IMPORTANT: For proper seating of the antennas, deburr and scrape any foreign matter from both sides of the hole, being careful not to mar the finish of the shell.

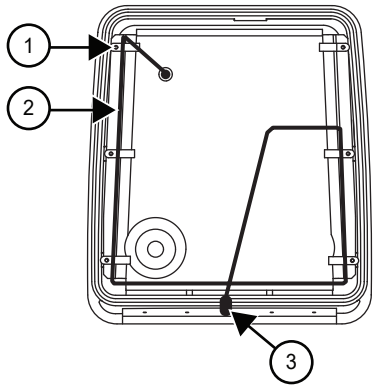
9 Clean the mounting surface around the hole to remove dirt and wax.

10 Refer to the *Motorcycle GPS Instruction Manual* for further installation instruction for the GPS. GPS must be mounted before the metal liner is installed.

11 Re-install the metal liner with the cable clamps provided in the weather-resistant housing. If installing GPS, the GPS coaxial cable must be fed through the hole in the metal liner before the liner can be placed onto the housing. Then route the GPS Coaxial Cable through the cable clamps before tightening the hex screws.

CAUTION: Be sure to observe the correct routing of the antenna cable. Failure to do so can damage the cable.

Figure 108: Routing the Coaxial Cable for GPS/Wi-Fi

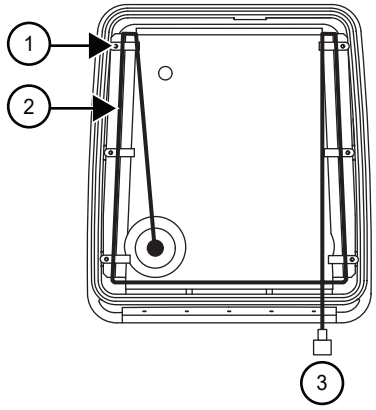


No.	Description
1	Cable Clamp
2	Coaxial Cable
3	Connector

12 To attach the 700/800, VHF, or UHF antenna base, refer to the *Antenna Installation Manual*.

13 Route the coaxial cable for the 700/800, VHF, or UHF antenna through the cable clamps.

Figure 109: Routing the Coaxial Cable for Antenna



No.	Description
1	Cable Clamp
2	Coaxial Cable
3	Attach to Antenna Connector on Radio

14 After routing the cable, allow enough of the cable to reach the radio antenna connector and cut off any excess length of the cable.

15 To install the connector, refer to the *Antenna Installation Manual*.

5.8 Installing the Antenna

Procedure:

1 Connect the appropriate antenna connectors to the antenna receptacles on the radio. Tighten the coupling until fully engaged.

IMPORTANT: Antenna Placement and Cable Routing as described inside the Antenna Installation Manual is not applicable for the APX radio series.

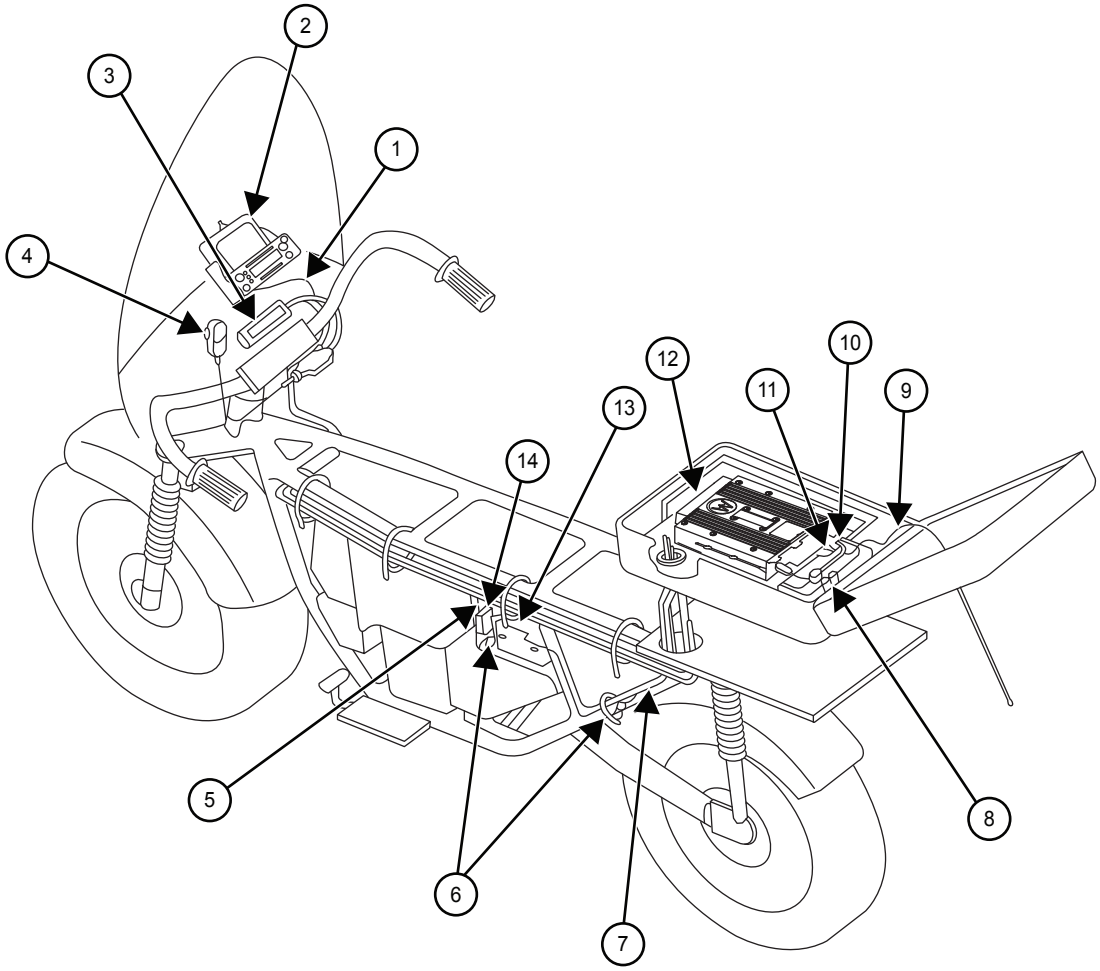
5.9 Cable Routing

Five cables must be installed to interconnect the components of the radio system as shown in the following figure. The antenna cable is routed away from the other cables inside the enclosure hinged cover (see Installing Antenna Base and Cables on page 110). The four remaining cables, routed along the motorcycle frame, are described in the following paragraphs.

NOTICE: Antenna Hole Placement and Cable Routing information in the *Antenna Installation Manual* is not applicable to the APX series.

Removal of the fuel tank and seat from the motorcycle facilitates routing the cables along the frame. Motorcycles with consoles attached to fuel tanks require routing cables between console and fuel tank. In this case the tank is not removed.

Figure 110: Cable Routing



No.	Description
1	Speaker Cable
2	Speaker / Control Head
3	Control Head Cable
4	Microphone
5	Ignition Cable
6	Chassis Ground
7	Fused Power Cable
8	Speaker Cable
9	Antenna Cable
10	Accessory Cable
11	Power Cable
12	Control Head Cable
13	Battery
14	Fuse Block

Speaker Cable
Runs from the speaker to the accessory-cable connector inside the weather-resistant enclosure.

Control Cable
Runs from the rear of the control head to the front of the transceiver inside the enclosure.

Ignition Sense (Red) Wire Portion of Accessory Cable
Runs from the ignition sense fuse terminal of the fuse box to the rear area inside the enclosure. The lug for attaching the ignition sense wire is contained on the accessory cable.

Power Cable
The red, unterminated end runs from the positive terminal of the battery to the power connector that plugs in the rear of the transceiver. Lugs for attaching the red and black leads are contained in the motorcycle power-cable kit. The black, unterminated end runs from a suitable motorcycle chassis ground to the power connector. DO NOT connect the black lead directly to the negative battery post.

You may route the cables in any order. As you route each cable, temporarily fasten it at both ends. When all cables have been run, permanently fasten the cables with appropriate cable tie wraps. Observe the followings during routing and hook-up:

1 Route the cables so that none interfere with motorcycle operation.

2 Fasten the cables with supplied nylon tie wraps. The wraps should be firmly installed at frequent intervals along the cable length in such a manner that motorcycle vibration will not cause metal fatigue and subsequent breakage of the cable wires.

3 Position cables away from parts of the motorcycle that become hot.

Bundle excess cable length inside the weather-resistant enclosure as discussed in Transceiver and Cabling Installation on page 116.

The fifth cable is the microphone with coiled cord. Plug the 9-pin D-connector end of the coiled cord into its mating connector, which is attached near the control head discussed in an earlier paragraph. Tighten the coiled-cord-retention screws. Insert the S-hook strain relief (terminated to the coiled cord) into the hole in the mounting bracket. Slide the microphone into the microphone hang-up bracket.

5.10 Installing the Weather-Resistant Enclosure

Procedure:

1 Remove the radio-mounting plate by removing four screws, lock washers, and flat washers.

2 The weather-resistant enclosure is mounted to the universal mounting plate using shock mounts. Assemble the shock-mount components exactly as shown in Figure 111: Weather-Resistant Enclosure Installation on page 116. Be sure to install ground straps between the shock-mount and the transceiver trunnion mount, and install one 7-1/2-inch ground strap between the right rear mount and the enclosure lid's antenna ground plane 0 (shown in Figure 111: Weather-Resistant Enclosure Installation on page 116 and in Figure 113: Installing the Transceiver on page 119).

3 The order of assembly is important to ensure proper shock mount operation. All components are supplied with the mounting kit. The five 7-1/2-inch straps are used on the rear and front shock mounts–four from shock mount to trunnion, and one from the shock mount to the lid's antenna ground plane.

NOTICE: Grounding through the power-supply cable is NOT sufficient. Whether the radio transceiver is mounted to a carrier or the chassis itself, the transceiver MUST be properly grounded to the motorcycle chassis. The ground strap supplied with the installation kit may have to be used to ensure a good RF ground path from the radio transceiver to the motorcycle chassis.

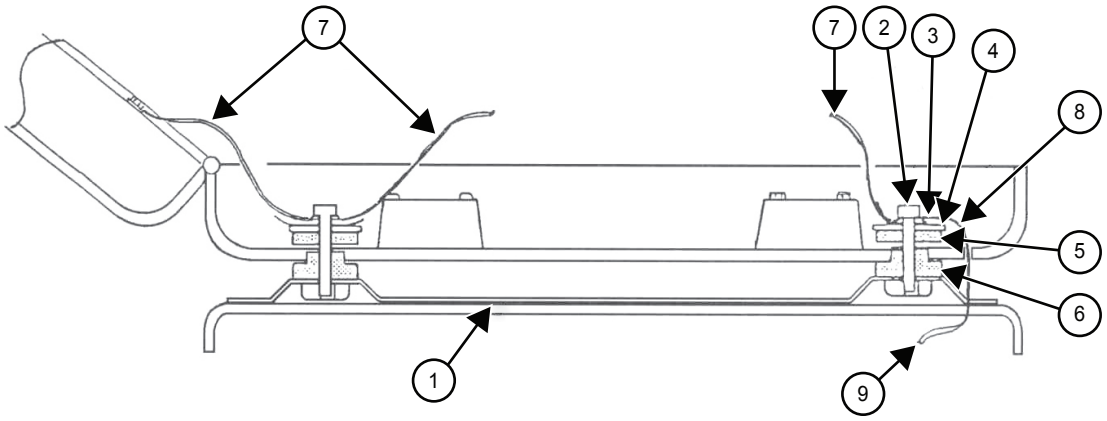
4 Install the 3-foot ground strap on one of the front shock mounts. Route it through the cable-routing hole and connect the other end to the motorcycle frame (see Figure 111: Weather-Resistant Enclosure Installation on page 116).

WARNING: DO NOT connect the ground strap directly to the negative battery post.

5 The diagram of the shock mount is shown loosely assembled. After the hex screws are tightened, the rubber washers are compressed to fasten the weather-resistant enclosure securely to the universal mounting plate.

6 Figure 113: Installing the Transceiver on page 119 is an exploded view of the enclosure; it shows details that will help to understand how the enclosure is mounted. After the enclosure is completely mounted, check for proper ground connection–continuity between the antenna ground plane and the motorcycle frame.

Figure 111: Weather-Resistant Enclosure Installation



No.	Description
1	Universal Mounting Plate
2	Machine Screw
3	Lockwasher
4	Flat Washer
5	Flat Rubber Washer
6	Shouldered Rubber Washer
7	7-1/2-inch Ground Strap
8	Ground Strap
9	To Motorcycle Chassis Ground

5.11 Transceiver and Cabling Installation

After the weather-resistant enclosure has been installed, the radio chassis (transceiver) is installed in the enclosure and then appropriate cables are connected.

Before the transceiver can be installed, the cabling must be properly positioned in the enclosure.

5.11.1

Installing Cabling in the Enclosure

Follow the procedure to position the cabling in the weather-resistant enclosure.

Procedure:

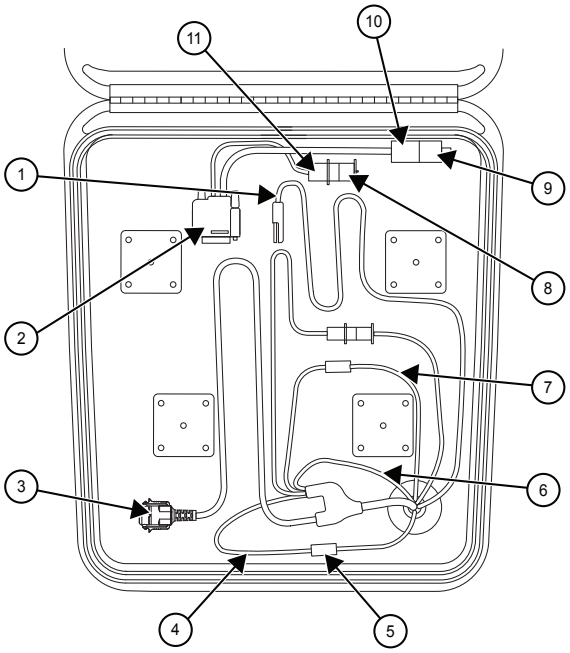
1. Run the speaker, power, control-head, and ignition sense cables into the enclosure.
2. Lay the excess cable length between the radio mounting bosses in an S configuration as shown in Figure 112: Installing Cables on page 117. Do not coil any excess cable. Use the supplied tie wraps to bundle cable as shown.

   NOTICE: If the extra cable length is not sufficient to match the illustrated cable routing, then match the illustration as closely as possible.
3. Connect the speaker cable to the accessory cable connector.

   NOTICE: The accessory-cable emergency connector is shipped with a shorting plug installed. The headset connector is also shipped with a shorting plug installed. If an emergency switch and/or headset is not used, the plugs must remain in. If an emergency switch and/or headset is used, remove the shorting plug and discard.
4. Install the mounting plate in position on top of the cables installed above. Take care not to damage or pinch the cables when securing the mounting plate in position.

   NOTICE: The control-head cable plug should be at the forward end of the enclosure, and the power-cable, speaker-cable, and accessory-cable plugs should be at the rear of the enclosure.

Figure 112: Installing Cables



No.	Description
1	Transceiver Power Cable
2	Accessory Cable
3	Control Cable (CAN)

No.	Description
4	Control Head Power (Red)
5	Control Head Power Fuse
6	Control Head Ground (Black)
7	Ignition Sense (ACC)
8	Emergency Cable Shorting Plug
9	Headset Sporting Plug
10	Accessory Cable Headset Connector
11	Accessory Cable Emergency and External Alarm Connector

5.11.2
Installing the Transceiver

Prerequisites:
Install the transceiver in the weather-resistant enclosure as follows (see Figure 113: Installing the Transceiver on page 119).

Procedure:

1. Install the mounting trunnion and loose ends of the four ground straps to the radio-mounting plate, using four screws, flat washers, and external-tooth lock washers (see Figure 113: Installing the Transceiver on page 119). The ground straps must be sandwiched between the flat washers and lock washers. The lock washer must be against the trunnion. The flat washer must be under the screw head.
2. Attach the transceiver to the mounting trunnion and secure with the two screws provided.
3. Connect the control cable to the front of the transceiver. Ensure the control cable connector screws are tightened.
4. Attach the accessory connector to the transceiver. Plug in the power connector.
5. Install the grommet around the cables and push the grommet into the cable-routing hole of the weather-resistant enclosure.

Figure 113: Installing the Transceiver

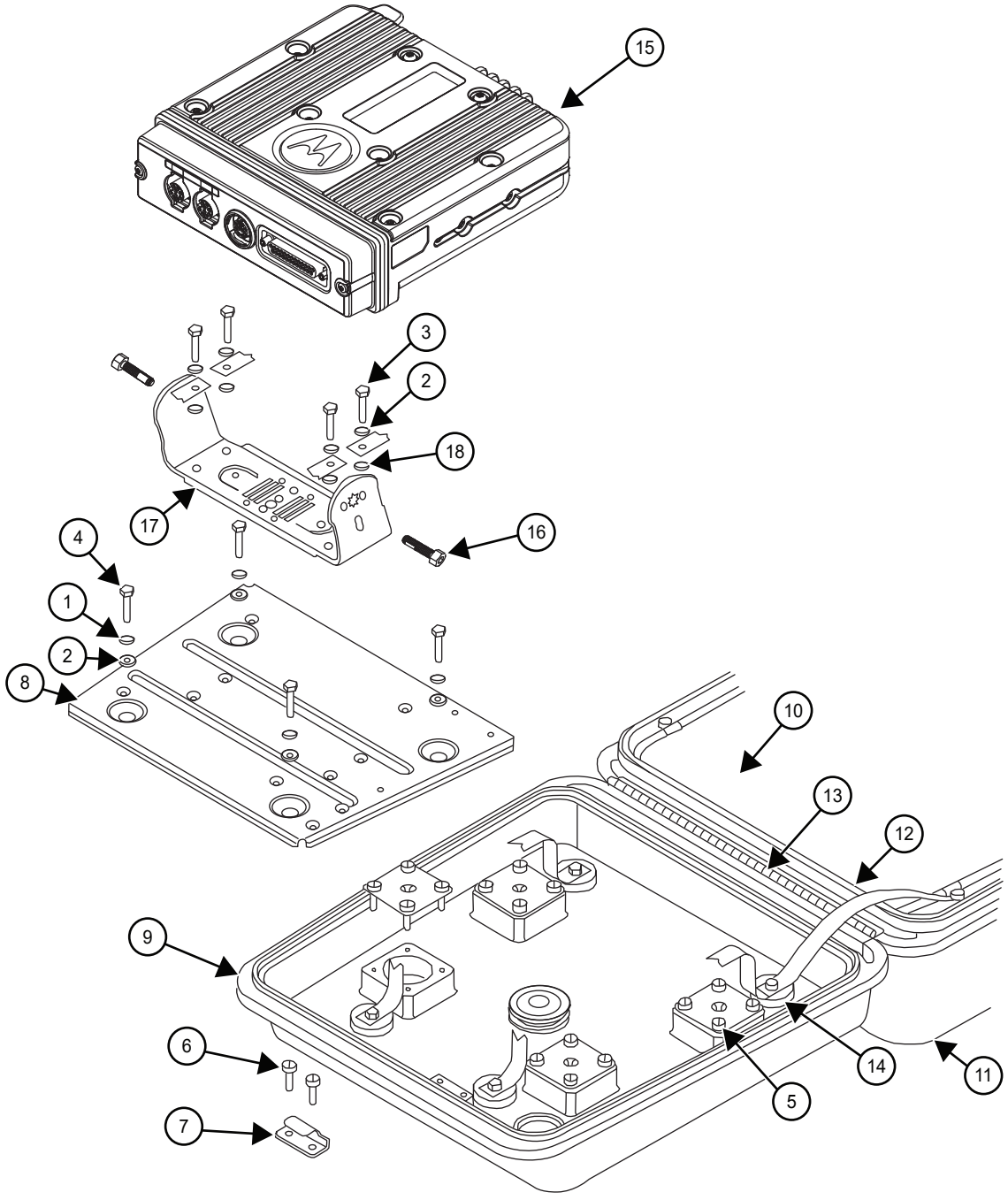


Table 16: Transceiver Installation Parts List

No.	Description
1	Lock washer
2	Flat washer (8 used)
3	Screw

No.	Description
4	Screw
5	Grommet
6	Screw
7	Lock catch
8	Radio mounting plate
9	Bottom housing
10	Ground shield plane
11	Top cover
12	Gasket
13	Hinge
14	Enclosure mounts
15	Transceiver
16	Screw
17	Trunnion
18	External tooth lock washer (8 used)

5.12 Installing the Emergency Switch Option

Use the two-conductor, green/black cable which has one end terminated with two contacts that is supplied with the HLN5131_ Emergency Push Button.

Disconnect the emergency switch shorting plug from the accessory cable. Replace the shorting wire of the shorting plug with the terminated end of the green/black emergency cable. Reconnect the plug to the accessory cable.

5.13 Installing the External Alarm Relay Option

The motorcycle radio is offered with only one optional relay connection. If both horn and lights are required, wire a second relay coil parallel to the first relay. Use the two-conductor green/black cable which has one end terminated with two contacts that is supplied with the W116 Emergency Push Button. Insert the contacts into positions 3 and 4 of the emergency shorting plug of the accessory cable. Refer to Figure 119: Horn/Lights Wiring Diagram on page 123.

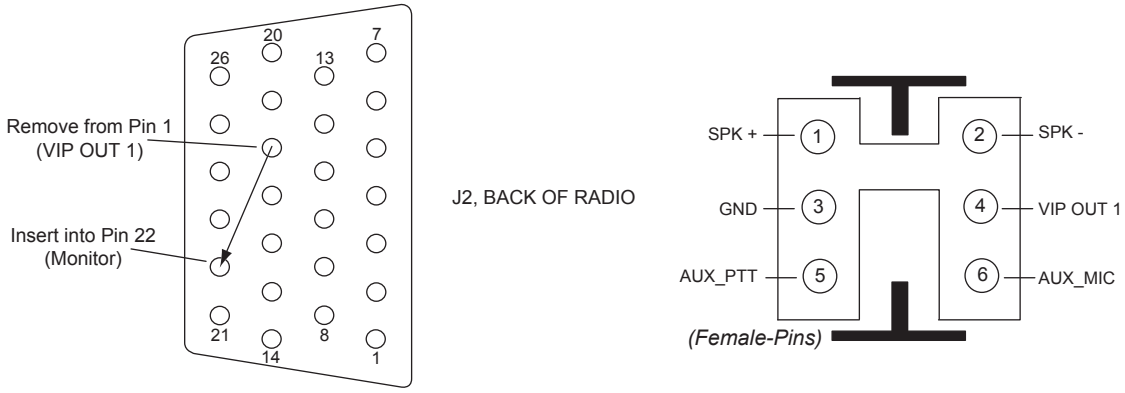
5.14 Installing the Headset Accessory

A six-position connector on the accessory cable has been made available for connecting a headset accessory.

Headset manufacturers should be consulted for compatibility with the motorcycle radio prior to purchase and installation of the headset. To install, disconnect the headset shorting plug. Remove the headset shorting wire from the headset shorting plug. Terminate the contacts provided to the applicable wires of the headset cable. Insert the terminated wires into the headset shorting plug per the contact positions illustrated in the typical headset schematic found in this manual. Reconnect the terminated headset shorting plug to the accessory cable.

When upgrading from a mobile radio, the existing headset cable HLN6890 requires these two pins to be swapped. The other motorcycle headset cable with this pin change is 3080010R07.

Figure 114: Motorcycle Wiring Harness Rework



5.15

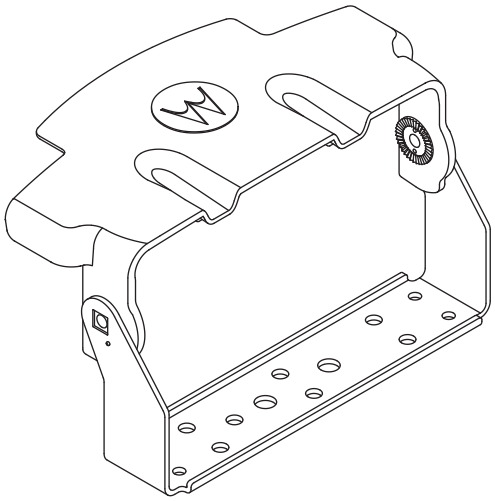
Installing the O5 and E5 Control Head Sunshield

Follow the procedure to install the sunshield (part number NNTN7279_) to the O5 and E5 control head.

Procedure:

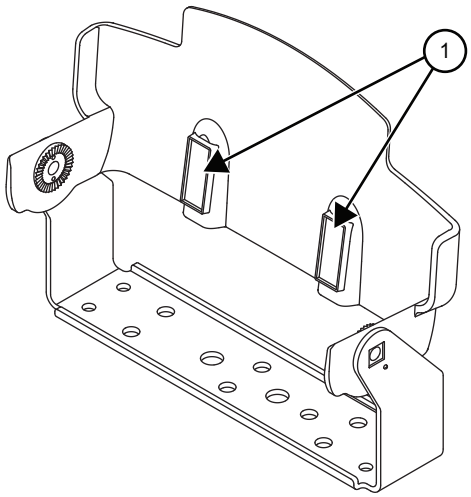
1 Assemble the sunshield to the remote mount trunnion. The same process can be used for the motorcycle trunnion.

Figure 115: Remote Mount Trunnion with Sunshield



2 Position the sunshield and remove the Velcro adhesive backing.

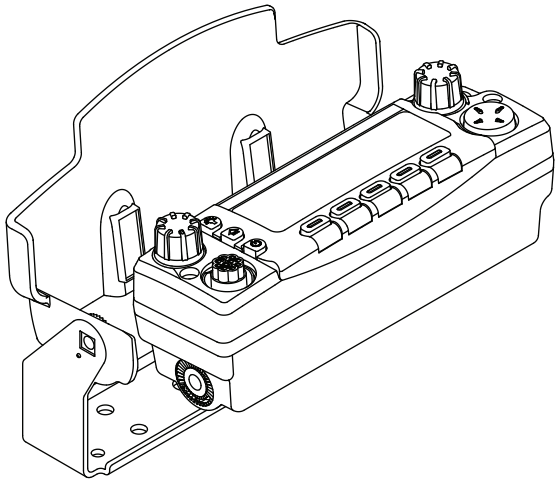
Figure 116: Position the Sunshield



No.	Description
1	Velcro Adhesive Backing

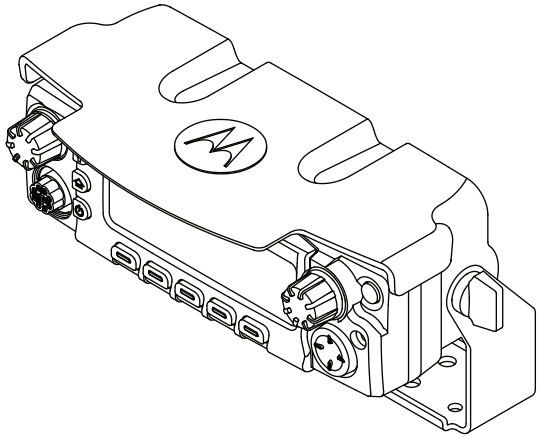
3 Slide the control head onto the trunnion while aligning the edge of the control head with the edge of the sunshield. Make sure the Velcro properly adheres to the control head.

Figure 117: Slide the Control Head onto Trunnion



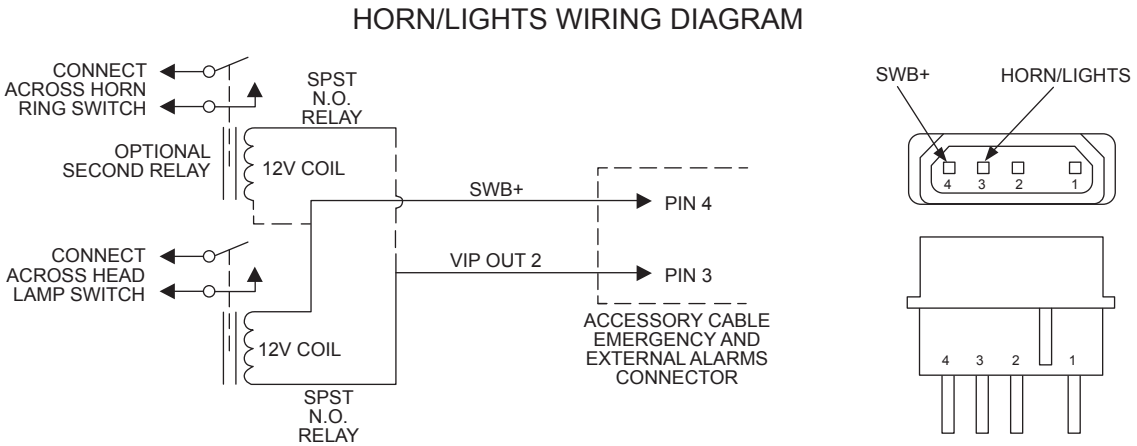
4 Position control head as desired and install screws.

Figure 118: Position Control Head as Desired



5.16 Horn/Lights Wiring

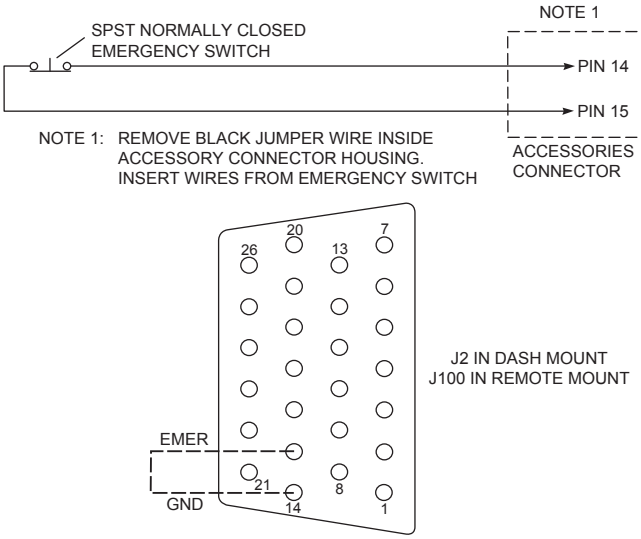
Figure 119: Horn/Lights Wiring Diagram



5.17

Emergency Switch Wiring

Figure 120: Emergency Switch Wiring Diagram



WARNING: Motorcycle products must have pins 1 and 2 connected together to allow the radio to power down. Opening this connection by removing the emergency shorting plug, or pressing the emergency switch, will turn on the radio. Failure to maintain a normally-closed path could drain the vehicle battery if left unchecked.
Emergency-equipped radios are capable of transmitting without warning.

Chapter 6

Finishing the Installation

This chapter provides the cable connection and dust cover installation procedure.

6.1 Cable Connection

The topic provides the procedure for control heads cable connection.

6.1.1 Connecting the Cables for O2 Control Head

Procedure:

1. Remove the control head from its mounting trunnion.
2. Plug the radio CAN cable into the proper location on the back of the control head (see Figure 47: O5 Control Head Installation Exploded View (Also applicable for O2, O7 and E5 Control Heads) on page 53 and Figure 49: O5 Control Head Rear View (Also applicable for O2, O7 and E5 Control Heads) on page 55).

   The connectors “click” when snapped into place. The control head model can have the microphone plugged into the lower left corner of the control head front panel.
3. Connect the plug from the speaker lead to the mating connector that comes out from the power cable.
4. Plug the VIP connector into the correct location an the back of the control head.
5. Connect the CAN cable to the proper location on the radio.

   NOTICE: Connector-protective covers are provided with the radio. They should be used for added environmental robustness.
6. Ensure that the control head and microphone PTT switches are turned off.
7. Install the 15 A fuse in the radio power cable fuseholder and the 3 A or 4 A fuse in the ignition sense cable fuseholder.
8. Turn on the radio at the control head and verify proper operation of all controls and indicators.

   Radio operation in some installations requires turning on the ignition sense.
9. Perform a complete operational check of the radio.
10. Dress the control and power cables out of the way to prevent damage (pull any excess cable into the trunk area), securing the cables with clamps and tie wraps where necessary.

6.1.2 Connecting the Cables for O3 Control Head

Procedure:

1. Unplug the CAN coiled cable connector from the Transceiver Interface.

2 Plug in the connector again.

You hear a click sound.

3 Ensure that the location of the CAN connector is correct (such as J800L or J800R) on the transceiver interface.

4 Connect the plug from the speaker lead to the mating connector of either J2 or J626 (refer to the cabling diagram for more information).

6.1.3
Connecting the Cables for O5, E5 and O7 Control Heads

Procedure:

1 Remove the control head from its mounting trunnion.

2 Plug the radio CAN cable into the proper location on the back of the control head (see Figure 47: O5 Control Head Installation Exploded View (Also applicable for O2, O7 and E5 Control Heads) on page 53 and Figure 49: O5 Control Head Rear View (Also applicable for O2, O7 and E5 Control Heads) on page 55).

The connectors “click” when snapped into place. The control head model can have the microphone plugged into the lower left corner of the control head front panel.

3 Connect the plug from the speaker lead to the mating connector that comes out from the power cable.

4 Plug the VIP connector into the correct location at the back of the control head.

5 Connect the CAN cable to the proper location on the radio.

6.1.4
Connecting the Cables for O9 Control Head

Perform the following if it has not been previously done:

Procedure:

1 Remove the control head from its mounting trunnion.

2 Plug the radio CAN cable into the proper location on the back of the control head (see Figure 48: O9 Control Head Installation Exploded View on page 54 and Figure 50: O9 Control Head Rear View on page 55).

The connectors “click” when snapped into place. The control head model can have the microphone plugged into the GCAI connection on the control head back panel.

3 Connect the plug from the speaker lead to the mating connector that comes out from the power cable.

4 Plug the VIP connector into the correct location at the back of the control head.

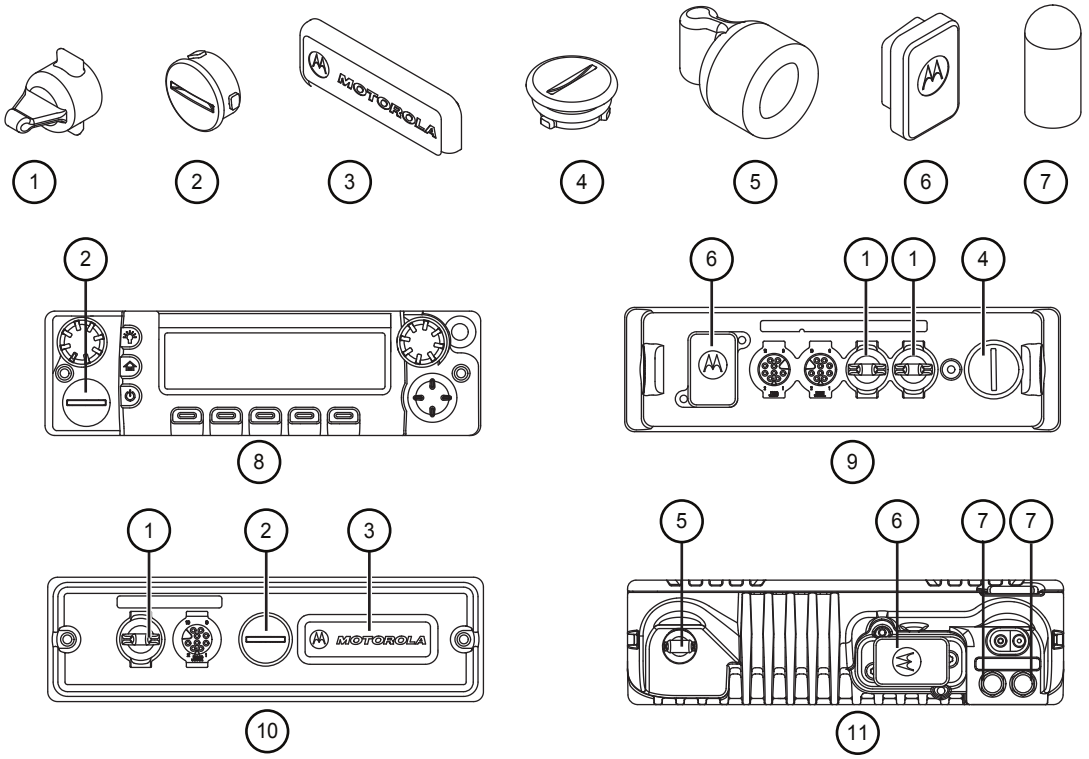
5 Connect the CAN cable to the proper location on the radio.

6.2
Dust Cover Installation

To help protect and ensure that debris does not affect or damage your unused connectors, use the provided dust covers.

Refer to the following figure to determine the correct cover for your connector.

Figure 121: Dust Cover Installation Locations



No.	Description
1	1515047C01
2	1515048C01
3	1515049C01
4	1515327H02
5	1575693A01
6	7575262A01
7	SL000319A01
8	Control Head
9	Control Head (Rear)
10	Mid Power Tanapa (Remote Front)
11	Enhanced Single Band Mobile Radio Mid Power Tanapa

NOTICE:
Using a coin as a tool, parts 2 and 4 require you to insert then turn the coin approximately 1/3 turn until snug.

Install parts 3 and/or 6 onto DB25 accessory cable assembly when the corresponding cable assembly connections are not in use.

6.3
Miscellaneous Information

On the mid power radio, there are rubber port plugs which seals an opening that is used for future antenna connection.

On the mid power radio, the port plug is at the bottom of the radio behind the control head or TIB. These plugs are critical to the sealing of the radio and should not be removed unless to replace it due to damage or to install the future antenna connector. Removal of the port plug in any other situation creates a leak path into the radio.

Chapter 7

Best Practices: Installation and Troubleshooting

This chapter covers the Motorola Solutions recommended vehicle installation practices that can address or prevent many issues.

- Radio circuit damage due to overvoltage condition.
- Radio/Accessories "lock-up".
- Radio/Accessories change state/lock-up when radio PTT is depressed.
- Radio powers up in the FL 01/90 state (general communication error code).
- Radio intermittently resets.
- Radio loses secure key.
- Transmit audio distortion on motorcycle radio when engine is running.
- Keypad buttons become inoperative for motorcycle radios when engine is running.
- Alternator whines when transmitting with engine running.
- Radio/Accessories turn themselves on/off.

7.1 Checking the Wiring of Ignition and Radio Ignition Sensing

- If it is required to turn the radio on and off using the ignition sense switch, in addition to the control head on/off switch, connect the ignition sense lead to the accessory terminal from the ignition switch (usually in the vehicle fuse panel under accessory or radio).

  NOTICE: Motorola Solutions recommends protecting or isolating the radio ignition sense input from voltage spikes more than +/- 40 VDC. Such spikes can be hundreds of volts in amplitude and are common in larger vehicles (for example utility trucks and buses), especially when the source is common to a solenoid coil. A triggerable oscilloscope is required to determine the existence of such spikes as most voltmeters cannot measure in short duration (< 1 ms). If the condition of the intended ignition sense source is unknown, Motorola Solutions recommends isolating the source from the radio with a relay or the use of a suppression diode wired between the source and ground. Any high current suppression diode (MR2535) with a breakdown voltage of between 18 V and 40 V would suffice. A suitable diode kit is available from Motorola Solutions parts, kit number HLN6325_.

- If it is required to have the radio power up only using the control head on/off switch, then connect the ignition sense lead directly to the positive terminal of the battery. The ignition sense will always be ignored and a re-wiring is necessary in the future if the operator chooses any ignition sense CPS setting.

7.2
Checking the Physical Installation of Radio Ground and Radio Accessory Wiring

Dash and Remote Mount Configurations

- Scrape away paint on the chassis at the place where you are making the ground connection, and try to keep the ground lead as short as possible.
- Verify that the red A+ lead is connected directly to the positive terminal of the battery and the black ground lead is connected to the vehicle chassis using a wire with practical length.
- Ensure that the mobile radio antenna is the minimum required distance (three feet) from the mobile radio equipment to prevent radio frequency interference (RFI).
- For vehicles that have other types of electronic equipment installed such as lights, flashers, computers, siren/PA, and others, use a separate ground for the mobile radio equipment.
- Do not coil up any excess length of the red A+ lead. Doing this may produce a large transient voltage when there is a high current drain for example, during transmit. This could cause the radio to reset when the push-to-talk (PTT) is depressed.

Motorcycle Configuration

- Ensure that the antenna ground connection is solid. An intermittent ground connection can distort the transmission when the motorcycle engine is running.
- Do not coil up any excessive length of antenna cable. It may affect the receive performance of the radio.
- If an extra length of cable is used to extend the microphone, ensure that the added capacitance does not interfere with the operation of the radio.

7.3
Improving the Electrical Quality of the Power and Ignition Lines

- Use a relay to isolate the vehicle ignition switch point (ACC) from the radio ignition sense point. Control this relay from the vehicle ignition switch point (ACC). Supply a cleaner voltage from the positive terminal of the battery into the relay, which will now be attached to the radio ignition sense point. Now the ACC line toggles the relay, instead of directly toggling the radios ignition sense line.
- Install a Power Line Filter between the A+ lead and the positive terminal of the battery. The Power Line Filter filters the battery power applied to the transmitter power amplifiers. Pay extra caution to this because the series filter introduces a negative spike when the radio transmits that may cause problems with radio operation. Lock-up issues have been seen with the dual control head MCS 2000 configuration.
- For vehicles that use electromechanical relays to control external devices (lights, motors, switch boxes, and others), isolate these relay circuits as best as possible from the mobile radio equipment. Also, use diode suppression across the relay coil to minimize the noise produced by the collapsing magnetic field.
- If the ignition sense switch is used, ensure that there is not a large voltage drop between the A+ point (usually the positive terminal of the battery) and the ignition sense point. In general, the voltage difference between these two points, should not be greater than 1.5 V when all accessories/ air-conditioner are turned on. Refer to the *Basic Service Manual* for specifications for minimum and maximum voltage levels. Typical battery voltage levels are 13.6 V +/- 20%.

7.4 Minimizing the Effect of Poorly Grounded Antennas

For vehicles with high power radios that use glass mount antennas, keep the radio and antenna cable as far as possible from the radiating element of the antenna. If a sufficient distance is not maintained, the lack of a proper ground plane from the glass mount antenna may cause the radio transmit signal to interfere with itself and cause a reset. To minimize this effect, it may be necessary to install ferrite beads on the antenna cable to protect the radio from this interference.

7.5 Jump-Starting the Vehicle

Prerequisites:

CAUTION: Do not jump-start vehicles with radio power or ignition sense cables connected. Damage to the radio and/or accessories may result.

Jump-starting a vehicle can crank 300+ volts through the vehicle charging system and these transients can damage electrical equipment.

The state of your radio before it needs a jump-start may be unknown, and the radio may attempt to return to its last state (radio ON), when doing a jump-start. Therefore, carry out the following procedure before jump-starting any vehicle containing a radio.

Procedure:

1. Locate the ignition sense line (thin yellow wire or thin red wire, depending on dash mount or remote mount installation) and the main power leads (thick red wire) near the battery positive terminal.

   NOTICE:
   These lines are fused. In the event these lines are not fused (add the appropriate fuse in line), use whatever tools necessary to physically disconnect the ignition sense and power lines from the battery terminal.

   Ensure that the disconnected lines are not in the way of moving motorcycle parts or interfering with the motorcycle operation in any way.
2. Open up the fuse holders and remove the fuses out of the kits.
3. Re-tighten the fuse holders but without the fuses to ensure that ignition sense and power lines do not interfere with moving motorcycle parts.
4. Proceed with the jump-start routine as described in the manual of your vehicle.
5. Once the jump-start process is complete, re-install the fuses into their holders.

7.6 Eliminating Noise/Howling from PA Speaker

- Refer to Installation Examples on page 32 for the recommended methods of installation available for the mobile two-way radio, with accessories placed to the vehicle as desired.
- Refer to Figure 38: Radio Installation of O9 Remote Mount with Transceiver (URC is optional) on page 39 and Figure 39: Radio Installation (O9 Remote Mount with Pinouts) on page 40 for the wiring diagrams for the recommended configurations.
- Refer to the *Siren/PA User Manual* for further details on lowering the wattage.

Appendix A

Replacement Parts Ordering

Basic Ordering Information

Some replacement parts, spare parts, and/or product information can be ordered directly from the Motorola Solutions local distribution organization or through Motorola Online. While parts may be assigned with a Motorola Solutions part number, this does not guarantee that they are available from Motorola Solutions Radio Products and Solutions Organization (RPSO). Some parts may have become obsolete and are no longer available in the market due to cancellations by the supplier. If no Motorola Solutions part number is assigned, the part is normally not available from Motorola Solutions, or is not a user-serviceable part. Part numbers appended with an asterisk are serviceable by Motorola Solutions Depot only.

Place orders for replacement parts, kits, and assemblies directly on Motorola Solutions local distribution organization or through Motorola Online. When ordering replacement parts or equipment information, include the complete identification number. This applies to all components, kits, and chassis. If the component part number is not known, the order should include the number of the chassis or kit of which it is a part of, and sufficient description of the desired component to identify it.

To identify non-referenced spare parts, request for help from the Customer Care organization of a Motorola Solutions local area representative.

Motorola Online

The product catalog is available on the Motorola Online website. To register for login access:

- For U.S. and Canada Service Centers only, call 1-800-422-4210.
- For APAC and ANZ regions, sign up at https://asiaonline.mot-solutions.com.
- For LACR region, sign up at https://businessonline.motorolasolutions.com.

Types of Orders	Contact Information
Mail Orders	Mail orders are only accepted by the U.S. Federal Government Markets Division (USFGMD). Motorola Solutions 7031 Columbia Gateway Drive 3rd Floor - Order Processing Columbia, MD 21046 U.S.A.
Telephone Orders and Parts Identification	RPSO (United States and Canada) 7:00 AM to 7:00 PM (Central Standard Time) Monday through Friday (Chicago, U.S.A.) 1-800-422-4210 1-847-538-8023 (United States and Canada) USFGMD 1-800-826-1913 Federal Government Parts - Credit Cards Only

Types of Orders	Contact Information
	8:30 AM to 5:00 PM (Eastern Standard Time)
Fax Orders	RPSO (United States and Canada) 1-800-622-6210 1-847-576-3023 (United States and Canada) USFGMD (Federal Government Orders) 1-800-526-8641 (For Parts and Equipment Purchase Orders)

Product Customer Service

RPSO (United States and Canada)

1-800-927-2744

NOTICE: The Motorola Solutions RPSO was formerly known as the Radio Products Services Division (RPSD) and/or the Accessories and Aftermarket Division (AAD).

A.1
Service Information

EMEA Technical Support Operations (TSO)

The EMEA Technical Support Operations (TSO) provides a remote Technical Support Service to help customers resolve technical issues and quickly restore networks and systems. This team of highly skilled professionals is available to customers with current service agreements in place that include the Technical Support Service. The TSO technical experts may be accessed through the Service Desk either electronically or using the listed telephone numbers. If you are unsure whether your current service agreement entitles you to benefit from this service, or if you would like more information about the Technical Support Service, contact your local customer support or account manager for further information.

Contact Details

Technical Requests: techsupport.emea@motorolasolutions.com

Repair Support: repair.emea@motorolasolutions.com

Contact Us: https://www.motorolasolutions.com/en_xu/support.html

Parts Identification and Ordering

If you need help in identifying non-referenced spare parts, direct a request to the Customer Care Organization of a local area Motorola Solutions representative. Orders for replacement parts, kits, and assemblies should be placed directly at the local distribution organization of Motorola Solutions or through the Extranet site Motorola Online at https://emeaonline.motorolasolutions.com.

However, you cannot order export-controlled products or spare parts such as TEA-related boards through Motorola Online. Send an order form with actual end-customer details by e-mail to your customer care team.

Your Input

Send questions and comments regarding user documentation to documentation@motorolasolutions.com.

A.2
Service Information – APAC

This topic contains contact details to service centers in Asia and Pacific region.

Technical Support

Technical support is available to assist the dealer/distributor in resolving any malfunction which may be encountered. Initial contact should be by telephone wherever possible. When contacting Motorola Solutions Technical Support, be prepared to provide the product model number and the serial number.

Further Assistance from Motorola Solutions

You can also contact the Customer Help Desk through the website: http://www.motorolasolutions.com/en_xp/products. If a unit requires further complete testing, knowledge and/or details of component level troubleshooting or service than is customarily performed at the basic level, send the radio to a Motorola Solutions Service Center as listed in the following table:

Table 17: Service Information – Telephone Numbers and Addresses of the Asia and Pacific Motorola Solutions Centers

Country	Telephone Number	Address
Singapore	+65-6352-6383	**Motorola Solutions Singapore Pte. Ltd,** c/o Azure Engineering, 49 Jalan Pemimpin, #03-11 APS Industrial Building, Singapore 577203 Contact: Mareen Phua E-mail: mareen@azure.com.sg Enquiry: Goe Engkiet E-mail: eng-kiet.goe@motorolasolutions.com
Malaysia	+603-7809-0000	**Motorola Solutions Sdn. Bhd.** Level 14, Persoft Tower, No. 68, Pesiaran Tropicana, 47410 Petaling Jaya, Selangor Darul Ehsan, Malaysia Contact: Koh Tiong Eng E-mail: A21001@motorolasolutions.com
Indonesia	+62-21-3043-5239	**PT. Motorola Solutions Indonesia** 30th Floor, Gedung BRI II, Suite 3001, Jl. Jend. Sudirman Kav. 44-46, Jakarta 10210, Indonesia Contact: Eko Haryanto E-mail: Eko.Haryanto@motorolasolutions.com
Thailand	Tel: +662-653-220 Fax: +668-254-5922	**Motorola Solutions (Thailand) Ltd.** 142 Two Pacific Place Suite 2201, 3220 Sukhumvit Road, Klongtoey,

Country	Telephone Number	Address
		Bangkok 10110 Contact: Nitas Vatanasupapon E-mail: Nitas@motorolasolutions.com
India	+91-9844218850	**Motorola Solutions India Pvt. Ltd.** C/o Communication Test Design India Private Limited, #4, 5 Maruthi Industrial Estate, Rajapalya, Hoodi Village, Bangalore - 560048, India Contact: K. Umamaheswari E-mail: umamaheshwari@motorolasolutions.com
China	+86-10-8473-5128	**Motorola Solutions (China) Co. Ltd.** No. 1 Wang Jing East Road, Chao Yang District, Beijing, 100102, P.R. China Contact: Sophy Wang E-mail: C18170@motorolasolutions.com
Hong Kong	852-2966-4823	**Motorola Solutions Asia Pacific Ltd.** Unit 1807-1812, 18/F, Two Harbourfront, 22 Tak Fung Street, Hunghom, Kowloon, Hong Kong Contact: Judy Leung E-mail: Judy.Leung@motorolasolutions.com
Philippines	Tel: +632 858-7500 Fax: +632 841-0681	**Motorola Communications Philippines, Inc.** Unit 2102, One Global Place Building, 5th Ave., Bonifacio Global City, Taguig, Philippines 1634. Contact: Arthur Nieves E-mail: Arthur.Nieves@motorolasolutions.com
Korea	+822-3497-3649	**Motorola Solutions Korea, Inc.** 9th Floor, Hibrand Building, 215, Yangjae-Dong, Seocho-Gu, Seoul, 137-924, Korea. Contact: KS Kwak E-mail: r45321@motorolasolutions.com
Taiwan	+886-2-8729 8000	**Motorola Solutions Taiwan, Ltd.** 8F, No. 9, Songgao Rd., Taipei 110, Taiwan (R.O.C.) Contact: Michael Chou E-mail: ftpe239@motorolasolutions.com

Country	Telephone Number	Address
Australia	+613-9847-7725	**Motorola Solutions Australia Pty. Ltd.** 10 Wesley Court, Tally Ho Business Park, East Burwood Victoria 3151, Australia. E-mail: servicecentre.au@motorolasolutions.com

Piece Parts

Some replacement parts, spare parts, and/or product information can be ordered directly. If a complete Motorola Solutions part number is assigned to the part, it is available from Motorola Solutions Service Organization. If no part number is assigned, the part is not normally available from Motorola Solutions. If a list of parts is not included, that means that no user-serviceable parts are available for that kit or assembly.

Customer Programming Software has no capability to tune the radio. Tuning the radio can only be performed at the factory or at the appropriate Motorola Solutions Repair Center. Component replacement can affect the radio tuning and must only be performed by the appropriate Motorola Solutions Repair Center.

All orders for parts/information should include the complete Motorola Solutions identification number. All part orders should be directed to your local Motorola Solutions Service Organization. See your latest price pages.

Parts Identification and Ordering

Request for help in identification of non-referenced spare parts should be directed to the Customer Care Organization of Motorola Solutions local area representation. Orders for replacement parts, kits, and assemblies should be placed directly on a Motorola Solutions local distribution organization or from the Motorola Solutions Online (Extranet).

Glossary

This glossary contains an alphabetical listing of terms and their definitions that are applicable to portable and mobile subscriber radio products.

Analog
Refers to a continuously variable signal or a circuit or device designed to handle such signals.

band
Frequencies allowed for a specific purpose.

Customer Programming Software
CPS-Software with a graphical user interface containing the feature set of an ASTRO radio.

default
A pre-defined set of parameters.

DEK
Direct Entry Keyboard

digital
Refers to data that is stored or transmitted as a sequence of discrete symbols from a finite set; most commonly this means binary data represented using electronic or electromagnetic signals.

EEPROM
Electrically Erasable Programmable Read-Only Memory

Electrically Erasable Programmable Read-Only Memory
EEPROM- A special type of PROM that can be erased by exposing it to an electrical charge. An EEPROM retains its contents even when the power is turned off.

FCC
Federal Communications Commission.

Firmware
Code executed by an embedded processor such as the Host or DSP in a subscriber radio. This type of code is typically resident in non-volatile memory and as such is more difficult to change than code executed from RAM.

frequency
Number of times a complete electromagnetic-wave cycle occurs in a fixed unit of time (usually one second).

Kilohertz (kHz)
One thousand cycles per second. Used especially as a radio-frequency unit.

Megahertz (MHz)
One million cycles per second. Used especially as a radio-frequency unit.

Megahertz
One million cycles per second. Used especially as a radio-frequency unit.

Microcontroller Unit
MCU-Also written as µC. A microprocessor that contains RAM and ROM components, as well as communications and programming components and peripherals.

PA
Power amplifier.

paging
One-way communication that alerts the receiver to retrieve a message.

Push-to-Talk
PTT-The switch or button usually located on the left side of the radio which, when pressed, causes the radio to transmit. When the PTT is released, the unit returns to receive operation.

Radio Frequency
RF-The portion of the electromagnetic spectrum between audio sound and infrared light (approximately 10 kHz to 10 GHz).

RAM
Random Access Memory

Random Access Memory
RAM-A type of computer memory that can be accessed randomly; that is, any byte of memory can be accessed without touching the preceding bytes.

receiver
Electronic device that amplifies RF signals. A receiver separates the audio signal from the RF carrier, amplifies it, and converts it back to the original sound waves.

Registers Short-term data-storage circuits within the microcontroller unit or programmable logic IC.

RESET
Reset line: an input to the microcontroller that restarts execution.

RX
Receive

signal
An electrically transmitted electromagnetic wave.

software

Computer programs, procedures, rules, documentation, and data pertaining to the operation of a system.

Time-out Timer
TOT-A timer that limits the length of a transmission.

transceiver
Transmitter-receiver. A device that both transmits and receives analog or digital signals. Also abbreviated as XCVR.

transmitter
Electronic equipment that generates and amplifies an RF carrier signal, modulates the signal, and then radiates it into space.

TX
Transmit.

UHF
Ultra-High Frequency.

Universal Serial Bus
USB-An external bus standard that supports data transfer rates of 480 Mbps.

VHF
Very-High Frequency.