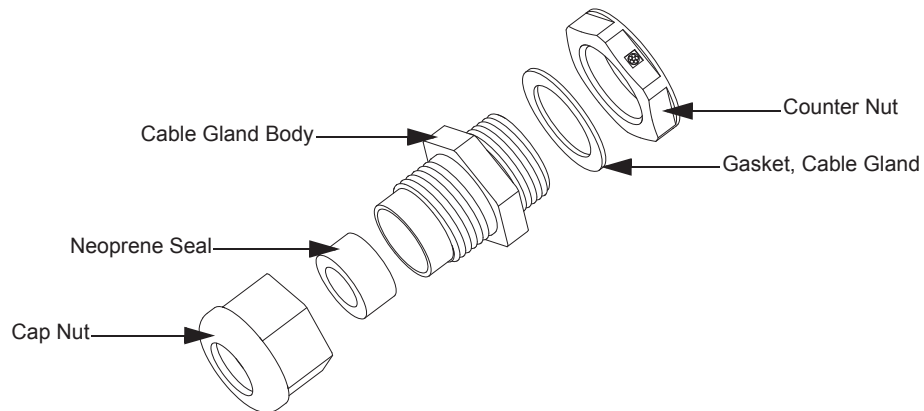


Figure 3-4. Cable Gland Assembly with Gasket

3.2.3 Wires

1. Assemble the wires into the lightbar gasket retainer and lightbar gasket. The URC can support lightbars through control wires with outer diameter ranging from 1.52 mm to 3.77 mm (0.06" to 0.148"), with wire gages ranging from AWG 12 – 20.
2. Each individual loose wire (prior to stripping off the wire jacket) needs to be inserted one at a time through the chassis. Ensure the lightbar wire is straight before inserting the wire into the chassis. Each wire is sealed individually by the radial gasket seal. When a thick wire (i.e. AWG 14 wire or wire OD > 2.90 mm) is inserted through the chassis, there is potential torn at the rubber gasket. Remove the rubber gasket residual and continue to the next step.
3. Thin wires 2.5 mm and below should be dressed into the retention feature using a black stick (see Figure 3-5); thick wires above 2.5 mm should be routed above the retention feature. Strip off the wire until 7.94 mm (5/16") after the wire is inserted into the URC, and install the wire into respective lightbar terminal block.
4. Cover the lightbar gasket retainer's hole with seal, gasket and ground cable gland, if no wire is inserted.

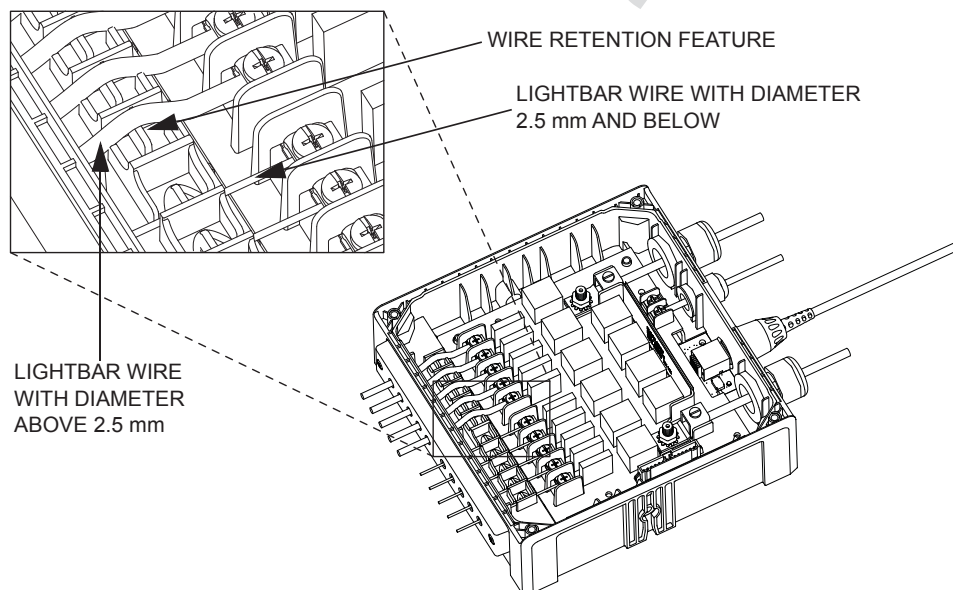


Figure 3-5. Wires Installation

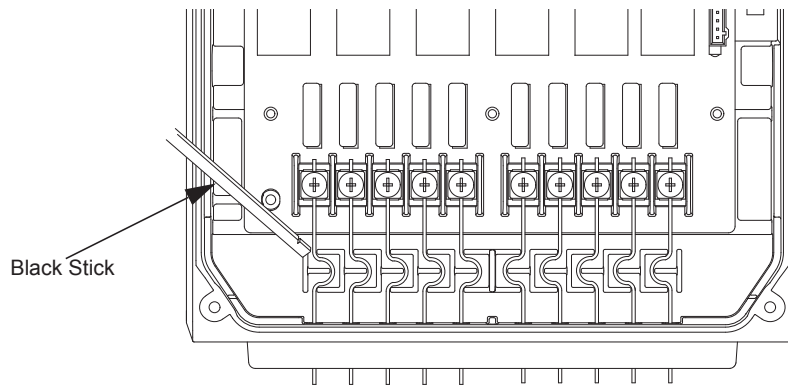


Figure 3-6. Wire Installation with Black Stick

5. The lightbar gasket should be replaced at each reassembly of the wire.

NOTE: Use of other cable gages except as recommended in this manual may result in water intrusion. Any reassembly of wire needs a new lightbar gasket replaced. If the current loading for one wire is higher than 12 A, the wires should be splitted before being assembled to the URC system. Wires kit (PMKN4109_) is provided to ease installation of the URC. Incorrect use of the wires kit, e.g. improper connection at external loose end wires, may impact the robustness of the URC.

Remove the wires and gasket residual inside the URC after the wire installation, before closing the top housing of the URC.

3.2.4 O7/O9 to URC Cable

The O7/O9 to URC cable (Motorola part number 3064153H02) can be assembled either before or after reassembling the top housing. Assemble the RJ45 port of the cable into the RJ45 connector on the URC and turn the locking collar instead of cable, 90 degrees to the right to ensure it is locked properly. After that, test whether the cable is locked properly or not by trying to pull out the cable.

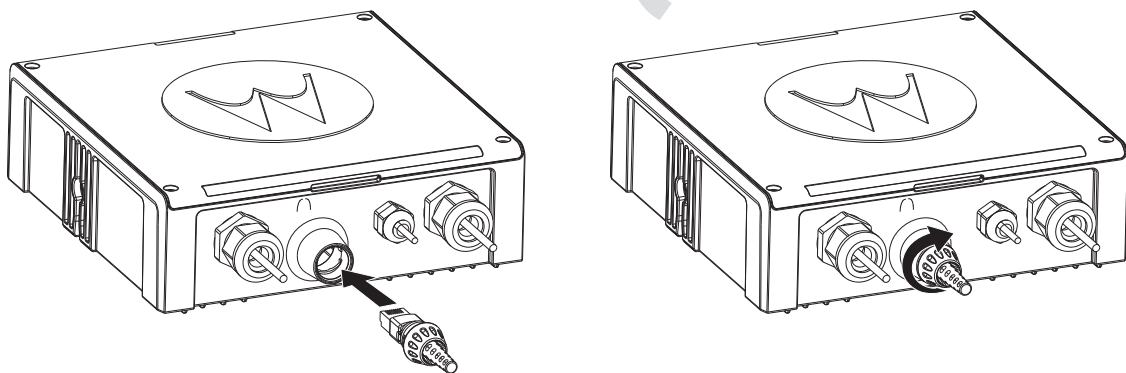


Figure 3-7. O7/O9 to URC Cable Installation

Notes

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Chapter 4 Options and Accessories Installation

4.1 Dash-Mount Accessory Installation

For dash-mounted configurations, the accessories must be installed through the accessory connector assembly that is located on the rear of the radio, adjacent to the power connector. Motorola-approved accessories are supplied with male terminals crimped to a 20-gauge wire specifically designed to fit the plug of the accessory connector assembly.

Insert the male terminal into the accessory connector assembly in the appropriate location and connect the accessory connector assembly in the rear accessory port. Do not use other generic terminals in the plug. Generic terminals can cause electrical intermittenancies and may cause damage to the plug.

4.1.1 Dash-Mount Emergency Pushbutton or Footswitch Installation

Mount the footswitch using the hardware that comes with the kit. Open the accessory cable connector housing; remove the jumper wire. Connect the emergency switch wires to pins 14 and 15 (see Figure 4-1). Close the connector housing; route the finished cable from the switch location to the control head location.

NOTE: The emergency footswitch should be attached with A+ unattached. A+ should be attached after successfully securing the screws in the connector.

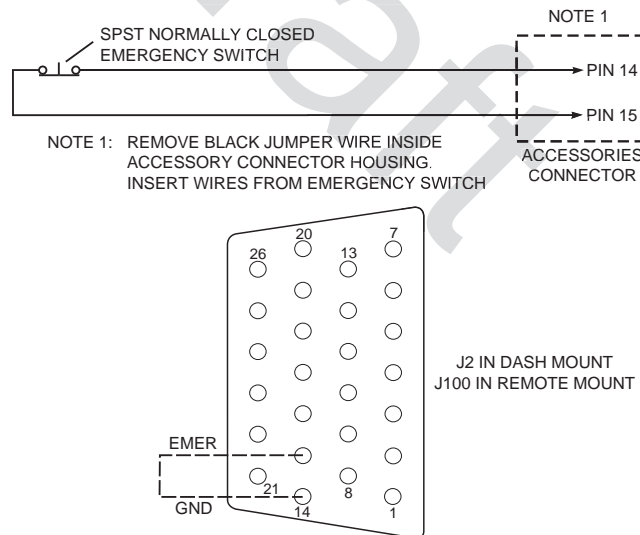


Figure 4-1. Emergency Switch Wiring Diagram



Caution

The radio is sold with correct accessory cables and jumpers in order to have emergency de-activated by default, regardless of the setting in CPS. However, if cables are not used, or if jumpers are removed without replacing with an emergency accessory button/switch at one of the accessory ports, the radio will power-up upon the application of A+. The display may not show an indication that the radio is on, and this can result in an incorrect operation of the radio as well as excessive current drain of the vehicle's battery when the engine is off.

4.1.2 Dash-Mount Horn and Lights (External Alarms) Relays

NOTE: For installations that use the horn/lights option, select a suitable location for mounting (normally under the dash) and, referring to [Figure 4-2](#), perform the following procedure:

1. **Horn Relay** – Connect the relay contacts across the horn ring switch, typically found in the steering column. Open the accessory cable connector and connect the two control wires (male pins) into locations 18 and 24 of the connector.
2. **Lights Relay** – Connect the relay across the head lamp ON/OFF switch, typically found in the steering column. Open the accessory cable connector and connect the two control wires (male pins) into locations 19 and 24 of the accessory connector.

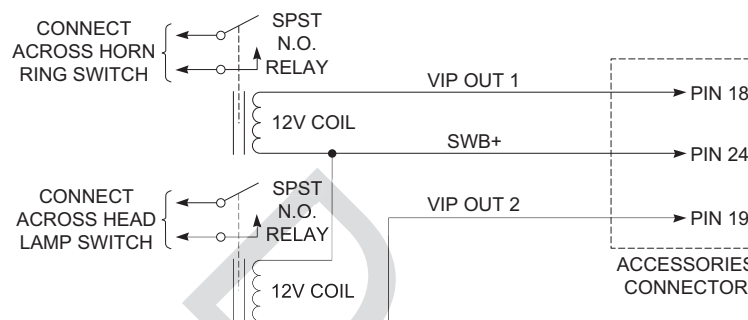


Figure 4-2. Horn/Light Wiring Diagram

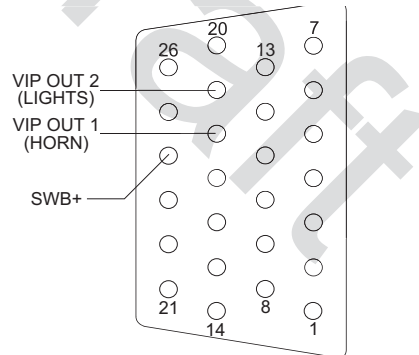


Figure 4-3. Radio MAP Connector

4.2 Remote-Mount Accessory 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. Attach wires from the accessory to the appropriate wire on the VIP cable (see [Table 4-1](#) and [Table 4-2](#)).

**Caution**

The radio is sold with correct accessory cables and jumpers in order to have emergency de-activated by default, regardless of the setting in CPS. However, if cables are not used, or if jumpers are removed without replacing with an emergency accessory button/switch at one of the accessory ports, the radio will power-up upon the application of A+. The display may not show an indication that the radio is on, and this can result in an incorrect operation of the radio as well as excessive current drain of the vehicle's battery when the engine is off.

4.2.1 Emergency Pushbutton or Footswitch Installation

Mount the switch using the hardware that comes with the kit. Connect the button/switch wires to a ground pin and the emergency pin, removing the default jumper wire in the rear accessory cable. The button/switch will short the pins when in-active. When the button/switch is pressed, its contact opens, the emergency path is un-grounded and pulled-high inside the radio transceiver, and detected by the processor. If an emergency accessory is used at either (or both) J2 connector and J626 connector, all jumper wires, shorting emergency to ground, must be removed so button/switch press can be detected.

4.2.2 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 VIP OUT pin on the VIP connector.

4.2.3 Lights (External Alarm) Relay Installation

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

4.2.4 Gunlock Installation

The O7 or O9 control head can program up to three gunlocks through the programmable buttons. You can set the time for the momentary trigger using the time-out trigger button. Connect the relay contacts across the gunlock switch to install the gunlock. Connect the two control wires to a SW B+ pin and a VIP OUT pin on the VIP connector.

It is recommended to install a failsafe/redundant bypass switch for the gunlock. It is suggested to use a separate timer switch or a manual push-on button switch to activate the gunlock. Connect the switch from the supply to the gunlock directly, as shown in [Figure 4-4](#). Place the manual button at a suitable and reachable location, yet not easily seen.

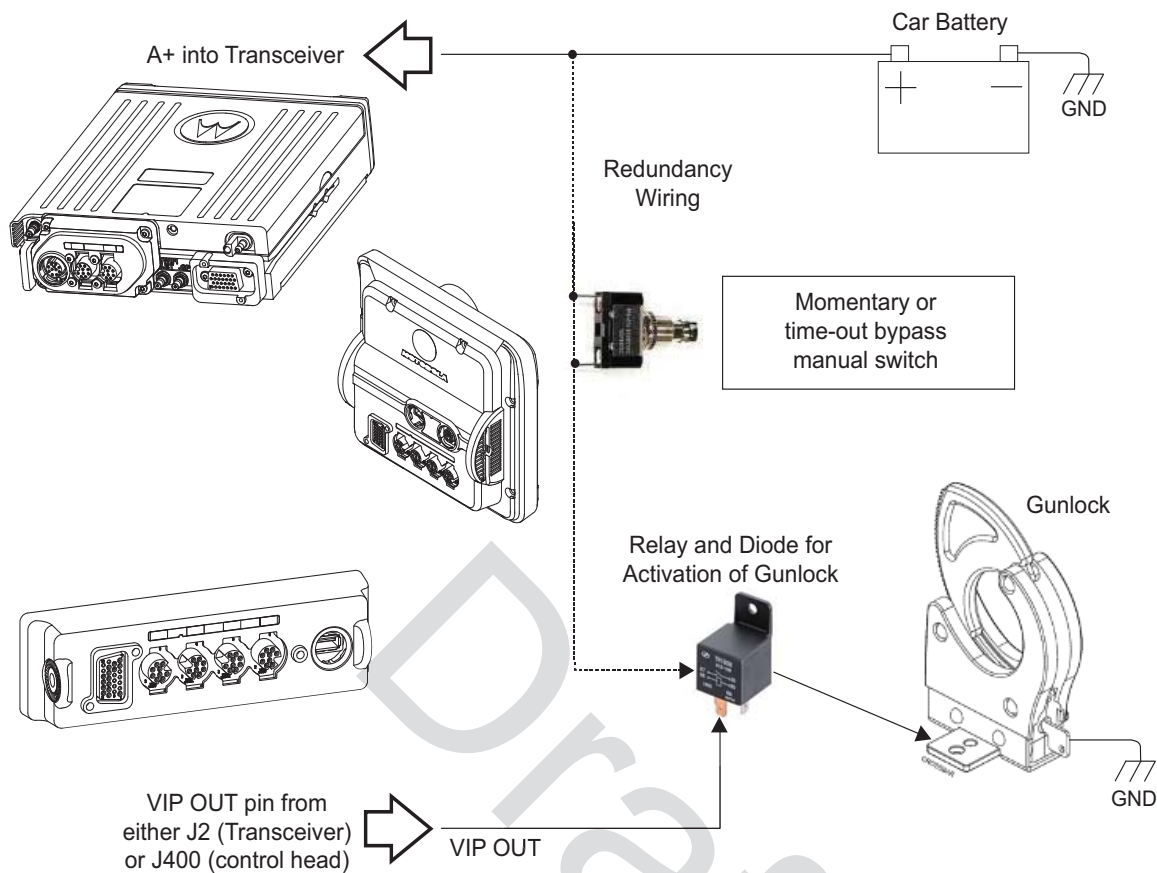


Figure 4-4. Gunlock Switch Redundancy Diagram

NOTE: Refer to section 4.3.1 for information related to wiring and activation of VIPOUTs

The Y-cable KT000247A01 is primarily designed to allow for simultaneous operation of the Motorola Branded SB9600 siren and still retain duplicate access to all the MAP (J2) connector pins located on the APX 8500 remote TIB. Use of emergency accessories, speakers, programming cables, VIPs, etc are possible via the P3 connector of Y-cable KT000247A01. The 26pin connector P2 does not contain every signal from the legacy DB25 port, called J600 on the APX 7500. Therefore, some legacy functionality (i.e. A+) is reduced with the APX 8500 remote mount configuration compared to the APX 7500 remote mount configuration.

4.2.5 Horn-Ring Transfer

Configure the Horn Relay for either Negative Contact or Positive Contact as shown in section 6.3 of the siren/PA manual (6881093C18). Program the designated VIP-OUT line for “Horn-Ring Transfer” and program the designated VIP-IN line for “Horn-Ring”.

Figure 4-5 shows wiring diagrams for connecting the Horn-Ring via a transfer relay for both negative and positive ground systems. Refer to the siren/PA manual (6881093C18) for more information.

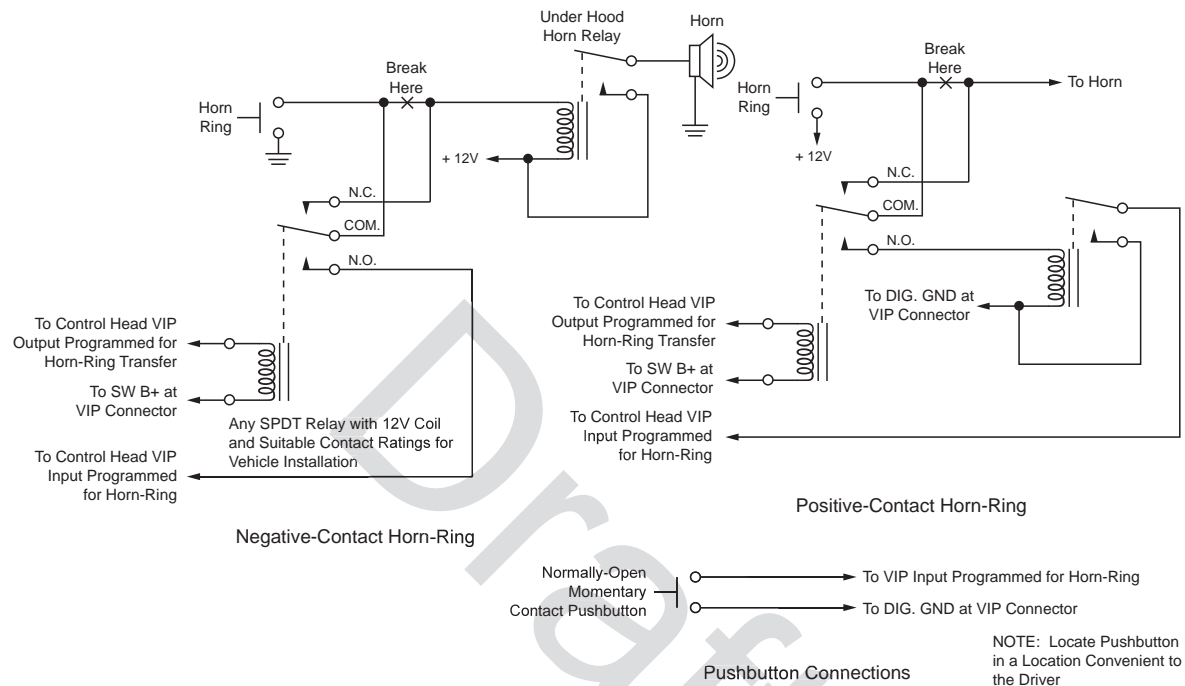


Figure 4-5. Siren/PA Horn-Ring Connections

4.2.6 Record Audio Out Jack of Transmit and Receive Audio

The use of Power Cable kit HKN6187_ (see Figure 2-34) provides access to both the transmitted audio speech, as well as the received audio speech. This can be recorded with a standard tape recorder using a 2.5 mm connector.

4.2.7 Earphone Jack

The use of Power Cable kit HKN6187_ (see Figure 2-34) provides the ability to use a standard earphone/headset instead of the external speaker. Once a cable is plugged into this 2.5 mm jack, the external speaker attached at the control head will turn mute.

4.2.8 USB Data Cables

It is recommended that the USB 1.5 meter data cable HKN6163_ is used for both dash mount configurations (at J2 connector) and for remote mount configurations (at J100 connector). This is because the HKN6163_ has the emergency jumper present, which is necessary for correct dash mount configurations. For interfacing at the MMP port, use Cable HKN6184_ which is a USB device cable.

The USB 4 meter (15 feet) data cable HKN6172_ is recommended for remote mount configurations only (at J2).

If the customer intends to use the HKN6172_ for dash mount configurations (at J2), the cable's 26-pin connector must be opened and an emergency jumper-wire placed across pins 14 and 15. Refer to [Figure 4-1](#).

4.2.9 RS232 Cables

The following are RS232 cables. Although not compatible with CPS radio reading or programming, they can be used for interfacing with RS232 accessories or RS232 computer programs. HKN6160_ is a 6 feet dash RS232 cable from J2 connector. HKN6161_ is a 20 feet dash RS232 cable from J2 connector.

4.3 Vehicle Interface Port Overview

The Vehicle Interface Port (VIP) allows the control head to operate outside circuits and to receive inputs from outside the control head. There are three VIP outputs which are used for relay control. There are also three VIP inputs which accept inputs from switches (remote mount only).

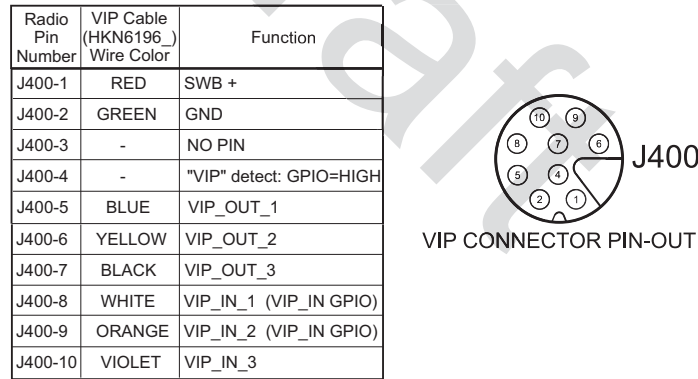


Figure 4-6. Remote Control Head Pinouts

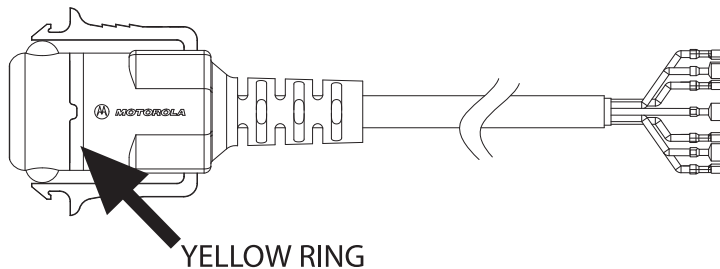


Figure 4-7. HKN6196_ VIP Connector Detail

4.3.1 VIP Output Connections

The VIP output pins are on the back of the control head (J100 and J400), or the rear accessory port (J2), as shown in [Figure 2-10](#). Use these connections to wire control relays. One end of the relay should connect to switched B+ voltage, while the other side connects to a software controlled ON/OFF switch inside the control head. The relay can be normally on or normally off depending on the configuration of the VIP outputs. There are three VIP output connections, as follows:

Table 4-1. VIP Output Connections

VIP OUT #	J400		J2		J100	
	SW B+ Pin Number	On/Off Switched Pin Number	SW B+ Pin Number	On/Off Switched Pin Number	SW B+ Pin Number	On/Off Switched Pin Number
1	Red 1	5 (Blue)	24	18	24	18
2	Red 1	6 (Yellow)	24	19	24	19
3	Red 1	7 (Black)	NA	NA	NA	NA

The function of these VIP outputs can be field programmed in the control head. Typical applications for VIP outputs are external horn/lights alarm and horn ring transfer relay control. For further information on VIP outputs, see the control head programming manual.

VIP OUT 1 and VIP OUT 2 can be accessed from either J100 or J400 connectors. This is to allow a previously wired VIP OUT at J2 to move easily to J100. However, when any cable is inserted into J400, J100 VIP OUTs are disabled.

When installing relays to the VIP OUT lines, a diode is necessary to prevent damage to the transistor or MOSFET, due to “back EMF” when the field collapses on the relay coil. Some vendor relays already come with this diode built-in, and other relays require the customer to install it. [Figure 4-8](#) shows the proper placement of the diode across the relay coil. The transistor or MOSFET is located inside the radio or the D.E.K. box.

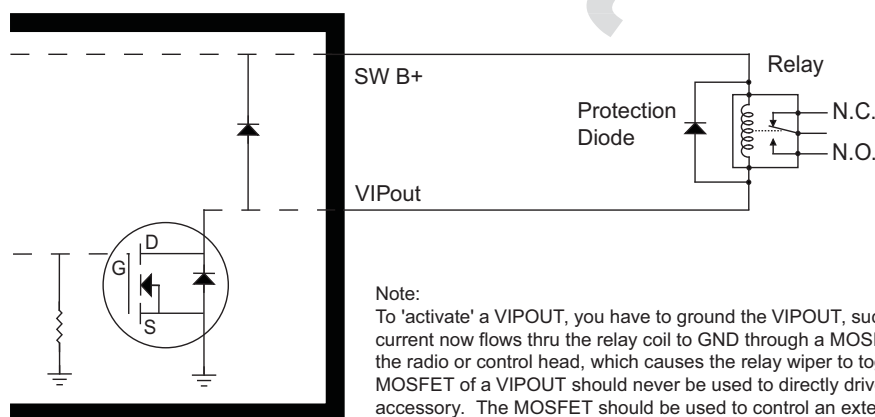


Figure 4-8. Relay Coil

NOTE: See Appendix A: Replacement Parts Ordering to order relay's for your VIP OUT applications. Example relay hardware: TLN4533_ (relay without internal diode), HLN6969_ (relay with internal back EMF protection diode), and HKN4258_ (relay wiring cable).

4.3.2 VIP Input Connections

The VIP input pins are only available on the back of the control head (remote mount). These connections control inputs from switches. One side of the switch connects to ground while the other side connects to a buffered input on the control head. The switch can be normally closed (NC) or normally open (NO) depending on the configuration of the VIP inputs. There are three VIP input connections, as follows:

Table 4-2. VIP Input Connections

VIP IN #	J400		J2	
	Ground Pin Number	On/Off Switched Pin Number	Ground Pin Number	On/Off Switched Pin Number
1	2 (green)	8 (white)	NA	NA
2	2 (green)	9 (orange)	NA	NA
3	2 (green)	10 (violet)	NA	NA

NOTE: Remote Mount requires the VIP cable to be attached to J400.

MCH installations require the VIP inputs to be connected to the head assigned ID #1. See [Section 2.2.2.4](#) for further information.



Caution

APX mobile radios equipped with the following features are capable of transmitting automatically, even if the radio is turned off:

- Automatic Vehicle Location
- Other Special Data Products

All APX mobile have accessory connector pins 14 and 15 connected together to allow the radio to power down. Opening this connection by REMOVING the accessory connector, or otherwise failing to maintain a normally closed path, could, if left unchecked, drain the vehicle battery, and possibly cause transmissions to occur.

4.4 Accessory Connector Assembly Details (P2)

The APX mobile accessory connector assembly is mounted on the right rear of the radio, opposite the antenna and adjacent to the power connector. It is fastened to the radio via jackscrews and held together by the two cover screws. It is a multi-functional connector that allows for many different types of adaptations. All approved accessory wires are securely strain-relieved through the exiting slots at the back of the accessory connector assembly. The terminations that are supplied with all accessories are designed to be fully engaged and locked into the plug connector (6680163F01). They can also be detached for service with the assistance of a terminal removal tool. The accessory connector assembly can be serviced multiple times for future installation upgrades.

The accessory connector assembly, supplied with every APX mobile dash-mounted radio, is equipped with a 26-pin plug assembly, two covers, two jackscrews, two cover screws, one emergency jumper, one ignition sense cable assembly, and one speaker pigtail. The jumper is provided to complete the circuit for emergency mode. If this circuit becomes open, the radio will be set to emergency mode.

39800834F05 is the crimping pin part number for use with any wires used inside the accessory cable connector.

4.4.1 Disassembly and Assembly

4.4.1.1 Disassembly

1. Disconnect the **negative terminal** from the vehicle's battery. Make sure that the battery cable is secured such that it will not power the vehicle's electrical system.
2. Unscrew both jackscrews completely.
3. Pull the accessory connector assembly out from the radio.
4. Loosen both cover screws, but do not remove them completely.
5. Pull the jackscrews away from the plug and hold them back.
6. Pry apart the accessory connector assembly covers.
7. Attach any new wire to its proper location by pushing in the male terminal. When you hear a pop, the wire is engaged. To verify that the wire is engaged, tug gently on the wire and be sure it does not come out. Do not overload the wire: severe damage will result to the plug.

4.4.1.2 Assembly

1. Place the plug in one cover. Be sure that the flange of the plug is in the slot of the cover. See [Figure 4-9](#).
2. Push the jackscrew through the plug to hold it in.
3. Position each wire across the strain-relief features in the cover. Avoid damaging loads on the plug by allowing some slack in each wire in the accessory connector assembly's wire chamber.
4. Place the second cover onto the plug. Be sure that the flange is protruding through both covers.

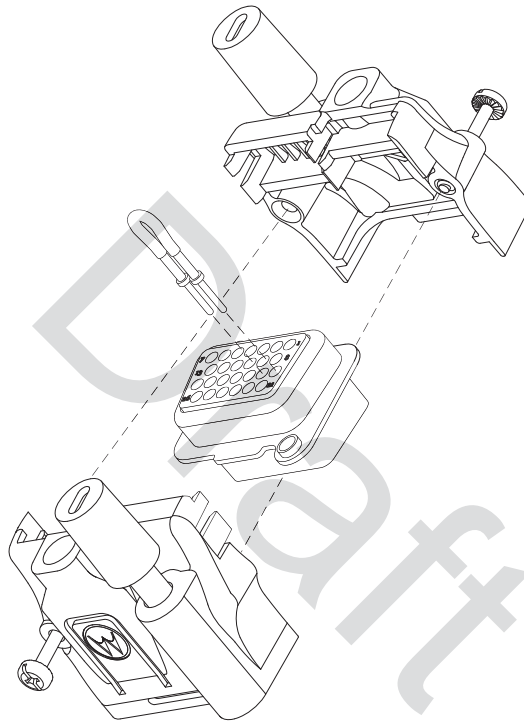


Figure 4-9. Exploded View of Accessory Connector Assembly (HLN6863_)

5. Squeeze the covers together bending the wires in the strain-relief features. You may need a pair of pliers to seat the assembly covers.
6. Once the covers are fully seated, fasten them with the cover screws. Tighten the screws firmly but do not over-tighten them. Be sure none of the wires are pinched.
7. Reattach the accessory connector assembly to the back of the radio and fasten it by finger-tightening the jackscrews to prevent any loosening.

NOTE: See APX Mobile Basic Service Manual for more detailed descriptions of these pins and other connectors located in the APX mobile radio.